MOMENTUM
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59 Croftdown Road

Basement Impact Assessment

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Background

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Issue History

Rev.	Date	Comments
0	31.03.16	First Issue
1	15.12.16	Updated information from site investigation
2	22.12.16	Updated SI (figures 6,7 and 8) Updated Construction methodology and provided typical calculations
3	07.02.17	Update for surface and reservoir flooding from updated maps

Contents

1.0 Introduction

1.1 Existing structure

59 Croftdown Road is a 3-storey load bearing masonry structure with an existing part basement in the Dartmouth Park area of Camden, London.

The building is located on a corner site, with one party wall on the South Western Boundary. A spire-style structure exists on the street corner, providing additional floor area at each level. The facade is typical for the street, being of red brick construction.

Timber floor joists are assumed to span between the external load bearing masonry and internal stud walls.

A raised timber platform exists at the rear of the structure at ground level.

The building is assumed to have traditional shallow corbeled footings bearing on London Clay.

Figure 1: Section through existing structure

1.2 Proposed works

All the existing superstructure is to be retained, with the exception of modifications to the rear external masonry wall. The existing basement is to be lowered by 0.5m and extended by 2.3m towards the rear of the site, covering the area of the existing deck. A new internal stairway is proposed for access to the basement. Above the basement extension, a single storey conservatory is proposed to extend the kitchen area.

For duration of the works please refer to the Architect's works programme.

1.3 Construction methodology

It is proposed the basement floor will be lowered by breaking out and excavating under the existing floor.

Existing masonry walls (and the south western party wall) will require underpinning to ensure the existing foundations capacity are sustained. This will be done sequentially in 1m sections.

A new concrete floor will be installed at the lower level. It is proposed that this will prop the retaining wall at the base.

The new retaining walls within the garden extension will consists of RC propped at the top via a new concrete suspended floor, and propped at the base via a new basement floor slab. This is to be constructed typically by battening back the soil and building the retaining wall either sequentially or as one. The wall will need to be propped until both floors are in place.

Temporary works will be required to support the retained masonry walls and floors during construction.

Refer to appendix F for further information on the design of the walls, typical cross sections, proposed construction methodology and temporary propping requirements.

The basement will be waterproofed using a proprietary product as specified by the Architect.

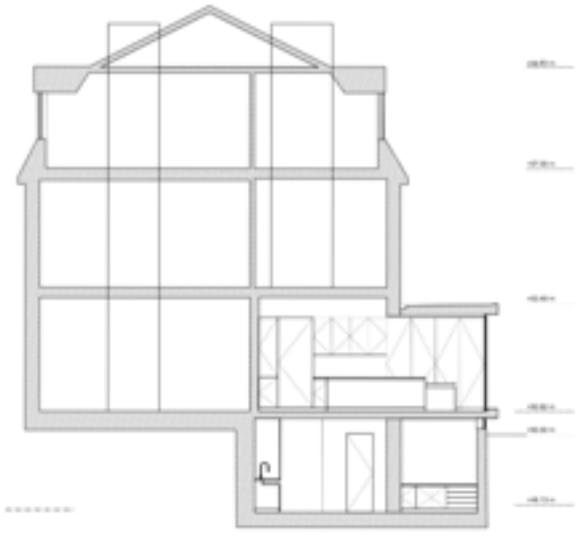

Figure 2: Section through proposed structure

1.3 Basement Impact Assessment

Planning guidance states that a site specific Basement Impact Assessment (BIA) is required for a development where either a new basement or an extension to an existing basement is proposed.

The purpose of this BIA is to assess whether any predicted damage to neighbouring properties and the water environment is acceptable or can be satisfactorily ameliorated.

The BIA methodology process includes the following steps:

- Stage 1- Initial screening: to identify whether there are any matters of concern.
- Stage 2- Scoping: to further define the matters of concern identified in the screening stage.
- Stage 3- Site investigation and study: to establish baseline conditions
- Stage 4- Impact assessment: to determine the impact of the proposed basement on baseline conditions.
- Stage 5- Final review and decision making by approving authority.

1.4 Site specific investigation

A site specific investigation has been undertaken by Ground and Water in November 2016. Refer to appendix E for the document dated December 2016 which is referenced throughout this report.

2.0 Stage 1: Screening

The first stage in assessing the impact of any proposed basement development is to recognise what issues are relevant to the proposed site and to identify those matters of concern which should be investigated further.

We have reviewed Camden Planning Guidance document CPG 4 (July 2015) on assessing the impact of basements and have therefore used the relevant headings and assessments adopted in the guide.

This Basement Impact Assessment has been carried out based on a desk study, refer to appendices A-D for information. A trial pit will be dug prior to starting work on site to confirm the assumptions made at this stage.

The screening flow charts cover the following topics:

- Groundwater flow (Table 1)
- Land stability (Table 2)
- Surface flow and flooding (Table 3)

2.1 Groundwater flow

Table 1: Subterranean (ground water) flow screening chart

No.	Question	Impact	Source/Comment
1a	Is the site located directly above an aquifer?	No	Based on Groundsure Enviroinsight aquifer maps, the site is not on a known aquifer.
1b	Will the proposed basement extend beneath the water table surface?	No	New basement level is approximately 0.5m below existing basement level, which is currently ~2.2m bgl. Based on the site specific site investigation, groundwater was not identified in the 5m deep borehole. From the desktop study this was expected to be at ~7m bgl. Standing water was identified at a depth of 4.28m bgl but was considered to be perched or surface water only. Based on the above information the proposed basement level will not extend beneath the water table surface.
2	Is the site within 100m of a watercourse, well (used/disused) or potential spring line?	No	From Groundsure Enviroinsight report the site is not over a groundwater source protection zone. There is no detailed river network entries within 500m of the study site. Based on Lost Rivers of London (Barton), an unused watercourse existed approximately 150m from the site.

No.	Question	Impact	Source/Comment
3	Is the site within the catchment of the pond chains on Hamstead Heath	No	The site is close to the Highgate chain on Hampstead Heath however based on Figure 14 of the Camden geological, hydrogeological and hydrological study, the site is not within the catchment area.
4	Will the proposed basement development result in a change in the proportion of hard surfaced/ paved areas	No	The overall extent of hard-standing will not change. The proposal occupies a similar footprint to the existing.
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)?	No	Initial review suggests that because the decking area is proposed to be replaced by roof area, the extent of hard-standing remains the same. Therefore surface water and runoff will remain similar to that at present.
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 (not just the pond chains on Hampstead Health) or spring line.	No	There are no local ponds or surface water features within 250m of the site Highgate Pond No1 is approximately 500m away.

2.2 Land Stability

Table 2: Slope Stability Screening Chart

No	Question	Impact	Source/Comment
1	Does the existing site include slopes, natural or manmade, greater than 7° (approx 1 in 8)	No	The site is relatively flat based on Figure 16 of Camden Geological, Hydrogeological and Hydrological Study.
2	Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 7° (approx 1 in 8)	No	The proposed will maintain the existing site slopes.
3	Does the development neighbour land, including railway cuttings and the like, with a slope greater than 7° (approx 1 in 8)	No	There are no significant artificial slopes or cuttings in the neighbouring land.
4	Is the site within a wider hillside setting in which the general slope is greater than 7° (approx 1 in 8)	No	There are no significant slopes in the neighbouring land.

No	Question	Impact	Source/Comment
5	Is the London Clay the shallowest strata at the site?	Yes	Based on the British Geological Survey results and the SI undertaken, London Clay is the shallowest strata on the site.
6	Will any tree/s 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? (Note that consent is required from LB Camden to undertake work to any tree/s protected by a Tree Protection Order or to tree/s in a Conservation Area if the tree is over certain dimensions)	No	The new basement extension does not require any trees to be removed as it is in the same location as the existing structure.
7	Is there a history of seasonal shrink-swell subsidence in the local area, and/or evidence of such effects at the site?	No	No evidence of shrink swell subsidence on site.
8	Is the site within 100m of a watercourse or a potential spring line?	No	From Groundsure Environinsight report the site is not over a groundwater source protection zone. There is no detailed river network entries within 500m of the study site. Based on Barton, Lost Rivers of London, an unused watercourse existed approximately 150m from the site.
9	Is the site within an area of previously worked ground?	No	There is no history of ground improvements or worked ground at this 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 site is not located within a known aquifer and is considered to be in an unproductive strata. Based on the SI undertaken, the basement will not extend below the ground water table. However temporary dewatering may be required for standing water.
11	Is the site within 50m of the Hampstead Heath ponds?	No	The site is approximately 500m form the ponds.
12	Is the site within 5m of a highway or pedestrian right of way?	Yes	The site is on the corner of two residential roads. On one of these roads, the basement will be within 5m of the footpath.

No	Question	Impact	Source/Comment
13	Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	No	Based on information provided by the owner, the neighbouring site has an existing basement of similar depth to that that exists on our site. There is a party wall that is shared by the properties with a basement on either side. Assuming that the ground floor level of the semi-attached 57 Croftdown Road does not change, then there will only be a 0.5m differential depth increase between neighbouring properties.
14	Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?	No	Based on Groundsure's Geoinsight investigation, the site is not located within 250m of any railway lines or tunnels.

2.3 Surface flow and flooding

Table 3: Surface flow and flooding screening flowchart

No	Question	Impact	Source/Comment
1	Is the site within the catchment of the pond chains on Hamstead Heath?	No	Based on Figure 14 of the Camden geological, hydrogeological and hydrological study the site is not within the catchment area.
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?	No	The amount of hardstand at the site occupies a similar area to the existing. Therefore the surface water flows will not be changed from the existing route.
3	Will the proposed basement development result in a change in the proportion of hard surfaced/paved external areas?	No	The amount of hardstand at the site occupies a similar area to the existing.
4	Will the proposed basement 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	The site profile is not being changed and will not impact on any adjacent properties.
5	Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No	No significant changes to the landscaping at the rear garden.
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	Not identified on Figure 15 of the Camden geological, hydrogeological and hydrological study as an 'area with potential to be at risk of surface water flooding'. However is identified on Groundsure Floodinsight report as having a significant risk of Pluvial flooding during a 1 in 75 year event. The street potentially flooded in the 1975 storm event according to 'Floods Scrutiny Panel flooded Roads 1975 and 2002 Figure 1'. Based on the Environment Agency maps, the site is subject to a low-medium risk of surface water flooding. The site is also identified as being at risk of flooding from reservoir (Highgate ponds neighbouring).

3.0 Stage 2: Scoping

The purpose of scoping is to assess in more detail the potential impacts of the proposed scheme. Potential consequences are assessed for each of the identified potential impact factors.

No public consultation has been undertaken during this scoping exercise as the proposed construction work is minimal and will have a negligible effect on the adjoining or nearby properties.

3.1 Groundwater flow

Matter carried forward	Scope of investigation and assessment
New basement level is at approximately 0.5m below the existing floor level. Standing water identified.	Based on the SI undertaken, the new basement will not be extended into the ground water table. It is possible that standing water within the strata will need to be temporarily dewatered during construction, which is to be taken into account by the Contractor when forming their methodology.

3.2 Land Stability

Matter carried forward	Scope of investigation and assessment
London Clay is the shallowest strata at the site.	The area and nominal depth of the structure extending into the ground is unlikely to pose any significant risk of instability. However a site investigation was undertaken to determine impact of this on the structure.
The site is within 5m of a pedestrian right of way.	Slope stability within this area is unlikely to be affected by lowering the basement floor 0.5m. The altered retaining wall will be designed and constructed to mitigate impacts on the adjacent structures. No further assessment is required.

3.3 Surface flow and flooding

Matter carried forward	Scope of investigation and assessment
The site was identified to have previously had surface water flooding and is at risk of future surface or reservoir flooding.	Further investigation of the Environment Agency Maps (shown below for reference) shows that the site is subjected to the following levels of flooding for surface water under different return periods: High risk scenario - 0mm depth (i.e not high risk) Medium risk scenario - Below 300mm depth Low risk scenario - 300mm- 900mm depth, below 300mm on two sides. For reservoir flood risk: 300-2000mm depth, but directly next to 300mm depth therefore expect ~300mm. Therefore the site needs to be investigated further to determine local risk and any potential anti-flood measures that are required.

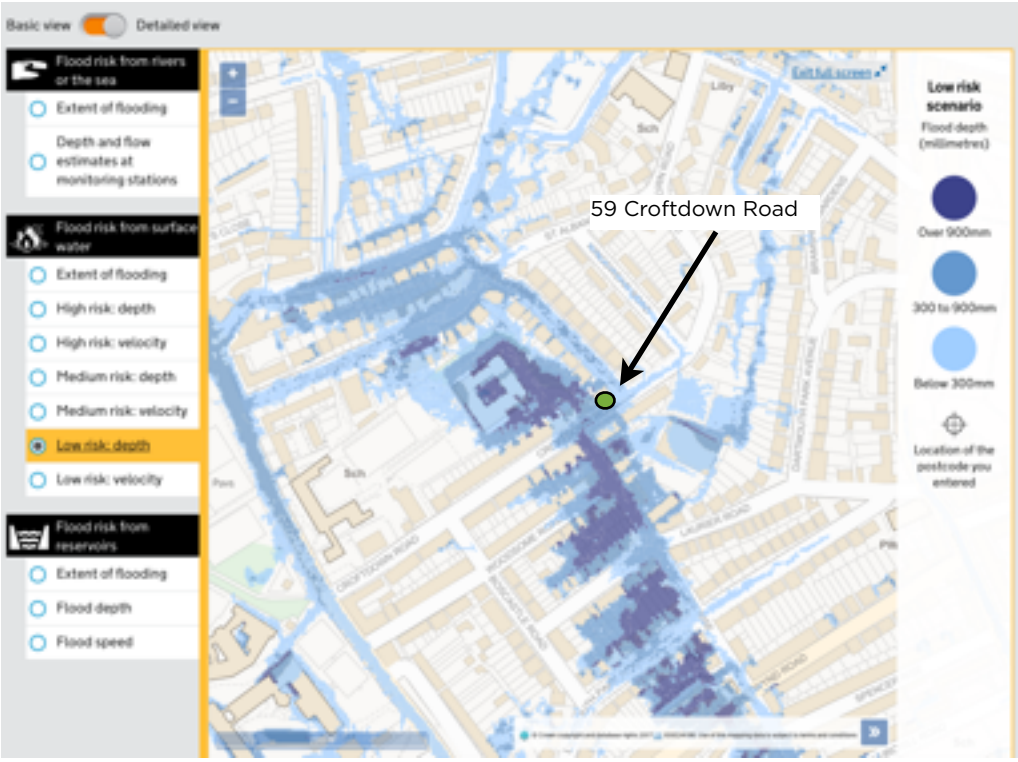

Figure 3: Environment Agency Map for Low Risk surface flooding.

4.0 Stage 3: Site Investigation and Study

The site investigation and study stage is undertaken to develop an understanding of the site and its immediate surroundings, in order to further investigate the matters of concern raised in stages 1 and 2.

4.1 Site specific investigation and ground movements

A site specific investigation has been undertaken to confirm the existing ground water table, existing foundations and the existing soil strata. The report can be found in Appendix E, with key points highlighted below:

- Existing water table is anticipated to be at 7m bgl (lower than the borehole investigation)
- Party wall foundations are at 0.6m (below basement level) which means underpinning will be necessary
- Geotechnical testing revealed that the Clay has a high volume change potential

Furthermore, a ground movement analysis was undertaken on the site, for lowering the basement to approximately 3.0m bgl (refer to section 6.6 of Appendix E for further parameters). This found:

- Maximum horizontal movement expected is between 1.5 and 5.25mm.
- This is expected to have negligible impact on neighbouring sites, except for 57 Croftdown road for which damage is expected to be very slight (in accordance with Table 2.5 of C580).
- This movement is noted as being able to be minimised during construction via careful temporary propping.

The above is for the excavation of the basement only. It is noted that due to the method of installation along the long basement wall that only the excavation deflection will be expected (wall to be cast then backfilled up to, minimising any deflection). With the shorter side walls, a similar method is applied however with a more vertical excavation which will staged and propped at regular centers to minimise any construction deflection.

Table 2.2 and figures 2.8, 2.9 of CIRIA C580 estimate up to 0.5% deflection for a diaphragm wall installation however that is excessive when we consider the actual wall construction methodology, therefore has not been applied to this analysis. The movement we do expect is to be very slight.

We therefore expect overall damage to be very slight on 57 Croftdown Road. Regardless, monitoring of movement and condition surveys will likely be required for 57 Croftdown Road, along with a careful temporary propping methodology from the Contractor to ensure any potential movements are minimised during construction. Details of these, including trigger levels are to be confirmed and agreed as part of the Party Wall award.

4.2 Surface water and reservoir flooding investigation

As identified in Stage 2 the site has potential for surface water flooding. Given the risk identified in the Environment Agency maps we are expecting below 300mm on 2 sides of the building, and 0.3-0.9m on the remaining sides. Based on this, and the lower backyard level (raising the potential flooding depth above 0.3m on EA maps) the flood risk for the site is 300mm above street level. Subsequently the new design requires anti-flood measures to be allowed for to this.

The anti-flood measures to be incorporated within the design are:

- Non return valves on below ground drainage (prevent back flow into basement)
- Entrance doors at ground level to have removable flood barriers installed. Existing window openings are above these levels and do not require further alterations.
- Smart Airbrick or similar to replace existing air vents preventing openings in external walls.
- Waterproof basement that incorporates a sump and pump system (part of cavity drain), this includes watertightness of any new works above.
- Structural design of basement to sustain surcharge loading applied via surface water at depth (structural stability during flooding, also strengthen existing masonry walls if necessary)
- Using concrete as main basement material to sustain stability during flooding.

In addition the site has additional landscaping benefits to assist in preventing surface water flooding:

- The site is surrounded by a masonry wall, >600mm high street side, with a higher timber fence elsewhere that will assist in keeping surface water out of the site. A removable barrier is to be installed over small fence openings to prevent water entering the site. Refer photo below for street view of site.
- At the rear of the building, the entrance is raised above the backyard level and is accessed via a timber deck (to be replaced with structure at same level).

These measures aim to prevent water at 300mm above street level entering the building, with redundancy in the basement design if they exceed this level. These minimise the impacts of surface water flooding on the proposed basement.

Figure 4: Google street view of site with wall surrounding

5.0 Stage 4: Impact assessment

The impact assessment stage evaluates the implications of the proposed project.

For this site, no scoped implications required further investigation and subsequently no impact assessment has been carried out for this project. Refer to stage 3 for details on the ground movement analysis for the proposed works.

6.0 Conclusion

The following section summarises the findings based on the 3 topics outlined at the screening stage.

The Basement Impact Assessment has been carried out based on a desk study only. Trial pits will be dug prior to starting work on site to confirm assumptions made at this stage.

6.1 Groundwater flow

The area and depth of the structure extending into the ground is unlikely to have any adverse affects on the ground water flow.

No known aquifers exist at the site.

Although nearby to the Hampstead Heath ponds- Highgate chain, the site is not within the catchment area.

The potential impact of the proposed lowering of basement level on ground water flow and nearby structures or environmental features is considered negligible as the development is above the ground water table.

6.2 Land stability

Slope stability within this area is unlikely to be affected by the lowering and extension of the basement. Any adverse effects to the neighbouring sites will be mitigated by the remediated retaining wall design, temporary propping and construction methodology.

The potential impact of the proposed lowering of basement level on ground movement and slope stability is considered 'negligible', with 'very slight' damage possible on the neighbouring 57 Croftdown road which is to be addressed and mitigated during the party wall award and construction sequencing (temporary propping included).

6.3 Surface flow and flooding

The site has flooded previously (in 1975), and is at low-medium risk of flooding from surface water with 300mm above street level being the design depth. The site was also identified as a risk during reservoir flooding. Anti-flood measures are subsequently to be provided, as outlined in section 4.2 to minimise the risk of flooding in the basement.