V&R
VINCENT
& RYMILL

1 SPENCER RISE, LONDON, NW5 1AR

PROPOSED BASEMENT UNDER EXISTING BUILDING WITH LIGHT WELLS AT FRONT AND REAR

STRUCTURAL DESIGN, CONSTRUCTION SEQUENCE AND TEMPORARY WORKS.

CONTENTS

APPENDICES

1. INTRODUCTION.

Vincent & Rymill, Consulting Engineers, have been appointed by the building owner to prepare the Structural design and drawings for the new basement for Planning purposes. The author of this report T. J. Vincent Bsc C.Eng M.I.Struct. E. first worked with The London Basement Company in 2004, designing and detailing such retro fitted basements all over London. Since that time T. J. Vincent has designed over 450 basements, both single and multi storey.

Site Investigation and B.I.A. has been carried out by Messrs Ground and Water, signatory on this report will be F. Williams C.Geol FGS CEnv AGS MSoBRA & T. J. Vincent BSc C.Eng M.I.Struct.E.

The property is a two storey, terraced dwelling probably constructed around the late 1800's. The new development proposal is to provide basement accommodation under the existing building footprint as well as light wells to front and rear and to form a 2nd floor living space the party walls will be raised.

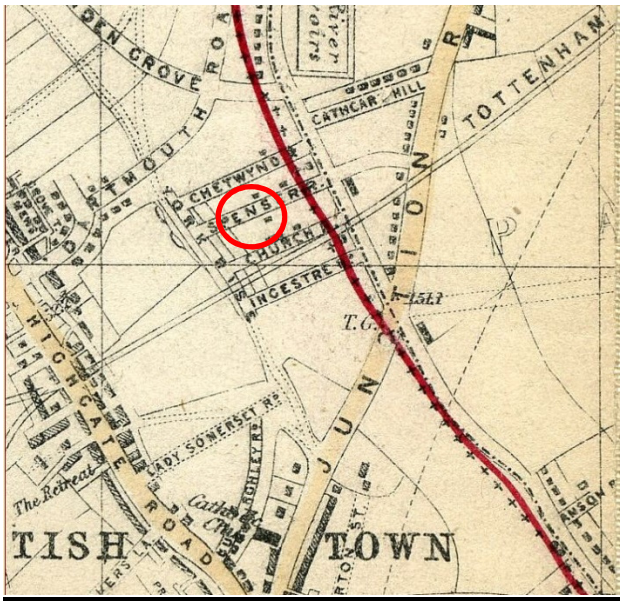
Details of the proposals are shown by the relative Edward Williams Architects drawings.

The purpose of this report / statement is to provide structural details as requested by the 'Camden Planning Guidance Basements and Light wells', together with details of the method and sequence of construction.

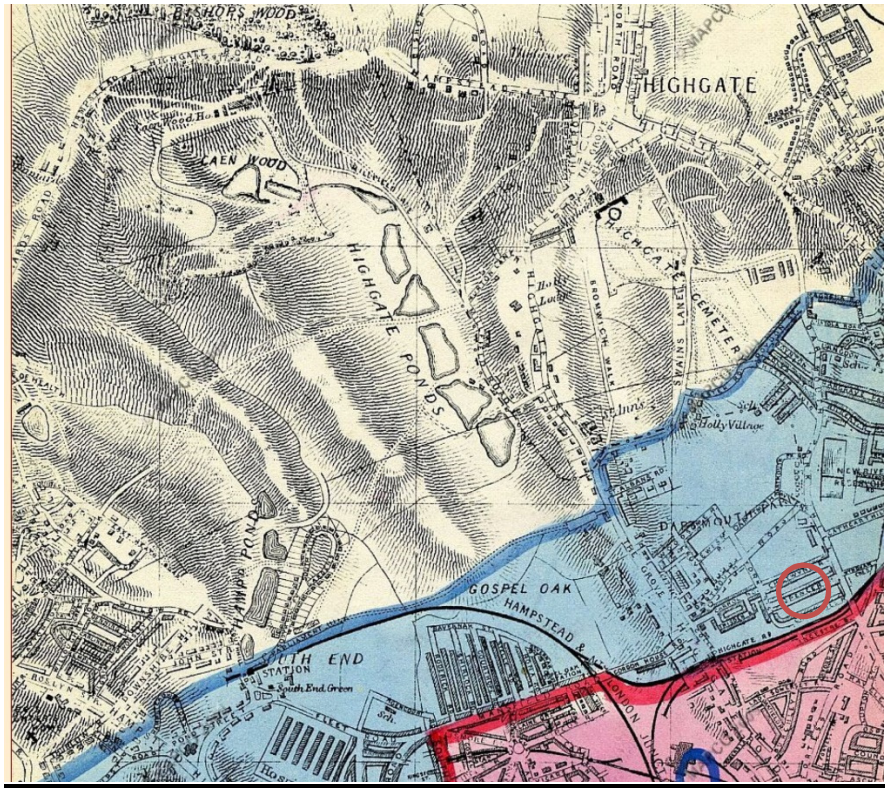
Site Investigation, Basement Impact Assessment (screening and scoping) and Report for Groundwater and land stability has been carried out by Messrs. Ground and Water Ltd, their report is appended to the Planning application as a separate document.

2. DESK TOP STUDY

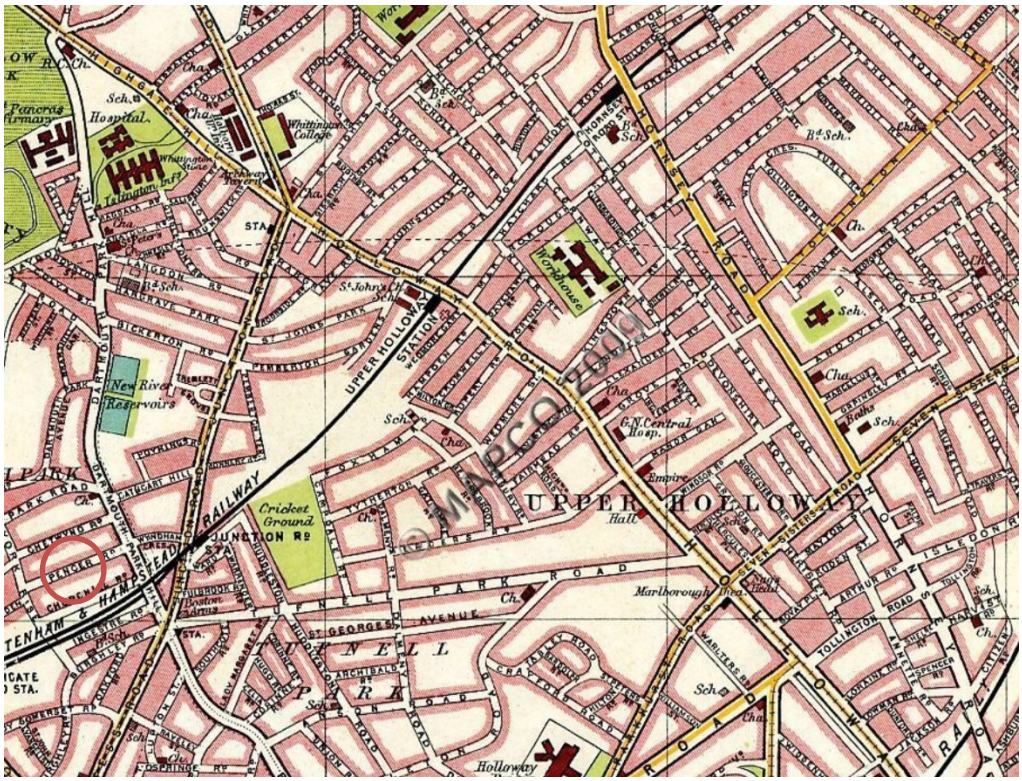
History



The 1865 Map of London shows Spencer Rise as a formed Road but with only one or two insignificant buildings along it.

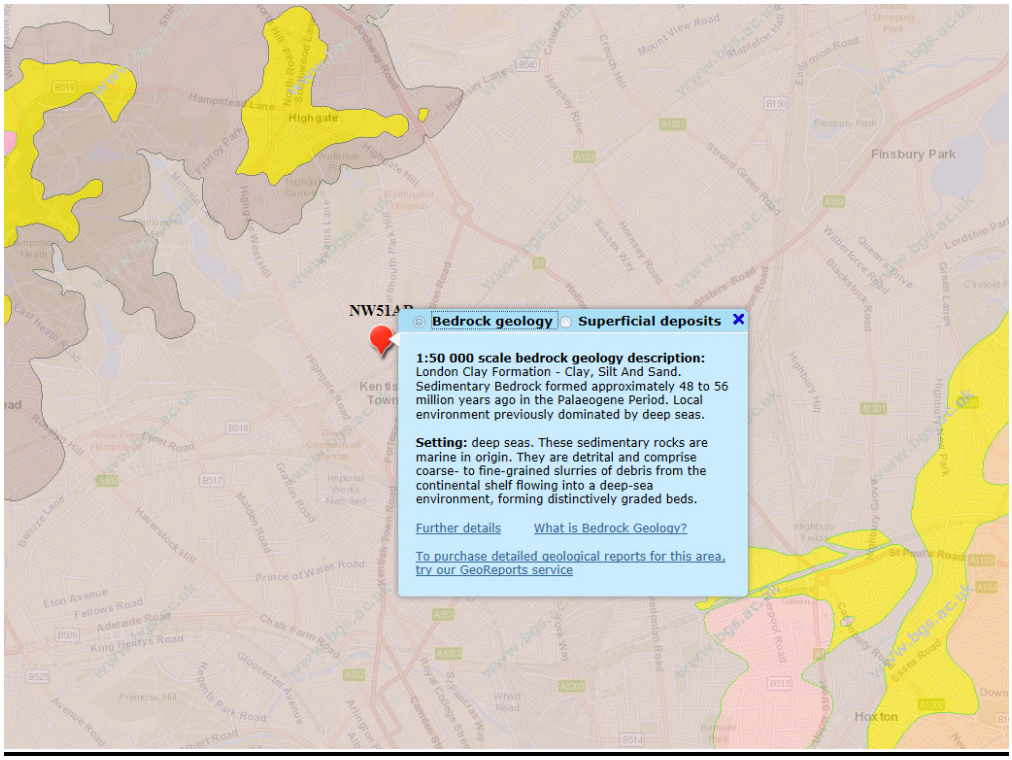


1886 Map of London shows Spencer Rise present but with no building along it.



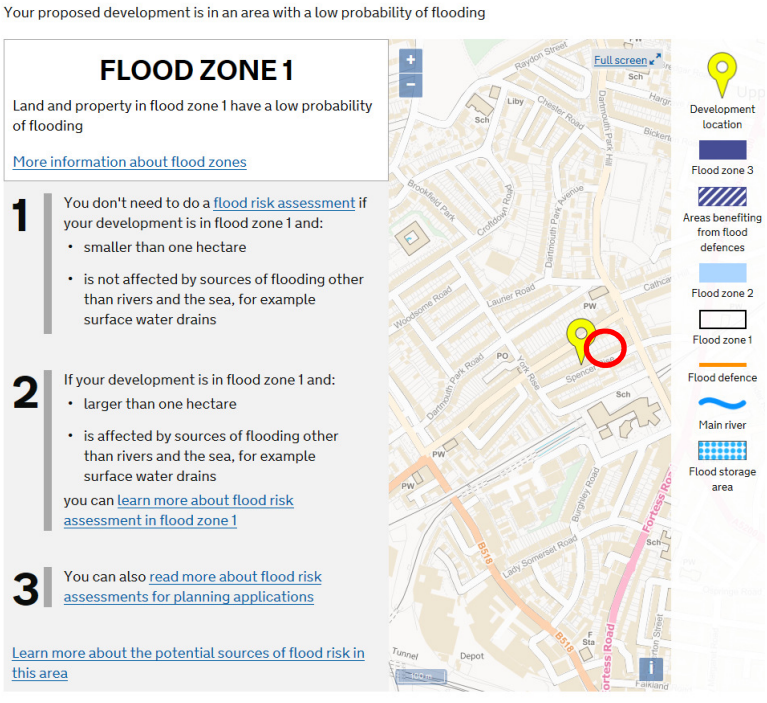
1908 Map, shows Spencer Rise and the surrounding area now developed. Construction of the property is therefore believed to be sometime between 1886 and 1906.

Geology



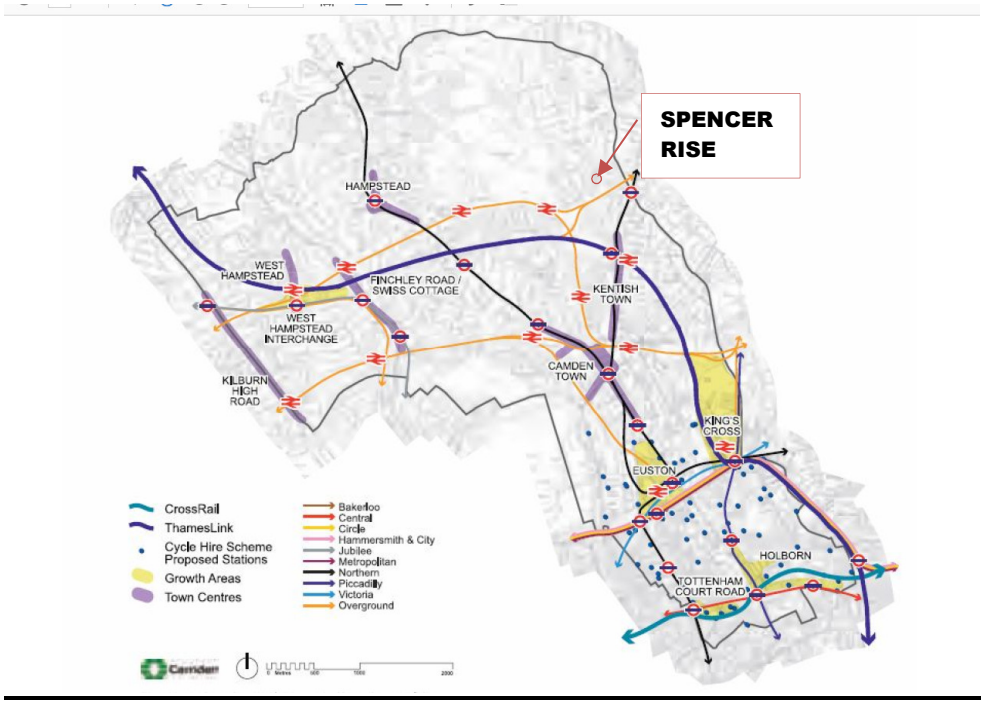
British Geological Science Viewer shows the site to overlay the London Clay.

Flood Risk



E.A. map shows the site to not be in a flood risk area

Underground / Railway



From Figure 18, Arup Report, No underground or railway routes near the site.

Other Utilities

Only utilities that cross the site are those which serve the dwelling its self, gas, water, electric. Telecom. These utilities will be protected and some turned off during the works.

No utilities serving neighbouring property will be affected by the works.

3 . SITE INVESTIGATIONS

Visual assessment of the existing building and its neighbours

A visual assessment of the existing building and its neighbours were completed by the author.

The layout of the existing building is given in the exiting architectural drawings included with the planning application.

No evidence of historic or ongoing movement was identified.

The buildings are in good overall structural condition.

No significant alterations appear to have been made to the existing or adjoining buildings.

Based on the inspection the proposed development is feasible and can be constructed using standard underpinning construction techniques.

4.STRUCTURAL DESIGN PRINCIPLES

External Walls

New concrete underpin walls below the property are designed as laterally propped walls in reinforced concrete, the lower ground floor slab acting as the lateral prop at wall base level, ground floor slab as a prop top of wall. The walls will be designed using the soil parameters relative to the site. The walls will be designed for a hyperthetical water table at 1.0m below ground level.

The surcharge load allowed on the external walls of the property will be 10KN/m^2 . The party wall bounding will have a surcharge load of 10.00KN/m^2 for adjoining floor and partition wall construction and will also take into account any loads from adjoining foundations.

Basement Slab

The slab will be formed in reinforced concrete. It will be designed for uplift due to water pressure below, or as a clear span as appropriate. The basement slab will act as a prop to the base of the basement walls. New lower ground floor slabs will be protected from heave by Cordek.

Design Criteria.

Basement walls and bases will be designed using the parameters for the retained soils and bearing soils as indicated by the Site Investigation.. The design is in accordance with BS 8002:1994.

The design will accomodate active and passive earth pressures. Pressure coeficients in the design will adopt ' at rest pressures'.

The wall and base in designed for the following

1. Vertical loads from walls above.
2. Party wall will be designed for a surcharge loading of 10kN/m^2.
3. Other external will be designed with a surcharge load of 10.00KN/m^2.
4. The design adopts a water head behind the wall to 1.0m below ground level.

The sub soils at new lower ground floor formation level will be London Clay, an SBP of 100KN/m^2 will be used in the design to limit differential foundation movements.

Concrete will generally be grade RC35/45 and Class 1 to BRE Digest 363. Reinforcement will be grade 500N/mm^2.

Existing brickwork assumes 7N bricks in a lime mortar, CP.111 gives basic compressive stress for this makeup of 0.45N/mm^2, and therefore allowable bearing stress will be 0.45N/mm^2. Any bearings into existing external or party wall masonry will take account of this allowable stress.

Mortar will be class (ii) or (iii) as required.

Relevant Codes of Practice and British Standards

B.S. 8002	Code of Practise for Earth Retaining Structures
B.S. 8004	Code of Practice For Foundations
B.S. 6031	Code of Practice For Earthworks
B.S. 8110	Structural Use of Concrete
B.S. 5750	Structural Use of Steelwork in Buildings

5.PREDICTION OF DAMAGE TO ADJOINING PROPERTYS

The formation of the new basement will result in a changed loading value and pattern to the bearing soil, the London Clay. The changed loading will also be applied at an increased depth below ground level. It is thought that such changes in loading may result in differential movement with adjoining buildings. However, based upon our previous experience of many other basements formed in the same way, in the same situation onto the London Clay differential movement post basement construction is nil or negligible. Any negligible movement would be no more that movement in the pre-basement condition resulting from shallow foundations on clay soils affected by seasonal moisture variation.

Works to form the basement will have construction sequenced in short sections, in excavations to form the walls and bases all soil faces will be continually temporarily laterally or vertically propped to avoid movement of soil during the construction stage. Permanent works will be designed to resist both pressures from the soils or structural loads from nearby buildings as appropriate. Strict control of the construction method together with the structural design will limit any potential damage to the adjoining garage to categories 0 (nil) or 1 (slight) of the Burland Scale. Or none, or at worst, ‘aesthetic’ as described by the BRE document for movement in buildings.

Refer also to Ground and Water Ground Movement calculations

6.BRIEF METHOD STATEMENT FOR CONSTRUCTION .

The exact sequence of works will be agreed with Main Contractor and Structural Engineer, clauses for a typical Contruction Method Statement for the under pinning works could be as follows.

a) The walls to the perimeter of the existing rooms will be underpinned in reinforced concrete. Underpins will take the vertical loads from the walls and horizontal loads from the earth. During their construction the walls and bases will require laterally propping in the temporary condition; propping will be made against the central earth pudding.
b) Underpinning legs will be excavated in short sections not exceeding 1200mm in width.
c) The sequence of the underpinning will be in the 1, 4, 2, 5, 3 sequence and such that any given underpin will be completed, dry packed, and a minimum period of 48 hours lapsed before an adjacent excavation commenced to form another underpin.

d) In the event that the existing foundations to the wall are found to be unstable, sacrificial steel jacks (props) will be installed underneath the foundation to prop the bottom few courses of bricks. These steel jacks will be left in place and will be incorporated into the concrete stem.
e) Whilst forming the wall and in the event that the vertical soil face is unstable, lateral propping will be provided as required to the excavation and to the sides of the working trench. The front and side faces of the excavation will be propped using a sacrificial inert board and acrow props as appropriate.
f) Concrete will be chuted from the point of delivery into a 'holding bath' within the working areas and placed by wheelbarrow and /or bucket, or mixed on site. The exact arrangement will be finalised when works commence on site.
g) Concrete will be placed within 30 minutes of batching on site, or delivery by lorry, concrete will be compacted with a mechanical hand held vibrator.
h) Excavation for an underpin section will be excavated in a day, and the concrete to the base poured by the end of the same day.
i) The concrete to the wall of the underpin will be poured the following day. This will be poured up to within 50 – 75mm of the underside of the existing wall foundations.
j) On the following day, the gap between the concrete and the underside of the existing foundation will be dry packed with a mixture of sharp sand and cement (ratio 3 : 1).
k) Once the dry pack has gained sufficient strength, any protrusions of the footings into the site will be carefully trimmed back using hand tools to avoid causing any damage to the foundation. The protrusions will be trimmed back to be flush in-line with the face of the wall above.
l) A minimum of 48 hours will be allowed before adjacent sections will be excavated to form a new underpin.
m) Once all pins are complete a temporary cross propping system will be introduced between the walls to allow bulk excavation will be carried out down to formation level.
n) The below – slab drainage for foul & ground water, sumps and pumps will then be installed. The pumps will discharge the foul / ground water into the sewer system to the front of the properties. The drainage layout will be designed in due course.
o) The basement slab will then be constructed, once cured this will provided the designed propping to the walls and the temporary cross propping can be removed.
p) A cavity drainage layer will be laid to the slabs and walls.

7.CONSTRUCTION SEQUENCE

1. Site set up will include a hoarding to the front garden; placement for skips will be made on the public highway subject to Camden approval.
2. The site is only accessible from Spencer Rise, and therefore all site deliveries and operations will take place from here. The front of the property will be manned throughout vehicle operations by a banksman to ensure construction deliveries do not pose a risk to other users of Spencer Rise.
3. Construct site hoarding, entrance gates to provide protection to passers-by from site operations. Site accommodation including welfare facilities will be confined to the main building throughout the site works.
4. Terminate / protect any incoming services temporarily divert any active drainage.
5. Install any tree protection measures as necessary.
6. Install enclosed skip to front on property and install conveyor to remove excavated soil to discharge soil into skip.

7. Fix monitoring points/ studs to party walls, as agreed under Party Wall Award. Points to be surveyed initially and co-ordinates recorded. Points to be surveyed weekly whilst underpinning works are carried out, both lateral and vertical movements to be checked for. Trigger levels of movement to stop works to be agreed prior to works commencing.
8. Remove ground floor to property.
9. Construction of underpins will commence within the property at a reduced level to just above existing foundation formation level.
10. Underpins will be carried out in the usual 1, 4, 2, 5, 3 underpinning sequence, the construction sequence for forming the pin is shown on the Vincent & Rymill drawings submitted for planning. Backfilling of the excavation will be made after each pin has been formed.
11. Excavations are to be kept dry and dewatering may be required to remove any perched water that enters excavation. Any requirement for dewatering of excavations is likely to be by pumping from small sumps formed at the base of the excavation. Dewatering process to be agreed with supervising engineer prior to this work commencing.
12. On completion of all underpinning cross propping of the pin walls will be erected to allow release of the local pins that may be propped against the central dumpling so the basement slab can be constructed. The propping will be designed to suit the lateral loads behind the walls but generally takes the form of a series of horizontal slimshor or UC props adequately laced and braced set approximately 1.5m from lower ground floor level.
13. Ground floor construction will commence once walls and bases are formed, fix steel beams, rib-deck permanent shutters, reinforcement and concrete.
14. Bulk excavation will be carried out down to basement slab formation level. Muck will continue to be removed from site via the conveyor belt.
15. The below – slab drainage for foul & ground water, sumps and pumps will then be installed. The pumps will discharge the foul / ground water into the sewer system to the front of the properties. The drainage layout will be designed in due course.
16. The basement slab (ground – bearing slab) will then be constructed.
17. After the new basement slabs have cured, the cross propping will be removed.
18. A drained – cavity layer will be laid to the slabs and walls.

T. J. Vincent

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