KEY GS

Geological & Geotechnical Consultants

21 Mornington Crescent, London NW1 7RG

Basement Impact Assessment

(May 2021)

Prepared for Xuelin Bates

Geological & Geotechnical Consultants

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21 Mornington Crescent, London NW1 7RG

Basement Impact Assessment

(May 2021)

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1 INTRODUCTION

Key GeoSolutions Ltd (KGS) have been commissioned by Ms. Xuelin Bates to undertake a Basement Impact Assessment in relation to a proposed development at 21 Mornington Crescent, London NW1 7RG.

1.1 Proposed Development

The existing property is a Grade II listed four-storey terrace house including basement. The property is situated in the London Borough of Camden.

The proposed development involves the reconstruction and enlargement of a former two-storey rear extension at the basement and ground level. The rear extension extends 6m, and the basement extension is well below the 50% permitted development.

The width of the extension at ground level is 2.6m, which also includes a conservatory. The finish floor level of the completed basement extension will be 600mm lower than the existing basement level, and a total of 3.28m below the current ground floor level.

1.2 Scope of Work

The aim of this work is to assess if the proposed basement can be constructed without having a detrimental impact on the surroundings with respect to land stability and in particular whether the development will affect the stability of neighbouring properties. The assessment conforms to the requirements of guidance set out by The London Borough of Camden which provides comprehensive guidance on planning applications for basement extensions.

1.3 Qualifications

This assessment has been undertaken by Brian Duthie and Zhengxin Lu. Brian holds a BEng in Engineering Geology and Geotechnics, is a chartered geologist and Fellow of the Geological Society and a UK Registered Ground Engineering Advisor with 30 years' experience in geotechnical engineering. Zhengxin holds a BEng and PhD in Geotechnical Engineering and is a Member of the Institute of Materials, Minerals & Mining with 14 years' experience in geotechnical engineering. Both assessors satisfy the qualification requirements given in the Camden Planning Guidance 4. Howard holds a BEng and PhD in Civil Engineering, is a chartered engineer and Member of the Institution of Civil Engineers and Member of the Institute of Structural Engineers with over 14 years' experience in civil engineering.

1.4 Limitations

The conclusions and recommendations made in this report are limited to those that can be made on the basis of the research carried out. The results of the research should be viewed in the context of the work that has been carried out and no liability can be accepted for matters outside the stated scope of the research. The assessment does not constitute a detailed structural design for the basement structure, as would be required to allow construction to take place.

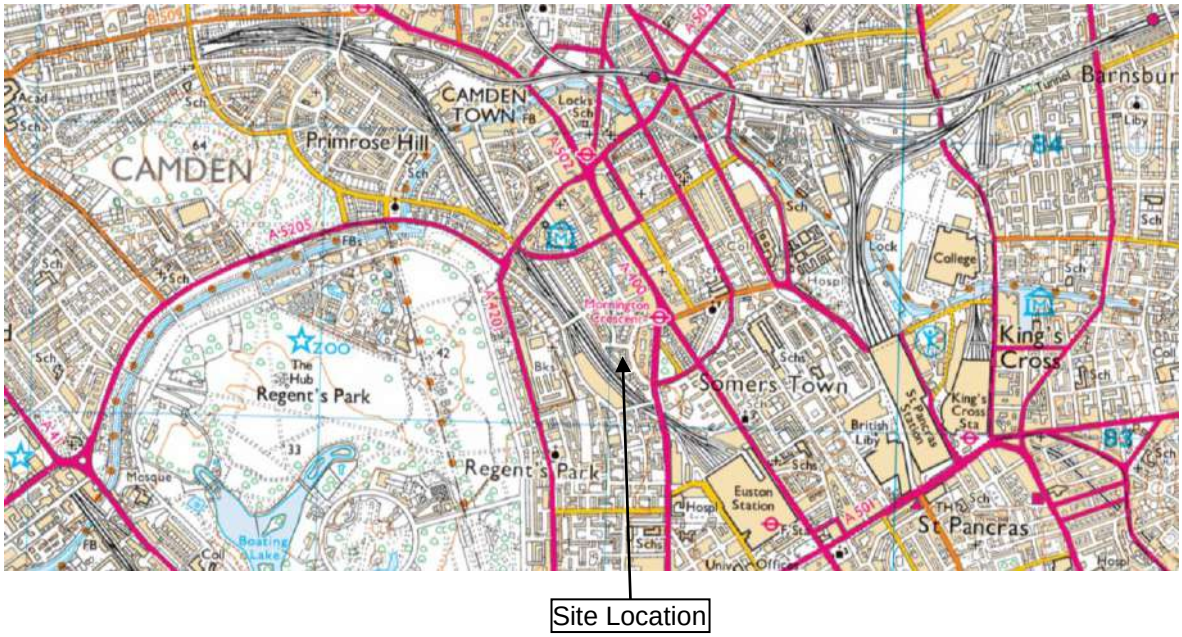
This report has been prepared for the information, benefit and use of Xuelin Bates only and any liability of Key GeoSolutions Ltd to any third party, whether in contract or in tort, is specifically excluded. Any third party finding themselves in possession of this report may not rely upon it without first obtaining the written authority of Key GeoSolutions Ltd.

2 SITE DESCRIPTION

The site, 21 Mornington Crescent, is in the London Borough of Camden, post code NW1 7RG and National Grid Reference 529053mE, 183243mN. The site is approximately rectangular in plan and covers an area of 180m², being approximately 6m by 30m with the long axis running front to back, perpendicular to Mornington Crescent.

The general topography of the area is gently sloping towards the west at a gradient of less than 7°. The location of the site is shown on Figure 1 below.

Figure 1 – Site Location



3 PROJECT SCREENING

Following the guidance given in the London Borough of Camden document CPG4 'Basements and lightwells' (2013) it is required to identify the potential impacts of the proposed scheme. The flowcharts given in Figures 3, 4 and 5 of CPG4 assists with understanding the potential impacts that a basement may have.

GROUNDWATER (Figure 3, CPG4 (Camden Council, 2015))			
Impact question	**Answer**	**Justification**	**Reference**
1a) Is the site located directly above an aquifer?	**No**	The site is located on the London Clay Formation, which is classified as Unproductive Strata.	BGS, 2021
1b) Will the proposed basement extend beneath the water table surface?	**No**	Boreholes drilled at the site did not encounter groundwater, no groundwater is encountered by the existing basement.	Appendix 1
2) Is the site within 100m of a watercourse, well (used/disused) or potential spring line?	**No**	The site is not within 100m of a watercourse (Figure 12, Camden Surface Water Features), or potential spring line (Figure 5 South Camden Geological Map). There have been no known historical problems regarding water ingress in the existing basement.	Ove Arup, 2010 Appendix 2
3) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	**Yes**	The area of the basement extension is partially covered in hard surfacing and partially by garden.	Drawings of proposed development
4) As part of the site drainage, will more surface water than at present be discharged to the ground?	**No**	There will be no increase of water transfer from surface to ground as a result of this development. Due to the underlying geology, there are no plans for the installation of a soakaway.	Drawings of proposed development
5) Is the lowest point of the proposed excavation close to, or lower than, the mean water level in any local pond or spring line?	**No**	No ponds or springs are present within 100m of the site.	Ove Arup, 2010 Appendix 2

SLOPE STABILITY (Slope stability screening flowchart (Figure 4, CPG4 (Camden Council, 2013))			
Impact question	**Answer**	**Justification**	**Reference**
1) Does the existing site include slopes, natural or manmade, greater than 7°?	**No**	Figure 10 Camden Topographic Map and Figure 16 Slope Angle Map indicate that the site area is very flat with slope angle of less than 7 degrees.	Ove Arup, 2010. Appendix 2
2) Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7°?	**No**	No re-profiling of the site is proposed.	
3) Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?	**No**	There is no plan for the development of neighbour land in the foreseeing future.	
4) Is the site within a wider hillside setting in which the general slope is greater than 7°?	**No**	Figure 10 Camden Topographic Map and Figure A Microsoft Bing Ordnance Survey Mapping.	Ove Arup, 2010. Appendix 2 and 3
5) Is the London Clay the shallowest strata at the site?	**Yes**	Figure 5 South Camden Geological Map and Appendix 1 Borehole logs.	Ove Arup, 2010 Appendix 1
6) Will any trees be felled as part of the proposed development and / or any works proposed within any tree protection zones where trees are to be retained?	**No**	No proposed tree-felling, construction works to be limited to confines of existing building and back yard. The proposed foundation is below the depth of the tree protection zones.	
7) Is there any history of seasonal shrink-swell subsidence in the local area, and / or evidence of such effects at the site?	**No**	There was record of ground subsidence issues in the site area and groundwater was not encountered during recent site investigation.	Appendix 1 Borehole logs
8) Is the site within 100m of a watercourse or potential spring line?	**No**	The site is not within 100m of a watercourse (Figure 12, Camden Surface Water Features), or potential spring line (Figure 5 South Camden Geological Map).	Ove Arup, 2010 Appendix 2
9) Is the site within an area of previously worked ground?	**Yes**	Showing on mapping as previously worked ground.	Ove Arup, 2010 Appendix 2
10) Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?	**No**	Figure 5 Geological Map, Figure 8 Aquifer Designation Map indicate that the site is not within an aquifer and Appendix 1 borehole logs indicate dewatering will not be required.	Ove Arup, 2010 Appendix 1 and 2

11) Is the site within 50m of Hampstead Heath ponds?	**No**	Figure 12 Camden Surface Water Features	Ove Arup, 2010 Appendix 2
12) Is the site within 5m of a highway or pedestrian right of way?	**No**	The proposed basement construction is at the rear garden yard	Appendix 3 Figure B Google Map
13) Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	**Yes**	Underpinning will be required to the garden walls which effectively form the party wall between the properties in relation to the proposed basement and ground floor extension.	Appendix 3 Figure B Google Map
14) Is the site over (or within the exclusion zone of) any tunnels e.g. railway lines?	**No**	There are no underground tunnels at the site area.	Appendix 3 Figure C Underground Map

SURFACE WATER (Figure 5, CPG4 (Camden Council, 2015))			
Impact question	**Answer**	**Justification**	**Reference**
1) As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?	**No**	The existing ground has very low permeability and the proposed design maintains the existing route for surface water disposal.	Drawings of proposed development
2) Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	**Yes**	The area of the basement extension is partially covered in hard surfacing and partially by garden.	Drawings of proposed development
3) Will the proposed basement result in changes to the profile of inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?	**No**	No changes to surface water disposal route.	Drawings of proposed development
4) Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	**No**	Site inspection and Ordnance Survey mapping.	Ordnance Survey Mapping.
5) Is the site in an area known to be at risk from surface water flooding, or is it at risk from flooding?	**No**	The Site lies within Flood Zone 1 with very low risk of flooding according to the Environment Agency.	Appendix 3 Figure E Flood Map

4 GROUND CONDITIONS

4.1 Soil Conditions

The British Geological Survey (BGS) map of the site area (Figure 5, Appendix 2) indicates that the site is underlain by London Clay Formation.

Online borehole records held at BGS and recent ground investigations (Appendix 1) undertaken for No. 21 Mornington Crescent indicate the London Formation extends to depths of over 10m below ground level. The base of the London Clay formation was not reached by these boreholes but would be expected to be very deep.

The ground investigation carried out on 8th April 2021 for 21 Mornington Crescent indicate that the London Clay Formation is overlain by Made Ground with a maximum thickness of 1.2m, which consists of gravelly Sand and Clay with fragments of bricks, concrete, glass and rootlets.

The factual report for the ground investigation is included in Appendix 1.

4.2 Groundwater Conditions

The Aquifer Designation Map shown on Figure 8 (Arup 2010) indicates that the site is not underlain by an aquifer. Groundwater was not encountered at the two boreholes of WS01 and WS02 which were drilled to a depth of 5.45m below ground level at the rear garden of the site. The floor level of the proposed basement construction is about 3.3m below ground level and hence the construction of the proposed basement has no impact on the groundwater conditions.

5 SCOPING

Where the screening checklist has returned as 'yes' response to any question that matter is carried forward to the scoping stage. The scoping produces a statement which defines the matters of concern identified in the screening stage.

5.1 Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?

As shown in the drawings of the proposed development, the footprint of the proposed basement development has an area of about 35m^2, the area is currently partially hard surfaced and partially garden. Therefore, the proposed basement development will not cause significant change of the hard surfaced areas. The site is shown by the BGS 1:50,000 Sheet 256 to be underlain by the London Clay Formation hence the use of soakaways will not be possible. Ultimately the drainage scheme will have to discharge into the existing drainage.

The property lies within Flood Zone 1, hence there is a low probability of surface water flooding. Given that the low permeability of existing ground and the relatively small change in the proportion of hard surfaced areas, the proposed development will have a minor impact on the existing drainage system.

5.2 Is the site within an area of previously worked ground?

The BGS 1: 50,000 Geological Sheet No. 256 (North London) shows the site to be in an area of worked ground.

Review of historical OS maps does not indicate any workings having taken place, with the site having only been agricultural land prior to the houses being constructed. Historic boreholes in the area and boreholes drilled at the site do not show any deep made ground that could indicate infilled worked ground.

5.3 Is the London Clay the shallowest strata at the site?

The London Clay formation was encountered at a depth of 1.2m below ground level during site investigation undertaken in April 2021 and is proven by boreholes in the area to extend to a depth of over 10m below ground level. The overlying ground at the site area comprise Made Ground materials with a thickness of 1.2m.

London Clay at the site is described as firm to stiff Clay and is slightly sandy in parts. London Clay is generally of high plasticity and has high volume change potential. As a result, London Clay can undergo considerable volume changes in response to variations in its natural moisture content. The seasonal volume changes of London Clay, swell in wet winter and shrink in dry

summer, normally upto to a depth of 1.5m below ground.

Given that no groundwater will be encountered for the construction of the proposed basement to a depth of 3.1m below ground floor level, the natural moisture content of the surrounding London Clay will not be considerably changed. The depth of the basement foundation is about 3.1m below ground level and thus beyond the zone of seasonal changes.

To control the impact of potential swelling of surrounding Clay ground when unloaded by the excavations required for the basement construction, the construction of the basement works should be planned to minimise movement in the ground around the excavation.

6 MOVEMENT ASSESSMENT

6.1 Discussion

The proposed development is shown on the KAS Architects drawings, which are included in Appendix 4. In summary, it is proposed to construct an extension to the rear of the property, the extension will be to the existing lower ground floor (basement) and ground floor storeys.

The proposed basement extension has a floor level of 600mm lower than the existing basement floor and hence the garden boundary walls will need to be underpinned. The sections of wall that will need to be underpinned are shown on Drawing No 21-102-D-001 for the proposed underpinning layout.

It is assumed that a suitably experienced specialist basement contractor will be appointed for the works, this contractor will be responsible for the design and implementation of the temporary works necessary to build the basement and ground floor.

Ground movements resulting from underpinning are not well documented and there is no specific method for assessing their magnitude. The proposed works are the extension of existing basement to the rear garden and only the garden walls on either side need to be underpinned. The movements of the garden walls adjacent to the basement formation will be typically small when underpinning is carried out in a well-controlled manner.

The proposed extension works will be undertaken towards the rear garden and thus will not significantly change the differential depth of foundations relative to the main neighbouring properties. The movements of main buildings adjacent to the proposed works are considered to be minor or even negligible when the works are carried out with good quality workmanship and well-controlled construction practices.

6.2 Movement Assessment

Assessment of the ground movement resulting from the excavation to form the basement has been undertaken with reference to CIRIA C760 Guidance on embedded retaining wall design (2017). To provide some basis for estimating likely movements and damage resulting from excavating the basement in front of the underpinning and in the absence of underpinning specific guidance, the underpinned sections have been treated as piles.

For the garden party walls the embedded length of the underpins will be wholly in firm London Clay, hence it is possible from C760 to estimate the horizontal and vertical movements that could be expected as a result of the underpinning construction and the excavation of the basements. It is assumed that a high stiffness support system will be applied to the underpins. The calculations for movement are presented in Appendix 2.

From C760 Figure 6.15 it can be seen that at a distance of four times the depth of the excavation from behind the wall the expected movement will be negligible, for the excavation depth of 3.7m this would be a distance of 14.8m. The key structures / infrastructure that would be impacted within this zone of influence are listed in Table 1, along with a summary of the total predicted levels of movement due to the basement construction.

Table 1 Summary of total ground movement

Structures/ Infrastructure	Horizontal Movement (mm)	Vertical Movement (mm)
Garden Party Walls No 21	6.9	2.8
Garden Party Walls No 20	3.3	2.0
Garden Party Walls No 22	3.3	2.0
Main Building Party Walls	0.0	0.0
Mornington Crescent	0.0	0.0

The movements given by C760 are for excavations with long straight walls, corners tend to limit movements, such that horizontal deflections towards an excavation in the vicinity of a corner to the excavation are typically reduced to about half that predicted. Hence, given the limited dimensions of the proposed excavations and likely effect the corners will have, the predicted movements given in Table 1 are likely to be conservative.

The two garden walls adjacent to the proposed basement will likely be impacted the most. However, the garden walls are free standing structures and are free to move laterally with the ground. Therefore, all garden walls within the affect zone should be relatively unaffected by the movements of less than 6.9mm.

Groundwater was not encountered during the 2021 ground investigation it is considered unlikely that large amount of groundwater will be encountered within the basement excavation, rather localised perched water, which should be dealt with as they are encountered.

The party walls underneath the main buildings should be relatively unaffected by the basement excavation since basements already exist for No. 20-22 properties.

Due to the presence of the existing basements void between the proposed basement excavation and the Mornington Crescent, it is considered unlikely the public pathway in front of the main building will be affected.

The work should be carried out in accordance with the Party Wall etc. Act 1996 and a pre-condition survey of the adjacent properties will be required.

6.3 Monitoring

It will be necessary to monitor the impact of the works on the adjoining properties and the public highway to ensure that movements are not excessive. The monitoring should comprise the following;

- Visual inspection of the party wall and any pre-existing cracking
- Attachment of tell tales to accurately record movement of any pre-existing cracks
- Installation of levelling targets to monitor settlement of the party walls and the public highway, to be monitored by standard optical equipment.

The levelling targets on the party walls should be no greater than 2m apart and located as close to the top of the existing foundations as possible. The maximum allowable movement should be no more than 3mm between adjacent levelling targets.

The limits on maximum movement and proposed actions are given in the table below;

Movement	Category	Action
0 - 5 mm	Green	No action required
5 – 10 mm	Amber	Crack monitoring: Carry out local structural review; Preparation for the implementation of remedial measures should they be required
>10 mm	Red	Crack monitoring: Implement structural support as required; Cease works with exception of necessary works for the safety and stability of the structure and personnel; Review monitoring data and implement revised method of works

Monitoring should be undertaken at weekly intervals during excavation works and if no significant movement is identified monitoring can be reduced to fortnightly.

6.4 Damage Category

The proposed basement is located at the rear garden and thus not directly next to the foundations of the neighbouring properties. Providing a structural design is undertaken and a suitable construction method is employed for the basement construction then it is considered that it should be possible to minimise the amount of movement of the ground such that the degree of damage to neighbouring properties would fall into Category 0 or 1, with the degree of severity being negligible to very slight, as defined CIRIA C580 Table 2.5 (after Burland, 1995).

7 CONSTRUCTION METHOD STATEMENT

7.1 Construction Programme

A construction programme will be made available by the main contractor to Planning and Building Control.

7.2 Construction Sequence

The proposed layout of underpins is shown on the Drawing No 21-102-D-001. The existing rear boundary wall and side garden walls next to the proposed basement excavation will be underpinned. The underpinning works will be carried out with the traditional 1, 3, 5, 2, 4 and 6 sequence of underpins to ensure that no more than 20% of the existing building wall is unsupported at any time. Underpinning shall be fully packed to underside of existing wall foundation with dry pack mortar soon after concrete has gone off.

The underpinning depth will potentially vary from 0.6m to 3.4m, the deeper underpins will only be under the garden wall. Temporary support, in the form of shuttering, should be installed where the underpinning depth is more than 1.0m in depth. Below is a suggested sequence of works to complete the underpinning of the existing garden walls and the rear boundary wall of the property, along with the installation of the new basement construction.

1) Excavate for underpin number 1,
2) Install timber shuttering to all sides to maintain a safe working zone and ensure stability of adjacent ground,
3) Excavate under section of party wall providing a sacrificial trench prop in the centre of the 1m width of exposed foundation,
4) Shutter to the rear face of the excavation to prevent collapse of material at rear and prevent underpin from extending beyond the rear line of the party wall,
5) Install underpin in two lifts with base extending beyond the underside of the new basement slab,
6) Ensure underpinning is fully packed to underside of existing party wall foundation with dry pack mortar soon after concrete has gone off,
7) Once underpinning has reached sufficient strength install temporary props for lateral restraint between underpin and formation level,
8) Repeat for underpins 3, 5, 2, 4 and 6 in the sequence,
9) Other three sides of the excavation to be supported with appropriate section trench sheets.
10) Replace underpinning lateral restraint props with waling beams and props across the full width of the basement to provide a clear area for the installation of the basement slab,
11) Fix the basement slab reinforcement and cast the basement slab with suitable starter bars extending up to form the perimeter walls,
12) Remove the bottom line of waling beams and props once the basement slab has gained sufficient strength as the underpinning and trench sheets are now propped by the permanent works at its base,

13) Repeat steps 11 and 12 for the wall sections,
14) Install props and shoring as required to allow the installation of the new suspended ground floor slab,
15) Cast new suspended ground floor slab,
16) Once the new suspended ground floor slab has sufficient strength remove all props as required.

The final design and implementation of the temporary works will be the design of the appointed contractor. Note: The appointed contractor may wish to vary the proposed sequence of works but this will be finalised prior to construction commencing on site.

A full structural design for the permanent and temporary works will need to be provided before any works commence on site.

7.3 Construction Management

7.3.1 Site Security and Access

All boundaries to the site will be protected with timber hoarding to ensure containment of the construction activities throughout the duration of the project. The hoarding will display the details of the main companies involved in the scheme and the emergency contact details. Any plant and vehicular movements through the construction phase will be scheduled to minimise the street congestion and the effects on immediate neighbours, so far as reasonably practical. Jet washing facilities will be provided for cleaning of vehicle tyres and the road or pavement at the end of each day as necessary.

The parking of contractor's vehicles will be off site and on the local highways.

7.3.2 Site Personnel

The site workforce will be familiar with this type of work and supervised by competent personnel at all stages of the work.

7.3.3 Recycling and Disposal of Waste

A waste management plan will be prepared to address the re-use and recycling of the material arising from demolition, excavation and construction stages.

7.3.4 Contractor's Compound

The area currently used for parking at the front of the property will be used as the contractor's compound. Additional material storage may take place in the rear garden.

As far as reasonably possible the levels of noise and dust pollution will be kept to normal standards.

8 CONCLUSIONS

An assessment has been made of the potential impacts of the proposed basement construction at No. 21 Mornington Crescent with respect to groundwater, surface water, slope stability and ground movement. This assessment does not constitute a detailed structural design for the basement.

Given that the natural topography of the area is relatively flat it is considered that the proposed basement will not have an impact on the overall slope stability within the area.

From the screening process three questions returned ‘yes’ answers and will require particular attention to be paid during the construction process. These questions can be dealt with by the adoption of an appropriate drainage management, structural design and appropriate construction techniques.

With regard to impact on the adjacent properties and the public highway it is considered that the expected movement will not be excessive. It should be possible to ensure that degree of damage to these properties would fall into Category 0 or 1, with the degree of severity being negligible to very slight, as defined CIRIA C580 Table 2.5 (after Burland, 1995), which in relation to damage to the buildings would equate to fine cracks which are easily treated in normal decoration.

Hence, it is concluded, based upon the information currently available, that the proposed basements could be constructed employing appropriate construction methods without significant impact on the surface water, groundwater or ground stability.

9 REFERENCES

9.1 CPG4 Basements and lightwells, London Borough of Camden, September 2013

9.2 Camden geological, hydrogeological and hydrological study, Guidance for subterranean development, Ove Arup & Partners, November 2010

9.3 CIRIA C580 Embedded retaining walls, 2003

9.4 Assessment of risk of damage to buildings due to tunnelling and excavation, Burland J B, 1995

9.5 Ground movements resulting from urban tunnelling: predictions and effects, Rankin W J, 1988

9.6 Drawings of proposed development:

101-LG-DR-001	Proposed Lower Ground Floor
101-GF-DR-002	Proposed Ground Floor
101-01-DR-003	Proposed First Floor Plan
101-02-DR-004	Proposed Second Floor Plan
101-03-DR-005	Proposed Third Floor Plan
101-AA-DR-006	Proposed Section AA
101-BB-DR-010	Proposed Section BB
101-RF-DR-009	Proposed Roof Plan
101-N-ELE-DR-010	Proposed North Elevation
101-EX-LG-DR-001	Lower Ground Floor Plan
101-EX-GF-DR-002	Existing Ground Floor
101-EX-01-DR-003	Existing First Floor
101-EX-02-DR-004	Existing Second Floor
101-EX-03-DR-005	Existing Third Floor
101-EX-AA-DR-006	Existing Section AA
101-EX-BB-DR-010	Existing Section BB
101-EX-RF-DR-009	Existing Roof Plan
101-EX-WEST-ELE-DR-008	Existing Rear Elevation

APPENDIX 1

FACTUAL GROUND INVESTIGATION REPORT

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Report on Ground Investigation (April 2021)

Prepared for Xuelin Bates

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1.0 INTRODUCTION

Key GeoSolutions Ltd (KGS) have been commissioned by Xuelin Bates to undertake a ground investigation at 21 Mornington Crescent in order to ascertain the ground conditions for the assessment of a proposed basement extension.

The property is described in the Camden Local List (2015) as 'Terrace of 12 houses forming part of a crescent. C1821-32".

The proposed development will comprise:

- The demolition of the existing walk way into the garden.
- The excavation of part of the garden and the addition of a basement extension.

The comments given in this report and any opinions expressed are based on the ground conditions encountered during the site work, the results of tests made in the field and on information made available by X Bates. There may be, however, conditions pertaining to the site which have not been disclosed by the investigation and which therefore could not be taken into account in this report. In particular old foundations or underground services may be present that could affect the proposed development. The term 'topsoil' is used in this report to describe the surface, usually organic, layer including turf and shallow soils, weathered material with roots etc. and should not be taken to imply agricultural soil suitable for sale.

2.0 SITE OVERVIEW

2.1 Site Location

The site, which may be located by approximate National Grid Reference 529060mE, 183244mN, is situated on the west side of Mornington Crescent, near Camden Town, in the Borough of Camden, London (Figure 1).

2.2 Geology of the Site

The site is covered by BGS 1: 50,000 Geological Sheet No. 256 (North London). This indicates the site to be underlain by deposits of the London Clay Formation of Eocene age. The sheet also shows the site to be in an area of worked ground.

3.0 GROUND INVESTIGATION

Two boreholes (WS01 and WS02) were sunk in the rear garden of the property in order to investigate the ground conditions in accordance with the guidelines laid down in BS EN 1997-2:2007. Two hand dug foundation trial pits (FP01 and FP02) were excavated along the northern and southern boundary of the site in order to expose the existing foundations of the adjacent buildings/ boundary walls.

The boreholes were sunk using a windowless sampling rig, the approximate locations of the boreholes are shown on Figure 1. The depths of the boreholes and trial pits and descriptions of the soils encountered are given in the records in Appendix 1.

Disturbed samples and SPT's (Standard Penetration Tests) were taken at the depths shown on the borehole records. The results of the SPT's are provided on the window sample logs within Appendix 1. Physical testing was carried out on two representative samples of the ground encountered; the results are given in Appendix 2.

On completion of each borehole a standpipe was installed; the standpipes in boreholes were installed within the made ground, and within the London Clay to a depth of approximately 5.00mbgl. Details of the installations are given on the borehole records.

The site work was carried out on the 8th April 2021 and generally in accordance with the guidelines laid down in BS EN 1997-2:2007.

4.0 GROUND CONDITIONS

The following strata were encountered during the investigation:-

- Made Ground
- Clays (London Clay Formation)

All boreholes were terminated in the London Clay Formation.

- WS01 was terminated at a depth of 5.45m bgl. Water was not encountered.
- WS02 was terminated at a depth of 5.45m bgl. Water was not encountered.

The trial pits uncovered bricks down to a concrete foundation at 0.10m bgl, the concrete foundation continued down to natural ground between 0.50m bgl and 0.80m bgl, and was seen to be founded on the London Clay.

- FP01 was terminated at a depth of 0.5m bgl. Water was not encountered.
- FP02 was terminated at a depth of 0.80m bgl. Water was encountered at 0.70m bgl, this is believed to be perched water within the made ground.

Review of historical OS maps does not indicate any workings having taken place, with the site having only been agricultural land prior to the houses being constructed. Historic boreholes in the area do not show any deep made ground that could indicate infilled worked ground.

A summary of the geotechnical testing is given in the table below;

	Range (number of results)			
Strata	Moisture Content %	Plasticity Index	SPT N Value	Notes
London Clay	26-30 (2)	36-42 (2)	4-30 (10 - sets)	

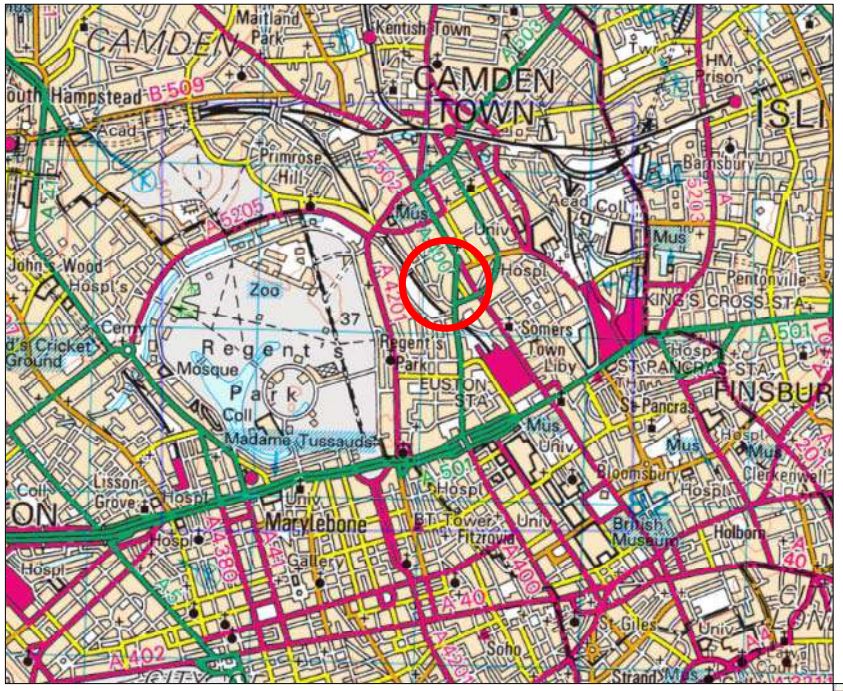
5.0 PRELIMINARY GEOTECHNICAL ASSESSMENT

Shallow spread foundations should be taken down to a minimum firm CLAY, foundations should be designed with an allowable bearing pressure of 100 kN/m². Given the high potential for volume change foundations should be designed in accordance with the NHBC Standards.

The following parameters are suggested for retaining wall design purposes;

Strata	Bulk Unit Weight (kN/m³)	Effective Cohesion (kN/m²)	Effective Friction Angle (Degrees)
London Clay	20	0	20

FIGURES



NOTES

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.

Rev.	Revision Detail	Drawn	Date
01	First Issue	RW	20/04/21

CLIENT:

XUELIN BATES

PROJECT:

21 MORNINGTON CRESCENT

TITLE:

LOCATION PLAN

DRAWN:	CHECKED:	DATE:
RW	BD	APR '21
SCALE:	ORIGINAL SHEET SIZE:	STATUS:
NTS	A4	DRAFT

DRAWING NO.

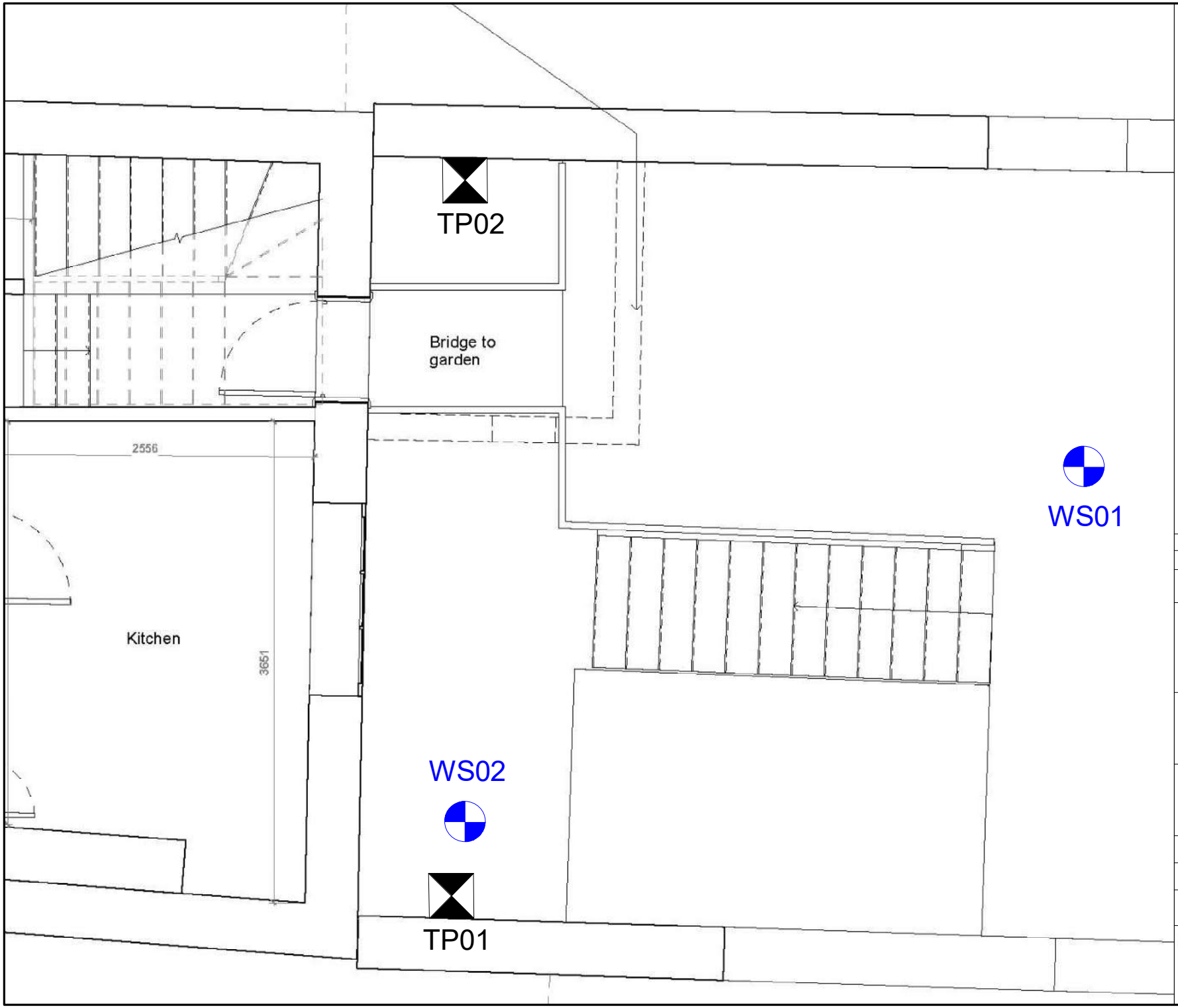
FIGURE 1

REVISION: 01

KEY GEOSOLUTIONS LTD

NOVA HOUSE
AUDLEY AVENUE
NEWPORT
SHROPSHIRE TF10 7DW

TEL: 01952 822960
E-MAIL: INFO@KEYGS.COM
WEB: WWW.KEYGS.COM



NOTES

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED.

Rev.	Revision Detail	Drawn	Date
01	First Issue	RW	20/04/21

CLIENT:

XUELIN BATES

PROJECT:

21 MORNINGTON CRESCENT

TITLE:

BOREHOLE AND TRIAL PIT LOCATION PLAN

DRAWN:	CHECKED:	DATE:
RW	BD	APR '21
SCALE:	ORIGINAL SHEET SIZE:	STATUS:
NTS	A4	DRAFT

DRAWING NO.

FIGURE 2

REVISION: 01

KEY GEOSOLUTIONS LTD

NOVA HOUSE
AUDLEY AVENUE
NEWPORT
SHROPSHIRE TF10 7DW

TEL: 01952 822960
E-MAIL: INFO@KEYGS.COM
WEB: WWW.KEYGS.COM

APPENDICES

APPENDIX 1

BOREHOLE LOGS

Key GeoSolutions Ltd
info@keygs.com
Telephone: 01952 822960

WELL NUMBER WS01

CLIENT Xuelin Bates
PROJECT NAME 21 Mornington Crescent
PROJECT NUMBER 21-102
PROJECT LOCATION 21 Mornington Crescent

DATE STARTED 8/4/21 **COMPLETED** 8/4/21
CO-ORDINATES 529053 mE, 183243 mN
DRILLING CONTRACTOR BOREHOLE SOLUTIONS
GROUND ELEVATION 33.3 m 31.0 **HOLE SIZE** 100
DRILLING METHOD Windowless Sampler
LOGGED BY Ruby Westnedge **CHECKED BY** BD

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (SPT N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION & REMARKS	WELL DIAGRAM
					0.05 (33.25) Paving Slab. MADE GROUND yellowish brown gravelly SAND with brick, plastic, concrete, glass and rootlets.	
					0.60 (32.70) MADE GROUND dark reddish brown gravelly SAND with brick concrete and occasional rootlets.	
1	SPT	1-1-1-1 (4)				
					1.20 (32.10) Firm light orangish brown sandy gravelly CLAY.	
2	SPT	2-2-2-2 (8)				
	B	()				
					2.00 (31.30) Firm yellowish brown sandy CLAY.	
3	SPT	2-3-3-4 (12)				
	B	()				
					3.00 (30.30) Firm to stiff light greyish brown CLAY with rare 2mm thick sand bands.	
4	SPT	3-4-4-4 (15)				
	B	()				
5	SPT	4-4-5-5 (18)				
					5.45 (27.85)	

Bottom of borehole at 5.45 metres.

NOTES No groundwater encountered during drilling, monitoring standpipe installed.

SAMPLE TYPE KEY U = Undisturbed D = Disturbed B = Bulk J = Jar VA = Shear Vane SPT = Standard Penetration Test

Key GeoSolutions Ltd
info@keygs.com
Telephone: 01952 822960

WELL NUMBER WS02

CLIENT Xuelin Bates
PROJECT NAME 21 Mornington Crescent
PROJECT NUMBER 21-102
PROJECT LOCATION 21 Mornington Crescent

DATE STARTED 8/4/21 **COMPLETED** 8/4/21
CO-ORDINATES 529057 mE, 183245 mN
DRILLING CONTRACTOR bOREHOLE SOLUTIONS
GROUND ELEVATION 31 m 31.0 **HOLE SIZE** 100
DRILLING METHOD Windowless Sampler
LOGGED BY Ruby Westnedge **CHECKED BY** BD

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (SPT N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION & REMARKS	WELL DIAGRAM
0.05					Paving Slab. (30.95)	
					MADE GROUND yellowish brown sandy gravelly CLAY with rootlets and inclusions of brick.	
1	SPT	1-2-2-2 (7)				
1.20					Firm orangish brown slightly sandy CLAY. (29.80)	
2	B	()				
2	SPT	3-3-4-4 (14)				
2.75					Stiff greyish brown slightly sandy CLAY. (28.25)	
3	B	()				
3	SPT	3-4-4-4 (15)				
4						
4	SPT	7-9-9-5 (30)				
5						
5	SPT	4-4-4-5 (17)				
5.45					Bottom of borehole at 5.45 metres. (25.55)	

NOTES No groundwater encountered during drilling, monitoring standpipe installed.

SAMPLE TYPE KEY U = Undisturbed D = Disturbed B = Bulk J = Jar VA = Shear Vane SPT = Standard Penetration Test

Key GeoSolutions Ltd
info@keygs.com
Telephone: 01952 822960

TRIAL PIT LOG

Project				TRIAL PIT No
21 Mornington Crescent - 21 Mornington Crescent				FP01
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
21-102	08-04-21 08-04-21	31.00	E 529056 N 183247	
Contractor				Sheet
Borehole Solutions				1 of 1

STRATA		SAMPLES & TESTS		
Depth	DESCRIPTION	Depth	Remarks/Tests	Legend
0.00-0.05	Paving Slab			
0.05-0.50	Yellowish brown sandy CLAY with rootlets. Foundation - 0.05mbgl - 0.20mbgl concrete foundations exposed to a depth of 0.20m beneath which yellowish brown sandy CLAY with rootlets was encountered down to a depth of 0.50m.			

PHOTOGRAPHS / DIAGRAMS

Photo 1 - View of pit.

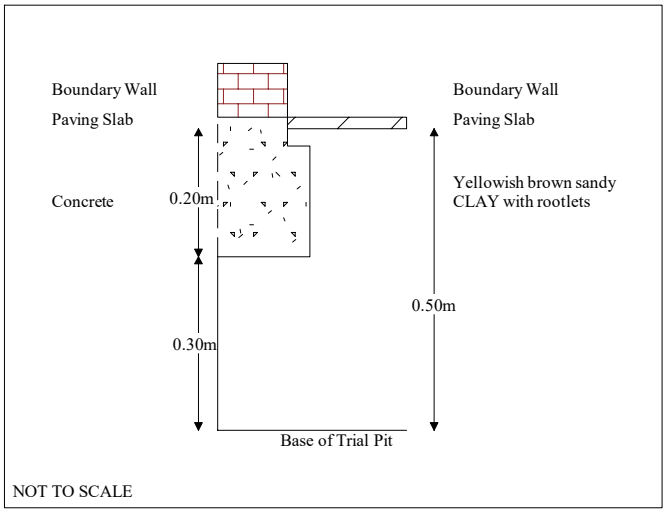
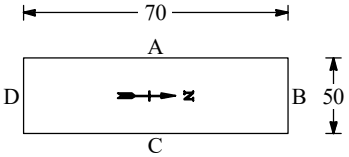


Photo 2 - Schematic of Foundations

Shoring/Support:
Stability:



GENERAL REMARKS

All dimensions in metres Scale 1:12.5	Client Xuelin Bates	Method/ Plant Used	Logged By rw

UK TRIAL PIT LOG WITH PHOTOS 21-MORNINGTON CRESCENT TP LOGS.GPJ GINT STD AGS 3_1.GDT 4/5/21

Key GeoSolutions Ltd
info@keygs.com
Telephone: 01952 822960

TRIAL PIT LOG

Project				TRIAL PIT No
21 Mornington Crescent - 21 Mornington Crescent				FP02
Job No	Date	Ground Level (m)	Co-Ordinates (m)	
21-102	08-04-21 08-04-21	31.00	E 529057 N 183242	
Contractor				Sheet
Borehole Solutions				1 of 1

STRATA		SAMPLES & TESTS		
Depth	DESCRIPTION	Depth	Remarks/Tests	Legend
0.00-0.05	Paving Slab			
0.05-0.80	Orangish brown sandy gravelly CLAY with inclusions of brick. MADE GOUND. Foundation - 0.05mbgl - 0.70mbgl concrete foundations exposed to a depth of 0.70m beneath which Orangish brown sandy gravelly CLAY with inclusions of brick (MADEGROUND) was encountered down to a depth of 0.80m.			

PHOTOGRAPHS / DIAGRAMS

Photo 1 - View of pit.

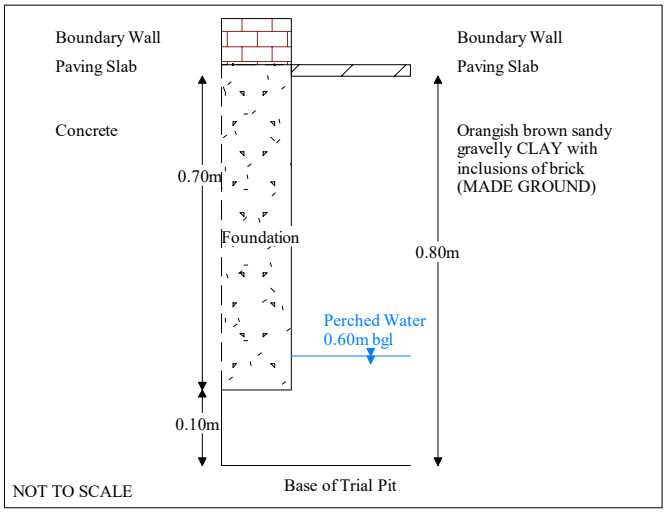
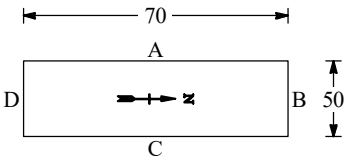


Photo 2 - Schematic of Foundations

Shoring/Support:
Stability:



GENERAL REMARKS

Perched water encountered within the made ground.

All dimensions in metres Scale 1:12.5	Client Xuelin Bates	Method/ Plant Used	Logged By rw

APPENDIX 2

LABORATORY TESTING RESULTS

8180

GROUND ENGINEERING LIMITED

Newark Road Peterborough
t: 01733 566566
e: admin@groundengineering.co.uk

TEST CERTIFICATE

Determination of Moisture Content

Tested in Accordance with BS 1377-2: 1990: Clause 3.2

Client:	Key GeoSolutions Ltd	Certificate Number:	PL7423-1/1/705
Client Address:	Nova House Audley Ave Newport Shropshire TF10 7DW	Client Reference:	L9967
		Job Number:	PL7423-1
		Date Sampled:	Unknown
		Date Received:	12.04.2021
Contact:	Ruby Westnedge	Date Tested:	15.04.2021
		Certificate of Sampling:	N/A
Site Name:	21 Mornington Crescent	Sampling Certificate No.:	N/A
Site Address:		Sampled By:	Client

TEST RESULTS

Laboratory Reference	Sample Reference	Location	Depth Top	Depth Base	Description	Moisture Content [%]
PL7423-1/1	Not Given	WS01	3.50m	3.75m	Stiff fissured brown orange-brown slightly silty slightly sandy CLAY with occasional sandy pockets plus rare selenite.	26
PL7423-1/2	Not Given	WS02	2.75m	3.00m	Very Stiff fissured brown orange-brown grey slightly silty slightly sandy CLAY with occasional sandy pockets plus occasional selenite and rare root traces.	30

Comments:

Approved Signatory: M. Hartnup - Laboratory Manager Signed:

for and on behalf of Ground Engineering Ltd

Date Reported: 21.04.2021 Page 1 of 1
Form Number: GELab/C/705 Version 18

Registered in England & Wales
Registration Number: 6929574
Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

8180

GROUND ENGINEERING LIMITED

Newark Road Peterborough
t: 01733 566566
e: admin@groundengineering.co.uk

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.3 & 5: Definitive Method

Client:	Key GeoSolutions Ltd	Certificate Number:	PL7423-1/1/704-1
Client Address:	Nova House Audley Ave Newport Shropshire TF10 7DW	Client Reference:	L9967
		Job Number:	PL7423-1
		Date Sampled:	Unknown
		Date Received:	12.04.2021
Contact:	Ruby Westnedge	Date Tested:	20.04.2021
		Certificate of Sampling:	N/A
Site Name:	21 Mornington Crescent	Sampling Certificate No.:	N/A
Site Address:		Sampled By:	Client

TEST RESULTS

Laboratory Reference: PL7423-1/1

Sample Reference: Not Given

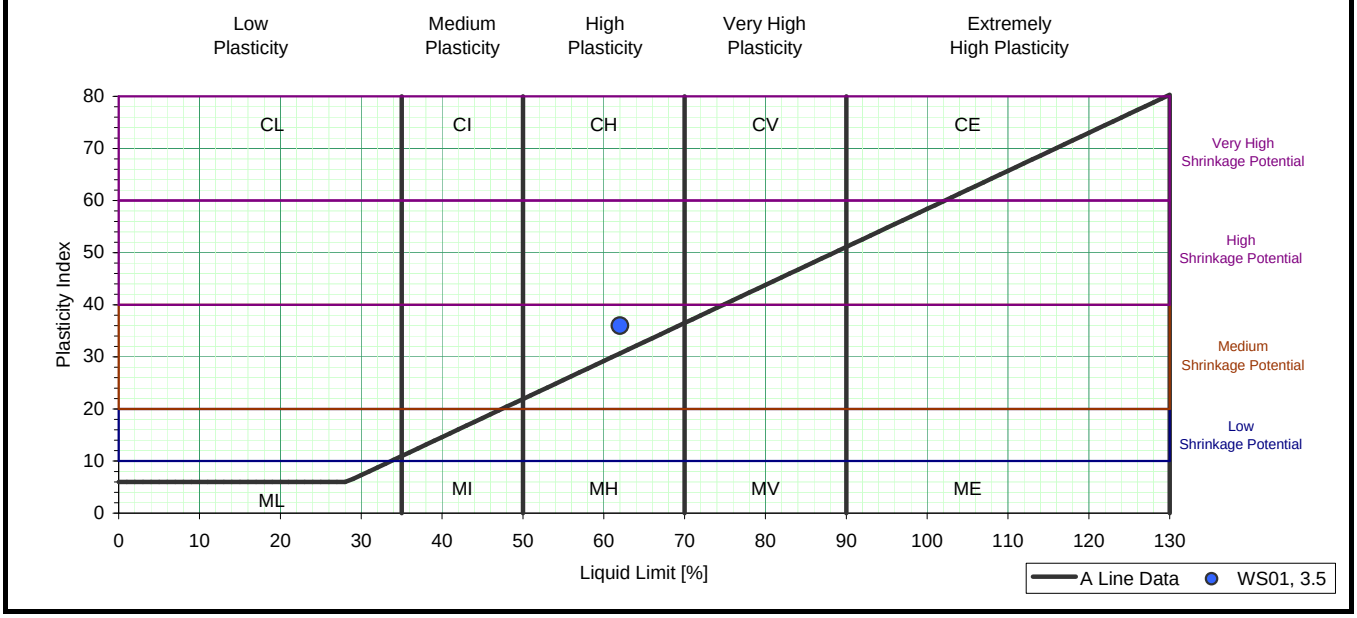
Description: Stiff fissured brown orange-brown slightly silty slightly sandy CLAY with occasional sandy pockets plus rare selenite.

Location: WS01 Depth Top: 3.50m

Sample Preparation: As Received Depth Base: 3.75m

Estimated % Passing 425µm BS Test Sieve

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index	% Passing 425µm BS Test Sieve
26	62	26	36	100



Comments:

Approved Signatory: M. Hartnup - Laboratory Manager **Signed:**

for and on behalf of Ground Engineering Ltd

Date Reported: 21.04.2021 Page 1 of 1

Form Number: GELab/C/704-1 Version 19

Registered in England & Wales
Registration Number: 6929574
Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

8180

GROUND ENGINEERING LIMITED

Newark Road Peterborough
t: 01733 566566
e: admin@groundengineering.co.uk

TEST CERTIFICATE

Determination of Liquid and Plastic Limits

Tested in Accordance with BS1377-2: 1990: Clause 4.3 & 5: Definitive Method

Client:	Key GeoSolutions Ltd	Certificate Number:	PL7423-1/2/704-1
Client Address:	Nova House Audley Ave Newport Shropshire TF10 7DW	Client Reference:	L9967
		Job Number:	PL7423-1
		Date Sampled:	Unknown
		Date Received:	12.04.2021
Contact:	Ruby Westnedge	Date Tested:	20.04.2021
		Certificate of Sampling:	N/A
Site Name:	21 Mornington Crescent	Sampling Certificate No.:	N/A
Site Address:		Sampled By:	Client

TEST RESULTS **Laboratory Reference:** PL7423-1/2

Sample Reference: Not Given

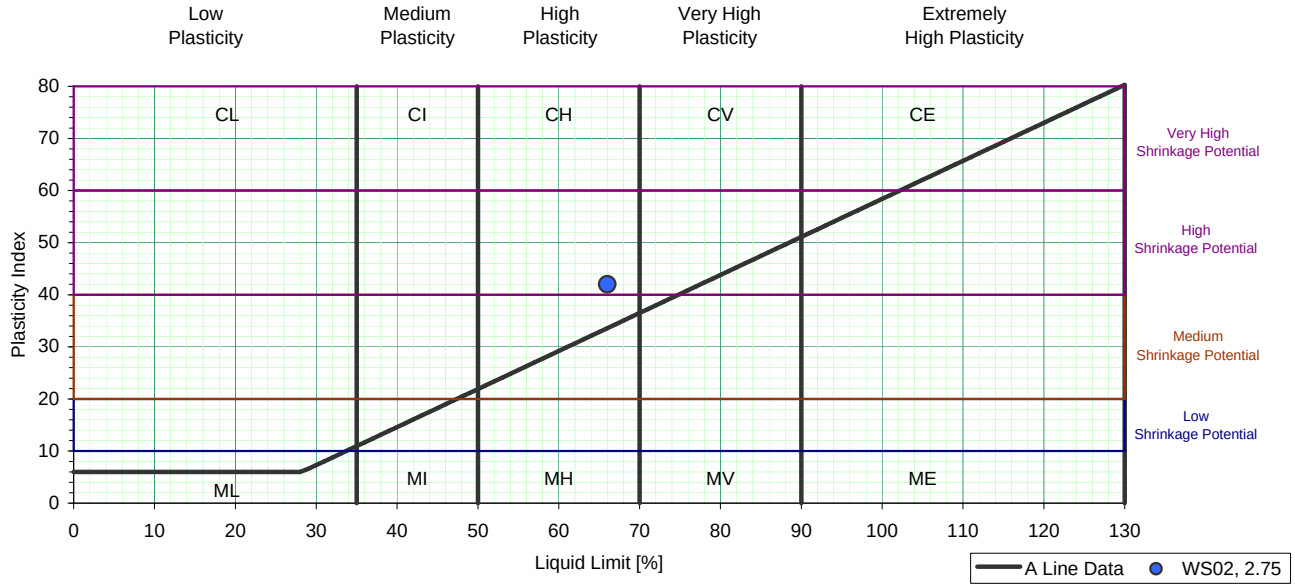
Description: Very Stiff fissured brown orange-brown grey slightly silty slightly sandy CLAY with occasional sandy pockets plus occasional selenite and rare root traces.

Location: WS02 Depth Top: 2.75m

Sample Preparation: As Received Depth Base: 3.00m

Estimated % Passing 425µm BS Test Sieve

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index	% Passing 425µm BS Test Sieve
30	66	24	42	100



Comments:

Approved Signatory: M. Hartnup - Laboratory Manager **Signed:**

for and on behalf of Ground Engineering Ltd

Date Reported: 21.04.2021 Page 1 of 1

Form Number: GELab/C/704-1 Version 19

Registered in England & Wales
Registration Number: 6929574
Reg Office: Ground Engineering Ltd
Newark Rd, Peterborough PE1 5UA

APPENDIX 2

SELECTED FIGURES FROM ARUP 2010

526000 528000 530000

184000 182000

Site Location

Data source: BGS Mapping - Scale 1:10,000

N

Scale at A3: 1:15,000

Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.25 0.5 1 1.5
Kilometers

Legend

- London Borough of Camden
- Railway Lines
- A Roads

BGS 1:10K Artificial Ground

- MADE GROUND
- WORKED GROUND

BGS 1:10K Drift Geology

- ALLUVIUM
- HACKNEY GRAVEL FORMATION
- LANGLEY SILT FORMATION
- LYNCH HILL GRAVEL FORMATION
- STANMORE GRAVEL FORMATION

BGS 1:10K Solid Geology

- BAGSHOT FORMATION
- CLAYGATE MEMBER
- LAMBETH GROUP
- LONDON CLAY FORMATION

NB. Geological boundaries are largely indicative based on available geological mapping data

Camden Geological, Hydrogeological and Hydrological Study

South Camden Geological Map

213923 FIGURE 5

524000 526000 528000 530000 532000 534000

188000 186000 184000 182000

Site Location

Environment Agency Aquifer Designation based on BGS Mapping

N

Scale at A3: 1:30,000

Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.5 1 2 3
Kilometers

Legend

- Borough of Camden
- Railway Lines
- A Roads

Aquifer Designation

- Secondary A Aquifer
- Unproductive Strata

Source Protection Zone

- Outer Source Protection Zone
- Inner Source Protection Zone

NB. Aquifer boundaries are indicative based on available geological mapping data

Camden Geological, Hydrogeological and Hydrological Study

Camden Aquifer Designation Map

213923

FIGURE 8

522000 524000 526000 528000 530000 532000

186000

184000

182000

Site Location

Topographic map based on digital terrain model provided by Camden Borough Council

N

Scale at A3: 1:30,000

Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.375 0.75 1.5 2.25 3 3.75
Kilometers

Legend

London Borough of Camden
Railway Lines
A Roads

DTM Terrain
* Window Size: 20.000

Elevation

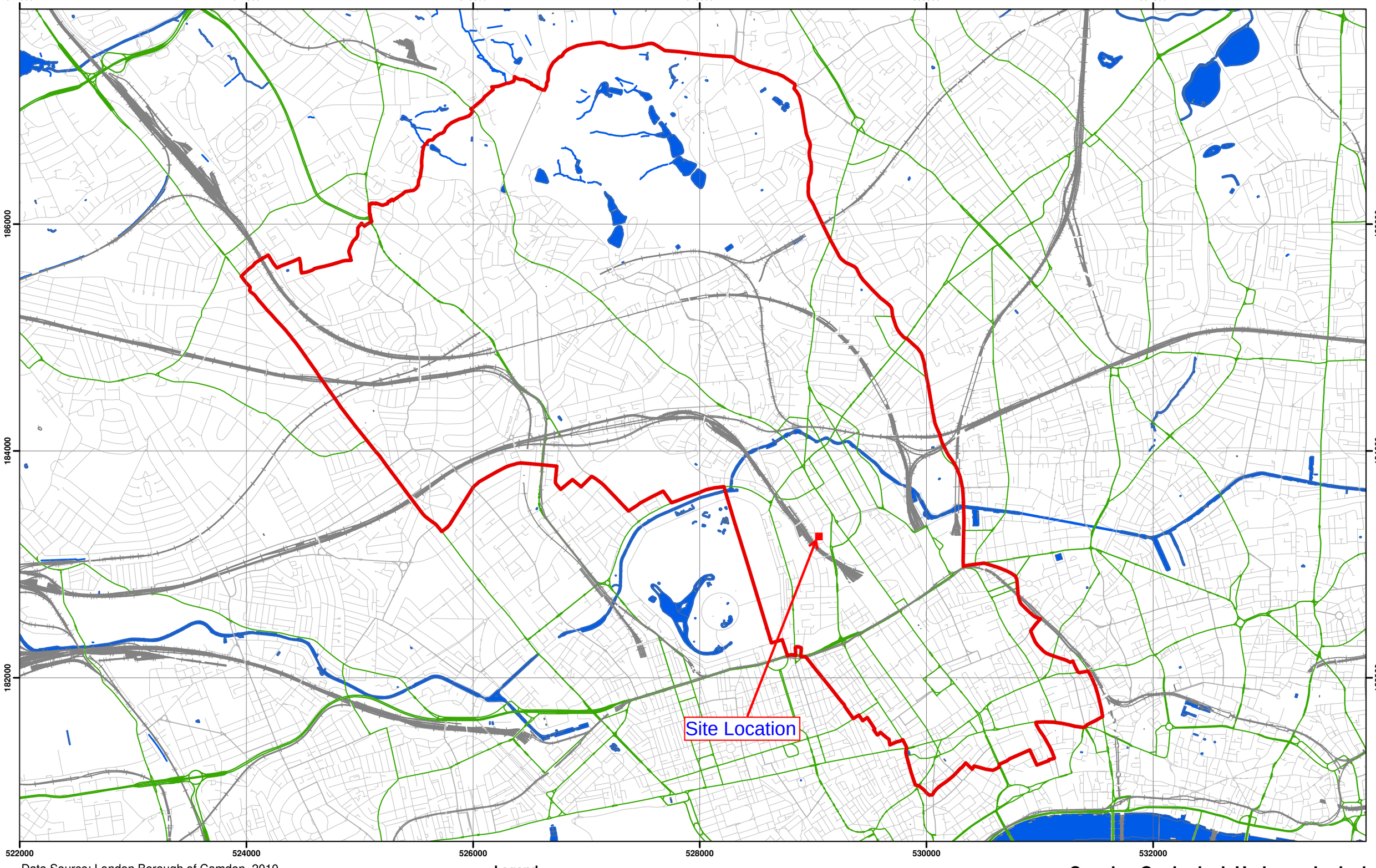
145 - 150
140 - 145
135 - 140
130 - 135
125 - 130
120 - 125
115 - 120
110 - 115
105 - 110
100 - 105
95 - 100
90 - 95
85 - 90
80 - 85
75 - 80
70 - 75
65 - 70
60 - 65
55 - 60
50 - 55
45 - 50
40 - 45
35 - 40
30 - 35
25 - 30
20 - 25
15 - 20
10 - 15
5 - 10
0 - 5
-5 - 0
-7.4 - -5

Camden Geological, Hydrogeological and Hydrological Study

Camden Topographic Map

213923

FIGURE **10**



Data Source: London Borough of Camden, 2010

N

Scale at A3: 1:30,000

Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.5 1 2 3
Kilometers

Legend

- London Borough of Camden
- Surface water
- Railway Lines
- A Roads

Camden Geological, Hydrogeological and Hydrological Study

Camden Surface Water Features

213923

FIGURE 12

524000 526000 528000 530000 532000 534000

186000 184000 182000

Site Location

Slope Angles calculated from Digital Terrain Model Provided By Camden Bourough Council

N

Scale at A3: 1:30,000

1:10,000 BGS Mapping
Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.5 1 2 3
Kilometers

Legend

Slope
- 0° - 7°
- 7° - 10°
- > 10°

London Borough of Camden
Railway Lines
A Roads

BGS 1:10K Artificial Ground
- MADE GROUND
- WORKED GROUND

BGS 1:10K Drift Geology
- ALLUVIUM
- HACKNEY GRAVEL FORMATION
- LANGLEY SILT FORMATION
- LYNCH HILL GRAVEL FORMATION
- STANMORE GRAVEL FORMATION

BGS 1:10K Solid Geology
- BAGSHOT FORMATION
- CLAYGATE MEMBER
- LAMBETH GROUP
- LONDON CLAY FORMATION

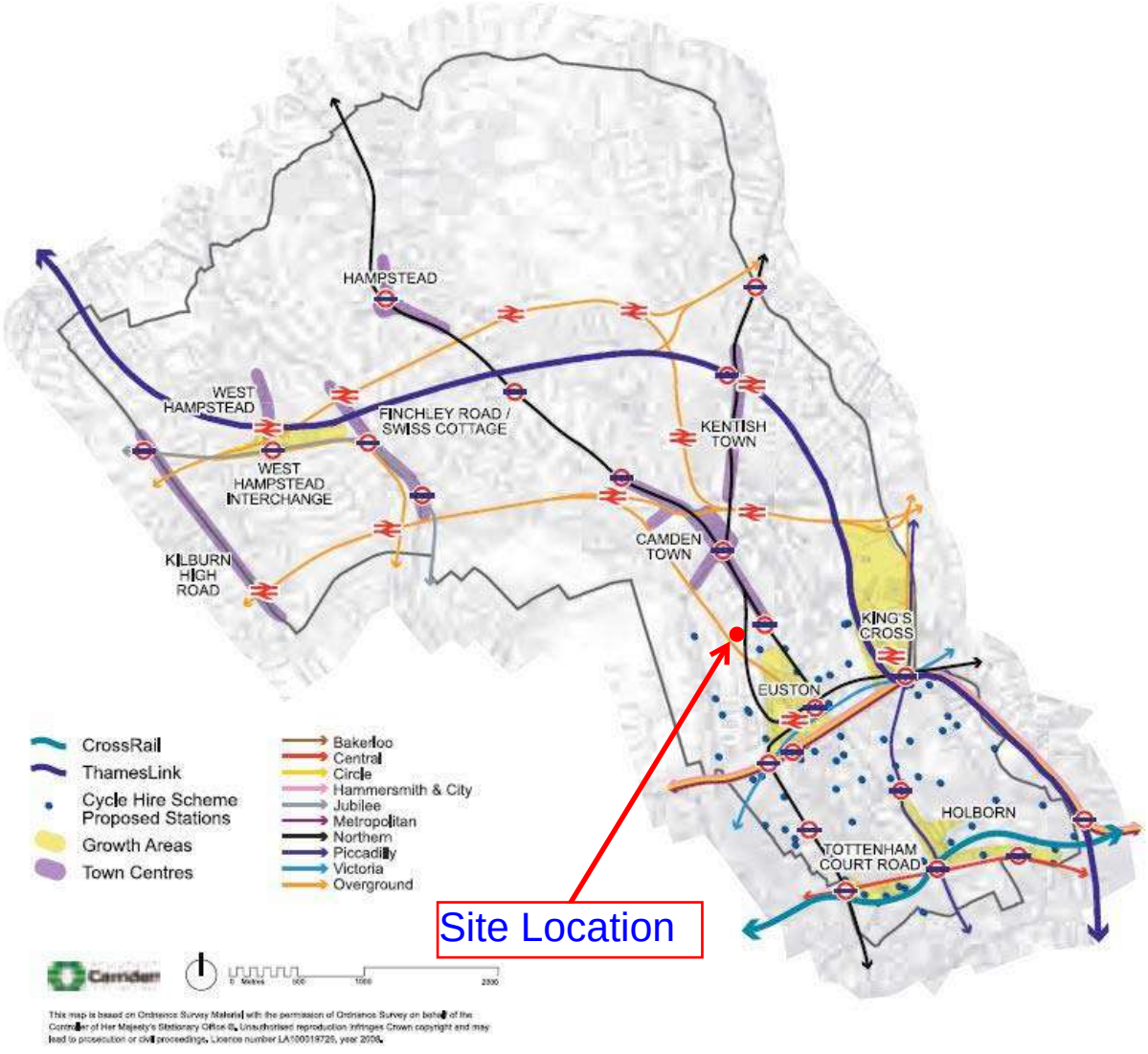
NB. Geological boundaries are largely indicative based on available geological mapping data

Camden Geological, Hydrogeological and Hydrological Study

Slope Angle Map

213923

FIGURE 16



Source - London Borough of Camden, January 2010. *Camden Core Strategy Proposed Submission*.

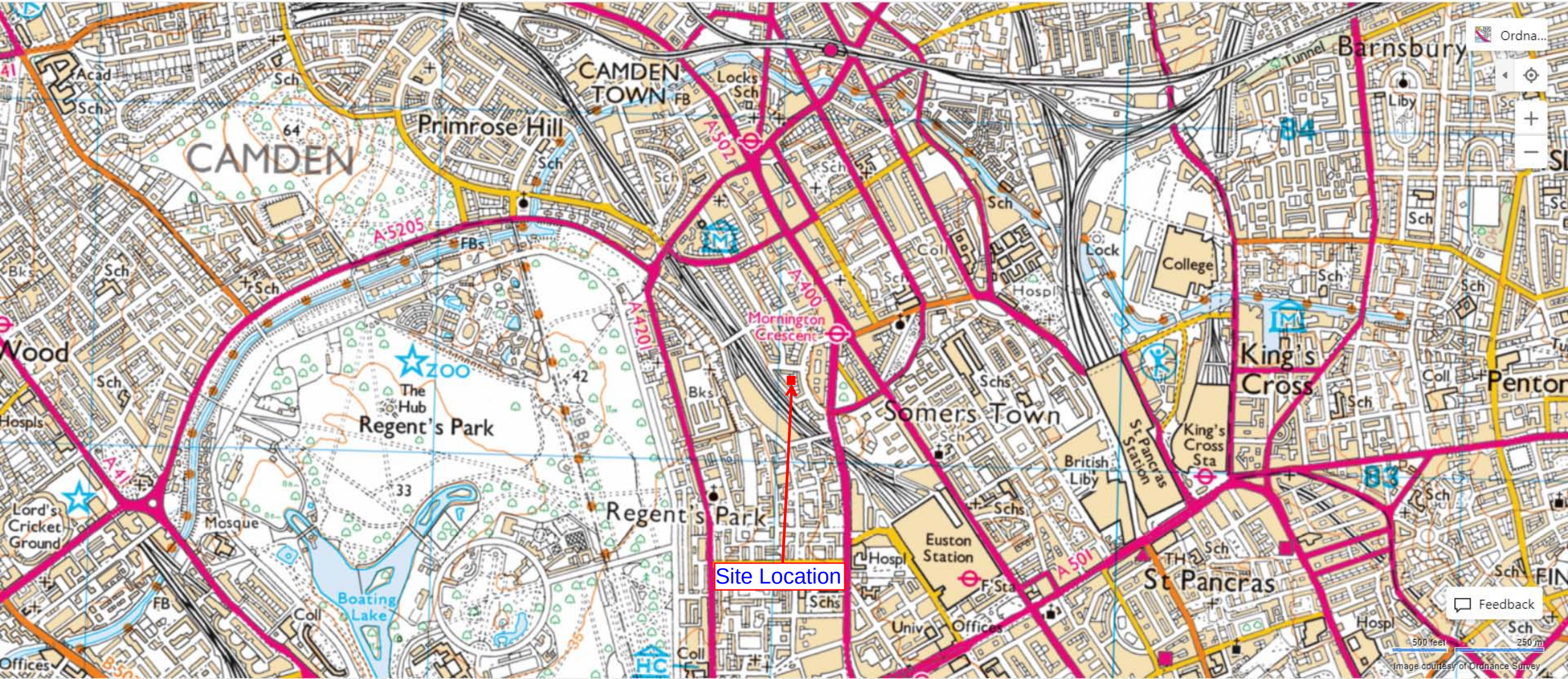
Camden Geological, Hydrogeological and Hydrological Study
Transport Infrastructure

213923 **FIGURE 18**

APPENDIX 3

FIGURES A – E

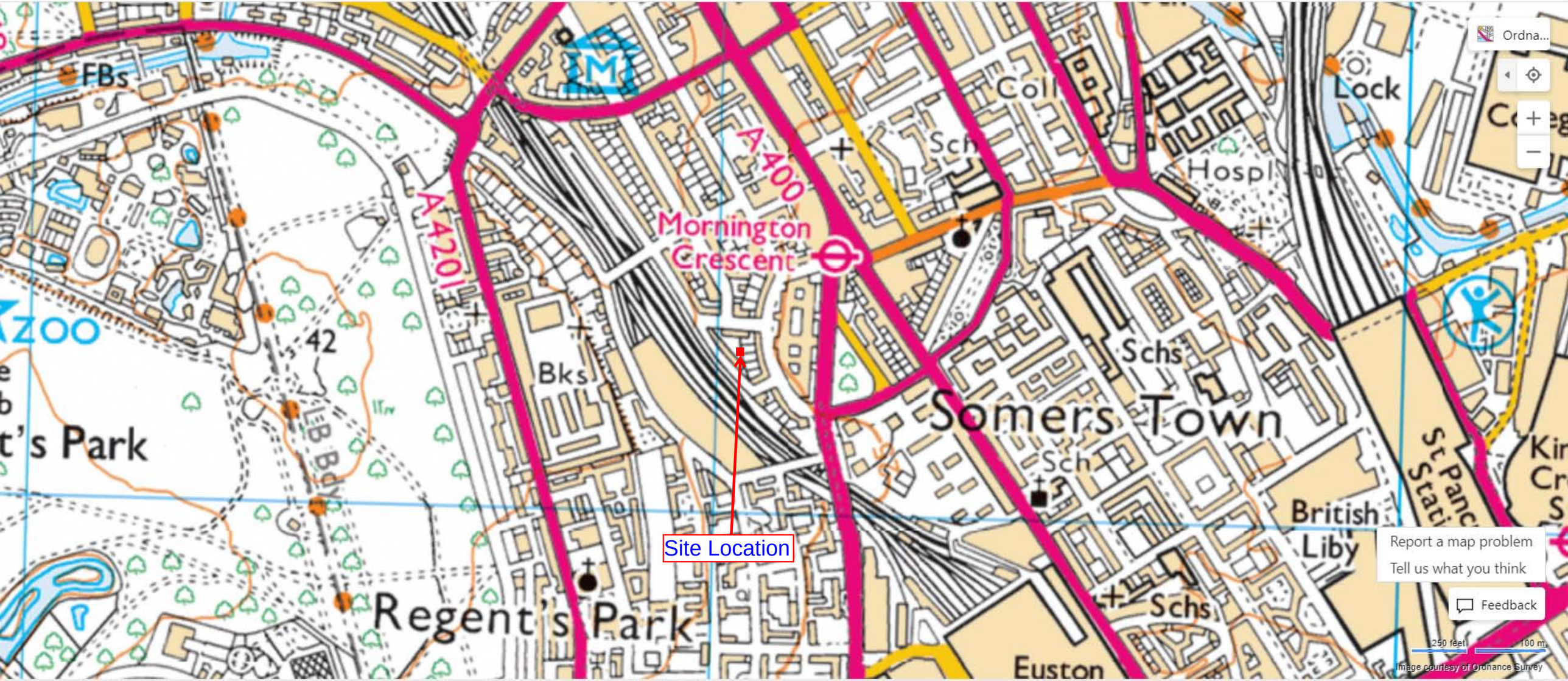
Figure A - 5m contour (Larger Area)



Microsoft Bing

Figure A - 5m contour (Site Area)

Directions Traffic My Places More

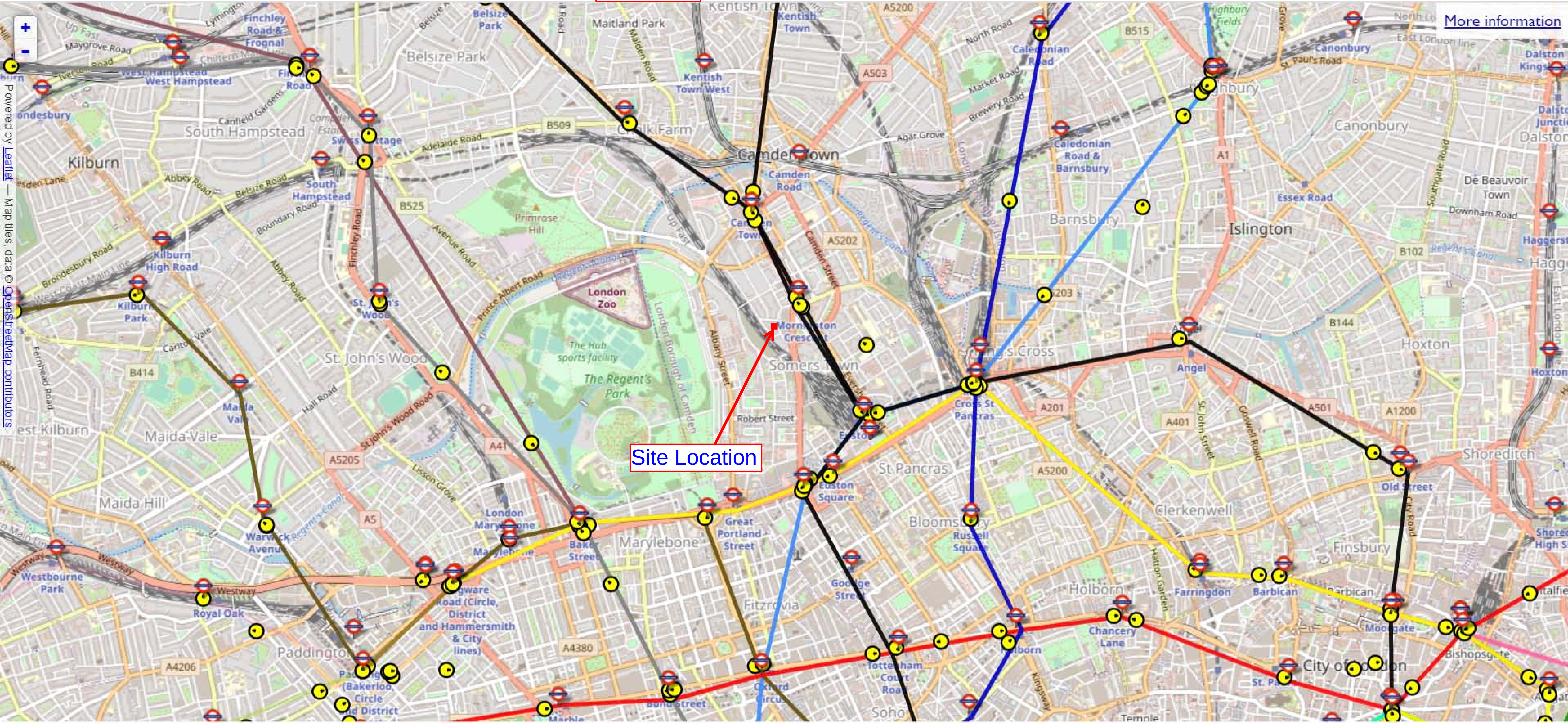



Mornington Crescent Station
24
39
35
25
24
21
13
12
12
3
Harrington Square Gardens
Metabolic
Mornington Crescent
2D

Figure B

traintimes.org.uk/map/tube/

Figure C



Live London Underground map – Geographic | **Schematic** | **Skyfall**

By Matthew Somerville. Data collected: Tue, 20 Apr 2021 11:05:05 +0100

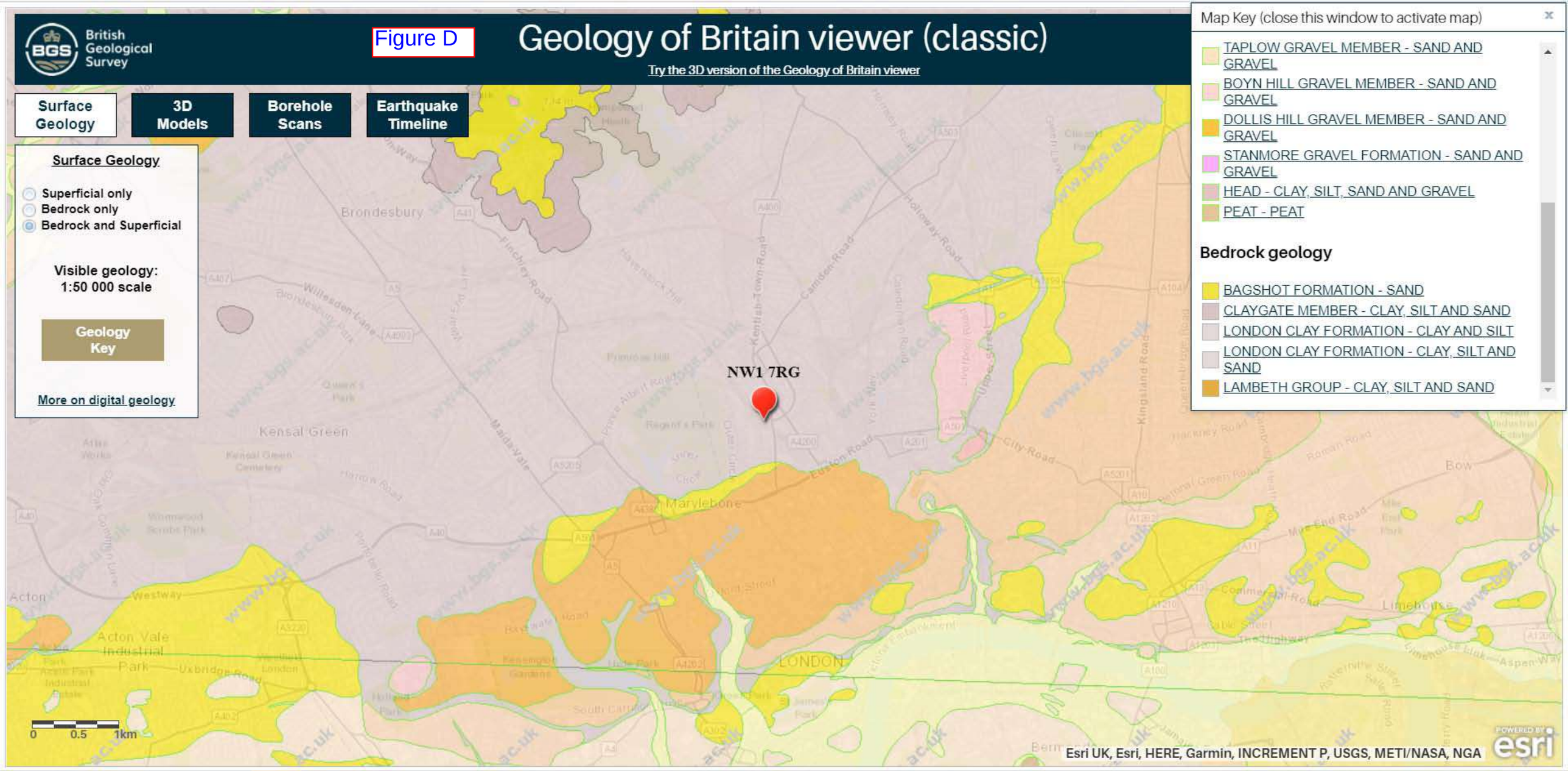
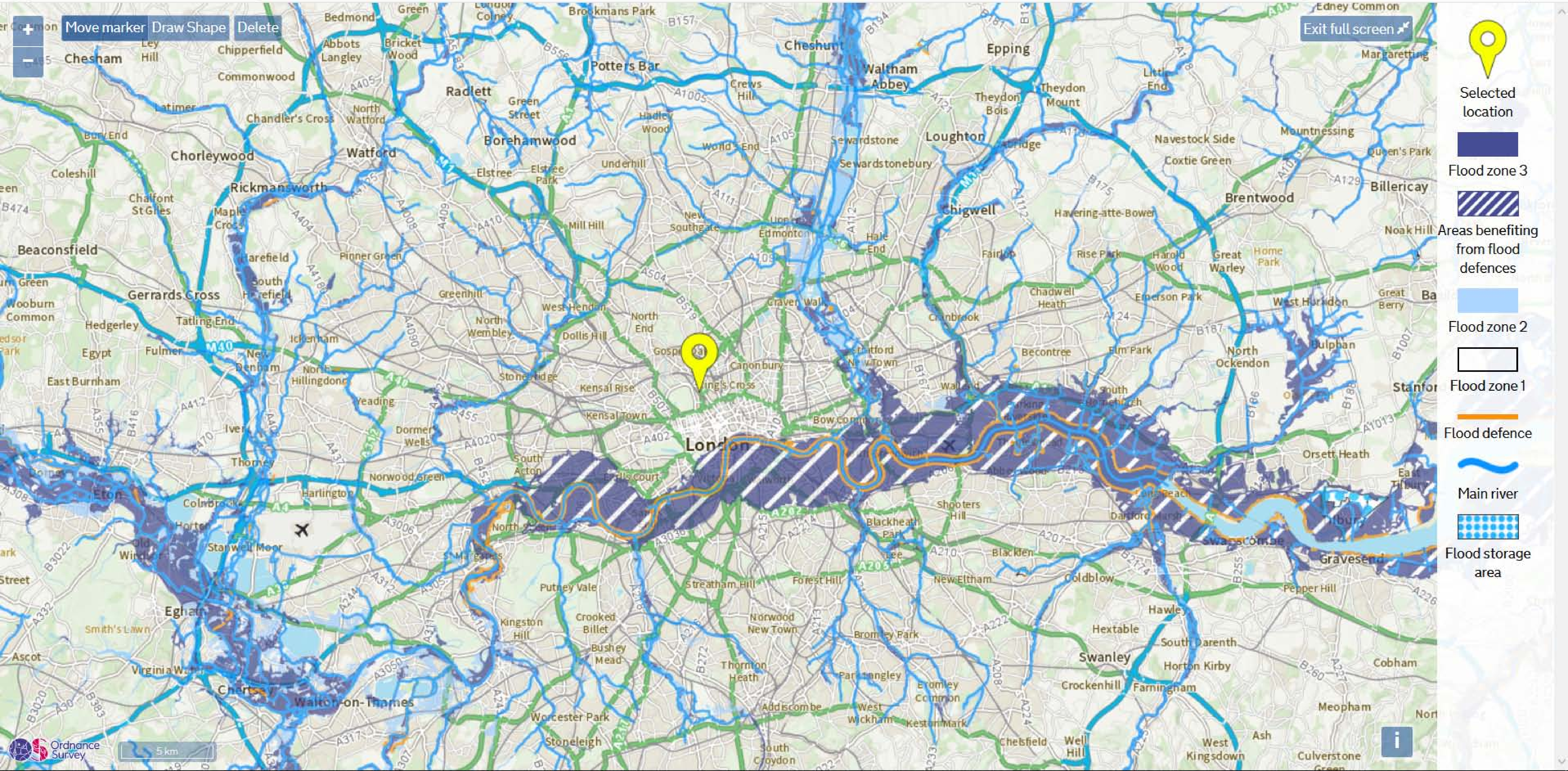


Figure D
Geology of Britain viewer (classic)
British Geological Survey
Try the 3D version of the Geology of Britain viewer
Surface Geology
3D Models
Borehole Scans
Earthquake Timeline
Surface Geology
Superficial only
Bedrock only
Bedrock and Superficial
Visible geology: 1:50 000 scale
Geology Key
More on digital geology
NW1 7RG
Map Key (close this window to activate map)
TAPLOW GRAVEL MEMBER - SAND AND GRAVEL
BOYN HILL GRAVEL MEMBER - SAND AND GRAVEL
DOLLIS HILL GRAVEL MEMBER - SAND AND GRAVEL
STANMORE GRAVEL FORMATION - SAND AND GRAVEL
HEAD - CLAY, SILT, SAND AND GRAVEL
PEAT - PEAT
Bedrock geology
BAGSHOT FORMATION - SAND
CLAYGATE MEMBER - CLAY, SILT AND SAND
LONDON CLAY FORMATION - CLAY AND SILT
LONDON CLAY FORMATION - CLAY, SILT AND SAND
LAMBETH GROUP - CLAY, SILT AND SAND
Brondesbury
Kensal Green
Marylebone
LONDON
Acton
Bow
0 0.5 1km
Esri UK, Esri, HERE, Garmin, INCREMENT P, USGS, METI/NASA, NGA
esri

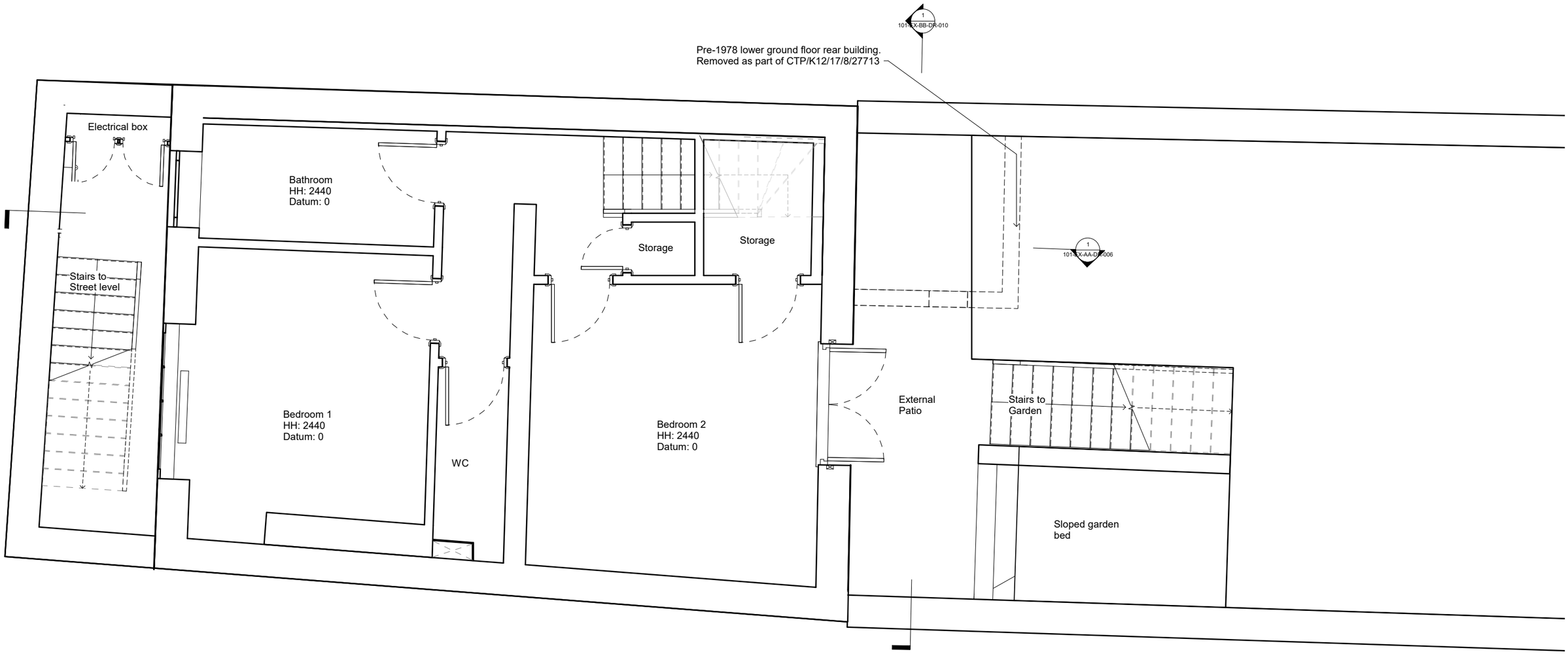
Figure E

https://flood-map-for-planning.service.gov.uk/confirm-location?easting=529063&northing=183228&placeOrPostcode=nw17rg



APPENDIX 4

DRAWINGS OF PROPOSED DEVELOPMENT



1 Level -1
1 : 25

Do not scale from the drawing. All dimensions to be verified on site by contractor prior to commencement of any shop drawings and any works on site. Report all discrepancies to the Architect immediately.

This drawing is to read in conjunction with all related consultant/engineers drawings and all other relevant information.

REV	DATE	DESCRIPTION	CKD
P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

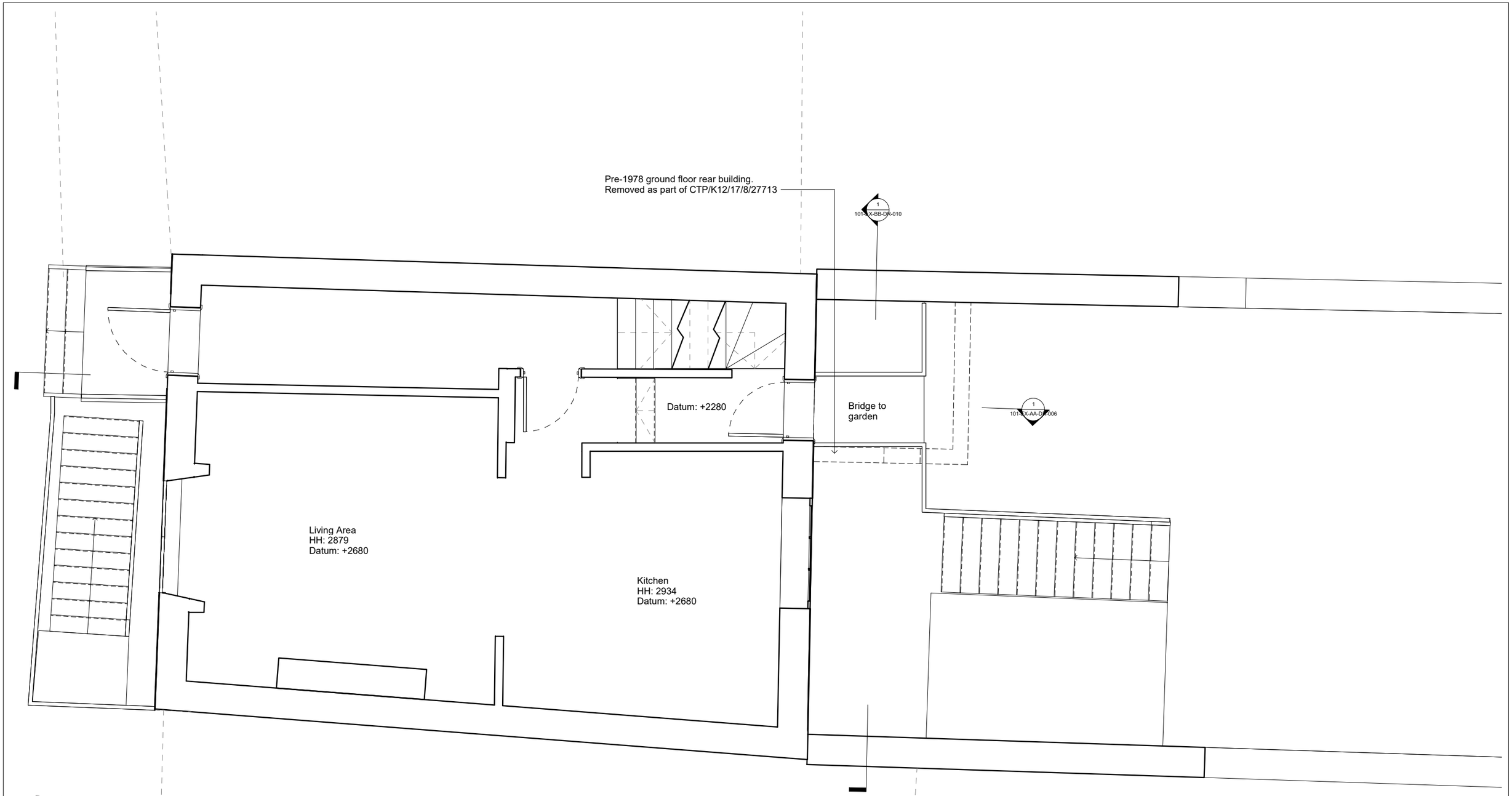
KAS Architects Ltd.
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Existing Lower Ground Floor
101-EX-LG-DR-001

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1



1 Level 0
1 : 25

Do not scale from the drawing. All dimensions to be verified on site by contractor prior to commencement of any shop drawings and any works on site. Report all discrepancies to the Architect immediately.

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REV	DATE	DESCRIPTION	CKD
P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

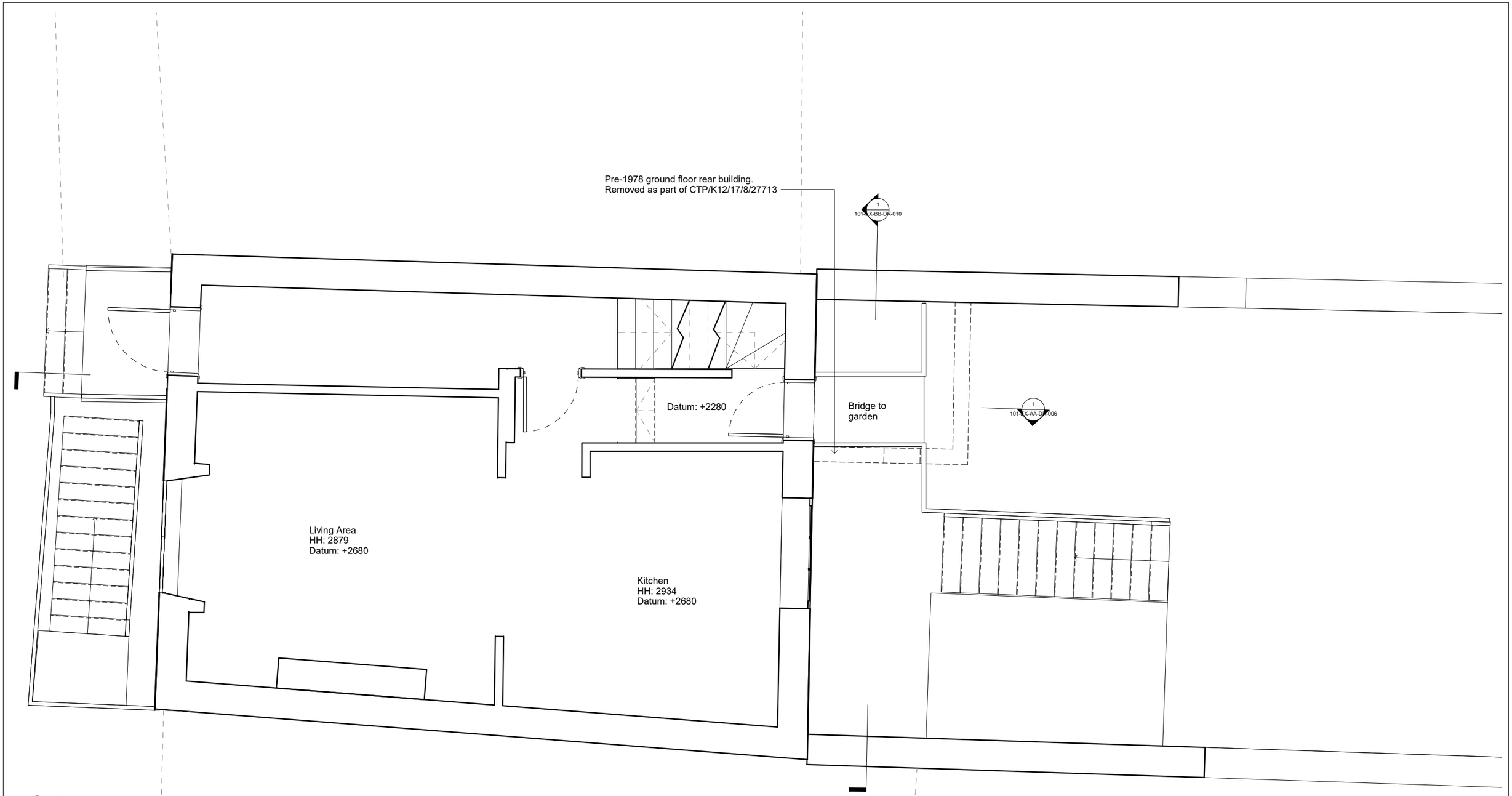
KAS Architects Ltd.
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Existing Ground Floor
101-EX-GF-DR-002

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1



1 Level 0
1 : 25

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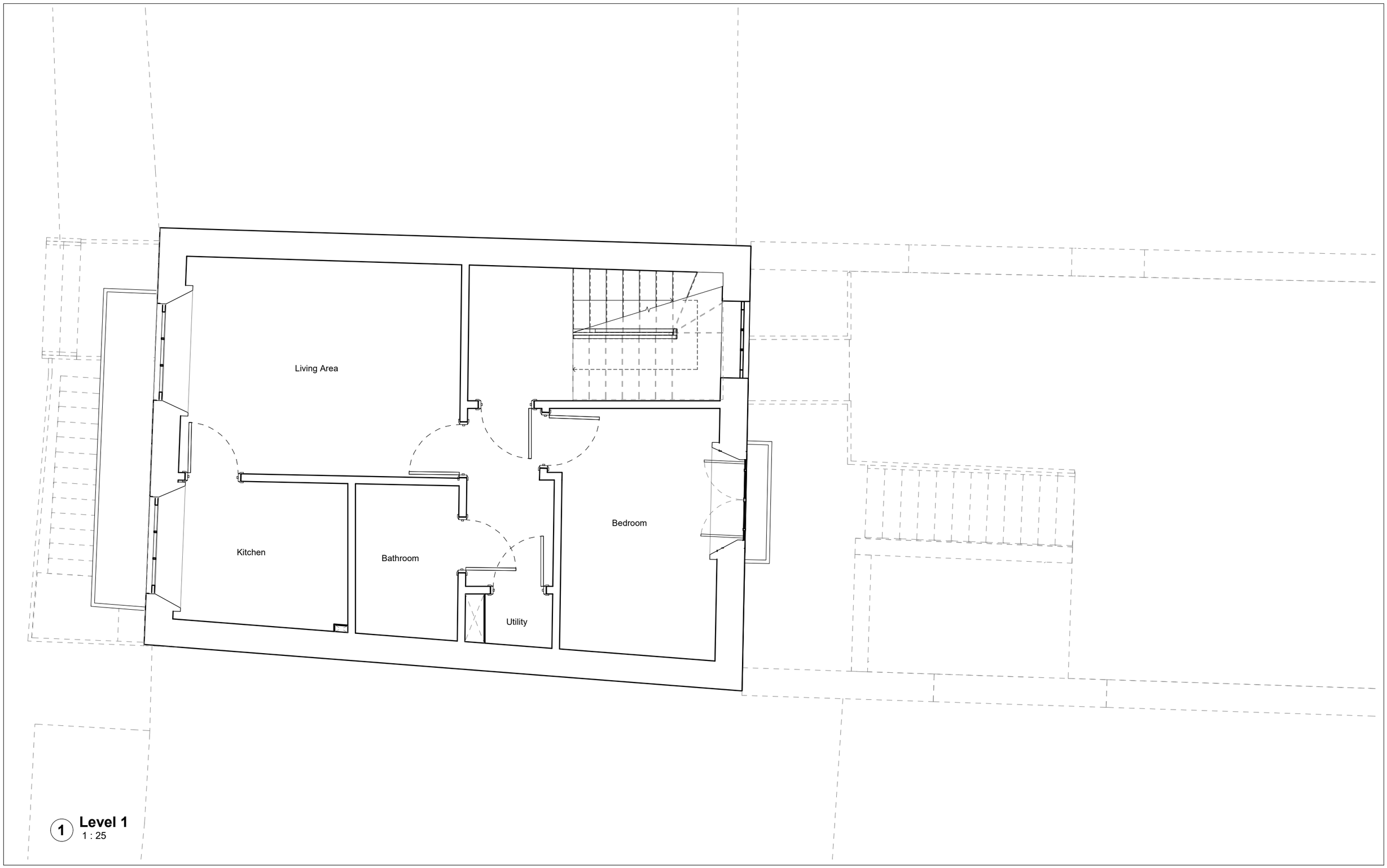
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Existing Ground Floor
101-EX-GF-DR-002

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1



1 **Level 1**
1 : 25

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REV	DATE	DESCRIPTION	CKD

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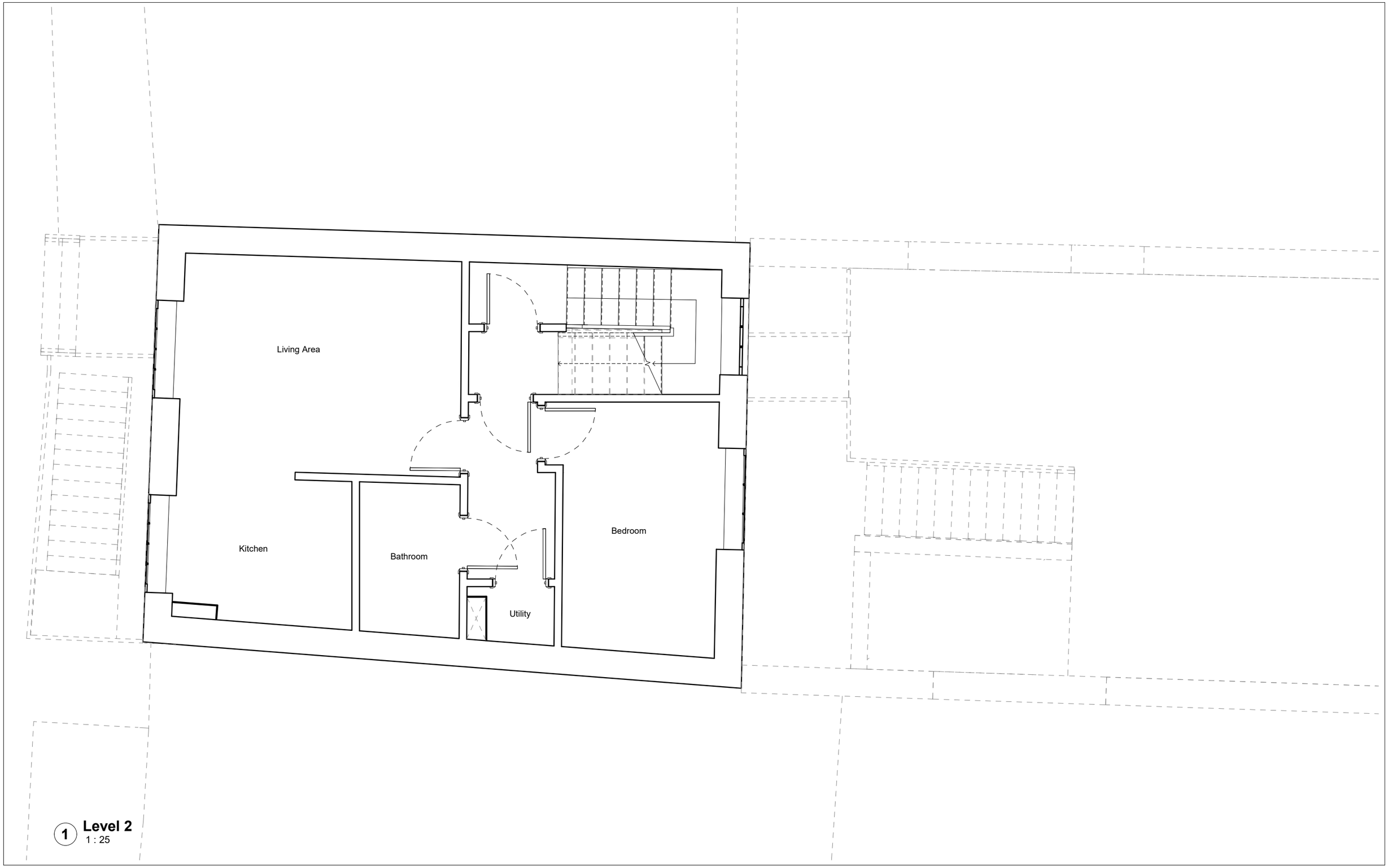
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Existing First Floor
101-EX-01-DR-003

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1



1 Level 2
1 : 25

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REV	DATE	DESCRIPTION	CKD
P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

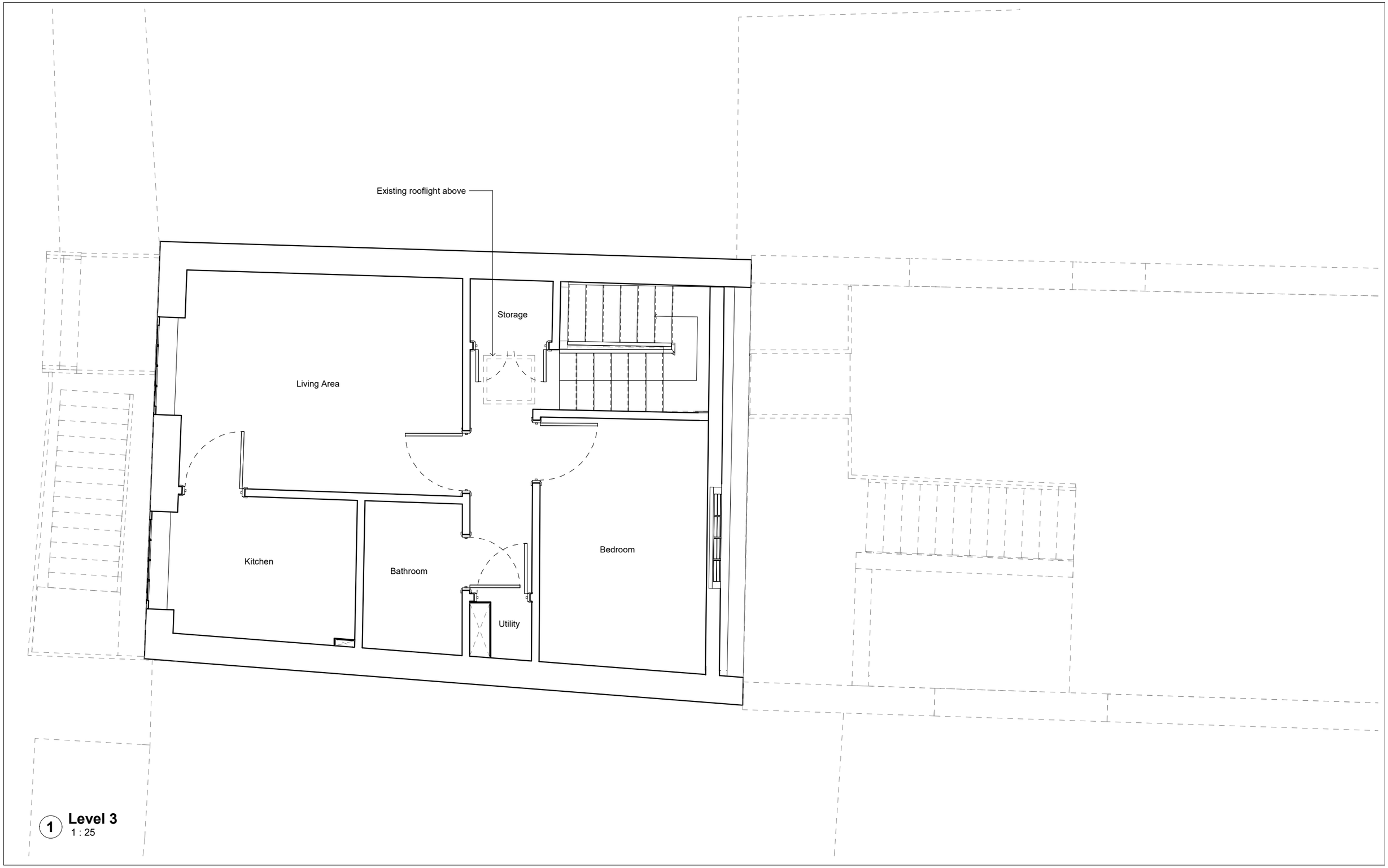
KAS Architects Ltd.
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Existing Second Floor
101-EX-02-DR-004

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1



1 Level 3
1 : 25

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REV	DATE	DESCRIPTION	CKD
P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

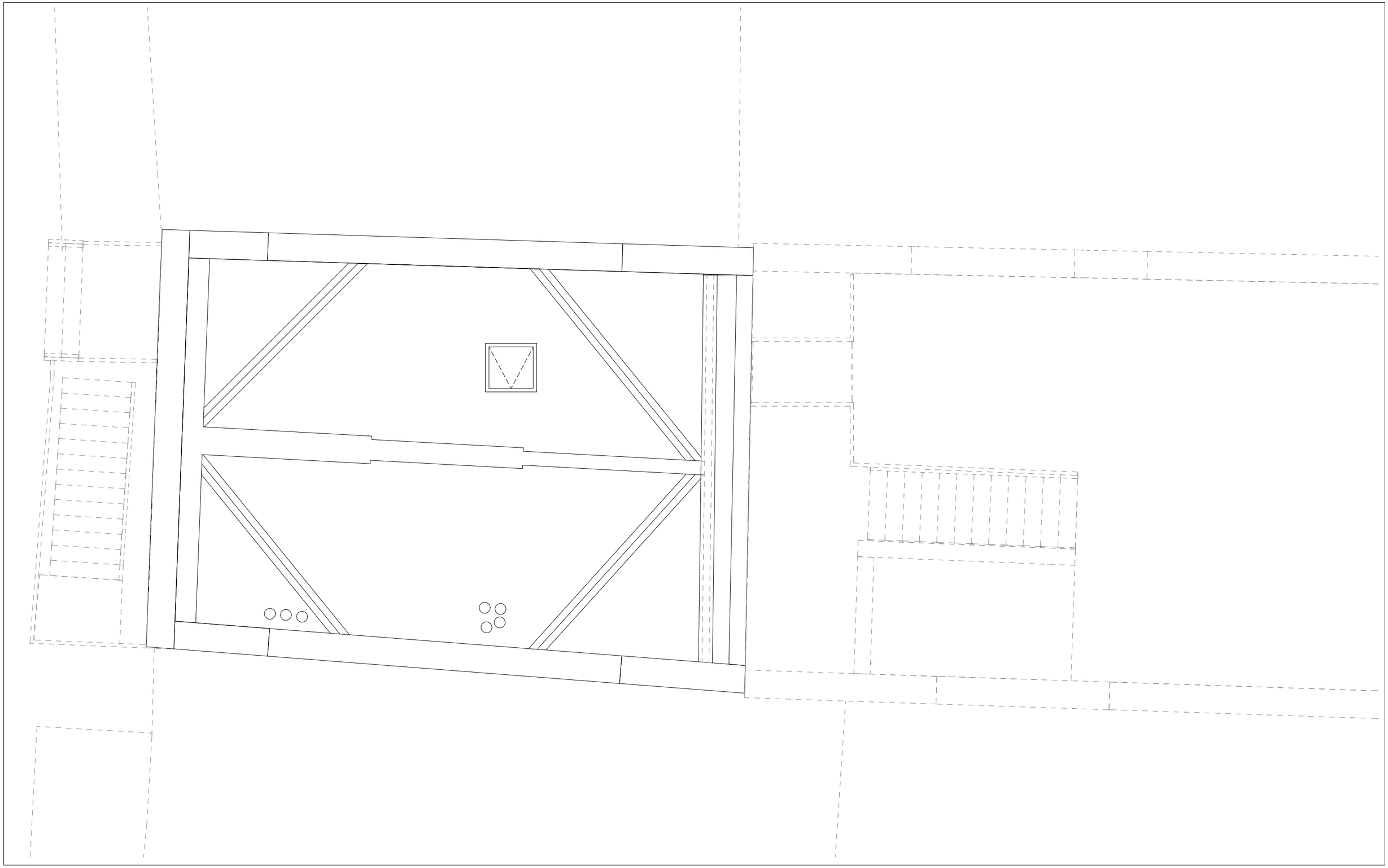
KAS Architects Ltd.
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Existing Third Floor
101-EX-03-DR-005

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1



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P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

KAS Architects Ltd.

2 Lord Cameron House
London NW3 7SU

telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent

Existing Roof Plan

101-EX-RF-DR-009

Client: Xuelin Bates

SCALE @ A1: 1 : 25

P1

1 East
1 : 25

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REV	DATE	DESCRIPTION	CKD
P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

KAS Architects Ltd.
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Existing Front Elevation
101-EX-EAST-ELE-DR-007

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1

REV	DATE	DESCRIPTION	CKD
P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

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KAS Architects Ltd.
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent

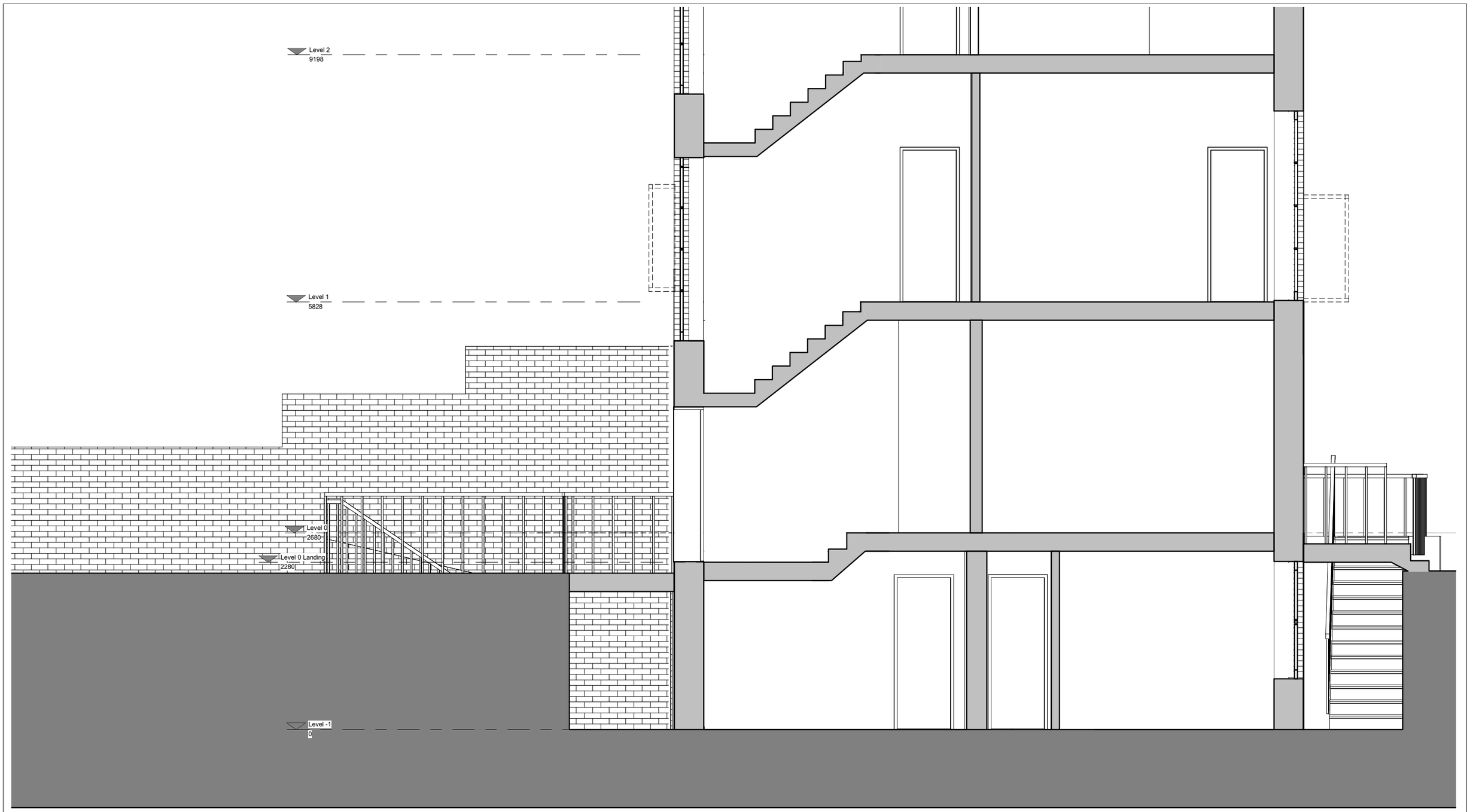
Existing Rear Elevation

101-EX-WEST-ELE-DR-008

Client: Xuelin Bates

SCALE @ A1: 1 : 25

P1



1 Section AA
1 : 25

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REV	DATE	DESCRIPTION	CKD
P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

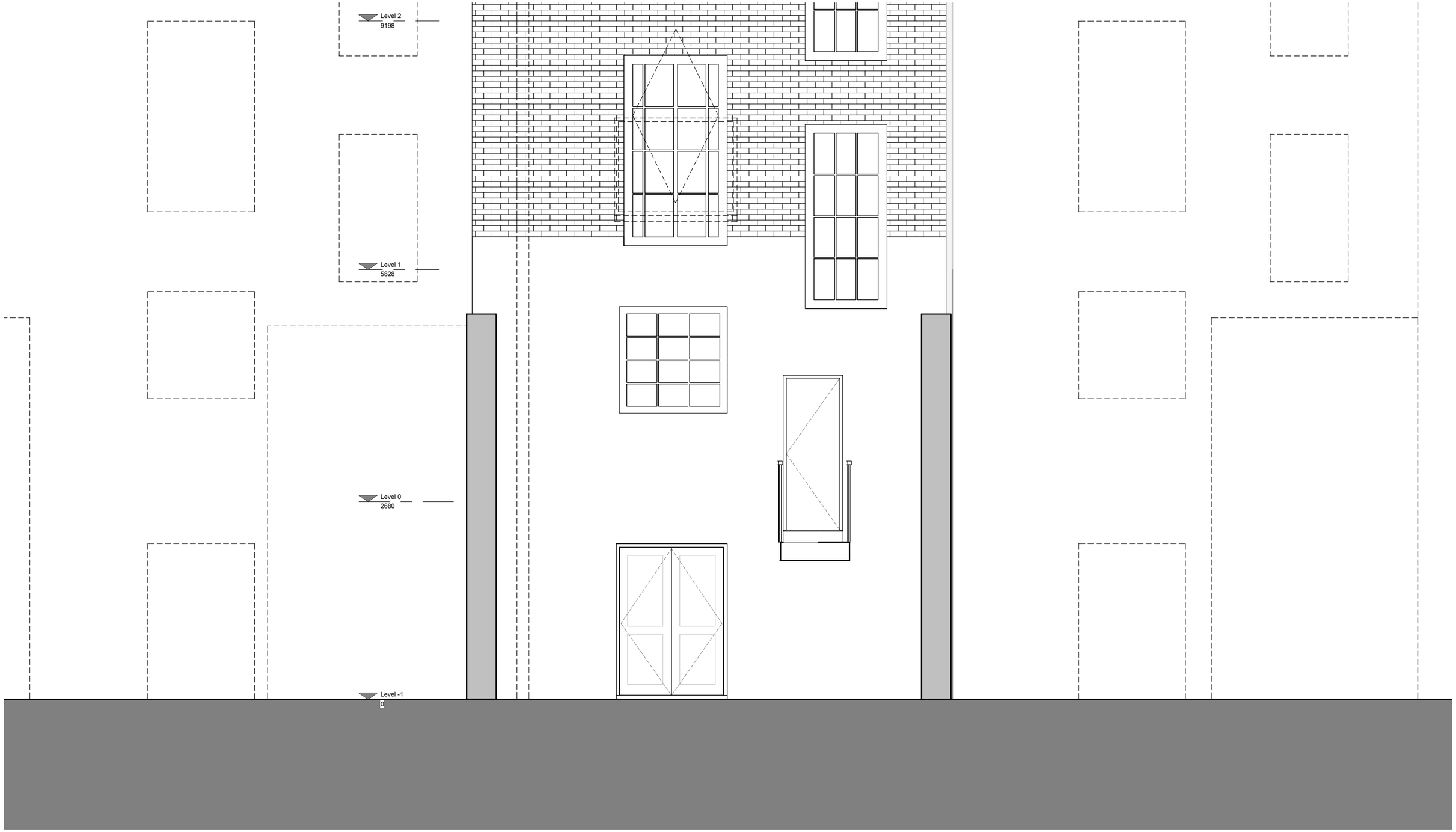
KAS Architects Ltd.
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Existing Section AA
101-EX-AA-DR-006

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1



1 Section BB

1 : 25

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REV	DATE	DESCRIPTION	CKD
P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

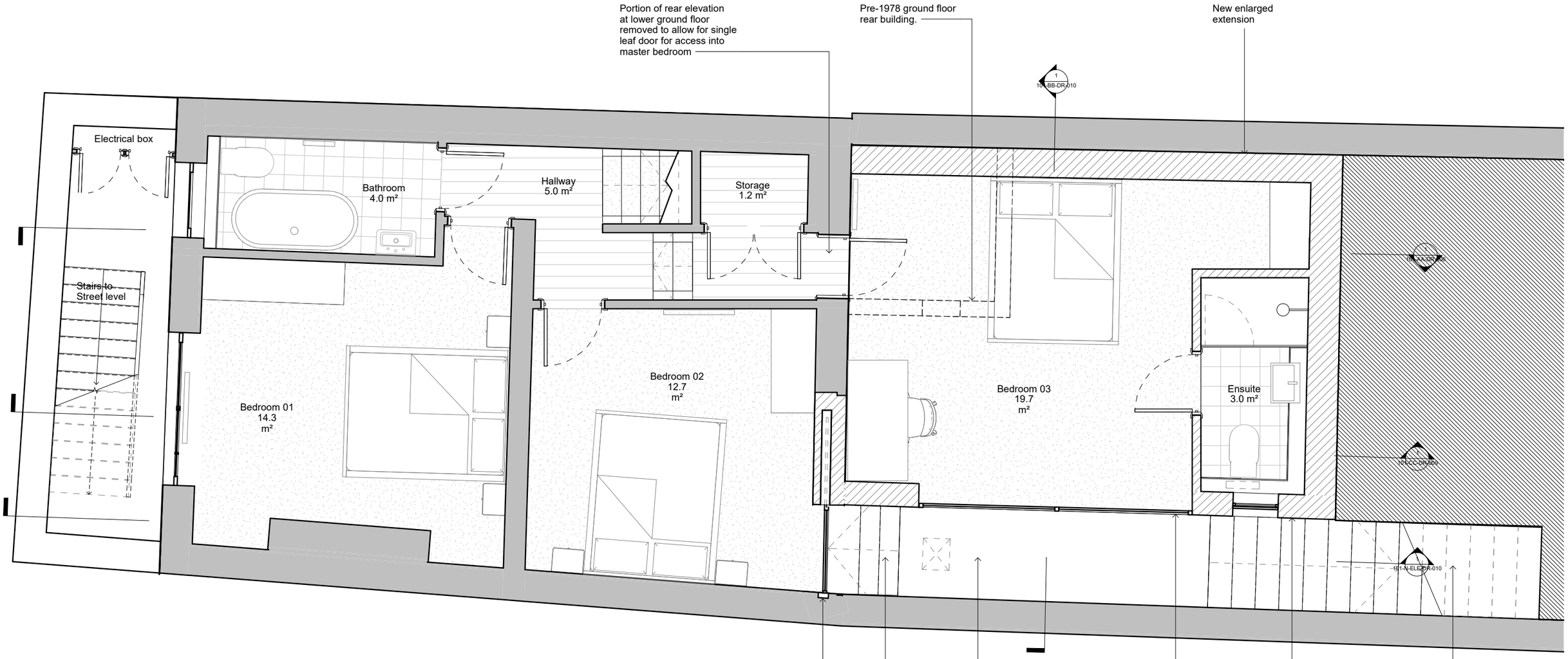
KAS Architects Ltd.
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Existing Section BB
101-EX-BB-DR-010

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1



1 Level -1
1 : 25

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P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

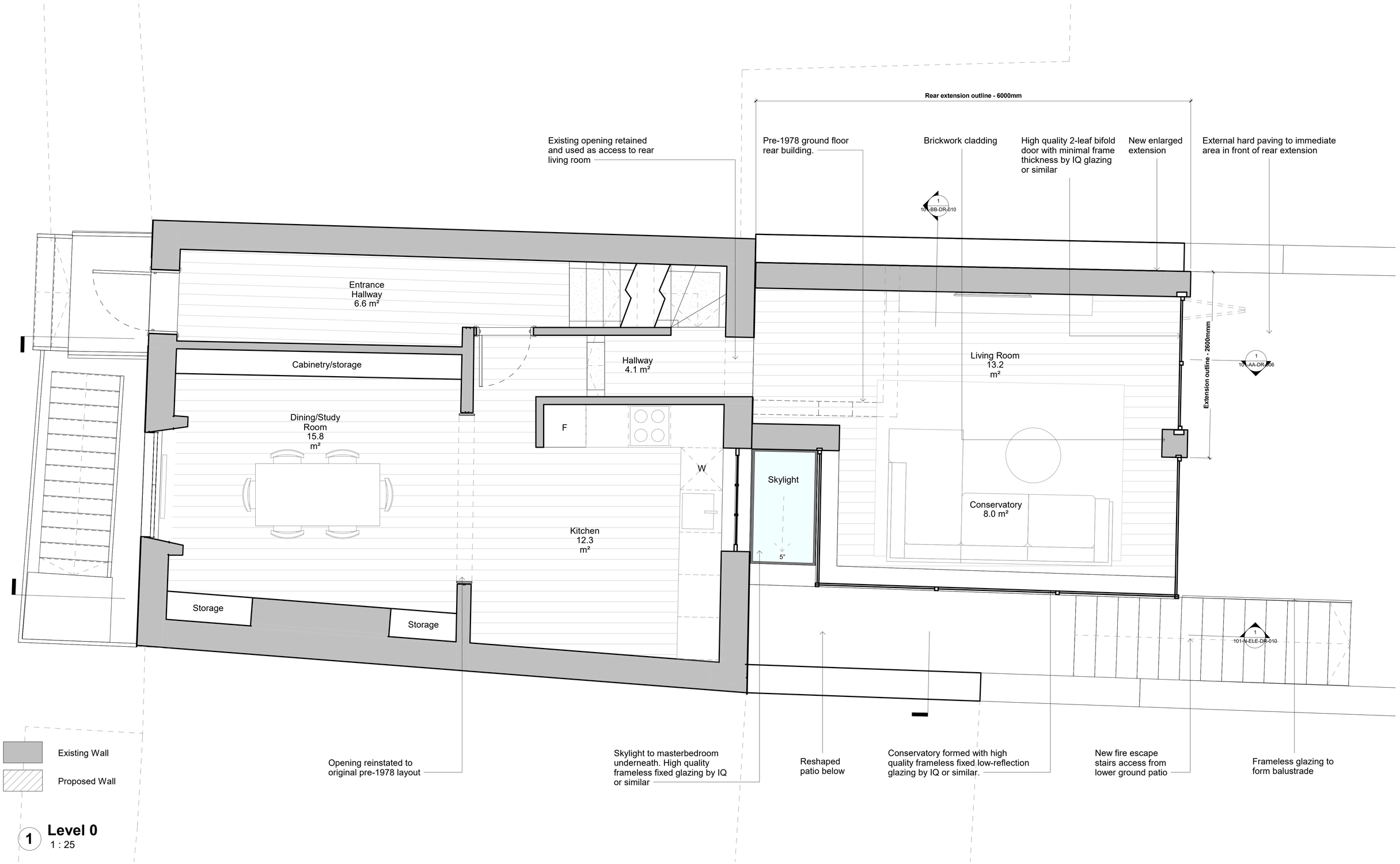
KAS Architects Ltd.
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Proposed Lower Ground Floor
101-LG-DR-001

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1



1 Level 0
1 : 25

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REV	DATE	DESCRIPTION	CKD
P1	28/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

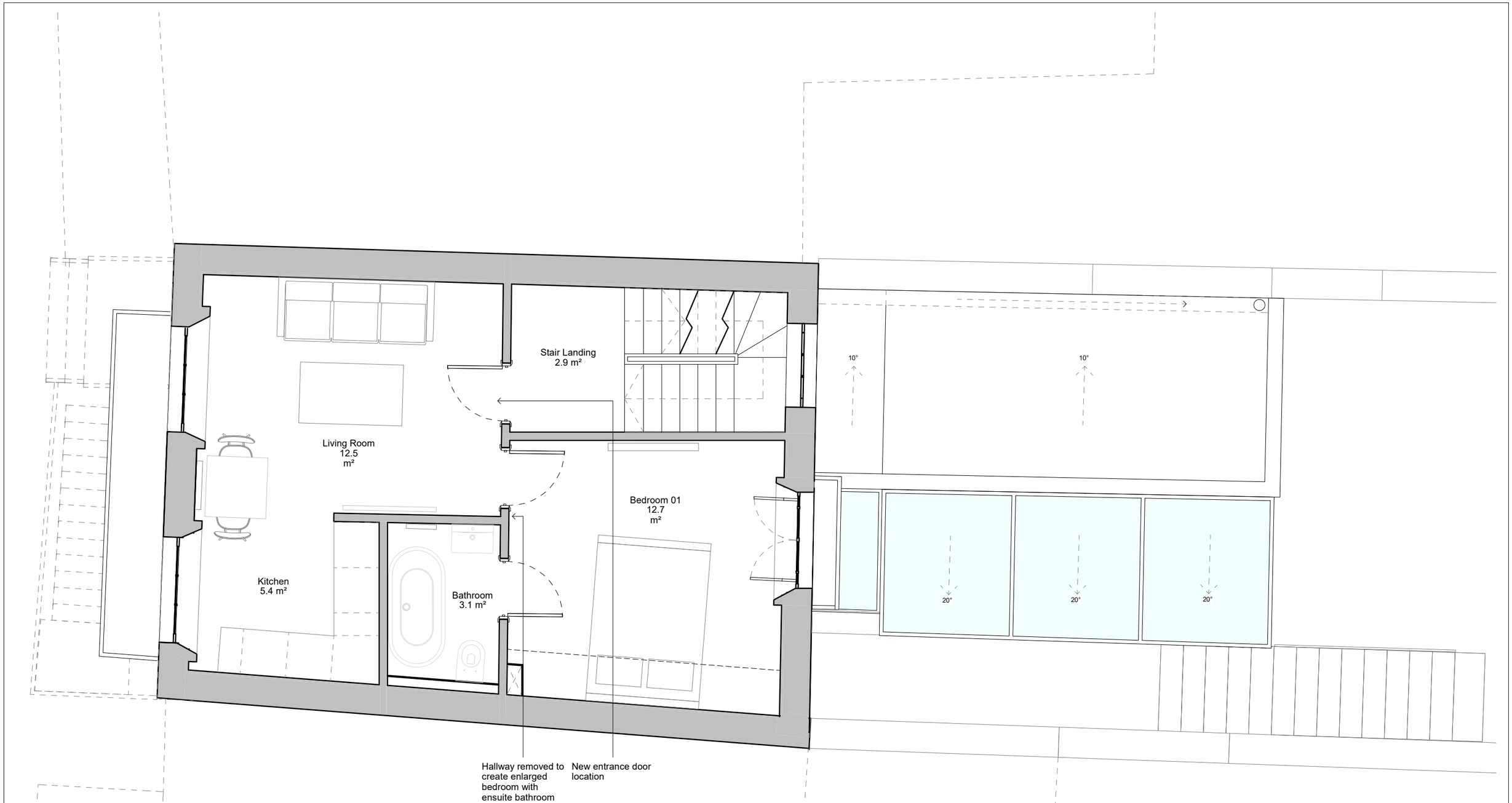
KAS Architects Ltd.
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Proposed Ground Floor
101-GF-DR-002

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1



1 Level 1
1 : 25

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REV	DATE	DESCRIPTION	CKD
P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

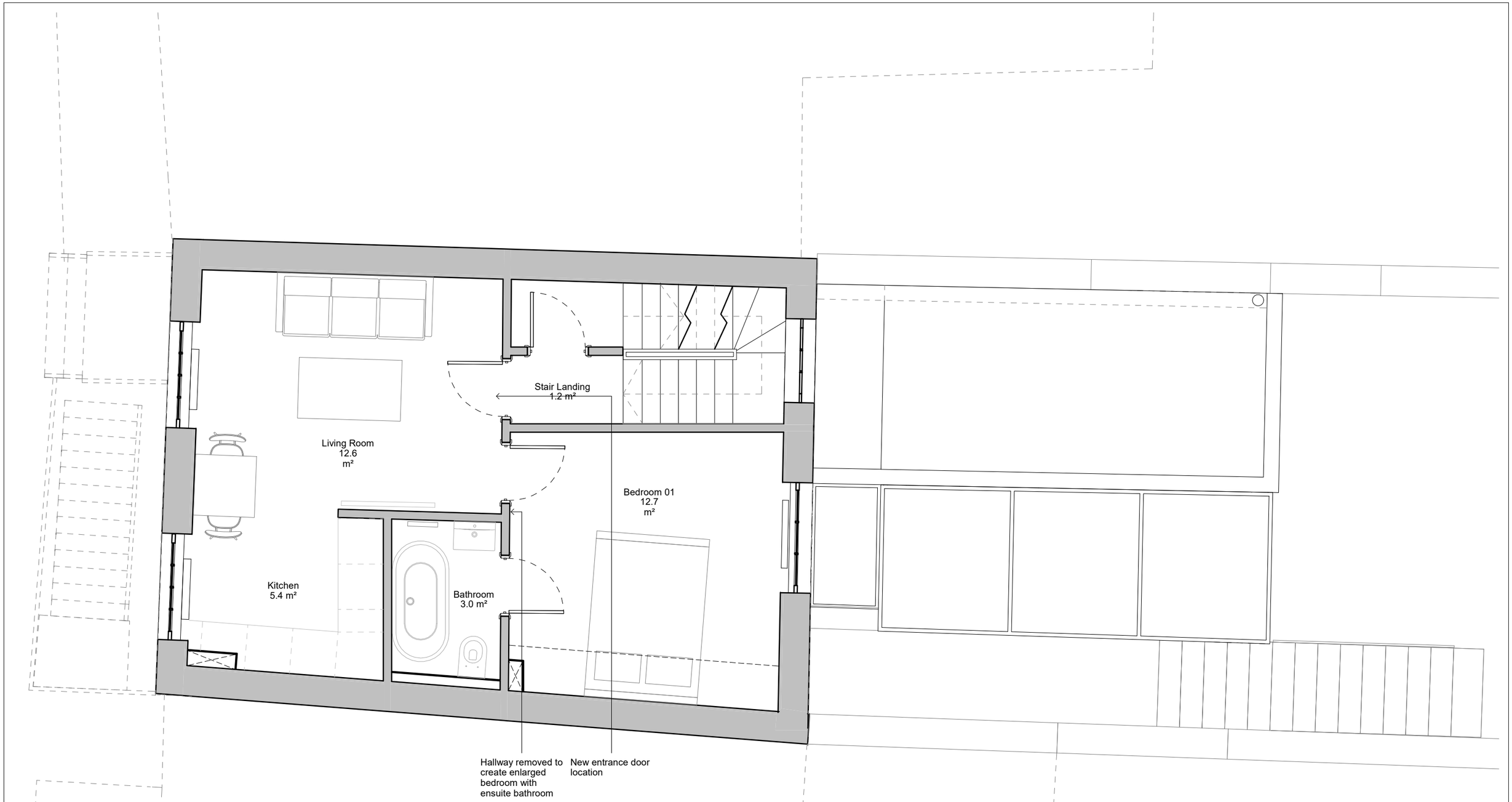
KAS Architects Ltd.
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Proposed First Floor Plan
101-01-DR-003

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1



1 Level 2
1 : 25

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REV	DATE	DESCRIPTION	CKD
P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

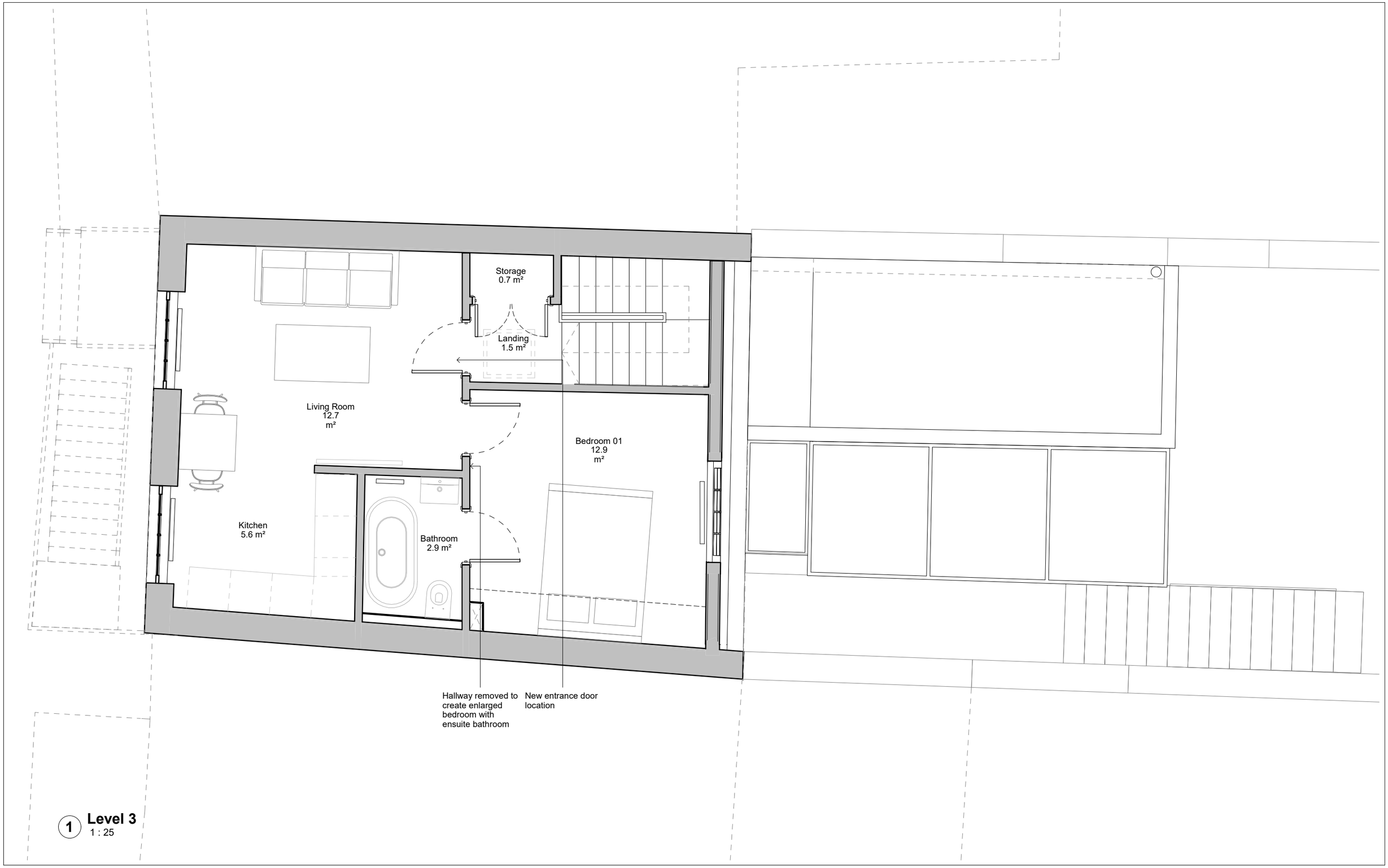
KAS Architects Ltd.
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Proposed Second Floor Plan
101-02-DR-004

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1



1 Level 3
1 : 25

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REV	DATE	DESCRIPTION	CKD
P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

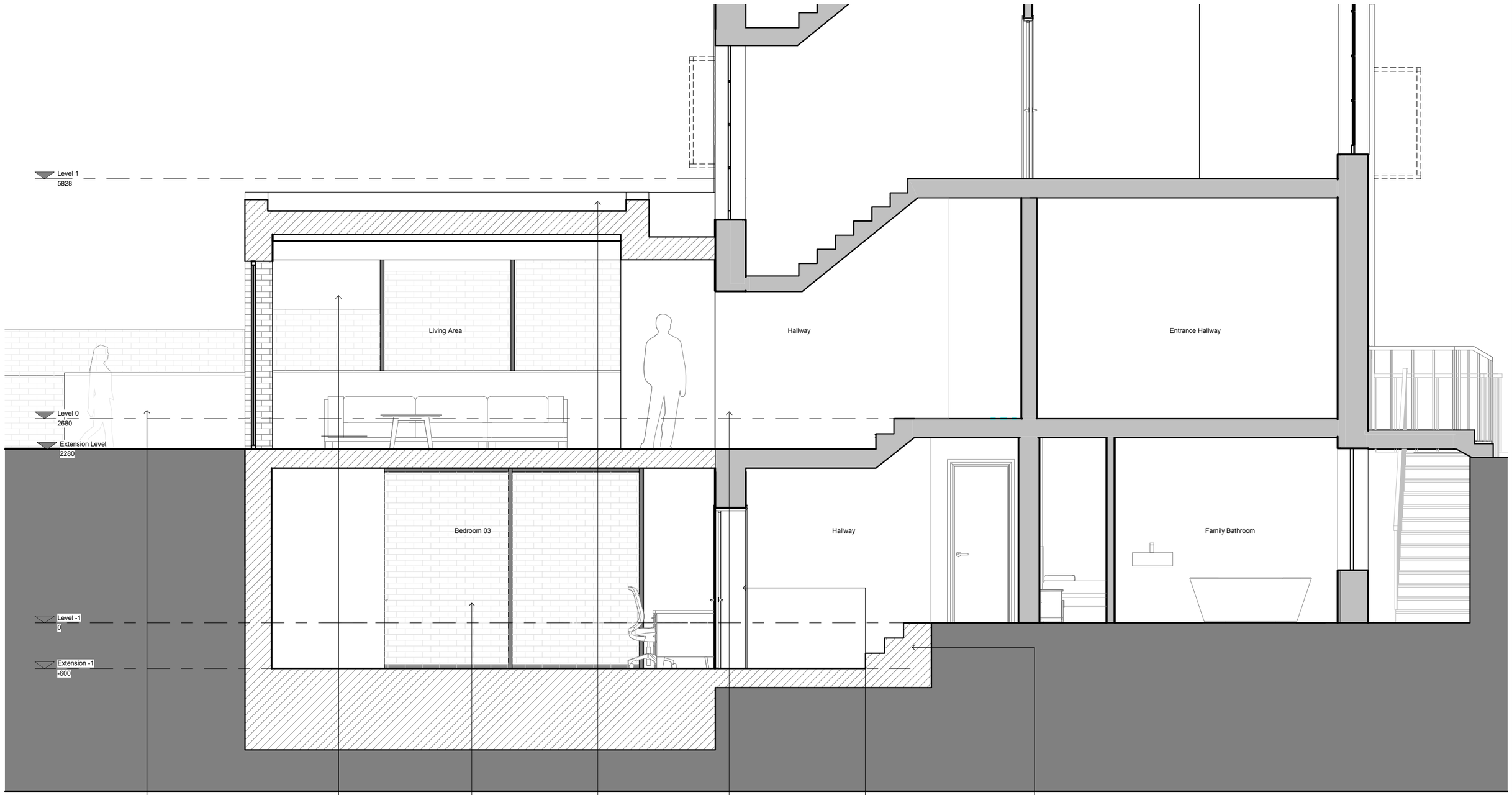
KAS Architects Ltd.
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Proposed Third Floor Plan
101-03-DR-005

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1



1 Section AA
1 : 25

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REV	DATE	DESCRIPTION	CKD
P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

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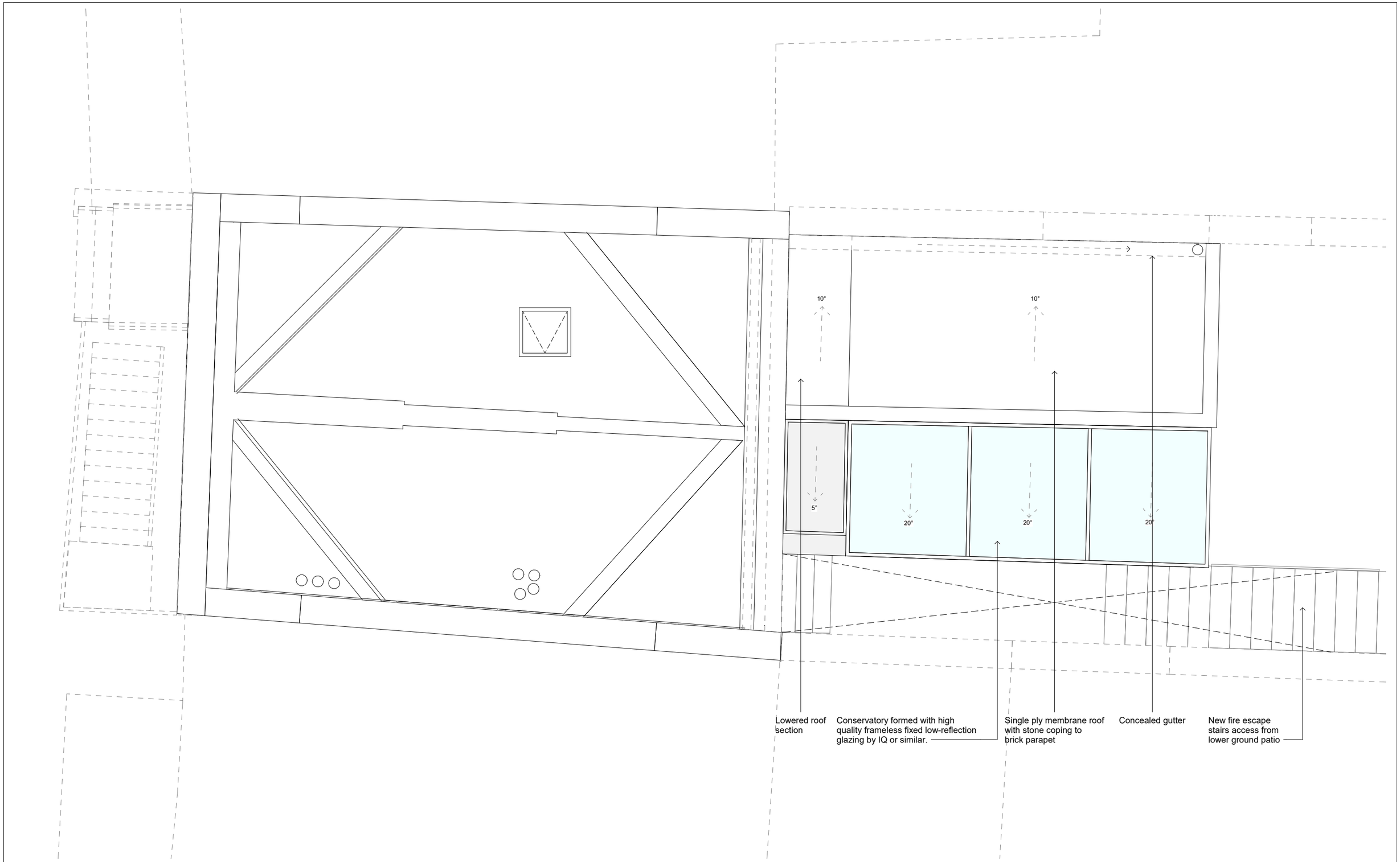
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Proposed Section AA
101-AA-DR-006

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1



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REV	DATE	DESCRIPTION	CKD

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2 Lord Cameron House
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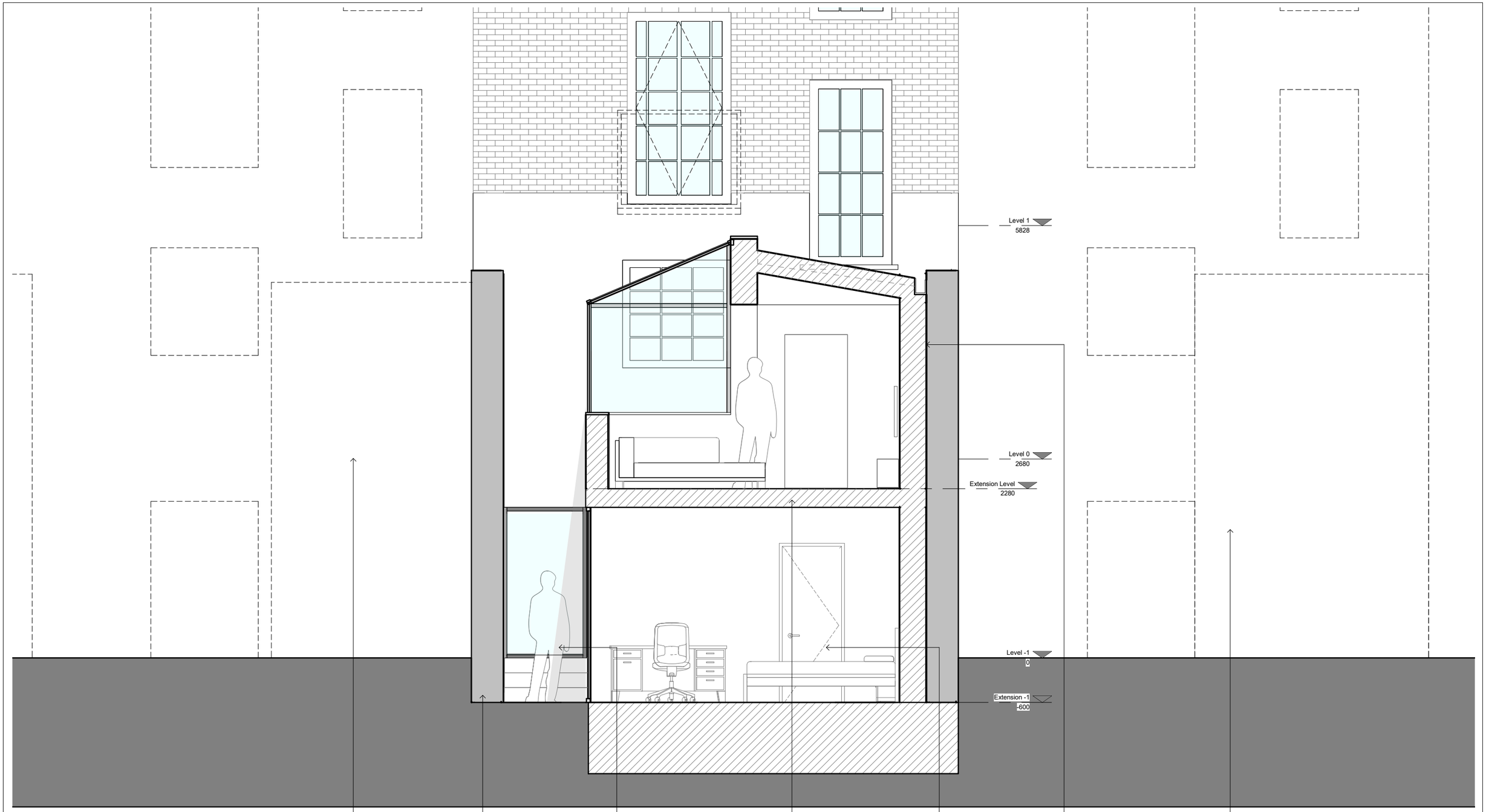
KAS JOB NO: 101

21 Mornington Crescent
Roof Plan
101-RF-DR-009

Client: Xuelin Bates

SCALE @ A1: 1 : 25

P1



1 Section BB
1 : 25

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REV	DATE	DESCRIPTION	CKD
P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

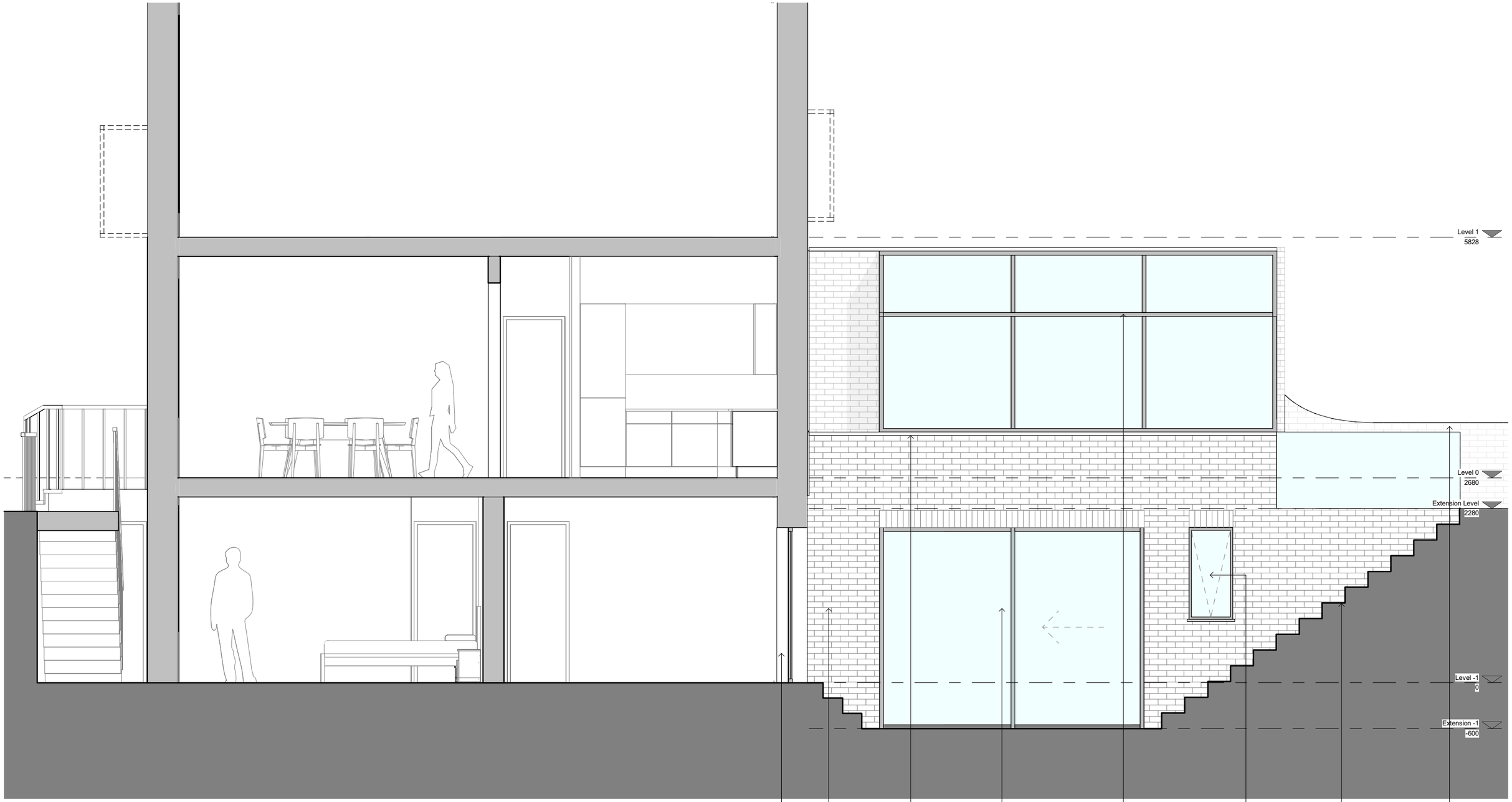
KAS Architects Ltd.
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Proposed Section BB
101-BB-DR-010

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1



Existing Wall

Portion of rear elevation at lower ground floor removed to allow for installation of new high quality 1-leaf, minimal frame thickness pocket sliding door by IQ glazing or similar

Brickwork cladding

Stone coping to brick wall

High quality minimal thickness sliding door by IQ glazing or similar

Conservatory formed with high quality frameless fixed low-reflection glazing by IQ or similar

Window to ensuite

Exposed in-situ cast concrete stairs to replace existing stairs

Existing brickwork party wall

1 North Elevation
1 : 25

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REV	DATE	DESCRIPTION	CKD
P1	19/05/2021	Planning Issue	KAS

REV	DATE	DESCRIPTION	CKD

KAS Architects Ltd.
2 Lord Cameron House
London NW3 7SU
telephone 07791420636
email info@kasarchitects.com

KAS JOB NO: 101

21 Mornington Crescent
Proposed North Elevation
101-N-ELE-DR-010

Client: Xuelin Bates
SCALE @ A1: 1 : 25

P1

APPENDIX 5

GROUND MOVEMENT CALCULATIONS

CLIENT:	PROJECT	KEY GS
Xuelin Bates	BIA for 21 Mornington Crescent	

Ground movement calculations:
1) Installation of underpin
For retained height 3.3m and underpinning depth 3.7m
From Figure 6.8 P160 C760

Dist From Wall (m)	Hor Mov/Wall Depth (%)	Horizontal Movement (mm)	Settlement/Wall Depth (%)	Settlement (mm)
0.0	0.04	1.3	0.04	1.3
0.7	0.032	1.1	0.036	1.2
1.7	0.022	0.7	0.03	1.0
2.3	0.016	0.5	0.026	0.9
3.3	0.009	0.3	0.02	0.7
4.0	0.005	0.2	0.016	0.5
5.0	0	0.0	0.01	0.3
5.6	0	0.0	0.006	0.2
6.6	0	0.0	0	0.0

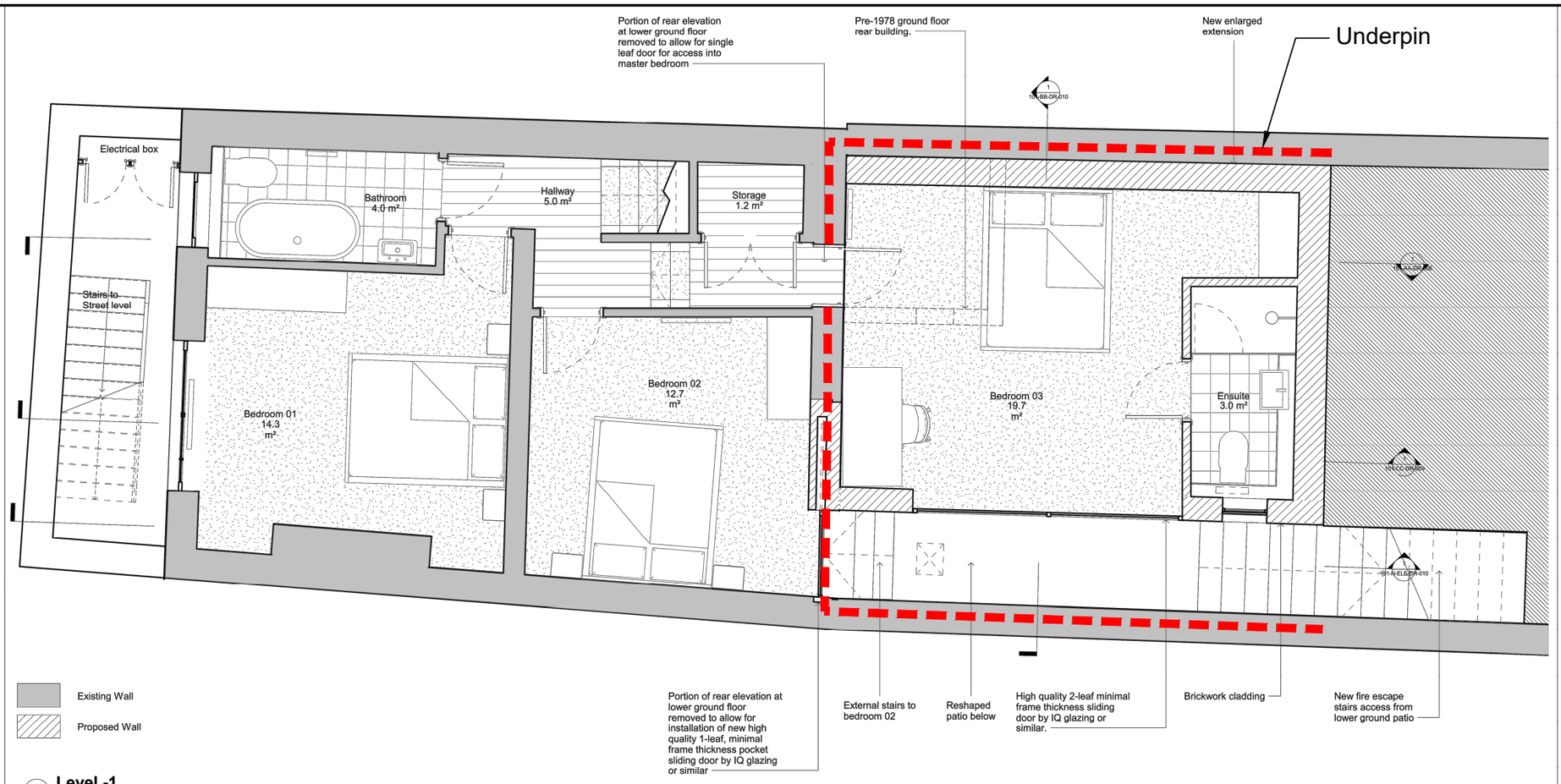
2) Basement Excavation
For maximum excavation depth 3.7m
From Figure 6.15 P168 C760; assuming high support stiffness

Dist From Wall (m)	Hor Mov/Exca Depth (%)	Horizontal Movement (mm)	Settlement/Exca Depth (%)	Settlement (mm)
0.0	0.15	5.6	0.04	1.5
0.7	0.14	5.2	0.06	2.2
1.9	0.13	4.8	0.08	3.0
2.6	0.12	4.4	0.08	3.0
3.7	0.11	4.1	0.07	2.6
4.4	0.1	3.7	0.06	2.2
5.6	0.09	3.3	0.05	1.9
6.3	0.085	3.1	0.04	1.5
7.4	0.078	2.9	0.03	1.1
11.1	0.04	1.5	0.01	0.4
14.8	0	0.0	0	0.0

3) Total Movement

Structures/ Infrastructure	Horizontal Movement (mm)	Vertical Movement (mm)
Garden Party Walls No 21	6.9	2.8
Garden Party Walls No 20	3.3	2.0
Garden Party Walls No 22	3.3	2.0
Main Building Party Walls	0.0	0.0
Mornington Crescent	0.0	0.0

DRAWINGS



1 Level -1
1 : 25

GARDEN WALLS TO BE UNDERPINNED

BASEMENT EXTENSION LIMIT

KEYS

UNDERPIN

Rev.	Revision Detail	Drawn	Date
01	First Issue	WR	01/01/20

CLIENT:
XUELIN BATES

PROJECT:
21 MORNINGTON CRESCENT
BASEMENT IMPACT ASSESSMENT

TITLE:
UNDERPIN LAYOUT PLAN

DRAWN:	CHECKED:	DATE:
ZL	BD	MAY 2021
SCALE: NTS	ORIGINAL SHEET SIZE: A3	STATUS: DRAFT

DRAWING NO. 21-102-D-001
REVISION: 01

KEY GEOSOLUTIONS LTD
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WEB: WWW.KEYGS.COM