

WE ARE SYMMETRYS

BASEMENT IMPACT ASSESSMENT

41 SHELDON AVENUE
LONDON
N6 4JP

23135-SYM-XX-XX-RP-S-0001 REV B



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REVISION HISTORY

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P1	Draft version	23/11/2023	SB	CA
P2	Draft version	24/11/2023	SB	CA
A	First issue	18/12/2023	SB	CA
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1.0 Non-technical summary

- 1.1 The site location is 41 Sheldon Avenue, London, N6 4JP.
- 1.2 The site is currently occupied by a 3-storey detached house.
- 1.3 The proposal consists of the demolition of the existing building, and construction of a new 3-storey building above 1-storey basement, along with a new outdoor swimming pool at the rear of the property.
- 1.4 The following assessments are presented:
 - Desk Study.
 - Screening.
 - Scoping.
 - Ground investigation.
 - Design proposal.
 - Hydrogeological assessment.
 - Temporary works sequence.
 - Ground stability and stability of neighbouring structures.
 - Drainage and SuDS.
 - Party wall matters.
 - Sustainability.
 - Summary.
- 1.5 The authors and reviewers of these assessments are listed in Clause 3.0 of the report.
- 1.6 The ground investigations, consisting of one borehole dug at the front of the property, two boreholes dug at the rear, and eight trial pits, confirmed the following site conditions.
 - Made Ground, comprising of brown locally organic sandy silty clay, extending to a maximum depth of 0.50m in the boreholes, and a depth greater than 1.40m in the trial pits.
 - Claygate Member, comprising of firm orange-brown mottled brown clay, with occasional pockets and partings of silt and sand, encountered at a depth between 2.50m to 3.50m.
 - London Clay, comprising of firm becoming stiff brown silty clay, encountered to the maximum depth investigated (20m).
- 1.6.1 Groundwater was encountered in Borehole No 2 during drilling, at a depth of around 4.0m, and was measured at a depth between 0.34m to 1.07m below ground during the ground water monitoring. Due to the nature of the soil, ground water is expected to be encountered during the basement construction works.
- 1.7 The proposed substructure solution consists of bored piles, installed in various arrangement below the proposed building.
- 1.8 The BIA has assessed land stability and the impacts of the proposed development on neighbouring structures. Based on analytical models, the predicted damage to the neighbouring properties from the construction of the proposed basement would be "Negligible" (maximum damage category "0") to "Very Slight" (maximum damage category "1").
- 1.9 The monitoring of movement of the adjacent properties shall be undertaken by a specialist survey company during construction.
- 1.10 The BIA has identified no potential slope stability impacts.
- 1.11 The BIA has identified no potential hydrogeological impacts to the existing site and surroundings.

- 1.12 The Environment Agency Flood Map indicates that the site is not at risk from flooding from rivers and seas. However, the north-west side of the rear garden appears to be in an area at a low to medium risk of flooding from surface water.
- 1.13 This is a live document and further detailed assessment will be ongoing as the design and construction progress.
- 1.14 This document is to be read in conjunction with reports by others. Refer to Architect's drawings for site layout, plans and sections of the properties.

2.0 Introduction

- 2.1 Symmetrys Limited have been engaged by Radcliffes, acting as project managers for the proposed development, to produce a Basement Impact Assessment in support of the planning application for the proposed works at 41 Sheldon Avenue, London N6 4JP, in the London Borough of Haringey.
- 2.2 The proposed scope consists of the demolition of the existing building, and the construction of three-storey building plus one-storey basement replacing the existing. The construction of a new swimming pool at the rear of the new building is also proposed..



Figure 1. Proposed front elevation.



Figure 2. Proposed section.

2.3 A walkover of the site was carried out by a geotechnical engineer of GEA during at the time of the site investigation fieldwork.

2.4 The following reference documents have been used as guidance in compiling this report;

- Local requirements for information to be submitted with planning applications, Haringey, adopted on July 2023;
- Development management DPD, including Policy DM18, Haringey, adopted July 2017;
- Haringey Council Strategic Floor Risk Assessment, issued on February 2015;
- Basement Development Guidance Note – Haringey Council Planning Regeneration & Economy, June 2012;
- Highgate Neighbourhood Plan – Policy DH7, adopted on 2017;
- Guidelines on safe and efficient basement construction below or near to existing structures (ASUC);
- Site investigation, interpretative report, and ground movement assessment, provided by Geotechnical & Environmental Associates Limited (GEA).
- Report regarding the impact on trees of proposals for development at 41 Sheldon Avenue, London N6 4JP – Report number S1110-J2-R1, produced by John Cromar’s Arboricultural Company.

2.5 This report and attached documents are not intended for, and should not be relied upon, by any third party for any other purpose. Symmetrys drawings are based on the existing and proposed drawings provided by Marek Wojciechowski Architects.

3.0 Authors

- 3.1 The BIA Report has been authored by Simone Boncio (BSc MSc CEng AStructE), Principal Engineer at Symmetrys.
- 3.2 The report has been reviewed by Chris Atkins (CEng MStructE), Managing Director at Symmetrys with more than 30 years of experience, and by Vasilis Papavasileiou (Meng CEng MICE MFPWS), Associate at Symmetrys with extensive experience in basement and complex structure/civil engineering works.
- 3.3 The hydrological assessment, included within the Desk Study & Ground Investigation Report carried out by Geotechnical and Environmental Associates Limited (GEA), has been carried out by Alexander Goodsell (BSc FGS), Senior Geotechnical Engineer at GEA, and checked by Steve Branch (BSc MSc CGeol FGS FRGS), Managing Director at GEA.

4.0 Desk study

- 4.1 Site Location
- 4.1.1 The site is located on the south-west of the junction between Sheldon Avenue and Denewood Road, and approximately 1 km west of Highgate London Underground Station.
- 4.1.2 The site is bounded to the south-east and north-west by houses and associated gardens, and the ground of the Highgate Golf Club to the north-west.
- 4.1.3 A topographical survey has been prepared for the site in September 2023 by Mobile Cad Surveying Solutions.



Figure 3. Location plan.



Figure 4. View of the existing property front elevation.

- 4.2

Site description
- 4.2.1

The site is currently occupied by a 3-storey detached house located in the eastern part of the site, with a landscaped rear garden.
- 4.2.2

No recorded current or historical landfill sites, and no waste management facilities or waste transfer sites within 1 km of the site are present. The site is not located within any areas of sensitive land use.
- 4.3

Site history
- 4.3.1

The site was predominantly within open fields until 1860'. Between 1870 and 1896 several residential developments were established to the northwest and southeast of the site. By 1915, more of the existing road network was established.
- 4.3.2

By 1936, the building on the 41 Sheldon Avenue site had been established, and the site and surrounding area had been developed broadly as existing.
- 4.4

Geology
- 4.4.1

The British Geological Survey (BGS) map indicates that the site is underlain by the Claygate Member, over the London Clay Formation (refer to Figure 5).

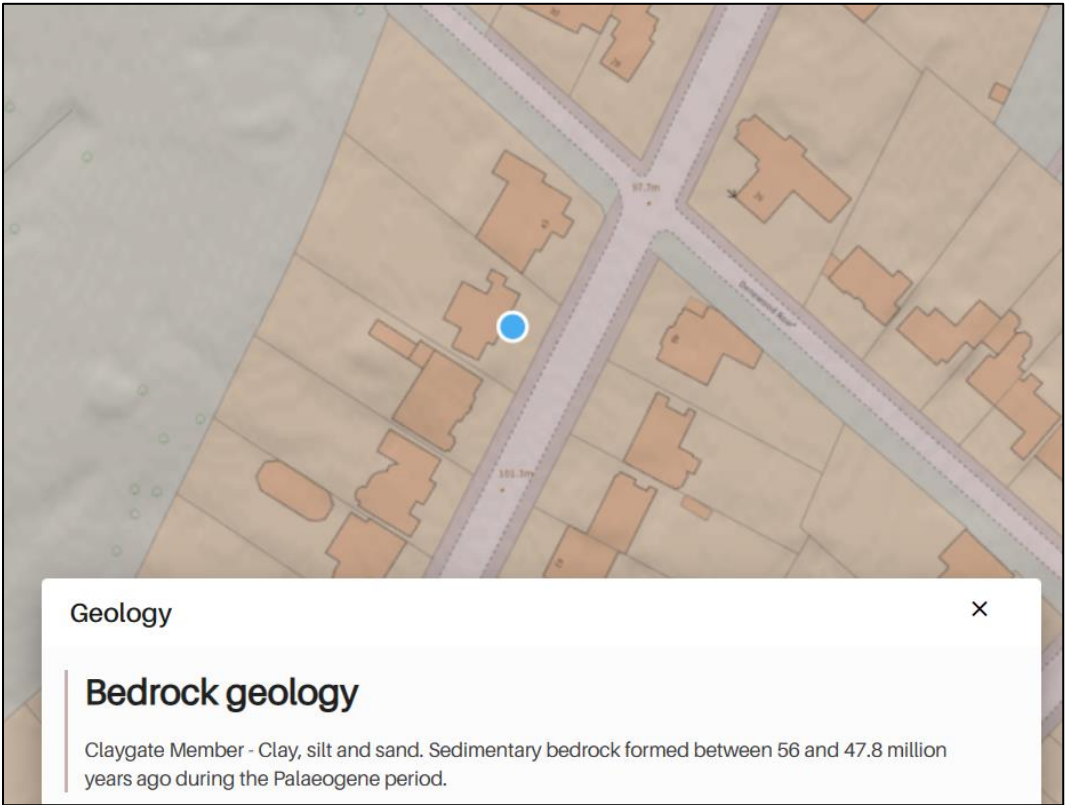


Figure 5. British Geological Survey plan showing the bedrock geology data on the site.

- 4.5

Hydrology and Hydrogeology
- 4.5.1

The Claygate Member is classified by the Environment Agency as a Secondary 'A' Aquifer. The Claygate Member is predominantly cohesive in nature and therefore groundwater flow is likely to be relatively slow. Exceptions might occur due to presence of sandier soils with higher permeability. Being designated Secondary 'A', the Claygate Member might include permeable layers that can support local water supplies and may form a source of based flow to rivers.
- 4.5.2

The site appears underlain by the London Clay, which is designated as unproductive strata, hence not capable of supporting a groundwater table, although pockets of perched water can be found.
- 4.5.3

The nearest surface water feature is located 104m to the west of the site, which is understood to be a stream or ditch within Highgate Golf Course. A small stream was located 65m to the east of the site, infilled or culverted at the start of the 20th century.
- 4.5.4

According to the Environment Agency, the site is not within an area at risk from flooding from rivers or the sea, nor within a Groundwater Source Protection Zone. Nonetheless, the north-west side of the rear garden appears to be in an area at a low to medium risk of flooding from surface water.
- 4.5.5

A slight increase in the proportion of the hard surfaced area is envisaged due to enlargement of the building footprint and the proposed pool at the rear of proposed building.
- 4.6

Overground and Underground Railway Infrastructure
- 4.6.1

Figure 6 shows the position of the proposed basement in relation to the existing and historic railway routes (source: web site <http://www.railmaponline.com/UKIEMap.php>). The closest railway infrastructure is the Northern Line, part of the Transport For London (TFL) network, approximately 600m to the northeast of the site.
- 4.7

Preliminary UXO Risk Assessment
- 4.7.1

A preliminary UXO Risk Assessment has been carried out by 1st Line Defence (report ref PA18617-00). The report indicates that, during World War II (WWII), no bomb strikes are recorded to have fallen within the site boundary. A low-minimal risk of encountering unexploded ordnance has been identified for the site and no further action is recommended.

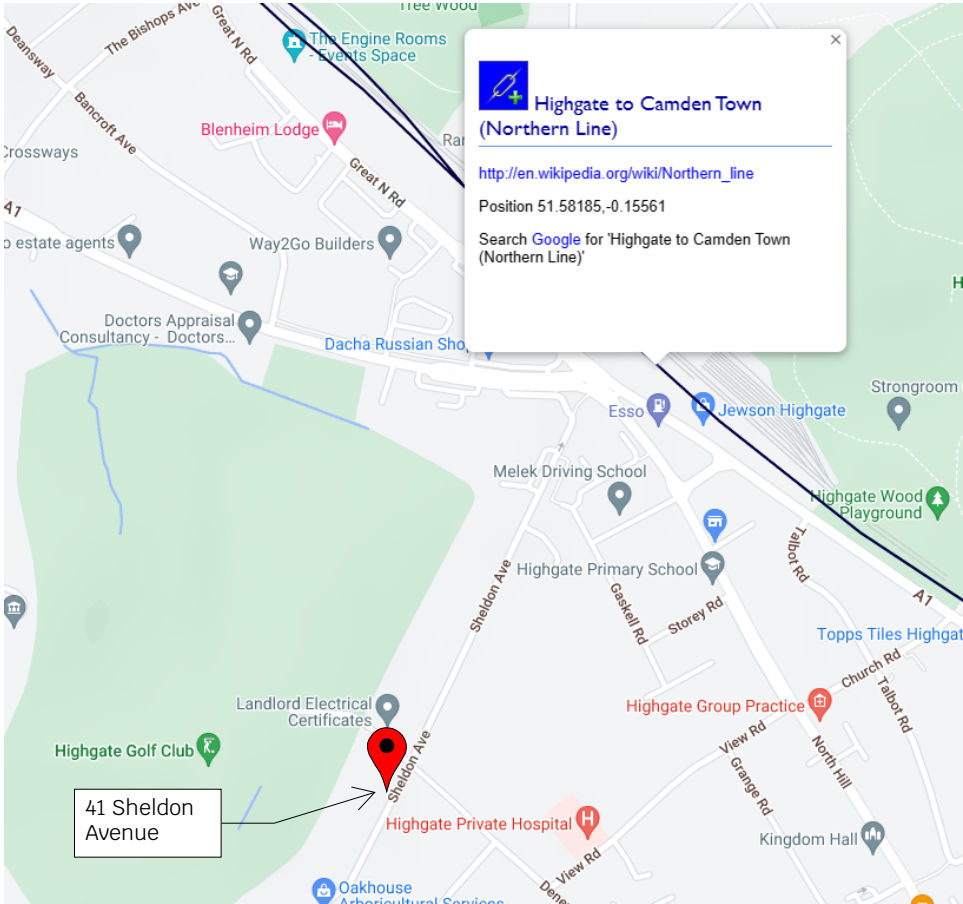


Figure 6. Site view showing the closest railway infrastructure to the site, approximately 600m to the northeast of the site.

5.0 Screening

The Basement Development Guidance Note outlines the following issues should be considered in the Basement Impact Assessment:

- Groundwater flow;
- Surface flow and flooding;
- Land stability;
- Cumulative development;
- Construction management.

The screening tools outlined in the London Borough of Camden have been used in absence of detailed guidance in the Haringey Guidance Note.

5.1 Subterranean ground water flow

5.1.1 A screening process has been undertaken and the findings are described below.

Question	Response	Details
1a. Is the site located directly above an aquifer?	Yes	The site is located above the Claygate Member, which is classified by the Environment Agency as a Secondary 'A' Aquifer
1b. Will the proposed basement extend beneath the water table surface?	Yes	Groundwater was encountered at a depth between 0.34m and 1.07m below ground floor level of the rear garden during the monitoring period.
2. Is the site within 100m of a watercourse, well (used / disused) or potential spring line?	Yes	A small stream was located 65m to the east of the site. This is believed to have been infilled or culverted at the start of the 20th century.
4. Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?	Yes	Larger building footprint/new pool at the rear of the building
5. As part of 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	Based on a desktop study, infiltration into the ground is not viable for the site.
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 Heath) or spring line?	No	

5.2 Land Stability

Question	Response	Details
1. Does the existing site include slopes, natural or man-made greater than 7 degrees (approximately 1 in 8)?	No	
2. Will the proposed re-profiling of landscaping at the site change slopes at the property boundary to more than 7 degrees (approximately 1 in 8)?	No	
3. Does the development neighbour land, including railway cuttings and the like, have a slope greater than 7 degrees (approximately 1 in 8)?	No	
4. Is the site within a wider hillside setting in which the general slope is greater than 7 degrees (approximately 1 in 8)?	No	
5. Is the London Clay the shallowest strata at the site?	No	Claygate Member was encountered over the London Clay Formation.

6. Will any trees be felled as part of the development and/or are any works proposed within any tree protection zones where trees are to be retained?	Yes	The scheme will require a few trees of low life expectancy or low amenity value to be removed.
7. Is there a history of seasonal shrink-swell subsidence in the local area and/or evidence of such effects at the site?	No	
8. Is the site within 100m of a watercourse or a potential spring line?	Yes	A small stream was located 65m to the east of the site. This is believed to have been infilled or culverted at the start of the 20th century.
9. Is the site within an area of previously worked ground?	No	
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?	Yes	Excavation will be undertaken within the Claygate Member which is a Secondary Aquifer ‘A’
11. Is the site within 50m of the Hampstead Heath Ponds?	No	
12. Is the site within 5m of a highway or pedestrian right of way?	No	
13. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Yes	The formation level of the proposed basement level is at a depth of 4.40 m below existing ground level. None of the neighbouring properties are understood to have lower ground floor levels
14. Is the site over (or within the exclusion zone of) any tunnels, e.g. railway lines?	No	

5.3 Surface Water and Flooding

Question	Response	Details
1. Is the site within the catchment of the pond chains on Hampstead Heath?	No	
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	There is no significant difference in the proposed surface water flow route from existing.
3. Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?	Yes	Larger building footprint/new pool at the rear of the building
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	Based on the surface water modelling on the GOV.uk website, the surface water flood risk is mainly at the rear of the property hence outside the proposed basement location.
5. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No	Based on the surface water modelling on the GOV.uk website, the surface water flood risk is mainly at the rear of the property hence outside the proposed basement location.

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	Refer to the Flood Risk Assessment for further details.
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5.4 Cumulative development

5.4.1 The proposed basement will not be part of a cumulative development.

5.5 Construction management

5.5.1 The proposed basement construction methodology will consist of contiguous pile walls that will be designed by a specialist piling designer, and that will maintain the stability of the surrounding ground. The construction of the basement is expected to be managed through the careful selection of contractors who will carry out the works in accordance with the approved design.

6.0 Scoping

The following issues have been brought forward from the Screening process for further assessment:

Subterranean ground water flow

6.1 Q1a: Is the site located directly above an aquifer?

- 6.1.1 The site is located above the Claygate Member, which is classified by the Environment Agency as a Secondary ‘A’ Aquifer. Ground water has been measured at depths between 0.34m to 1.07m during the ground water monitoring.
- 6.1.2 The basement construction will only partially act as a barrier to any ground water flow, as there will be space between the proposed basement and the neighbouring structures. Hence, it is unlikely that the development will cause significant increase in the water level on the upstream side.
- 6.1.3 Although theoretically partially deviating the ground water flows, the arrangement of the buildings is as such that no significant influence on the local hydrogeology is expected.

6.2 Q1b: Will the proposed basement extend beneath the water table surface?

- 6.2.1 Groundwater was encountered at a depth 0.34m and 1.07m below le level of the rear garden during the monitoring period. The formation level of the proposed basement level is at a depth of 4.40 m below existing ground level. Therefore, it is expected to encounter water during the basement construction works.
- 6.2.2 Potential water flow due to interconnected pockets of water would be dealt with localised grouting.

6.3 Q2: Is the site within 100m of a watercourse, well (used / disused) or potential spring line?

- 6.3.1 A small stream was located 65m to the east of the site. This is believed to have been infilled or culverted at the start of the 20th century. Due to the distance of the stream from the site, and the site investigations carried out at the site not having recorded the presence of soft spots, the proposed development is not expected to have any impact on the culvert, neither the proposed construction methodology is expected to be affected by the relative vicinity to the stream.

6.4 Q4: Will the proposed basement development result in a change in the proportion of hard surfaced / paved areas?

6.4.1 The new building footprint is larger than the existing. Moreover, a swimming pool is proposed at the back of the site. The drainage strategy confirmed the feasibility of discharging at the required flow rate via adoption of SuDS. Details of the SuDS design is included in the report prepared by Symmetrys, number 21135-SYM-XX-XX-RP-C-0002.

Land stability

6.5 Q6: Will any trees be felled as part of the development and/or are any works proposed within any tree protection zones where trees are to be retained?

6.5.1 The scheme will require a few trees of low life expectancy or low amenity value to be removed. However, the impact of the tree removal on the land stability is likely to be negligible.

6.5.2 Some of the works are proposed within the root protection zones where trees are to be retained. However, the area of encroachment appears to be minimal. Hence, no detrimental effects on the trees have been anticipated.

6.6 Q8: Is the site within 100m of a watercourse or a potential spring line?

6.6.1 A small stream was located 65m to the east of the site. This is believed to have been infilled or culverted at the start of the 20th century. Refer to clause 6.3.

6.7 Q10: 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?

6.7.1 Dewatering might be required during excavation. Assuming a contiguous pile wall solution will be adopted, potential water flow in the excavation will be dealt with localised grouting.

6.7.2 Continuous water monitoring is advised during the basement construction works.

6.8 Q13: Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?

6.8.1 The formation level of the proposed basement level is at a depth of 4.40 m below existing ground level. None of the neighbouring properties are understood to have lower ground floor levels. The basement formation level will be reached following installation of a perimeter contiguous bored pile wall, which will be propped in temporary conditions by temporary props, and by the cast in-situ ground floor and basement slab in permanent condition.

6.9 The Ground Movement Analysis carried out by GEA concluded that the proposed construction works will result in a building damage category for the neighbouring structures of Category 0 (Negligible) to Category 1 (Very Slight).

Surface water and flooding

6.10 Q3: Will the proposed basement development result in a change in the proportion of hard surfaced / paved external areas?

6.10.1 Refer to clause 6.4.

6.11 Q6: 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?

6.11.1 Flood risk mitigation measures, including control flow rate and SuDS have been included in the assessment carried out by Symmetrys, and present in the reports 21135-SYM-XX-XX-RP-C-0001 (Flood Risk Assessment), and 21135-SYM-XX-XX-RP-C-0002 (SuDS design).

7.0 Ground Investigation

7.1 A ground investigation was carried out by Geotechnical and Environmental Associates Limited (GEA).

7.2 A 20m deep borehole was excavated at the front of the existing building and two 8m deep boreholes were advanced at the rear of the site. Eight trial pits were also excavated to confirm the existing front façade foundation depth as well as the party walls along the site. See Appendix C for details. Standpipes were installed in the boreholes to allow groundwater monitoring.

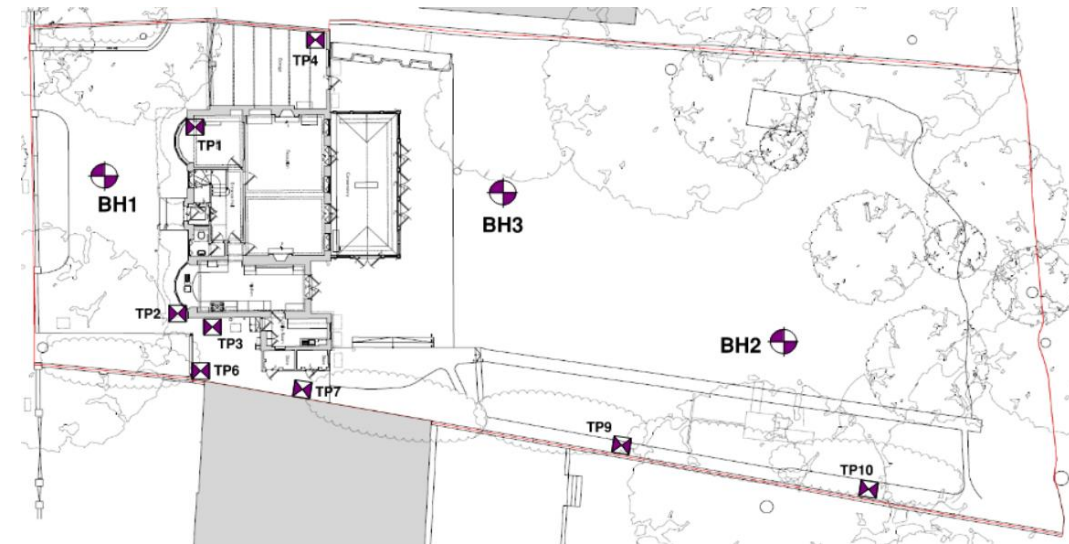


Figure 7. Plan showing boreholes (BH) and trial pits (TP) location.

7.3 The investigation has generally confirmed the expected ground condition, consisting of:

- Made Ground, comprising of brown locally organic sandy silty clay, extending to a maximum depth of 0.50m in the boreholes, and a depth greater than 1.40m in the trial pits.
- Claygate Member, comprising of firm orange-brown mottled brown clay, with occasional pockets and partings of silt and sand, encountered at a depth between 2.50m to 3.50m.
- London Clay, comprising of firm becoming stiff brown silty clay, encountered to the maximum depth investigated (20m).

7.3.1 Groundwater was encountered in Borehole No 2 during drilling, at a depth of around 4.0m, and was measured at a depth between 0.34m to 1.07m below ground during the ground water monitoring. Due to the nature of the soil, ground water is expected to be encountered during the basement construction works.

7.3.2 The deep excavation of the basement will result in a net unloading of approximately 85 kN/m², resulting in heave of the underlying London Clay. It is expected that 40% of the movement will take place immediately, with the rest of the total movement expected to take place over many years.

7.3.3 The contamination testing confirmed elevated concentration of lead and Polycyclic aromatic hydrocarbons (PAH). Additional testing will be required to reduce the uncertainty to potential risk. Alternatively, site specific risk assessment or soil remediation will be required prior to any construction work.

7.3.4 Chemical analysis confirmed that the concrete foundation design should account for the concentrations of soluble sulphate and PH in accordance with Class DS-1 to DS-2, as well as ACEC class of AC-2.

8.0 Design Proposal

- 8.1 The scope of works consists of demolition of the existing building, and construction of a new three-storey above ground plus one-storey basement on the footprint of the existing building. A swimming pool is also proposed to be construction at the rear of the site.
- 8.2 The proposed substructure solution consists of bored piles, installed in various arrangement below the proposed building.
- 8.3 Following the demolition of the existing building, contiguous piles, acting as soil retaining structure in permanent condition, will be installed around the perimeter of the proposed basement. Isolated piles will be installed below the ground beams along the north-east side of the development, and within the basement footprint to provide support to the pile caps and basement slab.
- 8.4 The basement structure will consist of a suspended 300mm RC slab on pile caps, and 250mm RC lining wall. A 250mm RC slab will be installed at ground floor level to provide permanent horizontal prop to the contiguous pile wall capping beams, as well as transferring vertical loadings to foundations.

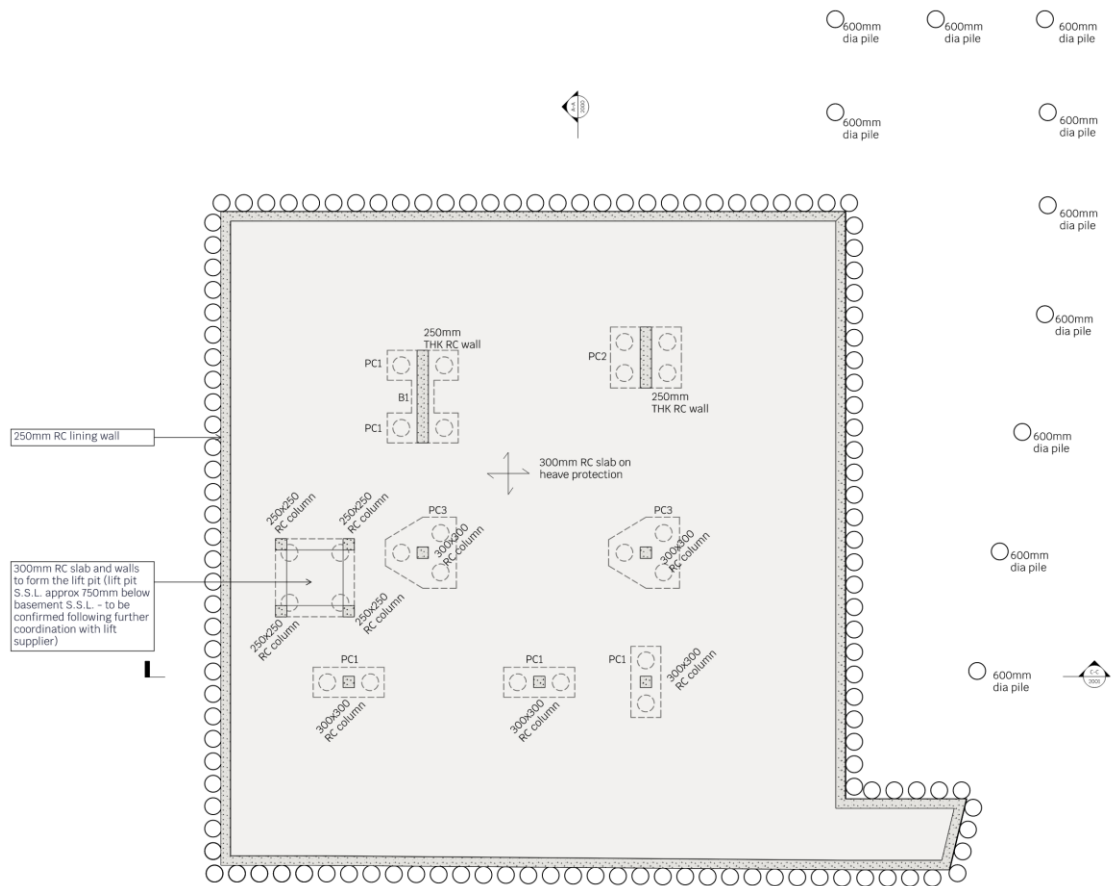


Figure 8. Proposed basement plan.

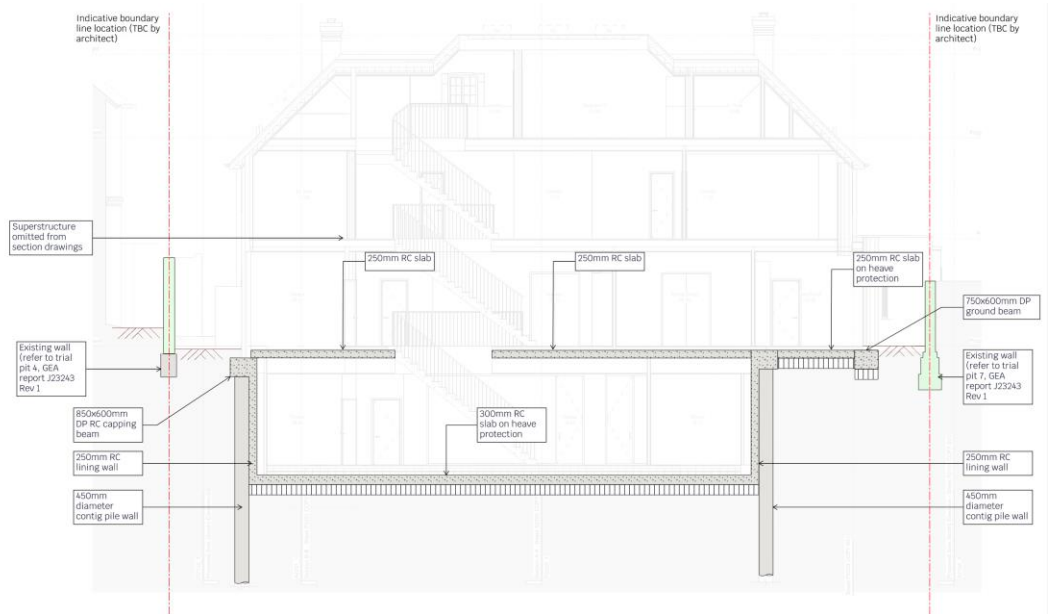


Figure 9. Proposed section C-C.

- 8.5 The ground floor slab will be internally supported on 300x300mm RC column, which will in turn be supported on pile caps at basement level. On the ground floor area not above the basement space, the slab will be cast on heave protection, and supported on ground beams on piles.
- 8.6 Heave protection in form of void formers will be allowed for the construction of basement slab, ground floor slab (where not above the basement space), and ground beams.
- 8.7 The structural planning drawings are included in Appendix A, including structural layout in permanent and temporary conditions,
- 8.8 The temporary works sequence is presented in clause 10.0 of this report and Appendix A, while the superstructure construction sequence is not presented.

9.0 Hydrogeological Assessment

- 9.1 The desk study and ground investigation confirmed the site is underlain by the Claygate Member, a Secondary "A" aquifer, over the London Clay. Ground water has been measured at depths between 0.34m to 1.07m during the limited period of monitoring.
- 9.2 The basement construction will only partially act as a barrier to any ground water flow, as there will be space between the proposed basement and the neighbouring structures. Hence, it is unlikely that the development will cause significant increase in the water level on the upstream side.
- 9.3 Construction below the groundwater level could theoretically deviate the ground water flows. However, the arrangement of the buildings is as such that no significant influence on the local hydrogeology is expected.

10.0 Temporary Works sequence

10.1 The proposed temporary works sequence for the basement construction is provided in Appendix A, and summarised below:

1. Demolition of existing building.
2. Contiguous piling around the perimeter of the proposed basement.
3. Piling below proposed ground level one storey north-east wing and pavilion.
4. Installation of capping beams.
5. Temporary prop capping beams.
6. Excavation to basement formation level.
7. Piling from basement level to install piles below proposed basement walls and columns.
8. Installation of pile caps to piles below basement walls and columns.
9. Installation of void formers at basement and ground floor level.
10. Installation of RC slab at basement level above void formers and pile caps.
11. Installation of RC lining wall.
12. Installation of RC ground floor slab and dismantling of temporary works propping capping beams.
13. Installation of superstructure (sequence not detailed in this section).

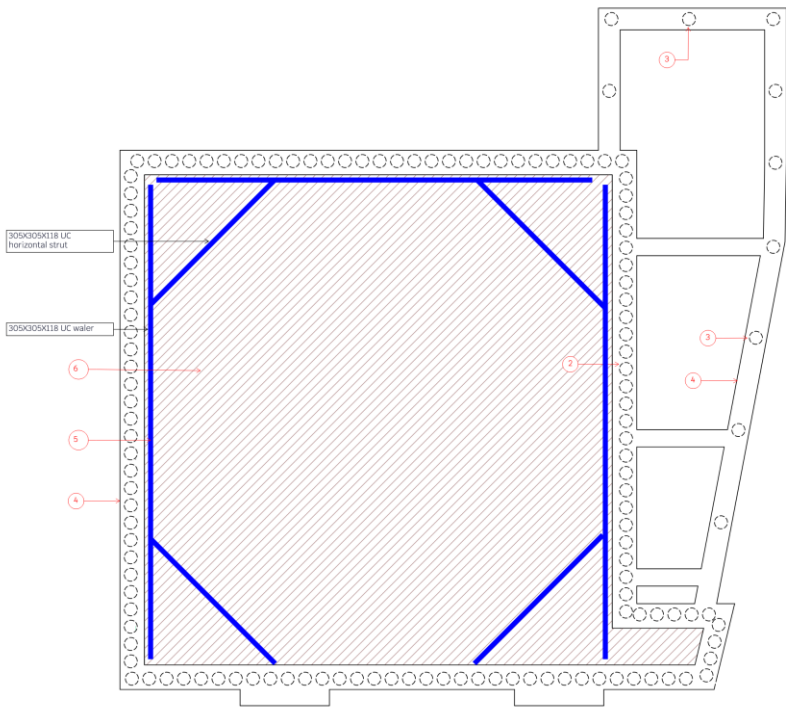


Figure 10. Basement and substructure temporary works construction (stages 2 to 7 of the proposed sequence).

10.2 The temporary works sequence is for design development purposes only and for the purposes of this planning application. A detailed construction method statement and temporary works design must be provided by contractor and temporary works designer post planning and prior to any construction works. The appointed contractor will be responsible for all temporary supports and for the stability of the structure during the works. The method of construction adopted for the basement construction minimises the quantity of temporary works required.

10.3 To ensure that the retained engineer's intent is correctly interpreted by the contactor, they will be required to submit all temporary works proposals for review a minimum of 7 working days prior to commencing works. The contractor should also submit a dewatering strategy to ensure a strategy is agreed should water be encountered.

11.0 Ground Stability and Stability of Neighbouring Structures

11.1 A Ground Movement Analysis has been carried out by Geotechnical & Environmental Associates Limited (GEA).

11.2 The computer programs X-Disp and P-Disp has been employed to predict ground movement likely to arise from the excavation and construction of the proposed basement. Details of the assessment has been presented in Part 3 of GEA report reference J23243 Rev 2, included in Appendix C of this report.

11.3 The analysis has predicted that the proposed installation of the retaining structure and excavation of the proposed basement will result in a building damage category for sensitive structures of Category 0 (Negligible) to Category 1 (Very Slight). The predicted movement should be checked by monitoring of the adjacent properties and structures during the construction stages.

Structure	Elevation Reference	Category of Damage*
39 Sheldon Avenue	Walls B, D & H	Very Slight (1)
	Walls A, E, F & G	Negligible (0)
	Wall C	Below limit of sensitivity
43 Sheldon Avenue	Walls B, G, H, I & L	Very Slight (1)
	Walls A, C, F, J, K & M	Negligible (0)
	Walls D & E	Below limit of sensitivity

Figure 12. Table showing the category of damage associated with the proposed construction works at 41 Sheldon Avenue and based on the Ground Movement Assessment carried out by GEA.

12.0 Drainage and SuDS

12.1 Refer to Symmetrys report 21135-SYM-XX-XX-RP-C-0001 Flood Risk Assessment, and 23135-SYM-XX-XX-RP-C-0002 SuDS Strategy Report for details on Drainage and SuDS.

13.0 Party Wall Matters

13.1 The proposed works will fall within the Party Wall Act 1996. Procedures under the Act will be dealt with by the client's Party Wall Surveyor. The Party Wall Surveyor will prepare and serve necessary Notices under the provision of the Acts and agree Party Wall Awards in event of disputes. The Contractor will be required to provide the Party Wall Surveyor with the appropriate drawings, method statements and all other relevant information covering the works notifiable under the Act. The resolution of the matters under the Act and provision of Party Wall Awards will protect the interests of all owners.

13.2

Monitoring

It is proposed that the structural stability of the adjacent properties is safeguarded by a system of movement monitoring. The Contractor shall monitor the position and movements of the elevations of the adjacent properties around the perimeter of the proposed excavation. The monitoring shall be undertaken by a specialist survey company. The monitoring system will have at least the following characteristics:

- (1)

The façades and flank wall of the neighbouring properties will be monitored near ground level and at roof level, at intervals not exceeding 3m centres.
- (2)

Monitoring points (targets) shall be firmly attached, to allow 3D position measurement, for the duration of the work, to a continuous and uninterrupted accuracy of $\pm 1\text{mm}$. A suitable remote reference base/datum unaffected by the works will be adopted, one located at least 50m from the site.
- (3)

Points/targets shall be measured for 3D positioning on, at not less than the following intervals:

(a)

Before any works commence (base reading).

(b)

Weekly during the period of basement excavation/construction.

(c)

Fortnightly until permanent structure is in place

(d)

Monthly during the course of the remainder of the works.

(e)

Six months after the completion of all construction works.
- (4)

All measurements shall be plotted graphically, to clearly indicate the fluctuation of movement with time. The survey company shall submit the monitoring results to the Engineer (Symmetry Ltd) and to the Adjoining Owners Party Wall Surveyors/Engineer within 24 hour of measurement, graphically and numerically.
- (5)

The following trigger levels for movement are proposed for agreement. In the event of a trigger value being reached the Contractor will immediately stop any work that might cause further movement, assess the situation and propose alternative methods for proceeding, with definitive further movement limits for those later steps.
- (6)

Trigger movement limits are proposed as follows:

Existing Buildings: Horizontal/Vertical Movement	
Amber $\pm 5\text{mm}$	All parties notified
Red $\pm 10\text{mm}$	Works Reviewed

14.0

Sustainability

- 14.1

As the basement construction will involve significant amounts of concrete, cement replacement alternatives should be considered. Cement replacements can used to replace up to 40% of the cement in concrete mix. These replacements are typically waste products from the energy production industry such as PFA (pulverised fuel ash) and GBFS (granulated blast furnace slag). By adopting them waste products from the energy production industry are recycled and not sent to landfill sites. Furthermore, this also reduces the amount of cement that needs to be mined. Concrete should be bought from a local supplier to further reduce the carbon footprint of transport.
- 14.2

There is a significant amount of reinforced concrete on the project for which steel reinforcement bars will be required. By specifying reinforcement from a UK supplier it ensures that the rebar is made from 100% recycled steel. Any structural steelwork should be sourced from a British manufacturer to ensure that rolled sections are made from at least 60% recycled steel. Sourcing the steel from a local supplier will further reduce the transport carbon footprint.

15.0

Summary

- 15.1

The proposed basement at 41 Sheldon Avenue has been designed with robust structural principals and methods of construction that are widely used and known. This will ensure the integrity of neighbouring structures and roadways are not compromised during its construction.

APPENDIX A

PLANNING DRAWINGS

APPENDIX B

STRUCTURAL CALCULATIONS

APPENDIX C

GEOTECHNICAL REPORT

AND GROUND MOVEMENT

ASSESSMENT

**TO DISCUSS YOUR PROJECT WITH US
PLEASE GET IN TOUCH ON 020 8340 4041
OR EMAIL US AT [INFO@SYMMETRYS.COM](mailto:info@symmetrys.com)**

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