
24 Redington Gardens

London, NW3 7RX

Detailed Basement Construction Method Statement

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Non-Technical Summary

If the recommended measures and sequence of works outlined in this report are properly undertaken by a suitably experienced contractor, it is very unlikely that the proposed works will pose any significant threat to the structural stability of the adjacent properties and surrounding grounds.

The 'Desk study and Ground Investigation Report' prepared by GEA suggests that it is unlikely that the proposed basement will pose a risk to the hydrogeological or hydrological setting.

Cranston Consulting will have an on-going role during the works on site to ensure that the works are being carried out generally in accordance with our design and specification. This role will typically involve weekly site visits at the beginning of the project and fortnightly thereafter.

1.0 Introduction

- 1.1 Cranston Consulting is a firm of consulting structural engineers. We have extensive experience in subterranean construction and have developed an understanding of the basement developments within north London, its unique geology, and in particular the design and construction of single and double storey basement structures utilising the top down construction methodology.
- 1.2 The following report has been prepared to ensure that the property and neighbouring properties are safeguarded during the works. This report follows the guidance given in the Camden Planning Guidance on Basements and Lightwells CPG4. This assessment has been prepared in accordance with the guidance given in CPG4, DP23 and DP27. The Basement Impact Assessment is being carried out by persons holding the required qualifications relevant to each stage.
- 1.3 The Contractor will provide a detailed method statement including all temporary works required before the works can commence on site. Whilst the Contractor is to accept full responsibility for the stability and structural integrity of the works during the Contract and provide temporary support as necessary, the design of these temporary elements shall be designed by Cranston Consulting to ensure that the integrity of the basement design philosophy is maintained.
- 1.4 This statement focuses on the proposed subterranean works. It should be read in conjunction with all relevant Architects and Specialists supporting documents, some of which appear in the Appendices of this documents.

2.0 Description of Existing Building and Desk Study Summary

- 2.1** No. 24 Redington Gardens is a two-storey detached house. The site has a front and rear garden whereby the house is situated approximately in the front third of the site.
- 2.2** The existing building consists of load bearing masonry walls which support timber floors at first floor. The existing roof structure consists of timber rafters spanning between the masonry walls while the ground floor slab appears to be a RC ground bearing slab. Stability of the overall structure is assumed to be provided by cellular action of the masonry walls and diaphragm action of the floors and roof. The building is not listed.
- 2.3** No. 24 Redington Gardens sits approximately 1.2m from its neighbouring property and approximately 1.0m from No 25. It should be noted that No 25 & 26 Redington Gardens shall be demolished at the same time as No's 24 and has planning permission for a new basement structure.
- 2.4** The Structure of the property adjacent to No 24 is 2 storey load bearing masonry building with a single storey flat roofed garage. On the boundary there is a masonry bin store with a timber roof.
- 2.5** Examination of the Environment Agency Flood Map indicates that the site lies within Zone 1 (low flood risk). As the site is less than 1 hectare, a Flood Risk Assessment should not be required. Also, Redington Gardens is not a street at risk of surface water flooding (as listed by Camden Planning Guidance CPG 4).
- 2.6** There are a number of trees located around the periphery of the existing building. The proximity of the existing trees will need to be considered in the final design of the basement and its foundations. An arboriculturalist has been appointed to ensure that the works do not have an adverse impact on the retained trees.
- 2.7** The results of our desk study can be summarised as follows;
- The site is not located within a flood plain as shown on the latest Environment Agency Flood Maps (reference; www.environment-agency.gov.uk).

3.0 Ground Conditions

- 3.1** Detailed information of the site and ground conditions have been provided in the 'Desk Study and Ground Investigation Report' prepared by Geotechnical & Environmental Associates (GEA).
- 3.2** Reference to British Geological Survey Maps (Sheet 256) suggests that the underlying ground is likely to be underlain by the Claygate Member of the London Clay Formation.
- 3.3** The ground conditions have been confirmed by a site investigation carried out by GEA in May 2015. The site investigation comprised of 1no. 20m deep borehole, 2No 6m boreholes and 5no. trial pits.
- 3.4** Three groundwater monitoring standpipes were installed to a depth of 8.0m to assess the ground water levels across the site.
- 3.5** The investigations imply that the underlying ground is London Clay overlaid by approximately 2-3.6m of gravelly clay known as the Claygate Member, overlain by up to 1.9m of Alluvium and 1.5m of made ground, which is in line with geological records for this area. Groundwater was encountered within the depth of the boreholes at approximately 2.4m and 4.8m within the Alluvium and claygate layers. There is also the possibility that perched water could be present. Sample testing indicated the underlying clay layer to be of expansive nature.
- 3.6** The desk study carried out by GEA suggests that the site has not had a contaminative history, having been occupied by residential properties throughout its development history. However, contamination testing has identified an elevated concentration of lead and Mercury within a sample of made ground. The exact source of the contamination is unknown, however, the made ground was noted as containing variable amounts of extraneous material.

4.0 Description of the Works

- 4.1** The development comprises the demolition of the existing properties and construction of 1No apartment including new single storey basement and swimming pool.

5.0 Proposed Below Ground Drainage

- 5.1** It is proposed that the existing connection to the public sewer is retained and re-used. This will be subject to location and condition, which will be confirmed by a CCTV survey prior to works.
- 5.2** It is proposed that all drainage from the lower ground floor and above is drained via gravity. The proposed basement level is lower than the level of the existing

public sewer connection as such the foul effluent generated at basement level will need to be pumped to the main private drainage system. This will prevent any flooding from the public sewer in case of backup.

5.3 The basic waterproofing strategy is determined by the proposed use of the basement and the existing ground conditions. Ground water was encountered within the proposed depth of the basement and will be considered in the design and waterproofing of the basement. It is proposed that the reinforced concrete basement walls and slab are constructed from water resistant concrete and will act as the primary barrier to possible water ingress. An internal drained cavity system will be installed to complete the system creating a Category 3 Basement as defined in Table 2 of BS 8102.

5.4 The cavity drain system will include a cavity drain sump to collect any water which will then be pumped to the main private drainage system.

5.5 It is proposed that SuDS are incorporated within the scheme, to reduce the surface water run-off from the site. The current proposals include both an extensive green and brown roof on the new extension respectively the site investigation confirms that the underlying subsoils consist of impermeable clay, therefore infiltration into the ground via soakaways will not be feasible.

6.0 Party Wall Matters

6.1 The proposed works development falls within the scope of the Party Walls Act 1996. Procedures under the Act will be dealt with in full by the Employer's Party Wall Surveyor. The Party Wall Surveyor will prepare and serve necessary Notices under the provisions of the Act and agree Party Wall Awards in the event of disputes. The Party Wall Surveyor has been provided with appropriate drawings, method statements and other relevant information covering the works that are notifiable under the Act. The resolution of matters under the Act and provisions of the Party Wall Awards will protect the interests of all owners.

6.2 The designs for 24 Redington Gardens have been developed so as not to preclude or inhibit similar, or indeed any, works on the neighbouring properties. This will be verified by the Surveyors as part of the process under the Act.

7.0 Hydrogeological Statement Summary

7.1 Groundwater was encountered below the site with the potential for perched ground water to be present within the made ground.

7.2 A Basement Impact Assessment has been prepared by GEA concluded that the proposed works would not result in a change to the hydrogeological or hydrological conditions, and suggested that flows within the alluvium layer are provided with drainage pathways around

the excavations to ensure there is no significant changes to ground water flows.

8.0 Ground Movement Assessment

- 8.1** A ground movement assessment has been carried out by Bayland Engineering Limited under instruction of Michael Alexander Consulting Engineers,
- 8.2** Anticipated loads for the proposed works were provided and these have been inputted into the ground movement assessment. The assessment takes into account both the long and short-term effects of the proposed basement and it has shown that the settlement is within acceptable limits.
- 8.3** The building damage assessment undertaken for the properties adjacent to the proposed excavation at 24 Redington Gardens generally indicates that, with due allowance for conservative assumptions and assuming a good standard of construction practice, in our professional opinion, negligible, very slight or slight damage is to be expected within the 3rd party walls adjacent to the proposed excavation.

9.0 Structural Monitoring

- 9.1** The Contractor shall provide monitoring to all structures and infrastructure adjacent to the basement excavation at the time of excavation and construction which is to be agreed with the party wall surveyors.
- 9.2** Monitoring during piling and excavations
- Install permanent stations in No 24 Redington Gardens site and permanent targets inside the boundaries.
 - Install monitoring targets on No 7 Redington Gardens and No 28 Redington Gardens and Garage beyond No 38 Redington Roads:
 - It is proposed to install 12 monitoring targets along on No 7 Property (6 targets at low level, 6 targets at high level) and 10 monitoring targets on No 28 (5 targets at low level, 5 targets at high level) the Garage wall beyond No 38 as per sketch.
 - Take preliminary readings on the installed targets prior to the works starting on site.
 - During the piling operation adjacent to the boundary walls take readings on a weekly basis and submit report with the results presented in both tabular and graphical format.
 - The readings shall be computed as soon as taken and compared with the threshold values tabulated in this specification.
- 9.3** Cumulative movement of survey points must not exceed:
- a. *Settlement*
Code amber trigger values: $\pm 4\text{mm}$
Code red trigger values: $\pm 8\text{mm}$
 - b. *Lateral displacement*
Code amber trigger values: $\pm 4\text{mm}$
Code red trigger values: $\pm 8\text{mm}$

9.4 Movement Monitoring Thresholds Values.

9.5 Three reading threshold levels are proposed and are summarised below together with the action to be taken.

- Level 1 (Green): Readings less than 5 mm

Action: -

- No action required
- Proceed with works

- Level 2 (Amber): Readings between 5 mm and 10 mm

Action: -

- Carry out an immediate review with the Main Contractor and Structural Engineer.
- Determine the site operations responsible for movements.
- Determine contingency measures required to limit movements to Level 1.
- Implement contingency measures.
- Increase the monitoring frequency and frequency of readings.

- Level 3 (Red): Readings above 10 mm

Action: -

- Stop working immediately.
- Secure site and adjoining properties.
- Carry out a condition survey of the adjacent properties.
- Carry out an immediate review with the Main Contractor, Structural Engineer and Party Wall Surveyors.
- Determine the site operations responsible for movements.
- Determine contingency measures required to limit movements to Level 1.
- Implement contingency measures.
- Seek agreement from Structural Engineer and Party Wall Surveyors to proceed with the works.
- Increase the monitoring frequency and frequency of readings.
- Determine damages to adjacent properties following the condition survey and put forward a proposal for remedial works to be agreed by Structural Engineer, Architects and Party Wall Surveyors

10.0 Ongoing Maintenance and Upkeep

The full structural design of the permanent and temporary works will be included within the Operations and Maintenance Manual for the completed development. Although the structure has been designed with conservative assumptions to ensure long term durability, the Manual will include a section on the required ongoing inspection of the permanent structure to ensure any potential issues are discovered quickly before they have the capacity to have any influence on the structural stability of the building or neighbouring structures. This maintenance regime will include regular cleaning and inspection of the underground drainage.

11 Ground Water Monitoring

A proposed groundwater monitoring regime has been included in Appendix E. This utilises standpipes already installed on site for the original Basement Impact Assessment submitted with the planning application and involves daily monitoring of water levels in the standpipes during construction by the contractor supplemented by frequent monitoring visits by the independent Geotechnical Consultant.

Based on the findings of the previous investigation, it is not anticipated that any significant issues with respect to groundwater will be encountered on this site. However, the practice of daily monitoring involving the direct input of the contractor and regular communication with the Geotechnical Consultant will ensure that any potential issues can be quickly identified and appropriate action can be taken with minimal delay.

12 The 'Basement Design Engineer'

	Company	Engineer	Qualifications
Permanent Works	Cranston Consulting	Kenneth Sydney Cranston Juan Elias	BEng CEng MStructE MIEI BEng MEng
Temporary Works	Cranston Consulting	Kenneth Sydney Cranston	BEng CEng MStructE
Geotechnical Analysis	Geotechnical & Environmental Associates Ltd	Steve Branch Matthew Penfold	BSc MSc CGeol FRGS MEnvSc MSci DIC CGeol FGS

13 The 'Certifying Engineer'

	Company	Engineer	Qualifications
Permanent Works	Barden Chapman	David Barden	BE(Hons) DipStructEng AdvDipPM CEng MStructE MIEI

14.0 Conclusion

- 14.1** It is assumed that the above measures and sequence of works are taken into account in the eventual design and construction of the proposed works.
- 14.2** Detailed method statements and calculations for the enabling and temporary works will be prepared by the Contractor for comment by all relevant parties including party wall surveyors and their engineers. Cranston Consulting will ensure that adequate supervision and monitoring is provided throughout the works particularly during the excavation and demolition stages.
- 14.3** In line with the site specific site investigation prepared by GEA, it is unlikely that proposed basement will pose a risk to the hydrogeological or hydrological setting.
- 14.4** To this end, Cranston Consulting will have an on-going role during the works on site to monitor that the works are being carried out generally in accordance with

our design and specification. This role will typically involve weekly site visits at the beginning of the project and fortnightly thereafter. A written site report is provided to the design team, Contractor and Party Wall Surveyor.

- 14.5** If the works noted above are properly undertaken by suitably qualified contractors, is very unlikely that these works will pose any significant threat to the structural stability of the existing house or the neighbouring properties. We consider that if the works are carried out in this manner then the likelihood of damage to the adjacent properties and will be limited to Category 2 as set out in CIRIA report 580.

15.0 Basement Construction Method Statement

15.1 Construction generally

All demolitions and excavations will need to be undertaken in a carefully controlled sequence. In our structural design we have assumed the following Subterranean Construction Method Statement. The Contractor will, provide a detailed method statement including all temporary works design before the works commence on site. These proposals will be issued to the design team for comments prior to commencement of the works on site.

Access onto the site will be from Redington Gardens and shall be coordinated to minimise disruption to the neighbouring residents; and provide a safe working environment. The principles of access to the property during construction have been outlined in the Construction Management Plan (CMP).

15.2 Noise & vibration

The Contractor shall undertake the works in such a way as to minimise noise, dust and vibration when working close to adjoining buildings in order to protect the amenities of the nearby occupiers.

15.3 Construction Method Statement

Refer to the attached drawings PL01 to PL03 for the assumed sequence of construction.

Site set-up

- Erect a fully enclosed painted plywood site hoarding along the boundaries, this should not impede on the neighbouring properties.
- The services within the site should be identified and isolated as necessary. All below ground obstructions should also be removed to allow the works to progress.
- The principles for the removal of spoil are indicated in the CMP, however, the final construction management plan and overall sequence is to be agreed with the

contractor after final proposals have been agreed.

- Tree Protection methods to be agreed and installed to all retained trees where required. Refer to the Arboricultural Impact Assessment Report prepared by Landmark Trees.
- If required, monitoring points will be installed to all neighbouring structures and infrastructure and a base reading should be taken prior to any construction works starting on the site.

Basement Construction

Stage 1: Demolition

- Demolition of the properties shall be carried out in accordance with the Contractors method statement. All measures to mitigate noise, dust and vibration shall be carried out to minimise the impact of the works on the neighbours.

Stage 2: Piling

- The contractor shall install the piling mat and proceed to install the secant piled wall around the perimeter of the basement along with internal bearing piles.
- Additional temporary piles and plunge columns shall be installed to facilitate the top down construction methodology.

Stage 3: Cast Lower Ground Floor slab

- The contractor shall carry out all necessary underpinning to neighbouring properties.
- The RC capping beam shall be cast around the perimeter of the basement.
- Temporary steel beams shall be installed under the lower ground floor slab.
- The ground floor reinforcement shall be fixed then cast the RC slab and internal beam strips in the respective areas, adequately tying the slab into any temporary internal piles. Voids are to be left in the slab as required to allow access and spoil removal.

Stage 4: Reduced Level Excavation to Basement / Pool area

- Once the ground floor slab has reached sufficient strength, the bulk excavation under the slab to Basement floor formation level can commence. The superstructure can be started at this point
- Locally batter back the ground to form a sloped excavation to accommodate construction of the proposed swimming pool and service void.

Stage 5: Construct Permanent Foundations and Load Bearing Walls/Columns.

- Install the below ground drainage as required.
- Install anti heave void formers under pile caps and ground beams.
- Cast RC pile caps and ground beams, lift cores etc and kickers to the permanent load bearing walls and columns.
- Cast internal load bearing RC walls and columns.
- Once the load bearing walls and columns are in place and have cured sufficiently, the internal temporary piles supporting the lower ground floor slab can be broken down.

Stage 7: Cast Basement Floor Slab and perimeter liner walls

- Install compressible void former under areas of suspended slab.
- Install and tie reinforcement for the basement slab including starter bars for RC walls.
- Cast RC base slab.
- Cast liner walls.
- Install cavity drainage systems and sumps in strict accordance with manufacturer's instructions.

Stage 8: Superstructure Works (Assumes the superstructure works would have already started)

- Works to the superstructure can continue.