

18 Ferncroft Avenue, NW3

PROPOSED EXTENSIONS AND BASEMENT CONSTRUCTION

Basement Impact Assessment

by:

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Available Information:

The property is a substantial semi-detached house built about 100 years ago in a residential road of houses of similar construction. In 2011 planning permission was given for a rear extension with a basement (referred to as previous planning permission PPP). The present application includes the PPP with the addition of extending the basement beneath the whole of the existing house with light wells at the front and rear.

The site has a pronounced slope down from the rear to the front of the property resulting in several steps up to the front ground floor entrance of the existing house and a rear patio at ground floor level. The ground also slopes down the road with Nos. 16&18 being about 600mm lower than Nos. 20&22. A site investigation was carried out by Chelmer Site Investigations to determine the nature of the ground and to expose the existing foundations (Appendix 1). During 2011 cracks were observed in the walls of the front entrance area and an investigation and report was carried out by PBA Structural Consulting Ltd (Appendix 2).

The above reports confirm that the soil is a stiff silty clay getting firmer with depth down to 4m at the front and rear whilst the deeper borehole at the rear showed a strata of dense silty sand at 4.6m with water.

Extent of the Works:

The work involves the demolition of the existing rear extension and the construction of a basement extension bounded by the existing main walls of the property and the boundary fence walls of the adjacent properties at the rear. There will also be a light well with a new basement access at the front and a light well with basement access to the garden at the rear. The basement extension at the rear will support a new ground floor extension with a roof balcony as in the PPP. The basement and floor over will be in reinforced concrete and the remainder of the work in traditional timber and masonry with steel beams where necessary and areas of structural glass.

The following table addresses the specific requirements of Camden's Planning Guidance with added information following:

Subterranean (ground water) flow**Answers**

Q1a	Is the site located directly above an aquifer?	No
Q1b	Will the proposed basement extended beneath the water table surface?	No
Q2	Is the site within 100m of a watercourse, well or potential spring line?	No
Q3	Is the site within the catchment of the pond chains on Hampstead Heath?	No
Q4	Will the proposed basement development result in a change in the proportion of hard surface/paved areas?	Yes
Q5	As part of the site drainage will more surface water than at present be discharged to the ground?	No
Q6	Is the lowest point of the basement excavation close to or lower than the mean water level in any local pond or spring line	No

Q4 At the rear there will be an approximate increase of 66% in hard surfaced areas which corresponds to a total proportion of 23% of the rear garden area being hard surfaced. These proportions are similar to those permitted by the PPP. In addition there will be the area of the front light well and basement access that will be hard surfaced.

Slope stability screening flowchart

Q1	Does the site include slopes, natural or manmade, greater than 7°?	No
Q2	Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7°?	No
Q3	Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7°?	No
Q4	Is the site within a wider hillside setting in which the general slope is greater than 7°?	No
Q5	Is London Clay the shallowest strata at the site?	Yes(refer to the attached site investigation report)
Q6	Will any trees be felled as part of the development or are any works proposed within any tree protection zones where trees are retained?	No

Q7	Is there a history of shrink/swell subsidence in the local area or evidence of such effects on site	Yes(refer to the attached report by PBA Structural Consulting Ltd.
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Q8	Is the site within 100m of a watercourse or potential spring line	No
Q9	Is the site within an area of previously worked ground	No
Q10	Is the site within an aquifer	No
Q11	Is the site within 50m of the Hampstead Ponds	No
Q12	Is the site within 5m of a highway or pedestrian right of way	No
Q13	Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties.	Yes
Q14	Is the site over or within the exclusion Zone of any tunnels	No
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Q5 & Q7 The boreholes at the rear and front of the property agree that the soil is a stiff silty clay becoming firmer with depth down to 4m. This soil should provide adequate bearing for the new underpinning foundations. Below 4.4m depth at the rear the soil becomes more sandy and water bearing. At the front the boreholes were not sufficiently deep to reach the sand strata which is probably at a greater depth because of the general slope of the ground. Tests on the clay below the foundations showed it to have a high plasticity index which together with the presence of tree roots beneath the existing basement foundations accounts for the recent slight settlement that has occurred on the front corner causing cracks in the walls over. The proposed basement construction will have foundations below the tree roots and desiccated clay and should eliminate the settlement problem although the cracks will still require repairing.

Q13 As with most basement constructions the foundations will be up to 3m deeper than those of adjacent properties. The central party wall between Nos. 18&16 will be underpinned with a reinforced concrete cantilever wall of similar thickness to the existing brick wall and constructed in 1.2m lengths connected with stainless steel dowel bars. The side wall of No. 18 is separated from No. 20 by a passage way about 1.2m wide which will remain in place whilst the new wall is constructed from inside the new basement, again in an underpinning sequence of 1.2m lengths to avoid any effect on the foundations to No. 20

Surface Flow and Flooding

Q1	Is the site within the catchment of the pond chains on Hampstead Heath	No
Q2	As part of the proposed site drainage, will surface water flows (e.g. volume of rainfall and peak run-off) be materially changed from the existing route?	No
Q3	Will the proposed basement development result in a change in the proportion of hard surfaced/paved external areas?	Yes (see comments on Q4 above)
Q4	Will the proposed basement result in changes to the profiles of the inflows of surface water being received by adjacent properties or downstream watercourses?	No
Q5	Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No

Design and Construction:

The demolition of the existing single storied rear extension will require only nominal access scaffolding and any pinning and propping will not be necessary. This work will not affect adjacent properties although permission may be requested for the erection of protecting hoardings.

The walls of the basement will be designed as reinforced concrete cantilevers from a spread footing as illustrated in the attached typical detail. The design parameters for pressure on the walls will be in accordance with recommended values given in the Reinforced Concrete Designer's Handbook (by Charles E. Reynolds and James C. Steedman) for the relevant soil type. In addition it will be assumed that pressure from ground water could be present to a level of 0.75 of the depth of retained material. The walls will also be designed to support a surcharge load of 5kN/m^2 on the surface of the ground adjacent to the wall as well as the effects of pressure from any existing foundations. Each wall section will be checked for overturning and sliding and reinforced as necessary where subject to tensile stresses.

The walls beneath the house will be constructed in traditional hit and miss lengths of not more than 1.2m with the top of the wall packed with mortar to the underside of the existing foundation. Adjacent lengths will be connected with stainless steel dowel bars. It is anticipated that these walls will be cast against the face of the excavated soil. The walls to the rear side boundaries will be of similar construction except that the upper parts in top soil will require double shuttering. This procedure will maintain the stability of the ground and neighbouring properties at all times apart from minor disturbance of the soil at surface level.

The floor of the basement will be checked for uplift due to possible water pressure and designed to span between the walls. It is likely that the slab will require reinforcing on each face and depending on the ground conditions it will probably be necessary to provide a layer of MOT type 1 compacted hardcore and a layer of blinding concrete before casting the basement slab.

The ground floor construction will be a combination of structural steel beams spanning between basement walls and insitu or precast concrete floor units with structural glazing panels.

Flooding:

The site is not in a location that is subject to flooding and with the ground sloping away from the site in two directions, future flooding does not appear to be possible.

Springs:

At the height of Ferncroft Avenue in Hampstead there is always the possibility of springs occurring where there is sufficient sand or gravel in the soil. The trial bore holes indicated that the soil below ground level was a stiff silty clay becoming stiffer with depth. There was also no sign of water or water bearing strata down to a depth of 4m. This type of soil is unlikely to carry springs and there was no surface evidence of spring water in the rear garden.

Trees:

There are 2 mature Plane trees growing in the pavement at about 10m from the front of the property. These trees appear to have been lopped in the past and should continue to have their growth controlled. Roots from these trees were identified below the foundations of the front wall and appear to be contributing to the existing settlement of the front corner of the property. However the proposed new basement and light well should increase the foundation depth to soil with a lower plasticity index at a depth below existing tree root penetration and minimise the possibility of future settlement problems.

Neighbouring Properties

The attached property No. 16 Ferncroft Avenue is a handed type of building to No.18 and it will be necessary to underpin the party wall to the depth of the proposed basement. At the rear there are separate garden walls and the No. 18 side will be underpinned to form the side wall of the proposed basement extension.

On the No.20 side, the wall of the proposed basement underpinning is along the side of the passage where there is a clear space of about 1.2m between the properties so that the basement wall can be constructed from the inside in an underpinning sequence without affecting No. 20. For the basement extension at the rear the back face of the new basement wall will be on the boundary line and will be constructed in an underpinning sequence with the addition of temporary works to support the part of the garden of No.20 that is above the proposed ground floor of No.18.

Surface Water:

The proposed basement extension is at a similar level to the existing patio and will drain surface water to the existing drain run in the side passage of the house.

The surface water from the light wells at the front and rear will drain to a sump chamber below the basement and be pumped to a ground level manhole.