Basement Impact Assessment

in connection with proposed development at

No. 11A Parkhill Road
London
NW3 2YH

for

Grant, Tani, Barash & Altman Inc.

LBH4530 Ver 1.1

November 2018

LBH WEMBLEY

ENGINEERING

Document Control			
Version	Date	Comment	Authorised
			Seamus Lefroy-Brooks BSc(hons) MSc CEng MICE CGeol FGS CEnv MIEnvSc FRGS SiLC RoGEP UK Registered Ground Engineering Adviser NQMS SQP DoWCoP QP DEFRA National Expert Panel Member
0.1	22nd May 2018	Draft Issued for internal review	
0.2	23rd May 2018	Draft Issued to Structural Engineer & Architect	
1.0	11th July 2018	Issue for submission to Camden	
1.1	5th Nov 2018	Revisions following receipt of BIA Audit by Campbell Reith	Seamus Lefroy-Brooks Digitally signed by Seamus Lefroy-Brooks Date: 2018.11.28 11:18:44 Z

LBH WEMBLEY ENGINEERING

12 Little Balmer

Buckingham Industrial Park

Buckingham

MK18 1TF

Tel: 01280 812310

email: enquiry@lbhgeo.co.uk

website: www.lbhgeo.co.uk

LBH WEMBLEY ENGINEERING

Contents

Foreword-Guidance Notes

GENERAL

This report has been prepared for a specific client and to meet a specific brief. The preparation of this report may have been affected by limitations of scope, resources or time scale required by the client. Should any part of this report be relied on by a third party, that party does so wholly at its own risk and LBH Wembley Engineering disclaims any liability to such parties.

The observations and conclusions described in this report are based solely upon the agreed scope of work. LBH Wembley Engineering has not performed any observations, investigations, studies or testing not specifically set out in the agreed scope of work and cannot accept any liability for the existence of any condition, the discovery of which would require performance of services beyond the agreed scope of work.

VALIDITY

Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances shall be at the client's sole and own risk. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should therefore not be relied upon in the future and any such reliance on the report in the future shall again be at the client's own and sole risk.

THIRD PARTY INFORMATION

The report may present an opinion based upon information received from third parties. However, no liability can be accepted for any inaccuracies or omissions in that information.

Non-Technical Summary

It is proposed to lower the existing basement to an infill studio extension at No. 11A Parkhill Road by around 0.5m depth. The new basement will also laterally extend to the front and rear of the building.

Although some minor underpinning may be required to accommodate this lowering, the existing party wall foundations appear to extend to at least the depth of the proposed basement; hence the proposed basement is to be constructed with minimal possible impact upon the neighbouring environment.

STAGE 1:

The Screening Assessment has identified potential issues relating to surface water flow & flooding and slope stability, but no matters of concern relating to groundwater.

The site is indicated to lie in an area that has previously experienced surface water flooding in 1975 and 2002.

STAGE 2:

The Scoping Assessment requires the investigation of potential seasonal shrink-swell movements in the clay and the potential effect of the removal of a small magnolia tree in the front garden.

STAGE 3:

The ground investigation confirms the soils beneath the site to comprise made ground overlying downwash deposits and London Clay Formation. The basement excavation will extend down into the London Clay Formation.

A shallow groundwater table is not present beneath the site, although there appears to be some surface water flow within the more permeable zones of the made ground.

STAGE 4:

There will be a need to maintain the present water discharge regime and provide Sustainable Urban Drainage Features (SUDS) to meet the planning policy requirements.

The depth of the new basement will obviate concerns regarding both potential seasonal shrink/swell movements, and potential effects associated with the removal of the small magnolia tree.

The proposed basement is concluded to have no residual unacceptable impacts upon the surrounding structures, infrastructure and environment. No cumulative impacts are envisaged.

1. Introduction

1.1 Background

It is proposed to lower the existing basement to No. 11A Parkhill Road by approximately 0.5m depth. It is also planned to laterally extend the basement to the front and rear of the building.

A planning application (ref: 2018/3365/P) has been submitted to the London Borough of Camden (LBC) in July 2018. A Basement Impact Assessment (BIA) was prepared as an earlier version of this document in support of this planning application.

This document has since been prepared as a revision of the original, in order to address the following queries that were raised the BIA Audit report by Campbell Reith (October 2018).

Audit Query No.	Audit Query	Response
1	Indicative construction programme should be provided	Addressed in Appendix
2	Map extract should be provided to justify conclusions on flood risk	Addressed in Section 3.4
3	More details on the effect of tree removal on the basement	Addressed in Sections 6.3 & 8.3.2
4	Depth of the party wall foundations assumed from drawings	N/A (to be confirmed prior to construction)
5	Input and output data sheets from ground movement assessment should be provided	The approach to ground movement assessment has been described in Sections 7.1 – 7.3.
6	Outline structural calculations and waterproofing details should be provided	To be confirmed in the detailed structural design.
7	Outline monitoring strategy should be provided	Addressed in Section 8

1.2 Brief

LBH WEMBLEY have been appointed by Grant, Tani, Barash & Altman Inc. to complete a Basement Impact Assessment (BIA) for submission to LBC in order to satisfy the specific requirements of the 2017 Camden Planning Policy and Supplementary Camden Planning Guidance (CPG) on Basements and Lightwells, and associated 2010 Camden Geological, Hydrogeological and Hydrological Study 2010.

1.3 Planning Policy

The 2017 Camden Local Plan Policy A5 Basements reads as follows:

"The Council will only permit basement development where it is demonstrated to its satisfaction that the proposal would not cause harm to:

a) neighbouring properties;
b) the structural, ground, or water conditions of the area;
c) the character and amenity of the area;
d) the architectural character of the building; and
e) the significance of heritage assets.
In determining proposals for basements and other underground development, the Council will require an assessment of the scheme's impact on drainage, flooding, groundwater conditions and structural stability in the form of a Basement Impact Assessment and where appropriate, a Basement Construction Plan.

The siting, location, scale and design of basements must have minimal impact on, and be subordinate to, the host building and property. Basement development should:

f) not comprise of more than one storey;
g) not be built under an existing basement;
h) not exceed 50% of each garden within the property;
i) be less than 1.5 times the footprint of the host building in area;
j) extend into the garden no further than 50% of the depth of the host building measured from the principal rear elevation;
k) not extend into or underneath the garden further than 50% of the depth of the garden;
l) be set back from neighbouring property boundaries where it extends beyond the footprint of the host building; and
m) avoid the loss of garden space or trees of townscape or amenity value.

Exceptions to f. to k. above may be made on large comprehensively planned sites.

The Council will require applicants to demonstrate that proposals for basements:

n. do not harm neighbouring properties, including requiring the provision of a Basement Impact Assessment which shows that the scheme poses a risk of damage to neighbouring properties no higher than Burland Scale 1 'very slight';
o. avoid adversely affecting drainage and run-off or causing other damage to the water environment;
p. avoid cumulative impacts;
q. do not harm the amenity of neighbours;
r. provide satisfactory landscaping, including adequate soil depth;
s. do not harm the appearance or setting of the property or the established character of the surrounding area;
t. protect important archaeological remains; and
u. do not prejudice the ability of the garden to support trees where they are part of the character of the area.

The Council will not permit basement schemes which include habitable rooms and other sensitive uses in areas prone to flooding.

We will generally require a Construction Management Plan for basement developments.

Given the complex nature of basement development, the Council encourages developers to offer security for expenses for basement development to adjoining neighbours."

The following policies in the Local Plan are also relevant to basement development and will be taken into account when assessing basement schemes:

- "Policy A2 Open space";
- "Policy A3 Biodiversity";
- "Policy D1 Design";
- "Policy D2 Heritage"; and
- "Policy CC3 Water and flooding".

In addition to the Local Plan Policy Camden publishes Camden Planning Guidance on Basements and Lightwells. These CPG documents do not carry the same weight as the main Camden Development Plan documents (including the above Policy A5) but they are important supporting documents.

It is noted that the CPG4 Planning Guidance on Basements and Lightwells (formerly CPG4 2015) has been updated (March 2018) to reflect the Local Plan.

1.4 Report Structure

The report commences with a desk study and characterisation of the site, before progressing to BIA screening and scoping assessments, whereby consideration is given to identifying the potential hydrogeological, hydrological and stability impacts to be associated with the proposed development. Following this the findings of an intrusive ground investigation are reported and a ground model is developed, followed by a discussion of the geotechnical issues.

Finally, an assessment of the potential impacts of the proposed scheme is presented.

1.5 Additional Supporting Documents

The following documents have been consulted during the preparation of this document:

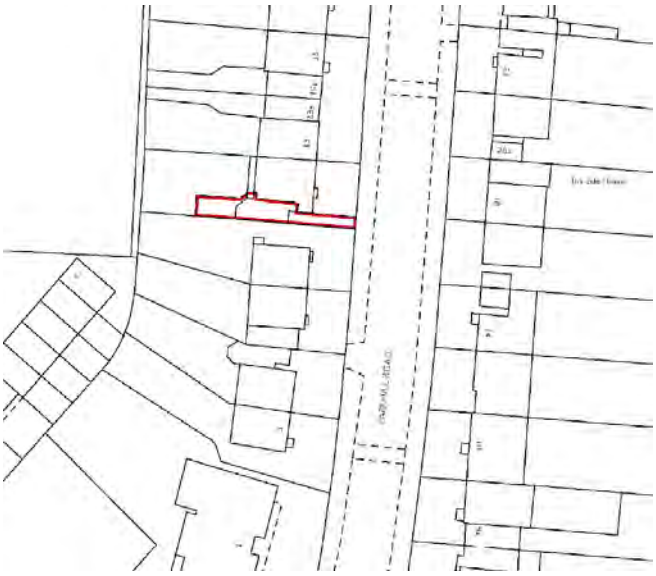
1. Design and Access Statement by Novel, dated 5th July 2018
2. Existing Plans by Novel Architects, dated 20th June 2018, Drawing Nos. PL_001, PL_002, PL_003
3. Proposed Plans by Novel Architects, dated 20th June 2018, Drawing Nos. PL_004, PL_005, PL_006, PL_007
4. Construction Method Statement by Howard Cavanna Structural Engineers, dated 9th July 2018, Ref: 2018 019 and accompanying Drawing Nos. TW01 to TW06

2. The Site

2.1 Site Location

The site is situated on the western side of Parkhill Road, roughly 400m to the southeast of Belsize Park Underground Station.

The site may be located approximately by postcode NW3 2YH or by National Grid Reference 527740, 184915.



Location Plan

(note the recently constructed adjacent building at 9c Parkhill Rd is not shown)

2.2 Topographical Setting

The site lies on the lower slopes of Hampstead Hill that is gently falling to the southeast towards a culverted tributary of the River Fleet.

Street level to the east of the site is situated at approximately +56m OD.

2.3 Site Description

The site is currently occupied by a two storey Victorian studio extension to the lager semi-detached villa at No.11, which comprises three storeys including a basement.

The ground floor of the studio situated more than 1m above street level; hence the basement only extends to around 1.2m depth below street level.

A driveway is located to the front of the building, bordered by a small strip of soft landscaping containing shrubs and a small magnolia tree.

The basement laterally extends around 2.5m to the rear of the building and opens out into the rear garden, which is situated at around the same elevation.

An external terrace is situated above this part of the basement.

11A Parkhill Road (centre) bordered by 9C Parkhill Road (left) and 11 Parkhill Road (right)

The small rear garden to the studio consists of a timber decked area bordered by shrubs. A bay tree that is approximately 6m in height is also situated along the southern boundary of the patio garden.

A retaining wall is present on the western and northern borders of the patio garden, beyond which lies the rear garden to No. 11 Parkhill Road that is situated at street level.

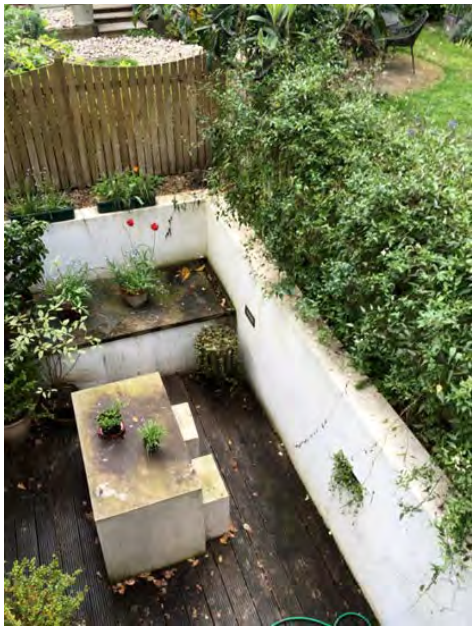
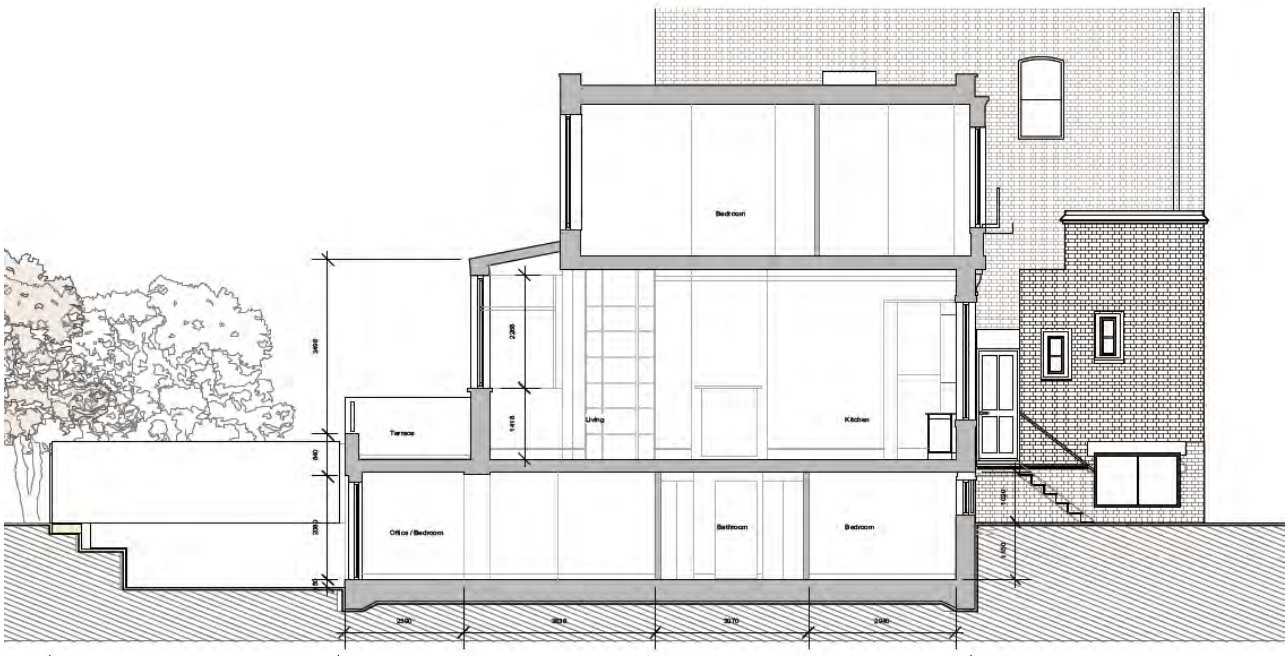


Photo showing rear garden to No. 11A Parkhill Road and rear garden to No. 11 Parkhill Road situated at a higher elevation behind the retaining walls.



Existing section

The adjoining four storey semi-detached villa at No. 11 Parkhill Road has a basement level that is situated at around the same elevation as the existing basement to No. 11A Parkhill Road.

To the south the building adjoins a more recently constructed three storey infill house at No. 9C Parkhill Road. Planning permission was granted (2015/1429/P) in November 2015 to lower the existing basement to No. 9C Parkhill Road by approximately 0.5m, which is similar to proposed development for No. 11A Parkhill Road.

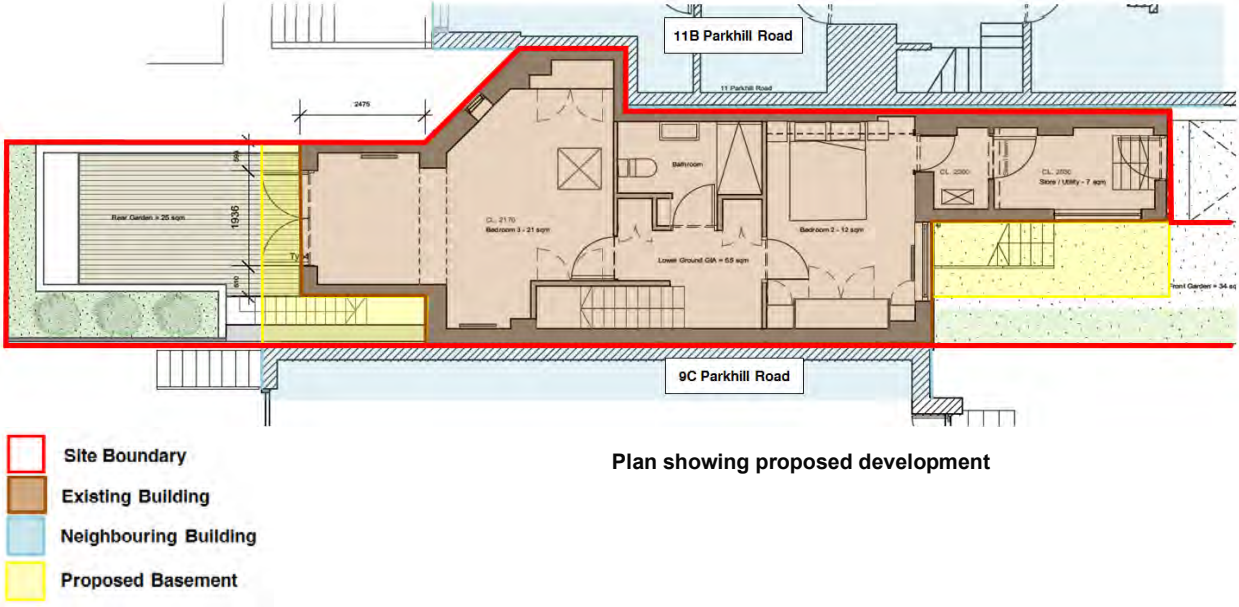
This development at 9C is understood to have been completed.

It is understood that the party wall foundations between 11A and 9C are placed below the depth that was required for lowering of the basement at 9C. Thus it appears that the basement construction was achieved without the requirement for underpinning.

2.4 Proposed Development

It is proposed to lower the existing basement to the building by approximately 0.5m depth, which corresponds to around 1.7m depth below street level. The new extension will also laterally extend to the front and rear of the existing house.

Although some minor underpinning may be required to accommodate this lowering, it appears that the existing party wall foundations extend to at least the depth of the proposed basement level; hence the proposed development is to be constructed with minimal possible impact upon the neighbouring environment.



Plan showing proposed development

3. Desk Study

3.1 Site History

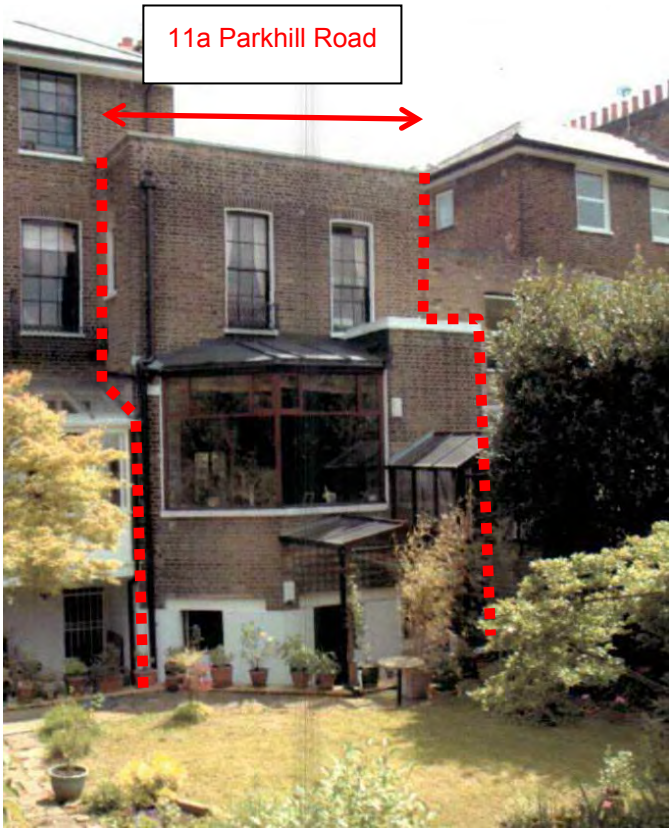
Parkhill Road comprised semi-detached villas with lower ground floors in the 19th Century and the site was occupied by land adjacent to a four-storey villa at No. 11 Parkhill Road that provided access to the rear garden that was situated approximately 1m above lower ground floor level.

At the end of the 19th Century, infill developments were occurring to the side of many villas and during this time the existing studio was built at No. 11A Parkhill Road, which adjoined to No. 11 Parkhill Road. The studio comprised a basement that was set at a similar depth to the basement at No. 11 Parkhill Road.

The area suffered bombing in the Second World War and the studio on site is recorded to have experienced blast damage.

By the 1990s, a conservatory was built to the rear of studio at basement level.

Following this, it is understood that two low water demand trees (birch and laburnum) were removed, which were presumably located near the entrance to the conservatory.



2004 photo of rear face of studio

(rear garden to No. 11 Parkhill Road is present to rear of conservatory and is situated approximately 1m above lower ground floor level)

2004 photo showing studio and conservatory at lower ground floor level

(laburnum tree located to rear of conservatory is now removed)

In 2006, the conservatory was removed and replaced by a single storey extension that adjoined to the rear of the studio. An external terrace was built on top of this extension as ground floor level.

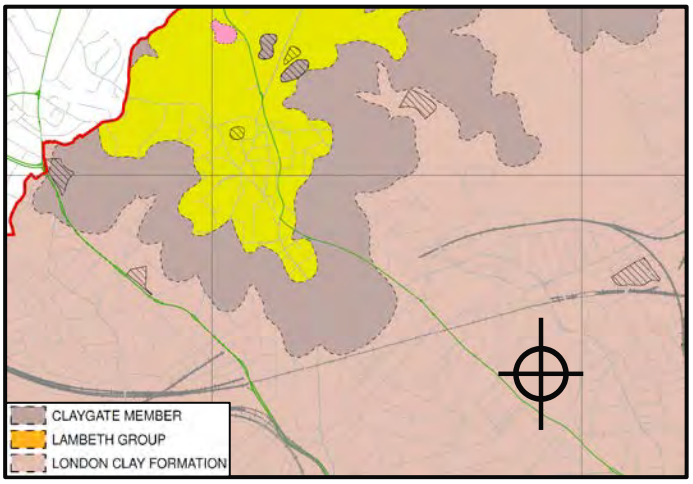
In addition, a rear garden to the studio was built at basement level, which laterally extended from the studio by approximately 5m.

In 2015, planning permission was granted to extend the lower ground floor to 9C Parkhill Road by approximately 0.5m.

3.2 Geological Information

The British Geological Survey (BGS) records indicate that the site is underlain by the London Clay Formation.

However, given that the site is located on the lower slopes of Hampstead Hill, the upper few metres of the ground are likely to comprise downwash deposits.



Extract of Figure 4: North Camden Geological Map - red cross denotes approximate location of site (CGHHS, 2010)

3.3 Hydrogeological Information

The permeability of the downwash deposits is likely to be inherently variable but limited because of the likely absence of any significant continuity of the fabric or bedding.

The underlying London Clay Formation may be considered virtually impermeable.

The BGS Bedrock Aquifer Designation map indicates that the London Clay Formation is classified as Unproductive Strata.

Figure 8 of the CGHHS indicates that the site is not located within a Groundwater Source Protection Zone.

3.4 Hydrological, Drainage & Flood Risk Information

Figure 2 of the CGHHS indicates that source of the River Tyburn lies approximately 400m to the west of the site. There are no surface water features in the vicinity of the site.

The site is largely hard-surfaced, although there are small areas of soft landscaping to the front and rear of the house. The new basement will be constructed within the footprint of the existing building and will also extend outside of the building beneath existing areas of hard surfacing. Therefore, there will be no change in amount of hard surfacing.

The existing house has shared rainwater down pipes with the adjoining villa at No. 11 Parkhill Road, which run along the front and rear faces of the existing house.

In addition, it is understood that there is possibly a gully that collects surface water beneath the timber decking in the rear garden, which passes into a drain beneath the existing house and is then directed to a Thames Water combined sewer beneath Parkhill Road.

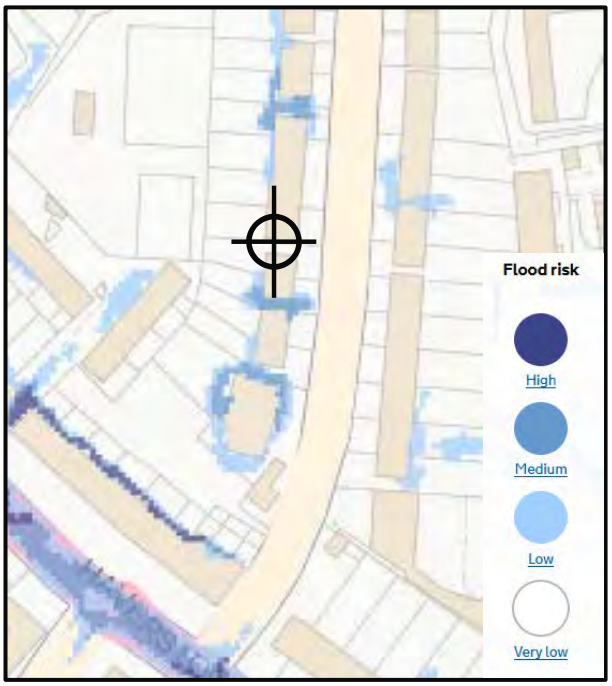
An inspection of a manhole beneath the house indicates a drain that lies at a level just below the existing basement.

Historic flood records indicate that Parkhill Road has been affected by surface water flood events in 1975 and 2002.

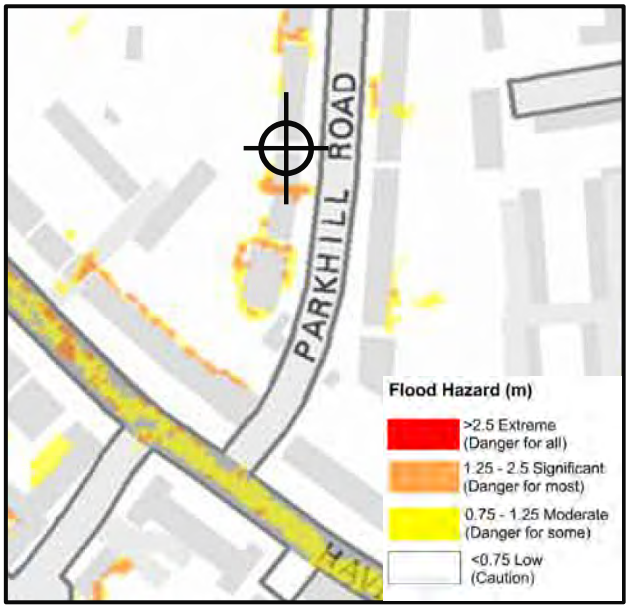
However, the Environment Agency (EA) indicates that the site is at a very low risk of surface water flooding. In addition, hazard mapping created by the EA indicates that even in the event of a 1 in 1000 rainfall event (<0.1%), the surface water flood hazard affecting the site is classed as Low.

It is concluded that the risk of surface water flooding at this site is low.

Figure 6 of the Camden SFRA indicates that the site is not located within a Critical Drainage Area or Local Flood Risk Zone.



Extract of EA Surface Water Flooding map showing the flood risk from surface water



Extract of Figure 3 viii: Hazard: 1 in 1000 Year Flood Event Map created by the EA (2014 Camden SFRA)

4. Screening & Scoping Assessments

The Screening & Scoping Assessments have been undertaken with reference to Appendices E and F of the CGHSS, which is a process for determining whether or not a BIA is usually required.

4.1 Screening Assessment

The Screening Assessment consists of a series of checklists that identifies any matters of concern relating to the following:

- Subterranean (groundwater) flow
- Surface flow and flooding
- Slope stability

4.1.1 Screening Checklist for Subterranean (Groundwater) Flow

Question	Response	Justification
Is the site is located directly above an aquifer?	**No**	The Environment Agency (EA) maps indicate that the site is not underlain by an aquifer.
Will the proposed basement extend beneath the water table surface?	**No**	
Is the site within 100m of a watercourse, well (used/disused) or potential spring line?	**No**	The nearest watercourse is the source of a tributary of the River Tyburn, roughly 400m to the west of the site.
Is the site within the catchment of the pond chains on Hampstead Heath?	**No**	Figure 14 of the CGHHS indicates that the site lies outside the catchment of the pond chains on Hampstead Heath.
Will the proposed development result in a change in the area of hard-surfaced/paved areas?	**No**	The proposed basement is within existing hard-standing areas.
Will more surface water (e.g. rainfall and run-off) than at present will be discharged to the ground (e.g. via soakaways and/or SUDS)?	**No**	There is no drainage to the ground.
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?	**No**	There are no nearby surface water features.

4.1.2 Screening Checklist for Surface Flow and Flooding

Question	Response	Justification
Is the site within the catchment area of the pond chains on Hampstead Heath?	**No**	Figure 14 of the CGHHS indicates that the site lies outside the catchment of the pond chains on Hampstead Heath.
As part of the site drainage, will surface water flows (e.g. rainfall and run-off) be materially changed from the existing route?	**No**	The existing drainage arrangement will be maintained.
Will the proposed basement development result in a change in the proportion of hard-surfaced/paved areas?	**No**	The proposed basement is within existing hard-standing areas.
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**	The existing drainage arrangement will be maintained.
Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	**No**	Surface water drainage will be to the sewer.
Is the site in an area known to be at risk from surface water flooding, or is it at risk from flooding for example because the proposed basement is below the static water level of a nearby surface water feature?	**No**	Although Parkhill Road is reported to have flooded in both 1975 and 2002, Environment Agency (EA) maps indicate that the site is at a very low risk of surface water flooding.

4.1.3 Screening Checklist for Stability

Question	Response	Justification
Does the existing site include slopes, natural or manmade, greater than 7 degrees?	**No**	There are no slopes greater than 7 degrees within the site.
Does the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7 degrees?	**No**	No re-profiling is planned at the site.
Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7 degrees?	**No**	There are no slopes greater than 7 degrees within the development land.
Is the site within a wider hillside setting in which the general slope is greater than 7 degrees?	**No**	Figure 16 of the CGHHS indicates that the general slope of the wider hillside is less than 7 degrees.

Is London Clay the shallowest strata at the site?	**Yes**	The British Geological Survey (BGS) records indicate that shallow stratum to be London Clay Formation
Will trees be felled as part of the proposed development and/or are works proposed within tree protection zones where trees are to be retained?	**Yes**	A small magnolia tree will be removed as part of the proposed development.
Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	**No**	No evidence of cracks or building movements was evident upon visiting the site. Similarly, nearby BIAs (including the adjacent No. 9 Parkhill Road) do not indicate any evidence of shrink-swell subsidence in the local area.
Is the site within 100m of a watercourse of a potential spring line?	**No**	The nearest watercourse is the source of a tributary of the River Tyburn, roughly 400m to the west of the site.
Is the site within an area of previously worked ground?	**No**	The British Geological Survey (BGS) records indicate that the site is not underlain by worked ground.
Is the site within an aquifer?	**No**	The Environment Agency (EA) maps indicate that the site is not underlain an aquifer.
Will the proposed basement extend beneath the water table such that dewatering may be required during construction?	**No**	
Is the site within 50m of the Hampstead Heath ponds?	**No**	Figure 12 of the CGHHS indicates that the site lies over 50m from the Hampstead Heath ponds.
Is the site within 5m of a highway or pedestrian right of way?	**No**	Although the site lies adjacent to the pedestrian right of way, the proposed lower ground floor extension is situated over 5m away.
Will the proposed basement significantly increase the differential depth of foundations relative to the neighbouring properties?	**No**	The proposed basement will be situated at approximately the same elevation as the basement to No. 9C Parkhill Road and approximately 0.5m below the basement to No. 11 Parkhill Road. Engineering drawings of No. 9C Parkhill Road indicates that the party wall foundations extend to a depth below the proposed basement (these drawings can be located within planning application (2015/1429/P))
Is the site over (or within the exclusion zone of) tunnels, e.g. railway lines?	**No**	The site is not within any exclusion zones or over tunnels.

4.2 Scoping Assessment

Where the checklist is answered with a “yes” or “unknown” to any of the questions posed in the flowcharts, these matters are carried forward to the scoping stage of the BIA process. The other potential concerns considered within the screening process have been demonstrated to be not applicable or not significant when applied to the proposed development.

The scoping produces a statement which defines further the matters of concern identified in the screening stage. This defining should be in terms of ground processes, in order that a site specific BIA can be designed and executed (Section 6.3 of the CGHHS).

4.2.1 Scoping for Stability

- **Is the London Clay the shallowest strata at the site?**

The guidance advises that of the at-surface soil strata present in LB Camden, the London Clay is the most prone to seasonal shrink-swell (subsidence and heave).

- **Will any tree/s 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?**

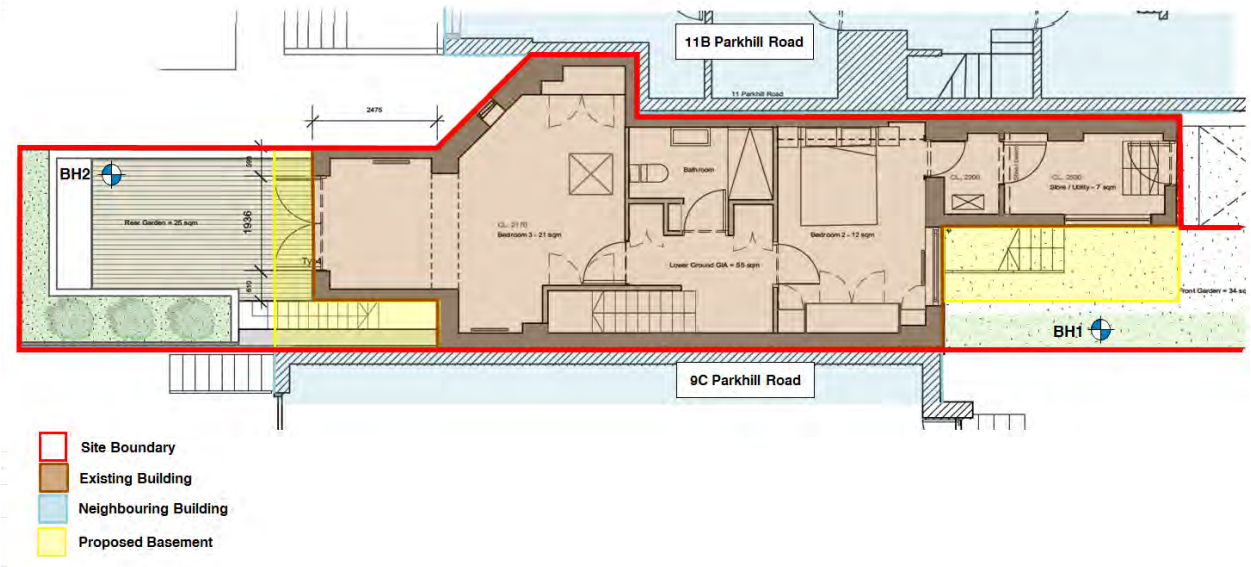
The soil moisture deficit associated with felled trees will gradually recover. In high plasticity clay soils (such as London Clay) this will lead to gradual swelling of the ground until it reaches a new value.

A site-specific ground investigation will need to be undertaken to confirm the ground conditions; however, it is considered that the depth of the proposed basement will extend below the zone of soil that exhibits shrink-swell behaviour.

5. Stage 3 – Site Investigation

An investigation comprising small diameter percussive boreholes was carried out in May 2018, in order to assess the ground conditions and recover samples for geotechnical and chemical laboratory testing.

The site plan below indicates the approximate position of the exploratory boreholes, while the associated records and laboratory test results are appended.



5.1 Ground Conditions

The ground investigation indicates the strata to comprise made ground overlying downwash deposits and subsequently the London Clay Formation.

5.2 Made Ground

There appears to be around 0.5m of made ground beneath the front and rear gardens.

The made ground beneath the front garden generally consists of dirty brown clayey sand containing rootlets, stones and various amounts of extraneous material including brick and concrete.

Beneath the timber decking in the rear garden, there is a 0.25m thick concrete slab with rebar, which is overlying dirty brownish-black clay with stones, brick and concrete that has an organic odour.

Dirty brownish-black clay

5.3 Downwash Deposits

Downwash deposits underlie the made ground the front garden and comprises soft becoming firm, pale grey mottled orange-brown, very gravelly silty clay, which transitioned to silty clay with flint gravel and minor pockets of sand at approximately 0.8m depth.

The presence of gravel throughout these soils is indicative of material that has experienced downhill creep or downwash.

These soils extend to approximately 1m depth (+55m OD) below street level. It appears that the downwash deposits are only present to the front of the house. The house and rear garden is situated at basement level, hence were likely excavated during its construction.

Downwash Deposits

5.4 London Clay Formation

The London Clay Formation underlies the made ground and downwash deposits (where present) and consists of typical firm, becoming stiff, pale brown fissured silty clay with occasional claystones, selenite crystals and pockets of sand.

The results of the plasticity index testing indicate that these soils are of high plasticity.

London Clay Formation

5.5 Groundwater

A shallow groundwater table is not present beneath the site.

However, some surface water seepage was encountered running through the more permeable zones of the made ground over the top surface of the natural clay soils.

6. Discussion of Geotechnical Issues

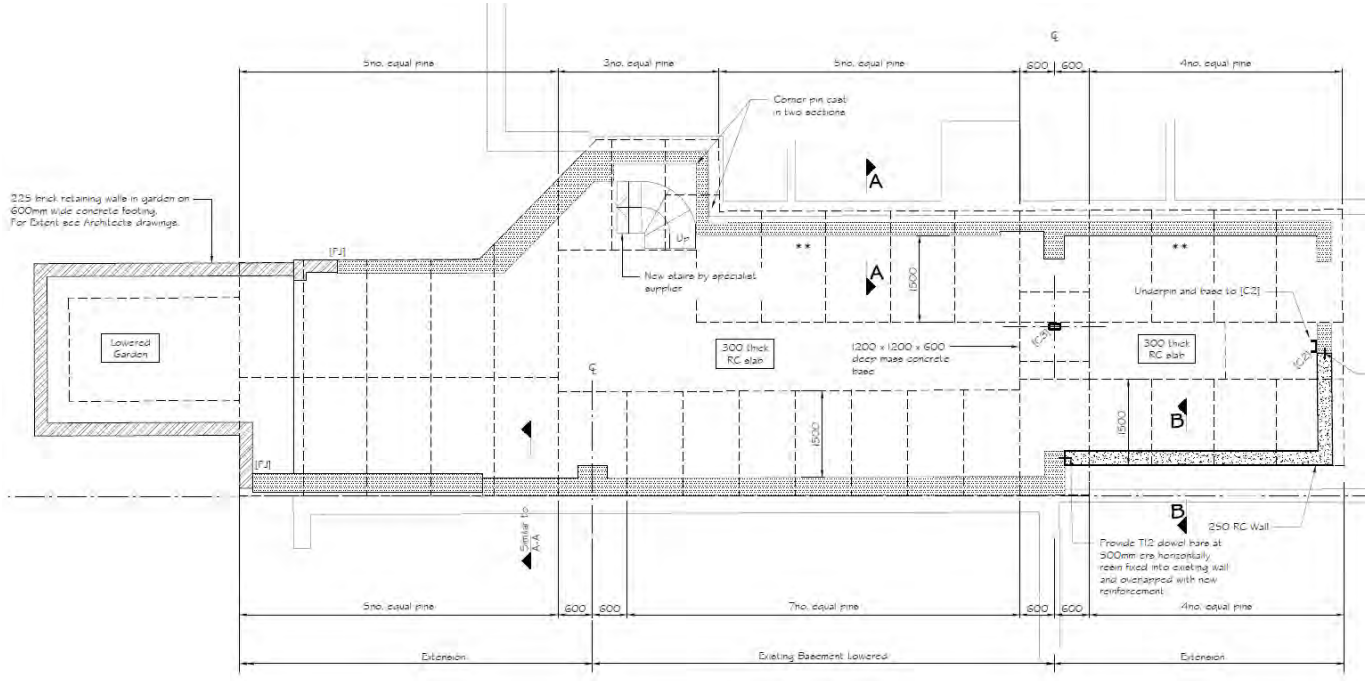
6.1 Basement Construction

It is proposed to lower the existing basement by approximately 0.5m, but to also laterally extend the basement to the front and rear of the building.

The basement excavation will bypass the made ground, downwash deposits and extend down into the London Clay Formation.

The existing foundations are expected to extend to at least the depth of the proposed basement. Although it is possible that no underpinning will be required, for the purposes of this assessment and to gauge a "worst case scenario", underpinning has been presumed necessary beneath the full extent of the existing foundations.

Where the basement extends outside the footprint of the existing house, "hit & miss" technique will be employed to construct the new basement walls. In this case, the depth of basement excavation will generally be 0.5m to the rear of the house, increasing to approximately 1.7m to the front of the house, where it is situated at a higher level.



Basement plan showing the proposed underpinning (Howard Cavanna, Dwg. No. 2018 019/01)

6.2 New Foundations

The light structural loads applied by the lightwell will be accommodated by the perimeter walls.

The perimeter walls will be placed in suitably firm clay, expected at approximately the depth of the proposed basement (0.5m below existing basement level), and may be designed to apply a net allowable bearing pressure of 120kN/m^2.

6.3 Effect of trees

It appears that the basement excavation will necessitate the removal of a small magnolia tree in the front garden.

However, given the size and low water demand of the tree, in combination with the depth of the proposed basement, the excavation is expected to remove any affected clay that may potentially result in additional forces being exerted on the structure due to possible swelling of the clay.

There is a bay tree located within the rear garden, approximately 1.5m distant from the proposed basement, which is indicated to be of moderate water demand. The tree is placed behind a garden retaining wall, hence is situated at a higher elevation, at around 1.2m above existing basement level.

NHBC guidance for soils of high shrinkability indicates that the foundations in the area near this tree will need to be increased to 1m depth below existing basement level.

Small (low water demand) magnolia tree to be removed

6.4 Retaining Walls

The following parameters may be considered in the design of the retaining walls:-

Stratum	Bulk Density	Effective Cohesion	Effective Friction Angle
	(kg/m^3)	(c' - kN/m^2)	(ϕ'- degrees)
Made Ground	1800	Zero	15
Downwash Deposits	2000	Zero	15
London Clay Formation	2000	Zero	20

6.5 Flooring

Post-construction soil heave movements of up to approximately 5mm are predicted to occur beneath new basement areas.

6.6 Waterproofing

There is potential for water to collect around the basement in the long term. Hence, it is recommended that the basement should be fully waterproofed and designed to withstand hydrostatic pressures in accordance with Guidance provided in BS8102:2009, Code of Practice for the Protection of Below-Ground Structures against Water from the Ground. An assumed groundwater level at 1m depth below existing street level would be prudent for the purposes of assessing hydrostatic pressures.

6.7 Foundation Concrete

The results of chemical analyses carried out on selected samples of the soils encountered indicate soluble sulphate concentrations falling within Class DS-3 as defined by BRE Special Digest 1 (2005). The recommendations of that guidance for Class DS-3 sulphate conditions should therefore be followed, assuming an Aggressive Chemical Environment for Concrete (ACEC) site classification of AC-3 for mobile groundwater.

6.8 Waste Disposal

All material to be disposed of off-site should be properly recorded, including the retention of any waste tickets, details of excavated soil export destinations and the waste classification.

The results have suggested that both the made ground and underlying natural soils may be classed as Non-Hazardous for waste disposal purposes.

The presence of slightly elevated concentration of Fluoride may preclude the natural soils from being accepted as Inert material.

7. Ground Movements to Neighbouring Properties

Camden Council seeks to ensure that harm will not be caused to neighbouring properties by basement development.

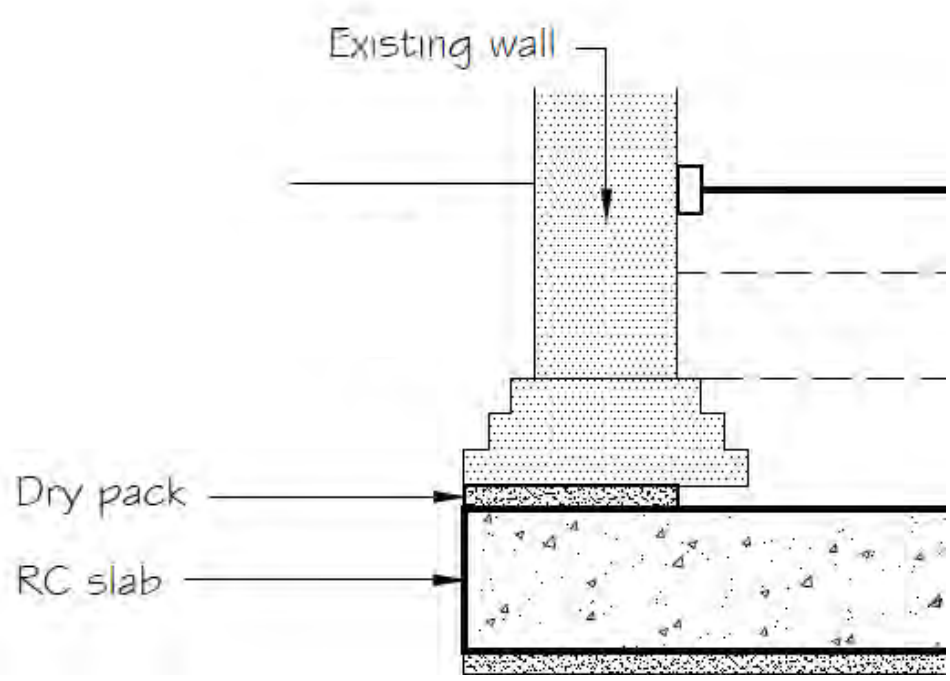
Camden Local Plan (June 2017) states that the BIA must demonstrate that the proposed basement scheme has a risk of damage to the neighbouring properties no higher than Burland Scale 1 'Very Slight'.

7.1 Structures Assessed for Ground Movement

7.1.1 Nos. 9C & 11 Parkhill Road

The party wall foundations to Nos. 9C & 11 Parkhill Road are expected to extend to at least the depth of the proposed basement.

However, for the purposes of this assessment, an analysis of ground movements has been made on the basis of 0.5m of underpinning excavation, as described in the Engineering Design and Construction Statement by Howard Cavanna, in order to gauge a "worst case scenario".



Extract of Temporary Works Sheet 1 (Howard Cavanna, Dwg. No. 2018 019/TW01 A)

7.2 Modelled Ground Conditions

Excavation of the basement will result in unloading of the clay leading to theoretical heave movement of the underlying soil in both the short and long term, depending upon the reapplication of loading.

Therefore, an analysis of the vertical movements has been carried out for a modelled situation, based on a soil model devised from the results of the ground investigation, together with published information on the London Clay Formation.

The soil model used for the analysis is detailed in the table below:

Stratum:	**Upper Boundary Level**	**Undrained Shear Strength C_u (kN/m^2)**	**Undrained Elastic Modulus Eu (kN/m^2)**	**Drained Elastic Modulus E' (kN/m^2)**
London Clay Formation	Proposed new excavation level	$50kN/m^2$ increasing linearly to $290kN/m^2$ at 30m depth	$37,500kN/m^2$ increasing linearly to $217,500kN/m^2$ at 30m depth	$25,000kN/m^2$ increasing linearly to $145,000kN/m^2$ at 30m depth

Poisson's Ratios of 0.5 and 0.1 have been used for short term (undrained) and long term (drained) conditions respectively.

Based on the above parameters, the potential vertical displacements and the post construction movements have been analysed.

The analysis uses classic modified Boussinesq elastic theory, assuming a fully flexible foundation applying a uniform loading/unloading to a semi-infinite elastic half-space, using the above parameters for stratified homogeneity and with the introduction of an assumed rigid boundary at approximately 30m depth.

7.2.1 Short Term Movements

There are two components of short term movement that will interact to affect the neighbouring structure.

These components are ground movements associated with underpinning of the party walls and the theoretical elastic heave movements due to excavation unloading.

7.2.2 Underpinning

Experience indicates that potential movements are very much dependent on workmanship.

It is suggested that given dry conditions and good workmanship, the amount of vertical movement of the party walls can be expected to be approximately 5mm per stage of underpinning.

The subsequent ground horizontal movements that may occur due to yielding of the underpinning wall during the basement excavation may also be estimated. As a first approximation, the magnitude of the horizontal movement is assumed to be equal to the vertical movement of the party wall.

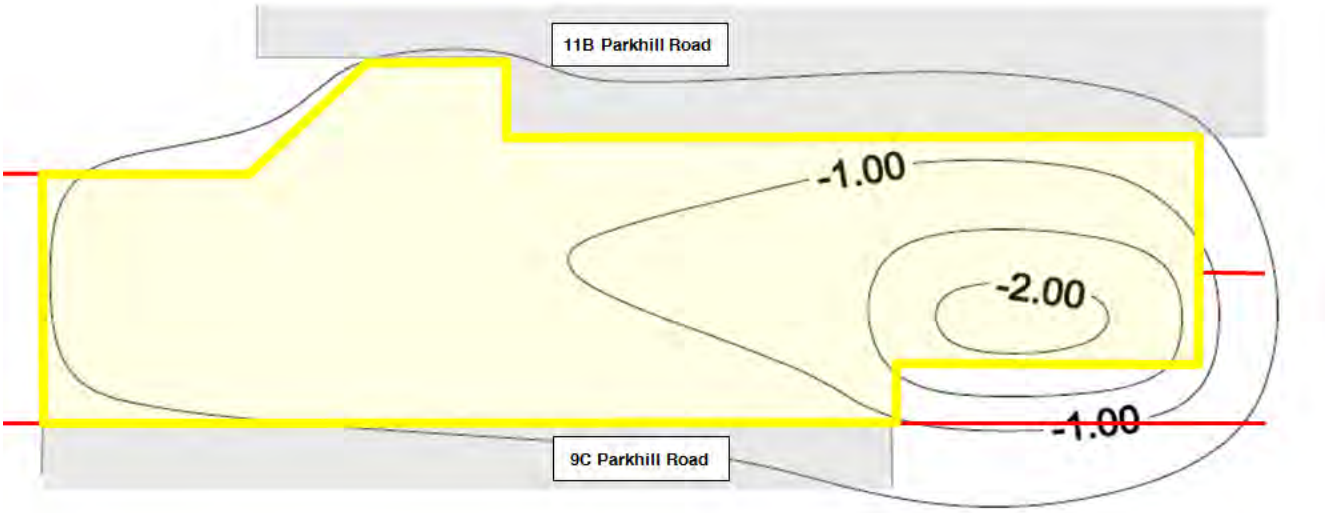
As a result, less than 5mm of horizontal movement can be expected at the party walls to No. 9C Parkhill Road and No. 11 Parkhill Road. These horizontal movements are assumed to decrease perpendicular from the underpinned wall on the basis of an assumed plane drawn upwards at an angle of 45° from the base of the excavation.

7.2.3 Excavation

It is envisaged that the basement excavation will extend to approximately 0.5m depth beneath the existing floor level, increasing to approximately 1.7m to the front of the house.

As a result, the potential effect of the excavation may be considered by applying a net unloading of $-10kN/m^2$ and $-34kN/m^2$ due to soil unloading.

Less than 5mm of short term soil heave is predicted within the basement excavation, reducing to negligible heave movement predicted beneath the party walls to No. 9C Parkhill Road and No. 11 Parkhill Road.



Plan showing theoretical approximate short term heave (mm) due to basement excavation (yellow colour)

The additional post-construction heave movement that may occur following construction of the basement is predicted to be negligible.

7.3 Impact on Neighbouring Structures

In view of the potential party wall movements described in the previous section, regardless of actual movements of the surrounding ground, the settlements affecting the party walls to No. 9C Parkhill Road and No. 11 Parkhill Road could potentially reach approximately 5mm.

The deflections predicted in the previous section have been used in combination with the Burland damage assessment process that is based upon consideration of the theoretical deflection ratio that would be experienced by a masonry panel of a given height and length.

The potential degree of damage due to the proposed basement construction has been assessed for each neighbouring property.

7.3.1 No. 9C Parkhill Road

The length of section is taken as 4.5m and the wall height as 10m.

The maximum horizontal strain, **δh (** L) is assessed as 0.067%, producing a maximum deflection ratio Δ / L = -0.002, within a limiting tensile strain of 0.065%, for a Burland Category 1 “Very Slight” condition.

7.3.2 No. 11 Parkhill Road

The length of section is taken as 15m and the wall height as 6m.

The maximum horizontal strain, **δh (** L) is assessed as 0.033%, producing a maximum deflection ratio Δ / L = -0.001, within a limiting tensile strain of 0.035%, for a Burland Category 0 “Negligible” condition.

8. Structural Monitoring Strategy

The Camden Local Plan (June 2017) states that the BIA must demonstrate that the basement scheme has a risk of damage to the neighbouring properties no higher than Burland Scale 1 (very slight).

Given the possibility of up to Category 1 damage to neighbouring structures, a structural monitoring strategy has been devised to ensure the movements remain within acceptable limits and to enable mitigation to be effectively implemented in the event of agreed trigger values for movement being exceeded.

The responsibility for implementation of a monitoring plan shall rest with the appointed contractor, working in conjunction with the appointed structural engineer.

8.1 Movement Monitoring Equipment

Precise survey equipment is to be used for monitoring movement. This equipment is to record all vertical and horizontal components of movement (in three perpendicular directions) to a minimum accuracy of 1mm.

Monitoring positions are to be located along the front and rear elevations to Nos. 9C, 11 & 11A Parkhill Road and along the party walls between Nos. 9C & 11A and Nos. 11 & 11A.

8.2 Baseline Situation

Before any excavation or construction works commence, monitoring is to be undertaken in order to establish a baseline situation. Ideally this should cover the full seasonal cycle.

Condition Surveys should be prepared for Nos. 9C, 11 & 11A Parkhill Road before any monitoring commences, in order to fully understand the present physical condition of each property.

8.3 Frequency of Monitoring

During all underpinning works and basement excavation works, monitoring is to be undertaken daily at the start and end of every work shift.

At other times monitoring is to be undertaken weekly to cover a period prior to commencement of any works and ceasing after completion of the works, by agreement of all interested parties.

8.4 Criteria for assessment of Monitoring data and Comparison with Predicted Movements

The cumulative movements in any direction of any monitoring point are to be compared with the predicted movements at any stage and using the following decision table:

MONITORING CRITERIA		
Total movement less than 5mm in any direction		Green
Total movement in excess of 5mm in any direction or additional movement of 5mm in any direction	Notify Structural Engineer and Party Wall Surveyor	Red

8.5 Contingent Actions

Contingency actions should be undertaken as provided using the following decision table:

CONTINGENT ACTIONS	
Green	None
Red	Cease work and Notify Structural Engineer and Party Wall Surveyor immediately. Commence backfilling / installation of additional propping. Undertake repeated monitoring as necessary to ensure that movement has ceased. Works to commence only once a revised construction methodology has been agreed with the Structural Engineer

9. Impact Assessment

The screening and scoping stages have identified potential effects of the development on those attributes or features of the geological, hydrogeological and hydrological environment. This stage is concerned with evaluating the direct and indirect implications of each of these potential impacts.

9.1 Hydrogeological Impact Assessment

The investigation has confirmed clay soils and there is no shallow groundwater table at this site.

It is therefore considered that the development will not have any impact upon groundwater flow and there is additionally no scope for any cumulative impact.

9.2 Hydrological Impact Assessment

The investigation has indicated that there is surface water flow within the more permeable zones of the made ground.

There will be a need to maintain the present water flow paths and discharge regime.

It is noted that the drain that runs beneath the existing lower ground floor will need to be lowered.

There will be a need to maintain the present water discharge regime and provide Sustainable Urban Drainage Features (SUDS) to meet the planning policy requirements.

9.3 Stability Impact Assessment

9.3.1 London Clay

The results of plasticity index testing have confirmed the clay beneath the site to be of high volume change potential.

However, the depth of the proposed construction will obviate concerns regarding potential seasonal shrink/swell movements.

9.3.2 Trees

Given the size and low water demand of the tree, in combination with the depth of the proposed basement, the excavation is expected to remove any affected clay that may potentially result in additional forces being exerted on the structure due to possible swelling of the clay.

9.3.3 Ground Movements

The predicted building damage levels resulting from ground movements associated with the proposed development have been analysed and found to be acceptable. Nevertheless, an outline monitoring strategy has been provided.

9.3.4 Residual Impacts

The proposed basement will have no residual unacceptable impacts upon the surrounding structures, infrastructure and environment. No cumulative impacts are envisaged.

Appendix

Exploratory Logs

Geotechnical Test Results

Chemical Results

Existing & Proposed Drawings

Structural Drawings

Indicative Construction Programme

PROJECT: 11A Parkhill Road, London, NW3 2YH

CLIENT: Grant, Tani, Barash & Altman LBH4530

BOREHOLE 1

METHOD OF BORING: Small Diameter Percussive

04/05/18

GROUND WATER: Not encountered

REMARKS: Groundwater monitoring standpipe installed to 3m depth (response zone: 1-2m)

G.L. +56m OD Approx.

Samples No	Samples Type	Depth m	SPT N Value	Legend	Depth m	Description
					0.30	MADE GROUND (topsoil over dirty brown clayey sand with brick, concrete, glass, rootlets and stones)
1	D	0.50			0.80	Soft to firm, pale brown, very gravelly silty CLAY
2	D	1.00			1.00	Soft to firm, pale grey mottled orange-brown, silty CLAY with occasional gravel, pockets of sand and rootlets
3	D	2.00				Firm pale grey mottled orange-brown ,silty clay with occasional pockets of sand
						…becoming firm to stiff at 2m
						…occasional rootlets to 2.5m
4	D	3.00				…becoming slightly sandy at 3.5m
					4.00	
						Stiff pale brown fissured CLAY with occasional selenite crystals

U=Undisturbed
B= Bulk
D=Disturbed
W=Water

LBH WEMBLEY ENGINEERING

PROJECT: 11A Parkhill Road, London, NW3 2YH

CLIENT: Grant, Tani, Barash & Altman LBH4530

BOREHOLE 1

METHOD OF BORING: Small Diameter Percussive

04/05/18

GROUND WATER: Not encountered

REMARKS: Groundwater monitoring standpipe installed to 3m depth (response zone: 1-2m)

G.L. +56m OD Approx.

Samples No	Samples Type	Depth m	SPT N Value	Legend	Depth m	Description
					5.50	Stiff pale brown fissured CLAY with occasional selenite crystals

U=Undisturbed
B= Bulk
D=Disturbed
W=Water

LBH WEMBLEY ENGINEERING

PROJECT: 11A Parkhill Road, London, NW3 2YH

CLIENT: Grant, Tani, Barash & Altman LBH4530

BOREHOLE 2

METHOD OF BORING: Small Diameter Percussive

04/05/18

GROUND WATER: Perched water encountered at 0.25m and 0.55m

REMARKS: Groundwater monitoring standpipe installed to 3m depth (response zone: 1-2m)

G.L. +54.75m OD Approx.

Samples No	Samples Type	Depth m	SPT N Value	Legend	Depth m	Description
					0.25	MADE GROUND (concrete slab with rebar)
1	D	0.30			0.45	MADE GROUND (dirty brownish-black organic clay with brick, concrete and stones)
					0.55	MADE GROUND (concrete)
2	D	1.00				Firm pale grey mottled orange-brown, silty CLAY with occasional pockets of sand and selenite crystals
3	D	2.00				…becoming firm to stiff at 2m …occasional rootlets to 2m
					2.50	
						Firm to stiff, pale brown, silty CLAY with occasional selenite crystals and claystones
						…becoming stiff at 3m

U=Undisturbed
B= Bulk
D=Disturbed
W=Water

LBH WEMBLEY ENGINEERING

PROJECT: 11A Parkhill Road, London, NW3 2YH

CLIENT: Grant, Tani, Barash & Altman LBH4530

BOREHOLE 2

METHOD OF BORING: Small Diameter Percussive

04/05/18

GROUND WATER: Perched water encountered at 0.25m and 0.55m

REMARKS: Groundwater monitoring standpipe installed to 3m depth (response zone: 1-2m)

G.L. +54.75m OD Approx.

Samples No	Samples Type	Depth m	SPT N Value	Legend	Depth m	Description
					5.90	Stiff pale brown fissured CLAY with occasional selenite crystals and claystones

U=Undisturbed
B= Bulk
D=Disturbed
W=Water

LBH WEMBLEY ENGINEERING

GroundTech Laboratories

Geotechnical Testing Facility

Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northants. NN12 8QD
Telephone: 01327 860947/860060 Fax: 01327 860430 Email: groundtech@listersgeotechnics.co.uk

Quality Assured to ISO 9001

SAMPLES				CLASSIFICATION TESTS							CLASSIFICATION TESTS							STRENGTH TESTS					CHEMICAL TESTS	
Test Location	Sample Type	Sample Depth -m	Test Type	WC %	LL %	PL %	PI %	Passing 425 µm %	Modified PI %	Class	Passing 63 µm %	WC/ LL	PL+ 2%	Liquidity Index	Loss on Ignition %	Soil Suction kPa	Bulk Density Mg/m³	Test Type	Cell Pressure kN/m²	Deviator Stress kN/m²	Apparent Cohesion kN/m²	ϕ	pH Value	Soluble Sulphate Content SO4 g/l
BH 1	D	2.00	PI/63	34	76	31	45	100	45	CV	98	0.45	33	0.07									6.5	2.02
BH 2	D	1.00	PI/63	34	77	28	49	100	49	CV	99	0.44	30	0.12									6.6	1.67

Symbols:

U	Undisturbed Sample	R	Remoulded	PI	Plasticity Index	T	Triaxial Undrained	L	100mm specimen
D	Disturbed Sample	63	Passing 63µm	F	Filter Paper Suction Tests	M	Multistage Triaxial	S	38mm specimen
B	Bulk Sample	H	Hydrometer	CC	Continuous Core	HP	Hand Penetrometer		
W	Water Sample	PSD	Wet Sieving			V	Vane Test		

LABORATORY TEST RESULTS

Project Reference
18.05.012

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

LBH Wembley Geotechnical & Environmental
Unit 12
Little Balmer
Buckingham Industrial Park
Buckingham
MK18 1TF

Attention: Ronnie Lancaster

CERTIFICATE OF ANALYSIS

Date:	17 May 2018
Customer:	H_LBHWGE_BUK
Sample Delivery Group (SDG):	180509-11
Your Reference:	LBH4530
Location:	11A Parkhill Road
Report No:	456563

We received 3 samples on Wednesday May 09, 2018 and 2 of these samples were scheduled for analysis which was completed on Thursday May 17, 2018. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Approved By:

Sonia McWhan
Operations Manager

ALS Life Sciences Limited. Registered Office: Units 7 & 8 Hawarden Business Park, Manor Road, Hawarden, Deeside, CH5 3US. Registered in England and Wales No. 4057291.

CERTIFICATE OF ANALYSIS

SDG:	180509-11	**Client Reference:**	LBH4530	**Report Number:**	456563
Location:	11A Parkhill Road	**Order Number:**	LBH4530	**Superseded Report:**	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
17517494	BH1		0.50 - 0.50	04/05/2018
17517500	BH1		1.00 - 1.00	04/05/2018
17517505	BH2		0.30 - 0.30	04/05/2018

Maximum Sample/Coolbox Temperature (°C) : **13.4**

ISO5667-3 Water quality - Sampling - Part3 -
During Transportation samples shall be stored in a cooling device capable of maintaining a temperature of (5±3)°C.

ALS have data which show that a cool box with 4 frozen icepacks is capable of maintaining pre-chilled samples at a temperature of (5±3)°C for a period of up to 24hrs.

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG:	180509-11	**Client Reference:**	LBH4530	**Report Number:**	456563
Location:	11A Parkhill Road	**Order Number:**	LBH4530	**Superseded Report:**	

Results Legend

X Test

N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			17517500				17517505				
Customer Sample Reference			BH1				BH2				
AGS Reference											
Depth (m)			1.00 - 1.00				0.30 - 0.30				
Container			1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)		1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)		
Sample Type			S	S	S		S	S	S		
ANC at pH4 and ANC at pH 6	All	NDPs: 0 Tests: 2		X				X			
Anions by Kone (soil)	All	NDPs: 0 Tests: 1						X			
Anions by Kone (w)	All	NDPs: 0 Tests: 2	X				X				
Asbestos ID in Solid Samples	All	NDPs: 0 Tests: 1					X				
Boron Water Soluble	All	NDPs: 0 Tests: 1						X			
CEN 2:1 Readings	All	NDPs: 0 Tests: 2	X				X				
CEN 8:1 Readings	All	NDPs: 0 Tests: 2	X				X				
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 1						X			
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 2	X				X				
Dissolved Organic/Inorganic Carbon	All	NDPs: 0 Tests: 2	X				X				
Easily Liberated Sulphide	All	NDPs: 0 Tests: 1						X			
EPH	All	NDPs: 0 Tests: 1						X			
EPH by FID	All	NDPs: 0 Tests: 1						X			
EPH CWG (Aliphatic) GC (S)	All	NDPs: 0 Tests: 1						X			
EPH CWG (Aromatic) GC (S)	All	NDPs: 0 Tests: 1						X			

Validated

CERTIFICATE OF ANALYSIS

SDG:	180509-11	**Client Reference:**	LBH4530	**Report Number:**	456563
Location:	11A Parkhill Road	**Order Number:**	LBH4530	**Superseded Report:**	

Results Legend

X Test

N No Determination Possible

Sample Types -

S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			17517500			17517505					
Customer Sample Reference			BH1			BH2					
AGS Reference											
Depth (m)			1.00 - 1.00			0.30 - 0.30					
Container			1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)			
Sample Type			S	S	S	S	S	S			
Fluoride	All	NDPs: 0 Tests: 2	X			X					
GRO by GC-FID (S)	All	NDPs: 0 Tests: 1						X			
Hexavalent Chromium (s)	All	NDPs: 0 Tests: 1					X				
Loss on Ignition in soils	All	NDPs: 0 Tests: 2		X			X				
Mercury Dissolved	All	NDPs: 0 Tests: 2	X			X					
Metals in solid samples by OES	All	NDPs: 0 Tests: 1					X				
Mineral Oil	All	NDPs: 0 Tests: 2		X			X				
PAH by GCMS	All	NDPs: 0 Tests: 2		X			X				
PCBs by GCMS	All	NDPs: 0 Tests: 2		X			X				
pH	All	NDPs: 0 Tests: 2		X			X				
Phenols by HPLC (S)	All	NDPs: 0 Tests: 1					X				
Phenols by HPLC (W)	All	NDPs: 0 Tests: 2	X			X					
Sample description	All	NDPs: 0 Tests: 2		X			X				
Total Dissolved Solids	All	NDPs: 0 Tests: 2	X			X					
Total Organic Carbon	All	NDPs: 0 Tests: 2		X			X				

Validated

CERTIFICATE OF ANALYSIS

SDG:	180509-11	**Client Reference:**	LBH4530	**Report Number:**	456563
Location:	11A Parkhill Road	**Order Number:**	LBH4530	**Superseded Report:**	

Results Legend

X **Test**

N **No Determination Possible**

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			17517500			17517505		
Customer Sample Reference			BH1			BH2		
AGS Reference								
Depth (m)			1.00 - 1.00			0.30 - 0.30		
Container			1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)	1kg TUB	250g Amber Jar (ALE210)	60g VOC (ALE215)
Sample Type			S	S	S	S	S	S
Total Sulphate	All	NDPs: 0 Tests: 1					X	
TPH CWG GC (S)	All	NDPs: 0 Tests: 1					X	
VOC MS (S)	All	NDPs: 0 Tests: 2			X			X

CERTIFICATE OF ANALYSIS

SDG:	180509-11	**Client Reference:**	LBH4530	**Report Number:**	456563
Location:	11A Parkhill Road	**Order Number:**	LBH4530	**Superseded Report:**	

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm

Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
17517500	BH1	1.00 - 1.00	Dark Brown	Sandy Clay	Stones	None
17517505	BH2	0.30 - 0.30	Dark Brown	Sandy Clay Loam	Stones	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally ocurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

Validated

CERTIFICATE OF ANALYSIS

SDG:	180509-11	**Client Reference:**	LBH4530	**Report Number:**	456563
Location:	11A Parkhill Road	**Order Number:**	LBH4530	**Superseded Report:**	

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH1	BH2			
			Depth (m)	1.00 - 1.00	0.30 - 0.30			
			Sample Type	Soil/Solid (S)	Soil/Solid (S)			
			Date Sampled	04/05/2018	04/05/2018			
			Sample Time	.	.			
			Date Received	09/05/2018	09/05/2018			
			SDG Ref	180509-11	180509-11			
			Lab Sample No.(s)	17517500	17517505			
			AGS Reference					
Moisture Content Ratio (% of as received sample)	%	PM024		12	15			
Loss on ignition	<0.7 %	TM018		7.74 M	7.49 M			
Mineral oil >C10-C40	<1 mg/kg	TM061		16.5	15.3			
EPH (C5-C40)	<35 mg/kg	TM061			186			
Mineral Oil Surrogate % recovery**	%	TM061		89.2	87.2			
EPH Range >C10 - C40	<35 mg/kg	TM061			185 M			
Phenol	<0.01 mg/kg	TM062 (S)			<0.01 M			
Cresols	<0.01 mg/kg	TM062 (S)			<0.01 M			
Xylenols	<0.015 mg/kg	TM062 (S)			<0.015 M			
2,3,5-Trimethylphenol	<0.01 mg/kg	TM062 (S)			<0.01 M			
2-Isopropylphenol	<0.015 mg/kg	TM062 (S)			<0.015 M			
Phenols, Total Detected 5 speciated	<0.06 mg/kg	TM062 (S)			<0.06 M			
Organic Carbon, Total	<0.2 %	TM132		<0.2 M	0.727 M			
Soil Organic Matter (SOM)	<0.35 %	TM132			1.25 #			
pH	1 pH Units	TM133		8.04 M	11.3 M			
Chromium, Hexavalent	<0.6 mg/kg	TM151			<0.6 #			
Cyanide, Total	<1 mg/kg	TM153			<1 M			
Cyanide, Free	<1 mg/kg	TM153			<1 M			
Thiocyanate	<1 mg/kg	TM153			<1 M			
PCB congener 28	<3 µg/kg	TM168		<3 M	<3 M			
PCB congener 52	<3 µg/kg	TM168		<3 M	<3 M			
PCB congener 101	<3 µg/kg	TM168		<3 M	<3 M			
PCB congener 118	<3 µg/kg	TM168		<3 M	<3 M			
PCB congener 138	<3 µg/kg	TM168		<3 M	<3 M			
PCB congener 153	<3 µg/kg	TM168		<3 M	<3 M			
PCB congener 180	<3 µg/kg	TM168		<3 M	<3 M			
Sum of detected PCB 7 Congeners	<21 µg/kg	TM168		<21	<21			
Sulphide, Easily liberated	<15 mg/kg	TM180			<15 @ M			
Arsenic	<0.6 mg/kg	TM181			11.9 M			
Boron	<0.7 mg/kg	TM181			18.3 #			
Cadmium	<0.02 mg/kg	TM181			0.415 M			
Chromium	<0.9 mg/kg	TM181			28.2 M			
Copper	<1.4 mg/kg	TM181			31.3 M			

Validated

CERTIFICATE OF ANALYSIS

SDG:	180509-11	**Client Reference:**	LBH4530	**Report Number:**	456563
Location:	11A Parkhill Road	**Order Number:**	LBH4530	**Superseded Report:**	

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH1	BH2				
			Depth (m)	1.00 - 1.00	0.30 - 0.30				
			Sample Type	Soil/Solid (S)	Soil/Solid (S)				
			Date Sampled	04/05/2018	04/05/2018				
			Sample Time	-	-				
			Date Received	09/05/2018	09/05/2018				
			SDG Ref	180509-11	180509-11				
			Lab Sample No.(s)	17517500	17517505				
			AGS Reference						
Lead	<0.7 mg/kg	TM181			115 M				
Mercury	<0.14 mg/kg	TM181			<0.14 M				
Nickel	<0.2 mg/kg	TM181			24.2 M				
Selenium	<1 mg/kg	TM181			<1 #				
Zinc	<1.9 mg/kg	TM181			84.2 M				
ANC @ pH 4	<0.03 mol/kg	TM182		0.103	0.283				
ANC @ pH 6	<0.03 mol/kg	TM182		0.0355	0.174				
Total Sulphur (ASB)	<0.0016 %	TM221			0.0407				
Boron, water soluble	<1 mg/kg	TM222			<1 M				
Water Soluble Sulphate as SO4 2:1 Extract	<0.004 g/l	TM243			0.203 M				

Validated

CERTIFICATE OF ANALYSIS

SDG:	180509-11	**Client Reference:**	LBH4530	**Report Number:**	456563
Location:	11A Parkhill Road	**Order Number:**	LBH4530	**Superseded Report:**	

PAH by GCMS

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH1	BH2				
			Depth (m)	1.00 - 1.00	0.30 - 0.30				
			Sample Type	Soil/Solid (S)	Soil/Solid (S)				
			Date Sampled	04/05/2018	04/05/2018				
			Sample Time	.	.				
			Date Received	09/05/2018	09/05/2018				
			SDG Ref	180509-11	180509-11				
			Lab Sample No.(s)	17517500	17517505				
			AGS Reference						
Naphthalene-d8 % recovery**	%	TM218			90				
Acenaphthene-d10 % recovery**	%	TM218			87.9				
Phenanthrene-d10 % recovery**	%	TM218			85.8				
Chrysene-d12 % recovery**	%	TM218			76.8				
Perylene-d12 % recovery**	%	TM218			76.6				
Naphthalene	<9 µg/kg	TM218			<9 M				
Acenaphthylene	<12 µg/kg	TM218			<12 M				
Acenaphthene	<8 µg/kg	TM218			11 M				
Fluorene	<10 µg/kg	TM218			<10 M				
Phenanthrene	<15 µg/kg	TM218			142 M				
Anthracene	<16 µg/kg	TM218			29.6 M				
Fluoranthene	<17 µg/kg	TM218			290 M				
Pyrene	<15 µg/kg	TM218			245 M				
Benz(a)anthracene	<14 µg/kg	TM218			143 M				
Chrysene	<10 µg/kg	TM218			130 M				
Benzo(b)fluoranthene	<15 µg/kg	TM218			230 M				
Benzo(k)fluoranthene	<14 µg/kg	TM218			83.2 M				
Benzo(a)pyrene	<15 µg/kg	TM218			151 M				
Indeno(1,2,3-cd)pyrene	<18 µg/kg	TM218			95.2 M				
Dibenzo(a,h)anthracene	<23 µg/kg	TM218			<23 M				
Benzo(g,h,i)perylene	<24 µg/kg	TM218			121 M				
PAH, Total Detected USEPA 16	<118 µg/kg	TM218			1670				
PAH total 17 (inclusive of Coronene)	<10 mg/kg	TM218		<10	<10				

Validated

CERTIFICATE OF ANALYSIS

SDG:	180509-11	**Client Reference:**	LBH4530	**Report Number:**	456563
Location:	11A Parkhill Road	**Order Number:**	LBH4530	**Superseded Report:**	

TPH CWG (S)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH2
			Depth (m)	0.30 - 0.30
			Sample Type	Soil/Solid (S)
			Date Sampled	04/05/2018
			Sample Time	.
			Date Received	09/05/2018
			SDG Ref	180509-11
			Lab Sample No.(s)	17517505
			AGS Reference	
GRO Surrogate % recovery**	%	TM089		105
GRO TOT (Moisture Corrected)	<44 µg/kg	TM089		59
Aliphatics >C5-C6	<10 µg/kg	TM089		<10
Aliphatics >C6-C8	<10 µg/kg	TM089		<10
Aliphatics >C8-C10	<10 µg/kg	TM089		18.9
Aliphatics >C10-C12	<10 µg/kg	TM089		<10
Aliphatics >C12-C16	<100 µg/kg	TM173		<100
Aliphatics >C16-C21	<100 µg/kg	TM173		334
Aliphatics >C21-C35	<100 µg/kg	TM173		2250
Aliphatics >C35-C44	<100 µg/kg	TM173		<100
Total Aliphatics >C12-C44	<100 µg/kg	TM173		2590
Aromatics >EC5-EC7	<10 µg/kg	TM089		<10
Aromatics >EC7-EC8	<10 µg/kg	TM089		<10
Aromatics >EC8-EC10	<10 µg/kg	TM089		16.5
Aromatics >EC10-EC12	<10 µg/kg	TM089		<10
Aromatics >EC12-EC16	<100 µg/kg	TM173		179
Aromatics >EC16-EC21	<100 µg/kg	TM173		1180
Aromatics >EC21-EC35	<100 µg/kg	TM173		5370
Aromatics >EC35-EC44	<100 µg/kg	TM173		1730
Aromatics >EC40-EC44	<100 µg/kg	TM173		<100
Total Aromatics >EC12-EC44	<100 µg/kg	TM173		8460
Total Aliphatics & Aromatics >C5-C44	<100 µg/kg	TM173		11100
GRO >C5-C10	<10 µg/kg	TM089		37.8

Validated

CERTIFICATE OF ANALYSIS

SDG:	180509-11	**Client Reference:**	LBH4530	**Report Number:**	456563
Location:	11A Parkhill Road	**Order Number:**	LBH4530	**Superseded Report:**	

VOC MS (S)

Results Legend	
#	ISO17025 accredited.
M	*m*CERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted test.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-5&+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH1	BH2				
			Depth (m)	1.00 - 1.00	0.30 - 0.30				
			Sample Type	Soil/Solid (S)	Soil/Solid (S)				
			Date Sampled	04/05/2018	04/05/2018				
			Sample Time	.	.				
			Date Received	09/05/2018	09/05/2018				
			SDG Ref	180509-11	180509-11				
			Lab Sample No.(s)	17517500	17517505				
			AGS Reference						
Dibromofluoromethane**	%	TM116		107	83.3				
Toluene-d8**	%	TM116		102	97.4				
4-Bromofluorobenzene**	%	TM116		90.3	91.5				
Methyl Tertiary Butyl Ether	<10 µg/kg	TM116		<10 M	<10 M				
Benzene	<9 µg/kg	TM116		<9 M	<9 M				
Toluene	<7 µg/kg	TM116		<7 M	<7 M				
Ethylbenzene	<4 µg/kg	TM116		<4 M	<4 M				
p/m-Xylene	<10 µg/kg	TM116		<10 #	<10 #				
o-Xylene	<10 µg/kg	TM116		<10 M	<10 M				
Sum of BTEX	<40 µg/kg	TM116			<40				

Validated

CERTIFICATE OF ANALYSIS

SDG:	180509-11	**Client Reference:**	LBH4530	**Report Number:**	456563
Location:	11A Parkhill Road	**Order Number:**	LBH4530	**Superseded Report:**	

Asbestos Identification - Solid Samples

		Date of Analysis	Analysed By	Comments	Amosite (Brown) Asbestos	Chrysotile (White) Asbestos	Crocidolite (Blue) Asbestos	Fibrous Actinolite	Fibrous Anthophyllite	Fibrous Tremolite	Non-Asbestos Fibre
Cust. Sample Ref. Depth (m) Sample Type Date Sampled Date Receieved SDG Original Sample Method Number	BH2 0.30 - 0.30 SOLID 04/05/2018 00:00:00 09/05/2018 09:23:34 180509-11 17517505 TM048	16/05/2018	Andrzej Ferfecki	-	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected (#)	Not Detected

Validated

CERTIFICATE OF ANALYSIS

SDG:	180509-11	**Client Reference:**	LBH4530	**Report Number:**	456563
Location:	11A Parkhill Road	**Order Number:**	LBH4530	**Superseded Report:**	

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/3

Client Reference		**Site Location**	11A Parkhill Road
Mass Sample taken (kg)	0.204	**Natural Moisture Content (%)**	16.9
Mass of dry sample (kg)	0.175	**Dry Matter Content (%)**	85.6
Particle Size <4mm	>95%		

Case	
SDG	180509-11
Lab Sample Number(s)	17517500
Sampled Date	04-May-2018
Customer Sample Ref.	BH1
Depth (m)	1.00 - 1.00

Solid Waste Analysis

		Landfill Waste Acceptance Criteria Limits		
		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon (%)	<0.2	3	5	6
Loss on Ignition (%)	7.74	-	-	10
Sum of BTEX (mg/kg)	<0.04	6	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg)	16.5	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	8.04	-	>6	-
ANC to pH 6 (mol/kg)	0.0355	-	-	-
ANC to pH 4 (mol/kg)	0.103	-	-	-

Eluate Analysis

	C_2 Concⁿ in 2:1 eluate	C_8 Concⁿ in 8:1 eluate	A_2 2:1 concⁿ leached	$A_{2\text{-}10}$ Cumulative concⁿ leached	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	mg/l		mg/kg				
Arsenic	0.00333	-	0.00666	-	0.5	2	25
Barium	0.00605	0.00124	0.0121	0.0198	20	100	300
Cadmium	<0.00008	<0.00008	<0.00016	<0.0008	0.04	1	5
Chromium	0.00355	<0.001	0.00709	<0.01	0.5	10	70
Copper	0.00507	0.00337	0.0101	0.0363	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.00002	<0.0001	0.01	0.2	2
Molybdenum	0.0117	-	0.0234	-	0.5	10	30
Nickel	0.00301	0.000852	0.00601	0.0118	0.4	10	40
Lead	0.00635	0.00419	0.0127	0.0452	0.5	10	50
Antimony	<0.001	-	<0.002	-	0.06	0.7	5
Selenium	0.001	-	0.002	-	0.1	0.5	7
Zinc	0.0335	0.00683	0.0669	0.105	4	50	200
Chloride	3.6	<2	7.19	<20	800	15000	25000
Fluoride	2.43	1.56	4.85	16.9	10	150	500
Sulphate (soluble)	10.6	<2	21.2	<20	1000	20000	50000
Total Dissolved Solids	114	36.3	228	483	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.032	<0.16	1	-	-
Dissolved Organic Carbon	10.6	6.58	21.3	72	500	800	1000

Leach Test Information

	2:1	8:1
Date Prepared	09-May-2018	10-May-2018
pH (pH Units)	8.654	8.576
Conductivity (µS/cm)	144.80	43.40
Temperature (°C)	20.00	20.20
Volume Leachant (Litres)	0.320	1.400
Volume of Eluate VE1 (Litres)	0.270	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
17/05/2018 13:59:01

13:58:51 17/05/2018

Validated

CERTIFICATE OF ANALYSIS

SDG:	180509-11	**Client Reference:**	LBH4530	**Report Number:**	456563
Location:	11A Parkhill Road	**Order Number:**	LBH4530	**Superseded Report:**	

CEN 10:1 CUMULATIVE TWO STAGE BATCH TEST

WAC ANALYTICAL RESULTS

REF : BS EN 12457/3

Client Reference		**Site Location**	11A Parkhill Road
Mass Sample taken (kg)	0.206	**Natural Moisture Content (%)**	17.6
Mass of dry sample (kg)	0.175	**Dry Matter Content (%)**	85
Particle Size <4mm	>95%		

Case	
SDG	180509-11
Lab Sample Number(s)	17517505
Sampled Date	04-May-2018
Customer Sample Ref.	BH2
Depth (m)	0.30 - 0.30

Solid Waste Analysis

		Landfill Waste Acceptance Criteria Limits		
		Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Total Organic Carbon (%)	0.727	3	5	6
Loss on Ignition (%)	7.49	-	-	10
Sum of BTEX (mg/kg)	<0.04	6	-	-
Sum of 7 PCBs (mg/kg)	<0.021	1	-	-
Mineral Oil (mg/kg)	15.3	500	-	-
PAH Sum of 17 (mg/kg)	<10	100	-	-
pH (pH Units)	11.3	-	>6	-
ANC to pH 6 (mol/kg)	0.174	-	-	-
ANC to pH 4 (mol/kg)	0.283	-	-	-

Eluate Analysis

	C_2 Concⁿ in 2:1 eluate	C_8 Concⁿ in 8:1 eluate	A_2 2:1 concⁿ leached	$A_{2\text{-}10}$ Cumulative concⁿ leached	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg		
	mg/l		mg/kg				
Arsenic	0.00383	0.00518	0.00766	0.0498	0.5	2	25
Barium	0.00427	0.00399	0.00854	0.0403	20	100	300
Cadmium	<0.00008	<0.00008	<0.00016	<0.0008	0.04	1	5
Chromium	0.00261	0.0023	0.00522	0.0234	0.5	10	70
Copper	0.0107	0.00428	0.0214	0.0523	2	50	100
Mercury Dissolved (CVAF)	<0.00001	<0.00001	<0.00002	<0.0001	0.01	0.2	2
Molybdenum	0.0242	0.00339	0.0483	0.0648	0.5	10	30
Nickel	0.00757	0.00215	0.0151	0.0295	0.4	10	40
Lead	<0.0002	<0.0002	<0.0004	<0.002	0.5	10	50
Antimony	0.00149	0.00114	0.00298	0.0119	0.06	0.7	5
Selenium	0.00428	0.00276	0.00855	0.0298	0.1	0.5	7
Zinc	<0.001	<0.001	<0.002	<0.01	4	50	200
Chloride	104	17.4	207	303	800	15000	25000
Fluoride	1.7	0.775	3.41	9.12	10	150	500
Sulphate (soluble)	163	26.8	325	470	1000	20000	50000
Total Dissolved Solids	434	178	868	2160	4000	60000	100000
Total Monohydric Phenols (W)	<0.016	<0.016	<0.032	<0.16	1	-	-
Dissolved Organic Carbon	14.3	5.46	28.6	67.7	500	800	1000

Leach Test Information

	2:1	8:1
Date Prepared	09-May-2018	10-May-2018
pH (pH Units)	10.513	10.788
Conductivity (µS/cm)	587.00	260.00
Temperature (°C)	20.10	20.30
Volume Leachant (Litres)	0.319	1.400
Volume of Eluate VE1 (Litres)	0.260	

Solid Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and ALS Environmental cannot be held responsible for any discrepancies with current legislation
Mcerts Certification does not apply to leachates
17/05/2018 13:59:01

13:58:51 17/05/2018

CERTIFICATE OF ANALYSIS

SDG:	180509-11	**Client Reference:**	LBH4530	**Report Number:**	456563
Location:	11A Parkhill Road	**Order Number:**	LBH4530	**Superseded Report:**	

Table of Results - Appendix

Method No	Reference	Description
PM001		Preparation of Samples for Metals Analysis
PM024	Modified BS 1377	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
PM114		Leaching Procedure for CEN Two Stage BatchTest 2:1/8:1 Cumulative
TM018	BS 1377: Part 3 1990	Determination of Loss on Ignition
TM048	HSG 248, Asbestos: The analysts' guide for sampling, analysis and clearance procedures	Identification of Asbestos in Bulk Material
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)
TM062 (S)	National Grid Property Holdings Methods for the Collection & Analysis of Samples from National Grid Sites version 1 Sec 3.9	Determination of Phenols in Soils by HPLC
TM089	Modified: US EPA Methods 8020 & 602	Determination of Gasoline Range Hydrocarbons (GRO) and BTEX (MTBE) compounds by Headspace GC-FID (C4-C12)
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM116	Modified: US EPA Method 8260, 8120, 8020, 624, 610 & 602	Determination of Volatile Organic Compounds by Headspace / GC-MS
TM123	BS 2690: Part 121:1981	The Determination of Total Dissolved Solids in Water
TM132	In - house Method	ELTRA CS800 Operators Guide
TM133	BS 1377: Part 3 1990;BS 6068-2.5	Determination of pH in Soil and Water using the GLpH pH Meter
TM151	Method 3500D, AWWA/APHA, 20th Ed., 1999	Determination of Hexavalent Chromium using Kone analyser
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM153	Method 4500A,B,C, I, M AWWA/APHA, 20th Ed., 1999	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate using the Skalar SANS+ System Segmented Flow Analyser
TM168	EPA Method 8082, Polychlorinated Biphenyls by Gas Chromatography	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Soils
TM173	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Soils by GC-FID
TM180	Sulphide in waters and waste waters 1991 ISBN 01 175 7186 SCA rec. 2007 (unpublished)'	The Determination Of Easily Liberated Sulphide In Soil Samples by Ion Selective Electrode Technique
TM181	US EPA Method 6010B	Determination of Routine Metals in Soil by iCap 6500 Duo ICP-OES
TM182	CEN/TC 292 - WI 292046-chacterization of waste-leaching Behaviour Tests- Acid and Base Neutralization Capacity Test	Determination of Acid Neutralisation Capacity (ANC) Using Autotitration in Soils
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM218	Shaker extraction - EPA method 3546.	The determination of PAH in soil samples by GC-MS
TM221	Inductively Coupled Plasma - Atomic Emission Spectroscopy. An Atlas of Spectral Information: Winge, Fassel, Peterson and Floyd	Determination of Acid extractable Sulphate in Soils by IRIS Emission Spectrometer
TM222	In-House Method	Determination of Hot Water Soluble Boron in Soils (10:1 Water:soil) by IRIS Emission Spectrometer
TM243		Mixed Anions In Soils By Kone
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

CERTIFICATE OF ANALYSIS

SDG:	180509-11	**Client Reference:**	LBH4530	**Report Number:**	456563
Location:	11A Parkhill Road	**Order Number:**	LBH4530	**Superseded Report:**	

Test Completion Dates

Lab Sample No(s)	17517500	17517505
Customer Sample Ref.	BH1	BH2
AGS Ref.		
Depth	1.00 - 1.00	0.30 - 0.30
Type	Soil/Solid (S)	Soil/Solid (S)
ANC at pH4 and ANC at pH 6	14-May-2018	14-May-2018
Anions by Kone (soil)		15-May-2018
Anions by Kone (w)	14-May-2018	14-May-2018
Asbestos ID in Solid Samples		16-May-2018
Boron Water Soluble		14-May-2018
CEN 2:1 Leachate (2 Stage)	09-May-2018	10-May-2018
CEN 2:1 Readings	11-May-2018	11-May-2018
CEN 8:1 Leachate (2 Stage)	11-May-2018	11-May-2018
CEN 8:1 Readings	14-May-2018	14-May-2018
Cyanide Comp/Free/Total/Thiocyanate		16-May-2018
Dissolved Metals by ICP-MS	16-May-2018	16-May-2018
Dissolved Organic/Inorganic Carbon	14-May-2018	14-May-2018
Easily Liberated Sulphide		15-May-2018
EPH		15-May-2018
EPH by FID		15-May-2018
EPH CWG (Aliphatic) GC (S)		16-May-2018
EPH CWG (Aromatic) GC (S)		16-May-2018
Fluoride	14-May-2018	14-May-2018
GRO by GC-FID (S)		15-May-2018
Hexavalent Chromium (s)		16-May-2018
Loss on Ignition in soils	11-May-2018	17-May-2018
Mercury Dissolved	17-May-2018	16-May-2018
Metals in solid samples by OES		15-May-2018
Mineral Oil	15-May-2018	15-May-2018
PAH by GCMS	14-May-2018	11-May-2018
PCBs by GCMS	14-May-2018	15-May-2018
pH	14-May-2018	15-May-2018
Phenols by HPLC (S)		14-May-2018
Phenols by HPLC (W)	15-May-2018	16-May-2018
Sample description	09-May-2018	09-May-2018
Total Dissolved Solids	15-May-2018	15-May-2018
Total Organic Carbon	15-May-2018	15-May-2018
Total Sulphate		16-May-2018
TPH CWG GC (S)		16-May-2018
VOC MS (S)	12-May-2018	16-May-2018

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

4. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

5. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

6. When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

7. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

9. NDP - No determination possible due to insufficient/unsuitable sample.

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

12. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%, they are generally wider for volatiles analysis, 50-150%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethyphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

17. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

18. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

21. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

22. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

23. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

24. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Holding time exceeded before sample received**
5	**Samples exceeded holding time before presevation was performed**
§	**Sampled on date not provided**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to sampled on date**
&	**Sample Holding Time exceeded - Late arrival of instructions.**

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

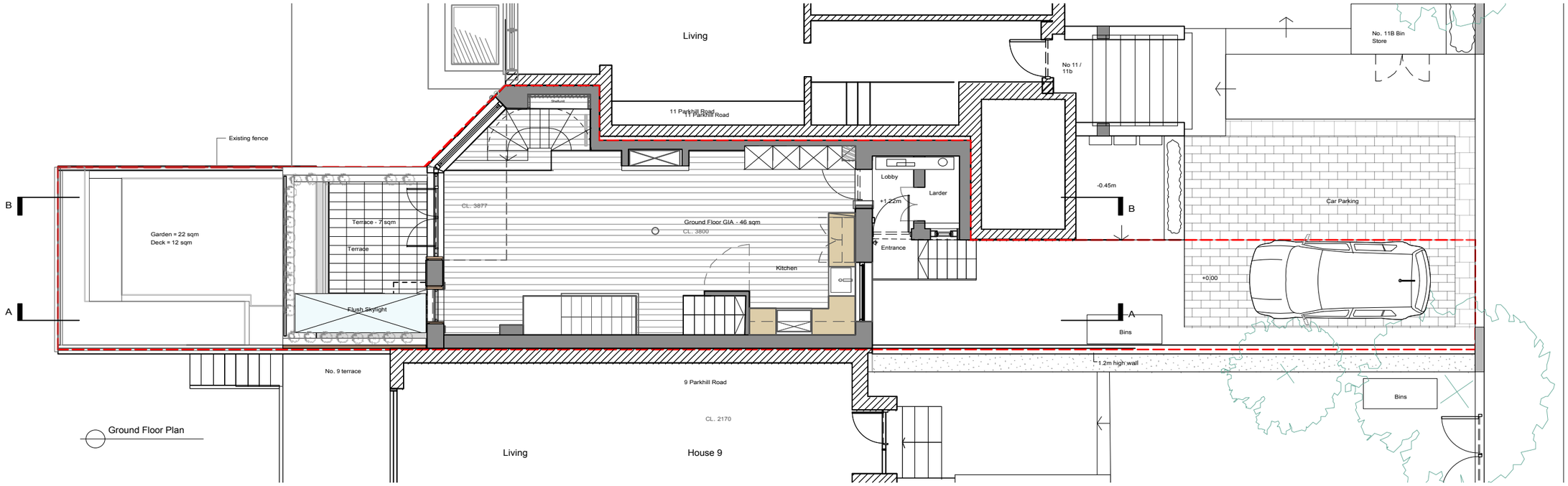
Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

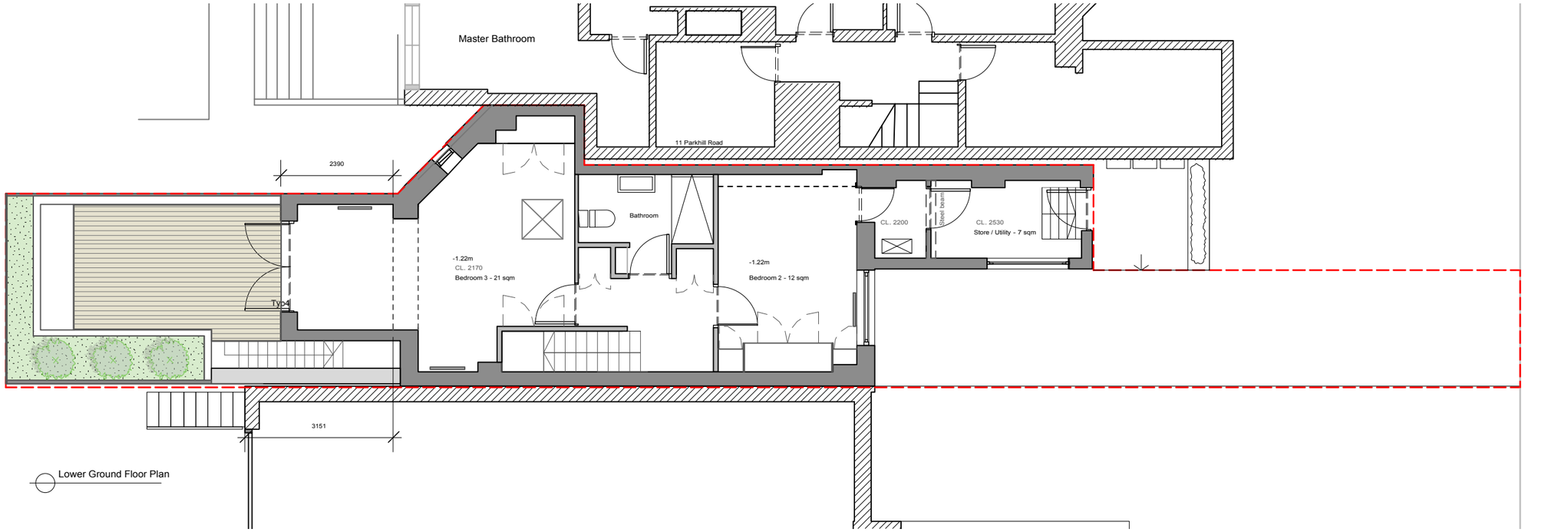
Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.





0m 1m 2m 5m

P1 Issued for Planning 12/07/18

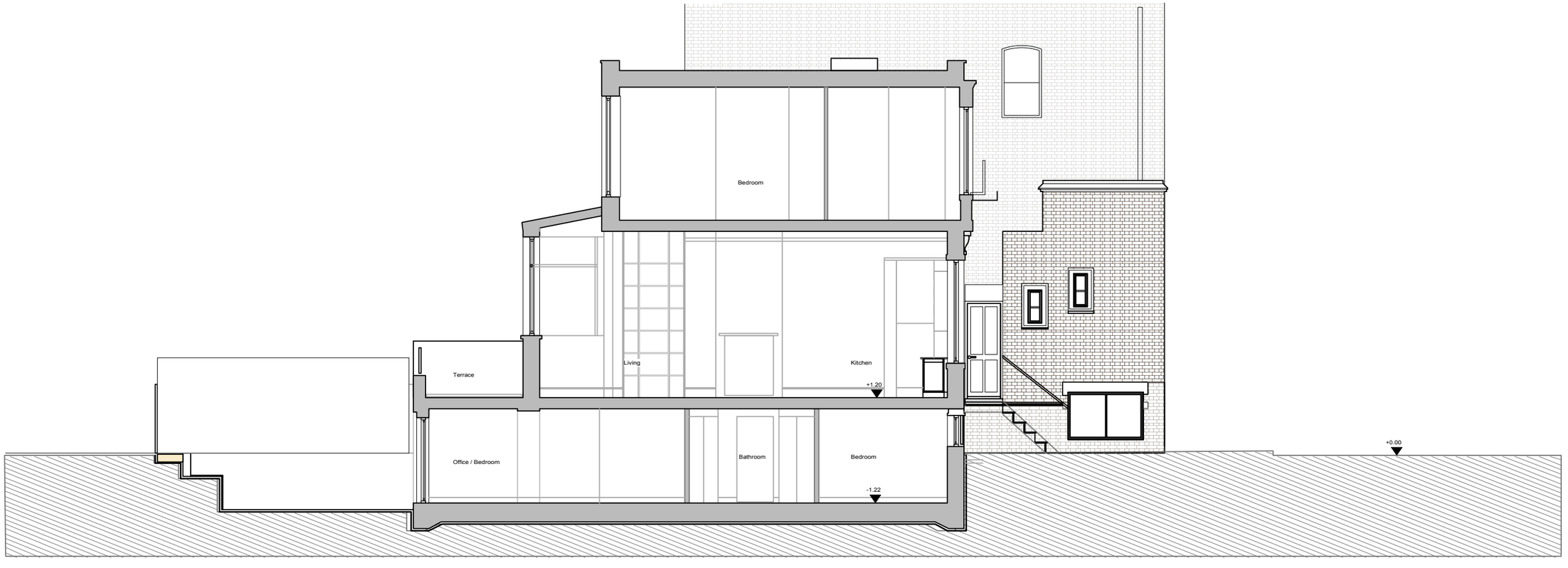
PROJECT
11a Parkhill Road

N o v e l
Tel: 07889 165290
Email: info@studionovel.co.uk

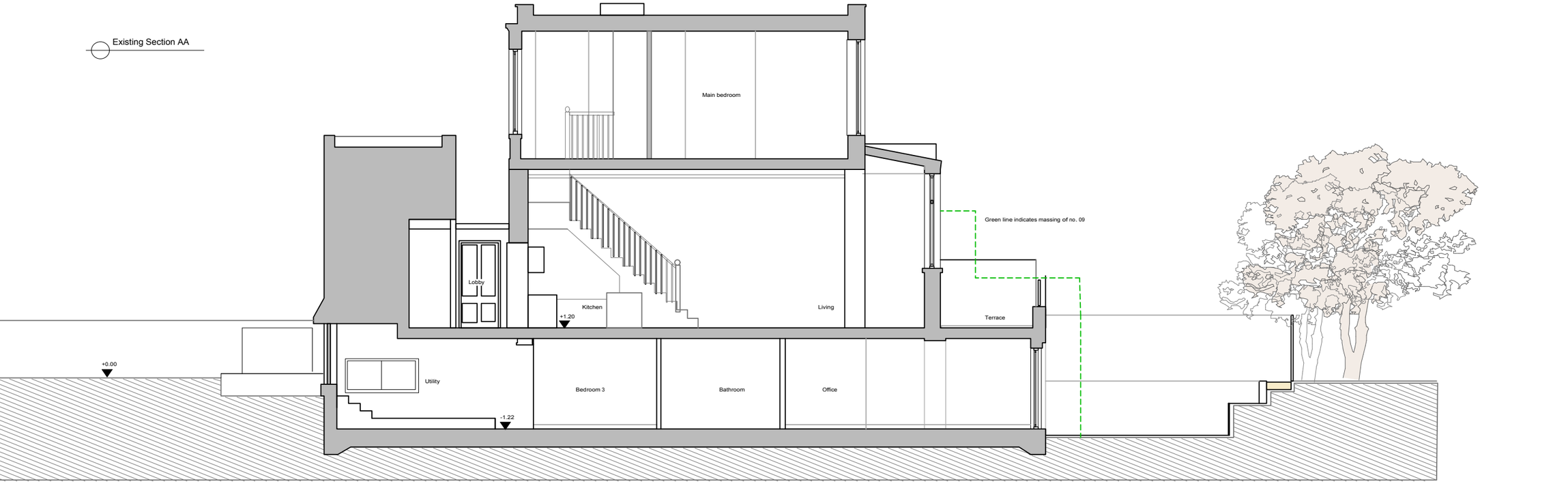
Existing Ground and Lower Ground Plan

DATE 20/06/18
SCALE 1:100 @ A3

PL_ 001



Existing Section AA



Existing Section BB

P1 Issued for Planning 12/07/18

PROJECT
11a Parkhill Road

N o v e l
Tel: 07889 165290
Email: info@studionovel.co.uk

Existing Sections

DATE 20/06/18
SCALE 1:100 @ A3

PL_ 002

9 Parkhill Road | 11A Parkhill Road | 11 Parkhill Road

Existing Front Elevation

11 Parkhill Road | 11A Parkhill Road | 9 Parkhill Road

Existing Rear Elevation

0m 1m 2m 5m

P1 Issued for Planning 12/07/18

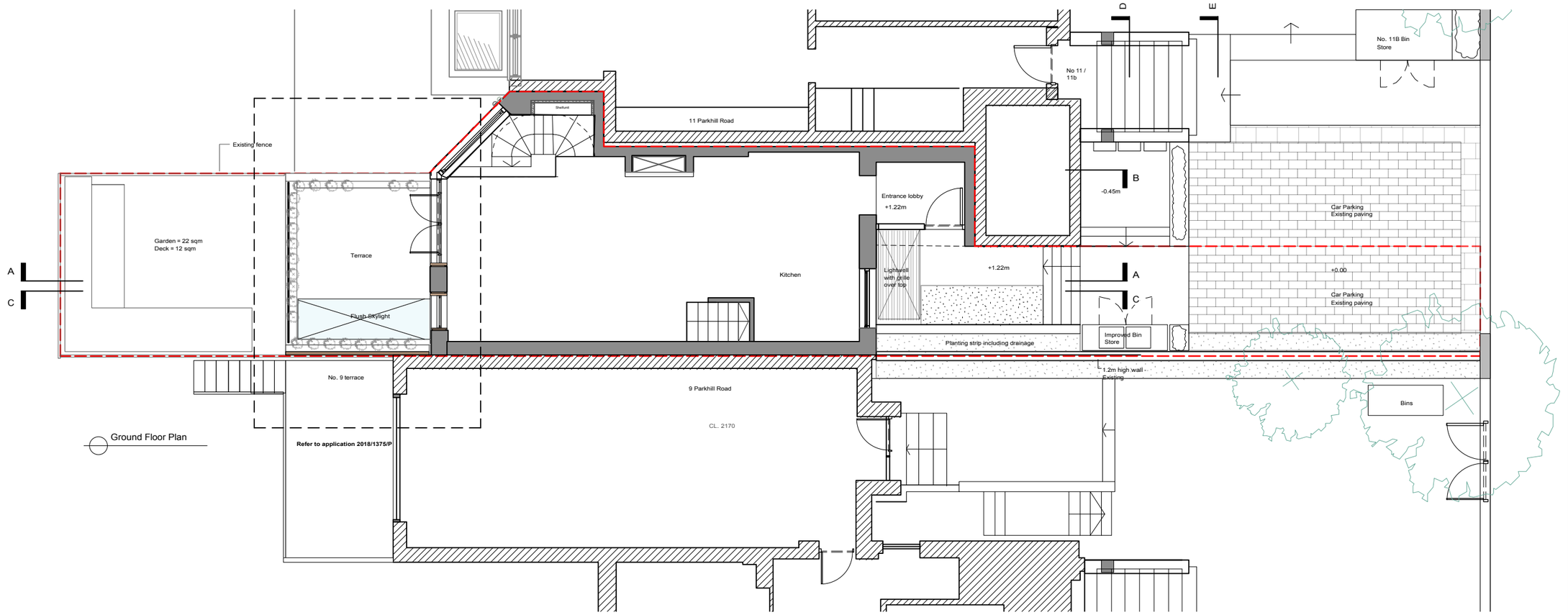
PROJECT
11a Parkhill Road

N o v e l
Tel: 07889 165290
Email: info@studionovel.co.uk

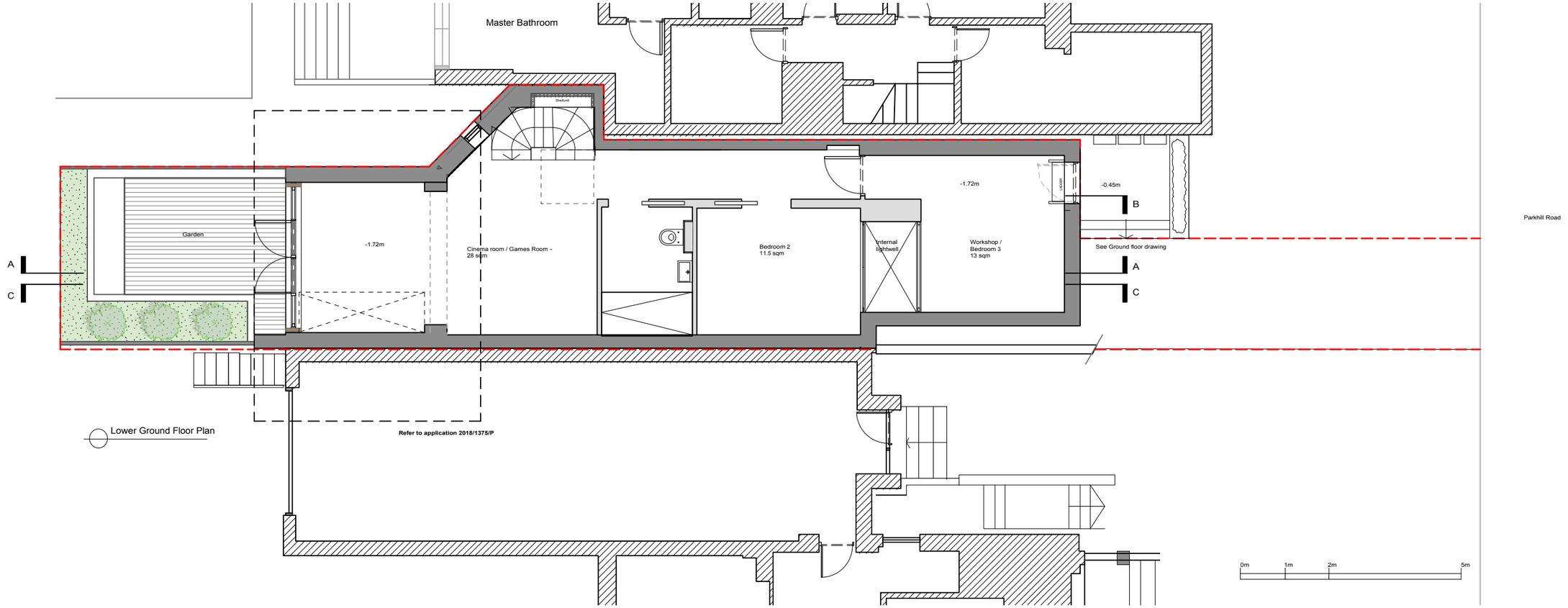
Existing Elevations

DATE 20/06/18
SCALE 1:100 @ A3

PL_ 003



Ground Floor Plan



Lower Ground Floor Plan

P1 Issued for Planning 12/07/18

PROJECT
11a Parkhill Road

N o v e l

Tel: 07889 165290

Email: info@studionovel.co.uk

Proposed Ground and Lower Ground Plan

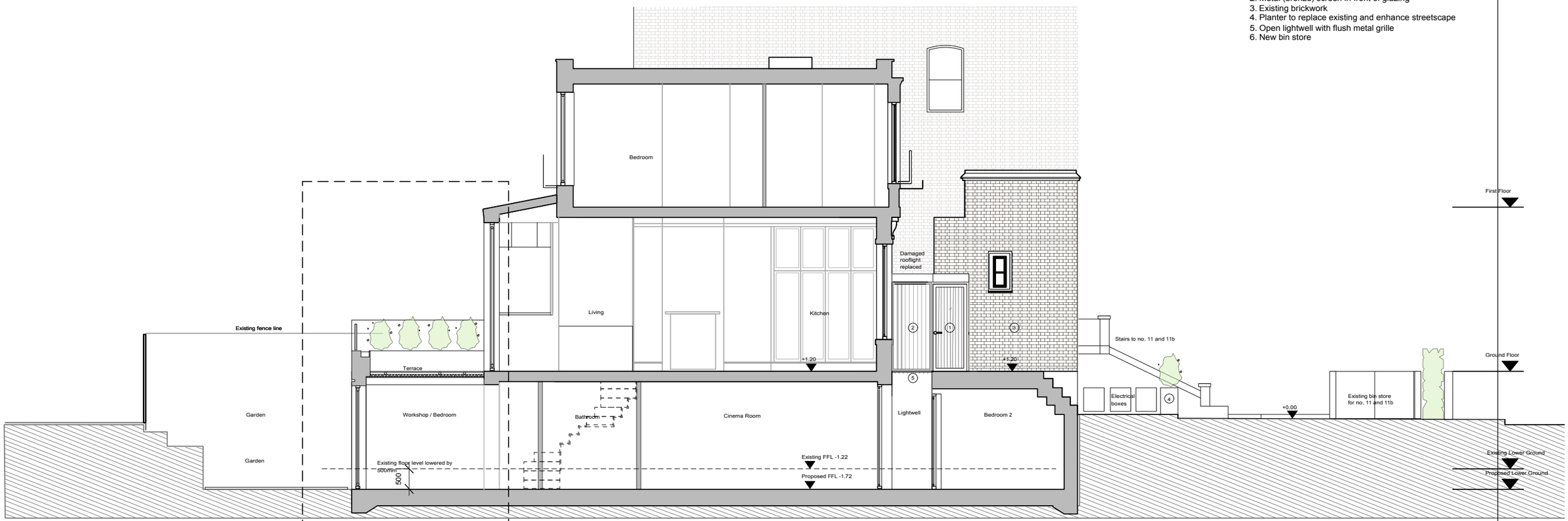
DATE 20/06/18
SCALE 1:100 @ A3

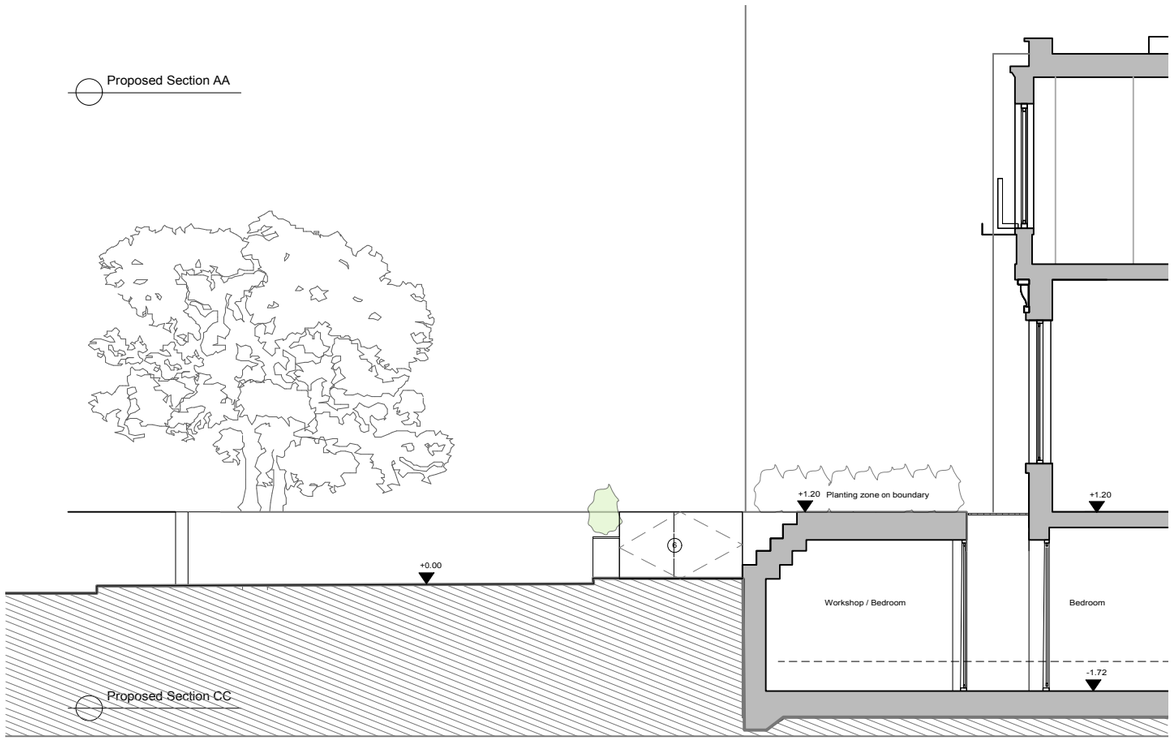
PL_ 004

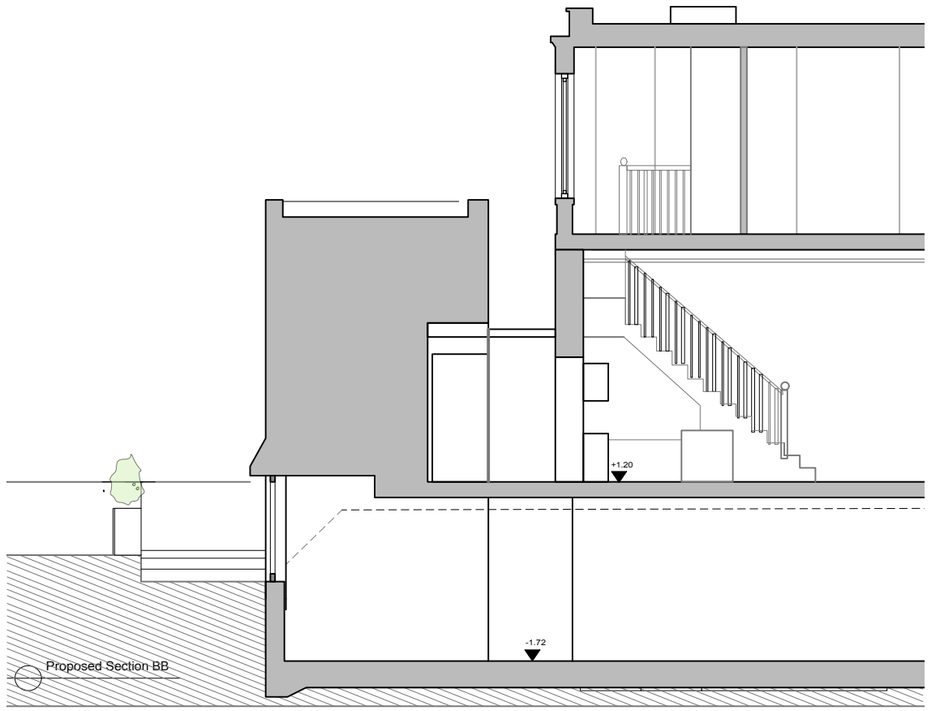
0m 1m 2m 5m

Material Key

1. New timber door
2. Metal (bronze) screen in front of glazing
3. Existing brickwork
4. Planter to replace existing and enhance streetscape
5. Open lightwell with flush metal grille
6. New bin store







P1 Issued for Planning 12/07/18

PROJECT
11a Parkhill Road

N o v e l
Tel: 07889 165290
Email: info@studionovel.co.uk

Proposed Sections

DATE 20/06/18
SCALE 1:100 @ A3

PL_ 005

9 Parkhill Road | 11A Parkhill Road | 11 Parkhill Road

Front Elevation - Section DD

9 Parkhill Road | 11A Parkhill Road | 11 Parkhill Road

Front Elevation - Section EE

Material Key

1. Masonry - colour to match existing
2. New stone steps
3. New door with metal framing and glazed inset
4. Existing brickwork
5. Planter to replace existing and enhance streetscape
6. Existing boundary wall
7. New planting zone with soakaway
8. Open lightwell with flush metal grille

0m 1m 2m 5m

P1 Issued for Planning 12/07/18

PROJECT
11a Parkhill Road

N o v e l
Tel: 07889 165290
Email: info@studionovel.co.uk

Proposed Elevations

DATE 20/06/18
SCALE 1:100 @ A3

PL_ 006

Material Key

1. Masonry - colour to match existing
2. New window with metal framing to match original studio windows
3. Metal Handrail and Balustrade
4. Feature Window
5. Existing brickwork
6. Planting screen
7. Privacy Screen improved

0m 1m 2m 5m

P1 Issued for Planning 12/07/18

PROJECT
11a Parkhill Road

N o v e l
Tel: 07889 165290
Email: info@studionovel.co.uk

Proposed Elevations

DATE 20/06/18
SCALE 1:100 @ A3

PL_ 006

howardcavanna
CONSULTING ENGINEERS

9 Sherwood Park Road
Sutton, Surrey
SM1 2SQ

T: [redacted]
F:
W: www.howardcavanna.co.uk
E: mail@howardcavanna.co.uk

Our Ref 2018 019/AB
Date: July 2018

11A PARKHILL ROAD.

LONDON NW3 2YH

ENGINEERING DESIGN AND CONSTRUCTION STATEMENT

[July 2018]

Howard Cavanna Limited trading as Howard Cavanna Registered In England Number 3948798
Directors: R Payne B.Eng (Hons) C.Eng M.I Struct.E, A. Biddulph C.Eng M.I.Struct.E.
Consultants: Eur Ing P Cavanna C.Eng F.I.Struct.E M.Cons.E.

1.0 STRUCTURAL REPORT RELATING TO THE PROPOSED TOWN PLANNING APPLICATION TO EXTEND AND ALTER THE EXISTING BASEMENT TO THIS BUILDING

1.1 INTRODUCTION

It is proposed to lower the existing basement to the house with small basement extensions at the front and the rear together with alterations at ground and first floors. The purpose of this report is to outline the structural considerations and likely method of construction for the proposed basement works. Orientation referred to in this report will be as viewing the house from the front in Parkhill Road.

1.2 DESCRIPTION OF EXISTING BUILDING

This building is a three storey house, including basement, which abuts a four storey house with basement at no 11 Parkhill Road. There are two storey sections at the front and rear. The ground level at the front is slightly below ground floor level and the ground level at the rear is at basement level.

The house is generally constructed with timber floors supported on masonry load bearing walls. The perimeter walls are load bearing masonry walls with facing brick from ground to second floor level.

The basement floor and foundation system are unknown at this time but are assumed to be traditional trench fill foundations with a ground bearing concrete floor slab.

1.3 DESCRIPTION OF PROPOSED BASEMENT STRUCTURE

The proposed lowering of the basement accommodation will be under the footprint of the existing house with a small basement extension at the front and rear. The rear section is already at basement level. The rear garden will be slightly lowered to form a rear patio area. The front extension will need to be lowered from ground level at the front.

Generally the proposed works will be formed at approximately 2.2 m below external ground level at the front and the top of the finished basement floor lowered by 0.5 m in the existing house and at the rear.

The extent of these proposed works is shown on the architects drawings produced by Novel.

Structural details are shown on Howard Cavanna drawings 2018 019 / 01 to 03, D1 to 3.

1.4 EXISTING GROUND CONDITIONS

Ground investigation works have been undertaken by LBH Wembley Engineering , the details of which can to be found their report. In terms of the field work two small diameter percussive boreholes were sunk, one in the in the front garden and one in the rear garden.

Specific details of the ground conditions found are recorded within the borehole records generally showing made ground over London clay at the front and London clay at the rear.

1.5 GROUND WATER

A shallow ground water table is not present on this site. Some surface water was encountered which can be dealt with using local pumping during construction.

The proposed basement area would be founded essentially into the London CLAY.

1.6 BOUNDARIES AND ADJOINING STRUCTURES

The proposed basement abuts an existing basement to no 11 Parkhill Road on the right hand side and an existing basement to no 7 on the left hand side. These basement areas extend out to the rear.

The proposed lowering of the basement in these areas is therefore a relatively shallow excavation.

The small front basement extension is adjacent to a brick boundary wall and will be constructed using traditional construction methods.

The front and rear boundaries will not be affected by the proposed works.

1.7 PROPOSED FOUNDATIONS

The basement to the existing house will be constructed with traditionally constructed reinforced concrete underpinning to the existing walls excavated and cast in short sections not exceeding 1.2 metres in length. A concrete slab will be cast at the new basement level.

The front basement extension below the garden will be formed in reinforced concrete construction including a suspended slab to the "roof" of the basement extension.

1.8 DESIGN AND CONSTRUCTION

The design and construction of the basement areas requires careful consideration of the support to the vertical building loads and lateral earth loads during the temporary (construction) and permanent conditions. The basement area will need to be designed for any upward water pressures and 'floatation' forces. The new basement areas will need to be waterproofed.

The reinforced concrete underpinning under the existing retained walls and the reinforced concrete walls to the new front section will transfer the vertical loading from the building to foundation level and will be designed to resist the horizontal earth and water pressures, including surcharge loadings from adjacent buildings. The walls will be temporarily horizontally propped during construction. In the permanent condition the walls will be horizontally propped by the new concrete basement slab and lower ground floor structure. The concrete basement slab will be designed to resist any upward water pressure.

Any local surface water ingress will be locally removed from the excavations by pumping from the excavated area to a sump area. The effects if any are anticipated to be very localised and of limited duration and therefore are unlikely to significantly alter the soil characteristics adjacent to the foundations. In the final condition the new wall foundation is cast onto the bearing strata.

The design upward water pressure on the basement will be resisted in the existing house by the reinforced concrete basement slab tied into the concrete underpinning to the walls. There is sufficient weight in the loading to the underpinned walls and the basement structure to resist any 'floatation' effects.

Water and moisture will generally be excluded from the permanent structure by the reinforced concrete walls/slab and the provision of an internal drained cavity system on the inside face of the walls/slab. Any water from the cavity system will drain to sumps in the external light-well and be pumped into the house surface water drainage system. The concrete walls/slab will prevent the migration of large quantities of water or soil particles and therefore the drained cavity will only need to deal with a limited quantity of ground water.

The adjoining properties will be continuously monitored for any movement during the basement construction works with all measures/details subject to agreement with the owners and occupiers of these buildings under the requirements of Party Wall Act.

Due to the careful consideration of the sequencing of the works and the introduction of temporary horizontal propping where necessary to the excavations and subsequently constructed retaining walls until such time as the basement floor slabs are constructed and cured, it is considered that the likely perceived settlement or horizontal movements within the excavations will be controlled to an extent that any damage to the existing structure above or to the adjoining properties will be limited to category 1 of the Damage Category Chart [CIRIA C580]. This is considered to be within acceptable limits for this type of construction.

The detailed structural design of the proposed works will be carried out in accordance with the current British Standards, Building Regulations and appropriate Guidance Documents published by CIRIA, ICE, IStructE etc.

The design and drawings will be submitted to the local Building Control for approval and the construction inspected by the Building Inspector on site.

1.9 CONCLUSIONS

The proposed basement areas to this property can be safely constructed using established construction techniques, which have been used in other properties in the area to form new basements without any significant adverse effects on the adjacent properties.

ANDREW BIDDULPH
C.Eng. M.I.Struct.E

2.0 CONSTRUCTION METHODOLOGY FOR THE FORMATION OF THE BASEMENT AREA

1. Access to the proposed basement area to construct the extension will be from the front of the existing building at the existing basement level. Access will be made from the front of the building. The excavated material and all construction materials will be taken through the front. Conveyer belts can be used to transfer the excavated spoil through the property to a skip located on the private drive at the front of the property, not on the public highway.

2. The existing walls will be underpinned in sections not exceeding 1200 millimetres in length, in accordance with Howard Cavanna's specification and as shown on the enclosed drawings TW01 to 06. The existing basement walls will be horizontally temporarily propped across the building as shown on these drawings before cutting out the existing basement floor. Local pumping as necessary will be provided at each excavation to remove any ground water during excavations and concreting of the underpinning.

3. When the central area is to be excavated at the front, temporary horizontal propping will be provided to the underpinning across the site as shown on drawings TW03 to TW06.

4. The new concrete basement slab can be cast and the temporary horizontal props removed at low level.

5. The ground floor structure at the front can be constructed. There should be no need for the Contractor to require a crane or hoist at the front for materials, plant etc.

3.0 METHOD STATEMENT FOR FORMATION OF NEW OPENINGS IN LOAD BEARING WALLS

3.1 Access into the building for construction of the basement will be as 2.1 above.

3.2 The existing load-bearing structure above the basement floor will be temporarily supported with steel needles and acrow props onto the new basement works at suitably appropriate stages of the works. Alterations to existing walls and support of the front enclosure walls can be carried out once the temporary supports have been installed and inspected by the Engineer.

4.0 GENERAL REQUIREMENTS FOR BASEMENT CONSTRUCTION WORKS

This method statement describes the work activities for the digging out, shuttering, mass pour concreting, backfilling and finishing of underpinning works.

4.1. Refer to drawings 2018 019 / 01 to 03, D1 to 3, N for structural proposals.

4.2. **Digging out (Excavations).** Any existing services will be protected or moved as required. Break up and remove basement floor slab in sections; excavate area to depth of shallowest footing. The holes are dug by hand, spoil moved by conveyer and grab; the excavations will be 1.2 metres wide maximum. To remove the potential for subsidence or movement, adhere strictly to the approved sequence of underpins. No adjacent sections are dug out until the concrete in the original excavations has been set for 48 hours.

4.3. **Excavation Safety.** No machines are allowed near the excavations to minimise the risk of collapse, all trenches will be protected from collapse with braced timber shuttering and acrow props, the site foreman will ensure the safety of each excavation prior to allowing work. Maintain constant horizontal bracing of all excavated faces, and single finished pins. Barriers will be erected around all excavations. Access and egress to trenches will be via short timber ladders, all excavations will have a banks man on duty and an evacuation hoist on site whilst the trench is being worked. Occasionally water enters the excavations and this has to be cleared out by hand bailing, severe flooding may require the use of a pump.

The construction staff will be made aware of the dangers of standing water and will take precautions to ensure contaminated water does not get onto the skin or enter the body. Good standards of hygiene will be maintained prior to eating, drinking and clearing site. After no less than 24 hours, ram dry pack to Engineer's specification. After 2 days, strike shuttering. During works, check rear of all pins; should any void be found, pack with compacted lean-mix.

4.4 **Shuttering.** Manually cut with spades the vertical far face of each pin to give an even and straight wall on the Neighbour's side of the excavation. No excavation machinery will be permitted therefore reducing any noise and vibration to the neighbour's property. Any loose ground should be retained by cement-board backfilled with lean-mix concrete (to remain permanently in place). The cement board is to be braced in position with concrete spacers from the reinforcing bar and top and bottom against the inside shutter or concrete wall base. Plywood shuttering will be fixed to the front face of the excavations and braced with 50 x 100 timbers fixed with 4" coach bolts to prevent movement. Acrow props will also be used to add strength to the shuttering. 12mm steel reinforcing bar will be fixed to tie each concrete block to its adjacent block. Retaining walls are to be propped after pouring until structure is complete. [Refer to sketch TM1.]

4.5 **Concreting.** The concrete will be delivered via cement mixer and poured against the face of the excavation. The concrete must be a minimum strength of 40 N/mm². Once poured the concrete will be vibrated with the use of a vibrating poker, the site foreman is responsible for ensuring the correct distribution of the concrete in to the shuttering and that the reinforcing rods are kept in position.

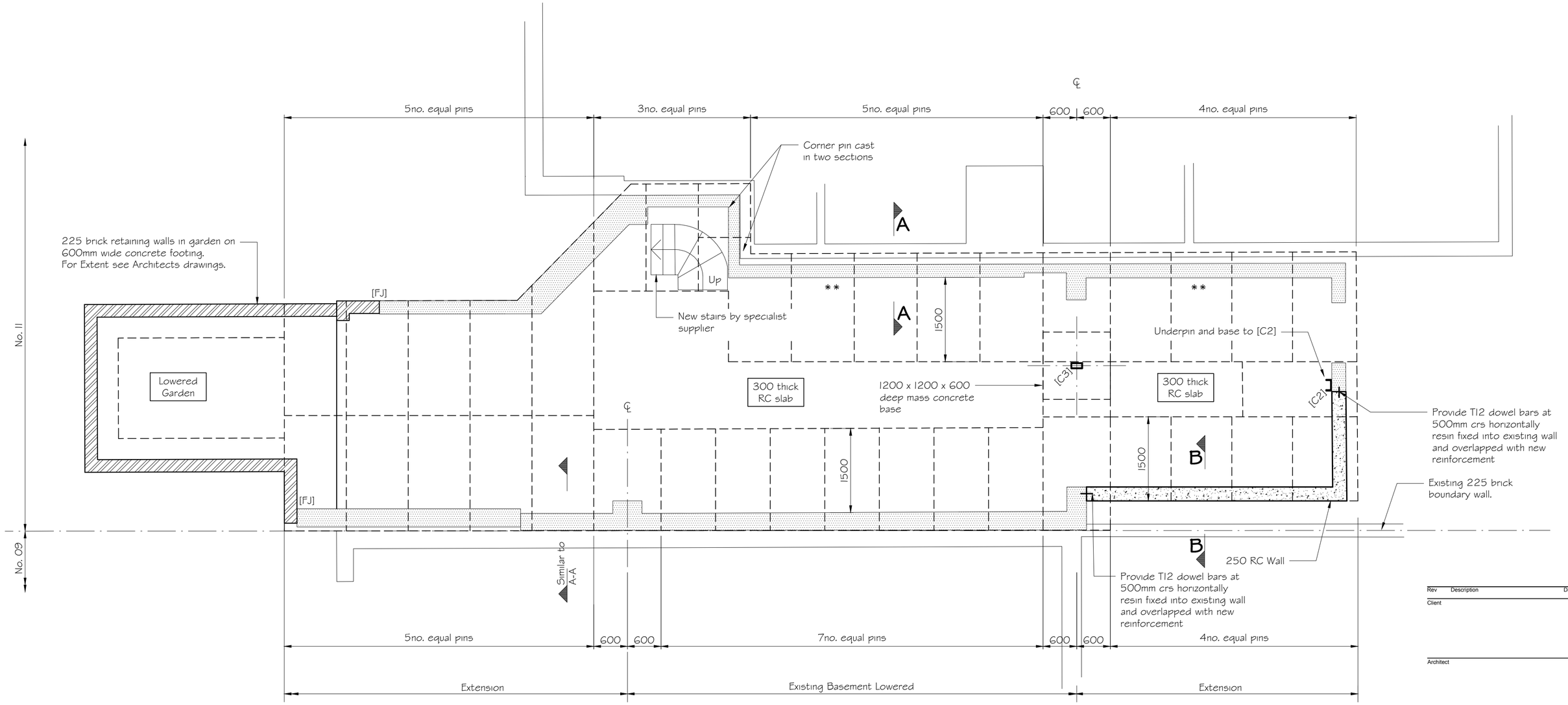
4.6. **Removal of Spoil.** Any spoil produced by the process will be removed via conveyer belts to skips located on the private drive at the front of the property and not on the public highway. The spoil will then be collected and removed from site to landfill.

4.7. **Finishing and Backfilling**. The holes will be backfilled externally with crushed limestone compacted in layers not exceeding 150mm and levelled off with either soil or paving. The finish level will be 150mm below dpc. It is the responsibility of the site foreman to ensure no hazards remain on the site and that the owners are informed of completion of the works.

4.8. **Inspections.** The Local Authority Engineer or Surveyor shall inspect each excavated base formation. All temporary works are to be inspected by the Engineer prior to removal of existing structure.

Do not scale from this drawing

For General Notes refer to drawing no. 2018 019/N



Basement Plan

1:50

New members

Columns

[C2] - 200 x 90 x 32 PFC
Resin bolted to wall with
M12 bolts at 300 crs

[C3] - 200 x 100 x 8 RHS
within stud wall

Joints

[FJ] - Stainless steel wall starter joints.

** Builder to investigate existing party wall thickness, foundation width and details, and notify engineer in order to finalize details along this wall.

For sections see drawings 2018 019 D1 to D3.

0 1 2 3 5m

Rev	Description	Date

Client

Architect

Project

11A Parkhill Road
London
NW3

Drawing Title

Basement Plan

howardcavanna
consulting engineers

3a Sandiford Road
Sutton, Surrey
SM3 9RN

t: 020 8644 0905

w: www.howardcavanna.co.uk
e: mail@howardcavanna.co.uk

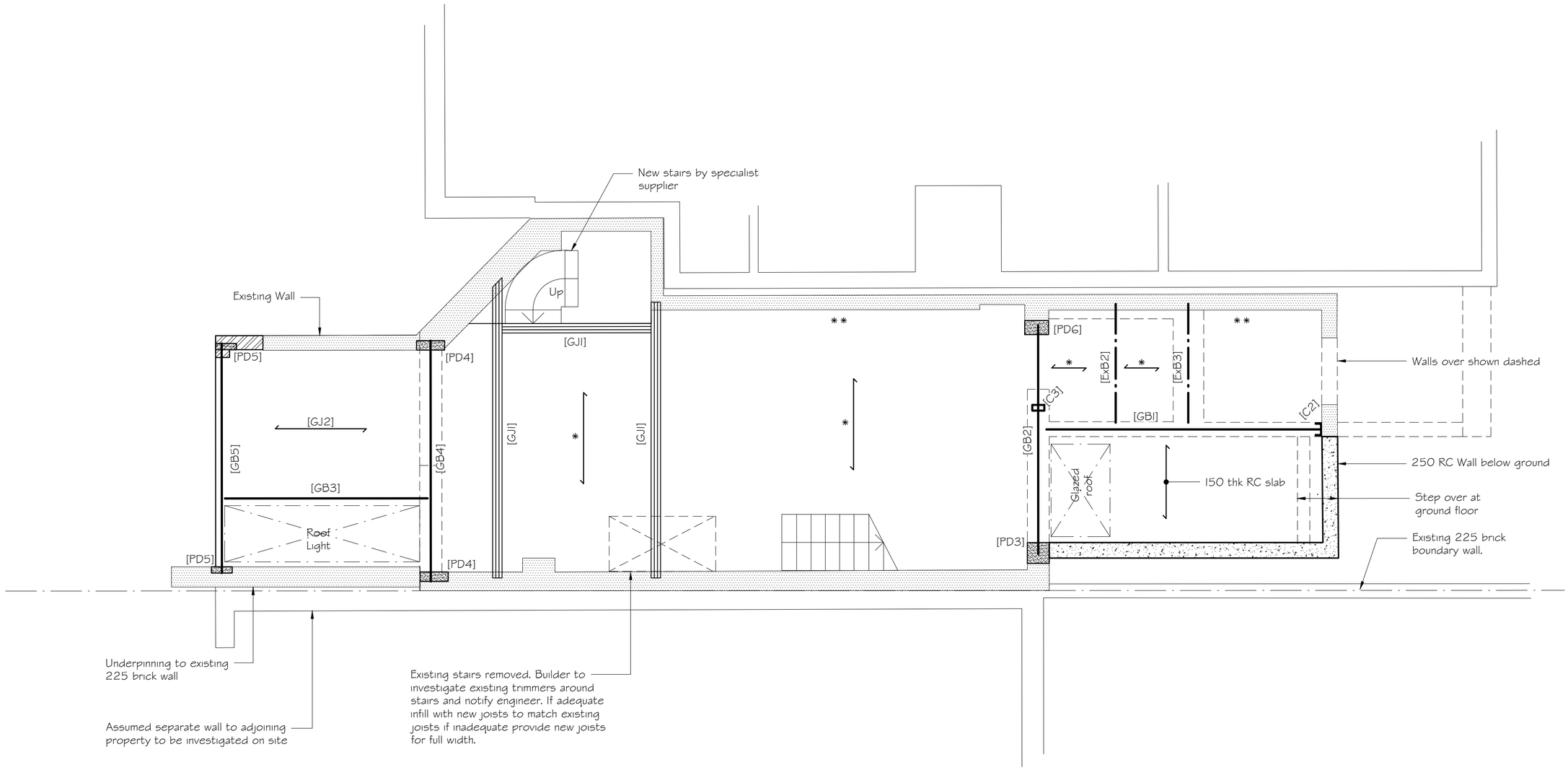
Scale.	Drawn by.	Date.
1:50 @ A2		

Drg. Status.

Drg No.
2018 019/01

Do not scale from this drawing

For General Notes refer to drawing no. 2018 019/N



Plan On Basement Showing Ground Floor Construction Over

1:50

Existing Memebers

[ExB1] - 2no. 150 deep I beams

[ExB2] - 125 deep I beams

[ExB3] - 125 deep I beams

New members

Timber (Grade C24)

[GJ1] - New treble joists bolted together to match existing joists.

[GJ2] - 50 x 150 High joists at 400crs

New members

Columns

[C2] - 200 x 90 x 32 PFC Resin bolted to wall with M12 bolts at 300 crs

[C3] - 200 x 100 x 8 RHS within stud wall

* Builders to notify engineer of existing joist sizes / spacing.

** Builder to investigate existing party wall thickness, foundation width and details, and notify engineer in order to finalize details along this wall.

New members

Beams

[GB1] - 203 x 203 x 52 UC

[GB2] - 2no. 203 x 133 x 30 UB's bolted together with M16 bolts and steel spacers at 500crs allow for 10mm plate on top of beams for width of wall.

[GB3] - 152 x 152 x 23 UC within roof

[GB4] , [GB5] - 2no. 150 x 90 x 24 PFC's bolted with M16 bolts with steel spacers at 500crs.

New members

Padstones

[PD2] - 450 x 335 x 225 High

[PD3] - 335 x 335 x 225 High

[PD4] - 450 x 150 x 150 High

[PD5] - 335 x 100 x 150 High

[PD6] - 225 x width of wall x 225 high

For sections see drawings 2018 019 D1 to D3.

0 1 2 3 5m

Rev	Description	Date

Client

Architect

Project

11A Parkhill Road
London
NW3

Drawing Title

Plan on Basement Walls Showing Ground Floor Construction Over

howardcavanna
consulting engineers

3a Sandiford Road
Sutton, Surrey
SM3 9RN

t: 020 8644 0905

w: www.howardcavanna.co.uk
e: mail@howardcavanna.co.uk

Scale.	Drawn by.	Date.
1:50 @ A2		

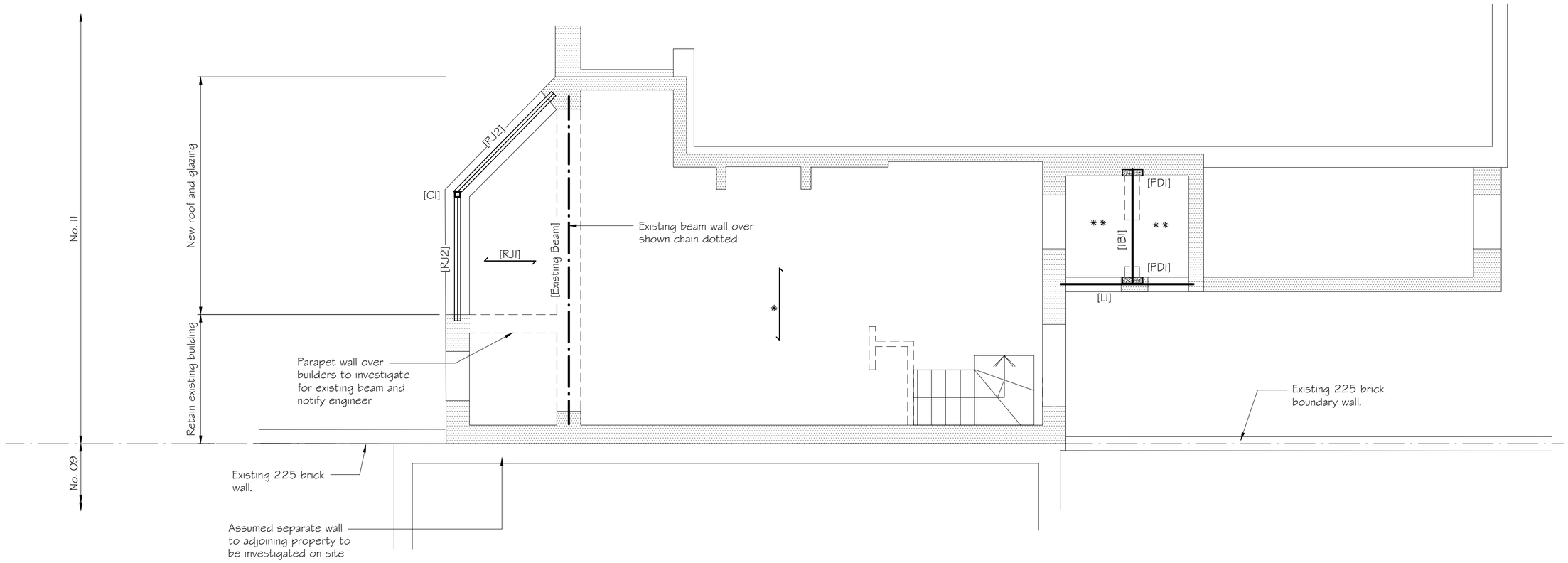
Drg. Status.

Drg No.

2018 019/02

Do not scale from this drawing

For General Notes refer to drawing no. 2018 019/N



Plan on Ground Floor Walls Showing 1st Floor Construction Over

1:50

New Members

Timber (Grade C24)

[RJI] - 50 x 150 High joists at 400crs

[RJ2] - 2no. joists [RJI] bolted together

Column

[CI] - 90 x 90 x 6.3 SHS subject to investigation of existing beam.

Beams

[IBI] - Existing parapet wall over. Provide 2no.150 x 90 x 24 PFC's bolted back to back with M16 bolts at 500mm crs.

New Members

Lintels (150mm min. bearings)

[LI] - Builder to investigate and confirm wall is 225mm solid brickwork to engineer before ordering Catnic 'CN81C' or similar approved , assuming [IBI] / [PDI] are above lintel.
If lintel is on same line as [IBI] provide 150x100x6.3 RHS with 10mm welded bottom plate - all galvanized and painted.

Padstones

[PDI] - 335 x 100 x 150 High

* Assumed span of joists over to be confirmed by builders on site

** Builder to investigate direction of span/size of existing joists and notify engineer.

For sections see drawings 2018 019 D1 to D3.

0 1 2 3 5m

Rev	Description	Date

Client

Architect

Project

11A Parkhill Road
London
NW3

Drawing Title

Plan on ground Floor Walls Showing 1st Floor Construction Over

howardcavanna
consulting engineers

3a Sandiford Road
Sutton, Surrey
SM3 9RN

t: 020 8644 0905

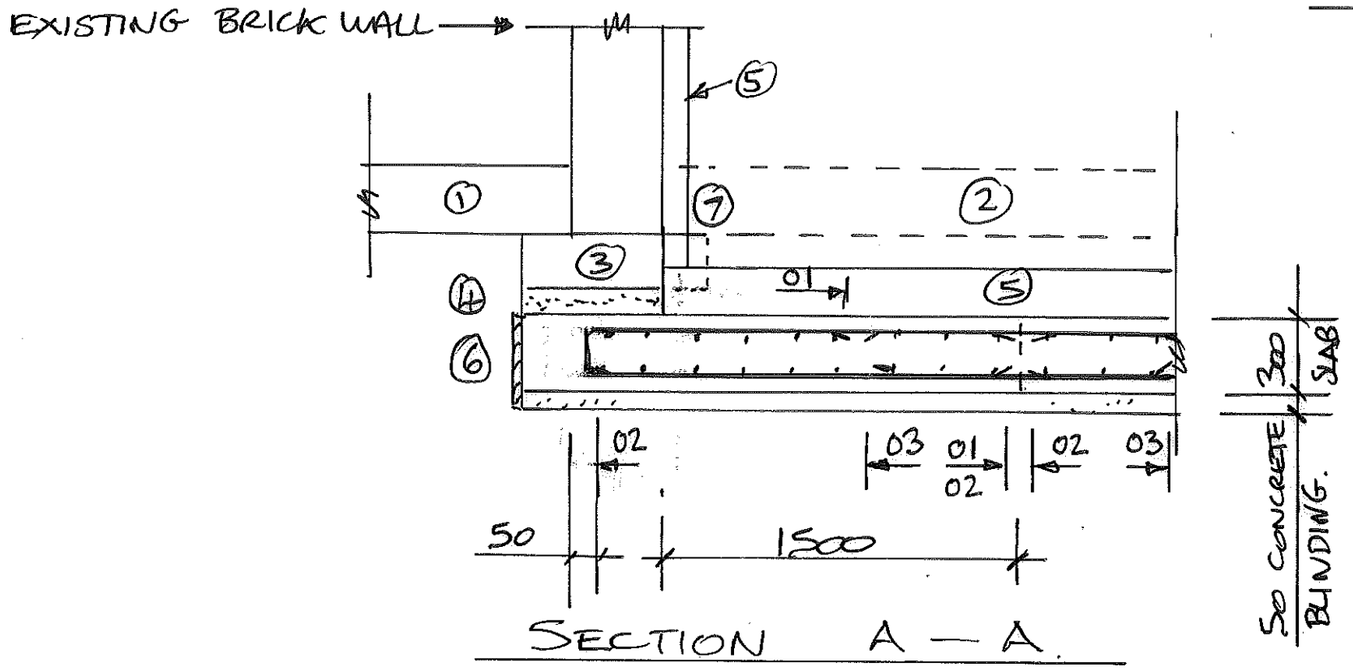
w: www.howardcavanna.co.uk
e: mail@howardcavanna.co.uk

Scale.	Drawn by.	Date.
1:50 @ A2		

Drg. Status.

Drg No.
2018 019/03

Do not scale from this drawing.



SECTION A — A.

NOTES

(1) EXISTING BASEMENT. TO BE INVESTIGATED AND CONFIRMED ON SITE.

(2) EXISTING SLAB LOWERED.

(3) EXISTING FOUNDATION. ASSUMED DETAIL TO BE INVESTIGATED AND CONFIRMED ON SITE.

(4) DRY PACK RAMMED IN TIGHT (1:3 MIX - SULPHATE RESISTING CEMENT : SHARP SAND)

(5) FINISHES/INSULATION AND WATER-PROOFING TO ARCHITECTS SPECIFICATION.

(6) CEMENT BOARD OR SIMILAR APPROVED PERMANANT SHUTTER. BOARD SHOULD BE PARALLEL TO WALL ON COMPLETION. ANY VOIDS BEHIND SHUTTER TO BE BACKFILLED USING LEAN MIX CONCRETE.

(7) ANY PROJECTIONS TO BE CAREFULLY CUT BACK AFTER DRY PACKING HAS BEEN COMPLETED AND REACHED DESIGN STRENGTH.

REINFORCEMENT

01 T12 U BARS AT 150 c/s.

02 1 LAYER OF BS A393 MESH TOP AND BOTTOM.

03 T12 LAP BARS AT 150 c/s

MINIMUM LAP 450 mm. TOP AND BOTTUM

COVER 40 mm MINIMUM.

NOTE

HORIZONTAL PROPPING ACROSS THE SITE MUST BE PROVIDED TO THE BOTTOM OF THE EXISTING BASEMENT WALL BEFORE THE EXISTING SLAB IS REMOVED AND RETAINED UNTILL THE NEW BASEMENT SLAB HAS BEEN CAST.

Rev	Description	Date

Client

Architect

Project
11A PARKHILL ROAD
LONDON NW3.

Drawing Title

BASEMENT SECTIONS
SHEET 1

howardcavanna
consulting engineers
3a Sandiford Road
Sutton, Surrey
SM3 9RN
t: 020 8644 0905
w: www.howardcavanna.co.uk
e: mail@howardcavanna.co.uk

(A3 SIZE)

Scale.	Drawn by.	Date.
1:25		

Drg. Status.

Drg No. 2018 019 / D1

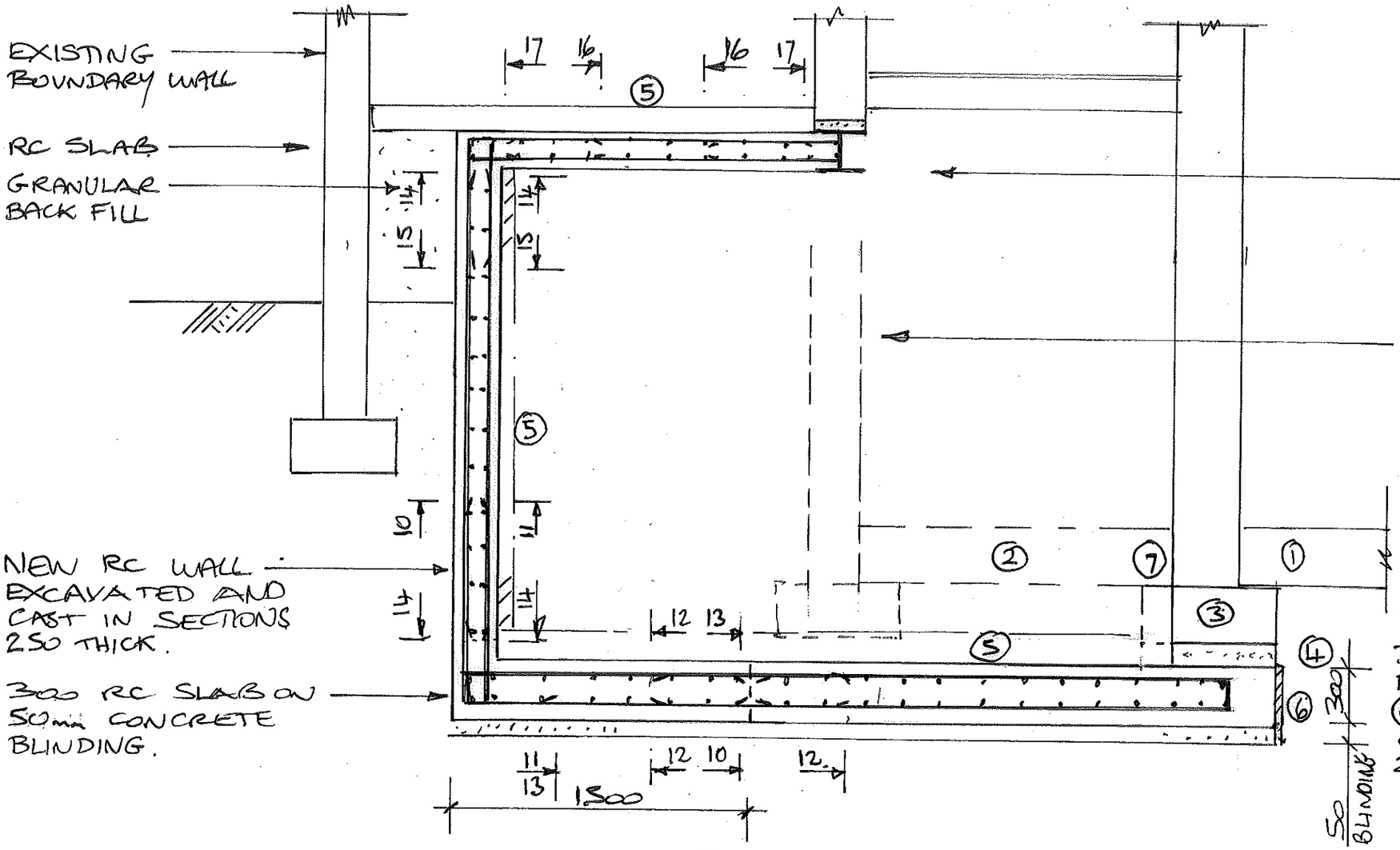
REINFORCEMENT

10 T12 L BARS AT 150 c/s
11 T12 L BARS AT 150 c/s
12 T12 LAP BARS TOP AND BOTTOM AT 150 c/s
13 T12 U BARS AT 150 c/s.
14 T12 BARS AT 150 c/s
15 T12 U BARS AT 150 c/s
16 T10 U BARS AT 150 c/s
17 T10 BARS TOP AND BOTTOM AT 150 c/s

DISTRIBUTION (LONGITUDINAL) BARS – T10 AT 200 c/s.

MINIMUM LAP = 450 mm
MINIMUM COVER 40 mm

Do not scale from this drawing



SECTION B – B.

A REDRAWN 11/7/18
Rev Description Date

Client

Architect

Project

11A PARKHILL ROAD
LONDON NW3

Drawing Title

BASEMENT SECTIONS
SHEET 2

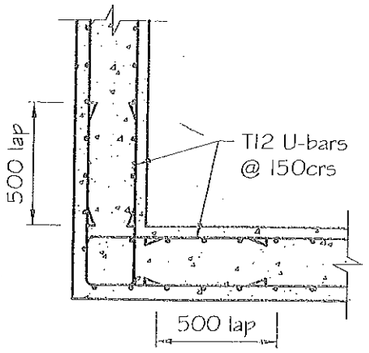
howardcavanna
consulting engineers
3a Sandiford Road
Sutton, Surrey
SM3 9RN
t: 020 8644 0905
w: www.howardcavanna.co.uk
e: mail@howardcavanna.co.uk

(A3 SIZE)

Scale. 1:25 | Drawn by. | Date.

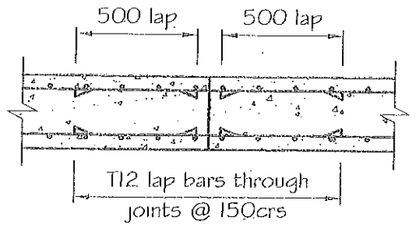
Drg. Status.

Drg No. 20180019/D2A



Details at Corner Junction of Wall

Scale 1:25



Details at Junction of Slab or Wall

Scale 1:25

Do not scale from this drawing

Rev.	Description	Date

Client

Architect

Project

11A PARKHILL ROAD
LONDON NW3

Drawing Title

BASEMENT SECTIONS
SHEET 3

howardcavanna
consulting engineers

3a Sandiford Road
Sutton, Surrey
SM3 9RN

t: 020 8644 0905
w: www.howardcavanna.co.uk
e: mail@howardcavanna.co.uk

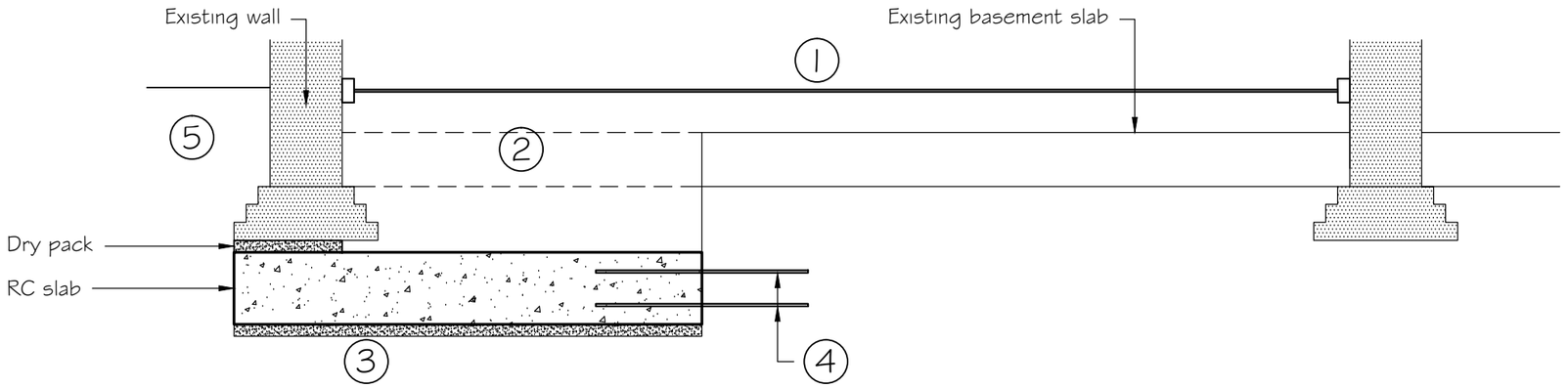
(A3 SIZE)

Scale.	Drawn by.	Date.
1:25		

Drg. Status.

Drg No. 20180019/D3

Do not scale from this drawing



Construction Method Statement For Lowering Existing Basement Slab

1. Install Horizontal Props at maximum 1800mm centers across the site. Use RMD or similar approved heavy duty props.

2. Carefully break out existing concrete slab at first underpin.

3. Excavate and cast first underpin.

4. Provide starter bars pushed into the earth each side for the adjacent underpins and the new basement slab.

5. 24 hours minimum later dry pack between underside of existing foundation and new foundation.

6. Repeat operations (2) to (4) second underpin.

7. Repeat this procedure all along each party wall untill all the underpinning has been completed.

Rev	Description	Date
A	RC Wall Revised	12.07.18

Client

Architect

Project

11A Parkhill Road
London
NW3

Drawing Title

Temporary Works Sheet 1

howardcavanna
consulting engineers

3a Sandiford Road
Sutton, Surrey
SM3 9RN

t: 020 8644 0905

w: www.howardcavanna.co.uk
e: mail@howardcavanna.co.uk

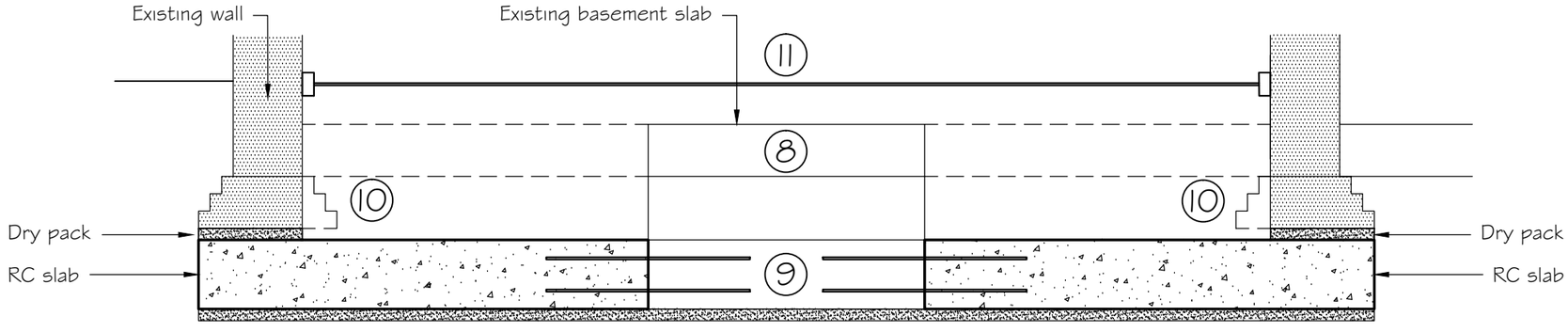
Scale.	Drawn by.	Date.
1:25 @A3		

Drg. Status.

Drg No.

2018 019/TW01 A

Do not scale from this drawing



Construction Method Statement For Lowering Existing Basement Slab

8. Carefully break out remainder of existing basement slab.

9. Excavate and cast remainder of new basement slab.

10. When new concrete slab has reached its design strength carefully break away using hand tools the existing foundations projections.

11. Remove Horizontal props.

Rev	Description	Date
A	RC Wall Revised	12.07.18

Client

Architect

Project

IIA Parkhill Road
London
NW3

Drawing Title

Temporary Works Sheet 2

howardcavanna
consulting engineers

3a Sandiford Road
Sutton, Surrey
SM3 9RN

t: 020 8644 0905

w: www.howardcavanna.co.uk
e: mail@howardcavanna.co.uk

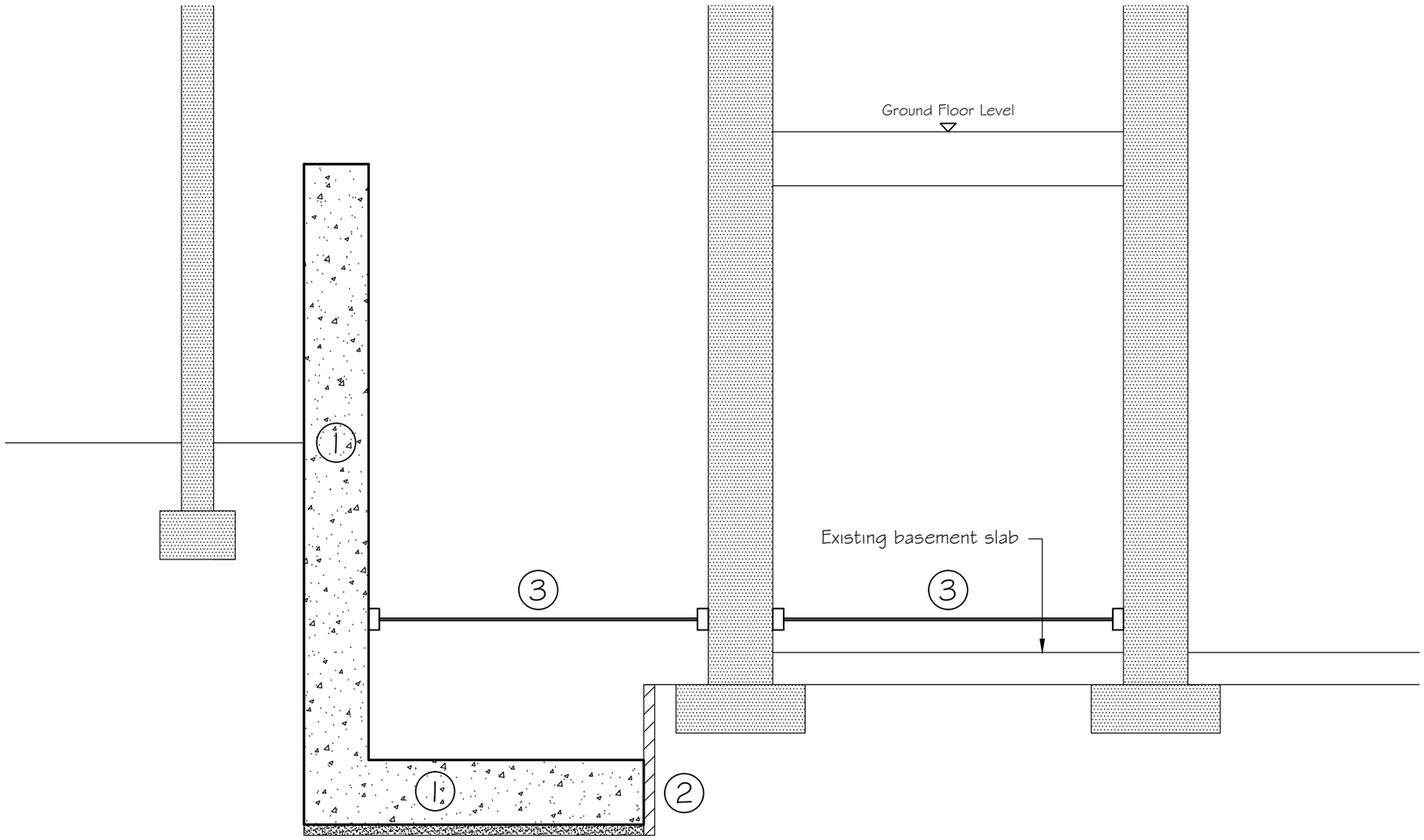
Scale.	Drawn by.	Date.
1:25 @A3		

Drg. Status.

Drg No.

2018 019/TW02 A

Do not scale from this drawing



Construction Method Statement For Construction Front Basement Area

1. Locally excavate and cast first underpin base and wall section.

2. In conjunction with base section, push in trench sheeting to support earth under existing foundation.

3. Provide RMD or similar approved horizontal props across the site at lower level.

4. Provide starter bars pushed into the earth each side for the adjacent underpins.

5. Repeat operations (1) to (4) for the second underpin.

6. Repeat this procedure until all the underpinning along this side wall has been completed.

Rev	Description	Date
A	RC Wall Revised	12.07.18

Client

Architect

Project

11A Parkhill Road
London
NW3

Drawing Title

Temporary Works Sheet 3

howardcavanna
consulting engineers

3a Sandiford Road
Sutton, Surrey
SM3 9RN

t: 020 8644 0905

w: www.howardcavanna.co.uk
e: mail@howardcavanna.co.uk

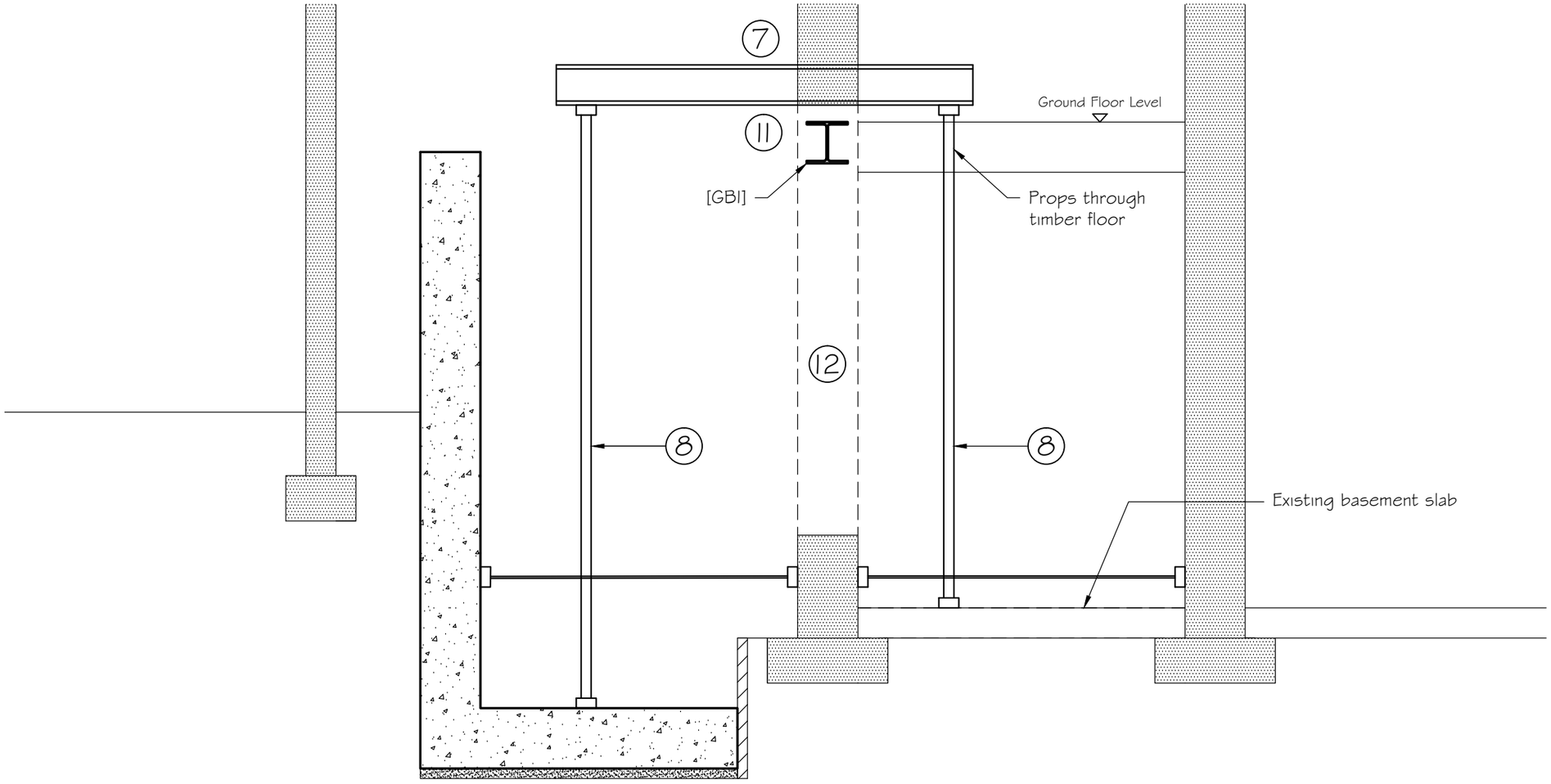
Scale.	Drawn by.	Date.
1:25 @A3		

Drg. Status.

Drg No.

2018 019/TW03 A

Do not scale from this drawing



Construction Method Statement For Construction Front Basement Area

7. Carefully cut out pockets for 152x152x30 UC needles dry packed into position one at a time at 750mm centers.

8. Provide Acrow prop support to steel needles onto concrete underpinning and existing basement slab.

9. Excavate and cast underpin at front to receive column [C2].

10. Excavate and cast base for column [C3].

11. Install new beam [GBI] dry packed in place under existing masonry. With columns each end.

12. When dry pack has reached its design strength remove existing wall. Down to existing props.

Rev	Description	Date
A	RC Wall Revised	12.07.18

Client

Architect

Project

IIA Parkhill Road
London
NW3

Drawing Title

Temporary Works Sheet 4

howardcavanna
consulting engineers

3a Sandiford Road
Sutton, Surrey
SM3 9RN

t: 020 8644 0905

w: www.howardcavanna.co.uk
e: mail@howardcavanna.co.uk

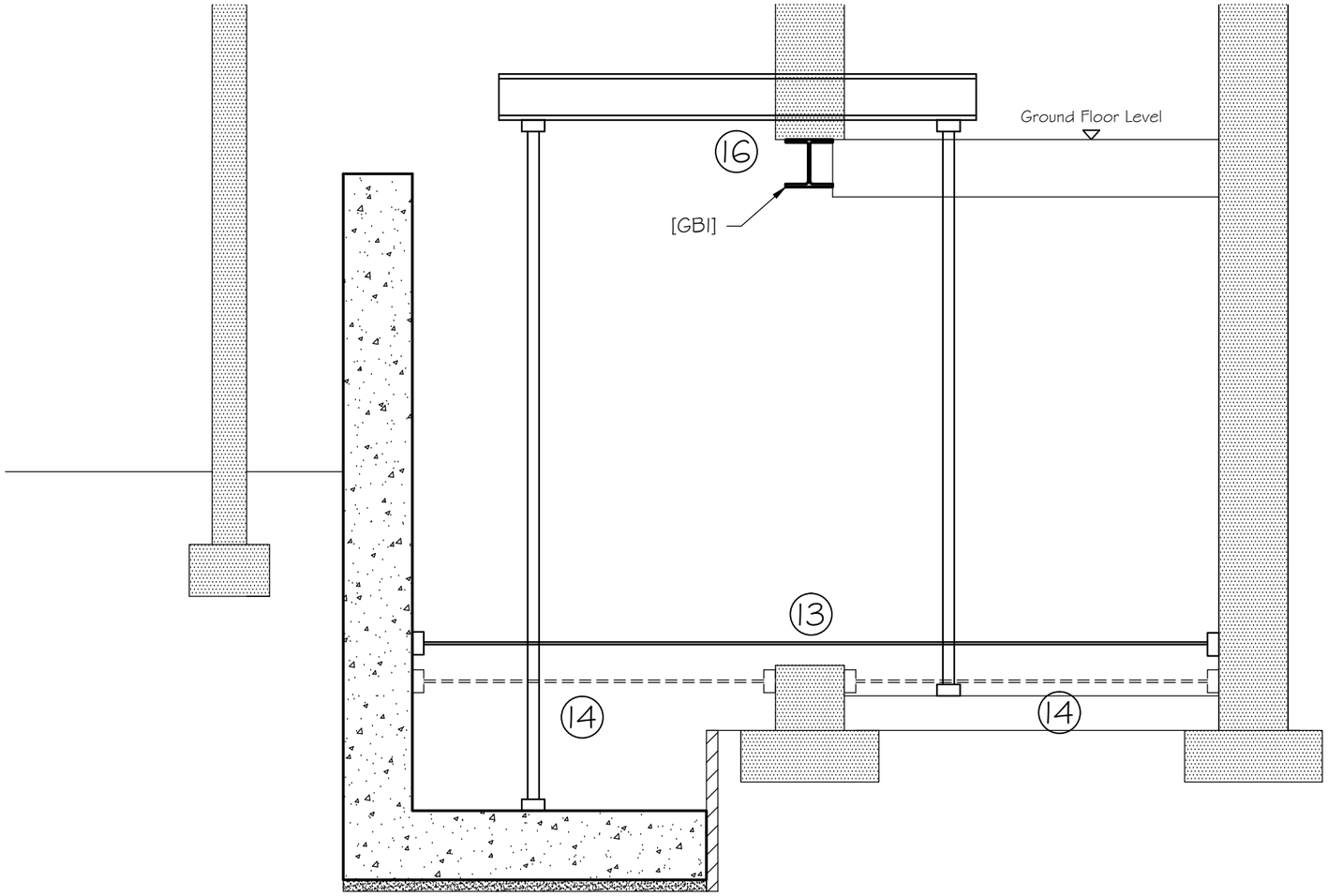
Scale.	Drawn by.	Date.
1:25 @A3		

Drg. Status.

Drg No.

2018 019/TW04 A

Do not scale from this drawing



Construction Method Statement For Construction Front Basement Area

13. Install horizontal props at maximum 1800mm crs across the site. Use RMD or similar approved heavy duty props.

14. Remove low level props.

15. In conjunction with these works, the internal support pier to [GBI] would have been underpinned and beam [GB2] installed.

16. Carefully remove steel needles and props. Make good pockets with new brickwork dry packed in place.

Rev	Description	Date
A	RC Wall Revised	12.07.18

Client

Architect

howardcavanna
consulting engineers

3a Sandiford Road
Sutton, Surrey
SM3 9RN

t: 020 8644 0905

w: www.howardcavanna.co.uk
e: mail@howardcavanna.co.uk

Project

IIA Parkhill Road
London
NW3

Drawing Title

Temporary Works Sheet 5

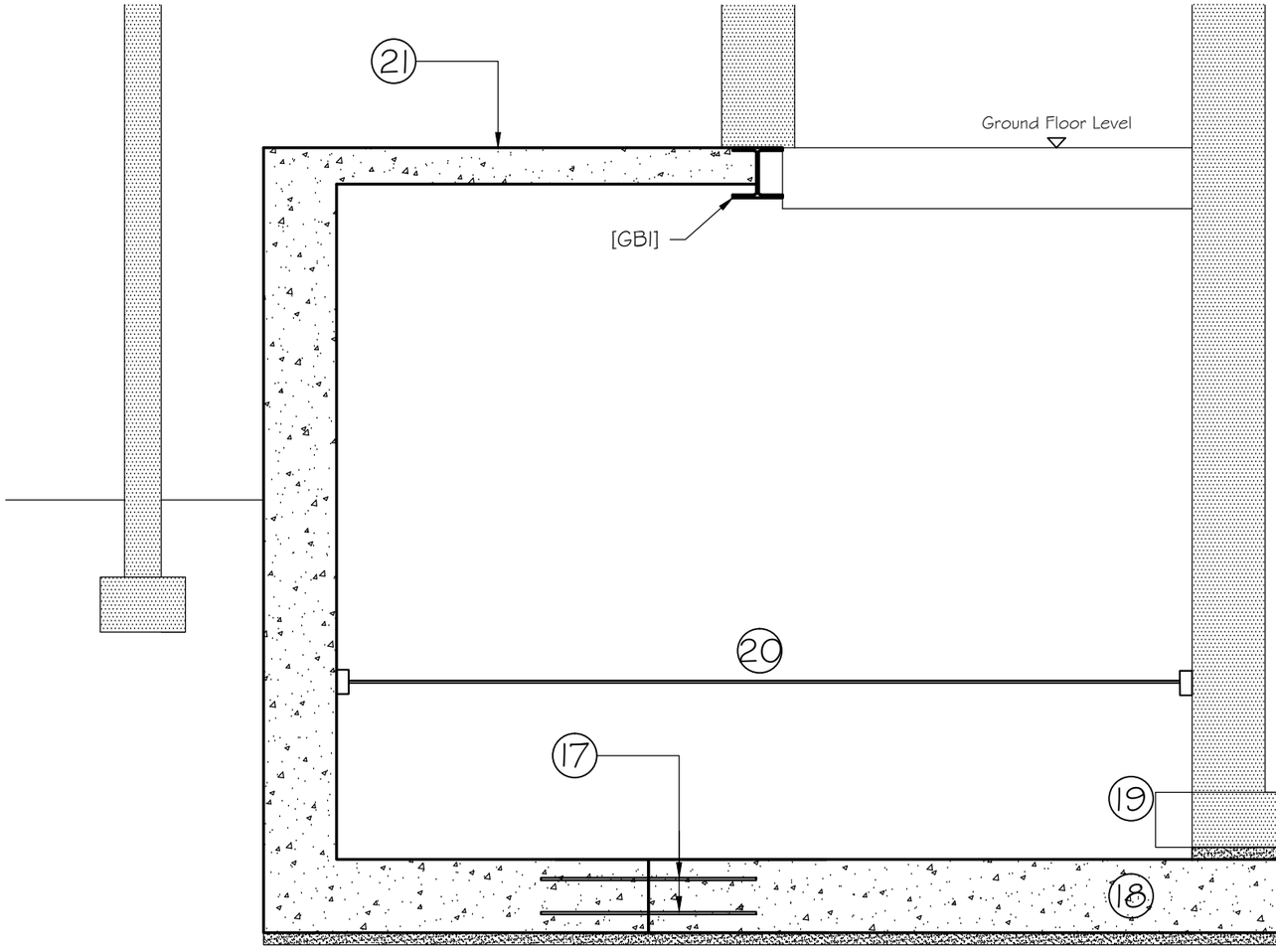
Scale.	Drawn by.	Date.
1:25 @A3		

Drg. Status.

Drg No.

2018 019/TW05 A

Do not scale from this drawing



Construction Method Statement For Construction Front Basement Area

17. Resin bond T12 lap bars top and bottom into concrete for new slab.

18. The existing basement slab is to be lowered and the party wall undrpinned in accordance with the method statement on Sheet TW01, TW02.

19. When basement slab has reached its design strength. The existing foundation projections can be carefully broken off using hand tools.

20. The temporary horizontal props can be removed.

21. Cast high level slab.

Rev	Description	Date
A	RC Wall Revised	12.07.18

Client

Architect

Project

11A Parkhill Road
London
NW3

Drawing Title

Temporary Works Sheet 6

howardcavanna
consulting engineers

3a Sandiford Road
Sutton, Surrey
SM3 9RN

t: 020 8644 0905

w: www.howardcavanna.co.uk
e: mail@howardcavanna.co.uk

Scale.	Drawn by.	Date.
1:25 @A3		

Drg. Status.

Drg No.

2018 019/TW06 A

11a Parkhill Road

Programme

05.11.18

n o v e l