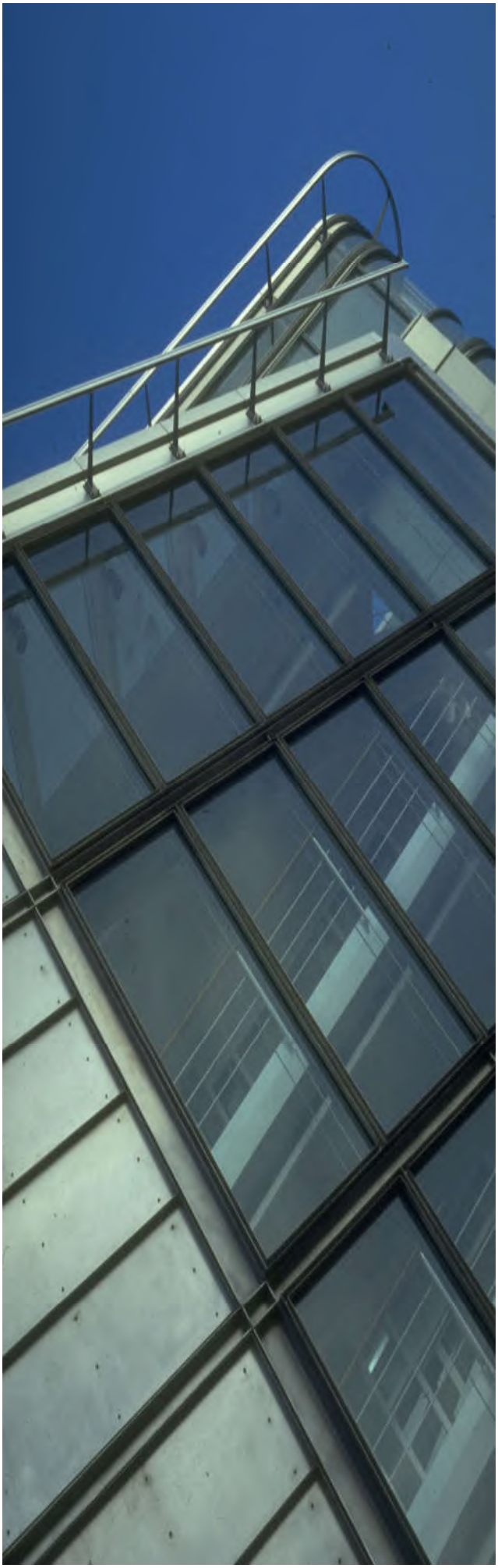


CSE CONSULTING
civil structural engineers

Engineering Assessment and Subterranean Construction Method Statement

PRE-PLANNING STAGE

PROJECT:

23-25 Argyle Square, London WC1H 8AS

CLIENT: Mr Giovanni Di Popolo

Job No.	10-421
Document No.	10-421380-ECMS01
Revision:	P – Planning
Date:	March 2022

Devonshire House, Cliveden Office Village,
I Lancaster Rd,
High Wycombe,
HP12 3YZ

tel: 01494 923907
email: mail@cseconsulting.co.uk
web: www.cseconsulting.co.uk

REPORT VERIFICATION

PROJECT	23-25 Argyle Square, London WC1H 8AS
REPORT DOCUMENT NUMBER	10-421-ECMS01
DOCUMENT TYPE	Engineering Design and Subterranean Construction Method Statement

REVISION	DATE	DESCRIPTION	PREPARED BY	ADMIN CHECK	APPROVED BY
P	March 2022	Planning	K Choudhary	M Hart	M Hart

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This report has been prepared to address the engineering issues associated with the proposed alterations at the property known as 23-25 Argyle Square, London WC1H 8AS. In particular, this report addresses the engineering aspects of the proposed extension of the existing basements in to the rear yard to the properties.

The subject properties under consideration are 'Grade II' listed located in the conservation area of Bloomsbury, currently being used as hotel accommodation. The properties have existing basements present to the full footprint of the buildings extending, to the rear, under existing two-storey back projections which are currently being used as boiler rooms at basement level and as hotel guest rooms at ground floor level. Single storey buildings are present to the rear yard of the subject properties which incorporate the rear boundary wall as the external rear elevation to these additions and which are currently being used as hotel guest rooms.

The proposed works include the demolition of the existing two storey back projections together with the single storey extensions above ground level located to the rear yard and the re-development of this space to provide a proposed two storey extension to the full area of the rear yard incorporating lightwells to provide amenity space for the hotel guest occupants. The proposals include extending the existing basement level to the rear boundary and side party lines and present logistical and engineering challenges which are addressed by this report.

The reduction in level to allow the extension of the existing basement, to the rear, to encompass the full footprint of the site is intended to be constructed using well proven traditional techniques comprising segmental reinforced concrete cantilever underpins beneath the existing foundations to the rear boundary wall and the side party walls in order to achieve the required reduced level. It is noted that the quantity of total excavation required, to the rear yard, in order to facilitate the proposals is relatively small in quantitative terms.

Excavation to facilitate the proposed extension of the existing basement to the full rear yard area will, it is anticipated, require temporary propping be installed to the concrete cantilever underpinning as an additional supplementary safety measure, although the design of the segmental reinforced concrete underpins will be designed to provide redundancy. These temporary props will be carefully designed by a specialist temporary works engineer acting on behalf of the main contractor to ensure that ground movements are minimised, albeit an outline temporary works scheme is presented within this report.

The design of the proposed basement extension is covered in this report and a sequence of work showing how the basement can be safely constructed is also presented.

Given that the proposed works involve an extension of the existing basement to the property a full and detailed site investigation is not considered necessary at this early stage of the design process. A full detailed site investigation will be undertaken prior to the detail design stage should this be deemed necessary by the structural engineer.

During the construction of the proposed basement a comprehensive monitoring scheme is to be implemented, this is to ensure that any settlement or deflections are identified at an early stage and adequate measures can be undertaken to limit further movement.

In accordance with the recommendations of Camden Planning Guidance (CPG)-2021 on basements; a specialist geotechnical desktop scoping study 'Basement Impact Assessment - (BIA)' has been undertaken by Soils Limited reference No. 19962/BIA, dated February 2022, in support of the planning application and is appended to this report.

The combination of the recommendations presented in this report provides a full suite of measures designed to ensure the proposed existing basement extension works to the rear yard can be constructed safely avoiding any significant damage to the existing building, adjoining properties or adjoining roads.

CSE Consulting Ltd have been appointed by *'the client'* Mr Giovanni Di Popolo to assess the civil and structural impact of the proposed basement extension to 23-25 Argyle Square, London WC1H 8AS.

The proposed alterations to the subject property primarily include the demolition of the existing two storey back projections and the single storey extensions above ground level to the rear yard and the construction of two storey extensions to the rear yard incorporating lightwells to provide amenity space. The proposals include extending the existing basement level to cover the whole footprint of the rear yard to the rear boundary and side party lines.

The following information relating to the site have enabled CSE Consulting Ltd to undertake the feasibility study and prepare this Construction Method Statement:

- Existing and proposed architectural layouts of the property prepared by Tsuruta architects care of Lyndon Goode Architects.
- The site is in a flood risk area benefiting from flood defences, and given that the proposed works are an extension to an existing basement, it is considered that there is no increase in flood risk as a result of the proposed works and therefore a flood risk assessment is not considered necessary.
- The proposed works are considered sufficiently far away from any London Underground tube tunnels for these not to affect the site.

1.1 DESCRIPTION OF PROPERTY AND WORKS

1.1.1 Description of the Property

The properties under consideration, No.'s 23-25 Argyle Square, are substantial four storey buildings plus an additional basement level, to the full footprint of the buildings, below external street pavement level with lightwells to the front. The existing buildings, as previously stated are 'Grade II' listed, located in a conservation area of Bloomsbury and are currently being used as a hotel premises.

The properties are located within a terraced block which was built in the late Georgian era, circa 1830's and 1840's after the collapse of an attempt to build a music and arts centre in the area. The front elevation is representative of Georgian townhouses, while the rear back additions to the properties were, in all probability, later additions of reduced architectural significance.

The construction of the buildings utilises traditional loadbearing brickwork solid external masonry walls, in yellow stock brick to the front elevation and timber upper floors with a conventional timber framed pitched roof. The properties are rectangular on plan with the first and second floor timber joists usually span front to back in this type of property with an intermediate loadbearing cross wall.

The site is relatively true and level with a gentle external ground slope front to back. Retaining conditions are present to the front with retaining walls used to form the front lightwell and under-pavement coal cellars and to the rear where existing boiler rooms are located in the back additions, at basement level, resulting in a retained condition of approximately 1.45m up to the general ground level in the rear yard. A high boundary wall, approximately 3.825m high, is present to the back boundary which in part forms the rear elevation to the existing single storey extensions present on the site in the rear yard.

No significant vegetation or trees are present in the immediate vicinity of the site although it is noted that grassed grounds and mature trees were present within the Argyle Square public gardens to the front of the site, and within the neighbouring properties to the rear.

1.1.2 Description of the Proposed Works

The proposed works involve, for the most part, demolition of the existing single storey extensions to the rear yard together with the two-storey back projections, excavation of the relatively small rear yard to the properties to allow an extension to the existing basement level to cover the full footprint of the rear yard. The proposals include reinstating the two-storey back projections together with a two-storey extension to cover the yard incorporating an extensive green flat roof. The proposed rear courtyard redevelopment is to include the formation of external amenity courtyard areas with permeable paving and amenity green turfed garden area.

From an engineering perspective extending the existing basement to encompass the full rear yard will require underpinning of the existing rear boundary wall together with the party walls to the sides of the yard. It should be noted that, for the most part, the extent of underpinning of the party walls to the sides of the excavation is expected to be nominal with deeper underpinning where this basement is not present to neighbouring properties. The degree of underpinning to the rear boundary wall is also considered to be nominal in engineering terms with the retained ground in the order of approximately 1.45m.

It is anticipated that the primary subterranean structural works will comprise the following:

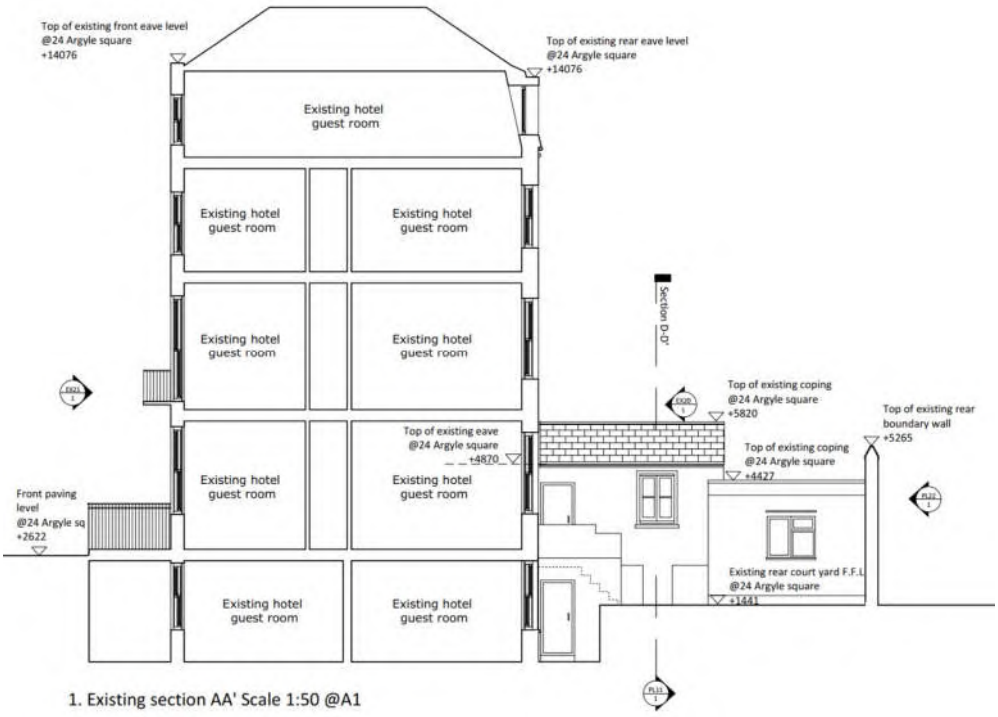
- Underpinning to existing party and rear boundary wall foundations in order to achieve a reduction in ground level to the rear yard sufficient achieve the proposed extension of the existing basement level to the full area of the rear yard. In construction terms, it is anticipated, that this will be achieved using traditional well tried and tested segmental underpinning construction techniques comprising reinforced concrete retaining underpinned stem wall sections with a reinforced base which will subsequently be tied into the basement slab. Reference should be made to CSE Consulting drawings appended to this report outlining the engineering solution to achieve the proposals together with a suggested method statement for construction.

- The surface water above ground drainage will, subject to invert levels, be drained by gravity to the existing combined sewer system, replicating the existing drainage strategy.

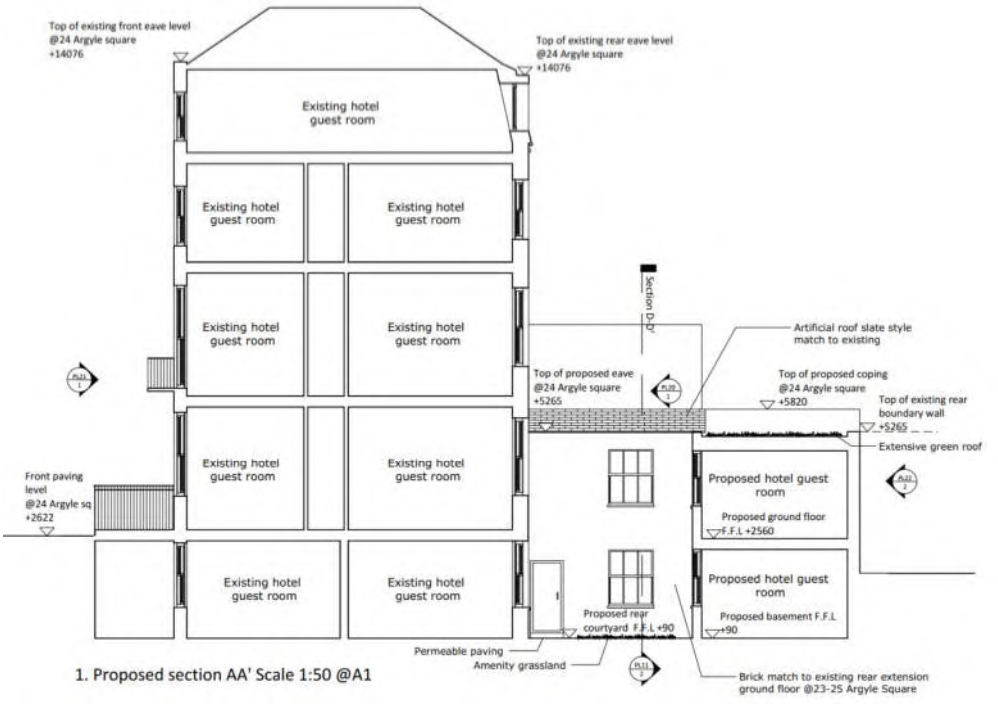
- The basement level foul water will be drained by gravity to the existing foul drainage system serving the property. The existing system, it is assumed, discharges into the existing sewer assumed to be located in Argyle Square.

- A basement level cavity drainage system will be required as waterproofing provision and arising discharge, if any, is to be collected by gravity and connected to the existing below ground drainage system serving the property.

- The proposed alterations fall within the scope of the Party Wall Act 1996 and procedures under the act will be dealt with in full by fully a qualified professional Party Wall Surveyor appointed on behalf of the client. The designs for the proposed basement extension will be developed so as not to preclude or inhibit similar works on the adjoining properties. This will be verified by Surveyors as part of the process under the Act.



Existing Diagrammatic Architectural Section



Proposed Diagrammatic Architectural Section

2.1 THE SITE AND EXISTING USE

The site is located on 23-25 Argyle Square, WC1H 8AS and is in close proximity to King's Cross. The square has a small, but well-maintained central lawn, surrounded by a pedestrian path and planted borders. The buildings surrounding the square are formal Georgian terraced properties, echoing the architectural language of some of Bloomsbury's larger squares. As with the subject property, the majority of the properties are now occupied by small hotels.

The site was bounded to the north by No. 22 Argyle Square, with further buildings part of the block beyond, to the west by Argyle Square and public gardens, to the south by 49-51 Argyle Street and gardens beyond and to the east by four high rise six to seven storey residential building blocks with associated communal buildings and gardens as part of the Birkenhead Street Estate.

2.2 SITE TOPOGRAPHY

The site is relatively level with no significant retaining conditions present with only a nominal difference of approximately 1.2 m in ground levels between the front and rear. Generally, the ground levels appear to be similar for all surrounding and adjacent properties with no significant variation in ground level.

2.3 GEOTECHNICAL CONSIDERATION

The nature of the proposed works primarily seeks to extend the existing basement to the properties to encompass the full footprint of the rear yard. This is to be undertaken by using conventional tried and tested underpinning techniques to lower the existing wall foundation formation levels to the rear and side of the rear yard.

Reference to British Geological Survey (BGS) indicate that the site is located directly upon the bedrock London Clay Formation with no anticipated overlying superficial deposits. No made or infilled ground is anticipated at the site with reference to the Camden Geological, Hydrogeological and hydrogeological Study (GHHS), prepared by Arup.

With reference to the geotechnical desktop scoping study prepared by Soils Limited and appended to this report, it is noted that available borehole data from within 300m of the site indicated the following profile of the ground conditions can be expected: -

Depth [m]	Description
~ 1.2 to 5.9	**Made Ground/ Superficial Deposits:** brick rubble, earth and gravel fill.
~ 16.2 to 24.0	**London Clay Formation:** stiff grey fissured clay, weathering to brown near surface with concretions of argillaceous limestone in nodular form occur throughout formation.
~ 35.0 to 41.2	**Lambeth Group:** a stratigraphic group, a set of geological rock strata in the London and Hampshire Basins of southern England. It comprises a complex of vertically and laterally varying gravels, sands, silts and clays deposited between 56-55 million years before present during the Ypresian age (lower Eocene)
~ 40.2 to 47.0	**Thanet Sand Formation:** Typically composed of homogeneous, bioturbated, glauconitic silty fine-grained sand, with sandy silt, silt or sandy, silty clay especially in the lower part, forming a coarsening-upwards sequence.
~ > 50.0	**Chalk Formation:** Lithostratigraphic unit containing upper cretaceous limestone succession consisting of coccolith biomicrite.

Should the detail design stage require a more site specific and detailed site investigation, this will be carried out before finalisation of the design by the structural engineer.

2.3.1 Allowable Ground Bearing Pressure

The British Geological Survey indicates that the expected ground conditions pertaining to the site are bedrock London Clay Formation. For the purposes of design, in the absence of a site-specific geotechnical investigation, a conservative value for the net allowable bearing pressure, on the gravel strata of 125 kN/m^2 will used for design purposes.

2.4 DRAINAGE

The below ground drainage system currently in-situ below existing basement level, serving the properties, will be checked by CCTV survey to confirm integrity. Any new connection arising from the small extensions to the rear yard will be connected in to existing systems since there is no net increase in load to the existing system. The proposed works associated with the basement extension will not increase the net existing surface storm water runoff areas from the site.

The waterproofing strategy for the proposed basement extended areas will, itis anticipated, comprise a 'Delta' type membrane cavity drain water management system. The primary barrier to water penetration will be the reinforced concrete underpinning and basement floor with the cavity drain system collecting any "perched water" that penetrates the primary underpinning construction.

3.1 GEOLOGY

Reference to British Geological Survey (BGS) indicate that the site is located directly upon the bedrock London Clay Formation with no anticipated overlying superficial deposits. No made or infilled ground is anticipated at the site with reference to the Camden Geological, Hydrogeological and hydrogeological Study (GHHS), prepared by Arup.

London Clay

London Clay is a well-known stiff (high strength) blue-grey, fissured clay, which weathers to a brown colour near the surface. It contains thin layers of nodular calcareous mudstone "claystone" from place to place, and crystals of water clear calcium sulphate (selenite) are common. Although slopes will stand in the clay at steep angles in the short term, the long-term stable slope angle is about 7degrees for grassed, or cleared slopes, and a few degrees more for wooded slopes.

3.1.1 Slope Stability

The site is on generally level ground and not cut into the side of hills or valleys and therefore slope instability is not considered to be an issue associated with the proposed basement development.

3.1.2 Existing Foundations

The existing foundations are anticipated to consist of traditional corbelled brick spread footings or mass concrete strip footings.

In so far as it has been possible to establish, the site is not located above any historic tunnels, LUL assets, infrastructure, sewers or utilities.

3.2 HYDROGEOLOGY

3.2.1 Existing Water Table

Groundwater is not expected to be encountered during the course of the works given that it is not currently an issue with the existing basement.

The scoping study undertaken by Soils Limited has noted that boreholes in near proximity to the site indicated that groundwater was recorded at a minimum depth of 6.0m below ground level (bgl) but more generally at depths of circa 21.0m, within granular beds of the Lambeth Group, to 63.4m bgl, within the chalk at depth.

It is therefore unlikely that groundwater will be encountered during the anticipated worst case 2.5m deep excavation to allow the extension of the existing basement into the rear yard.

It should be noted that changes in groundwater levels do occur for a number of reasons including effects and variations in drainage. Such fluctuations may only be recorded by the measurement of the groundwater level within a standpipe or piezometer installed within appropriate response zones either during or before construction works commence on site.

3.2.2 Ground Water Flow

It is our considered assessment that given the limited depth of excavation that the existing flow of ground water will not be adversely affected or impeded by the proposed basement extension.

Information presented by the Environment Agency classifies the London Clay Formation bedrock as unproductive strata. The Camden Planning Guidance (CPG) confirm that the areas with London Clay Formation outcropping are not to be considered as aquifer.

All available data show the site under consideration to be located at more than 100m from any local water feature or lost river and to be located outside of the catchment of the ponds chain on Hampstead Heath.

Reference to published geological data show that River Terrace Deposits are not anticipated at the site, therefore the Upper Aquifer would not be present onsite. Groundwater within the London Clay Formation, will generally tend to flow either in alignment with the topography or vertically downwards at a very slow rate towards the Intermediate and subsequently Lower Aquifer. Due to the presence of predominantly cohesive nature of the soils, the groundwater flow rate is anticipated to be very slow. Published permeability data for the London Clay Formation indicates the horizontal permeability to generally range between 10-10 m/s and 10-8 m/s, with an even lower vertical permeability.

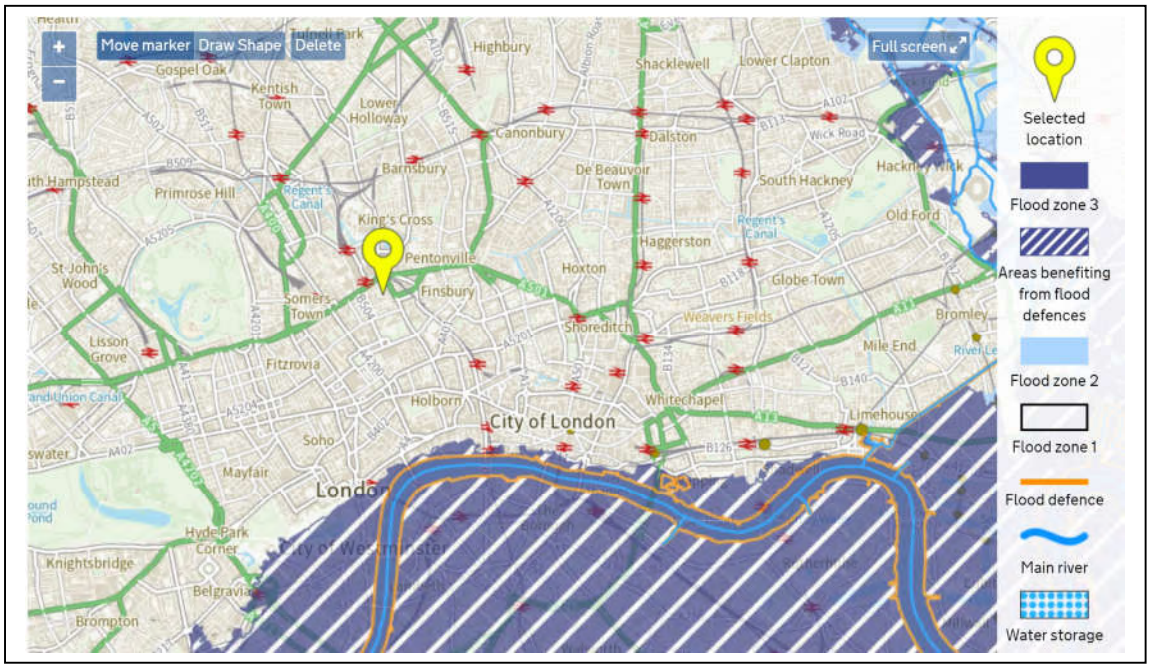
Arup's Subterranean Development Scoping Study (para 5.1) June 2008, states that the impact of subterranean development on groundwater flows is negligible as groundwater flows will find an alternative route if blocked by a subterranean structure.

In the unlikely event that ground water is encountered during the course of excavation a localised excavated sump of size 1m x 1m x 1m is to be formed at a level lower than the progressive base of excavation being carried out.

A timber perforated plywood shell is to be constructed to support the perimeter of the temporary working sump and placed within the excavated zone. Any ground water which is present will naturally flow to the sump area and at this point a 50mm diameter semi trash water pump unit is to be introduced with a 50mm diameter discharge hose. Once located adjacent to the excavation level sump the solids pump hose is to be routed to the nearest adjacent manhole for discharge.

3.3 FLOOD RISK ASSESSEMENT

With reference to the Environmental Agency mapping data, the site is located within flood risk designation **Zone 1**, an area with a low probability of flooding. Given the site area is less than 1 hectare; there is no requirement to undertake a flood risk assessment.



[Extent of flooding from rivers or the sea – very low risk] [Surface water flood risk – low]

The extension proposed to the existing basement to the rear is nominal and in itself does not increase the overall hard standing surface area and the overall water runoff will not therefore change to any significant degree.

Reference to the Strategic Flood Risk Assessment undertaken by URS for the London Borough of Camden, confirms that the site is not located in Critical Drainage Area or Local Flood Risk Zone. The risk of flooding for surface water was confirmed to be low and the risk of flooding from internal and external sewer failure was therefore considered extremely low to negligible, as well as the susceptibility to elevated groundwater.

It is concluded therefore that there will be no significant contribution to the effects of flooding either on the site or elsewhere due to the proposed extension to the existing basement construction to the properties under consideration.

4.1 BASEMENT EXTENSION WORKS DESIGN

The following sections should be read in conjunction with the drawings prepared by Tsuruta Architects.

The proposed works associated with the extension of the existing basement to encompass the small rear yard to the properties will be undertaken using traditional construction techniques including steel reinforced concrete underpinning of the existing rear boundary wall and side party walls to achieve the required reduced level. The degree of reduction of ground level to achieve the basement extension is relatively small and estimated to be less than 2m in depth.

All structural work will be undertaken in accordance with the recommendations of the relevant British Standards including BS 8110.

Underpinning of the of the rear boundary and side party walls with adjoining properties will be undertaken to ensure that these walls are not undermined during the excavation works and to ensure that continuous support to the walls is maintained. The underpinning will be undertaken by a competent contractor, in a sequenced segmental fashion, in short (approximately 1.0-1.2m) sections in a 'hit and miss' pattern typical of this type of construction.

The foundations for the rear boundary and side party walls will be extended down below the proposed basement level in order to prevent excessive settlement. The underpinning will act to transfer the vertical load from the respective wall foundations down to the new lower level with the aid of temporary propping to provide support against the lateral pressures from the sides of the excavations during construction.

Underpinning is the primary component of the works and the safe and proper execution of the construction will require the works to be undertaken by a contractor with considerable experience of this type of construction technique. The contractor will need to ensure a high quality of workmanship together with a well-defined sequence of construction with appropriate levels of attention to the temporary works design including the provision of an adequate level of lateral propping.

The temporary propping systems, where required, will be designed by a specialist chartered temporary works design engineer acting on behalf of the contractor undertaking the works and installed in sufficient quantities so as to minimise any settlement of adjacent ground. A suggested sequence for the underpinning works is included on CSE Consulting Ltd structural scheme design drawings appended to this report.

Following the completion of the underpinning construction of the reinforced concrete basement and ground floor reinstatement can then be completed.

4.1.1 Hydrostatic Pressure

Based on borehole data in the vicinity, groundwater was recorded at a minimum depth of 6.0m below ground level and therefore hydrostatic pressure in not anticipated to be present given that the maximum depth of anticipated excavation is less than 2m below ground level.

4.1.2 Clay Heave

The limited amount of excavation for the basement extension will result in a degree of unburdening of the stiff London clay formation, potentially resulting heave. This is a long-term effect that occurs due to unloading of the shrinkable soils. This effect will start during excavation and will continue over a number of years. This effect results in a force being exerted on the underside of the new basement over time.

Theoretically, the proposed 2.00 m deep excavation will result in a net unloading of 36 kN/m^2. Given the relatively minimal proposed excavation depth, together with the mitigating effects of the vertical loads applied by the existing buildings, heave movements are not considered likely to be significant, although due account will need to be taken in the final design.

4.1.3 Waterproofing Systems

The basement waterproofing will be provided with a type 'C', grade 3 level of protection in accordance with client requirements and as defined by BS 8102:2009.

Water and moisture will be excluded from the finished basement by the installation of a proprietary specialist designed cavity drained system with an inner liner wall. The cavity drained waterproofing system will discharge into the existing below ground drainage system.

The waterproofing system will be installed in accordance with the specialist contractors' details and manufacturers technical specification.

4.2 TEMPORARY WORKS

An outline sequence of construction for the proposed basement is included within the drawings prepared by CSE Consulting Ltd and appended to this report. The final detailed temporary works design will be carried out by an appropriately qualified professional temporary works engineer acting on behalf of the main contractor and will be checked on behalf of the client by the consulting structural engineer.

Prior to commencement of any works the full detailed design, drawings, method statements and calculations shall be submitted to the consulting structural engineer for comment and approval purposes.

4.3 OUTLINE SEQUENCE OF WORKS AND METHOD OF CONSTRUCTION

The following is a suggested proposed sequence of works, which should be read in conjunction with all relevant CSE Consulting Ltd. drawings and specification. As previously stated in this report, the final detailed temporary works design will be carried out by an appropriately qualified professional temporary works engineer acting on behalf of the main contractor.

The following 'Subterranean Construction Method Statement' has been prepared by CSE Consulting Ltd for the proposed works associated with this project.

4.3.1 General

4.3.1.1 This method statement provides an approach that will allow the existing basement extension design to be correctly considered during construction. The statement also contains proposals for the temporary support to be provided during the works. The contractor is responsible for the works on site and the final temporary works methodology and design on this and any adjacent sites.

4.3.1.2 Set up monitoring points on existing buildings at locations agreed with the engineer and start taking weekly readings for a period of two months prior to start of work in order to establish naturally occurring background movements. Prior to start of construction instigate the monitoring regime noted in this report.

4.3.1.3 Install standpipes and monitor existing ground water levels.

4.3.1.4 During this period the contractor is to appoint a specialist temporary works engineer to carry out a full and detailed design of the temporary works needed to construct the basement extension. This temporary works design will be sent to the consulting structural engineer for comment and approval.

4.3.1.5 Brace all existing window and door openings to the rear elevations of the properties, as a precautionary measure using timber framing and cross bracing.

4.3.1.6 Agree temporary works design and contractor's method statement with the contact administrator and the party wall surveyor and ensure to inform of any changes to this method statement during the construction process.

4.3.1.7 The cantilever underpinning pins are designed to be inherently stable without lateral support to the top of the wall. However, temporary props shall be provided to the wall as necessary to ensure lateral support until the concrete has gained sufficient strength.

4.3.1.8 In the absence of a site-specific geotechnical investigation, the design bearing pressures have been limited to 125 kN/m^2. This is a conservative assessment of the allowable bearing for the pressure for the London Clay Formation which is expected at foundation formation.

4.3.1.9 The water-proofing specialist together with the project architect will be responsible for the approval of the design to ensure that the proposals will provide adequate waterproofing.

4.3.1.10 The structural engineer shall be provided with details and information relating to concrete mix, supplier, delivery and placement methods two weeks prior to the first pour. The contractor must provide a method on how to achieve site mixing to the correct specification. The contractor must undertake regular meetings with staff to ensure site quality is maintained.

4.4 ENABLING WORKS

4.4.1. The site is to be hoarded with ply board sheets, at least 2.2m high, to prevent unauthorised public access.

4.4.2. Obtain all necessary statutory approval and licenses necessary to properly execute the works. Licenses for skips and conveyors, if used, for material disposal, should be posted on the hoarding.

4.4.3. Provide suitable protection to public as necessary to ensure complete safety, particularly if a conveyor is used and extends over a public footpath. Depending on the requirements of the local authority, construct a plywood bulkhead over the pavement. Hoarding to have a plywood roof covering over the footpath, night- lights and safety notices.

4.4.4. Dewater: There is no evidence of water entering the site at the levels to which excavation will be undertaken. Should any water be discovered, the engineer will be informed and water will be appropriately pumped from the site.

4.4.5. On commencement of construction, the contractor will determine the existing foundation type, width and depth to take full account of site conditions.

Any discrepancies with the design will be reported to the structural engineer in order that the detailed design may be modified as necessary.

4.5 BASEMENT EXTENSION UNDERPINNING SEQUENCING

4.5.1. Begin excavation sufficient only to allow placement of the cantilevered underpinning segments in accordance with the details and sequencing indicated on CSE Consulting Ltd. drawings.

It should be noted that this is a suggested sequencing proposal and the contractor is to prepare his own sequencing plan and agree this with the engineer.

4.5.2. Continue cantilevered underpinning wall formation around perimeter of the proposed the basement extension, in accordance with the method outlined in Section 4.0.

4.5.3. Excavation for the next numbered sequential sections of underpinning shall not commence until at least 8 hours after dry packing of previous works. Excavation of adjacent pin not to commence until 48 hours after dry packing. (24 hours possible due to inclusion of 'Conbextra' 100 or similar approved cement accelerator to dry pack mix).

4.5.4. On completion of the cantilevered underpinning to the full perimeter of the basement extension, excavate any remaining soil, place any below ground drainage and cast the reinforced concrete basement slab.

4.5.5. Install water proofing to the new build structure and retaining walls as required, in accordance with the architect's details and specification. It is recommended to leave 3-4 weeks between completion of the basement and the installation of the drained cavity system. This period should be used to identify and locate any localised leakage of the basement and to carry out remedial works, if necessary.

4.6 UNDERPINNING

4.6.1. Prior to the commencement of the installation of underpinning, the contractor is to undertake a local exploration of the site and surrounding areas to identify and confirm the exact form and location of the temporary works that will be required to safely execute the permanent works. It should be clear that the full responsibility for maintaining the full integrity of all existing structures is the solely the responsibility the contractor.

4.6.2. Excavate first section of underpinning (no more than 1.2m wide). Where excavation is greater than 1.0m deep, provide temporary propping to sides of excavation to prevent earth collapse (Health and Safety). A 1.2m width wall has a lower risk of collapse to the heel face.

4.6.3. Excavation of pins is anticipated to involve working in confined spaces and the following measures should be applied wherever applicable for deep/full depth excavations in fully enclosed pits:

- Operatives must wear a harness and there must be a winch above the excavation.
- An attendant must be present at all times, at ground level, while excavation is occupied.
- A rescue plan must be produced prior to the works as well as a task-specific risk and method statement.

4.6.4. The rear face of the excavation is to be adequately propped, as necessary, in the temporary condition with appropriate board or trench sheets, as conditions may determine. Back propping to extend over entire height of excavation and can be placed in short sections as the excavation progresses.

- If the ground is stable, back-propping can be removed as the wall reinforcement is placed and the shuttering is constructed.
- Where trench sheets are left in place a slight over-spill may occur past the neighbour's boundary wall line. Where this slight over-spill is not allowed by the party wall surveyor then cement particle board should be used.
- Where soft spots are encountered, leave in trench sheets or alternatively back prop with precast lintels or sacrificial boards. If the soil support to the ends of the lintels is insufficient, then brace the ends of the PC lintels with 150x150 C24 timbers and prop with 'Acrows' diagonally back to the ground.
- Where voids are present behind the lintels or trench sheeting, grout the voids behind sacrificial propping. Grout to be 3:1 sand/cement packed into voids.

- Prior to casting, place layer of DPM between trench sheeting (or PC lintels) and new concrete. The lintels are to be cut into the soil by 150mm either side of the pin. A site stock of a minimum of 10 lintels should be present to prevent delays due to ordering.

4.6.5. If cut face is not straight, or sacrificial boards noted previously have been used, place a 15mm cement particle board between sacrificial sheets or against the soil prior to casting. In this case, the cement particle board is to line up with the adjacent owner's face of wall. The method adopted, to prevent localized collapse of the soil, is to install these progressively, one at a time. Cement particle board must be used in any condition where overspill onto the adjacent owner's land is possible.

4.6.6. Excavate base. Mass concrete heels to be excavated. If soil over is unstable, prop top with PC lintel and sacrificial prop.

4.6.7. Visually inspect the existing wall footings and clear the underside of existing footing.

4.6.8. Local Authority inspection to be carried out for approval of excavation base.

4.6.9. Place reinforcement for retaining wall base and starter bars to stem. Drive H20 dowel bars into soil along centre line of base to act as shear ties to subsequent adjacent bases. Drive slab starter bars for later casting into basement slab.

4.6.10. Site supervisor to inspect and sign off works before proceeding to next stage.

4.6.11. Cast base. On short stems it is possible to cast base and wall at the same time. It is essential that pokers/vibrators are used to compact concrete.

4.6.12. Place reinforcement for retaining wall. Drive H 20 dowel Bars into soil along centre line of stem to act as shear ties to adjacent wall. Bottom bars of wall to be bent flush with shutter and fixed with mould release oil.

4.6.13. Site supervisor to inspect and sign off works for proceeding to next stage.

4.6.14. For pins 1, 3 and 5 inform the engineer 48 hours before the reinforcement is ready, to allow for inspection of the reinforcement prior to casting.

4.6.15. Place shuttering and pour concrete for retaining wall/stem. Stop a minimum of 75mm from the underside of existing footing. It is essential that pokers or vibrators are used, hitting shutters is not considered adequate.

4.6.16. 24 hours after pouring the concrete pin, the gap between the soffit of the existing brickwork footing and top of new concrete stem to be filled using a dry-pack mortar. Ram in dry-pack to ensure full load transfer.

4.6.17. If gap is greater than 120mm, place a line of engineering bricks to the top of the wall. Dry pack from the engineering bricks to existing masonry.

4.6.18. After 24 hours, the temporary wall shutters can be removed.

4.6.19. Trim back existing masonry corbel and concrete on internal face.

4.6.20. Site supervisor to inspect and sign off for proceeding to the next stage. A record will be kept of the sequence of construction, which will be in strict accordance with recognised industry procedures.

4.6.21. Concrete Testing:

- For first 3 pins take 4 cubes and test at 7 days then at 14 days and inform the engineer of results. Test last cube at 28 days. If cube test results are low then action will be required to reassess the concrete specification and placement method.

- If results are good from first three pins, then from the 4th pin onwards take cubes of concrete from every third pin and store for testing. Test one at 28 days. If result is low, test second cube. Provide results to client and design team on request or if values are below those required.

- A record of dates for the concrete pouring of each pin must be kept on site.

- The location of where cubes were taken and their reference number must be recorded.

4.7 APPROVALS

4.7.1. Building Control Officer/Approved Inspector to inspect all underpin bases and reinforcement prior to casting concrete.

4.7.2. Contractor to keep full record of dates relating to when the pins were cast and inspected.

5.1 STRUCTURAL SETTLEMENT OR DAMAGE

The underpinning process involves transferring the foundation loads to a lower level and inevitably this can lead to settlement. Some movement will be caused by the sequential transfer of load between different parts of the structure but the careful control of the underpinning process and sequence will keep such movements to a practicable minimum. Particular care will be taken in the vicinity of the more vulnerable parts of the existing building fabric.

The depth to the London clay below the site are such that the heave of the clay is unlikely to exceed a few millimetres or to have any discernible effect outside the site boundaries. Any movement that does occur will be further mitigated by the slow rate of the excavation and construction.

By installing adequate temporary propping and new permanent works the anticipated movements caused by the proposed works are to be limited to not exceed 5mm at any location within the host or adjacent properties. It is anticipated that the crack widths will not exceed 5mm within the slight category as described by BRE Digest 251, Category 2. The definition of these classifications is given in 'Building Response to the Excavation- Induced Settlement' M.D. Boscardin and E.J. Cording, ASCE 1989 and summarised below:

Class of Damage	Description of Damage	Approximate Crack Width
Negligible (Cat 0)	Hairline Cracks	< 0.1mm
Very Slight (Cat 1)	Fine Cracks easily treated during normal Redecoration. Perhaps isolated fracture in building. Cracks in exterior brickwork visible upon close inspection.	< 1mm
Slight (Cat 2)	Cracks easily filled. Re-decoration probably Required. Several slight fractures inside building Exterior cracks visible, some re-pointing may be required for weather tightness. Doors and windows may stick slightly.	< 5mm
Moderate (Cat 3)	Cracks may require cutting out and patching. Recurrent cracks can be masked by suitable Linings. Tuck-pointing and possibly replacement of a small amount of exterior brickwork may be Required. Doors and windows sticking. Utility Services may be interrupted. Weather tightness often impaired	5 to 15mm or several cracks >3mm.
Severe (Cat 4)	Extensive repair involving removal and replacement of sections of walls, especially over doors and windows required. Windows and door frames distorted, floor slopes noticeably, some loss of bearing in beams. Utility service disrupted.	15 to 20mm depends on number of cracks
Very Severe (Cat 5)	Major repair required involving partial or complete re-construction. Beams lose bearing. Walls lean badly and require shoring. Windows lean badly and require shoring. Windows broken by distortion. Danger of instability.	usually, > 25mm depends on number of cracks

It is anticipated that that no more than 'negligible' to 'very slight 'damage may be inflicted on the adjoining buildings as a result of the proposed works.

5.2 MOVEMENT MONITORING OF ADJACENT PROPERTIES

Throughout the construction process including underpinning, basement excavations, basement slab and ground floor construction an independent specialist surveying company is to be appointed by the main contractor to monitor movement of the adjacent properties.

The methodology for the monitoring to be as follows:

- Set up monitoring points on the existing buildings at locations agreed with the engineer and start taking weekly readings for a period of two months prior to start of work to establish naturally occurring background movements. 3D reflective targets to be established on the front and rear of the subject properties as well as on the adjacent properties to each side of the subject property.

- Establish a suitable monitoring control station(s) at the perimeter of the site from which the monitoring targets will be surveyed. The coordinate system for the monitoring to be specific to the monitoring of adjacent properties.

- Fix additional targets for control on surrounding structures outside the zone of influence of the site works. The location of these targets to be determined during establishment of the primary control targets and will be used to establish station coordinates prior to commencement of each set of survey readings. This method of control establishment will allow for accurate control to be determined without having to rely on a fixed position in close proximity of the site works.

- Minimum two rounds of readings to be taken to establish baseline readings before commencement of any basement works.

- The instrument readings of the targets fixed to the adjacent building will provide both level and eastings and northing movement data. The 3D target monitoring will provide a plus or minus 2mm accuracy.

  The following items will be monitored to ensure precise information is available the engineer and the team carrying out the works:

  Ground conditions:

  Observe soil and groundwater levels. Conditions that are not in accordance with design data, including unforeseen obstructions will be reported to the engineer.

  Ground Movements:

  Measuring points will be set up outside the front and the rear of the subject properties. These points will be monitored for the duration of the structural works.

  Frequency of monitoring:

  At least twice a week during the excavation works associated with the lightwell and the basement, during excavation and construction of permanent supports.

  Thereafter: once a week until a reading of less than 3mm is reached then once a month until the completion of the structural works.

  Wall Movements:

  A minimum of 6 No. spot targets will be located on the front and rear elevation of the subject properties & a minimum of 6 No. spot targets will be located on the front and rear of the neighbouring properties.

  These points will be monitored for the duration of the structural works.

Trigger Levels:

Limits on ground movement during wall installation movement of survey points must not exceed:

Settlement:	Amber trigger level:	6mm
	Red trigger level:	10mm
Lateral displacement:	Amber trigger level:	6mm
	Red trigger level:	10mm
Lateral wall movement:	Amber trigger level:	6mm
	Red trigger level:	10mm

Movement approaching critical values:

Amber: Notify engineer immediately and await response. Install additional propping as instructed. The consulting engineer is to attend site to inspect the area locally for signs of new defects such as hairline cracking. If new defects are visible then the contractor is to stop work in the affected area. The defects are to be recorded with photographs and distributed to the consulting engineer. The contractor is to await instructions from the engineer prior to proceeding with works in the affected area. If the amber level is reached a decision is to be made by the engineer if the frequency of monitoring to be increased.

Red: Stop work. The contractor is to stop work and put in place any temporary works measures necessary to prevent further movement. The project and temporary works engineers are to be informed and proposals agreed to limit further movement. The monitoring frequency to be increased to daily until movement is deemed to have stopped.

A monthly report will be provided to the consulting structural engineer showing the movements recorded on all survey points in the form of a graph of displacement versus time with clear lines indicating the amber and red trigger levels.

5.3 OTHER CONSIDERATIONS

5.3.1 Excavation and removal of soil

It is anticipated that hand dug and excavated spoil is to be removed using small excavators in conjunction with conveyor belts up to ground level. Lorries will then take the spoil off site.

Public rights of way will be maintained. Footpaths and roads adjacent to the site will be maintained in a clean state.

5.3.2 Demolition, Dust & Noise Control

Demolition work is to take place within the hoarded confines of the site. Materials such as stock bricks, re-usable timbers; steel beams etc. are to be recycled where possible. To minimise dust and dirt from demolition netting is to be installed where possible, fine mist water dust suppression spray to be used and roads and pavements adjacent to the site to be cleaned regularly.

5.3.3 Pre-Contract Procedures

It is anticipated that the following procedures will be undertaken at Pre-Contract stage prior to works commencing on site:

- Undertake a detailed site investigation, should this be required by the engineer to carry out structural design to determine all design parameters sufficient to allow the final structural design.

- Undertake pre-condition surveys of adjacent and neighboring properties. It is expected that these surveys will be undertaken by suitably qualified party wall surveyor as part of the party wall award agreements with the neighbouring property owners/occupiers.

- Undertake a detailed structural design relating to the proposals together with the preparation of detail design structural drawings sufficient in detail for building regulation approval and construction purposes.

The design and construction methods to be used, to achieve the proposed alterations which include extension of the existing basement to the subject properties, are conventional well tried and tested methods.

This detailed engineering assessment and subterranean construction method statement of the proposals has demonstrated, in our view, that the design and construction methods to be used are such as to ensure that the construction, either during the course of works or upon the completion of works, will not cause harm to the built environment and will at all times maintain the structural integrity of the subject as well as all neighboring properties.

Khalid M Choudhary - BEng [Hons] CEng MIStructE FConsE

DIRECTOR - CSE Consulting Ltd
DATED - March 2022

CSE CONSULTING
civil structural engineers

APPENDIX - 1

SCOPING DOCUMENT
BASEMENT IMPACT ASSESSMENT

Reference: 19962/BIA - February 2022
Prepared By: Soils Limited

soils LIMITED

Basement Impact Assessment

at
23-25 Argyle Square, Camden, London WC1H 8AS

for
CSE Consulting Ltd

Reference: 19962/BIA
February 2022

Control Document

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Document Type
Basement Impact Assessment

Document Reference
19962/BIA

Document Status
Final

Date
February 2022

Prepared by
D V Tedesco MEng, PhD, ChIta, CEng MICE, RoGEP
(dt@soilslimited.co.uk)

Hydrogeology Check by
C G Swainston BSc, PGCE, CGeol, FGS CLAire QP, MIAH

First check by
Eur Ing R B Higginson BSc, PGDip, CEng, MICE, FGS.

Second check by
Nikos Sidiropoulos BSc MSc CEng MIMMM

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

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

Commission

Soils Limited was commissioned by CSE Consulting Ltd to undertake a scoping Basement Impact Assessment on land at 23-25 Argyle Square, Camden, London WC1H 8AS. The scope of the investigation was outlined in the Soils Limited quotation reference Q5685, dated 5th January 2022.

This document comprises the Basement Impact Assessment (BIA) and incorporates the results, discussion and conclusions to this purely desk based report. No site-specific intrusive investigation or ground movement assessment was commissioned by the Client at this stage of the proposed development. However, further activities could be required and recommended as a consequence of the screening and scoping process.

Sources of Information

The contents of this report site works, soil descriptions and geotechnical testing was undertaken in accordance with the following standards:

- CIRIA C760 – Guidance on embedded retaining wall design
- Burland J.B., et al (2001). Building response to tunnelling. Case studies from the Jubilee line Extension, London. CIRIA Special Publication 200
- Gaba A.R., et al (2003). Embedded retaining walls – guidance for economic design. CIRIA Report C580
- Basement Impact Assessment pro forma 1v0, The London Borough of Camden
- Camden Planning Guidance (CPG): Basements, January 2021
- Basement Impact Assessments: Defining the scope of Engineering input – Guidance note 1v0
- Camden Local Plan, 2017
- Camden Geological, Hydrogeological and Hydrological Study (GHHS), Guidance for subterranean development, Issue01/November 2010
- Environment Agency Water Framework Directive
- London Borough of Camden SFRA – Strategic Flood Risk Assessment, July 2014
- Property Asset Register Public Web Map, Transport for London
- The Lost Rivers of London, Historical Publications Ltd, 1992, N Barton
- Ward. L (2015) The London County Council Bomb Damage Maps 1939-1945 Hardcover – 31 Aug. Thomas & Hudson.

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

Non-Technical Summary

Soils Limited was appointed for the preparation of a Basement Impact Assessment on land at 23-25 Argyle Square, Camden, London WC1H 8AS. The building for the proposed development was a hotel, set into a block of Grade II Listed buildings with its front elevation representative of a row of Georgian townhouses and the structure already including basements.

Some of the buildings, including the one for the proposed development, comprised ground floor/first floor rear extensions with basements.

The proposed development comprised the internal renovation of the existing premises, the construction of a new ground floor plus basement rear extension at 25 Argyle Square and the enlargement of the rear extensions at 23 and 24 Argyle Square. The proposed basement extension was considerably smaller in plan than the existing basement and was surrounded by properties already having basements of similar depth to that proposed.

No intrusive investigation or Ground Movement Assessment, with evaluation of the expected damage on structures falling within the area of influence of the proposed development, were commissioned from the Client due to the small size of the proposal and that basements were already present both onsite and under the adjoining/neighbouring buildings.

This Basement Impact Assessment, therefore, is purely desk based and was prepared considering information from the existing literature and documents approved by the London Borough of Camden. Particular reference must be given to the 2021 Camden Planning Guidance: Basements (CPG) and references thereby reported.

The Basement Impact Assessment considered a screening stage for the identification of risks linked to the construction of the proposed development and a subsequent scoping stage to discuss the findings of the screening. Three screened areas of interest were Groundwater Flow, Land Stability and Surface Water Flow and Flooding.

The screening exercise identified the site to be at low risk of flooding from surface water and at very low risk of flooding from the action of rivers and sea. Extremely low to negligible risk could be associated to sewer failure, breaches of reservoirs and elevated groundwater. The site was identified as not falling within Critical Drainage Areas or Local Flood Risk Zones. The risk of flooding could be mitigated at design stage by using suitable strategies. Excavations are recommended to be undertaken in the summer and the premises, in the long-term, must be waterproofed and equipped with pumps introduced into suitably designed sumps. Drainage systems within the basement must be provided with anti-return valves and/or positive pumped devices to avoid the flow from sewers under pressure due to excessive surface water backing up into the building. Surface water must be collected and taken to sewers in public highway, subjected to dedicated design and approval from the relevant Authority. Attenuation methods can also be considered based upon the comments on the use of infiltration SuDS in the SFRA.

The preparation of a site-specific Flood Risk Assessment is required due to the site falling in Flood Zone 1 and affected by flood sources other than rivers and sea. However, this must be discussed with the local Planning Authority for clarifications. The property itself and the surrounding ones, in fact, already included basements, with the onsite one wider in size than the proposed built, and moreover already included habitable rooms (hotel rooms) at basement level. The proposed development, therefore, is not considered to increase the risk of flooding, must include dedicated drainage design to mitigate the existing risk and will not increase the existing vulnerability with the introduction of habitable rooms in areas with a previous different use. In addition, due to the expected geology, very low permeability London Clay Formation, and to the presence of a large number of existing basements in comparison to which the proposed one can only represent a marginal enlargement, the risk of cumulative effects causing the rise of groundwater can be considered as negligible.

The risk of shrink-swell induced ground movements was also identified at the site, due to the BGS and other sources showing the cohesive soils of the London Clay Formation outcropping at surface in the wider area. The design activities must include countermeasures to mitigate the risk of subsidence based upon soil volume change potential. In the absence of specific data from site investigations, the volume change potential of the cohesive soils of the London Clay Formation must be considered as high and the design carried out in accordance with NHBC Standards Chapter 4.2.

The proposed development will take place under and adjacent to Grade II Listed buildings, although it will not introduce significant changes to the existing differential foundation depth, due to basements being already present under the whole block of buildings. The undertaking of a full Basement Impact Assessment including a Ground Movement Assessment and the evaluation of the expected damage on the neighbouring structures, therefore, would not be considered a strict requirement and must be discussed with the Planning Authority. However, it must be clarified that the eventual damage must be limited using appropriate design and construction methods and must not exceed Burland's Category 1 (very slight damage), as presented in CIRIA C760 and in the LB Camden CPG. The design must be undertaken by an experienced structural engineer and the site works undertaken by a basement construction specialist. Furthermore, the monitoring of ground and structure movements within a radius of not less than 20m must be undertaken before, during and for a certain period after the completion of site works.

A pre-construction structural assessment must be undertaken on the building and on the surrounding structures in order to identify already existing damages or criticalities. The installation of monitoring instruments and monitoring activities must then be undertaken by a specialist surveyor and must consider a suitable traffic light alert system (green-amber-red colours) based on limit ground movements and minimum monitoring frequency agreed with the Council and/or Party Wall Engineers.

No information was available at the time of writing this BIA with regards to construction methods and structural design, but it is considered that the use of pile walls cannot be

considered at the site because of issues with access and size of the plant. Site works, however, can be undertaken using traditional RC basement walls and/or underpinning built by a competent and specialised contractor.

Overall, it was considered the proposed development could have a limited impact on neighbouring properties provided a suitable basement construction method was selected and effective monitoring of ground movements put in place, to inform of eventual excessive movements that could require the undertaking of remedial measures. The statement is strictly related to building structures in good conditions. No comments are or can be provided with regards to the structural conditions of the existing building and of the adjoining properties, as a specific assessment must be undertaken by a structural engineer, who has to ensure the structures are suitable to undergo the proposed development in safe conditions.

Should the undertaking of a site-specific intrusive investigation, of a site-specific Flood Risk Assessment and/or of a full Basement Impact Assessment be required at a later stage by the Council or by Party Wall Engineers, Soils Limited can assist in their preparation.

Contents

List of Figures

List of Tables

List of Appendices

Section 1 Introduction

1.1 Objective of Investigation

Soils Limited was commissioned by CSE Consulting Ltd to undertake a Basement Impact Assessment (BIA). The objective of this investigation was to establish the impact and risk of the proposed basement extension at 23-25 Argyle Square, Camden, London WC1H 8AS.

This document comprises the Basement Impact Assessment (BIA) and incorporates the results, discussion and conclusions to this purely desk based report. No site-specific intrusive investigation or ground movement assessment was commissioned by the Client at this stage of the proposed development. However, further activities could be required and recommended as a consequence of the screening and scoping process. The report, however, provides a qualitative risk assessment of the potential impacts the proposed development might have on groundwater levels, surface water flows and flooding.

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

No Preliminary Investigation Reports, contamination laboratory tests or Conceptual Site Model (CSM) were undertaken at the site by Soils Limited, as this did not form part of the Client's brief at this stage.

1.2 Limitations and Disclaimers

This Basement Impact Assessment relates to the site located at 23-25 Argyle Square, Camden, London WC1H 8AS and was prepared for the sole benefit of CSE Consulting Ltd (The "Client"). The report was prepared solely for the brief described in Section 1.1 of this report.

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

This report has been prepared by Soils Limited, with all reasonable skill, care and diligence within the terms of the Contract with the Client, incorporation of our General Conditions of Contact of Business and taking into account the resources devoted to us by agreement with the Client.

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

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

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

The investigation, interpretations, and recommendations given in this report were prepared for the sole benefit of the client in accordance with their brief. As such these do not necessarily address all aspects of ground behaviour at the site.

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

If the term “competent person” is used in this report or any Soils Limited document, it means an engineering geologist or civil engineer with a minimum of three years post graduate experience in the understanding and application of the appropriate codes of practice.

Unless the site investigation works have been designed and specified in accordance with EC7, this report is a Geotechnical Investigation Report and is not necessarily a Ground Investigation Report as defined by EC7 (Eurocode 7 Part 1, §3.4, Part 2, §6.1) or a Geotechnical Design Report (Eurocode 7 Part 1, §2.8) as defined by Eurocode 7 and as such may not characterise the ground conditions and additional works may be required to comply with the requirements of EC7.

Deleterious materials may be present in any Made Ground that pose a potential risk to site workers, end users and adjacent vulnerable receptors. These could include a range of contaminants, including asbestos, especially if the material includes large fractions of demolition derived materials.

Within the report reference to ground level relates to the site level at the time of the investigation, unless otherwise stated.

The depth to roots and/or of desiccation may vary from that found during the investigation. The client is responsible for establishing the depth to roots and/or of desiccation prior to the construction of foundations. Supplied site surveys may not include substantial shrubs or bushes and is also unlikely to have data or any trees, bushes or shrubs removed prior to or following the site survey.

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

Section 2 Site Context

2.1 Location

The site was located at 23-25 Argyle Square, Camden, London WC1H 8AS, had an approximate O.S Land Ranger Grid Reference of TQ 30414 82768 and fell within the administrative boundaries of the London Borough of Camden.

The site location plan is given in Figure 1.

2.2 Topography

A topographic survey was not available to Soils Limited at the time of writing this report, therefore information on the onsite and offsite topography were derived from online available levelling data (Google Earth Pro).

Onsite topography was substantially flat, with the rear courtyard recorded at a level of circa 1.20m to 1.80m lower than the front road level, located at an elevation of circa 20m AOD. The wider topography sloped downwards to the north/north-west at an average angle of <6°.

2.3 Site Description

At the time of writing this report, the site of interest included a part three and part four storey hotel building in yellow stock bricks. The building was part of a larger block overlooking Argyle Square, with the front elevation representative of Georgian townhouses, while the rear extensions of the premises were later additions of reduced architectural significance. Basements and lightwells were already present under the front, larger, portion of the whole property, from No. 1 to No. 25 Argyle Square, and also under part of the rear extensions at No. 23 and No. 24 Argyle Square. The site was entirely hard landscaped, with paved rear courtyards. Vegetation in the form of grassed grounds and mature trees were observed within the Argyle Square public gardens to the front of the site, and within the neighbouring properties to the rear. The site was bounded to the north by No. 22 Argyle Square, with further buildings part of the block beyond, to the west by Argyle Square and public gardens, to the south by 49-51 Argyle Street and gardens beyond and to the east by the six to seven storey buildings and gardens at Birkenhead Street Estate.

An aerial photograph of the site and its close environs has been included in Figure 2.

2.4 Proposed Development

The proposed development included the internal renovation of the property, the construction of a basement and ground floor rear extension at No. 25 Argyle Square and the horizontal extension of the existing basement and ground floor rear extensions at No. 23 and No. 24 Argyle Square. The rear courtyard will also include the installation of permeable paving and amenity grassland within unbuilt areas.

In compiling this report reliance was placed on the Design and Access Statement and on drawings number L000, EX00 to EX02, EX10, EX20, EX21, PL00 to PL02, PL10, PL11 and PL20 to PL22, dated April 2021 and prepared by Tsuruta Architects. Any change or deviation from the scheme outlined in the drawing could invalidate the foundation design and remediation recommendations presented within this report. Soils Limited must be notified about any such changes.

Development plans provided by the client are presented in Appendix A.

2.5 Listed Buildings

The site was located within the Conservation Area of Bloomsbury. The block of buildings including 23-25 Argyle Square was classified as a Grade II Listed Buildings. Further locally listed buildings were also present along Argyle Square, Argyle Street, Crestfield Street, St. Chad's Street and Belgrove Street. The map of Listed Buildings in the surroundings of 23-25 Argyle Square was presented in Figure 3.

2.6 Published Geological Data

The 1:50,000 BGS map showed the site to be located directly upon the bedrock London Clay Formation with no anticipated overlying superficial deposits. No infilled ground, reworked ground or thick Made Ground was anticipated at the site by the Camden Geological, Hydrogeological and Hydrological Study (GHHS) prepared by Arup. Geological data were presented on Figure 4 and Figure 5.

2.6.1 London Clay Formation

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

The upper boundary member of the London Clay Formation is known as the Claygate Member and marks the transition between the deep water, predominantly clay environment and succeeding shallow-water, sand environment of the Bagshot Formation.

The lower boundary is generally marked by a thin bed of well-rounded flint gravel and/or a glauconitic horizon. The formation overlies the Harwich Formation or where the Harwich Formation is absent the Lambeth Group.

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

2.7 Web-Published Geology

A review of historic boreholes was undertaken to provide information on the expected soil stratigraphy. Deep boreholes (>30m below ground level) within 300m from the site were used to describe the succession of soil units with depth (BGS Ref. TQ38SW1074, TQ38SW4250, TQ38SW122, TQ38SW4976 and TQ38SW502). Borehole logs suggest the following sequence and final depth of strata.

Made Ground/Superficial Deposits: 1.2m to 5.9m

London Clay Formation: 16.2m to 24.0m

Lambeth Group: 35.0m to 41.2m

Thanet Sand Formation: 40.2m to 47.0m

Chalk: >50.0m to >137.2m.

2.7.1 Groundwater

Based on the above deep boreholes, groundwater was recorded at a minimum depth of 6.0m bgl but more generally at depths of circa 21.0m, within granular beds of the Lambeth Group, to 63.4m bgl, within the chalk at depth.

2.8 Hydrology

The Camden Geological, Hydrogeological and Hydrological Study undertaken by Arup showed the nearest surface water feature to be the Regent's Canal, located at >550m N. The River Thames was identified at circa 2000m S, while the Boating Lake at Regent's Park was located at >2200m E.

The presence of lost rivers was also considered with regards to the information reported within the GHHS. The River Fleet was understood to flow in Bloomsbury and the former route was anticipated at >100m NE of the site.

The Strategic Flood Risk Assessment (SFRA) produced by URS in 2014 showed the site to be located circa 400m E of the closest culverted watercourse.

Paragraph 4.1.1 of the SFRA commented that "*all main rivers historically located within LBC are now culverted and incorporated into the TWUL sewer network and therefore there is no fluvial flood risk within LBC*".

In conclusion, the available data showed the site to be at more than 100m from any local water feature or lost river and to be located outside of the catchment of the ponds chain on Hampstead Heath. The noted information from the GHHS and the SFRA was reported in Figure 6 to Figure 9.

2.9 Hydrogeology

The Environment Agency has produced an aquifer designation system consistent with the requirements of the Water Framework Directive. The designations have been set for

superficial and bedrock geology and are based on the importance of aquifers for potable water supply and their role in supporting water bodies and wetland ecosystems.

The London groundwater model was generally split into three aquifers, the Upper, Intermediate and Lower Aquifer.

> The Upper Aquifer was confined to the River Terrace Deposits, which were not anticipated onsite, overlying the London Clay Formation, which acts as an aquiclude.
>
> The Intermediate Aquifer was generally associated with granular layers within the Lambeth Group.
>
> The Lower Aquifer was principally associated with the Chalk, but can include the Thanet Sand Formation, which overlays the chalk.

Information presented by the Environment Agency classifies the London Clay Formation bedrock as unproductive strata. The Camden Planning Guidance (CPG) confirmed that the areas with London Clay Formation outcropping are not to be considered as aquifers.

Published geological data showed the River Terrace Deposits to be not anticipated at the site, therefore the Upper Aquifer would not be present onsite. Groundwater within the London Clay Formation, will generally tend to flow either in alignment with the topography or vertically downwards at a very slow rate towards the Intermediate and subsequently Lower Aquifer. Due to the predominantly cohesive nature of the soils, the groundwater flow rate is anticipated to be very slow. Published permeability data for the London Clay Formation indicates the horizontal permeability to generally range between 10^{-10} m/s and 10^{-8} m/s, with an even lower vertical permeability.

The Upper Aquifer was not considered to be relevant to the proposed development and basement impact assessment. The Intermediate and Lower Aquifers would not be affected in any way by the proposed works so were not considered further. Information from the GHHS on aquifers in Camden was presented in Figure 10.

2.10 Flood Risk

The Environment Agency (EA) considered the site to be located within Flood Zone 1, not at risk of flooding from breaches at reservoirs, at very low risk of flooding for the action of rivers and sea and at low risk of flooding from surface water. Information from the EA was reported in Figure 11 to Figure 14.

According to the Strategic Flood Risk Assessment undertaken by URS for the London Borough of Camden, the site did not fall within any Critical Drainage Area or Local Flood Risk Zone. The risk of flooding for surface water was confirmed to be low within the rear of the property. The hazard for 1 in 1000 year flood events was moderate to significant. Sewer flooding incidents were not recorded in the area of 23-25 Argyle Square. The risk

of flooding from internal and external sewer failure was therefore considered extremely low to negligible, as well as the susceptibility to elevated groundwater. Information on flood risk from the Strategic Flood Risk Assessment and the GHHS was reported in Figure 15 to Figure 22.

In conclusion, the site fell within Flood Zone 1, the surface area of the site was <1 hectare, but the site was considered potentially affected by flooding sources other than rivers and sea, therefore the undertaking of a detailed, site specific flood risk assessment would be required. However, the site already included a basement, therefore it is recommended to discuss with the Local Planning Authority the requirement for a site-specific Flood Risk Assessment.

2.11 Ground Instability

The site was anticipated to be set directly into the cohesive soils of the London Clay Formation. The wider topography sloped downwards in a north/north-easterly direction according to an angle <6°. The GHHS did not consider the area of interest of risk of slope failure, as presented in Figure 23. The risk of ground instability phenomena was therefore considered negligible.

2.12 Underground Infrastructure

No underground infrastructures were recorded from the TFL Property Asset Register Public Web Map and from the GHHS within the area of influence of the proposed development, as showed in Figure 24 and Figure 25. The closest underground infrastructure was the Piccadilly Line underground line, located >100m.

Information on the presence of public utilities, such as sewers or water mains, was not available at this stage. The document “Guidelines for working near our water mains and sewers” from Thames Water clarified that the zone of influence in the vicinity of sewers or distribution mains was considered equal to three metres. This must be taken into account at design and construction stages.

2.13 Unexploded Ordnance (UXO) Risk

The web-based service Bomb Sight was used to undertake a preliminary appraisal of the risk for unexploded ordnance from the Second World War. A map of the area was presented in Figure 26, where it can be observed that high-explosive bombs, deployed during the heavy bombing between 7th October 1940 and 6th June 1941, were recorded in the area of 23-25 Argyle Square.

The above results were compared with the information available on-line from Zetica UXO. The map in Figure 27 showed the site to be located within an area at high risk for the presence of UXO.

The London County Council Bomb Damage Maps 1939-1945 showed that the buildings at Argyle Square were profoundly devastated during WW2. In particular, the property at 23-25 Argyle Square was subjected to damage ranging between damages beyond repair and total destruction, as observed in Figure 28.

Considering the results of the preliminary appraisal and also that the site was already developed and included a basement, contacting a UXO specialist for a Preliminary UXO risk assessment was not considered as mandatory although recommendede ahead of the construction phase.

Section 3 Screening

3.1 Introduction

The Ove Arup 2008 Scoping Study prepared for the London Borough of Camden and the 2021 Camden Planning Guidance: Basements require that any development proposal that includes a subterranean basement should be screened to determine whether or not a full BIA is required.

A number of screening tools are included in the Arup document (Ref: Camden geological, hydrogeological and hydrological study, Issue01/November 2010) and the CPG, comprising a series of questions within a screening flowchart for three categories: Groundwater Flow, Land Stability and Surface Flow and Flooding. Responses to the questions are tabulated below.

3.2 Groundwater Flow Screening Assessment

The response to the Groundwater Flow Screening Assessment is given in Table 3.1.

Table 3.1 – Subterranean (Ground Water) Flow Screening

Question	Response
1a. Is the site located directly above an aquifer?	No – The BGS, the GHHS and the SFRA showed the site set onto/into the cohesive soils of the London Clay Formation, which acts as an aquiclude.
1b. Will the proposed basement extend beneath the water table surface?	No – Superficial deposits capable of supporting local water supplies were not anticipated by BGS, GHHS and SFRA and information from web-published groundwater monitoring showed groundwater at depths greater than the existing and proposed basement formation level. No groundwater flooding incidents were recorded at the site.
2. Is the site within 100 m of a watercourse, well (used/ disused) or potential spring line?	No – The nearest Surface Water Feature was the River Fleet, located at >100m, culverted and incorporated into the TWUL sewer network. Therefore there is no fluvial flood risk within LBC.
3. Is the site within the catchment of the pond chains on Hampstead Heath?	No – The site was located outside of the catchment area as observed in Figure 9.
4. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	**Yes** – The proposed development will increase the available permeable areas by introducing permeable paving and amenity grassland within the courtyard.
5. As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?	**Yes** – Permeable areas will be introduced into the rear courtyard.
6. Is the lowest point of the proposed excavation (allowing for any drainage and foundation space under the basement floor) close to or lower than, the mean water level in any local pond or spring line?	No – The nearest waterbody was the River Fleet, located at >100m from the site, culverted and incorporated in the TWUL sewer network.

3.3 Land Stability

The response to the Land Stability Screening Assessment is given in Table 3.2.

Table 3.2 – Slope Stability Screening

Question	Response
1. Does the existing site include slopes, natural or manmade, greater than 7° (approximately 1 in 8)?	No – No site slopes exceeded 7°.
2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7° (approximately 1 in 8)?	No – No reprofiling was part of the proposed development.
3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7° (approximately 1 in 8)?	No – Average slope angles within the area of influence of the proposed development were <7°.
4. Is the site within a wider hillside setting in which the general slope is greater than 7° (approximately 1 in 8)?	No – Average slope angles within the area of influence of the proposed development were <7°.
5. Is the London Clay the shallowest strata at the site?	**Yes** – The BGS, the GHHS and the SFRA anticipated outcropping cohesive soils of the London Clay Formation.
6. Will any trees be felled as part of the proposed development and / or are any works proposed within any tree protection zones where trees are to be retained?	No – The proposed plans did not show any trees being removed.
7. Is there a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site?	**Unknown** – Anticipated geology was London Clay Formation, which could potentially be subject to shrink-swell subsidence. No information was provided to Soils Limited with regards to the evidence of subsidence at the site.
8. Is the site within 100 m of a watercourse or potential spring line?	No – The nearest water feature was the River Fleet, located at >100m.
9. Is the site within an area of previously worked ground?	No - The relevant geological map did not show any Made Ground or Worked Ground within or in close proximity to the site.
10. Is the site within an aquifer? If so, will the proposed basement extend beneath the water table such that dewatering may be required during construction?	No – The BGS, the GHHS and the SFRA showed the site set onto/into the cohesive soils of the London Clay Formation, which acts as an aquiclude.
11. Is the site within 50m of the Hampstead Heath ponds?	No – The site was located outside of the catchment area as observed in Figure 9.
12. Is the site within 5 m of a highway or pedestrian right of way?	No – The proposed excavation is >5m distant from highways or pedestrian right of way.

Question	Response
13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	No – It was understood from the Council Planning Portal that basements were already present under the whole block of buildings at Argyle Square and under the neighbouring property to the south (49-51 Argyle Street). The proposed basement would not introduce significant changes to the existing differential foundation depth.
14. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?	No – Underground infrastructures were >100m away from the site, which fell outside of the related exclusion zone.

3.4 Surface Flow and Flooding

The response to the Surface Flow and Flooding Screening Assessment is given in Table 3.3.

Table 3.3 – Surface Flow and Flooding Screening

Question	Response
1. Is the site within the catchment of the pond chains on Hampstead Heath?	No – The site was located outside of the catchment area as observed in Figure 9.
2. As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?	**Yes** – Part of the surface water will seep through permeable paving and amenity grassland and part of it will be taken/pumped to combined sewer in the public highway.
3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	**Yes** – The proposed development will increase the available permeable areas by introducing permeable paving and amenity grassland within the courtyard.
4. Will the proposed basement development result in changes to the profile of the inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?	No – No changes were anticipated to site drainage.
5. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No – The quality of surface water would not be affected.
6. Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or the Strategic Flood Risk Assessment or is it at risk from flooding, for example because the proposed basement is below the static water level of nearby surface water feature?	**Yes** – Low flood risk was reported by both the EA and the SFRA.

3.5 Summary

Based on the screening exercise, further stages of the basement impact assessment are required. A summary of the basement impact assessment requirements has been provided in Table 3.4, Table 3.5 and Table 3.6.

Table 3.4 – Ground Flow Screening Assessment

Item	Description
Q4	**Yes** – The proposed development will increase the available permeable areas by introducing permeable paving and amenity grassland within the courtyard.
Q5	**Yes** – Permeable areas will be introduced into the rear courtyard.

Table 3.5 – Land Stability

Item	Description
Q5	**Yes** – The BGS, the GHHS and the SFRA anticipated outcropping cohesive soils of the London Clay Formation.
Q7	**Unknown** – Anticipated geology was London Clay Formation, which could potentially be subject to shrink-swell subsidence. There was no visual evidence of subsidence at the site or properties in the vicinity.

Table 3.6 – Surface Flow and Flooding

Item	Description
Q2	**Yes** – Part of the surface water will seep through permeable paving and amenity grassland and part of it will be taken to combined sewer in public highway.
Q3	**Yes** – The proposed development will increase the available permeable areas by introducing permeable paving and amenity grassland within the courtyard.
Q6	**Yes** – Low flood risk was reported by both the EA and the SFRA.

Section 4 Scoping

4.1 Introduction

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

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

4.2 Potential Impacts

The following potential impacts were identified in Table 4.1.

Table 4.1 – Potential Impacts

Screening Flowchart Question	Potential Impacts	Discussion
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?	Reduction in hard landscaping could increase the risk of ponding due to the presence of low permeability soils of the London Clay Formation and affect the neighbouring properties. The proposed development could pose a risk of increased flooding at the site itself and/or adjacent developments.	Site drainage to be designed considering specific information from the site. SuDS design could be considered to attenuate the effects of surface water flooding **Effects mitigated at design stage.**
Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?		
Is the site in an area identified to have surface water flood risk according to either the Local Flood Risk Management Strategy or the Strategic Flood Risk Assessment or is it at risk from flooding, for example because the proposed basement is below the static water level of nearby surface water feature? As part of the site drainage, will more surface water (e.g. rainfall and run-off) than at present be discharged to the ground (e.g. via soakaways and/or SUDS)?		
Is the London Clay the shallowest strata at the site?	Damage to foundation due to volume change potential.	Site-specific ground investigation and geotechnical testing would be

Screening Flowchart Question	Potential Impacts	Discussion
Is there a history of seasonal shrink-swell subsidence in the local area and / or evidence of such effects at the site?	Changes to vegetation on site could adversely affect foundations of adjoining structures.	required to prove ground conditions and soil volume change potential. Data from previous investigation could be adopted, if present, . Existing foundation details to be established by means of trial pits/foundation exposures or boreholes. Changes to vegetation were not anticipated to Soils Limited from the drawings provided by the Client. **Effects mitigated at design stage.**

Section 5 Basement Impact Assessment

5.1 General

This section of the report addresses the potential impacts identified by the scoping study, as presented in Table 4.1, and mitigation measures, where required.

The findings of this report are informed by data from the existing literature and from documents provided by the Council. A site-specific intrusive investigation was not undertaken. It must be considered that a basement was already present under the building, that the proposed basement is considerably smaller and that the proposed basement formation level will not be deeper than the existing one.

The scoping section of this Basement Impact Assessment report considered that all the risks identified at screening and scoping stages can be mitigated at detailed design stage.

5.2 Flood Mitigation

The site was affected by a certain number of non-negligible sources of flooding, including surface water and rivers and sea. The risk of flooding from sewers and groundwater was considered extremely low to negligible.

The site of interest was located in Flood Zone 1 and was smaller than one hectare, but the presence of non-negligible sources of flooding other than rivers and sea would require the preparation of a site-specific Flood Risk Assessment.

However, it must be pointed out that the site already included a basement with guest hotel rooms and does not fall within a critical drainage area. The proposed development, therefore, further to being of much smaller size than the existing one, does not introduce changes to the use of the basement and does not increase the existing vulnerability. It is therefore recommended to discuss the requirement for a site-specific Flood Risk Assessment with the Local Planning Authority.

The site was set onto/into the cohesive soils of the London Clay Formation, which act as an aquiclude. It is considered highly unlikely that groundwater could enter the excavations in the short-term and the premises in permanent conditions.

With regard to surface water, it is recommended to carry out the excavations during drier months. In the long term, the premises must be waterproofed and protected with pumps introduced into sumps. Pumping out water from the excavation or the premises must not be intended as a dewatering exercise, as this could affect the groundwater table in the wider area, if present, and trigger the development of consolidation phenomena within eventual superficial cohesive beds or even within the London Clay Formation. Where drainage systems in the basement are to be considered,

they must be protected using anti-return valves and/or positive pumped devices against the risk of flooding from sewers.

Surface water runoff could affect the neighbouring properties. It is recommended to undertake the design of **a suitable drainage system** with surface water collected to public sewer, if permitted following consultation with the relevant Authority. The use of surface water attenuation systems could also be beneficial if feasible on the basis of specific testing.

5.3 Shrink-Swell Related Subsidence

The cohesive soils of the London Clay Formation were anticipated by the BGS, the GHHS and the SFRA as outcropping at the site. Shrink-swell induced ground movements could be possible as the consequence of seasonal changes of soil moisture content or of vegetation activities.

Basement foundations must therefore be designed to resist shrinkage-swelling phenomena and consider soil volume change potential, which should be determined on the basis of a site-specific ground investigation. In the absence of results from a site investigation, foundations must be considered according to the **worst-case scenario**, which considers **high volume change potential for the cohesive soils of the London Clay Formation**.

5.4 Cumulative Effects

The soils of the London Clay Formation were classified as an aquiclude and, therefore, groundwater flows were considered as negligible or, if present, extremely slow. Basements were already present under the whole block of buildings at Argyle Square and also under several of the buildings in the surroundings. The proposed basement, therefore, would be a very small addition to a very large set and, as a consequence, would only apply irrelevant changes to the existing conditions.

Considering the above, it is highly unlikely that the construction of the proposed basement would cause cumulative alterations to the existing groundwater regime and the eventual rise of groundwater levels to the upstream can therefore be considered as negligible.

5.5 Use of SuDS

The SFRA indicated that the use of bespoke infiltration SuDS could be possible at the site, subjected to the development of specific testing. Drainage strategies must be designed by a specialist and could consider infiltration/attenuation strategies. Surface water could be collected and taken to public sewer, subject to approval by the relevant Authority.

5.6 Structural Stability

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

The proposed development will take place under and adjacent to listed buildings which already included basements. The existing development already included a basement under the original part and the rear extension. The proposed development was of much smaller size than the existing one and would not increase the differential depth between basement foundations and the foundations of the adjoining property to the north (22 Argyle Square) and the neighbouring property to the south (49-51 Argyle Street), which also had an existing basement of similar depth underneath.

The production of a full Basement Impact Assessment including a Ground Movement Assessment was therefore considered **not a strict requirement at planning stage**. Should this be required at a later stage or because of party wall agreements, it must be reminded that the maximum allowable damage to the properties within the area of influence of the proposed basement must not exceed Burland Category 1 (very slight damage) in order to limit the potential consequences to minor remedial actions of pretty cosmetic relevance. This is particularly relevant due to the presence of listed buildings.

The design and construction activities must rely on safe and recognised methods aimed to preserve the stability of the structure itself and of neighbouring properties. Detrimental effects would be manifested as cracking and more serious structural damage. Many old buildings exhibit signs of historic movement and repair. In practice, it is often difficult to attribute cracks visible in a structure to specific site construction activities unless a detailed survey of the affected structure and its founding strata had been undertaken before the construction works.

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

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

The client's engineer can prepare working drawings and construction method statements that will mitigate adverse effects of nearby properties.

5.7 Conclusions

The risks highlighted by the screening assessment were analysed within the scoping section of this report and effects reduced to negligible level due to the specific site

characteristics, site specific design from experienced professionals and dedicated management at design stage.

Overall, it is considered that the proposed development would not harm the existing groundwater regime or increase the risk of flooding onsite and at downstream properties, provided that suitable construction methods and monitoring of ground and structures are undertaken during construction.

The production of a full Basement Impact Assessment including the evaluation of ground movements and the assessment of the expected damage category with reference to the neighbouring buildings is not considered mandatory because the proposed basement development would introduce very limited changes to the existing development and would not increase the differential depth between adjacent structures. However, it is considered possible that a Basement Impact Assessment could be required at a later stage because of the presence of listed buildings or because of Party wall agreements. Soils Limited can assist in the preparation of the geotechnical analyses if required.

This report was produced with reference to information about building layout provided by the Client's Architect. Should changes to the proposed development be applied, Soils Limited must be immediately informed as this could invalidate the conclusions and recommendations presented throughout this report.

List of Figures

List of Appendices

Figure 1 – Site Location Map

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Figure 2 – Aerial Photograph

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

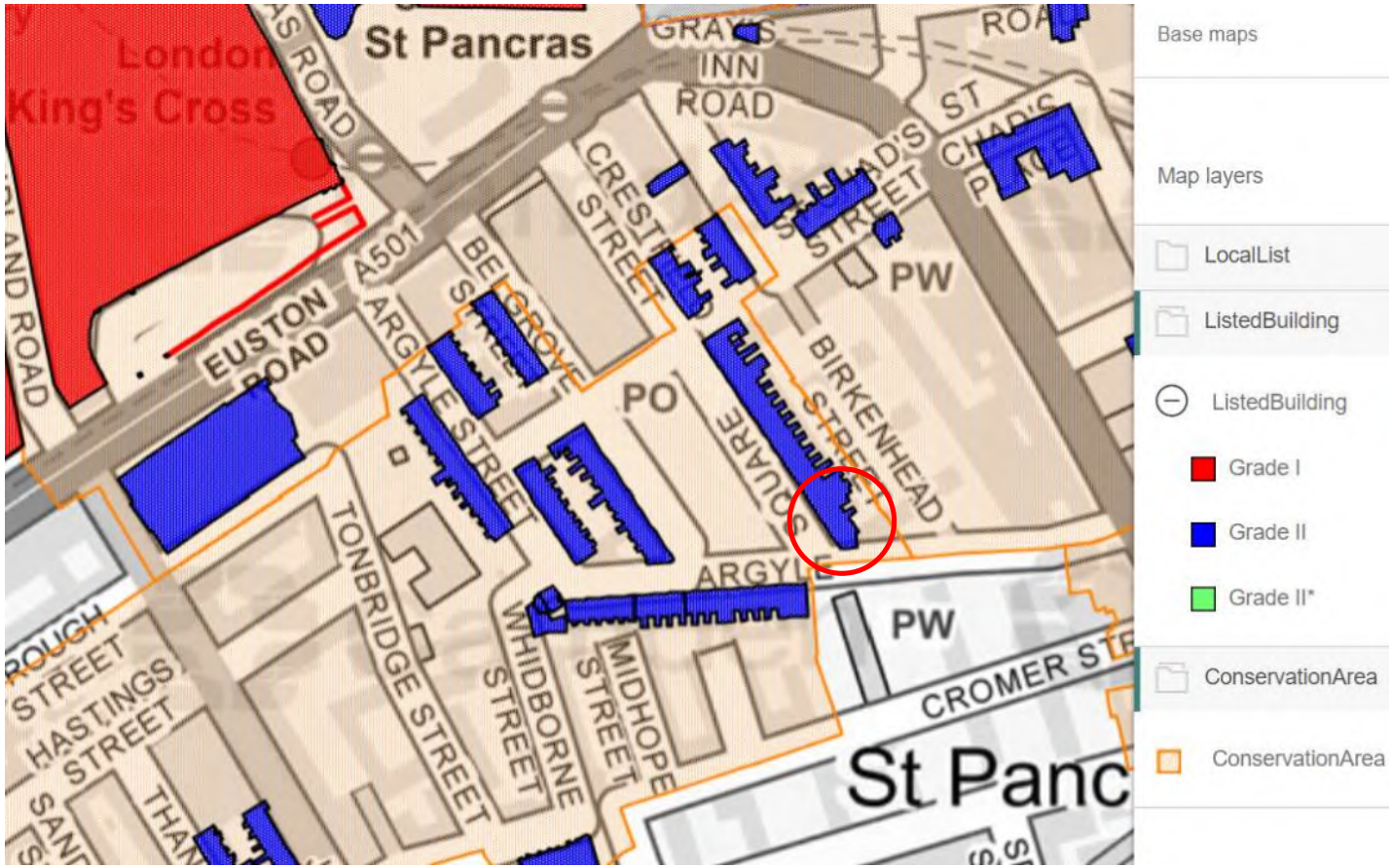


Figure 3 – Listed Buildings

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

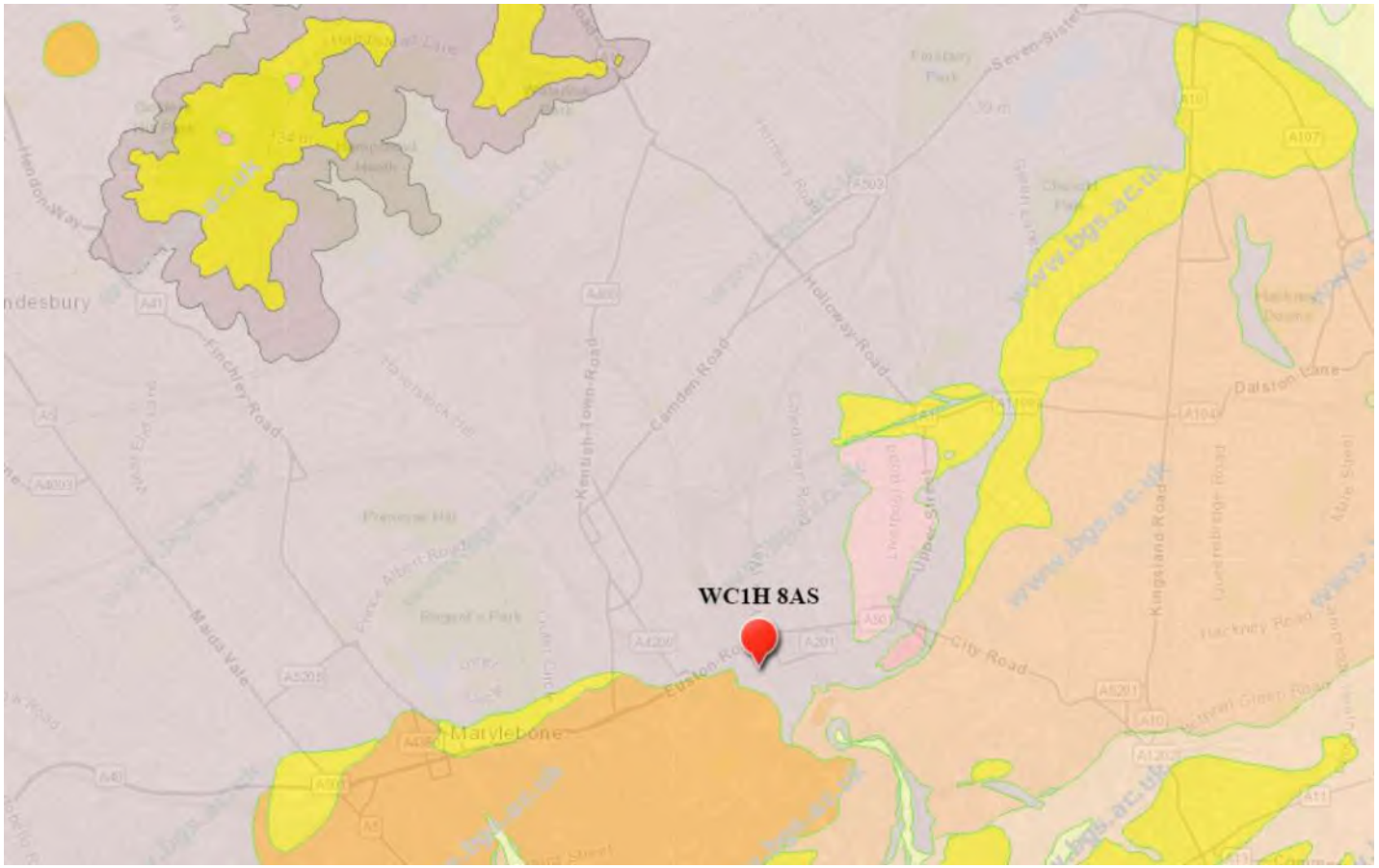
Date
February 2022

Job Number
19962

Approximate site location

N

Figure 4 – BGS 1:50,000 Map



Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

N

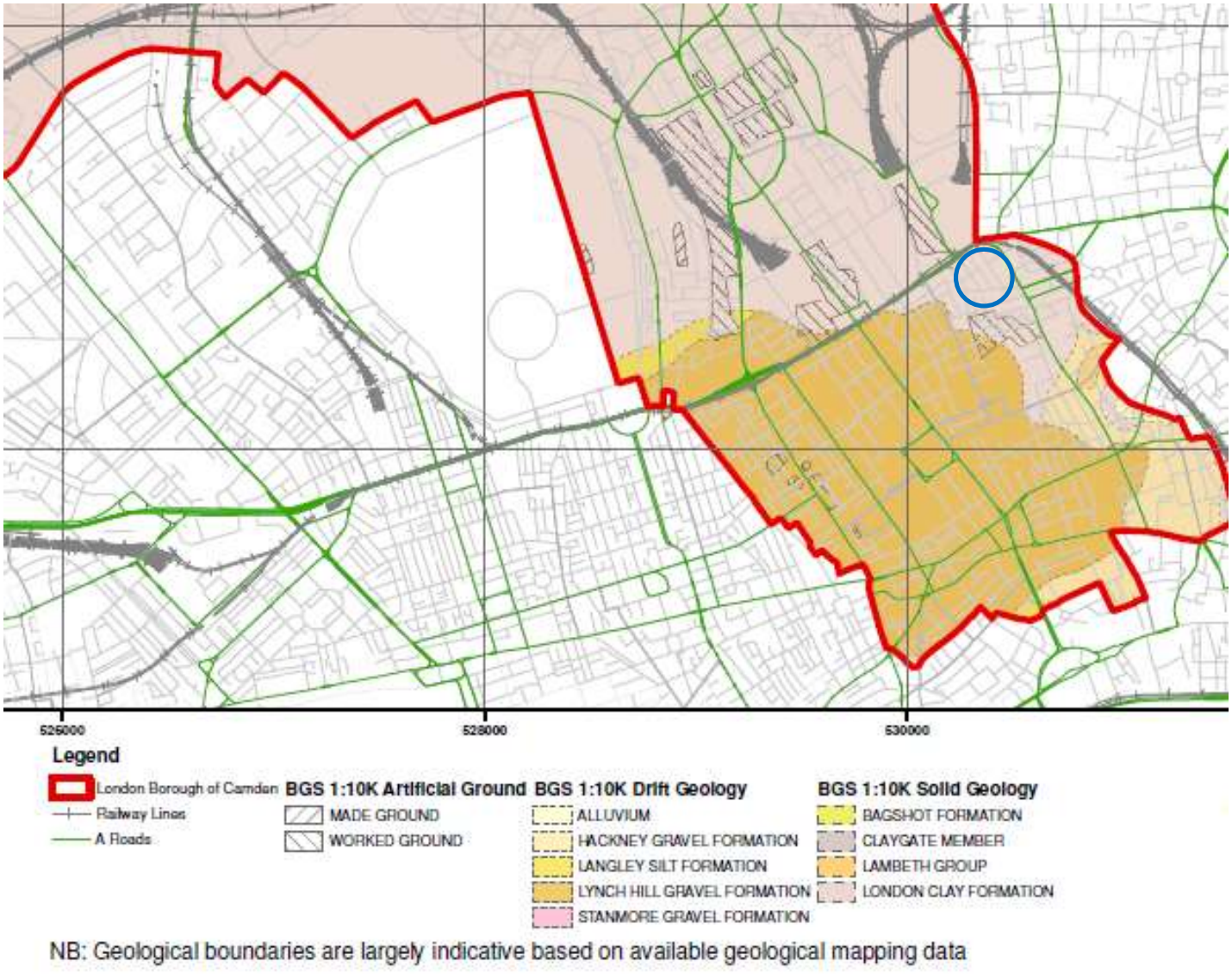


Figure 5 – GHHS, Camden Geological Map

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Approximate site location

N

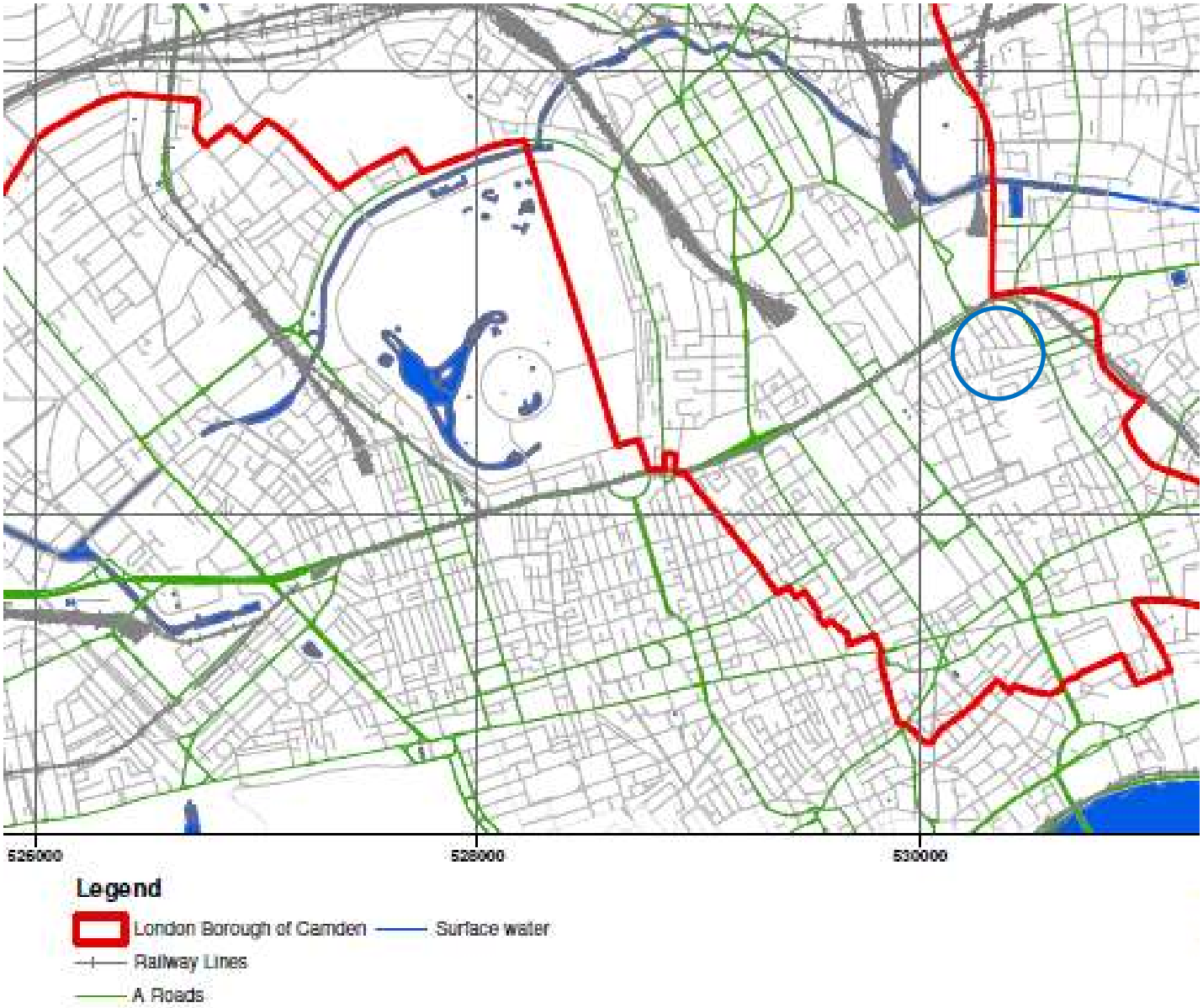


Figure 6 – GHHS, Surface Water Features

Project
23-25 Argyle Square, Camden, London WC1H 8AS

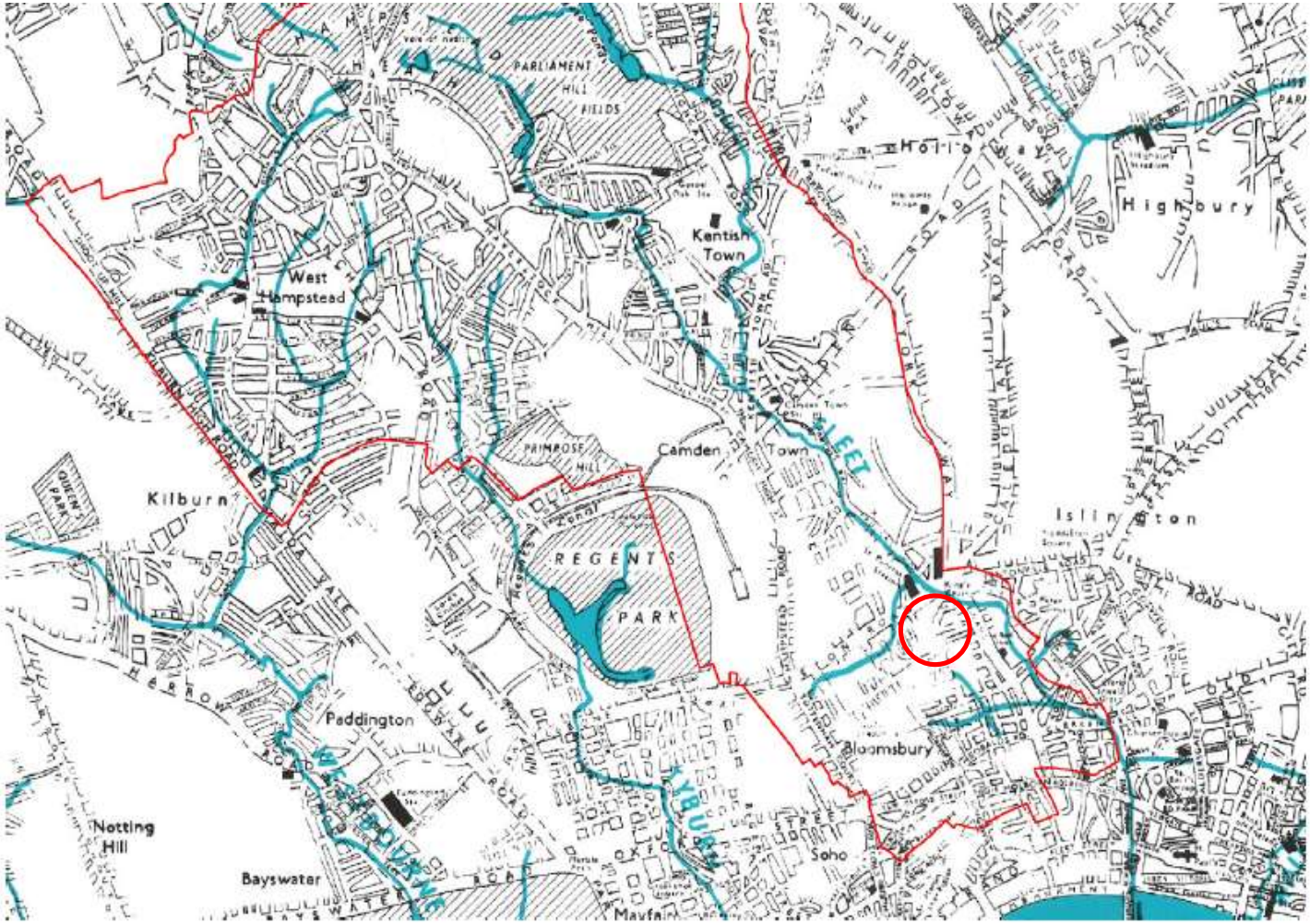
Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Approximate site location

N



Source – Barton, Lost Rivers of London

Figure 7 – GHHS, Lost Rivers

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Approximate site location

N

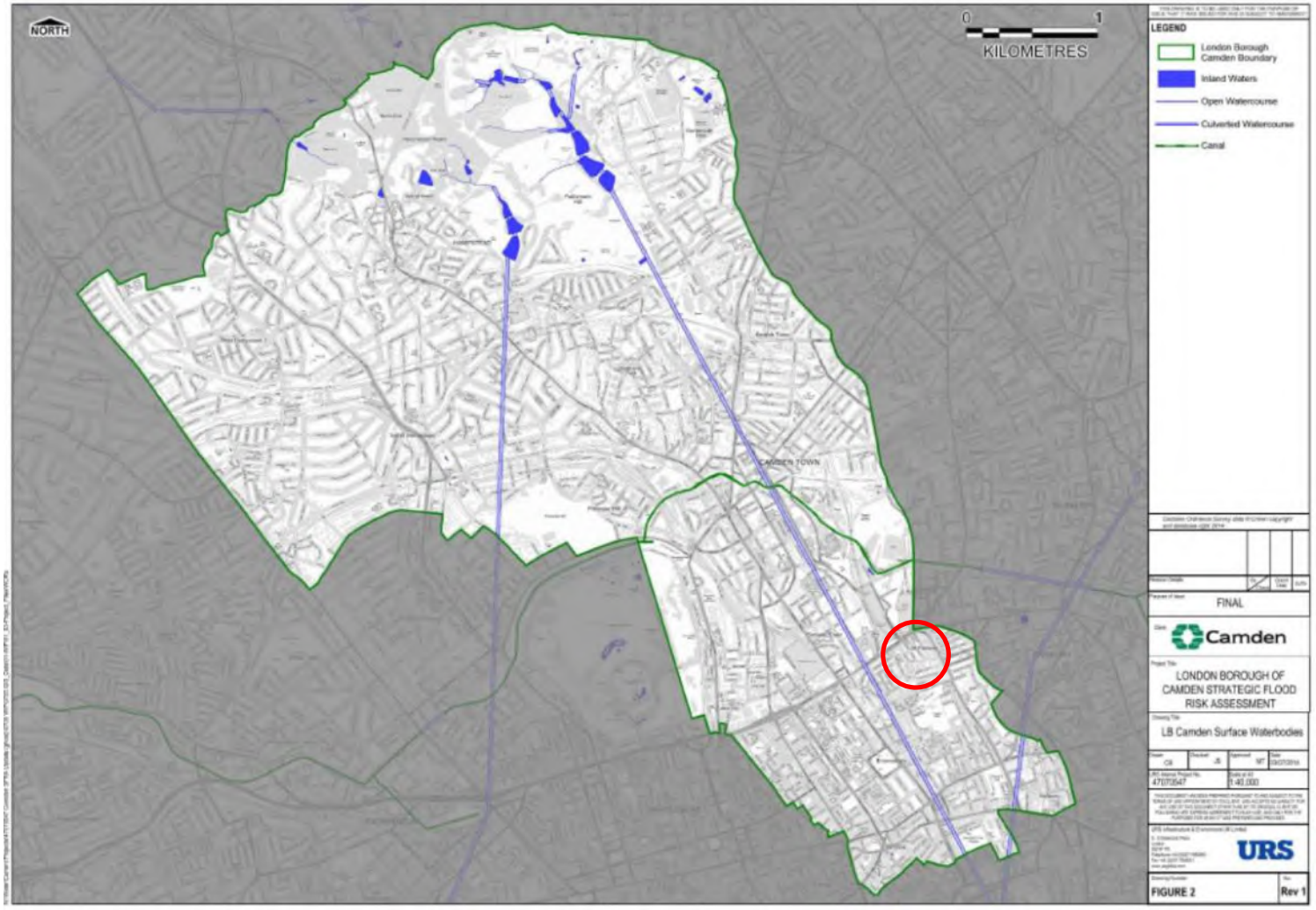


Figure 8 – SFRA, Surface Waterbodies

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

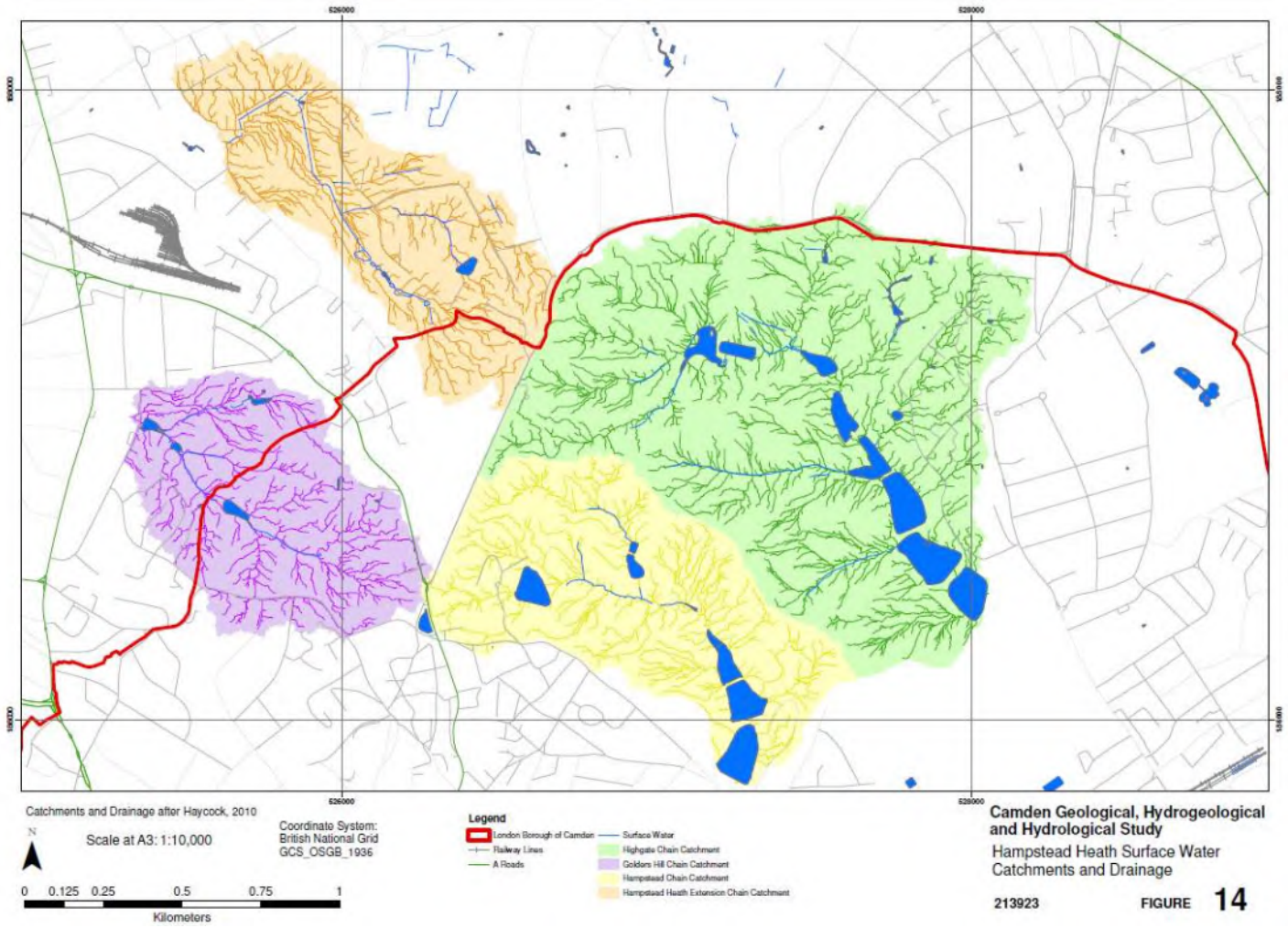
Date
February 2022

Job Number
19962

Approximate site location

N

Figure 9 – GHHS, Hampstead Heath Pond Chains Catchment Area



Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

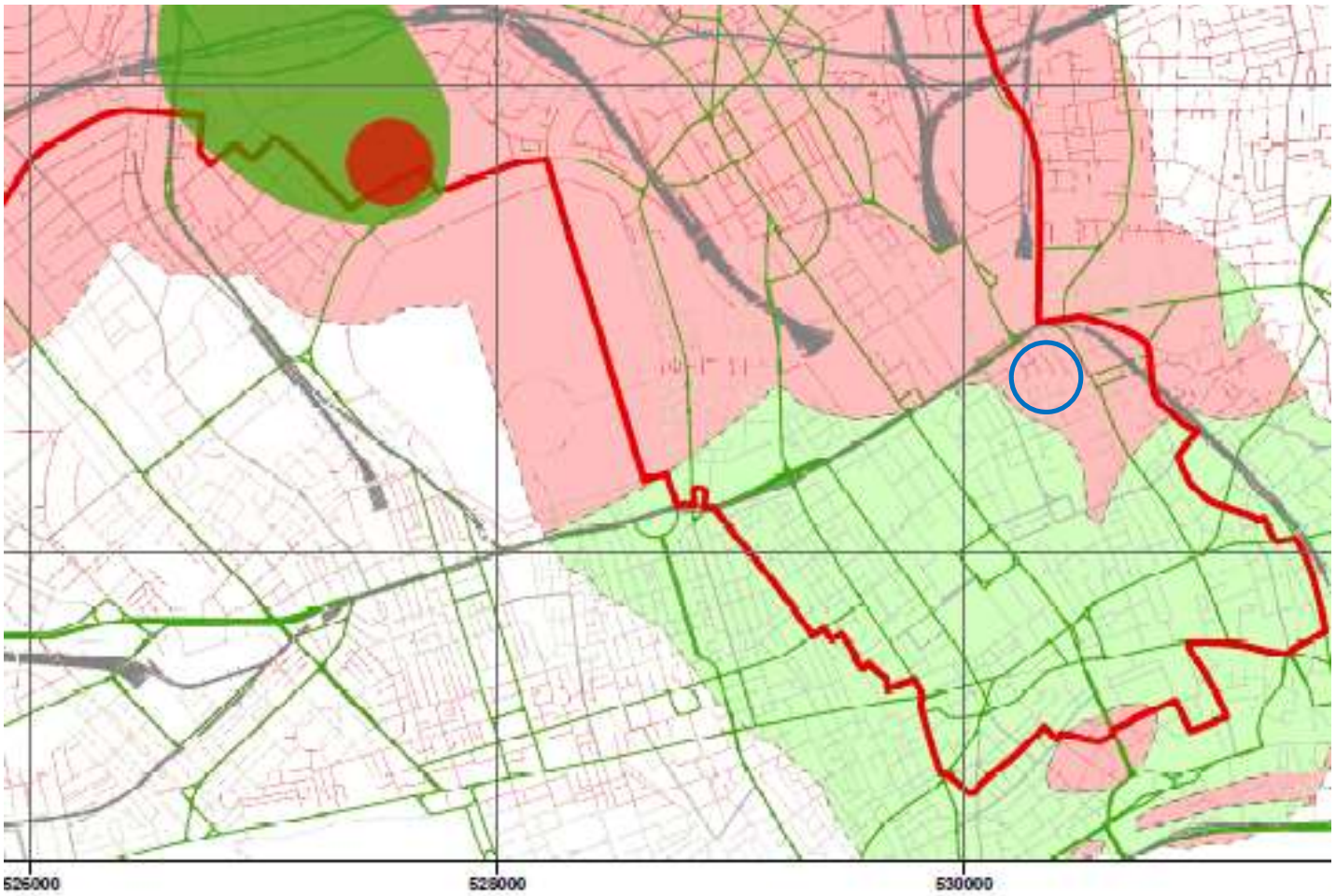


Figure 10 – GHHS, Aquifer Designation Map

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Approximate site location

N

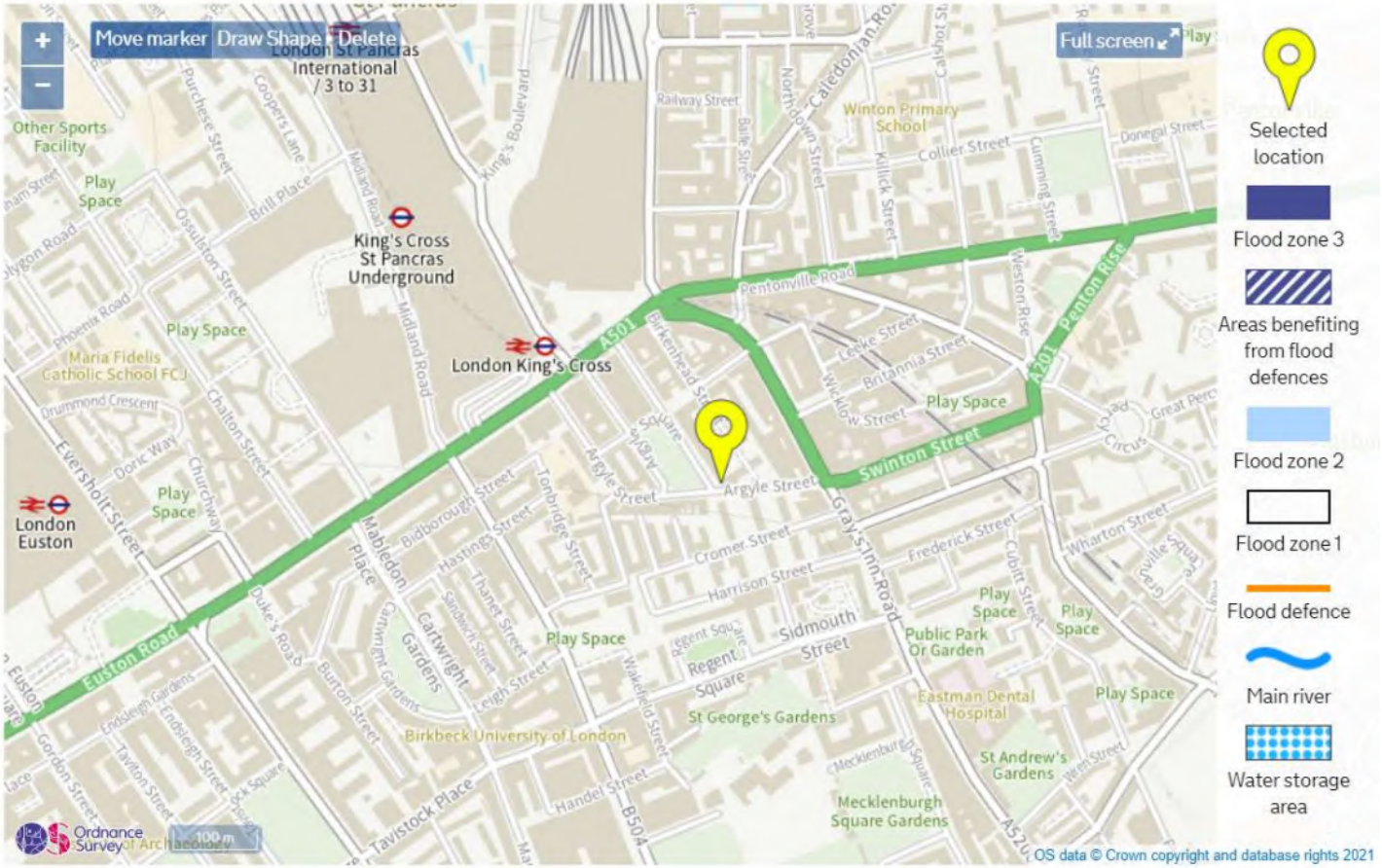


Figure 11 – EA, Flood Zones

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Extent of flooding from rivers or the sea

High Medium Low Very low Location you selected

Figure 12 – EA, Flooding from Rivers and Sea

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

N

Extent of flooding from surface water

High Medium Low Very low Location you selected

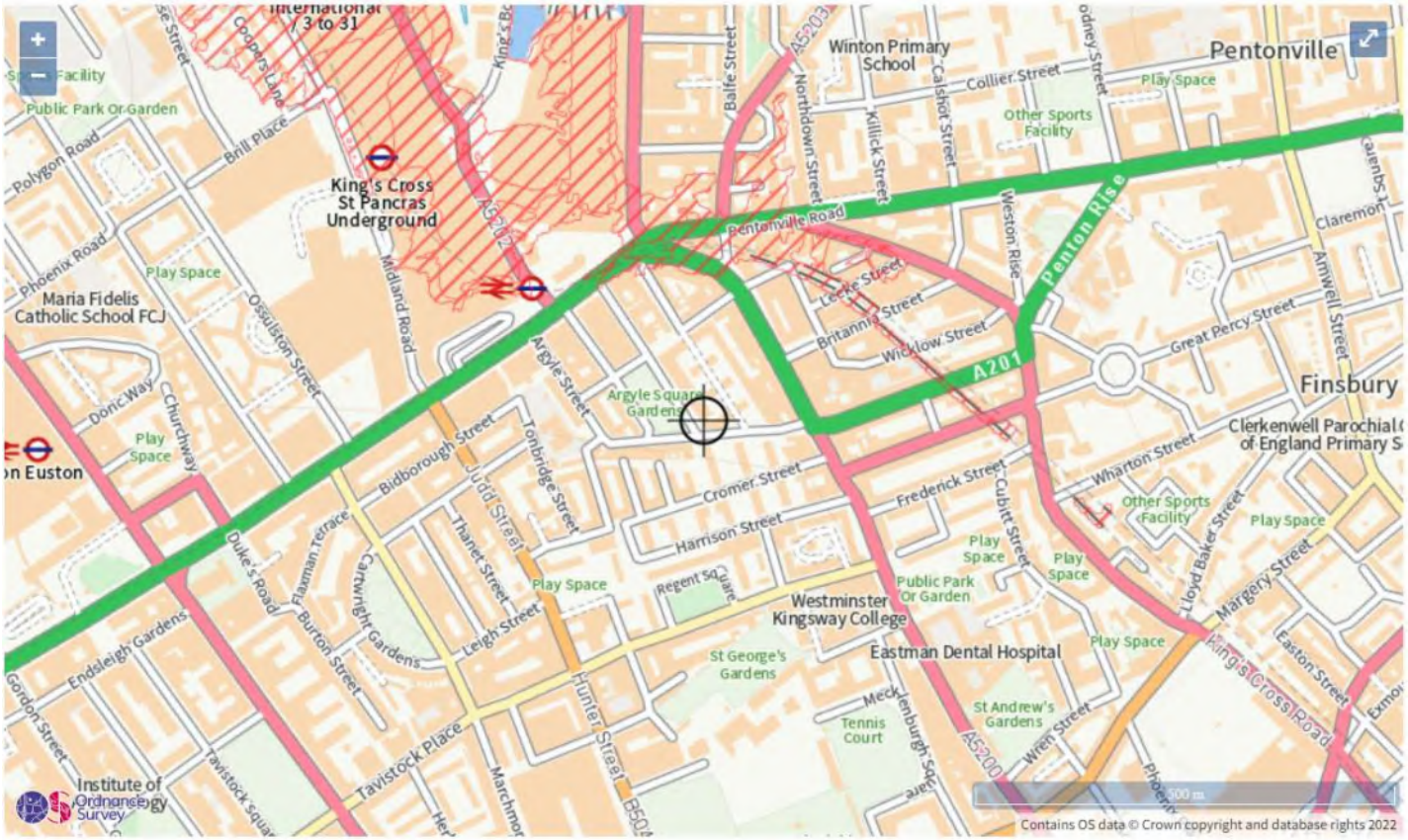
Figure 13 – EA, Flooding from Surface Water

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962



Maximum extent of flooding from reservoirs:

when river levels are normal | when there is also flooding from rivers | Location you selected

Figure 14 – EA, Flooding from Reservoirs

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

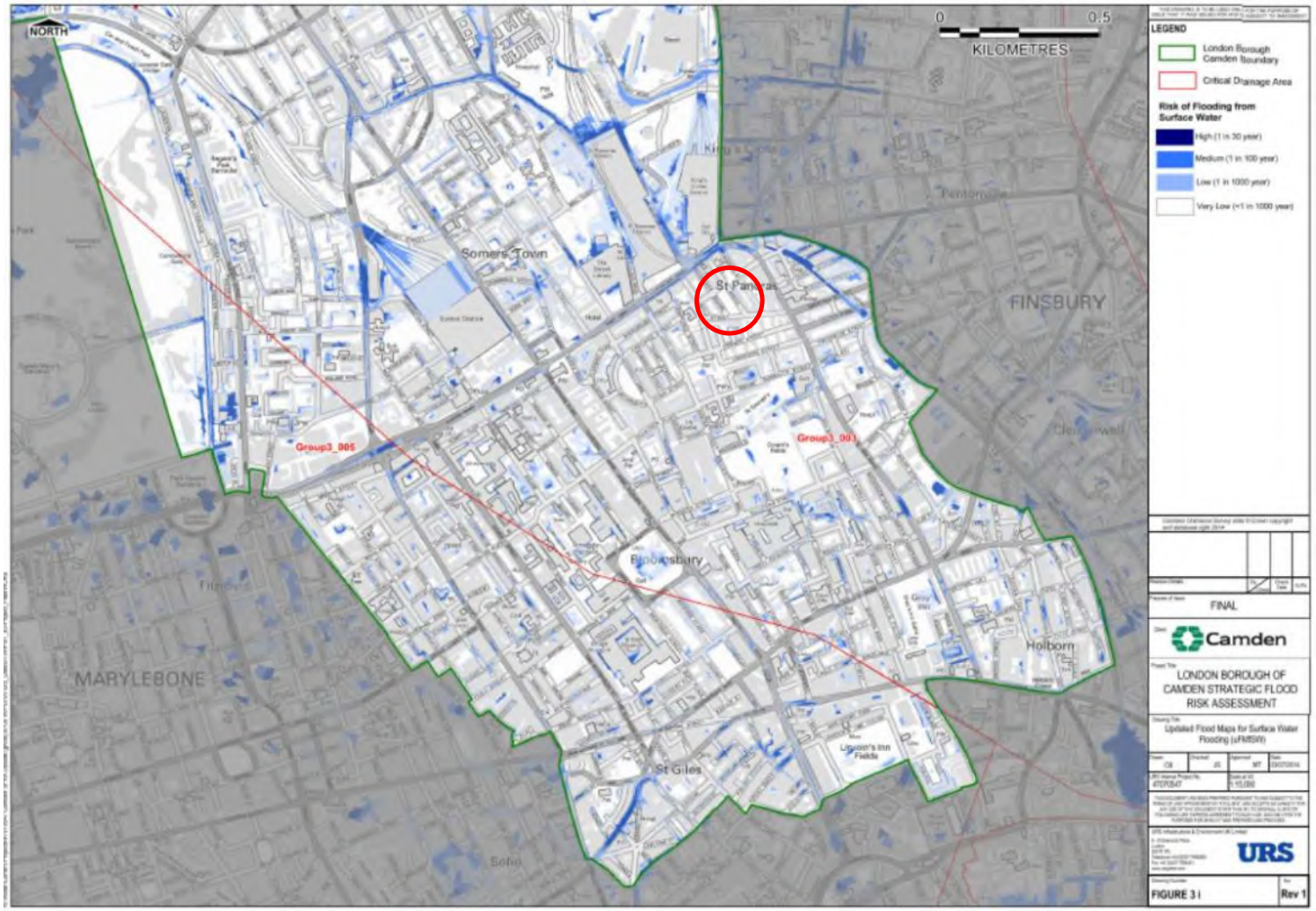


Figure 15 – SFRA, Flooding from Surface Water

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Approximate site location

N

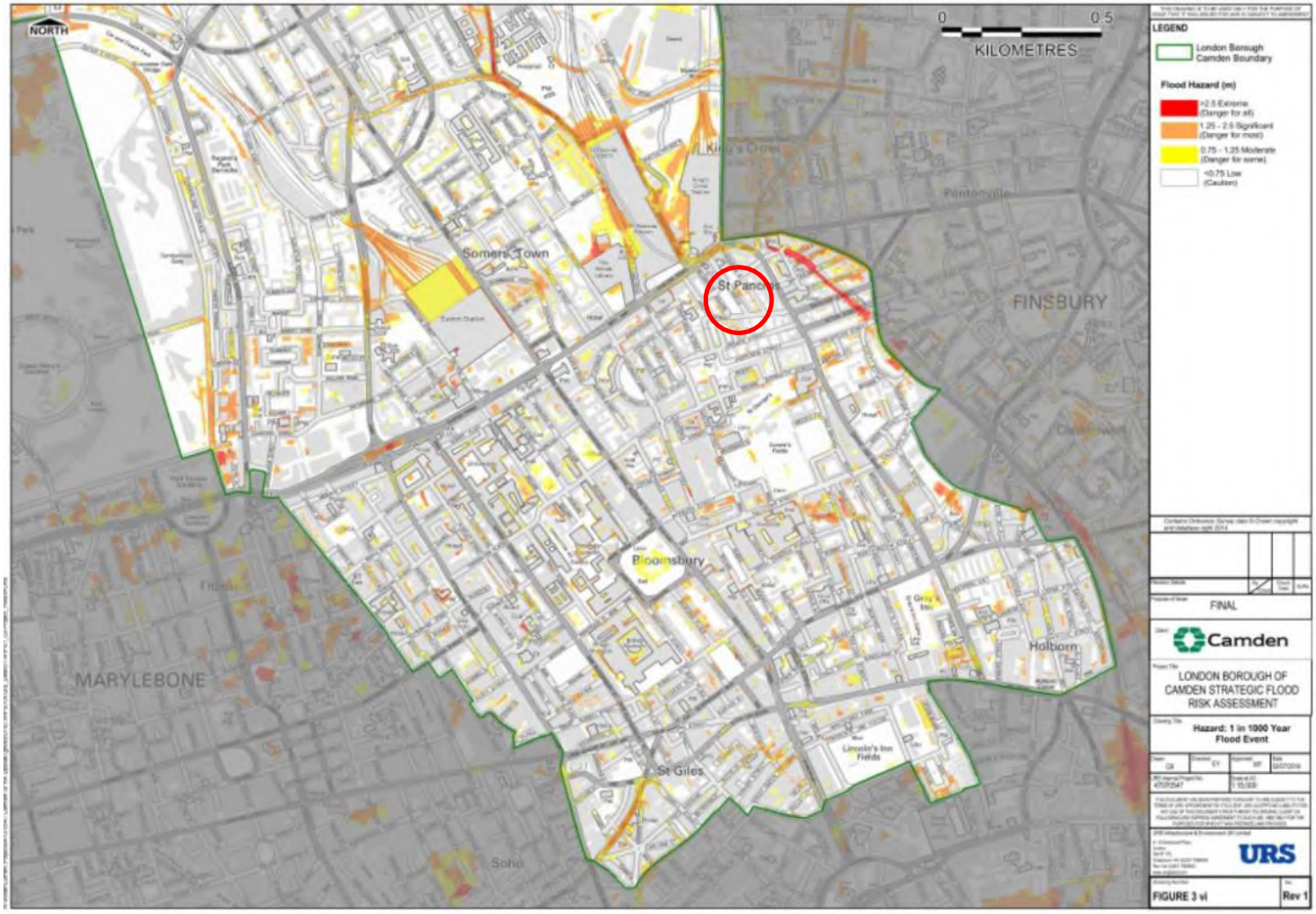


Figure 16 – SFRA, 1 in 1000 year Flood Event

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Approximate site location

N

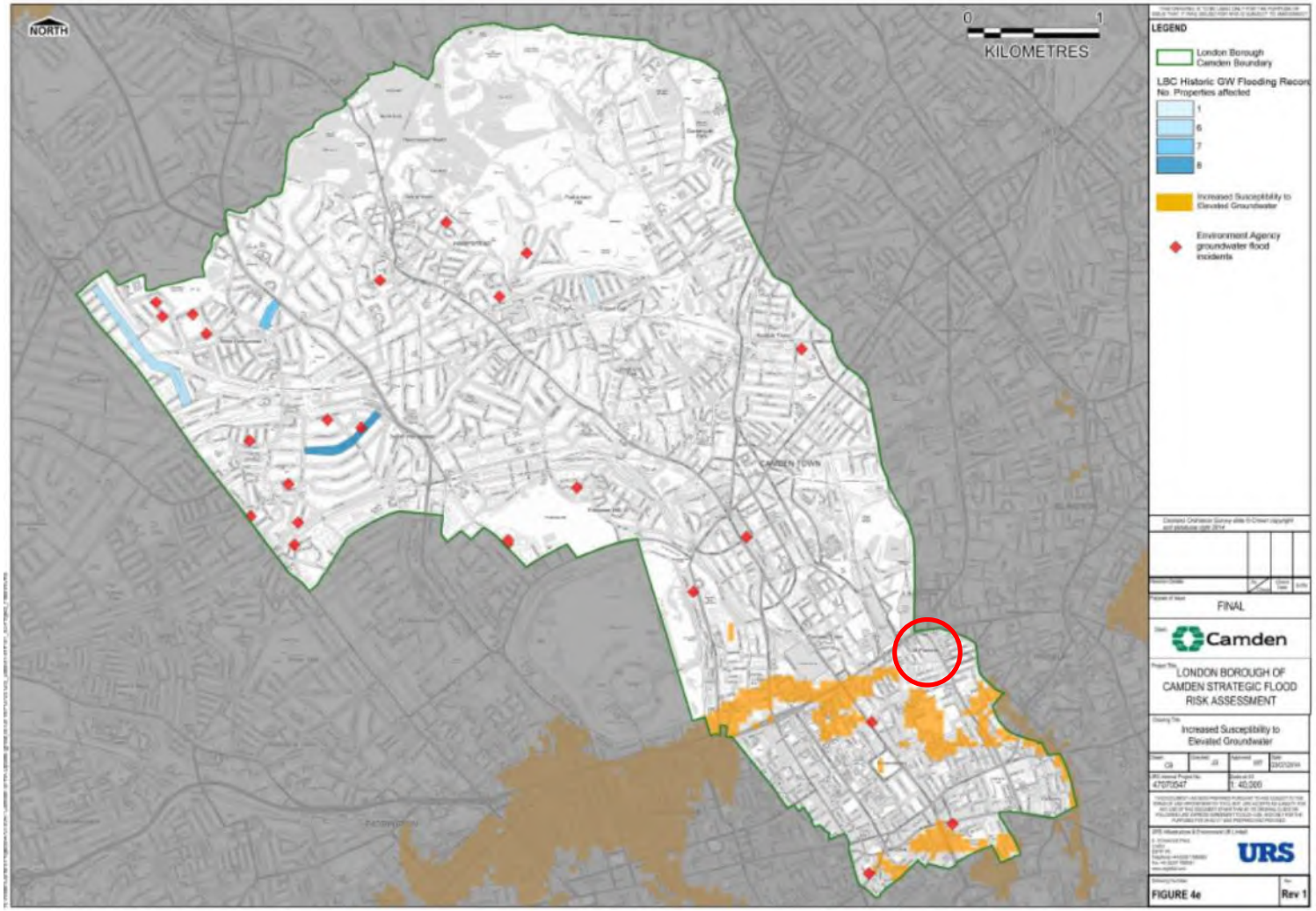


Figure 17 – SFRA, Susceptibility to Elevated Groundwater

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Approximate site location

N

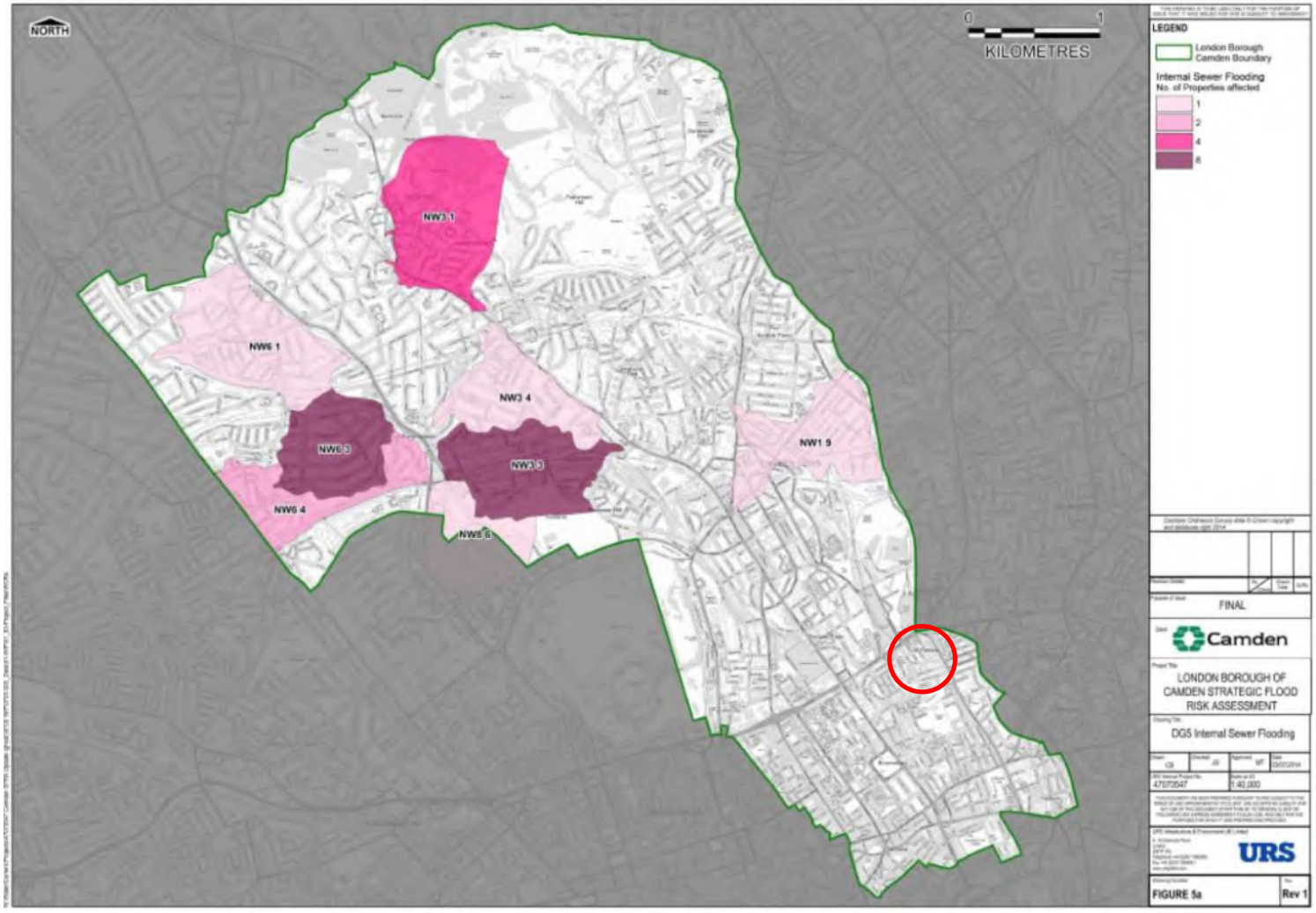


Figure 18 – SFRA, Internal Sewer Flooding

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Approximate site location

N

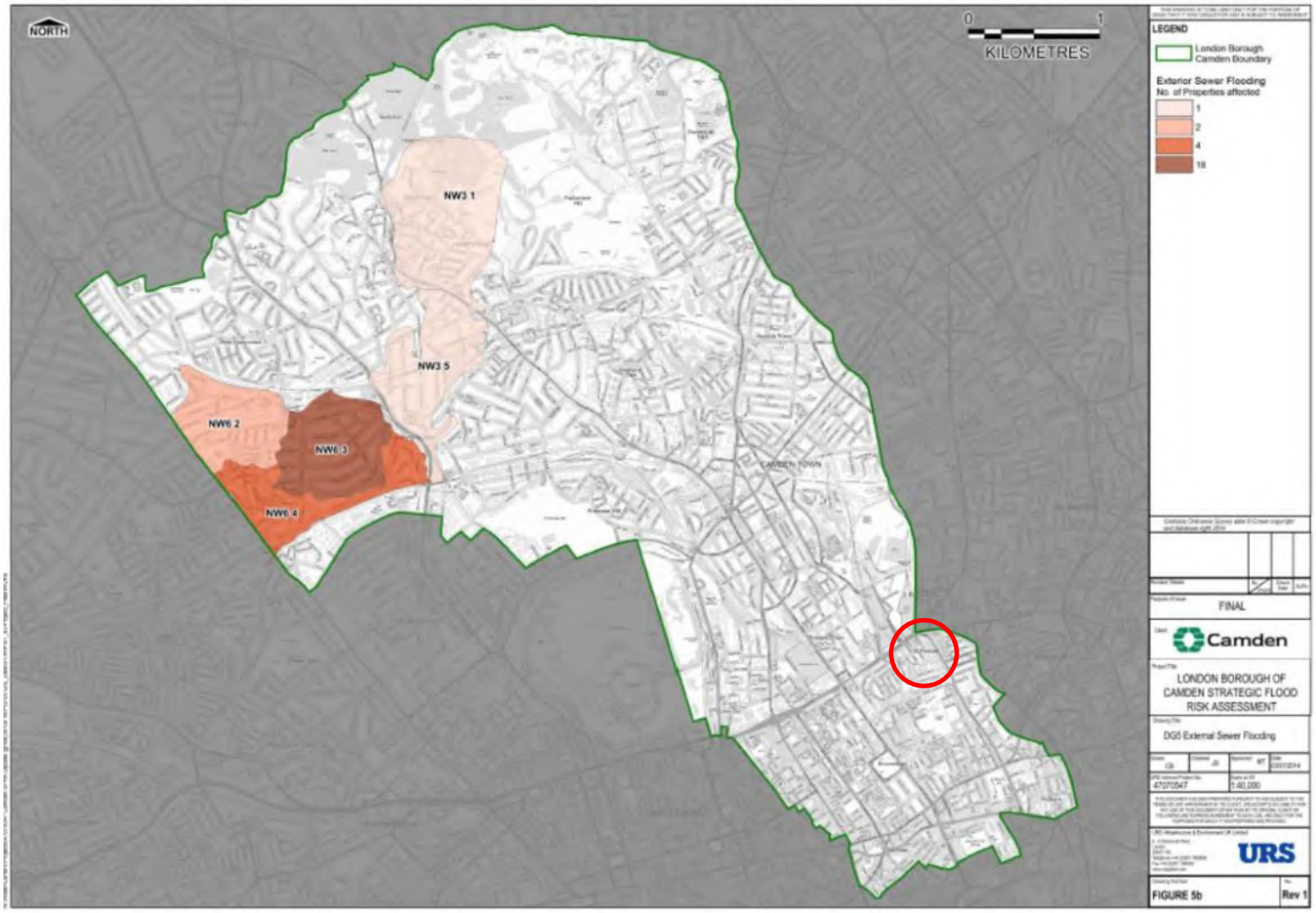


Figure 19 – SFRA, External Sewer Flooding

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Approximate site location

N

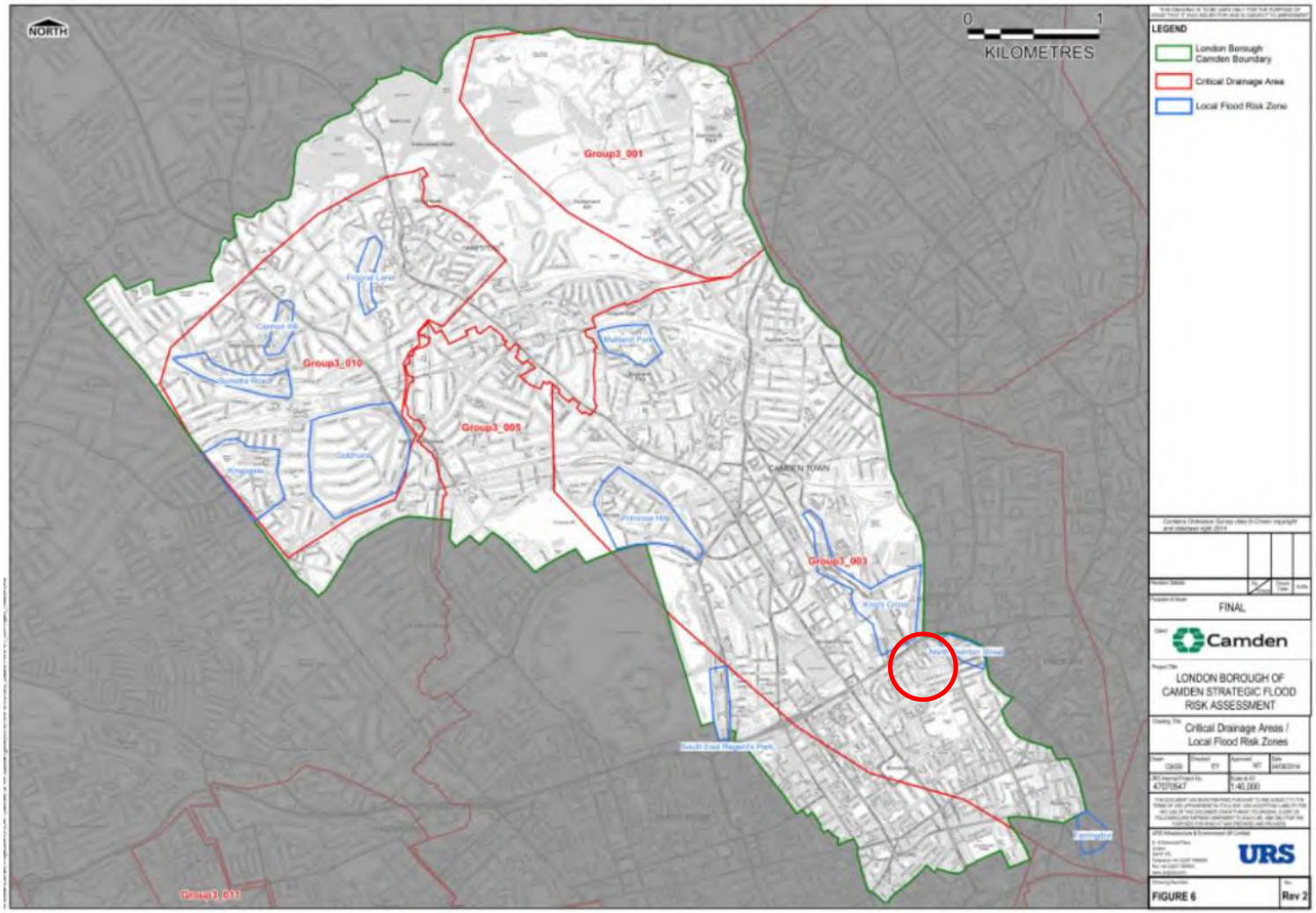


Figure 20 – SFRA, Critical Drainage Areas

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Approximate site location

N

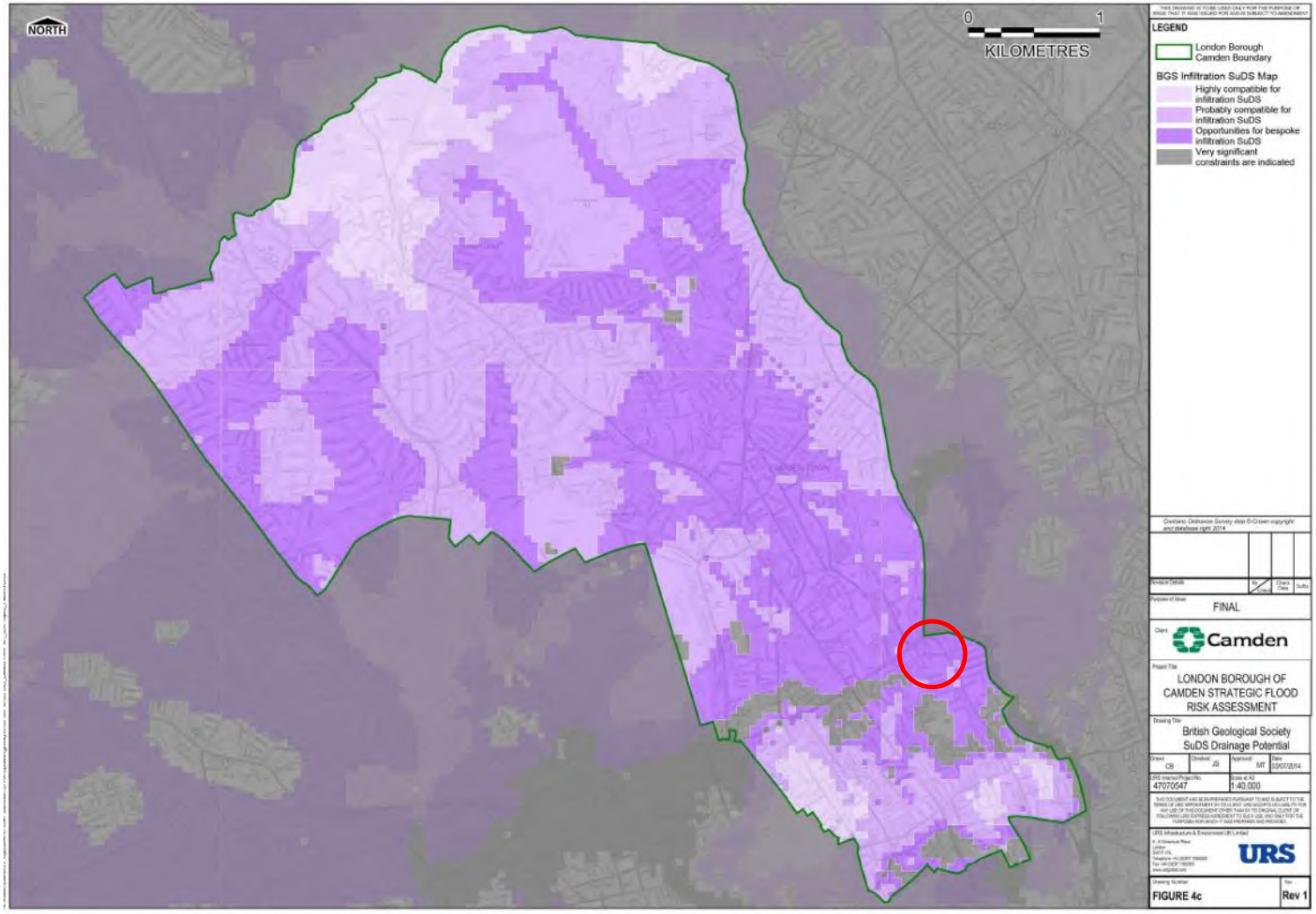


Figure 21 – SFRA, SuDS Drainage Potential

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Approximate site location

N

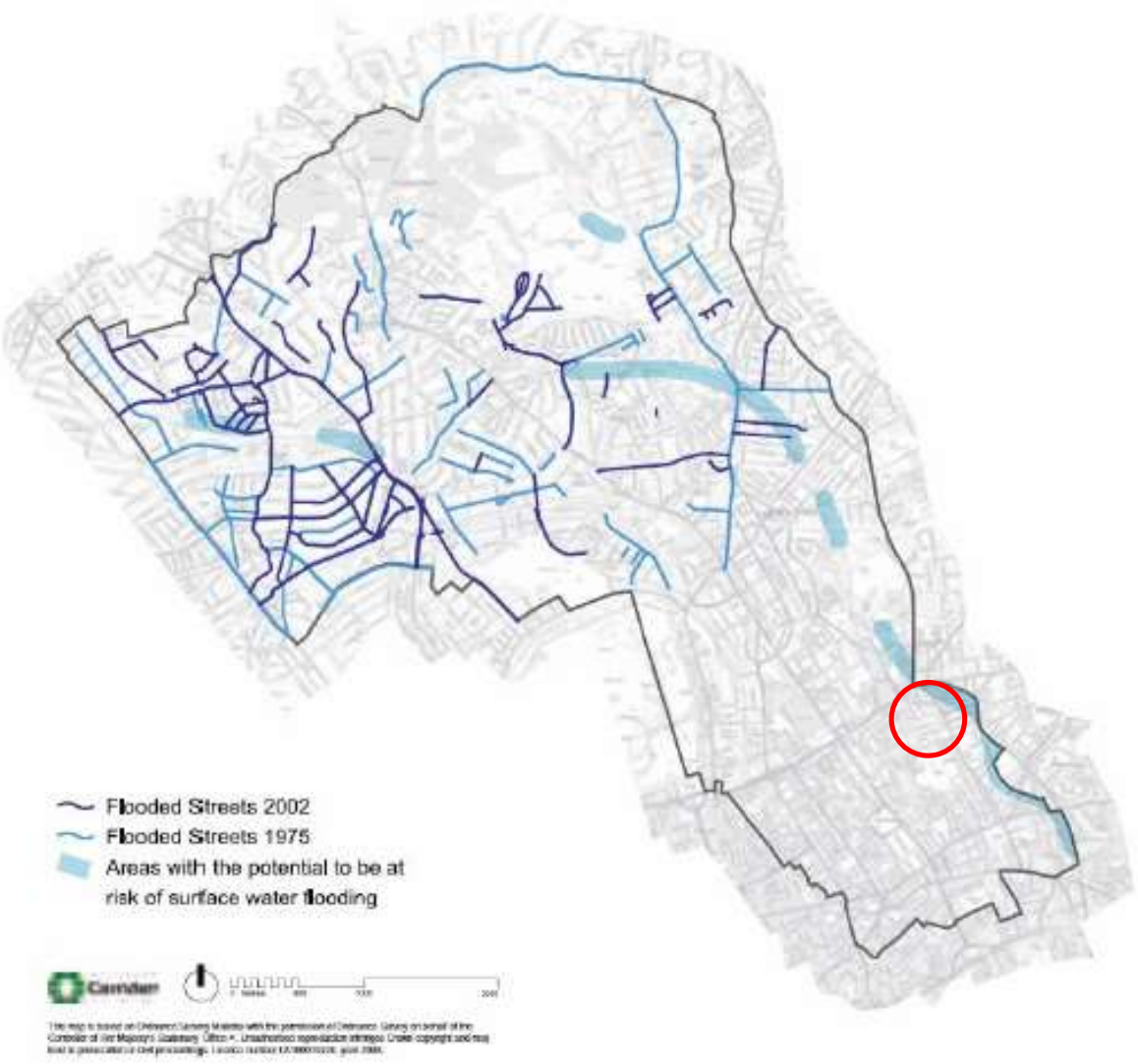


Figure 5 from Core Strategy, London Borough of Camden

Figure 22 – GHHS, Historic Flooding Events

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Approximate site location

N

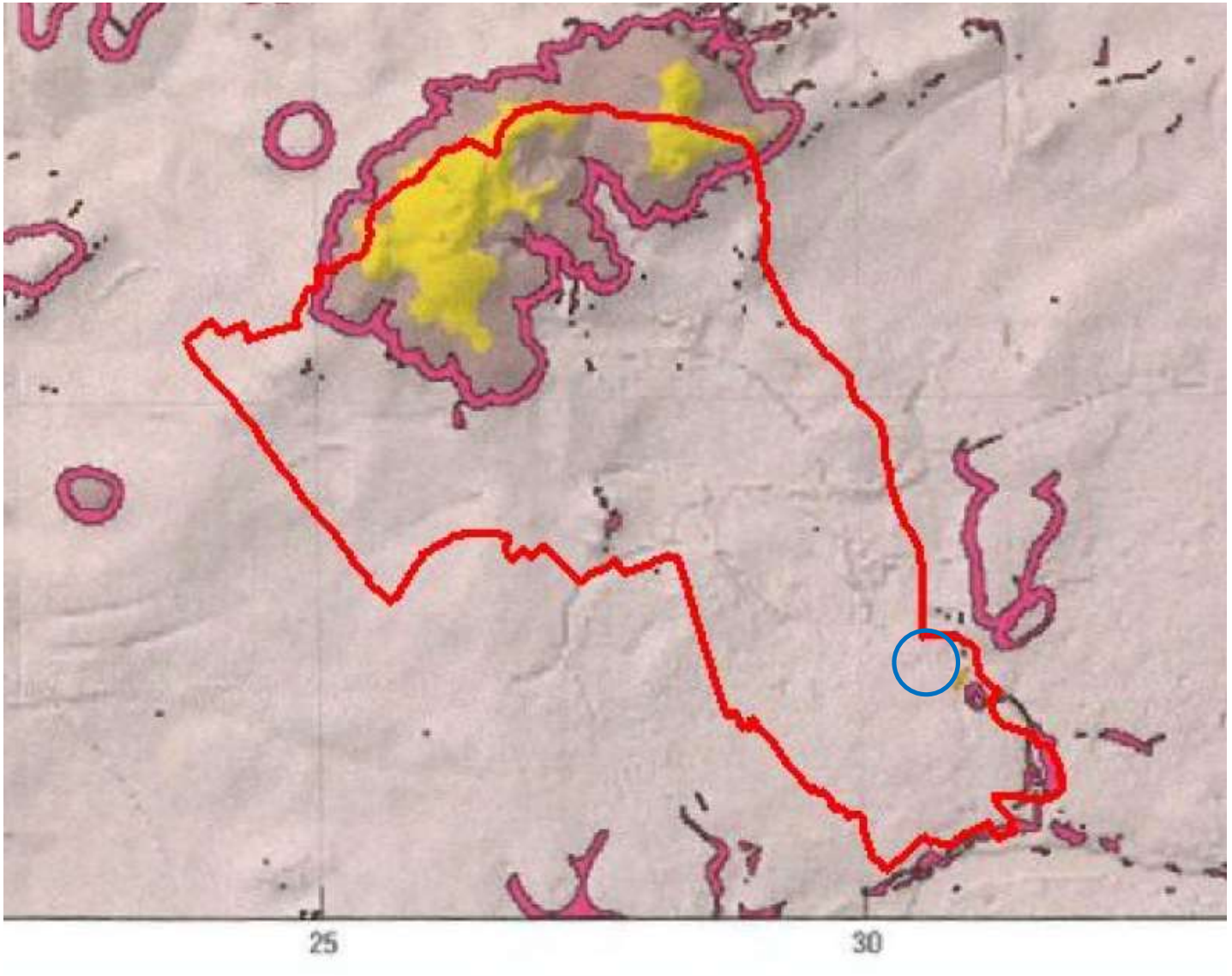


Figure 23 – GHHS, Slope Stability

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Approximate site location

N

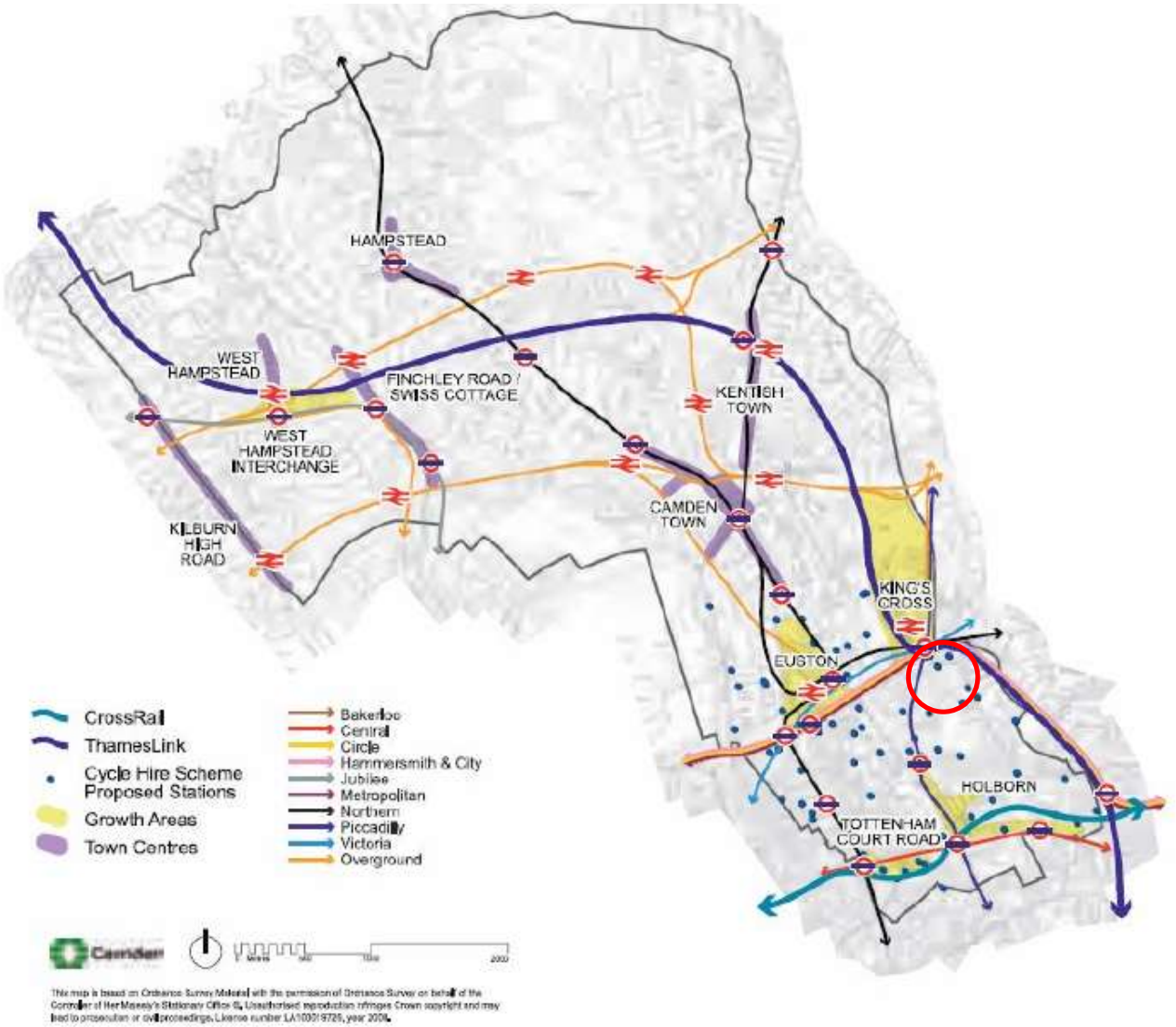
Figure 24 – TFL, Underground Infrastructures

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962



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

Figure 25 – GHHS, Underground Infrastructures

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Approximate site location

N

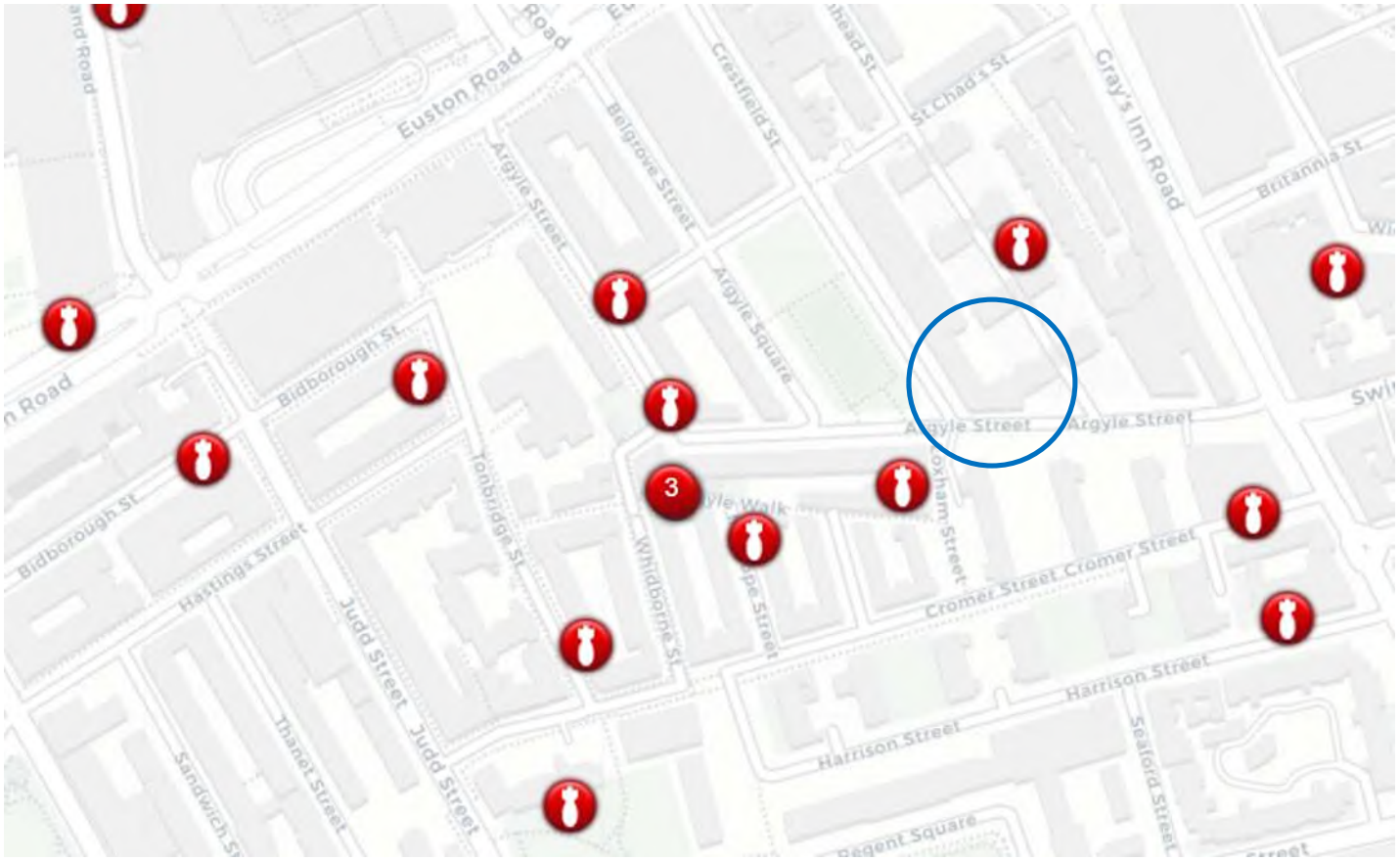


Figure 26 – Bombsight, UXO Risk Map

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Approximate site location

N

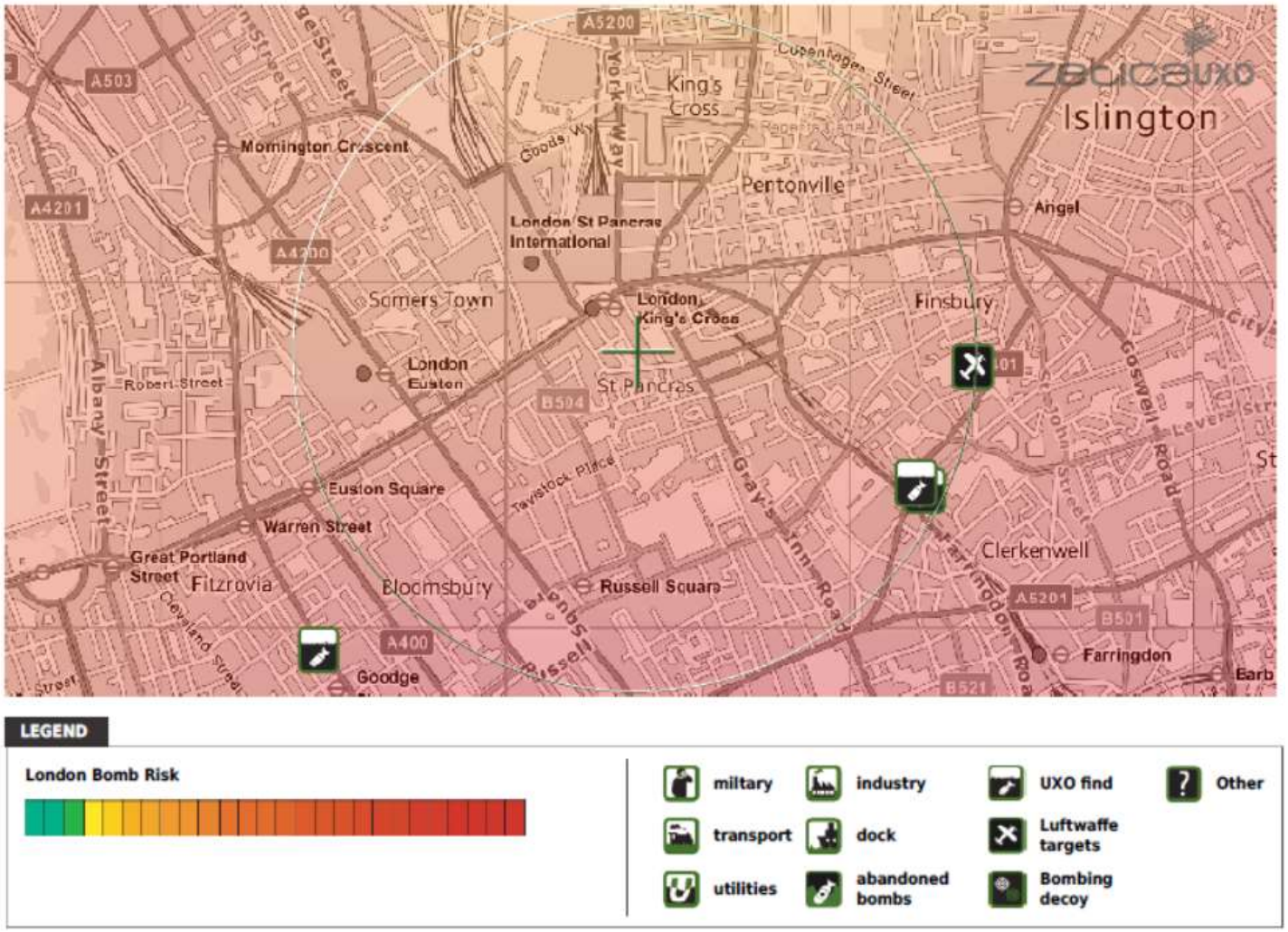


Figure 27 – Zetica UXO, UXO Risk Map

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

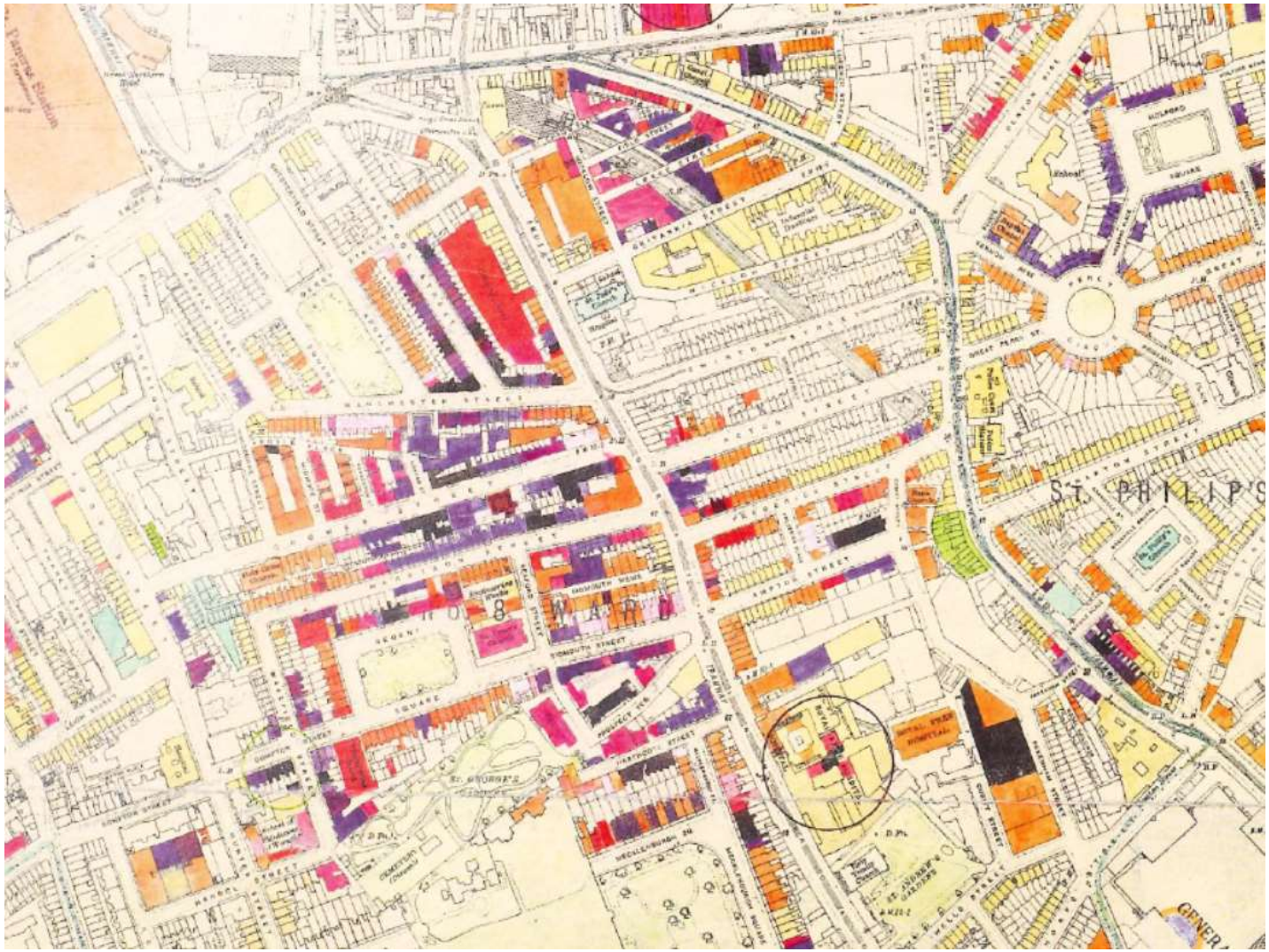


Figure 28 – LCC Bomb Damage Maps 1939-1945

Project
23-25 Argyle Square, Camden, London WC1H 8AS

Client
CSE Consulting Ltd

Date
February 2022

Job Number
19962

Appendix A Information Provided by the Client

Design and Access Statement for 23-25 Argyle Square WC1H 8AS

Date: April 2021

INTRODUCTION:

This document is a supporting statement to the planning application being submitted for the
reinstatement of the original sash windows on the front elevation, a new basement and an additional ground floor rear extension containing 6 new hotel guest rooms.

ACCSES STATEMENT:

Currently the main frontage is accessed and approached via a pavement off Argyle Square.

STATEMENT OF INTENT

We intend to comply with all current regulations and good practice. The physical limitations of the building impose some constraints, however it is our intention to make the scheme as accessible as possible in line with local planning policy and the requirements of the Disability Discrimination Act (DDA).

We have taken advice from our Approved Inspector, Butlers and Young Ltd and used as our main source of reference the standards in the Approved Document Part M in so far as it is relevant. In addition, we have referred to the Disability Rights Commission (DRC) web site.

Consultation

No detailed consultation has been used since we have no established client base. However, once established we intend to gauge feedback from the hotel customers in the form of a questionnaire.

Specific Access Issues

ISSUE	RELEVANT LEGISLATION	Management
Entrance: A)No new steps are proposed at the entrance to the communal corridor and stair All retained as existing	A) Planning and Building Regulations	A) Planning and Build Regs
B) No new communal door is proposed, doors to proposed rooms	B) Planning and Building Regulations	B) Build Regs and management
Evacuation: Evacuation by occupiers via entrance door as existing	Building Regulations Fire Regulations and DDA	Building Regulations and management
Communal Corridor: Existing communal stair may be upgraded but may not be able to be reconfigured in the dimensions compliant with the Part M	Building Regulations and DDA	Building Regulations and management

DESIGN STATEMENT:

Urban Context:

The proposed site situates in the Conservation Area of Bloomsbury. The notable public garden, Argyle Square, is in front of the building and the 7-storey housing blocks are behind. The premises is a Grade 2 Listed building. The entire front elevation of the block is intact and is representative of a Georgian square town house facade. The character of this particular context is that whilst the premises and surrounding area is in a Conservation area, the building frontage retainsan important architectural and historic value however there is no such significant value found at the rear extension of the premises, which are much later additions.

Arial view of the proposed site in the context

DESIGN STATEMENT:

Proposal:

1. Front elevation:

The existing front elevation windows have been replaced with casement windows on the basement, ground and first floor.
We are proposing to replace all existing casement windows on the basement, ground and first floor in a style to match the sash windows at No.16 to No.22 Argyle Square.
This will enhance the street scene, the heritage value can be appreciated and enjoyed.

Exiting No.16 to No.22 Argyle Square sash windows

No.16 to No.22 Argyle Square appear to be the only houses which have traditional sash windows in the style of the original design on this side of the square.

2. Rear extension

No.19-22 Argyle Square was granted permission for their first floor rear extension by removing these original first floor rear windows from the parent buildings in 2004.

In total, 9 properties along this block had their first floor rear extension granted and executed despite the host buildings losing the original rear Grade 2 listed building windows.

Despite this fact, that there are a number of houses granted new first floor rear extensions, we are not proposing to obtain the same first floor extension along the rear of the proposed properties.

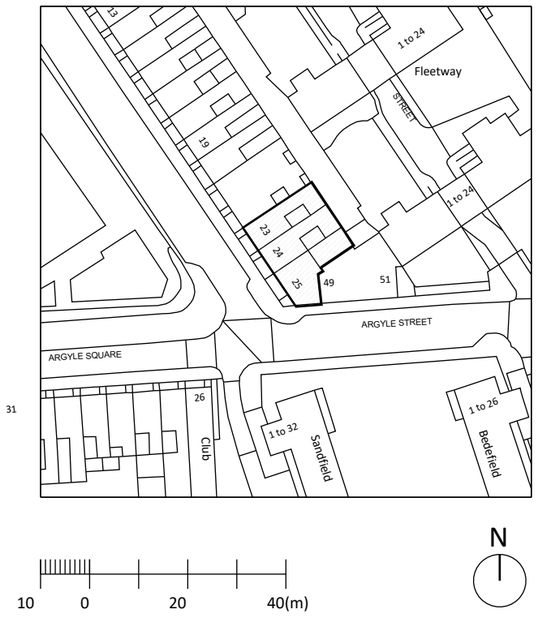
Instead our current proposal retains a profile similar to the existing rear extension but extends the width on the ground floor and basement for No.23 and No.24 and Creates a new ground and basement extension on No.25 Argyle Square. This is so our proposal can appreciate and respect the Grade 2 listed host building. All materials match what already exists in the site surroundings so that our proposal is well integrated to the existing surrounding.

The entirety of the newly extended flat roof will be covered with an extensive green roof in order to reduce a heat island effect in this dense urban setting. In addition, a newly formed courtyard between No.24 and No.25 offers green amenity areas to the guests.

Conclusion:

Our proposal provides additional bedrooms and increases the floor area by about 77 sqm over three properties (No.23 to No.25) however, this increase is minimal and the impact to the properties surroundings is not significant.

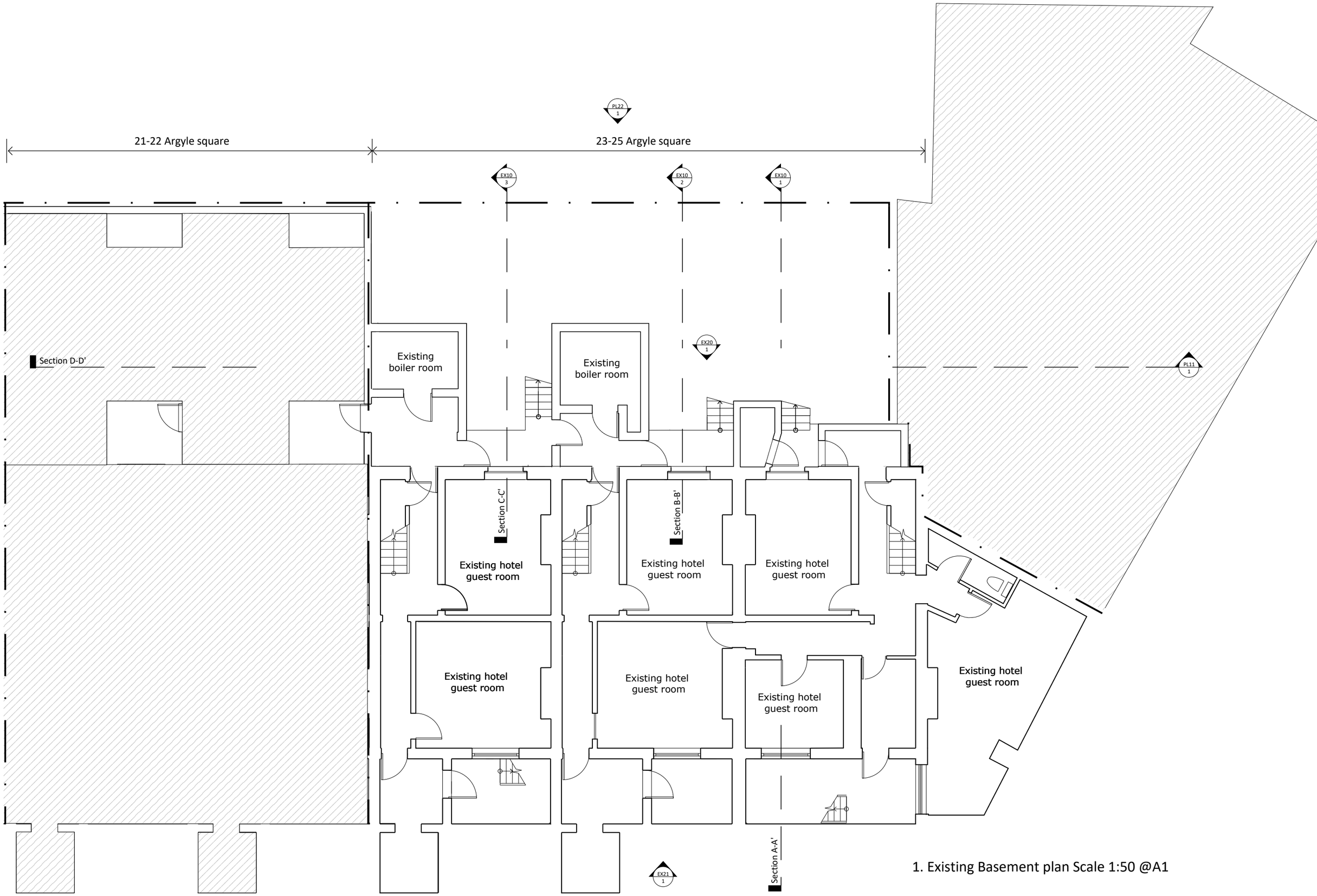
Our proposal respects the Grade 2 listed buildings and context by not removing any of the original elements or features. Instead it brings back the front sash windows to the original style of a Georgian town square facade, which contributes significantly to the listed buildings on the street and will enhance the Conservation Area.



1. Location plan scale 1:1250 @A3

2. View from 26 Argyle square

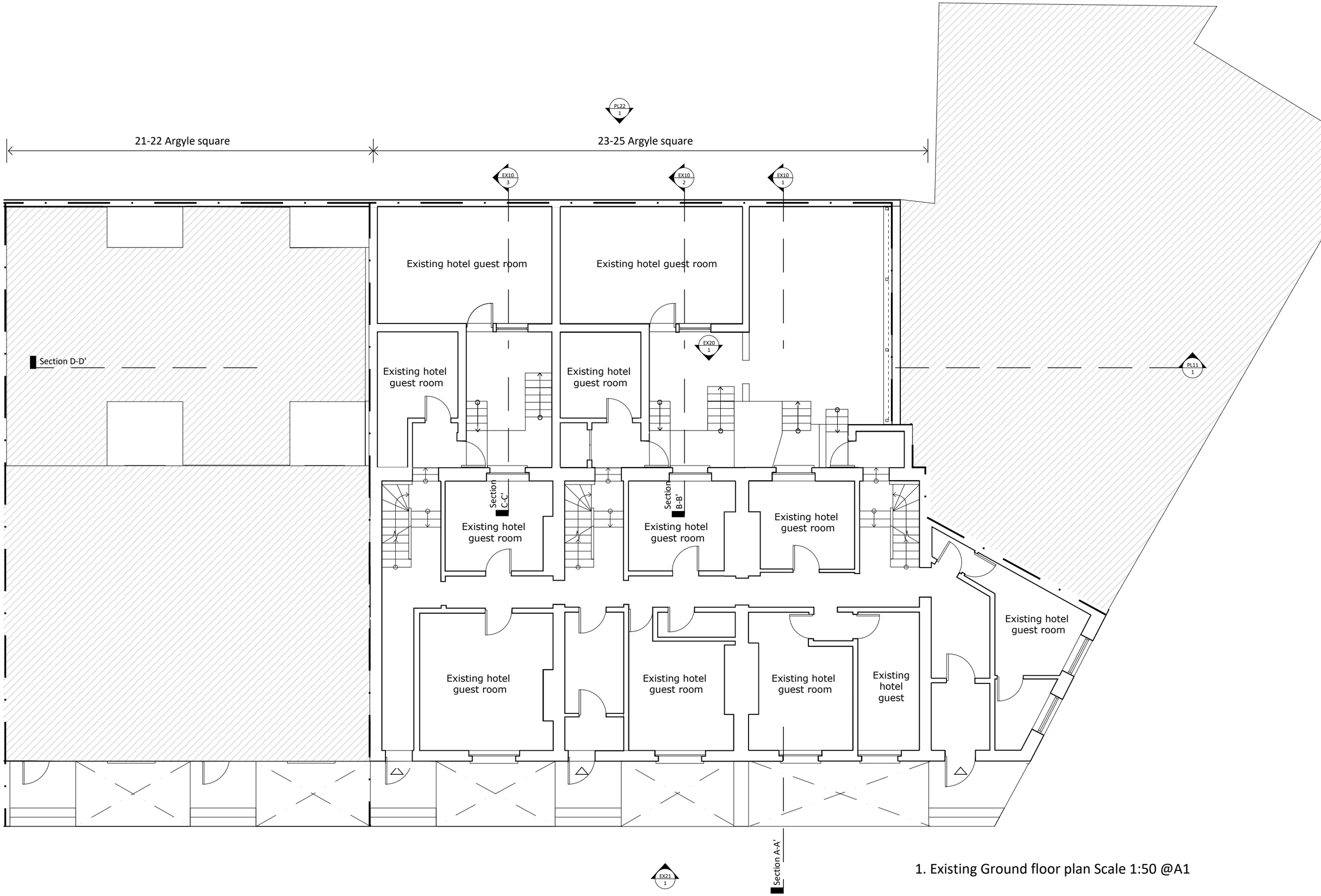
tsuruta_architects	Project 23-25 Argyle Square, WC1H 8AS	Drawing title Location plan	Date Apr. 2021	Drawing No. LO00	Rev. -



1. Existing Basement plan Scale 1:50 @A1

tsuruta_architects

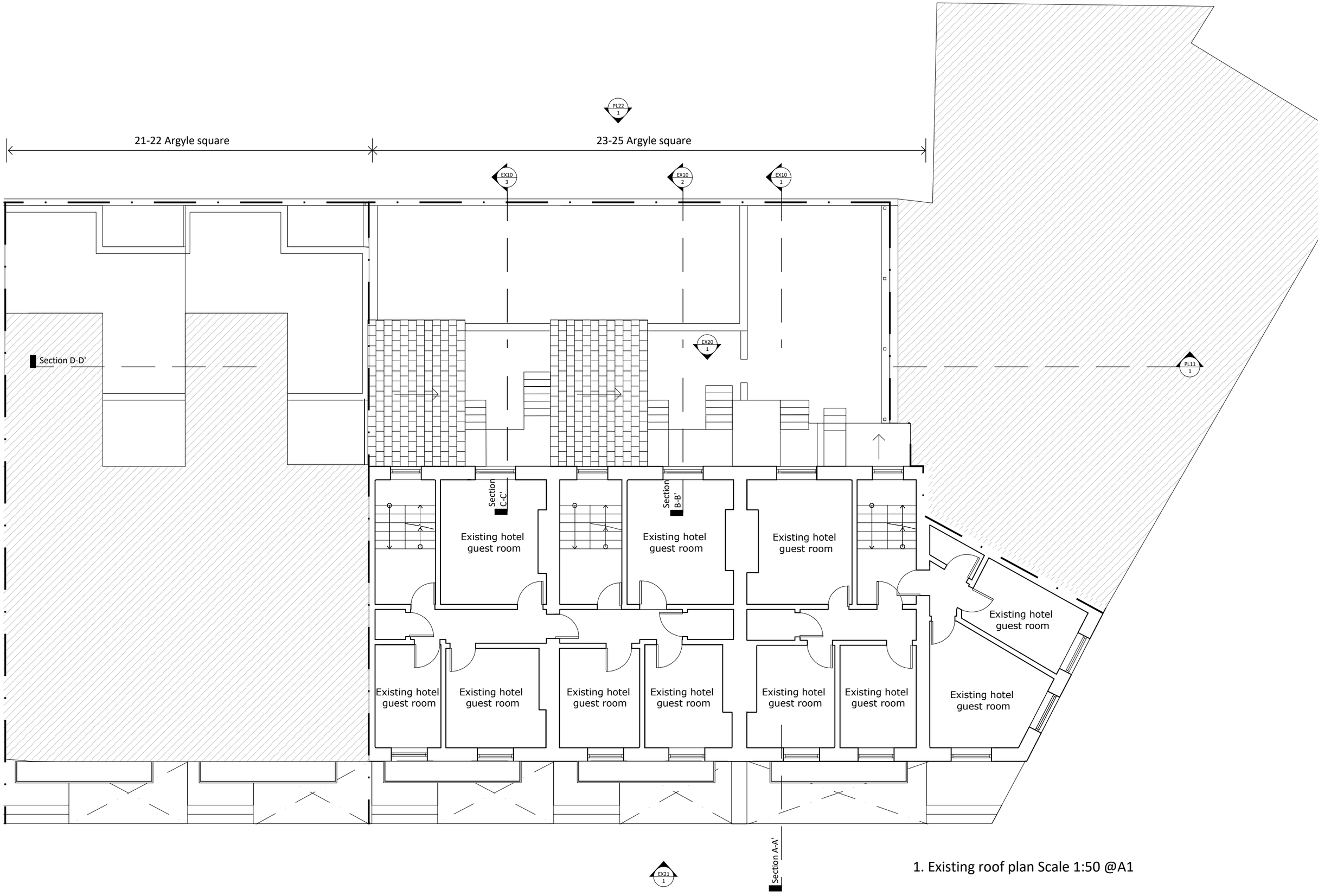
Project	Drawing title	Date	Drawing No.	Rev.
23-25 Argyle Square, WC1H 8AS	Existing basement plan	Apr. 2021	EX00	-



1. Existing Ground floor plan Scale 1:50 @A1

tsuruta_architects

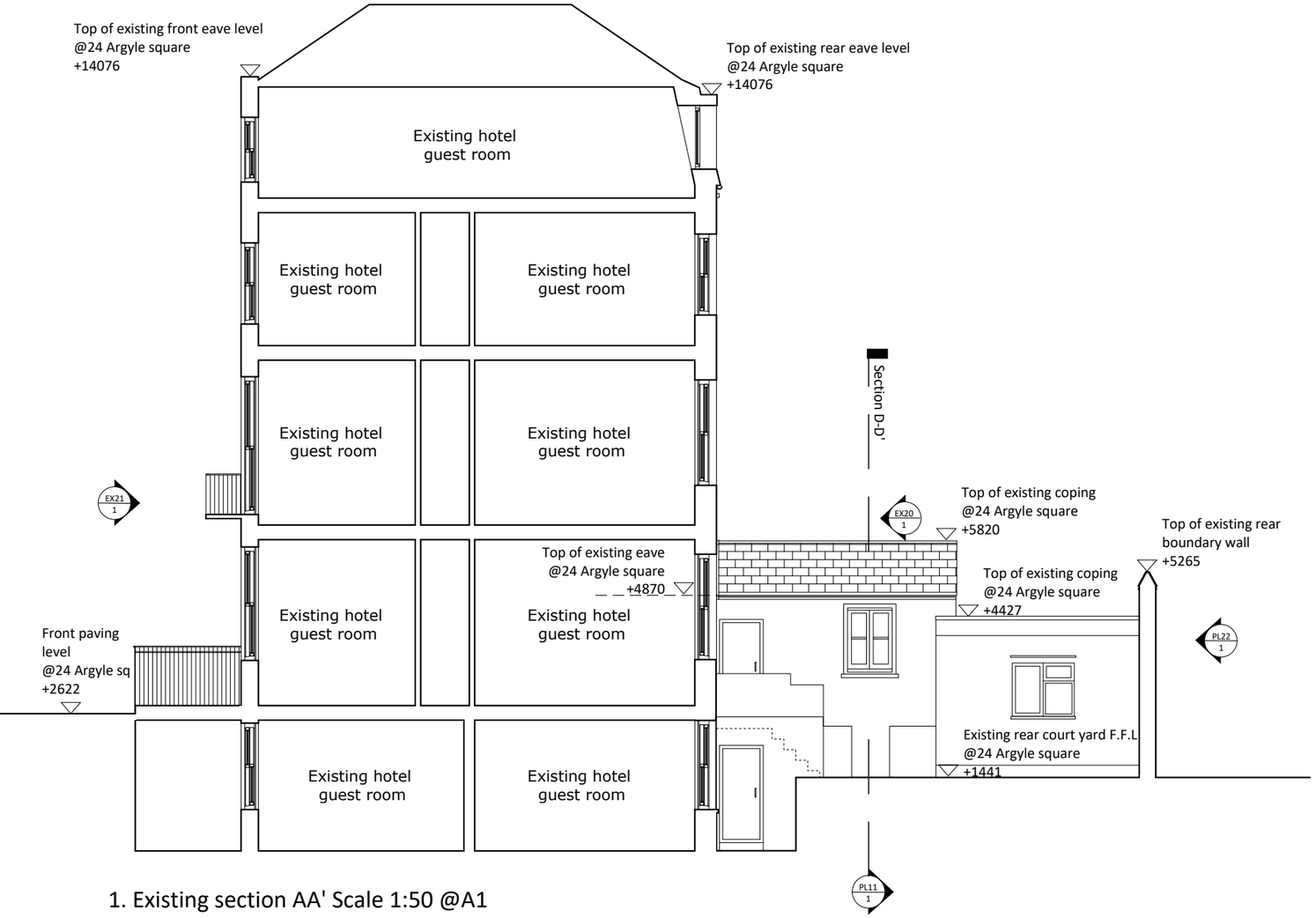
Project	Drawing title	Date	Drawing No.	Rev.
23-25 Argyle Square, WC1H 8AS	Existing Ground floor plan	Apr. 2021	EX01	-



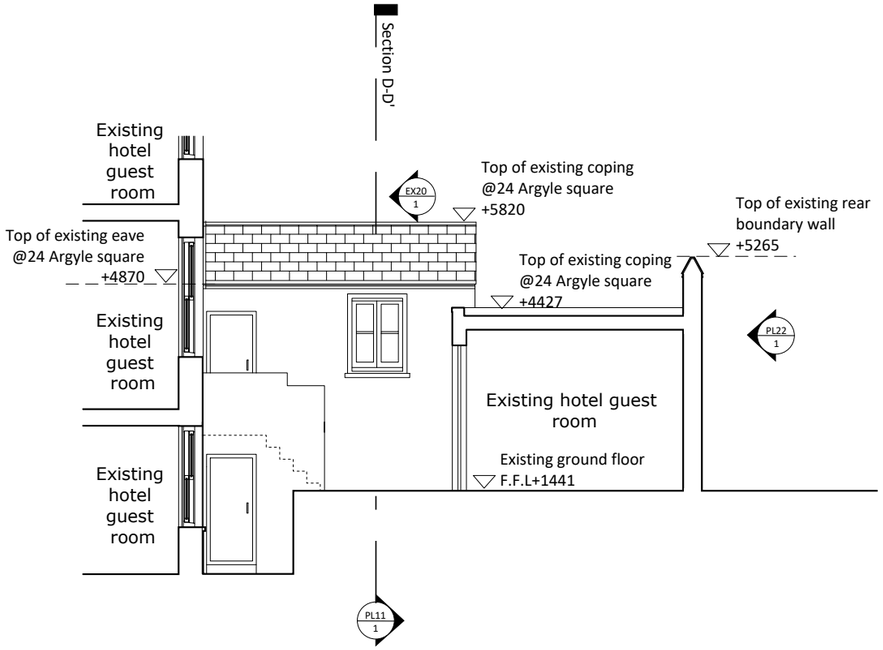
1. Existing roof plan Scale 1:50 @A1

tsuruta_architects

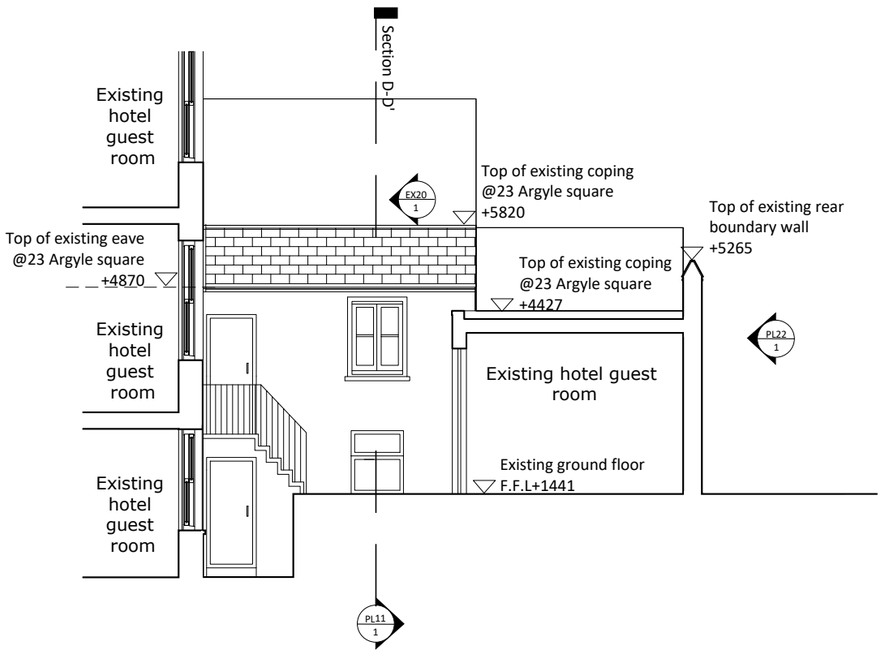
Project	Drawing title	Date	Drawing No.	Rev.
23-25 Argyle Square, WC1H 8AS	Existing roof plan	Apr. 2021	EX02	-



1. Existing section AA' Scale 1:50 @A1



2. Existing section BB' Scale 1:50 @A1



3. Existing section CC' Scale 1:50 @A1

tsuruta_architects

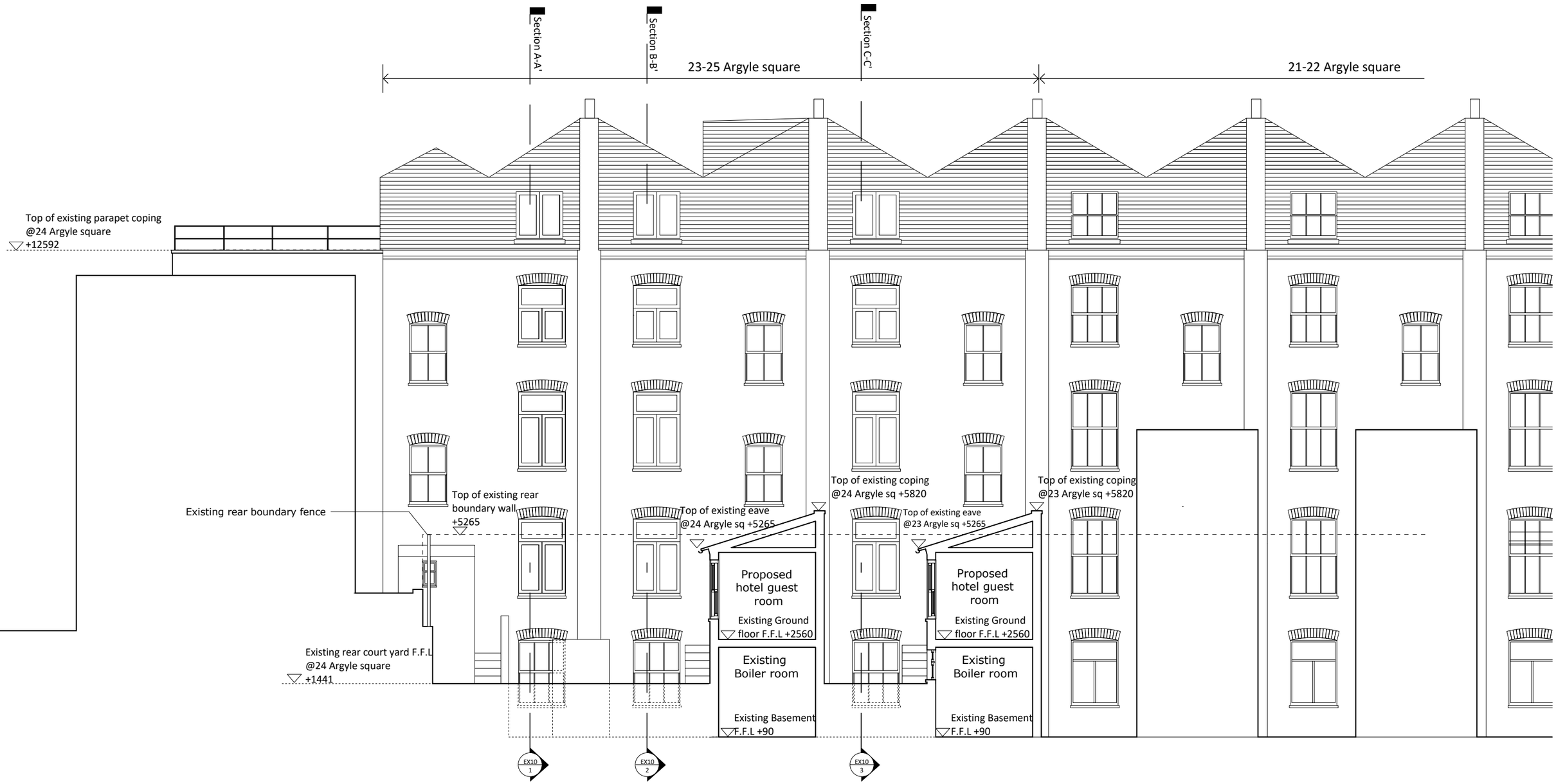
Project
23-25 Argyle Square, WC1H 8AS

Drawing title
Existing sections

Date
Apr. 2021

Drawing No.
EX10

Rev.
-

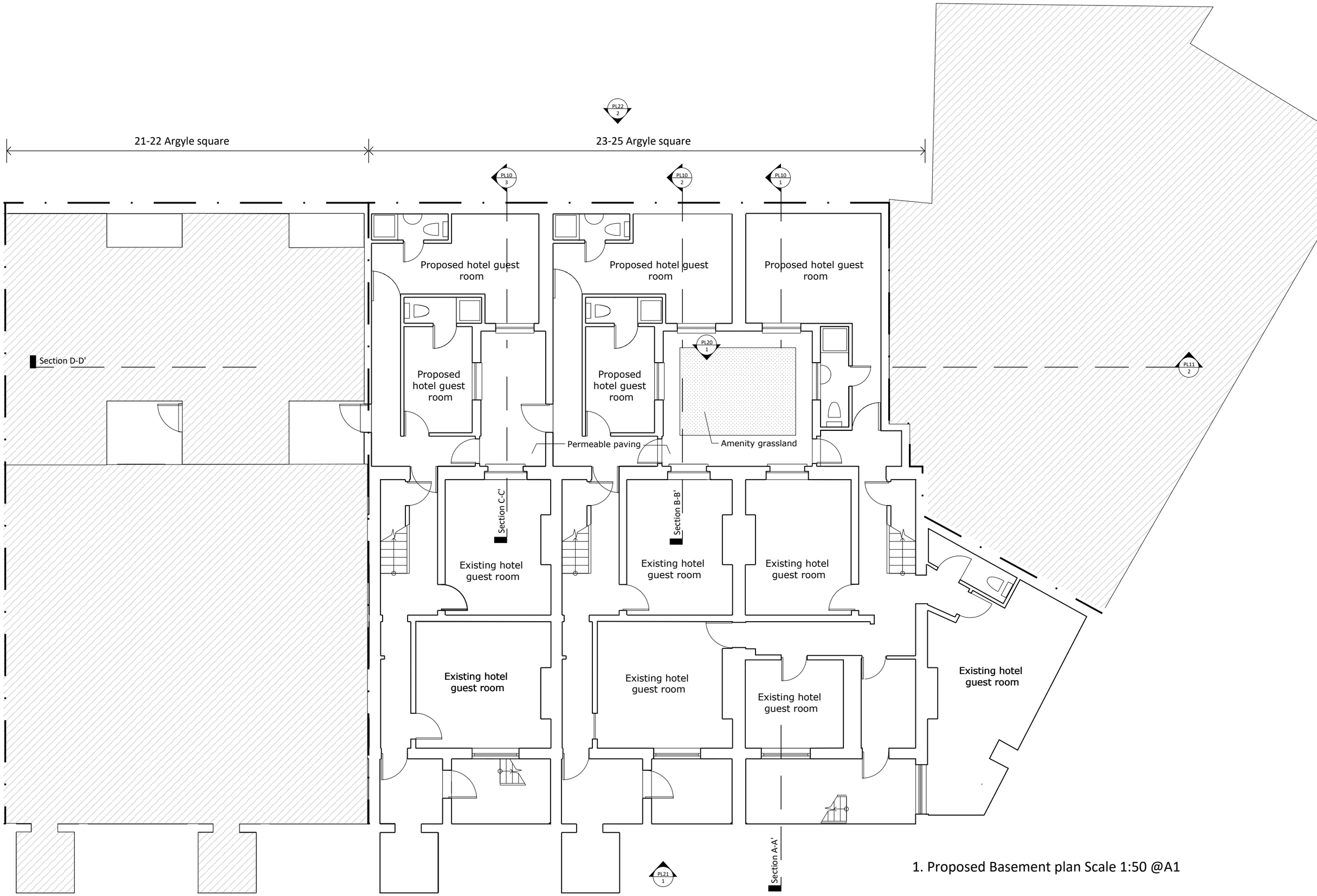


1. Existing section &parent building rear elevation
Scale 1:50 @A1

tsuruta_architects	Project 23-25 Argyle Square, WC1H 8AS	Drawing title Existing section &parent building rear elevation	Date Apr. 2021	Drawing No. EX20	Rev. -

1. Existing Front elevation Scale 1:50 @A1

tsuruta_architects	Project 23-25 Argyle Square, WC1H 8AS	Drawing title Existing front elevation	Date Apr. 2021	Drawing No. EX21	Rev. -



1. Proposed Basement plan Scale 1:50 @A1

tsuruta_architects

Project	Drawing title	Date	Drawing No.	Rev.
23-25 Argyle Square, WC1H 8AS	Proposed basement plan	Apr. 2021	PL00	-

21-22 Argyle square

23-25 Argyle square

PL22 2

PL10 3

PL10 2

PL10 1

PL20 1

PL11 2

Section D-D'

Proposed hotel guest room

Proposed hotel guest room

Proposed hotel guest room

Proposed hotel guest room

Proposed hotel guest room

Section C-C'

Section B-B'

Existing hotel guest room

Existing hotel guest room

Existing hotel guest room

Existing hotel guest room

Existing hotel guest room

Existing hotel guest room

Existing hotel guest room

Existing hotel guest

Existing hotel guest room

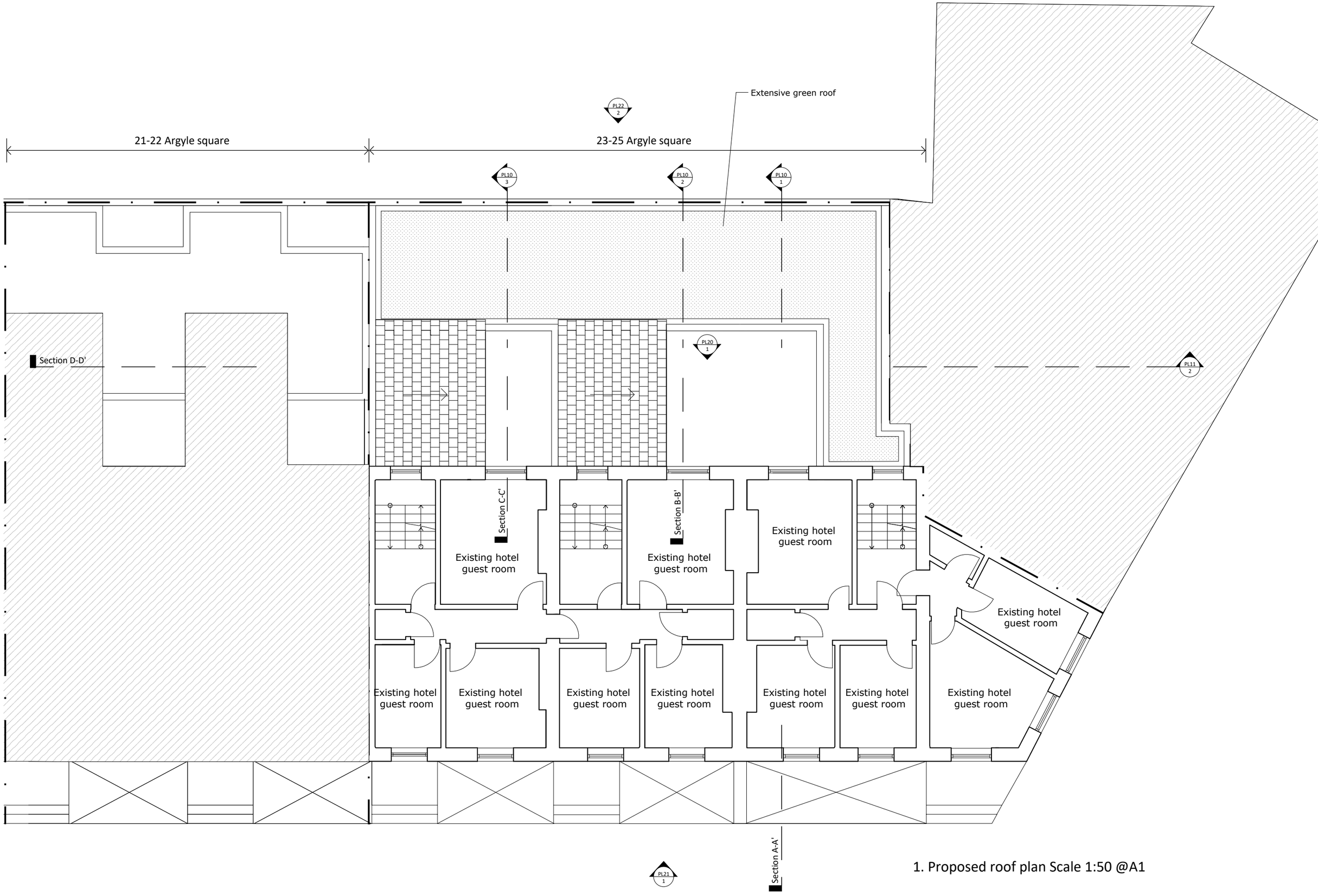
Section A-A'

PL21 1

1. Proposed Ground floor plan Scale 1:50 @A1

tsuruta_architects

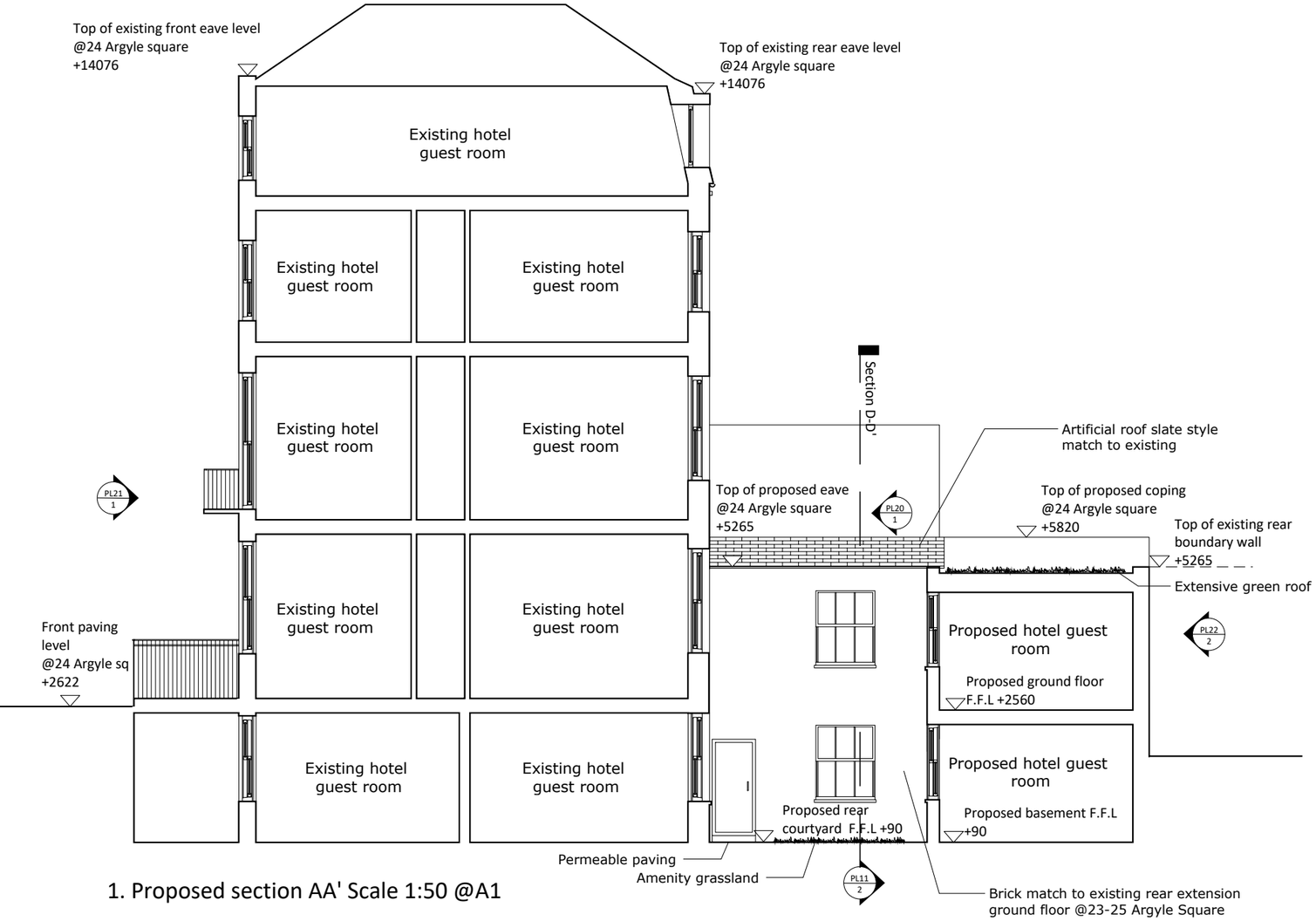
Project	Drawing title	Date	Drawing No.	Rev.
23-25 Argyle Square, WC1H 8AS	Proposed Ground floor plan	Apr. 2021	PL01	-



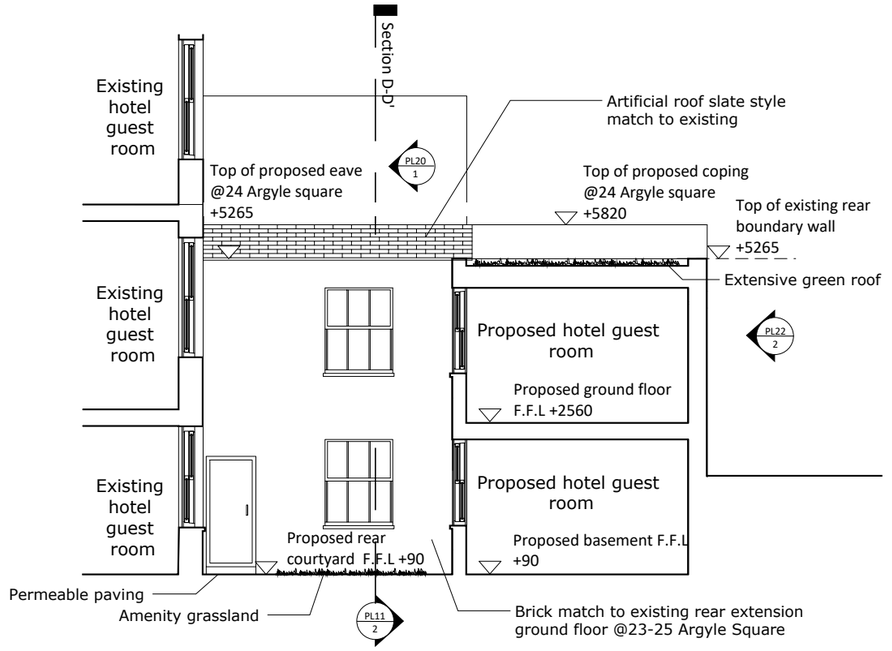
1. Proposed roof plan Scale 1:50 @A1

tsuruta_architects

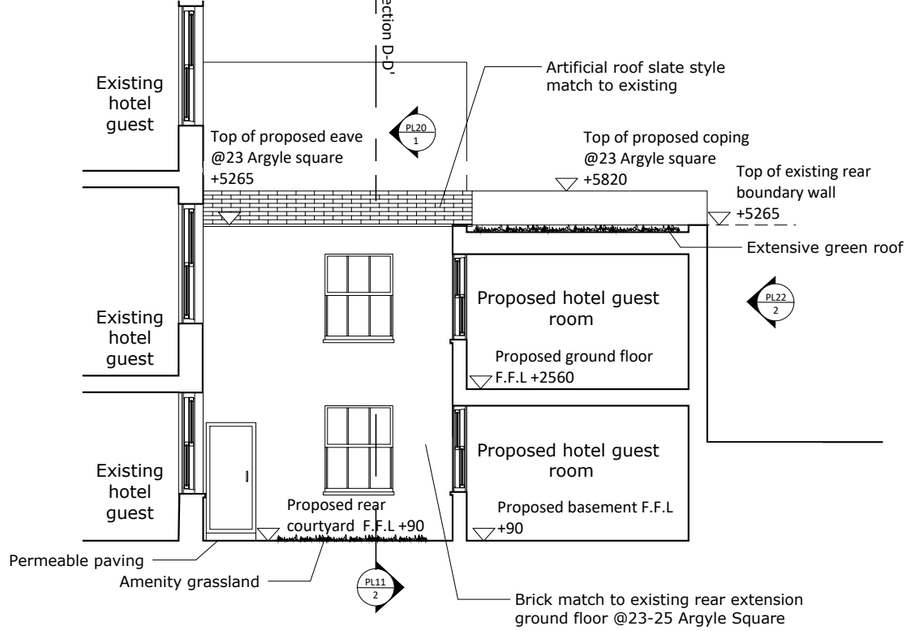
Project	Drawing title	Date	Drawing No.	Rev.
23-25 Argyle Square, WC1H 8AS	Proposed roof plan	Apr. 2021	PL02	-



1. Proposed section AA' Scale 1:50 @A1



2. Proposed section BB' Scale 1:50 @A1



3. Proposed section CC' Scale 1:50 @A1

tsuruta_architects

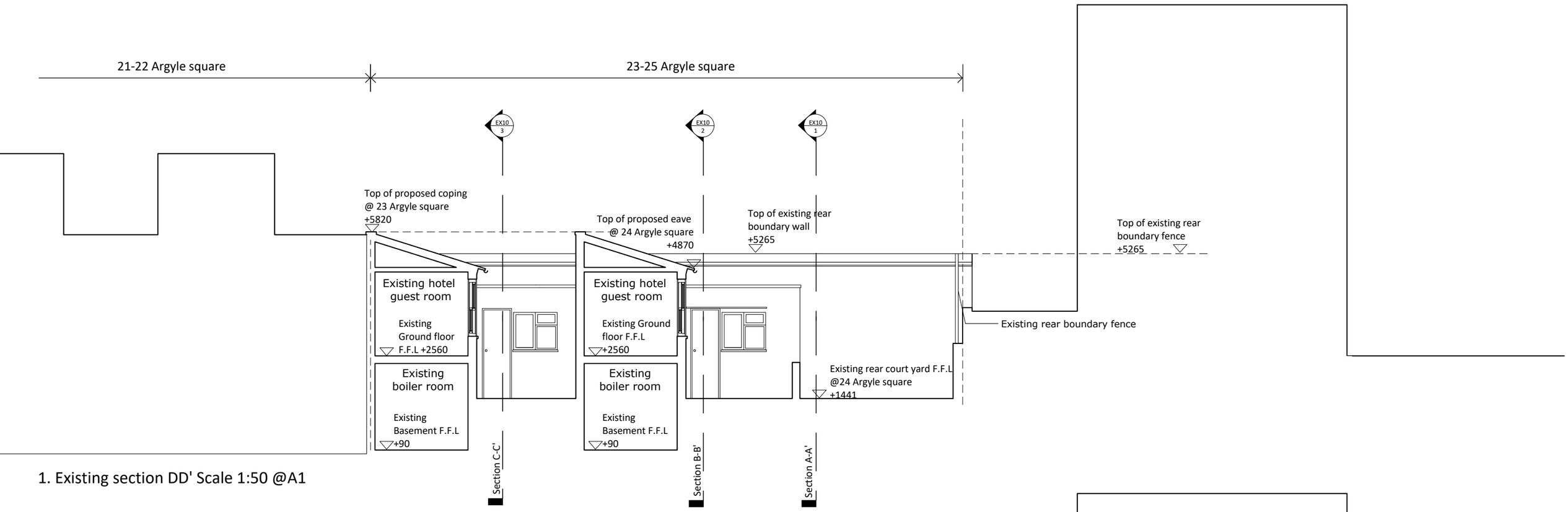
Project
23-25 Argyle Square, WC1H 8AS

Drawing title
Proposed sections

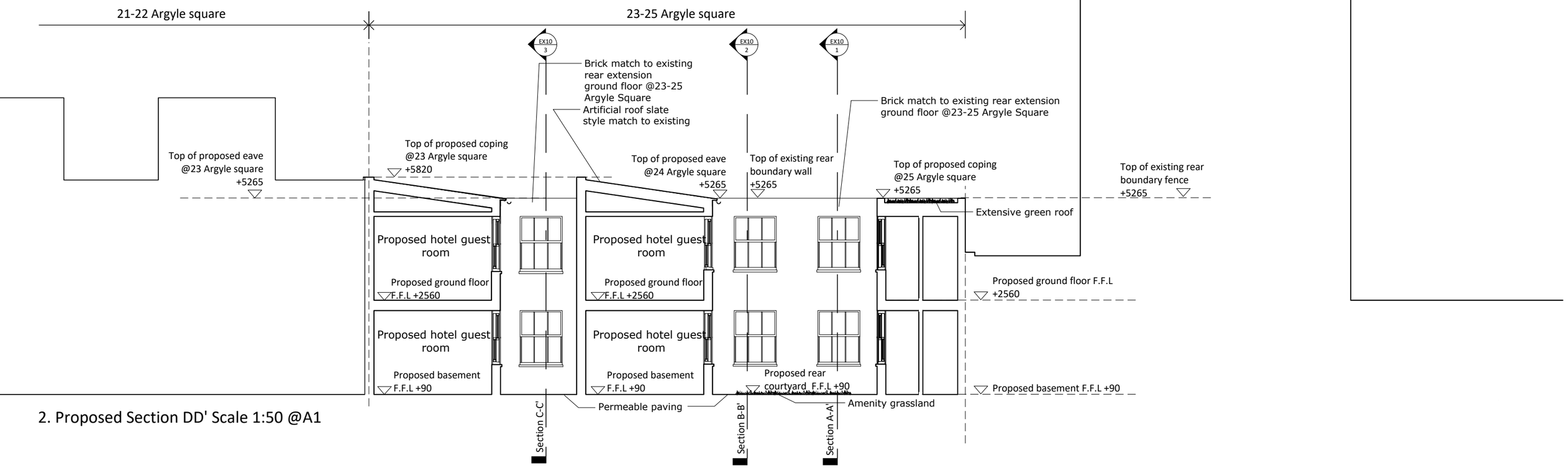
Date
Apr. 2021

Drawing No.
PL10

Rev.
-



1. Existing section DD' Scale 1:50 @A1



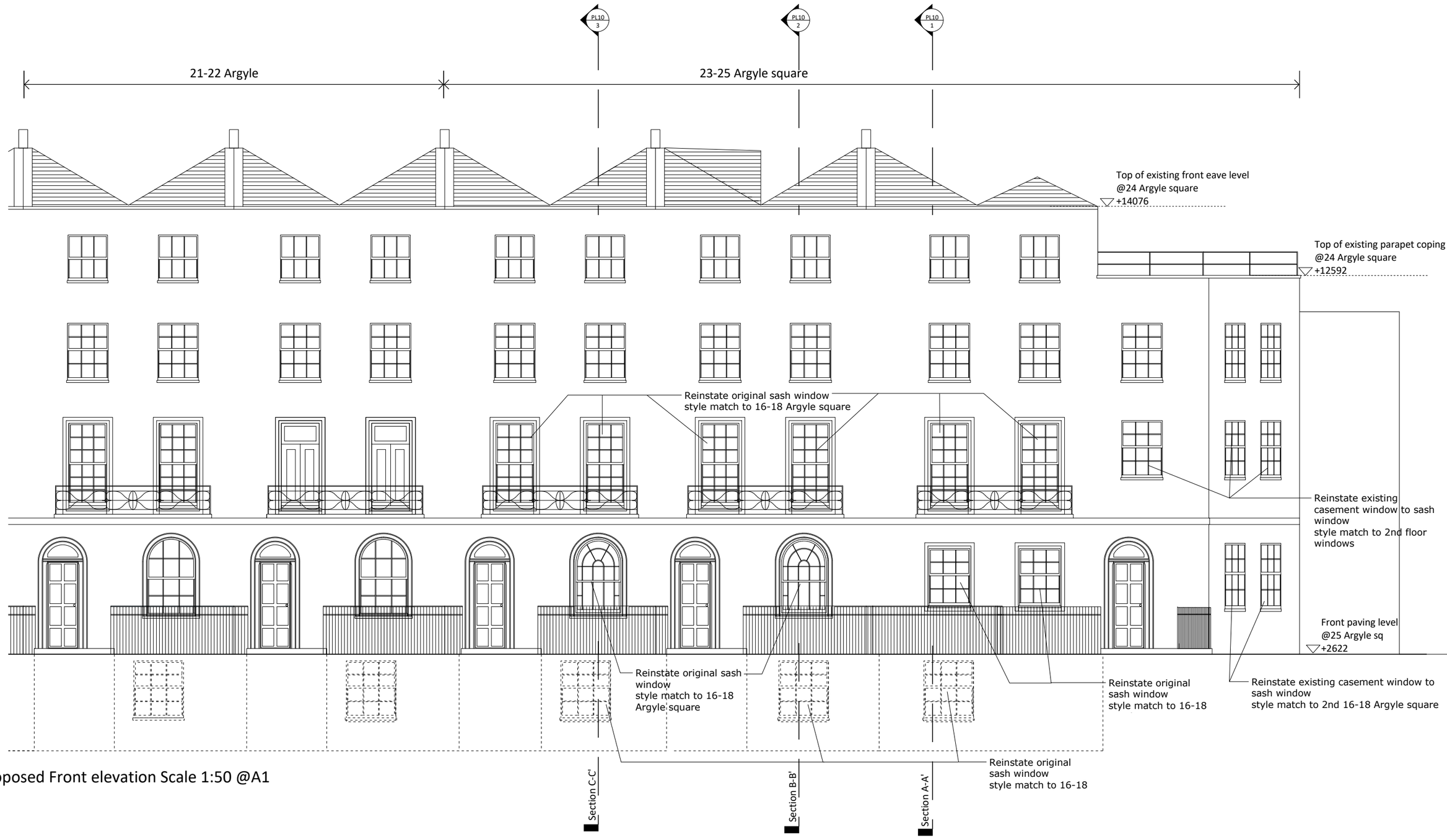
2. Proposed Section DD' Scale 1:50 @A1

tsuruta_architects

Project	Drawing title	Date	Drawing No.	Rev.
23-25 Argyle Square, WC1H 8AS	Existing and Proposed section DD	Apr. 2021	PL11	-

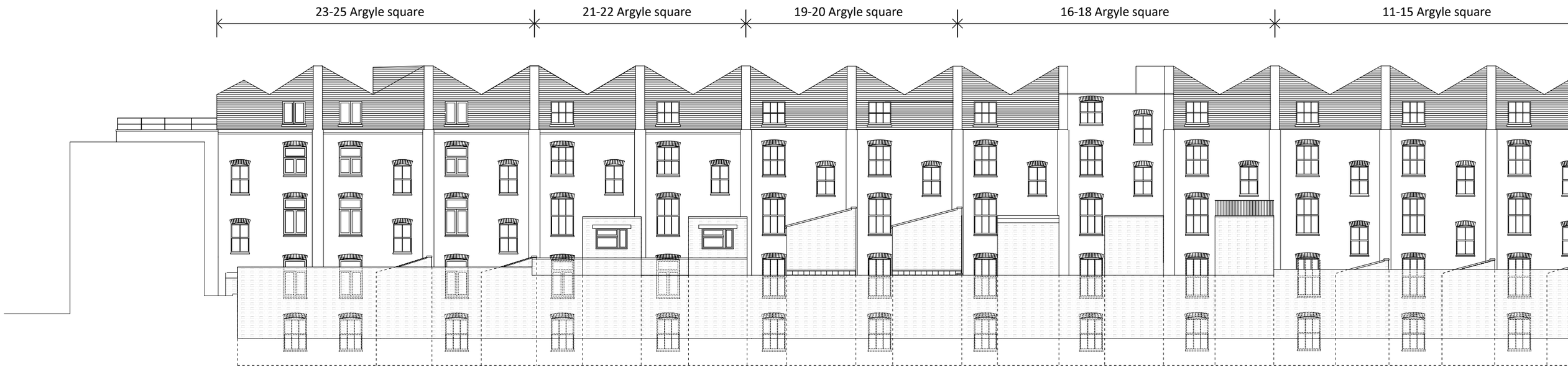
1. Proposed section &parent building rear elevation
Scale 1:50 @A1

tsuruta_architects	Project 23-25 Argyle Square, WC1H 8AS	Drawing title Proposed section &parent building rear elevation	Date Apr. 2021	Drawing No. PL20	Rev. -

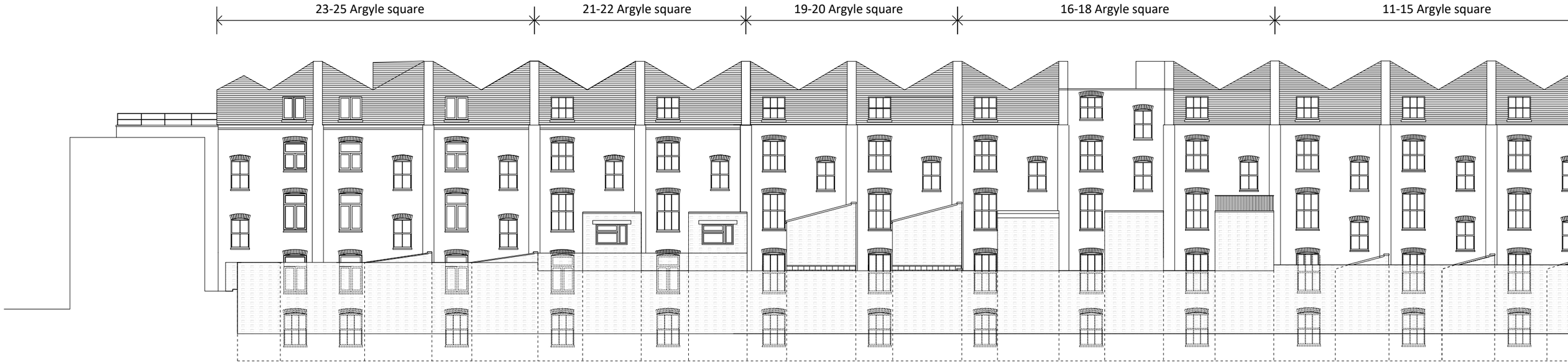


1. Proposed Front elevation Scale 1:50 @A1

tsuruta_architects	Project 23-25 Argyle Square, WC1H 8AS	Drawing title Proposed front elevation	Date Apr. 2021	Drawing No. PL21	Rev.



1. Existing rear elevation Scale 1:100 @A1



2. Proposed Front elevation Scale 1:100 @A1

tsuruta_architects

Project
23-25 Argyle Square, WC1H 8AS

Drawing title
Proposed & Existing rear elevation

Date
Apr. 2021

Drawing No.
PL22

Rev.

Soils Limited
Geotechnical & Environmental Consultants

Newton House
Cross Road, Tadworth
Surrey KT20 5SR

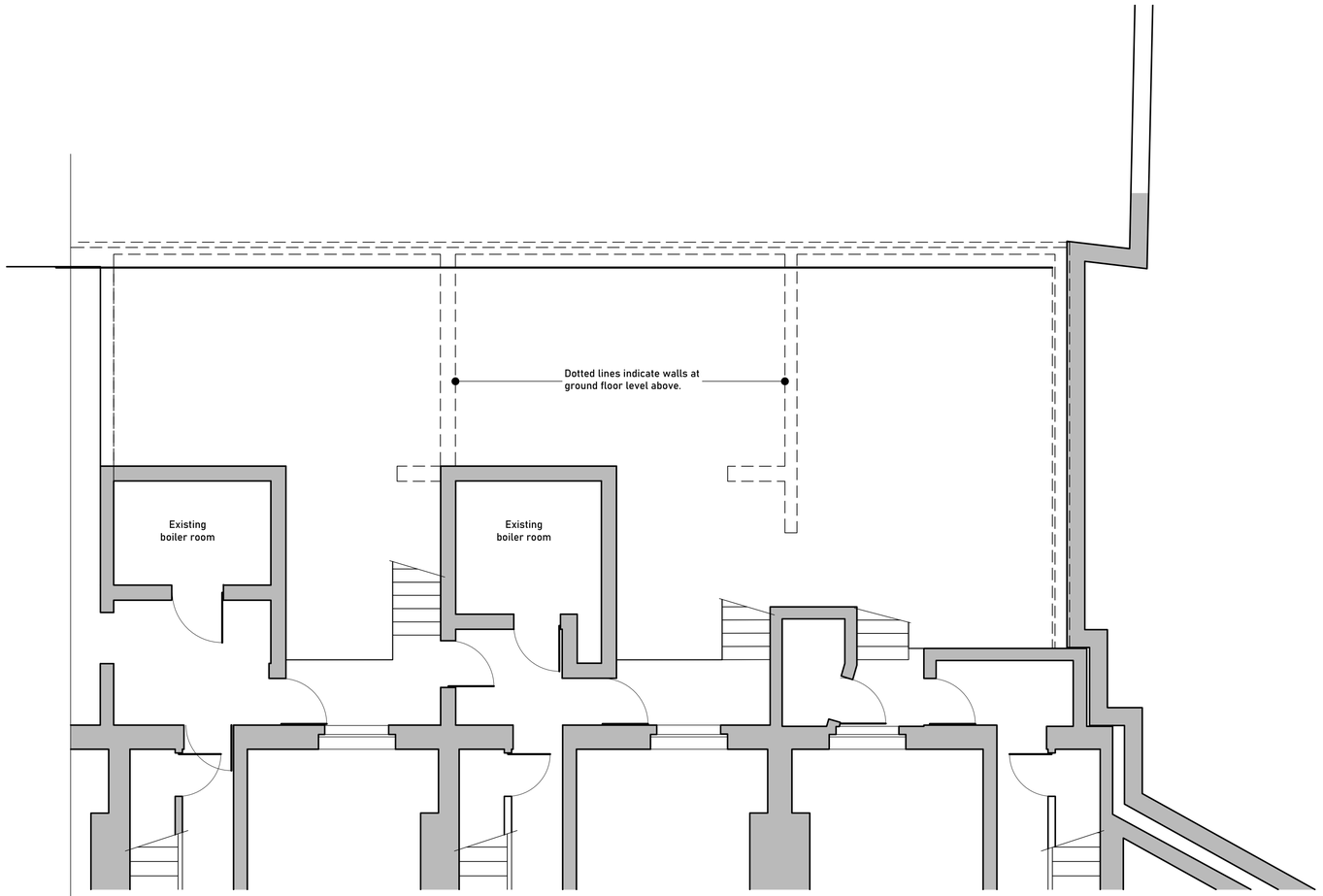
T 01737 814221
W soilslimited.co.uk

APPENDIX - 2

BASEMENT EXTENSION SCHEME DESIGN

SCHEME DESIGN DRAWINGS

CSE Consulting Ltd



EXISTING PART BASEMENT PLAN
scale 1:50

preliminary-planning

rev.	date	description	chk.
P	24.03.22	Preliminary Issue	

CSE CONSULTING civil structural engineers
Devonshire House
Cliveden Office Village
1, Lancaster Road
High Wycombe
Bucks HP12 3YZ
tel: 01494 923307
email: mail@cseconsulting.co.uk

client:
Mr Giovanni Di Popolo

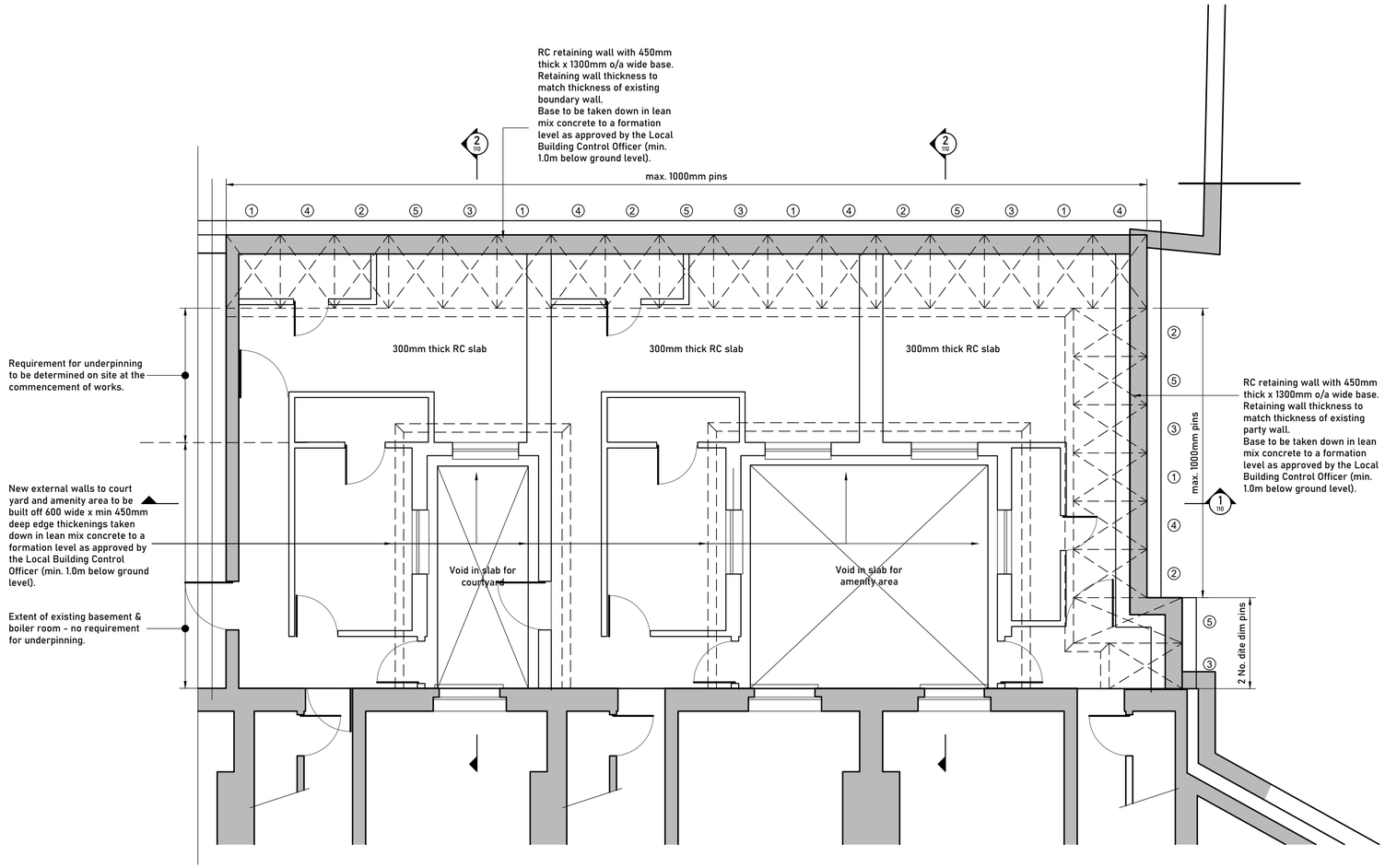
job title:
23-25 Argyle Square,
London
WC1H 8AS

drawing title:
Existing Basement Plan

scale:	date:	drawn by:	checked by:
1:50@A1	Mar 2022	MRH	

job number:	drawing number:	revision:
10-421	100	P

1:50 0 1m 2m 5m



Note:
All new internal walls to new basement extension are to be built off the 300mm thick RC slab construction.

Note: ① ④ ② ⑤ ③
Numbering indicates suggested proposed sequence of underpinning operation. Contractor may vary sequence with the permission of the Engineer and to the satisfaction of the Local Authority.

PROPOSED PART BASEMENT PLAN
scale 1:50

Note - Underpinning:
Existing walls/foundations to be underpinned in reinforced concrete to allow construction of new basement. Refer to relevant sections and CSEconsulting Specification for Traditional Underpinning on this drawing.
Wall stem to be minimum 300 thick grade C32/40 reinforced concrete cast in 1000 max lengths with 450 deep RC base. Provide H20 dowel bars at 400 centres between adjacent underpinning legs.
Underpinning to be temporally propped at base, mid height and top.
The Contractor is to allow for additional temporary penetrations through reinforced concrete wall.

SUB STRUCTURE WATERPROOFING PHILOSOPHY:

1. The basement is to be designed for habitable use or grade 3 environment in accordance with BS8102: 2009. It is proposed to provide Type B waterproof protection as outlined in BS8102: 2009 "Code of practice for protection of below ground structures against water from the ground". All materials and products are to be installed by an approved specialist conversant with the manufacturer's specification, building regulations and the relevant codes of practice.

(a) The concrete structure is to be waterproofed by means of type B protection using the Cementaid Everdure Caltite waterproof system or other similar approved system which is structurally integral against water ingress.

The reinforced concrete basement walls, underpinning and floor slab are to be waterproofed by the use of Cementaid Everdure Caltite System concrete additive strictly in accordance with CEMENTAID (UK) Ltd. specification (tel-01293 447878). The extent of waterproof structure is to be read in conjunction with the Architect's drawings and design.

The method and appropriate sequence of construction pours is to be agreed with the waterproofing manufacturer and must satisfy the Engineer's and Architect's requirements for waterproofing the sub structure.

All construction joints are to be agreed with the Engineer and are to be prepared strictly in accordance with Cementaid's requirements. Service penetrations through Caltite are to be provided with the appropriate approved sealant systems in accordance with Cementaid design and detail. All DPCs, DPMs and interface waterproofing details to be approved by the Architect in conjunction with CEMENTAID (UK) Ltd details where CALTITE waterproof concrete is used.

Where new concrete walls abuts existing structure the joint is to be sealed in accordance with CEMENTAID details. Provide 2 No. 12mm wide continuous beads of swell mastic (50mm apart) installed along the full length of joint.

SPECIFICATION OF TRADITIONAL UNDERPINNING

1.00 Codes of Practice

All continuous underpinning is to be carried out strictly in accordance with the requirements of B.S.8004, 1985. The Code of Practice for Foundations. All materials used in the works shall comply with the requirements of the relevant Codes of Practice.

2.00 Shoring and Propping

It is the Contractor's responsibility to take all necessary steps to ensure that the structure is adequately propped, shored and braced to ensure that during the progress of the works excessive deflections or deformations of the structure do not occur.
The Contractor shall discuss with the Engineer any proposals for temporary works. This does not in any way relieve the Contractor of his responsibly to ensure that the structure is adequately supported at all times during the progress of the works.
It is frequently necessary for the Contractor to brace or prop existing openings so that isolated load bearing piers may be underpinned.
The Contractor is to allow in his tender price for all propping, shoring and bracing required to ensure that the works may be safely undertaken with no undue disruption to the structure.
Where temporary propping is necessary to facilitate dismantling and reconstruction of load bearing elements the contractor shall prepare a method statement, which shall be subject to the approval of CSEconsulting

3.00 Sequence of Working

The sequence of working is to be submitted to the Engineer and approved by the Local Authority. This shall be based on a maximum bay length of approximately 1.0m.
The agreed sequence of operations shall be strictly adhered to.
The Contractor may wish to alter the excavation and concreting sequence, but this must be discussed with the Engineer/Local Authority Representative, and no deviation from the sequence of operations shall be permitted unless the Engineer/Local Authority Representative confirms otherwise in writing.
The underpinning works shall be carried out strictly in the following sequence:-

a. Excavate legs No. 1. These are to be inspected and approved by the Local Authority Building Inspector and CSEconsulting to ensure that the conditions are consistent with the site investigation data.

b. On approval of leg No.1 excavations, insert dowel bars, clean off the underside of the existing footing. Obtain approval to concrete, ensuring concrete is well vibrated to give adequate compaction. Allow concrete to harden for a minimum of 24 hours

c. Dry pack 75mm to ensure complete load transfer Allow to harden for a minimum of 24 hours.

d. Repeat stages b and c for legs No. 2 and so on.

4.00 Excavation and Approval

During excavation the Contractor shall take all necessary steps to prevent softening of the excavation base by ground water. Where necessary the Contractor shall keep excavations free from ground water by pumping.
The Contractor shall also ensure that the base of the excavation shall not become contaminated by loose material falling into the excavation.
The Contractor shall take steps to ensure that the size of the excavation closely matches the required size agreed with the Engineer/Local Authority
Representative. Excessive overbreak will not be permitted, and the Contractor shall provide all necessary trench sheeting and strutting to prevent overbreak.
The Contractor may be required to provide sheeting and strutting to prevent any ingress of loose material from beneath the existing slab.
All underpinning excavations shall be approved by the Local Authority Representative before any concrete is placed.

5.00 Linking of adjacent bays

Prior to concreting the Contractor shall incorporate dowel bars to permit shear transfer between adjacent underpinning bays. All underpinning legs shall be linked to adjacent legs by driving H20 dowel bars, 600mm long into adjacent ground. Penetration of bars to be 300mm into adjoining legs. Minimum cover to all dowel bars to be 100mm. Projecting dowel bars should be cleaned of all loose dirt prior to concreting.

6.00 Cleaning of existing footings

The underside of all existing footings (where exposed by excavation in preparation for underpinning) shall be cleaned of all loose soil and fragments.
Any major projections or inclusions such as bricks, broken concrete or boulders, shall be broken away from the underside of the existing footings. Prior to concreting the underpinning leg the existing footings should be clean, firm and level so that dry packing may be accomplished satisfactorily.

7.00 Concreting

All concrete shall be grade RC30 with min OPC content of 300 kg/m³ and a nominal aggregate size of 20mm, and mixed, delivered, placed and vibrated strictly in accordance with the concrete specification contained in B.S.8110:Part 1:1985. Sulphate resisting cement to be used should site conditions dictate or as directed by Local Building Control Officer.
It should be noted that the concrete should be adequately compacted with a vibratory poker to ensure adequate density.
The concrete for the underpinning legs should be brought up to 75mm form the underside of the existing footings.

8.00 Dry packing

Once the concrete in the underpinning legs has set (at least 48 hours after concrete placement) the gap between the underside of the existing footing and the top of the new footing is to be packed with dry concrete.
The mix proportions for the dry concrete are to be weight 1:3 (cement:zone 2 sharp sand) with Combex admixture added in accordance with Manufacturers recommendations. The constituents are to be mixed dry and a small volume of water is to be added such that when compressed, a small ball of mixture retains its shape.
The dry packing concrete is then to be rammed solid into the gap between the underside of the existing footing and the top of the new footing using a steel bar.

9.00 Curing time

A sufficient time should elapse between the completion of dry packing and the excavation of any underpinning legs in the vicinity. The curing time shall be agreed with the Engineer, this being dependent upon the prevailing weather conditions.
Vicinity in this context shall be deemed to include all legs adjacent to, or next but one to the leg in question.

10.00 Provision for existing services

Underpinning legs may be punctured by the services entering the building. The means of "sleeving" these services shall be agreed with the Engineer during the progress of the works.
Where existing services interfere with or affect the underpinning excavation these should be temporarily diverted.
The Contractor shall make due allowances in his tender price for any diversions of services, sleeving or other service adjustments which may be required in order to undertake the works in satisfactory fashion.

rev.	date	description	chk.
P	24.03.22	Preliminary Issue	

civil structural engineers
Devonshire House
Cliveden Office Village
1, Lancaster Road
High Wycombe
Bucks HP12 3YZ
tel: 01494 923307
email: mail@cseconsulting.co.uk
CSE CONSULTING

client:
Mr Giovanni Di Popolo

job title:
23-25 Argyle Square,
London
WC1H 8AS

drawing title:
Proposed Basement Plan

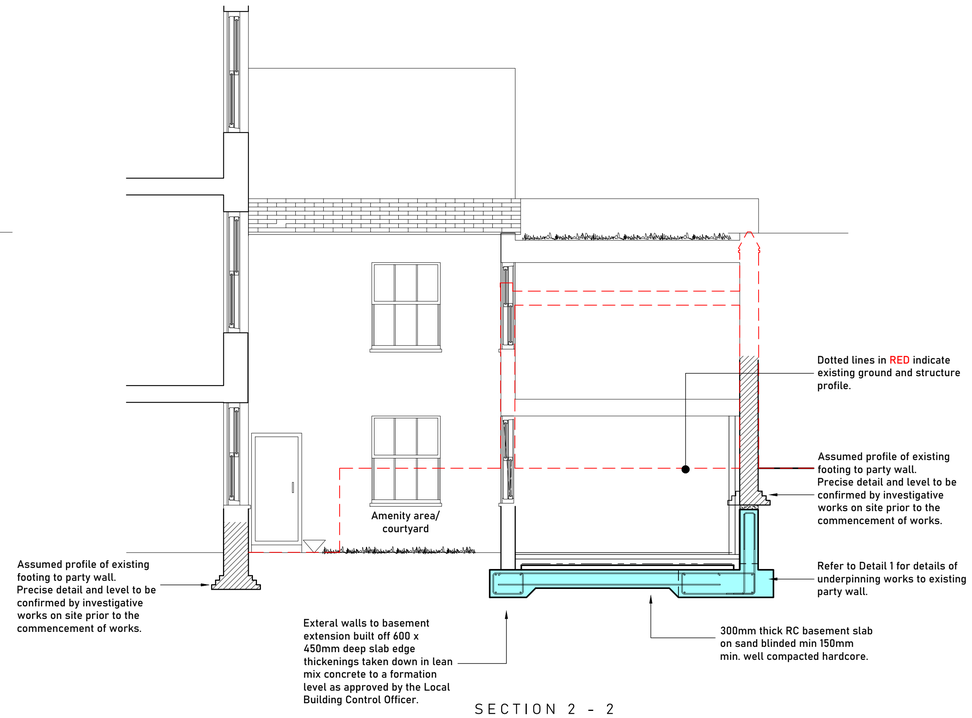
scale:	date:	drawn by:	checked by:
1:50@A1	Mar 2022	MRH	

job number:	drawing number:	revision:
10-421	110	P

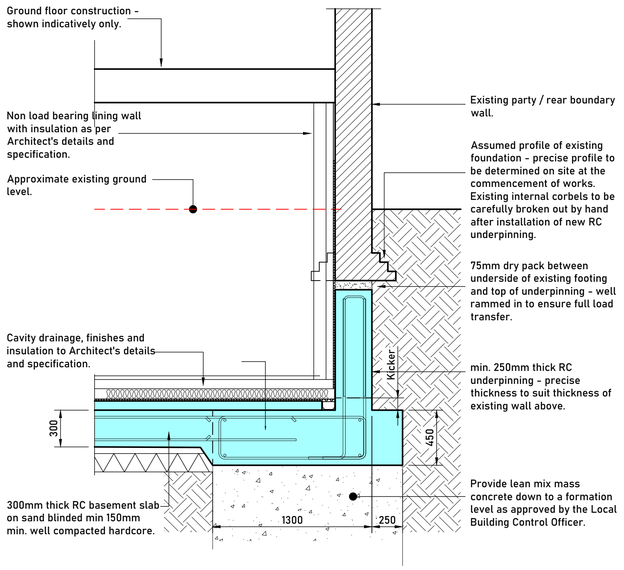
1:50 0 1m 2m 5m

preliminary-planning

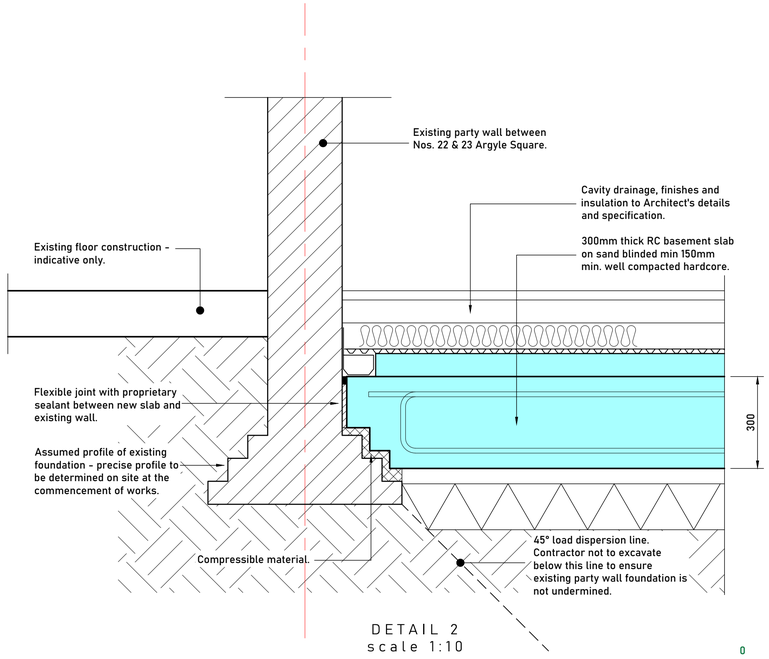
SECTION 1 - 1
scale 1:50



SECTION 2 - 2
scale 1:50



DETAIL 1
scale 1:25



DETAIL 2
scale 1:10

preliminary-planning

rev.	date	description	chk.
P	24.03.22	Preliminary Issue	

civil structural engineers
CSE CONSULTING
Devonshire House
Cliveden Office Village
1, Lancaster Road
High Wycombe
Bucks HP12 3YZ
tel: 01494 923307
email: mail@cseconsulting.co.uk

client:
Mr Giovanni Di Popolo

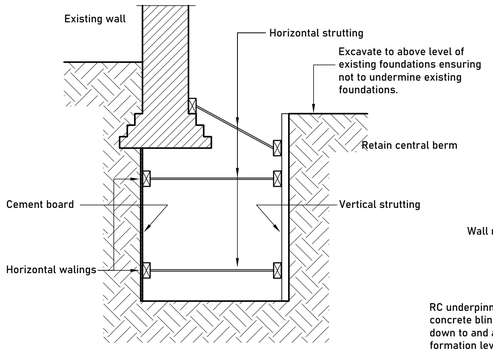
job title:
23-25 Argyle Square,
London
WC1H 8AS

drawing title:
Sections and Details

1:10 — 0, 500mm, 1m
1:25 — 0, 500mm, 1m, 1.5m, 2m, 2.5m
1:50 — 0, 1m, 2m, 5m

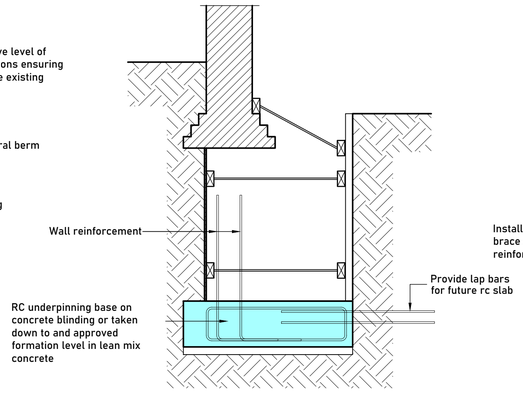
scale:	date:	drawn by:	checked by:
1:50,1:25,1:10@A1	Mar 2022	MRH	

job number:	drawing number:	revision:
10-421	110	P



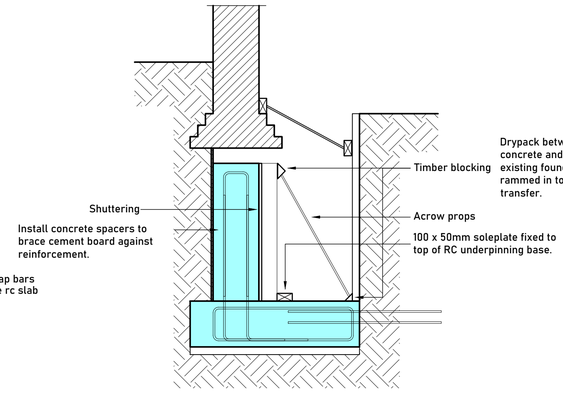
STAGE 1

Excavate 1200mm maximum wide pit for underpinning.



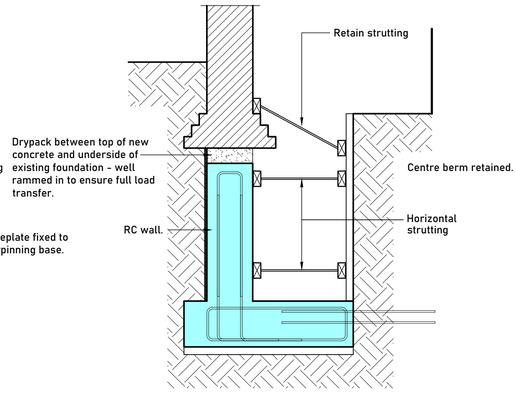
STAGE 2

Excavate for base.
Excavation to be inspected and approved by Building Control Officer.
Cast blinding.
Fix reinforcement and cast with wall starters and projecting bars each side for adjoining pins.



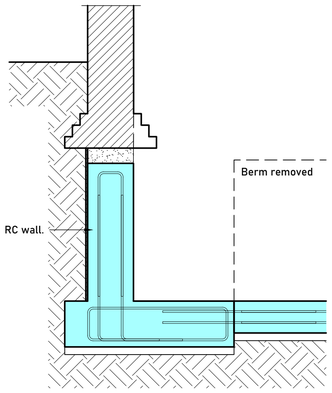
STAGE 3

Remove temporary trench cross bracing .
Fix wall reinforcement with projecting bars each side for adjoining pins.
Fix concrete spacers to brace cement board against reinforcement.
Fix shuttering to wall and cast wall section - concrete can be poured trough top of wall and vibrated through the space to be dry packed.



STAGE 4

Minimum 24 hours after casting wall section dry pack between top of new concrete and underside of existing foundation.
When concrete has cured strike shuttering and back prop against excavation as shown.



STAGE 5

When full perimeter underpinning works are complete and have reached design strength:
Remove berm and props.
Cast concrete blinding then cast basement slab with reinforcement.
Carefully cut back existing foundation projection using a hammer and bolster taking care to avoid unnecessary vibrations and noise to the adjoining property.

preliminary-planning

rev.	date	description	chk.
P	24.03.22	Preliminary Issue	

CSE CONSULTING
civil structural engineers
Devonshire House
Cliveden Office Village
1, Lancaster Road
High Wycombe
Bucks HP12 3YZ
tel: 01494 923307
email: mail@cseconsulting.co.uk

client:
Mr Giovanni Di Popolo

job title:
23-25 Argyle Square,
London
WC1H 8AS

drawing title:
Suggested Underpinning Works Sequence

scale:	date:	drawn by:	checked by:
N.T.S. @A1	Mar 2022	MRH	

job number:	drawing number:	revision:
10-421	111	P