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ROJECT REF 4303
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STRUCTURAL ENGINEER'S REPORT AND BASEMENT IMPACT ASSESSMENT

in support of a planning application at

22 CHURCH ROW NW3

CONTENTS

		Page
1.0	INTRODUCTION	3
	1.1 Proposed Development	
	1.2 Purpose of Work	
	1.3 Qualifications	
	1.4 References	
	1.5 Limitations	
2.0	SCREENING	5
	2.1 Structural Stability Screening Assessment	
	2.2 Slope Stability Screening Assessment	
3.0	SCOPING AND SITE INVESTIGATION	7
	3.1 Existing buildings and surroundings	
	3.2 Site Investigation	
	3.3 Potential Impacts	
4.0	PROPOSED CONSTRUCTION	9
	4.1 Proposed Structural Form	
	4.2 General Underpinning Method	
	4.3 Impact from Underpinning	
	4.4 Outline Method Statement	
	4.5 Contractor's Method Statement	
5.0	BASEMENT IMPACT ASSESSMENT	11
	5.1 Impact on the Main Building and Adjacent Buildings.	
	5.2 Impact on the Vaulted Cellar Structure.	
	5.3 Impact on Party Fence Walls	
	5.4 Impact on Land Stability	
	5.5 Impact on Ground Water	
	5.6 Impact on Surface Water and Flooding	
	5.7 Impact on Trees	
	5.8 Cumulative Effects	
6.0	MITIGATION	13
	6.1 Sequencing	
	6.3 Protection and De-watering	
	6.4 Noise and Vibration	
7.0	CONCLUSION	14

1.0 INTRODUCTION

1.1 Proposed Development

This report is submitted in support of a planning application pertaining to the property in accordance with the requirements of the London Borough of Camden. These requirements are set out within the Development Policy DP27 and the Camden Planning Guidance CPG4 – Basements and Lightwells.

The report is to be read in conjunction with The Heritage Statement, Design and Scoping Statement and Tree Impact Assessment which form part of the planning application, together with structural drawings series 4303.

This report deals specifically with the requirement under DP27 to maintain the structural stability of the building and neighbouring properties. In doing so this report reviews the constraints imposed by the existing structure, adjacent structures and surroundings and prevailing ground conditions to ascertain the most appropriate form of construction work to achieve the proposals indicated in the drawings. Methods of working are selected on the basis of minimising the impact, both during the works and in the permanent condition, on the following aspects.

- The existing building and structures
- Party walls and boundaries
- Adjacent structures

References to left and right are made viewing the property from the front.

1.2 Purpose of work

It is proposed to lower the floor level over the full footprint of original cellars which extend out at the rear of the property below the garden. This is in order to secure the long term integrity of the foundations and brickwork, allow repairs to the brickwork and facilitate damp proofing work. The space is to be used for storage per its original intended purpose.

An extension to the existing steps would be incorporated to reach the lowered level.

1.3 Qualifications

This report has been prepared by Ian Drummond BSc(Eng) CEng MIStructE. Ian Drummond has been practicing as a consulting engineer in central London for over 30 years and has extensive experience in subterranean developments. This report has been checked by Peter Lecheta MSc (Eng) who has practiced as a structural engineer involved in subterranean developments for over 15 years.

1.4 References

Camden Development Policy DP27
Camden Planning Guidance CPG4
Camden Geological, Hydrogeological and Hydrological Study

1.5 Limitations of Report

The conclusions and recommendations made in this report are limited to those that can be made on the basis of the research carried out. The results of the research should be viewed in the context of the work that has been carried out and no liability can be accepted for matters outside the stated scope of the research. Any comments made on the basis of information obtained from third parties are given in good faith on the assumption that the information is accurate. No independent validation of third party information has been made by IDCE Ltd

2.0 SCREENING

2.1 Structural Stability Screening Assessment

1. Does the proposed work involve propping and re-support of the existing building	No
2. Does the proposed work extend lower than the party fence structure to the right	Yes
3. Does the proposed work extend lower than the building structure to the right	No
4. Does the proposed work extend lower than the party fence structure to the left	Yes
5. Does the proposed work extend lower than the building structure to the left	No
6. Does the proposed work undermine the public highway?	No
7. Does the proposed work undermine any structures in the rear garden?	No

2.2 Slope Stability Screening Assessment

1. Does the existing site include slopes, natural or manmade, greater than 7°?	No
2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7°?	No
3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?	No
4. Is the site within a wider hillside setting in which the general slope is greater than 7°?	No

5. Is the London Clay formation the shallowest strata at the site?	Yes
6. Is there a history of seasonal shrinkage-swell subsidence in the local area and/or evidence of such effects on the site.	No
7. Is the site within an area of previously worked ground?	No
8. is the site within 5m of a highway or pedestrian right of way?	No
9. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties.	No
10. Is the site over (or within the exclusive zone) of and tunnels eg railway lines?	No

3.0 SCOPING AND SITE INVESTIGATION

3.1 Existing Buildings and Surroundings

The existing structure under consideration comprises a pair of underground storage cellars constructed below the level of the garden at the rear of the property. The cellars are apparently contemporary with the original construction referred to in the Heritage Statement. They are beyond the rear of the main building and remote from the main building structures each side.

The cellars are constructed in solid vaulted brickwork. The whole construction is set at a slight angle so that the vaults slope down towards the rear, with the natural fall of the ground. There is direct access to the left cellar from the main house and an exit at the rear of through a light well.

Tanking in the left cellar dates from the 1970s however the right vault is perpetually damp with standing water on the floor having to be pumped away.

3.2 Site investigation

A visual survey and measured survey have been carried out to the existing cellars and surroundings. These did not reveal anything prohibitive with respect to the proposals.

Ground investigation revealed that the vaulted walls terminate just below at floor level and has no appreciable foundation or spread footing in the location examined. They are founded at underside of existing floor level on the natural ground which is the London Clay Formation.

This ground will be suitable for re-support of the building on new foundations and for staged excavations. While temporary shoring of excavations is required as a matter of course, clay stands up well in the temporary condition and it will be possible to cut the ground to accurate lines to form the various ground works stages.

Cracking through the brickwork was noted at the rear of the right vault. This appears to be due to slight settlement of the lower end of the vault due to softening of the bearing strata as a result of perpetual flooding.

3.3 Potential Impacts

Based on the results of the screening exercise under 2.0 the following potential impacts need to be considered.

POTENTIAL IMPACT	POSSIBLE CONSEQUENCES
1. The party fence structure to the right will be undermined as part of the works	Movement and structural damage to party fence structure
2. The party fence structure to the left will be undermined as part of the works	Movement and structural damage to party fence structure

4.0 PROPOSED CONSTRUCTION

4.1 Proposed Structural Form

In view of the traditional ground bearing foundations to the existing structure, it is proposed to use ground bearing retaining walls to maintain continuity of structural form and compatibility with the existing foundations with respect to seasonal movement in the bearing strata. Existing foundations and extended foundations are proposed to be founded on the same bearing strata. The proposed ground slab would also be ground bearing at a level close to the foundations. Underpin retaining walls are proposed to be used to facilitate the ability to excavate and re-support only short sections at a time and limit the movement in the surrounding ground and buildings during the operation.

4.2 General Underpinning Method

The underpinning essentially projects the existing footing arrangement downwards. Underpinning for increased height below existing buildings is routinely carried out in London and can be successfully achieved by a system of sequenced excavations and construction of short lengths of concrete walls and foundations. These serve to provide new vertical support to the existing structure, as well as retain the ground to achieve the increased head height. Limited excavations of approximately one metre wide are carried out to ensure that a short length of structure only is undermined at any point in the construction sequence. The excavations can require temporary shoring if sections of the ground are found to be insufficiently cohesive to be stable in the temporary condition. Once the short section of reinforced concrete has been cast and the building re-supported by pinning up tight off the new construction, the next section of excavation is commenced in a location remote from the first. This method of working ensures the temporary stability of the existing structure. As the sequence progresses, more and more of the existing structure is re-supported on new foundations, which are usually more stable than the original due to the increased founding depth.

In this case a heel is required to properly carry the vertical loads on the bearing strata, but this does not project onto the adjoining owner's land. The heel is un-reinforced but sufficiently short to enable load spread through the mass concrete.

4.4 Outline Method Statement

1) Carefully remove any flagstones or other salvageable building components and set aside for re-use.
2) Commence with underpinning of perimeter walls in sequence specified.
3) Carefully excavate down and under the existing wall to ascertain the actual depth and thickness of the wall in individual locations. Notify engineer of findings if these differ significantly from that shown on the drawings. Thoroughly clean the underside of the brickwork.
4) Excavate down to base level and bottom out the pit
5) Notify the Building Control Officer for inspection and obtain approval.
6) Immediately blind the base on approval.
7) Hammer dowel bars into the clay each side.
8) Install the reinforcement, supported on cover blocks and ensuring minimum cover to all faces as specified.
9) Cast the base and kicker.
10) The following day, shutter the front face and cast the stem.
11) After a further day, dry-pack the top gap using a mix as specified on the drawings and ram in tight.
12) In the case of the central wall, form the stem in new engineering brickwork or concrete shuttered both sides.
13) Carefully cut back any projecting brick footing that may be discovered, flush with the face of the brickwork above.
14) Repeat the process for all pins until the sequence is complete.
15) Excavate and construct the drainage sump.
16) Reduce to level throughout and bottom out the base. Seal immediately with blinding concrete.
17) Drill in dowel bars around the perimeter of the slab.
18) Install the mesh reinforcement on proprietary chairs and cast the slab.
19) Continue with installation of the damp proofing system, other non-structural elements and finishes.

4.5 Contractor's Method Statement

Actual working practices on site would be subject to the Contractor's Risk Assessments & Method Statements which the contractor would be obliged to produce prior to start of works on site.

5.0 BASEMENT IMPACT ASSESSMENT

5.1 Impact on the Main Building and Adjacent Buildings

Being situated in the rear garden and well beyond the main rear wall of the house, the works are remote from the main body of the building. Considering the clay bearing strata which is cohesive and impermeable in nature, the effects of excavation are localised in terms of movement of ground water, removal of fine particles and release of stress. It is considered therefore that there will be no impact at all on the main building as a result of the proposed works.

The adjoining properties are even more remote and consequently it is considered that there will be no impact at all on the adjacent buildings from the proposed works.

5.2 Impact on the Vaulted Cellar Structure

While there is a potential impact on the existing cellar in terms of slight settlement during load transfer the risk is no greater than for any other underpinning operation. Care will need to be taken to follow the sequence of ground works and to ensure that excavations are kept to short sections and re-supported promptly during the works. Dry-packing is to be rigorously carried out at the foundation interface to minimise deflection during load transfer. Providing such measures are taken the impact on the cellar is anticipated to be small with category of damage under the Burland Scale being 0 or 1, Negligible or Very Slight

5.3 Impact on Party Fence Walls

The underpinning works is well below the level of the party fence walls. There may be some physical connection between the fence wall foundations and the top of the vaulted structure. However the substantial depth of the works below the party fence walls and cellar walls will allow those structures to adequately bridge over the excavations during the works. The sequential nature of underpinning work carried out in short sections will minimise subsequent ground movement, particularly in the case of cohesive clay. The party fence walls are built using lime mortar and able to accommodate movements in excess of the likely settlements expected here without any discernible damage. The impact on the party fence walls is therefore anticipated to be very small with category of damage under the Burland Scale being 0, Negligible.

5.4 Impact on Land Stability

A slight slope exists down towards the rear of the property. The underpinning will extend below the level of the land towards the rear. The cellar is constructed at a slope with the natural fall of the ground and it appears that the cellar foundations may also be constructed at the same slope. Part of the reason for the works is to level the floor and clearly the base of the new foundations will also be constructed level. The result will be that slope stability is improved by the works. It is clear that there will be no adverse impact on land stability.

5.5 Impact on Ground Water

The clay bearing stratum is essentially impermeable. Movement of ground water through clay is minimal. Damp ingress arises from surface water from above percolating through the fill material over the vaults, not from migration of ground water through the natural ground. Lowering the base of the cellar walls will not change this situation. The natural ground falls away to the rear eventually to below the level of the proposed underpinning and consequently ground water in the shallower layers above the clay is able to drain away as before. There is therefore no change to the ground water scenario and no anticipated impact on ground water.

5.6 Impact on Surface Water and Flooding

There is no change to the footprint of the building or external surfaces and arrangement. There is also no change to the drainage of surface water. It is considered therefore that there will be no impact on surface water or the risk of flooding.

5.7 Impact on Trees

Reference should be made to the separate Tree Impact Assessment, which concludes that there will be no adverse impact on surrounding trees.

5.8 Cumulative Effects

No other building structures are contiguous with the subject cellars and the cellars are not being extended laterally. Consequently there is no continuous barrier formed by the works and no contribution to a possible future cumulative effect.

6.0 MITIGATION

6.1 Sequencing

Sequencing of the works is the primary mitigating factor in limiting settlement. The sequencing of the work has been carefully designed to prevent movement of the cellar structures and the two adjacent party fence walls during the works. This is covered in detail in the method statement and in the engineering drawings.

6.2 Protection and de-watering

While only a small degree of ground water at the base of the excavations is anticipated, protection of excavated areas together with de-watering facilities are recommended to ensure that all excavations and reinstatement works are carried out in dry conditions.

6.4 Noise and Vibration

While all building operations generate some degree of noise, dust and vibration, these would be minimal in this case. Little, if any, breaking out of the existing structure is involved. The work is by nature small scale and localised and heavy plant and machinery is not appropriate and access does not allow the use of this. The operations will be carried out using mainly hand tools. The work is all contained in the existing cellar areas which will serve to attenuate noise and contain dust effectively. No special measures in this regard are considered necessary.

7.0 CONCLUSION

In preparing this report the following aspects have been considered and the conclusions can be summarised as follows:-

Whether the geology is capable of supporting the loads and construction techniques to be imposed.	Site investigation and calculations as appended have confirmed this.
The impact of the subterranean development, and associated construction and temporary works, on the structural integrity and natural ability for movement of existing and surrounding structures, utilities, infrastructure and man-made cavities, such as tunnels.	This has been discussed in depth under the section "Party Walls and Adjacent Buildings" and demonstrated to be satisfactory.
Whether the development will initiate slope instability which may threaten its neighbours.	The discussion under this section demonstrates that there is no adverse effect on slope stability which is improved.
The impact of the subterranean development on drainage, sewage, surface water and ground water, flows and levels.	The surface water situation and drainage loads are to be no worse than the existing arrangement.
How any geological, hydrological and structural concerns have been satisfactorily addressed.	There is minimal ground water movement due to impermeable clay and very little change to the existing situation.
The engineering details of the scheme, including proposals for the excavation and construction.	This is described in the engineering drawings and in the Outline Method Statement. Only standard procedures are used.
The impact of the proposed subterranean development on the structural stability of the existing and adjoining buildings, especially listed buildings.	This has been demonstrated to be minimal primarily due to remoteness of the works.
The impact of the proposed subterranean development on existing and proposed trees.	This has been addressed under the separate Tree Impact Assessment. .
The sequence for the temporary works, which mitigates the effects on neighbours	The "Outline Method Statement" describes how this can be sequenced in order to avoid reliance on temporary works.
Details and design of the preferred method of temporary works.	Not applicable in view of the above.

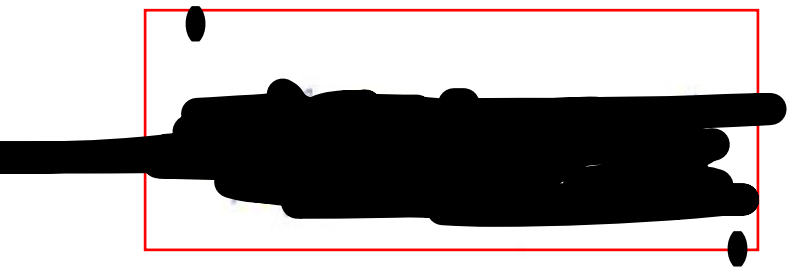
The proposed works as set out in the drawings and method statement gives due consideration to the occupants and building structures on and adjacent to the site and allows work to proceed in a way which can be monitored as it progresses, so that any variations in soil conditions or unforeseen anomalies can be dealt with as they arise.

The works can be constructed in such a way as to ensure the temporary and long-term stability of the boundary walls and adjacent structures.

The works do not present a risk to surrounding trees or vegetation, either during the works or after completion.

The methods of working described in the proposals are common methods of construction, regularly employed and do not involve any unusual or experimental techniques.

The foregoing demonstrates that, using methodologies appropriate to the site, the proposed development can be carried out in such a way that maintains the structural stability of the existing structures and neighbouring properties, avoids adversely affecting drainage and run-off and avoids cumulative impact or damage to the water environment in the local area.



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