

Basement Impact and Flood Risk Assessment

Project: 70 Duckett Road, London, N4 1BW

Scope: Basement flat with front and rear lightwells

Master Document Control

Master Authorisation Record

	Name	Role	Signature & Date
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Brief Change History

Version	Status	Date	Summary of changes and contributors	Approver
0.1	Draft 1	22/02/2024	Initial Draft	PC
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1 Introduction

This Basement Impact and Flood Risk Assessment has been prepared for submission to the London Borough of Haringey in support of the planning application GY/2024/0120 for the proposed works at 70 Duckett Road, London, N4 1BW. The proposal consists of a construction of a new basement, internal alteration and conversion of a single dwelling into four units.

It should not be used for any other purposes, e.g., Party Wall Awards. It is intended to explain the proposed methodology, construction logistics and considerations to undertake the proposed works of the application site.

The works are to be carried out to the approval and satisfaction of the Building Control Officer, to accepted good building practice and with full compliance and in accordance with all relevant British Standards and Codes of Practice.

2 Construction Summary

This report was commissioned by the building's owner to outline a suitable method to undertake the proposed works at the property located at 70 Duckett Road, London, N4 1BW.

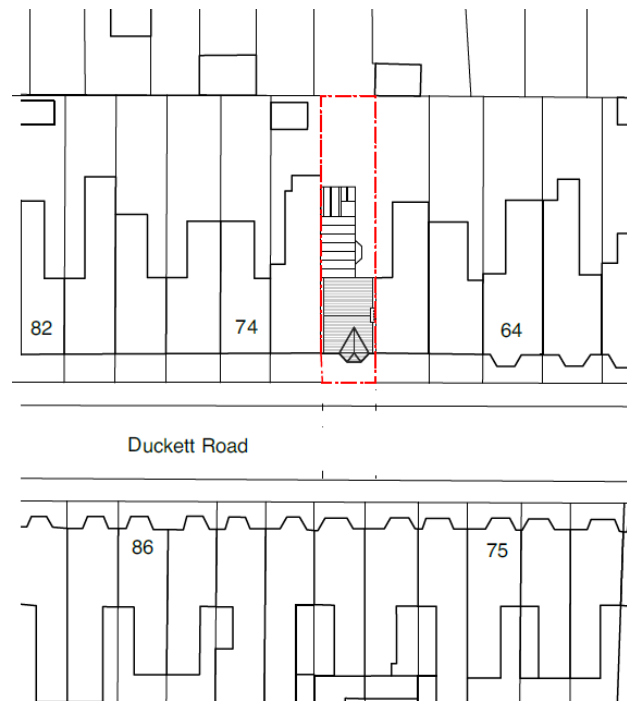


Figure 1: Site Location Plan – Planning Application Drawings

The works include the construction of a new basement flat with a front and rear lightwell. Due to the proposed excavations, the London Borough of Haringey requires a Basement Impact Assessment Report to be included within the Planning Submission.

This report includes an assessment considering the effects of a basement construction on ground stability, surface water and groundwater regime at the property.

The method statement included in this report demonstrates how the proposal can be constructed taking all reasonable steps to minimize the effects of ground movement in order to protect the existing structure of adjacent properties during the excavation and construction of the basement.

Basement construction methods have been selected to minimize movement of the basement perimeter retaining walls. These measures include installation of reinforced concrete underpinned retaining walls.

3 Site Context and Scoping

3.1 Site Location

The existing site is situated in North London, the general area is under the authority of the London Borough of Haringey. It is predominately residential and the majority of houses are terraced housing.

The site is positioned approximately 108 meters east of New River and 200 meters north of Railway Fields Nature Reserve. In terms of transportation accessibility, the site is conveniently located within walking distance, approximately 500 meters, to Haringay Train Station, and 350 meters to Haringay Green Lanes Underground Station.

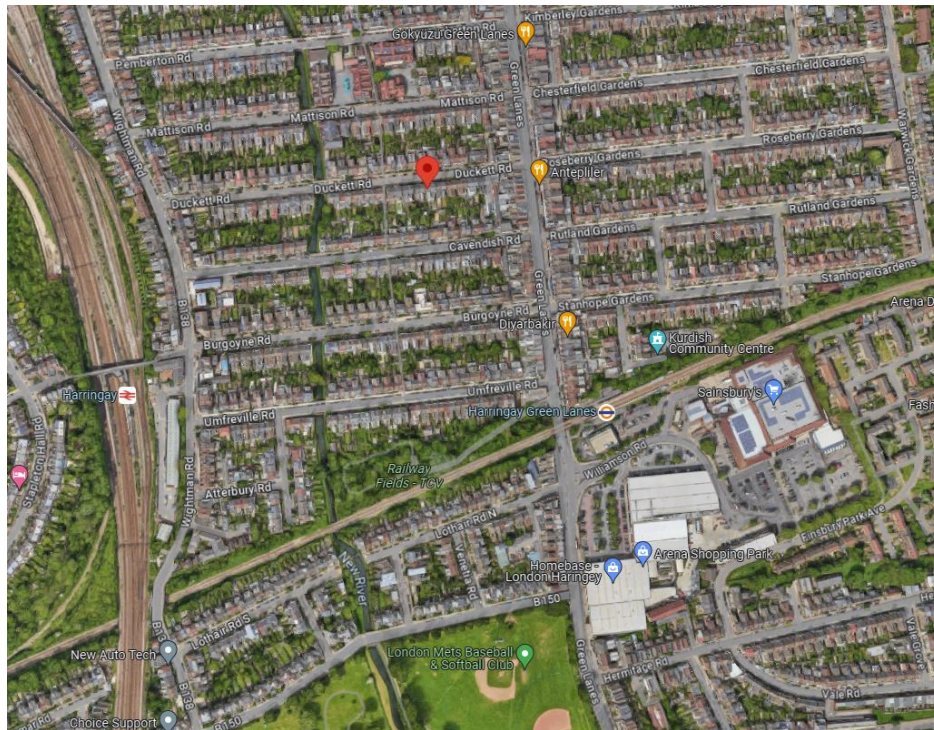


Figure 2: Site Location Map - Google Maps

3.2 Existing Building

The property, located at 70 Duckett Road, London, N4 1BW, is a terraced house. The site is rectangular and oriented in a north-south direction.

Access to the front of the house is at ground floor level from Duckett Road. It is a single dwelling distributed across the ground floor and first floor plans.

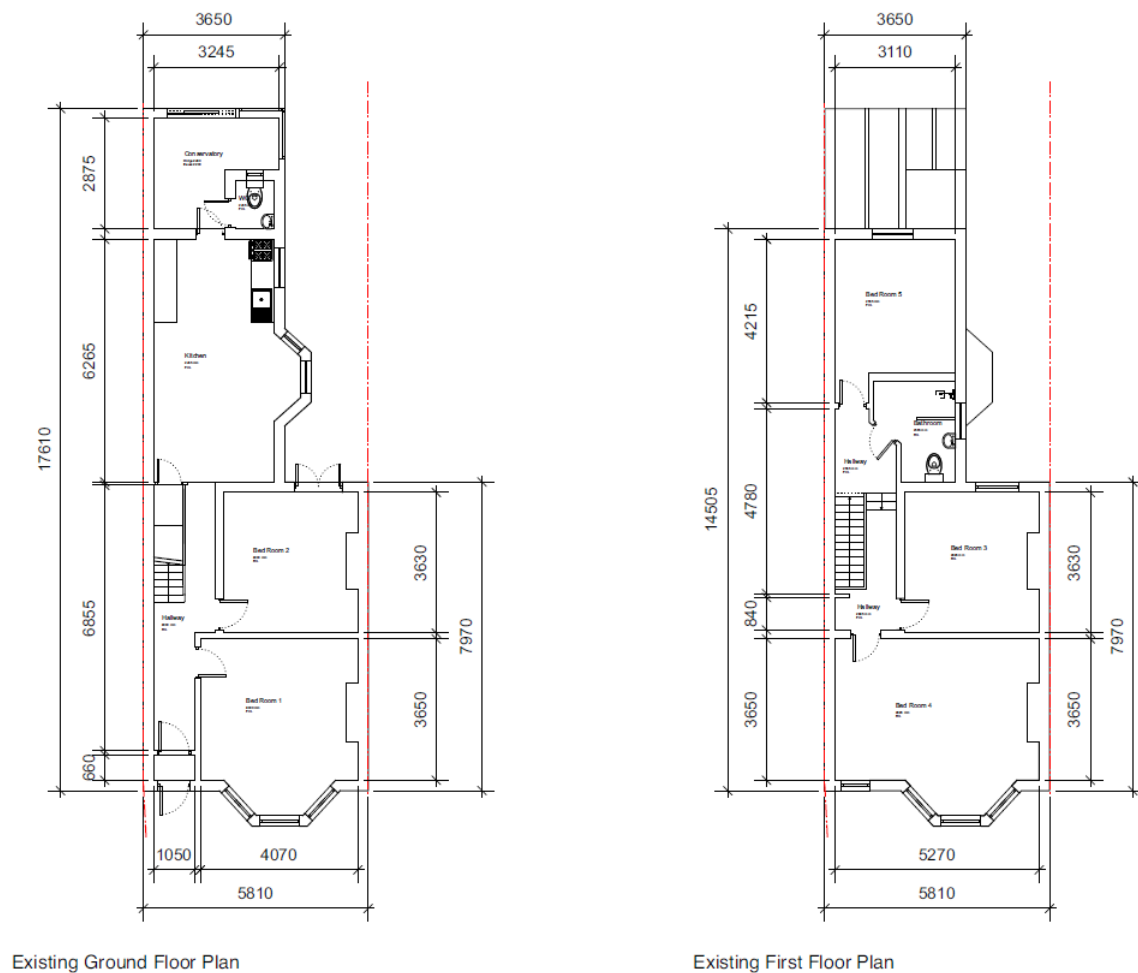


Figure 3: Existing Layouts – Architect's drawings

Adjoining properties No.72 and No. 68 are of the same terrace construction. The property shares a party wall with No.72 on the left-hand side when viewed from the road and with No.68 on the right-hand side.

The footprint of the existing ground floor is approximately 5.8m wide between the site boundaries by 17.6m long from the front façade to the existing rear wall. The externals and party walls are of solid masonry. The main ground and upper floors are of suspended timber.



Figure 4: 70 Duckett Road - Street View - Photo showing terrace housing

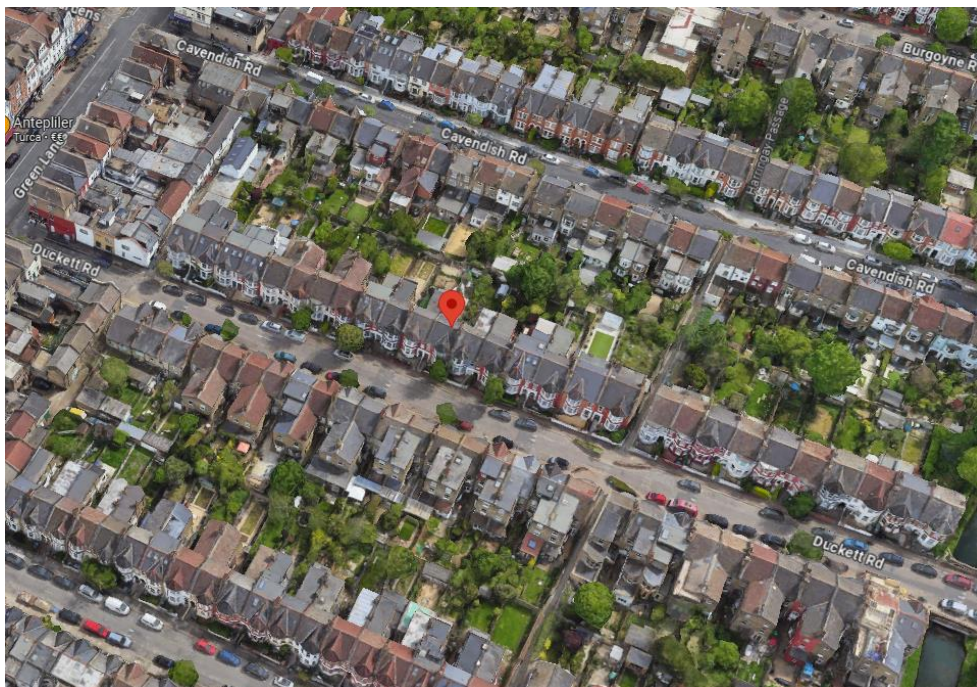


Figure 5: 70 Duckett Road - Birds View Photo showing terrace housing

3.3 Proposed Development

Existing and Proposed development drawings are provided by My-Architect. Refer to Architect's drawings for details. An extract of the proposed basement floor plan is shown in Figure 5.

The proposal involves excavating under the existing building to construct a single-storey basement beneath the footprint of the proposed ground floor. This includes the construction of a front lightwell to provide direct access to the basement flat from Duckett Road, as well as a rear lightwell for access to the rear patio. The basement will be founded approximately 3.0m below ground level.

The layout of rooms on this floor consists of one independent flat with two bedrooms, a bathroom, and a combined kitchen, dining area, and living space.

The proposed basement floor gross internal area will be 76m². The new design will include a new rear L-shaped lightwell which will be 18m² and a new front lightwell which will be 6.7m². Proposed head-height will be 2.25m approximately. See Annex for Architects Drawings.

In the event of an emergency, occupants of the basement floor can evacuate through the front door onto the external lightwell, accessing the staircase leading to Duckett Road. Alternatively, a secondary emergency exit is available via the proposed external staircase at the rear lightwell, providing access to the rear patio.

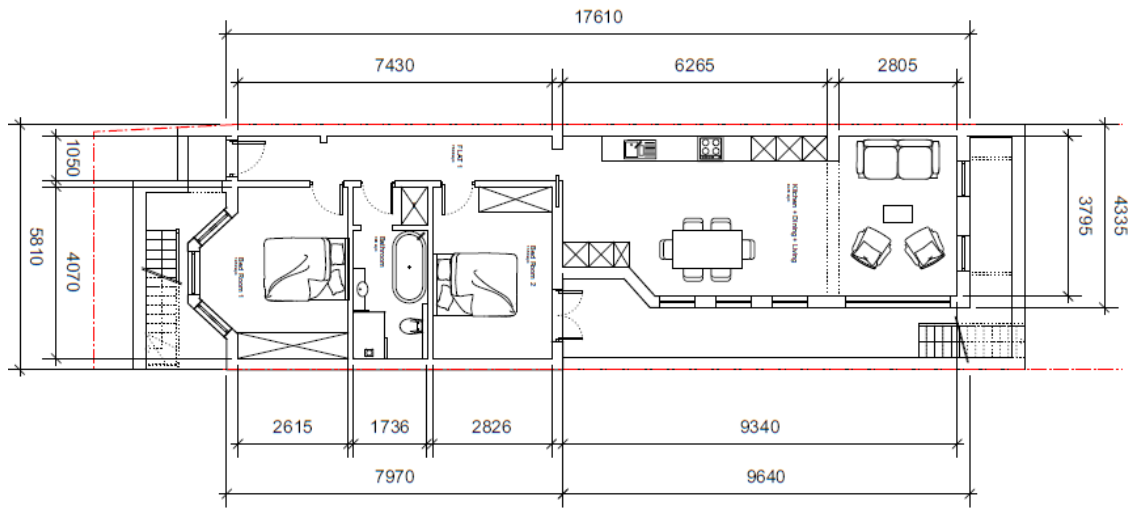


Figure 6: Proposed basement layout – Planning Application Drawings

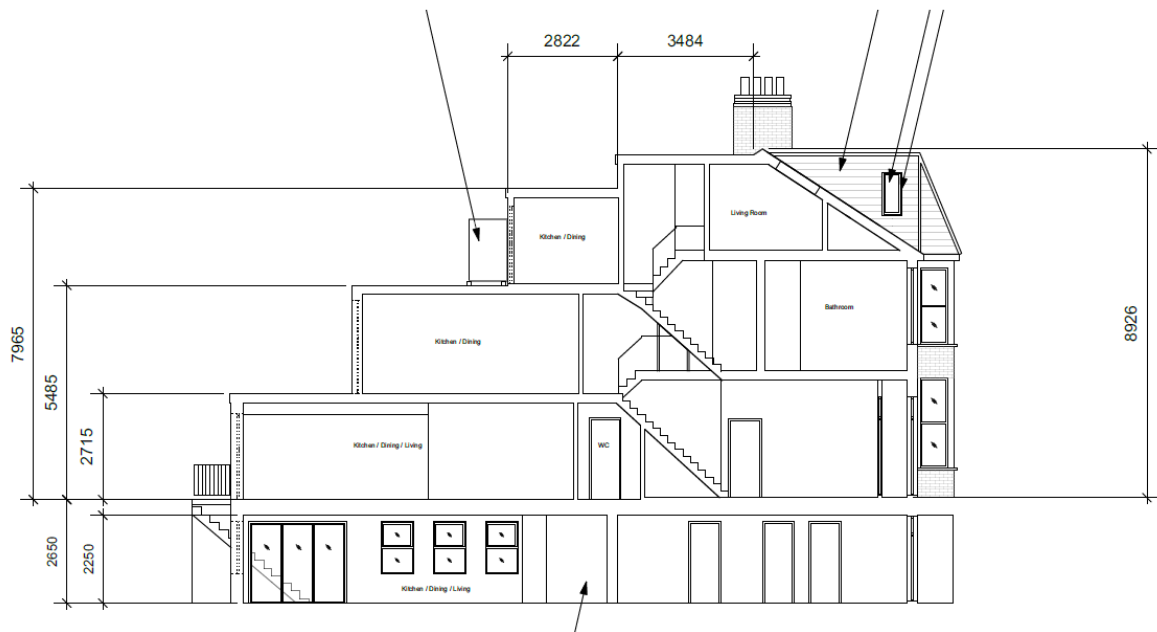


Figure 7: Proposed section – Planning Application Drawings

4 Site Geology

The geological maps for this area, as depicted in Figure 6 to 8, indicate that the site's bedrock geology primarily consists of the London Clay Formation.

The London Clay Formation primarily consists of blue-grey or grey-brown clay, occasionally mixed with layers of silt and sandy clay. It often contains thin layers of carbonate concretions and scattered pyrite. There are intermittent thin beds of shells and fine sand, more prevalent towards the base and top of the formation. Some areas also feature thin beds of black, rounded flint gravel.

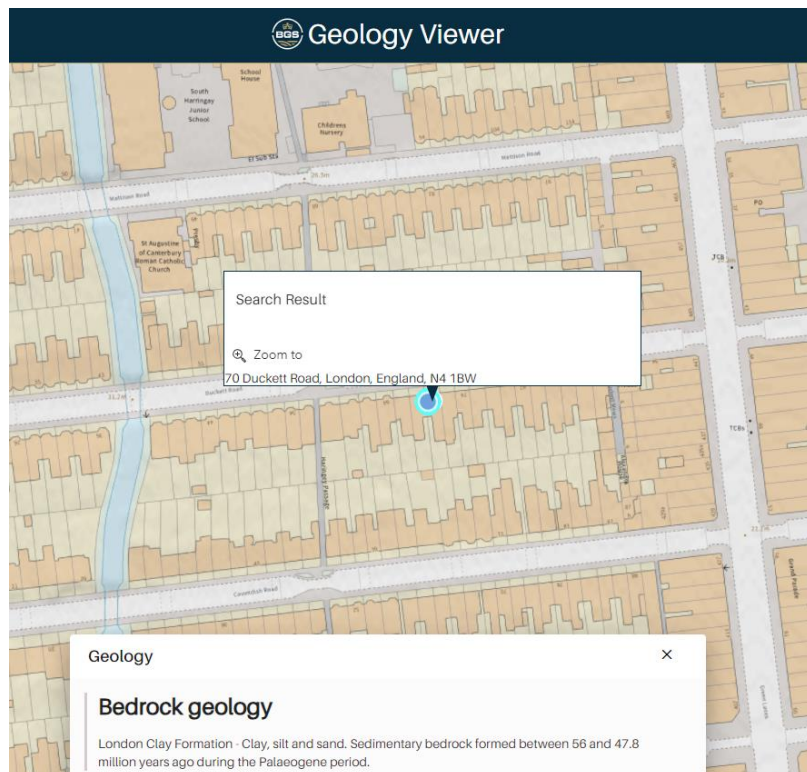


Figure 8: Geological Map - British Geological Survey Viewer

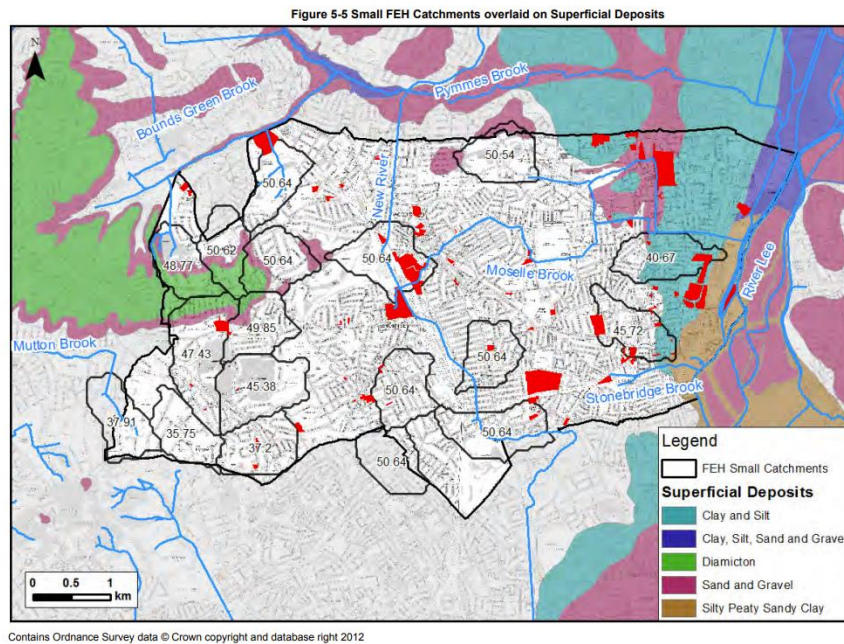


Figure 9: Superficial deposits (Haringey Council - Strategic Flood Risk Assessment)

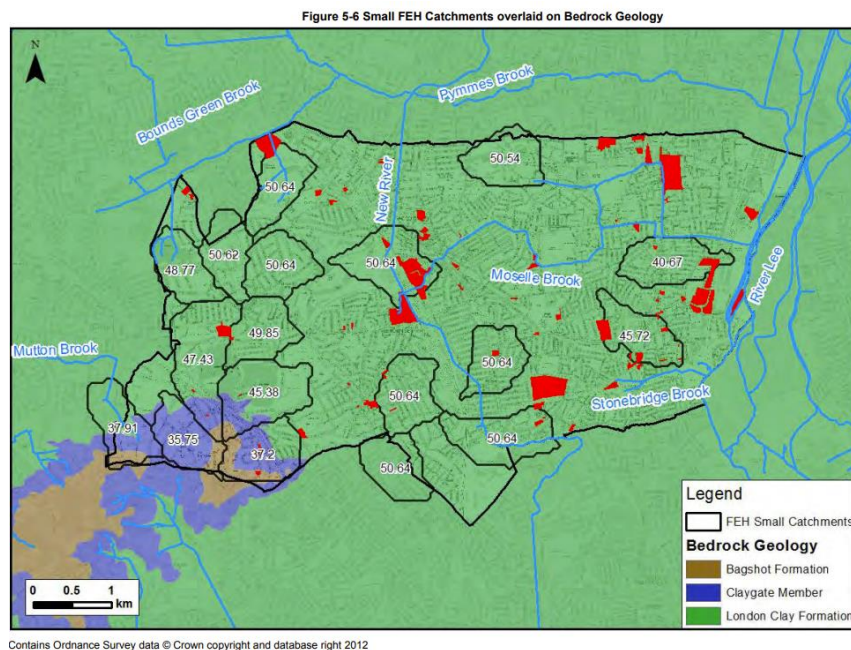


Figure 10: Bedrock Geology (Haringey Council - Strategic Flood Risk Assessment)

Available information from the British Geological Survey borehole records indicates the ground conditions near the property (See annexe 1). Groundwater records are observed in borehole logs.

In borehole TQ38NW644, located roughly 400 meters to the south-east, it is revealed that there exists a layer of made ground, which measures approximately 3.25 meters in thickness. This made ground is composed of a mixture of ash, clay, and other materials. Below this layer, lies a stratum of

firm, becoming stiff brown fissured clay, distinguished by grey veins. Additionally, partings of silt and selenite crystals are observed in the upper levels of this stratum. Ground water records indicate water strike at a depth of 3m, sealed at 4m depth

On the other hand, in borehole TQ38NW573, located roughly 500 meters to the east, there are no groundwater records. However, the borehole reveals a similar ground formation, featuring hard brown fissured clay, mottled and silty in parts, with sulphate crystals present. This stratum is situated on a layer of stiff to hard clay.

It is suggested to perform a site investigation report to confirm the ground conditions and establish the likely presence of any groundwater prior to any excavations carried out as part of the main works.

The position of described boreholes is shown in Figure 7 with red circles.

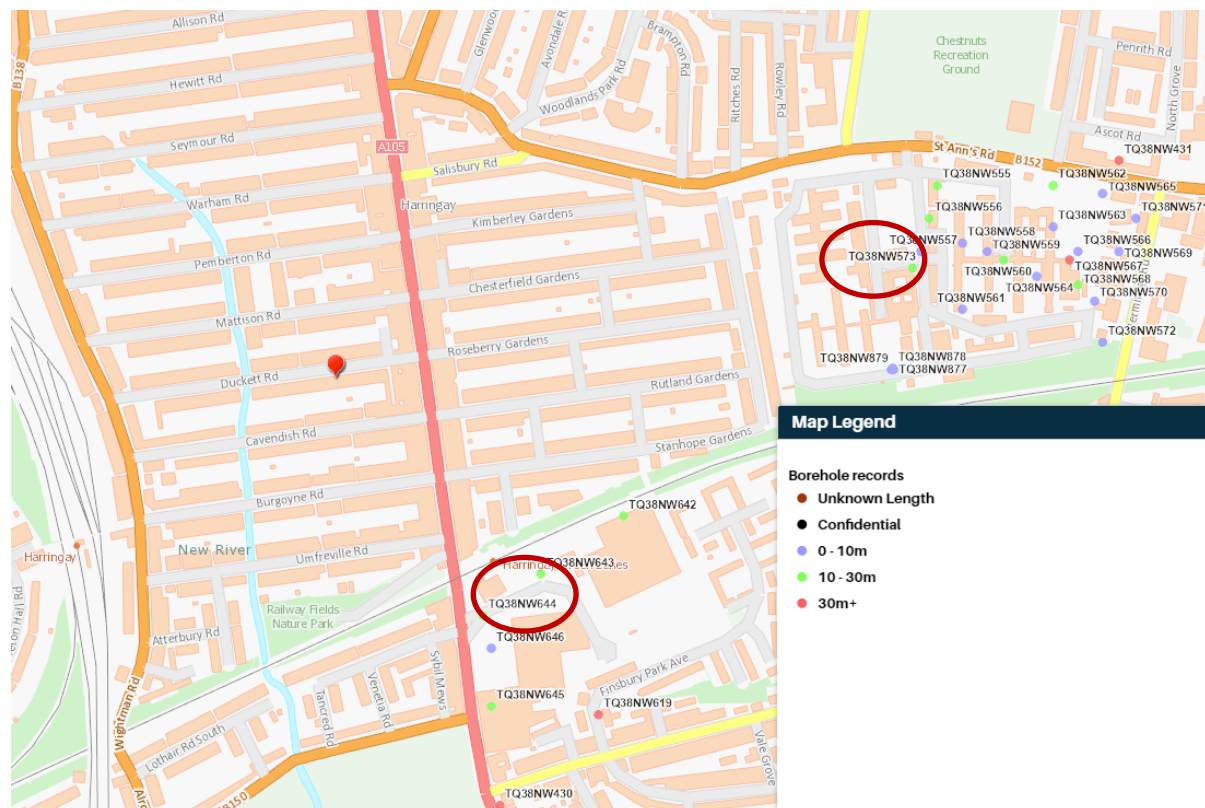


Figure 11: BGS Boreholes Records Viewer

5 Flood Risk Assessment

5.1 Existing site flood risk

As shown on the extract of the map from the Environment Agency (Figures 8 and 9), the property is located in Zone 1, an area with low risk of flooding from rivers, coastal waters or surface water.

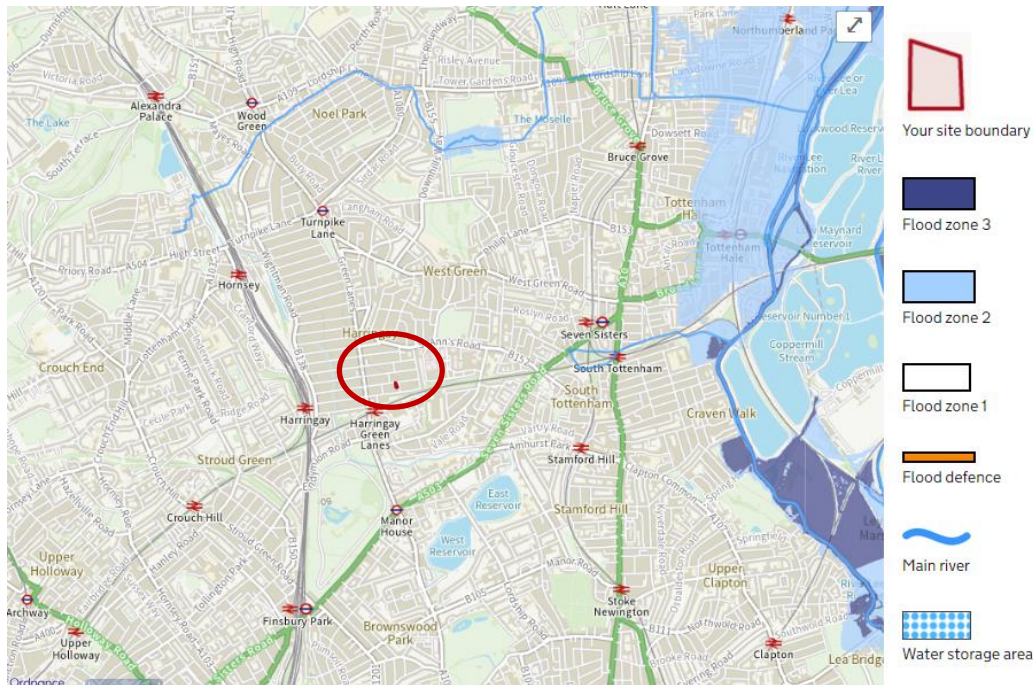


Figure 12: Flood map for planning (Environment Agency)

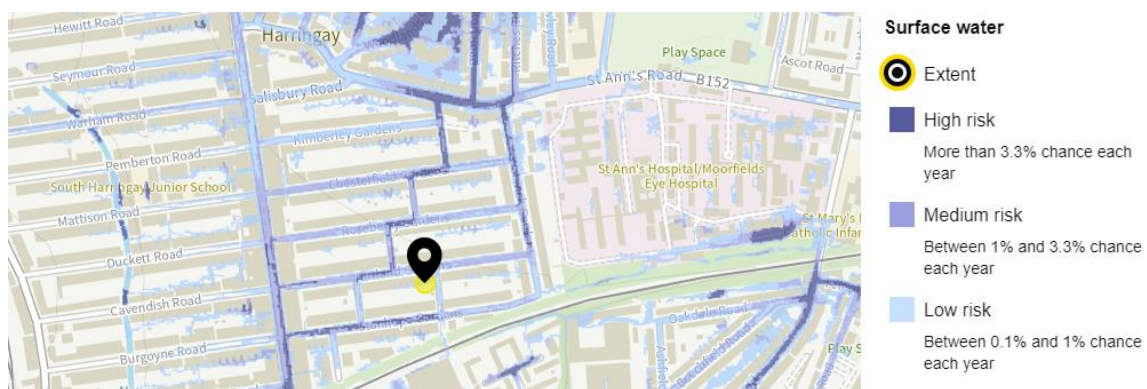


Figure 13: Surface water – Flood map (Environment Agency)

5.2 Mitigation measures

The following measures are suggested:

- Appropriate tanking measures will be installed.
- Water penetration from below will be prevented by a floor construction consisting of a solid concrete slab and damp-proof membrane.
- Sealing joints between walls and frames of doors.
- Non-return valves will be installed in all plumbing. It will prevent backflow in cases of flooding.
- The main drain to the building will be fitted with a flow return stop valve to prevent water from flowing into the building.
- Any manholes within the building will be fitted with bolted-down frames and covers.
- Sealing gaps around pipes
- All electrical points and sockets will be set a minimum of 900mm above FFL on the basement floor.
- Boilers and ancillary devices to be installed above predicted flood level
- Media wiring and connections to be protected by suitable insulation
 - Use of engineered bricks and other flood-resilient materials (for example lime plaster) where compatible with the design
 - All utility services such as fuse boxes, meters, mains cables, gas pipes, phone lines and sockets will be positioned as high as it is practically possible.

5.3 Conclusion

In conclusion, the proposed development will have no impact on flood risk in the area, the property itself or its neighbours.

6 Basement Impact Assessment

6.1 Screening

This screening incorporates the flood risk screening to identify potential risks to the ground, groundwater/surface water, land stability, adjacent properties and infrastructure. The screening exercise has identified the following potential issues, which will be carried forward to the scoping phase.

Summary of screening conclusions to take forward to scoping stage	
Item	Description
1	Subterranean Groundwater Flow
	Will the proposed basement extend beneath the water table surface?
2	Slope & Ground Stability
	Is the London Clay the shallowest strata at the site?
	Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?
	Is the site within 5m of a highway or pedestrian right of way?
	Will the proposed basement significantly increase the differential depth of foundations relative to neighboring properties?
3	Surface Flow and Flooding
	No issues were identified to be carried forward for scoping

6.1.1 Subterranean Ground Water Flows

The soil is indeed composed of London Clay, which typically exhibits very low permeability characteristics, restricting the flow of water. While London Clay can impede the movement of perched groundwater to some degree, it does not completely eliminate the potential for encountering groundwater during excavation.

It is advisable to record observations on groundwater levels during excavation activities. In the event that groundwater is encountered, it is important to implement appropriate mitigation strategies to manage it effectively.

The proposed basement floor will need to be fully waterproofed in order to provide adequate long-term control of moisture ingress from groundwater. The system will be designed in compliance with the requirements of BS 8102.

The basement structure must be designed to resist the buoyant uplift pressures which would be generated by ground water at ground level, and provide lateral resistance to water up to 1.0m from the top of the wall in accordance with BS 8102.

6.1.2 Drainage and Flooding

The proposed site lies in Flood Zone 1. The mentioned area is known as an area with low risk of flooding from rivers, coastal waters or surface water, as mentioned in the Flood Risk Assessment.

- a) As far as possible, drainage on the site will be handled by the existing connections to the public sewer.
- b) It is recommended to undertake a CCTV drainage survey. If required, existing private pipes should be replaced due to the presence of rodents, pipes damage and miss-placed joints. If the location and levels of existing manholes and existing pipes are shallow, they shall be modified to avoid colliding with proposed basement.
- c) Surface water run-off and the foul water is envisaged to be pumped from basement level to the appropriate invert level up-stream from the new or replaced drainage using a sump pump via an inspection chamber, de-pressurized, and then run under gravity to a new manhole to join the existing sewer in accordance with statutory requirements.
- d) There are no ponds, streams, or other surface water features on or immediately adjacent to site.
- e) The depth of the proposed basement excavation will create minimal ground water movement problems elsewhere as evidenced by the prevailing ground conditions likely to be encountered.

6.2 Slope and Ground Stability

Information obtained from Topography Maps indicate that the site is levelled with only minor undulations. Although it should be noted that the immediate site area is heavily urbanized and the slopes in the vicinity have been altered as part of previous developments.

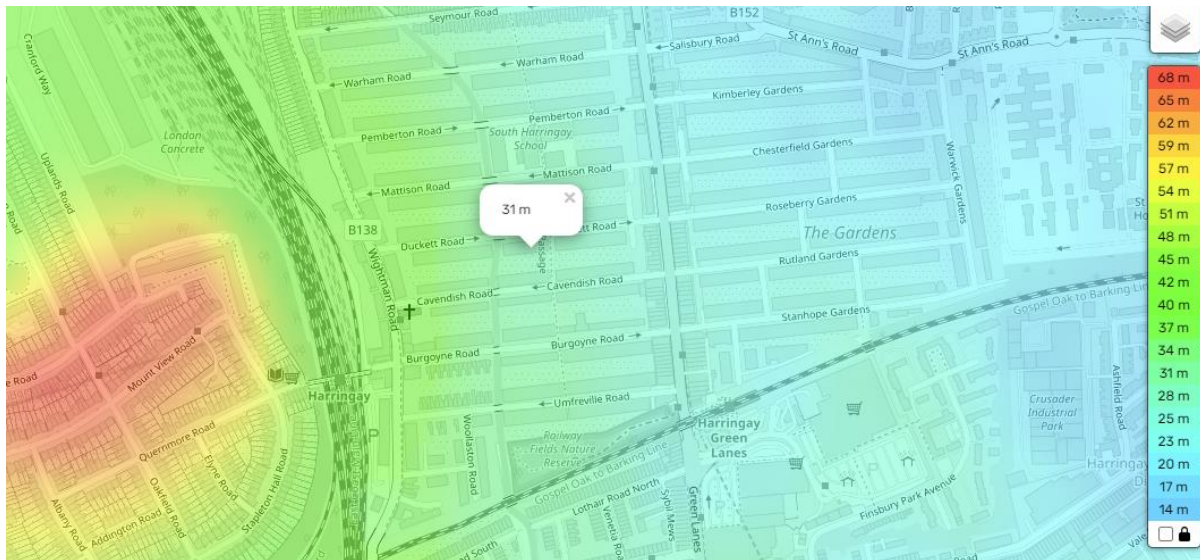


Figure 14: Topography map

6.2.1 Shrining/Swelling

No testing on soil samples carried out to date to determine the susceptibility to shrinkage and swelling with changes of moisture. Clay soils are usually classed as having a highly or medium plasticity index. The plasticity index value need to be confirmed with a site investigation, followed by laboratory analysis of samples.

6.2.2 Heave of Underlying Soils

The main phase of uplift or heave from the cohesive soils will come immediately following the excavation of the basement when the greatest elastic rebound of the soil will occur. Heave will be reduced by proceeding with the excavation in stages.

6.2.3 Adjacent Pedestrian Right of Way and Utilities

The construction methodology must be considered to ensure adequate support the adjacent footpath maintained at all times.

6.2.4 Adjacent Properties

The new excavation for the basement floor level has the potential to cause some movement in the surrounding ground. The resultant ground movements depend primarily on the geology and the

adequacy of the temporary support to both the underpinning excavations and the partially complete underpins prior to installation of full permanent support.

A high-quality workmanship and use of best practice methods of temporary support are therefore crucial to the satisfactory control of ground movements alongside basement excavations.

The work should be carried out in accordance with the Party Wall etc. Act 1996 and condition survey will be necessary. However, the movement, if any, will be managed through proper design of permanent and temporary works and in conjunction with the requirement of the Party Wall Act (1996).

6.2.5 Damage Category

In view of the comments above and provided that a suitably experienced contractor is appointed and the temporary support follows Engineer's design, then extensive past experience and data from analysis of similar works designed has shown that the bulk of ground movements caused by underpinning to this depth should not exceed 5mm in either horizontal or vertical directions. When relating this figure of ground movement to possible damage to adjacent buildings it is expected that a damage category of 'very slight' (Burland Category 1) applies, see Table 1.

Category	Description
0 Negligible	Hairline cracks of less than about 0.1mm are classed as negligible. < 0.1 mm
1 Very Slight	Fine cracks that can easily be treated during normal decoration. <1mm
2 Slight	Cracks easily filled; redecoration is probably required. Some repointing may be required externally. <5mm
3 Moderate	The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable linings. Repointing of external brickwork and possibly a small amount of brickwork to be replaced. 5-15mm or a number of cracks >3mm
4 Severe	Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. 15-25mm but also depends on number of cracks
5 Very severe	This requires a major repair involving partial or complete re-building. >25mm but depends on number of cracks

Table 1: Classification of visible damage to walls CIRIA C580 (table 2.5)

7 Outline Construction Sequence

The Main Contractor will be responsible for site safety and the implementation of all construction works to current British Standards and relevant health and safety legislation. This method statement is not exhaustive and assumes the Main Contractor has the competence and relevant experience to undertake building works of this nature.

At this stage, the sequence of works is expected to be:

- **Site Pre-Works** It is expected that the contractor will carefully protect and/or remove any internal or external fixtures and fittings affected by the works, terminate/protect services and temporarily divert all active drainage.
- **Surveys:** An inspection is to be made to confirm the condition of both existing party walls, front & rear walls. An assessment is to be made regarding any temporary support requirements needed before commencement of foundation works.
- **Set up a dewatering system**
- **Temporary propping to reinforced underpins:** Provide temporary lateral support to the all-underpinned sections during the construction works. Temporary support will take the form section propping. TW plans provided should be followed and designed by a competent person.
- **Excavation of basement soil for new basement floor and lightwell** as per Structural Engineer's sequence plans and specifications. Excavation to be done in underpinning bays in the order specified by the Engineer's plans
- **Prepare and construct the basement slab** as per structural engineering design and specifications
- **Remove temporary supports** according to temporary management plan designed by a competent person.
- **Fit cavity drain membrane** to walls and floor.
- **Insulation and screed floor.**
- **Decommission groundwater system and clear site.**
- **Internal activities and finishes:** Upon completion of the structure, internal fit out operations will commence, including installation of the staircase, plumbing, electrics and all internal finishes.

8 Design Criteria Requirements

8.1 Design Loads and Structural Load Paths

Loads on building structure should be assessed in accordance with BS6399 loadings for buildings and EN 1991-1-1.

8.2 Codes and Standards

The design should be developed in accordance with the Building Regulations and based on the current relevant British Standards or Eurocodes

8.3 Design Loading for Hydrostatic Pressure

The hydrostatic pressures should be resisted by the basement enclosure walls and basement slab shall be determined in accordance with:

- The guidance and recommendations of BS8102:2009.
- Geotechnical/hydrological Site Investigation.
- Future predicted hydrological regime during the life of the structure.
- Potential future accidental loading (e.g., Burst Water Mains etc.).

9 ANNEXES

9.1 Borehole TQ38NW644

TQ 38NW 644 3188
BOREHOLE

soil mechanics department

CONTRACT **HARRINGAY REDEVELOPMENT.**

Client **Messrs. Oscar Faber & Partners.**

Site Address **Harringay Stadium, Green Lanes, London, N.15.**

Shell & Auger Boring **200** mm. dia. to m. mm. dia. to m.

Rotary Drilling mm. dia. to m.

REPORT No. **418**

Ground Level **23.**

Boring Commenced **2**

Boring Completed **2**

Strikes **3.00** m. Inflow **Seepage** m. Sealed at **4.00** m.

Ground Water Record m. m. m.

Date **Hole Depth**

Casing Depth

Water Level

Remarks **U Sample attempted at 9.8 m. not recovered.**

Description

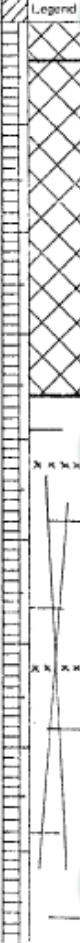
Made ground (concrete).

Made ground (ash, clay, etc.)

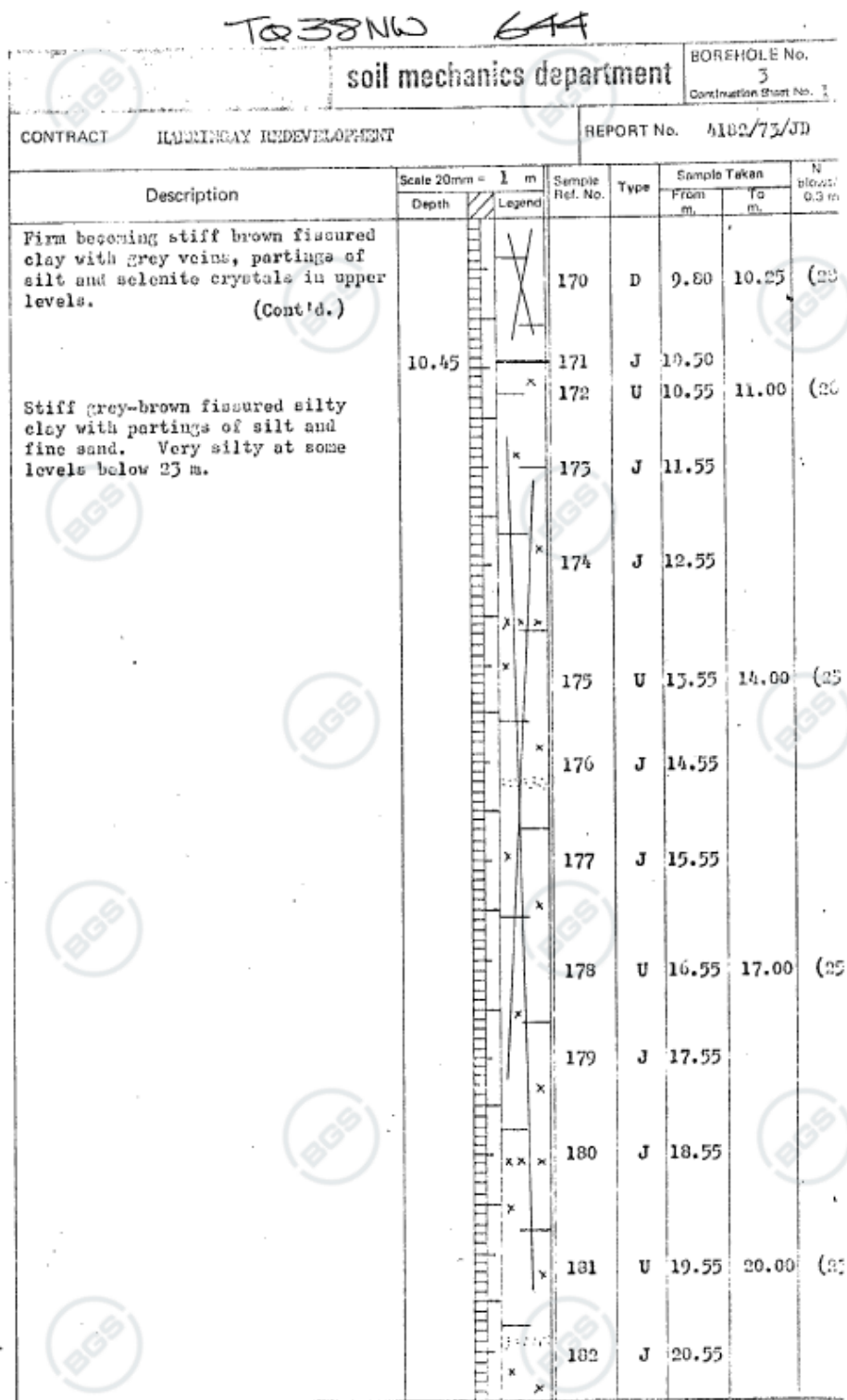
Firm becoming stiff brown fissured clay with grey veins, partings of silt and selenite crystals in upper levels.

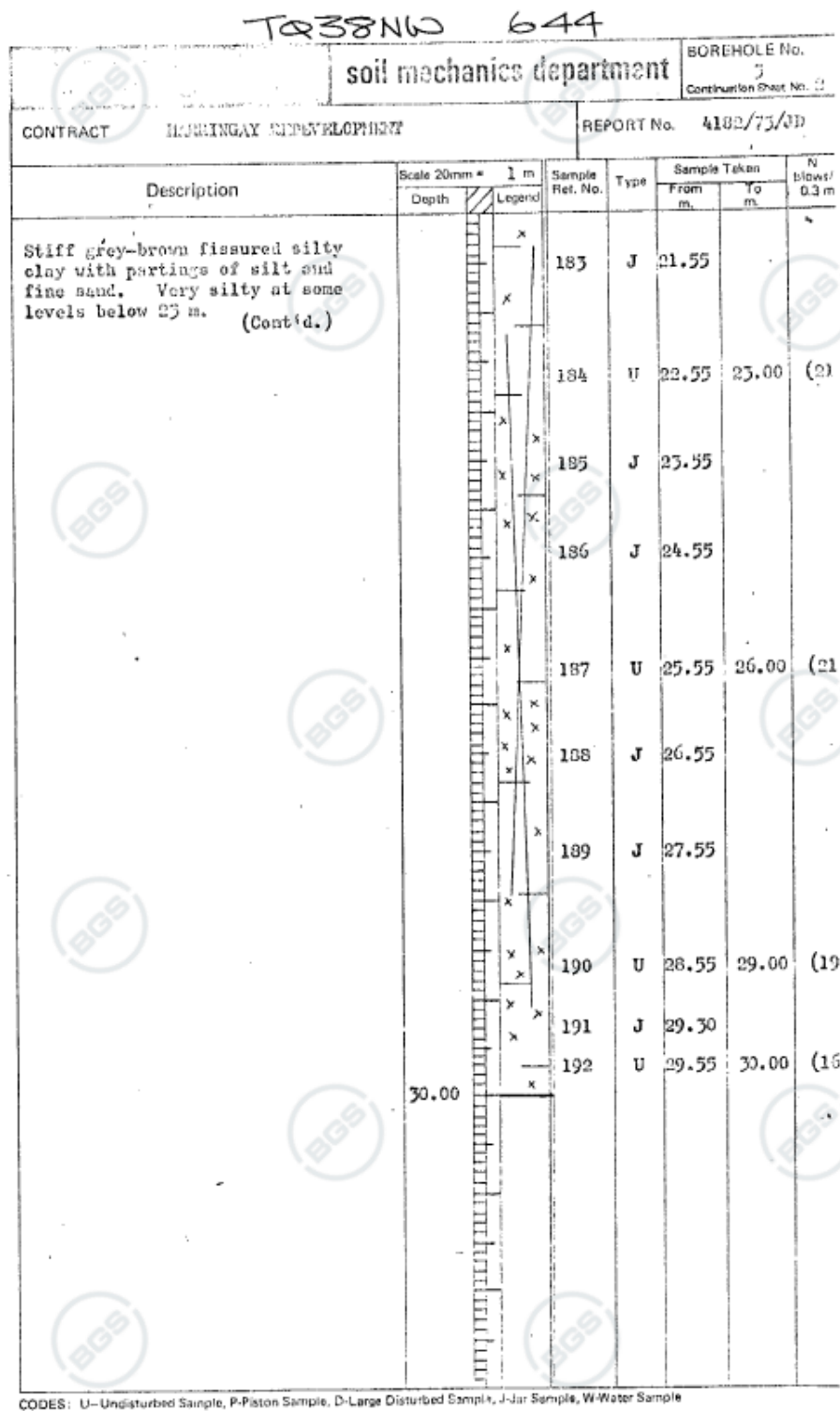
Scale 20mm = 1 m	Depth	Legend	Sample Ref. No.	Type	Sample From m.
	0.35		160	J	0.50
			161	D	1.30
			162	J	2.90
	3.60		163	J	3.65
			164	U	3.80
			165	J	4.80
			166	J	5.80
			167	U	6.80
			168	J	7.80
			169	J	8.80

7038NW 644 3188 8813

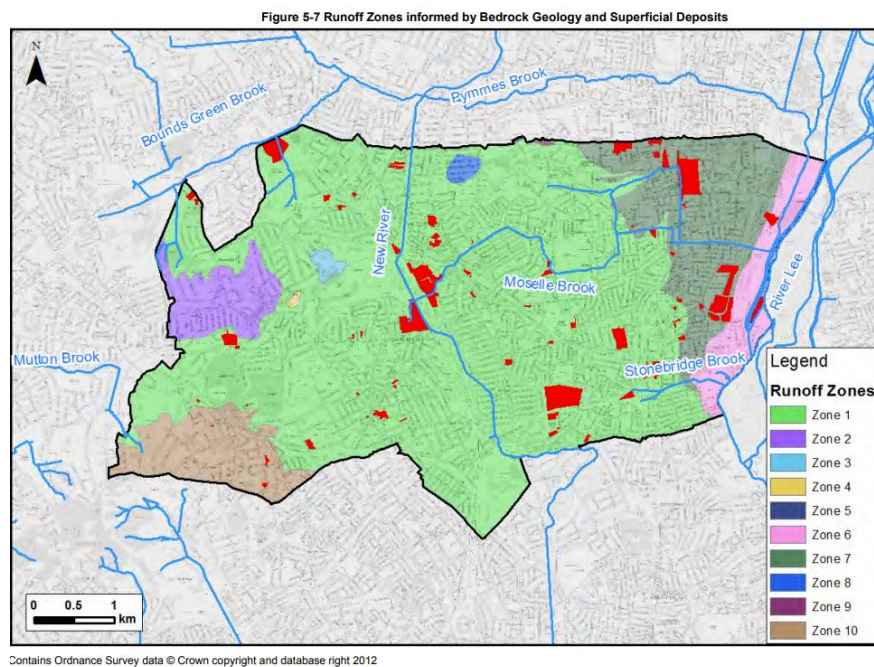
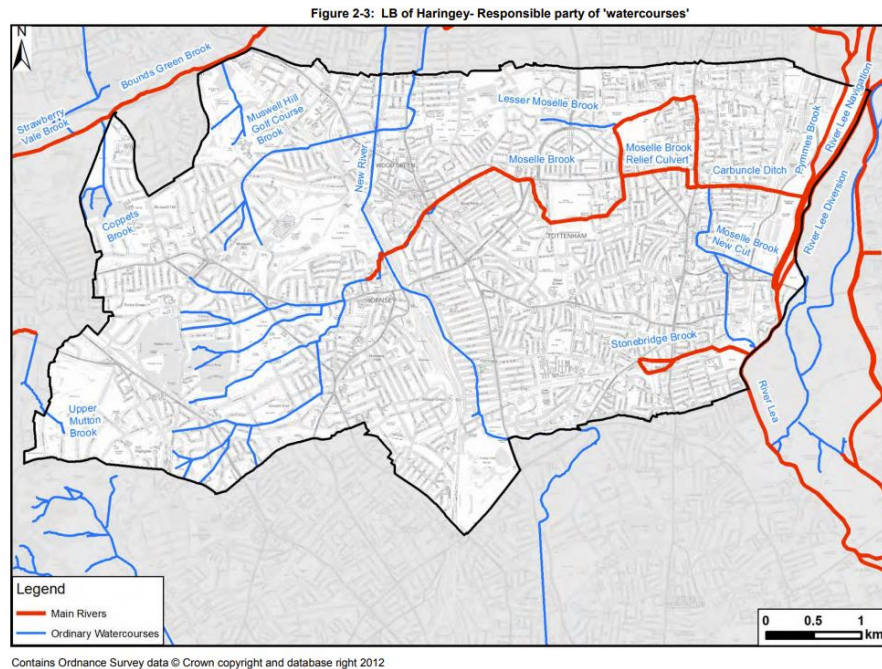
soil mechanics department				BOREHOLE No. 3				
CONTRACT HARRINGAY REDEVELOPMENT.				REPORT No. 4182/73/3D				
Client Messrs. Oscar Faber & Partners.				Ground Level 23.04 m.O.D.				
Site Address Harringay Stadium, Green Lanes, London, N.15.				Boring Commenced 25.4.73 Boring Completed 25.4.73				
Shell & Auger Boring 200 mm. dia. to " m. mm. dia. to m. Rotary Drilling dia. to m. dia. to m. Circulation Fluid— dia. to m. Circulation Fluid—								
Ground Water Record	Strikes	Inflow	Sealed at	Date				
	3.00 m.		4.00 m.	Hole Depth				
				Casing Depth				
				Water Level				
Remarks U Sample attempted at 9.8 m. not recovered.								
Description		Scale 20mm = 1 m		Sample Ref. No.	Type	Sample Taken		N blows/ 0.3 m.
		Depth	Legend			From m.	To m.	
Made ground (concrete).		0.55		160	J	0.50		
Made ground (ash, clay, etc.)				161	D	1.30	1.90	10
				162	J	2.90		
				163	J	3.65		
Firm becoming stiff brown fissured clay with grey veins, partings of silt and selenite crystals in upper levels.		3.60		164	U	3.80	4.25	(15)
				165	J	4.80		
				166	J	5.80		
				167	U	6.80	7.25	(27)
				168	J	7.80		
				169	J	8.80		

NOTES: LL-Undisturbed Sample, P-Piston Sample, D-Large Diameter Sample, J-Jar Sample, W-Water Sample





9.3 London Borough of Ealing Strategic Flood Risk Assessment Maps



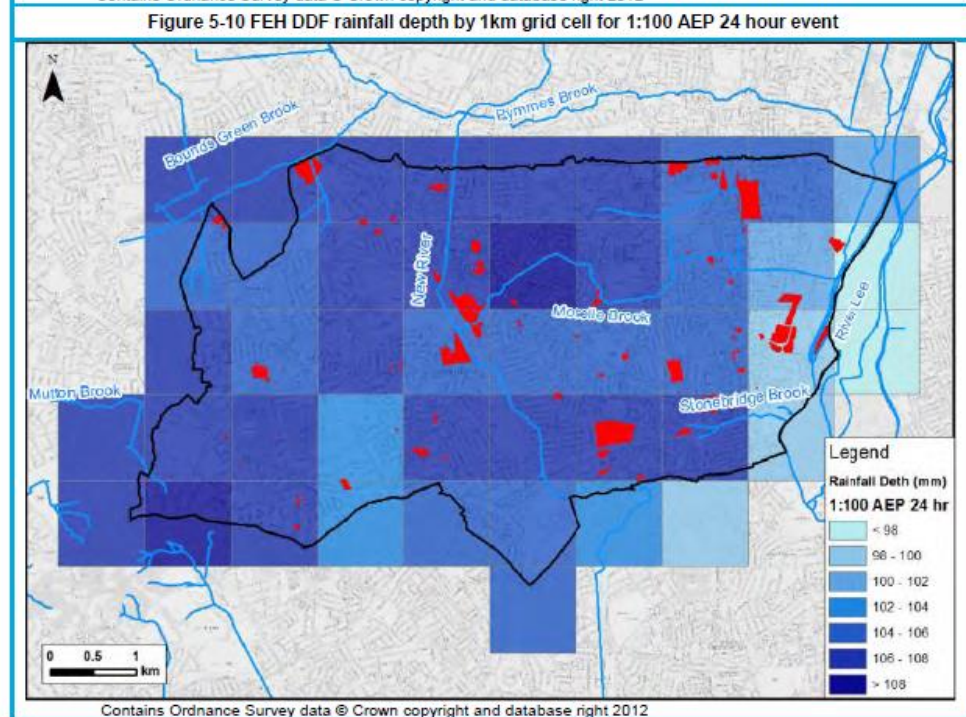
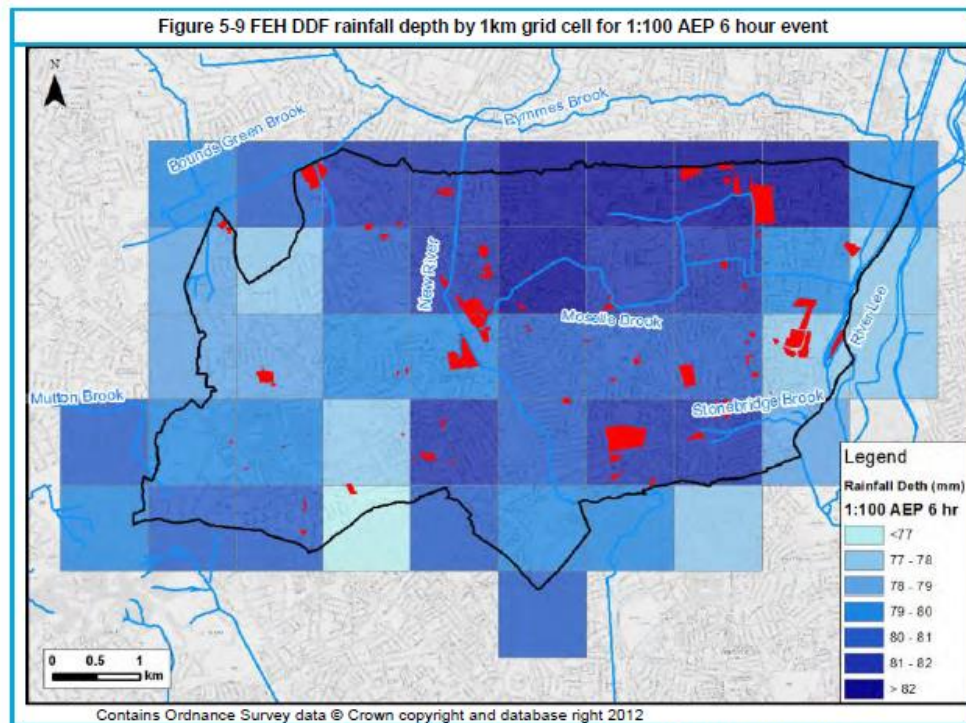
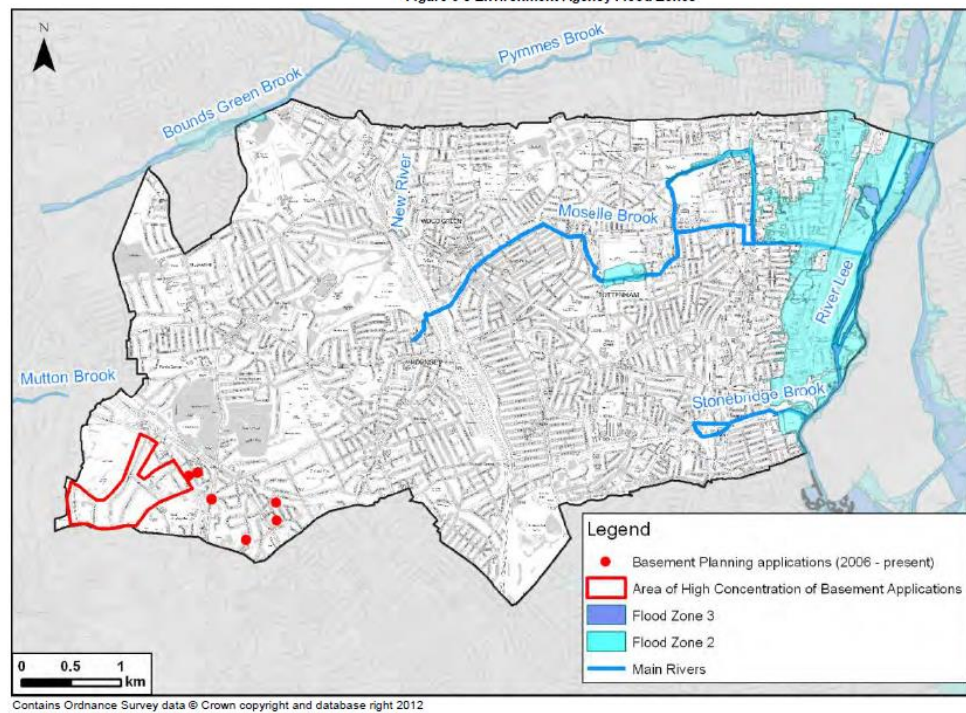


Figure 6-5 Environment Agency Flood Zones



9.4 Subterranean Development Screening

Item	Description	Response	Comment	Source
Subterranean (Ground water Flow)	1a. Is the site located directly above an aquifer?	Unknown	It needs to be confirmed with a Site Investigation Report	-----
	1b. Will the proposed basement extend beneath the water table surface?	Unknown	It needs to be confirmed with a Site Investigation Report	-----
	2. Is the site within 1000m of a watercourse, well (used/disused) or potential spring line?	Yes	The site is placed to more than 100m of a watercourse	Environment Agency OS maps.
	3. Will the proposed basement development result in a change in the proportion of hard surface/paved areas?	Yes	The proposed basement floor will be lightly extended to the front and rear.	Architects Drawings
	4. 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	The drainage strategy on site will be designed to attenuate surface water run off on site with controlled release to local sewers at rates agreed with service providers.	Architects Drawings
	5. Is the lowest point of the proposed excavation (allowing for drainage and foundation space under the basement floor) close to, or lower than, the mean water level in any local pond.	No	There are no evident ponds in close proximity to the site.	Environment Agency OS maps.

Item	Description	Response	Comment	Source
Slope & Ground Floor Stability	1. Does the existing site include slopes, natural or manmade greater than 1 in 8	No	The land is essentially levelled	Topography maps
	2. Will the proposed re-profiling of landscaping at site change slopes at the property boundary to more than 1 in 8	No	-----	Architects Drawings
	3. Does the development neighbour land, including railway cuttings and the like, with a slope greater than 1 in 8	No	Neighbouring land is essentially flat	Topography maps
	4. Is the site within a wider hillside setting in which the general slope is greater than 1 in 8	No	-----	Topography maps
	5. Is the London clay the shallowest strata at the site?	Yes	To be confirmed with a Site Investigation Report	BGS
	6. Will any trees be felled as part of the development and or any works proposed within any tree protection zones where trees are to be retained	No	-----	Map of tree preservation orders – Haringey Council website
	7. Is there a history of seasonal shrink-swell subsidence in the local area and or evidence of such effects at the site?	No	-----	BGS

	8. Is the site within 100m of a watercourse or potential spring line?	No	The site is located 108 meters from the New River	OS Maps
	9. Is the site within an area of previously worked ground?	Yes	Proposed works in an existing building	-----
	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?	Unknown	It needs to be confirmed with a Site Investigation Report	-----
	11. Is the site within 5m of a highway or pedestrian right of way?	Yes	The property is fronting Duckett Road	OS Maps
	12. Will the proposed basement significantly increase the differential depth of foundations relative to neighbouring properties?	Unknown	To be confirmed by Engineer	-----
	13. Is the site over (or within the exclusion zone of) any tunnels, e.g., railway lines.	No	Nearest over ground line is located 400m south of the property.	OS Maps

Item	Description	Response	Comment	Source
Surface Water and Flooding	1. 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 proposed development will not change the surface drainage strategy of the property.	Architects Drawings
	2. Will the proposed basement result in a change to the proportion of hard surfaced/paved external No areas?	No	-----	Architects Drawings
	4. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?	No	No changes to the surface water regime are expected.	Architects Drawings
	5. Is the site within a Flood Risk Zone 2 or 3 or on site greater than 1ha?	No	The site is on Flood Risk Zone 1	EA Flood Risk Maps