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Basement Impact Assessment

Property Details: 15 Lyncroft Gardens
London
NW6 1LB

Rev	Date	Author	Checker	Comment

CROFT STRUCTURAL ENGINEERS

Contents

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Basement Impact Assessment for Site Address

1. Non-Technical Summary

1.1. Existing Property, Site & Neighbouring Sites

The site comprises a mid-terrace Victorian domestic property, 15 Lyncroft Gardens. The flat at ground floor has an existing cellar under part of the footprint, as do each of the neighbouring properties.

1.2. Proposed Development

The proposed development involves the construction of a new basement level by extending the existing cellar under the full footprint of the property, with a front and rear lightwell.

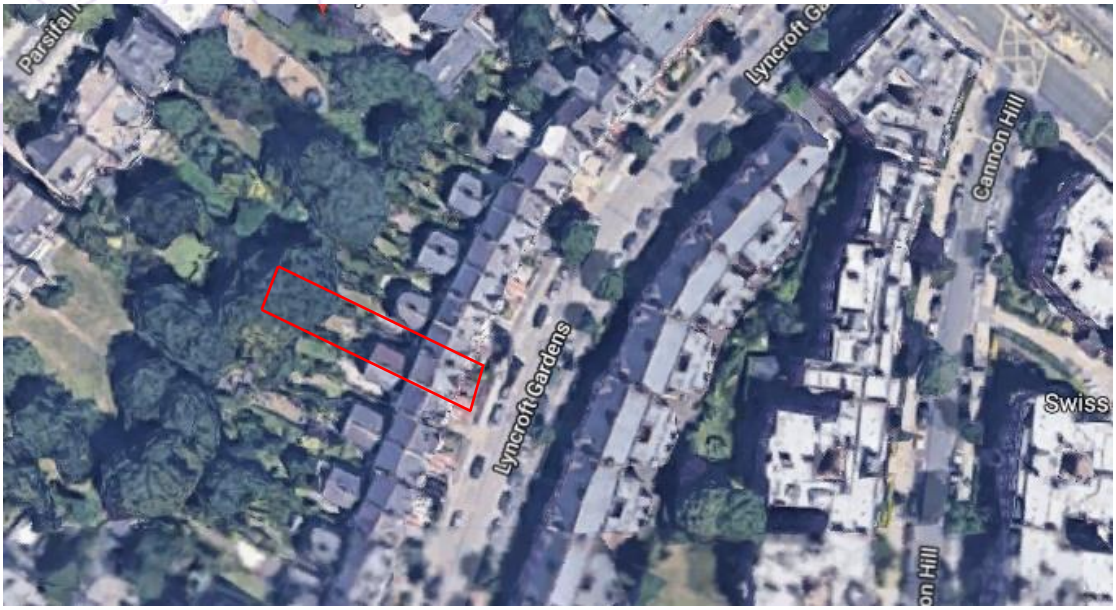

Figure 1: Map / Aerial view with approx. site area indicated

1.3. Hydrogeology

This Summary has been taken from the Maund Geo-consulting report: "There does not appear to be any requirement for groundwater mitigation measures for groundwater due to the depth of groundwater. It is recommended that groundwater seepage is allowed for in the Basement Method Statement"

1.4. Land Stability

This Summary has been taken from the Maund Geo-consulting report: "The results of this Basement Impact Assessment are supported by site investigation data and outline construction methods and sequence provided by the structural engineer.
The maximum damage category for the adjacent properties has been calculated to be within Category 1 (slight damage).
An appropriate monitoring regime should be adopted and maintained throughout construction to manage risk and potential damage to the neighbouring structures as construction progresses onsite."

1.5. Drainage, Surface Water & Flooding

The BIA has identified:

- The construction of the basement will not have any significant impacts on the Surface water.
- The area is in a CDA but flooding is not a concern because the risks of flooding are low. Mitigation factors are in place and will be added to, to deal withany residual risks of flooding.
- The risk of flooding from excess surface water is not considered significant. There is a risk of flooding due to the failure of the pumping system but this can be reduced to acceptable levels with appropriate design and installation measures.

2. Report Authors and Qualifications

2.1. Geology, Land stability and Hydrogeology

To undertake the Land stability, Geology and Hydrogeology, Croft Structural engineers has employed a suitably qualified professional Mr Julian Maund BSc PhD CEng MIMMM CGeol FGS of Maund Geo-consulting Ltd.

2.2. Surface water and Flooding.

Phil Henry
MEng CEng MICE

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MEng CEng MIStructE

3. Introduction

3.1. Site & location

The property is located in Lyncroft Gardens, NW6.

Figure 2: Plan view of site (approx. area outlined in red) and the surrounding properties

For further information refer to the Desk Study Section.

3.2. Proposed works

The existing cellar will be increased in height, and extended in plan area under the full footprint of the building, with a new lightwell at the rear and at the front. Some minor wall alterations are proposed at ground floor. No work will take place on first floor or above. Refer to the architects plans and Croft Structural Engineers' Structural Scheme, appended to this report in Appendix D.

The engineering method statement & temporary works construction sequence is included in Appendices B and E, respectively.

4. Desk Study & Walk over Survey

4.1. General Desk Study

4.1.1. Site History

The Historical Map Review is located in the Maund Geo-Consulting Geologist Basement Impact Assessment.

4.1.2. Listed buildings

The existing building is not listed. Data from Historic England shows that there are no listed buildings close by.

The site is in the West End Green conservation area.

4.1.3. London Under Ground and Network Rail Infrastructures

The site is more than 800m away from the nearest national rail line and the nearest subterranean train line. These are unlikely to be affected by the new basement.

4.1.4. Highways

The site is not within 5m of the public highway, but the front lightwell is within 5m of the pavement.

4.1.5. UK Power Network

There are no significant items of electrical infrastructure (such as pylons, substations or tunnels) in the immediate vicinity.

4.1.6. Utility Search

A utility search has been completed and is attached in Appendix C.

4.2. Walk Over Survey

A structural engineer from Croft Structural Engineers visited the site on 18th October 2019.

4.2.1. Site and Existing Property

15 Lyncroft Gardens is a 3 ½ storey domestic building (including a part cellar) which has previously been converted into flats. The building is Victorian, and the main load-bearing external walls are in

solid masonry, with timber floors and roof. A small singles storey rear extension has previously been completed.

Figure 3 - view on front elevation, 15 Lyncroft Gardens

The entire front garden is covered in concrete, with a set of concrete steps leading down to the partial cellar. The rear garden is covered with an impermeable surface up to the rear wall of the small extension. Beyond this line, the garden is covered with lawn and planting.

The road has a gradual slope of approximately 1/10 from right to left. The front garden is raised by 2 steps above pavement level. There is a retaining wall supporting the front garden at the concrete steps down to the cellar.

4.2.2. Proximity of Trees

In the rear garden, there is a 6m high apple tree approximately 13m from the proposed basement and a ~20m high lime tree approximately 20m from the rear of the proposed basement.

BS 5837: 2012 *Trees in relation to design, demolition and construction – Recommendations* estimates the root protection area (RPA) equivalent to a circle with a radius of 12 times the stem diameter. Based on the diameter of the existing trees, the roots would not be affected by a basement that is over 10m away.

4.2.3. Adjacent Properties

4.2.3.1. Nos 13 – Property to Left

Property age: Victorian (over 100 years old)

Property use: Residential

Number of storeys: 3 ½ (including partial cellar)

Current Basement: The property includes a partial cellar that is approximately 1.8m deep. No planning portal records exist for a basement extension

Figure 4 View on front elevation, 13 Lyncroft Gardens

4.2.3.2. Nos 17 – Property to Right

Property age: Victorian (over 100 years old)

Property use: Residential

Number of storeys: 3 ½ (including partial cellar)

Current Basement: The property includes a partial cellar that is approximately 1.8m deep. No planning portal records exist for a basement extension

Figure 5 View on front and rear elevations, 17 Lyncroft Gardens

4.3. Surface Water and Drainage Walk Over Survey

4.3.1. Hardstanding

The hardstading on the site is located

- Position 1 Size and Area

- The rear garden is covered in impermeable paving for approximately

Figure 6 - View on rear patio, 15 Lyncroft Gardens

4.3.2. Site Drainage

The sewer is a combined sewer. The foul water exits to the front of the property.

The surface water down pipes are located to the right hand party wall and on the flank wall of the rear addition. The manholes are positioned adjacent to the rear addition, and in the middle of the front garden.

4.3.3. Surface Water

No areas of surface water in the form of ponds lakes, streams or rivers were noted on or near the site.

4.3.4. Summary Surface Water and Drainage Walk

A walk over survey has confirmed that there are no surface water features, either within or close to the site. The survey has also confirmed that the site is covered with hard surfaces. Rainwater from these surfaces is likely to flow in the direction of the slope of the surrounding area, i.e. from north-west to south east. This will be towards Lyncroft Gardens, which is drained by gullies.

4.4. Geology and Hydrogeology: Ground Investigation

See Maund Geo-consulting Report. The ground investigation report, which has data from initial site investigations and data from subsequent monitoring, is available as a separate report.

A Ground investigation has been undertaken to better determine the ground conditions. Water monitoring has been undertaken over time to investigate the Hydro geology.

5. Screening Stage

See Maund Geo-consulting report, section 7 (pp 21-25).

5.1. Subterranean (Groundwater) Flow

See Report Completed by Maund Geo-consulting

Summary by Maund Geo-consulting: "In summary, the site is located on the London Clay Formation. Post investigation monitoring of 1 No. boreholes drilled at the site to a depth of 7.95 m bgl indicated that groundwater was encountered between 3.9 and 4.02 bgl, or at least 0.9 m below the basement excavation."

5.2. Slope / Land Stability

See Report Completed by Maund Geo-consulting

Summary by Maund Geo-consulting: "In summary, the proposed basement is located on level ground and will be founded within the London Clay Formation, which is present from 0.8 m depth below the site surface."

5.3. Surface Flow and Flooding

Question 1: Is the site within the catchment of the pond chains on Hampstead Heath?

No. The site lies outside the areas denoted by Figure 14 of the GSD (extract shown below)

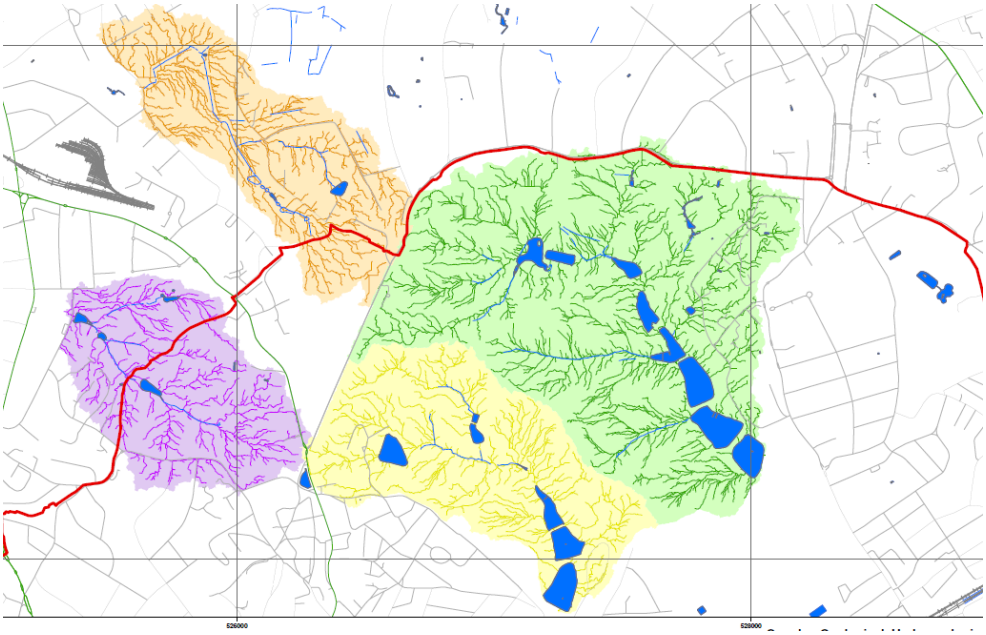

Figure 7: Extract from Figure 14 of the GSD (site lies to the south of the shaded areas)

Question 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 surface water that flows from the proposed development will be routed the same way as before: water is and will be collected from hard-surfaced areas and enter the existing drainage system.

Question 3. Will the proposed basement development result in a change to the hard surfaced /paved external areas?

No. The amount of hard standing will remain unchanged

Question 4. Will the proposed basement result in changes to the inflows (instantaneous and long term) of surface water being received by adjacent properties or downstream watercourses?

No. Surface water that is received by adjacent properties and downstream watercourses is not from the site. This is will remain the case with the proposed development.

Question 5. Will the proposed basement result in changes to the quality of surface water being received by adjacent properties or downstream watercourses?

No. Collected surface water will be from building roofs and paving, as before. The quality of the water received downstream will therefore not change.

Question 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?

The potential sources of flooding are summarised below:

Potential Source	Potential Flood Risk at site?	Justification
Fluvial flooding	No	EA Flood Mapping shows Flood Zone 1. Distance from nearest surface watercourse >1km
Tidal flooding	No	Site location is 'inland' and topography > 40mAOD.
Flooding from rising / high groundwater	No	The site is located on low permeability London Clay.
Surface water (pluvial) flooding	Yes	15 Lyncroft Gardens is noted on the flooded street list and maps from 2002

Flooding from infrastructure failure	Yes	Drainage at or near the site could potentially become blocked or cracked and overflow or leak. Drainage of the basement terrace areas may rely on pumping.
Flooding from reservoirs, canals and other artificial sources	No	There are no reservoirs, canals or other artificial sources in the vicinity of the site that could give rise to a flood risk.

The answers to Questions 1-5 above indicate that the issues related to surface water flow and flooding are not significant. These questions therefore do not have to be carried forward to Scoping Stage.

Summary

The property is on a street that flooded in 2002, and a flood risk assessment is required. Carry forward to Scoping Stage.

6. Scoping Stage

See Maund Geo-consulting report, section 8 (pp 26-27)

6.1. Hydrogeology

See Report Completed by Maund Geo-consulting

Summary by Maund Geo-consulting: "It is recommended that groundwater seepage is allowed for in the Basement Method Statement"

6.2. Land Stability

See Report Completed by Maund Geo-consulting

Summary by Maund Geo-consulting: "Determine heave and ground movement from the excavation of the clay and construction of basement walls. Assess the ground movement from the basement construction on the pedestrian walkway."

6.3. Surface Flow and Flooding

It is evident from the screening study that the only significant flood risk associated with the development is due to the failure of existing sewers in the vicinity of the site. The flow paths of surface water around the property should be investigated further.

The property is on a street that is reported to have been flooded. A flood risk assessment has there for been carried out. The report for this has been produced by Croft Structural Engineers and is attached in Appendix G. This also includes a SUDS assessment and drainage proposals.

7. Construction Methodology and Engineer Statements

7.1. Outline Geotechnical Design Parameters

From the Geological report and soil investigation, reasonably conservative geotechnical parameters have been determined, based on the soil investigation: design overall stability to K_a & K_p values.

K_a = 0.40 , K_p = 2.46

7.2. Hydrostatic Pressure

Design temporary condition for water table level, if deeper than basement ignore.

Design permanent condition for water table level:

If deeper than existing, design reinforcement for water table at full basement depth to allow for local failure of water mains, drainage and storm water. Global uplift forces can be ignored when the water table is lower than the basement. BS8102 only indicates guidance.

7.2.1. Intended Use & Loadings

	UDL kN/m²	Concentrated Load kN
Domestic Single Dwellings	1.5	2.0

Below ground level, the reinforced concrete retaining walls are designed to carry the lateral loading applied from above.

The lateral earth pressure exerts a horizontal force on the retaining walls. The retaining walls will be checked for resistance to the overturning force this produces.

Lateral forces will be applied from:

- Soil loads
- Hydrostatic pressures
- Surcharge loading from behind the wall

These forces produce retaining wall thrust. This will be restrained by the opposing retaining wall.

7.2.1.1. Surcharge Loading

The following will be applied as surcharge loads to the front/ front lightwell retaining walls:

- 10kN/m² if within 45° of road
- 100kN point loads if under road or within 1.5m
- 5kN/m² if within 45° of Pavement
- Garden Surcharge 2.5kN/m² + 1 m of soil (if present above basement ceiling) 20kN/m²
- Surcharge for adjacent property 1.5kN/m² + 4kN/m² for concrete ground bearing slab

Adjacent Properties:
All adjacent property footings within 45° to have additional geotechnical engineers' input. A line at 45° from the base of the neighbours' wall footing would be intersected by the basement retaining wall. This should be accounted for in the design.

7.3. Permanent Design Proposals

Reinforced concrete cantilever retaining walls will be placed in underpin sections to the existing load-bearing walls, and will form a new raft foundation of the property.

The design of the retaining walls was calculated using software by TEDDS. The software is specifically designed for retaining walls and ensures that the construction is kept to a limit to prevent damage to the adjacent properties.

The overall stability of the walls is designed using K_a & K_p values, while the design of the wall structure uses K_0 values. This approach minimises the level of movement from the concrete affecting the adjacent properties.

The investigations highlight that the water table was recorded as low. The design of the walls considers long term scenarios. It is possible that a water main may break causing a local high water table. To account for this, the wall is designed for water 1m from the top of the wall.

The design also considers floatation as a risk. The design has accounted for the weight of the building and the uplift forces from the water. The weight of the building is greater than the uplift, resulting in a stable structure.

Appendix A shows an example calculation of one of the most heavily loaded retaining walls. The most critical parameters have been used for this.

7.3.1. Temporary works

Walls are designed to be structurally stable with top and bottom propping. Temporary propping details will be required to be provided by the contractor and must be completed by a suitability qualified professional.

To demonstrate the feasibility of the works, a proposed basement construction sequence is in appendix E.

7.4. Ground Movement Assessment

See Maund Geo-consulting report for Ground Movement Assessment (Section 10, pp30-32).

7.5. Control of Construction Works

7.5.1. Construction Management Plan

A Construction Management Plan (CMP) has been produced by Advantage Basements and is appended to this report in Appendix H.

7.5.2. Structural Method Statement

A structural Method Statement has been produced by Croft Structural Engineers and is appended to this report in Appendix B.

7.5.3. Monitoring

In order to safeguard the existing structures during underpinning and basement construction, movement monitoring using total stations or similar is to be undertaken.

Before the works begin, a detailed monitoring report is required to confirm the implementation of the monitoring. The items that this should cover are:

- Risk Assessment to determine level of monitoring
- Scope of Works
- Applicable standards
- Frequency of Monitoring
- Specification for Instrumentation
- Monitoring of Existing cracks
- Monitoring of movement
- Reporting

We would recommend that the monitoring frequency should follow:

Pre-construction: Monitored once.

During construction: Monitored after every pin is cast for first 4 no. pins to gauge effect of underpinning. If all is well, monitor after every other pin.

Post construction works: Monitored once.

Trigger values and contingency actions are noted in the table below. Monitoring locations are noted on the drawing, which is included in the appendix F.

MOVEMENT		CATEGORY	ACTION
Vertical	Horizontal		
0mm-4mm	0-3mm	Green	No action required
4mm-6mm	3-6mm	AMBER	Detailed review of Monitoring:

			Check studs are OK and have not moved. Ensure site staff have not moved studs. If studs have moved reposition. Relevel to ensure results are correct and tolerance is not a concern. Inform Party Wall surveyors of amber readings. Double the monitoring for 2 further readings. If stable revert back. Carry out a local structural review and inspection. Preparation for the implementation of remedial measures should be required. Double number of lateral props
6mm-10mm	6-8mm		Implement remedial measures review method of working and ground conditions
>10mm	>8mm	RED	Implement structural support as required; Cease works with the exception of necessary works for the safety and stability of the structure and personnel; Review monitoring data and implement revised method of works

8. Basement Impact Assessment

8.1. Geology, Land stability and Hydrogeology

To undertake the Land stability, Geology and Hydrogeology, Croft Structural engineers has employed a suitably qualified professional, Mr Julian Maund BSc PhD CEng MIMMM CGeol FGS of Maund Geo-consulting Ltd. Refer to their report for the BIA on these items.

8.2. Surface Water & Flooding Assessment

8.2.1. Flood Risk Assessment

The site is less than 1 hectare, so a detailed FRA is not considered necessary.

From borehole investigations in the soil investigation, the building is understood to be founded on London Clay.

The existing hard landscaping is described in the Walk over survey section.

The proposal is to form a basement below the footprint of the existing property, with front and rear lightwells. The area of hard standing will remain unchanged.

8.2.2. Flood Hazards

The potential hazards related to flooding are as follows:

Tidal and Fluvial Flooding

Given that the site lies in Flood Risk Zone 1 (defined by the Environment Agency as having low risk of flooding from rivers and seas), the risk of flooding from fluvial and tidal sources is not significant.

Surface Water and Pluvial Flooding

The site is adequately drained, as are the surrounding roads (which are drained by gullies maintained by Thames Water). The new basement will not involve a significant removal of permeable surfaces (the walk-on roof-light will occupy less than 1m^2). Rainwater will be able to infiltrate into the ground as before and will not migrate to alternative locations above ground level.

Groundwater Flooding

The presence of the new basement has the potential to affect groundwater flow. The risk of groundwater flooding is concluded as being low, both on-site and off-site

Infrastructure Flooding

There are no reservoirs nearby which could cause flooding in the event of failure. Furthermore, these items are assumed to have a high level of maintenance thus the risk of flooding from these is considered very low.

There are no known cases of flooding from sewers in the local area. There is always a risk that incoming water mains may break, causing significant flood risk to the occupants of the basement. This risk is inherent with all basement structures. Mitigation measures are proposed in the following section.

8.2.3. Flooding Mitigation Measures

To mitigate the risks associated with flooding, Croft would recommend the following mitigation measures:

- A pumping mechanism should be installed for the proposed basement. There is a likelihood that this may fail and allow excess water to accumulate. If this were to occur, the build-up of water would be gradual and noticeable before it becomes a significant life-threatening hazard.
- The pumping system should be a dual mechanism to maintain operation in the event of a failure. This should include a battery backup and a suitable alarm system for warning purposes. After the planning application is concluded, the design team should seek consent from Thames Water to pump and discharge water into the sewer.
- Route all electrical wiring at high level
- Ensure that the basement structure is adequately waterproofed during construction.

8.2.4. Surface Water and Flood Risk Assessment Summary

The risk of flooding from excess surface water is not considered significant. There is a risk of flooding due to the failure of the pumping system, but this can be reduced to acceptable levels with appropriate design and installation measures.

8.3. Drainage Assessment

The design of drainage and damp-proofing is not within the scope of this assessment and would normally be expected to be part of the structural waterproofers remit at detailed design stage.

A common and anticipated detailed design stage approach is to use internal membranes (Delta or similar). These will be integral to the waterproofing of the basement. Any water from this will enter a drainage channel below the slab. This will be pumped and discharged into the existing sewer system.

It is recommended that a waterproofing specialist is employed to ensure all the water proofing requirements are met. The waterproofing specialist must name their structural waterproofer. The structural waterproofer must inspect the structural details and confirm that he is happy with the robustness.

Due to the segmental construction nature of the basement, it is not possible to waterproof the joints. All waterproofing must be made by the waterproofing specialist. They should review the structural engineer's design stage details and advise if water bars and stops are necessary.

The waterproofing designer must not assume that the structure is watertight. To help reduce water flow through the joints in the segmental pins, the following measures should be applied:

- All faces should be cleaned of all debris and detritus
- Faces between pins should be needle hammered to improve key for bonding
- All pipe work and other penetrations should have puddle flanges or hydrophilic strips

8.3.1. SUDS Assessment & Mitigation Measures

Existing Hard Standing = 49 m^2

Proposed Hardstanding = 49 m^2

Percentage Increase in hard standing = 0 %

The increase in hard surfaces is negligible in proportion to the area of the site (less than 10%).
To minimise the discharge to the existing sewer SuDS (Sustainable Drainage Systems) should be considered at detailed design stage. This aims to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible. To achieve this, the generally accepted hierarchy of these methods are presented below:

1. store rainwater for later use
2. use infiltration techniques, such as porous surfaces in non-clay areas
3. attenuate rainwater in ponds or open water features for gradual release
4. attenuate rainwater by storing in tanks or sealed water features for gradual release
5. discharge rainwater direct to a watercourse
6. discharge rainwater to a surface water sewer/drain
7. discharge rainwater to the combined sewer.

The suitability of different SuDS features is unique to each site: some features may not be practical or not be suitable due to space constraints or soil conditions. SuDS proposals, which should be considered further at detailed design stage (after the Planning Application is concluded) should note the following:

1. There is space in the gardens for rainwater storage butts
2. There is limited scope for infiltration by means of soakaways due to the low permeability of the soil (clay is present below ground level)
3. Given the size of the site the use of open water features would not be practical
4. Given the scale of the proposal, the use of attenuation tanks would be out of proportion to the site development
5. There are no water courses traversing the site and therefore discharging into these is not possible
6. The property is understood to discharge water into a combined sewer. It is therefore not possible to discharge water into a separate surface water drain
7. There may be a minor increase in surface water discharge into the existing (combined) sewer. At detailed design stage the discharge stage should be calculated and this should be approved by the local sewerage undertaker.

It is pertinent to note that with the proposed development, there will be soft landscaping in the gardens. This will allow infiltration of surface water into the more permeable ground above the clay. At detailed design stage, if the design team consider paving areas, then permeable paving should be incorporated into the design. This will allow for a steady discharge of water into the ground and is illustrated below.

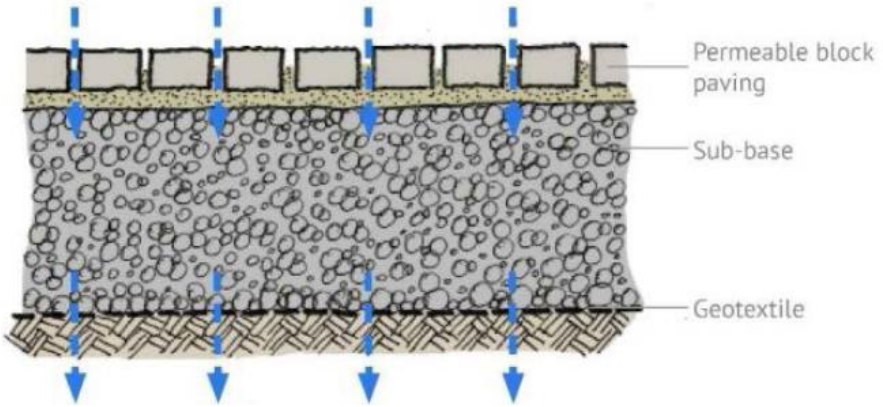

Figure 8: Typical section through permeable paving and sub-base showing infiltration

The lightwell will create an additional hard surfaced area at basement level. This will be drained via Aco channels (or similar) and the water will be pumped and discharged into the existing sewer system.

8.3.2. Drainage & SUDS Summary

There is not significant increase in the discharge of surface water into the existing sewer system. The use of complex SUDS features is therefore not considered applicable to a development of this scale. However, Croft has proposed the use of permeable paving to minimise the amount of surface water discharge into the sewer. This will act as a storage area for surface water allowing the water to recharge the ground water in the area.

Where basements below a garden are present, then a soil band will be provided. This will act as a storage area for surface water allowing the water to recharge the ground water in the area.

8.3.3. Mitigation Measures – Localised Dewatering

Monitor water levels 1 month prior to starting on site and throughout the construction process.

Localised dewatering to individual underpins may be necessary during construction.

Appendix A: Structural Calculations

Building Regulations will be required after planning. As part of the building control pack full calculations must be undertaken and provided at detailed design stage once planning permission is granted. The calculations must be completed to a recognised Standard (BS or Euro Codes). The calculations must take into account the findings of this report and the recommendations of the auditors.

The design must resist:

- Vertical loads from the proposed works and adjacent properties
- Lateral loads from wind, soil water and adjacent properties
- Loadings in the temporary condition
- All other applied loads on the building
- Uplift forces from hydrostatic effects and soil heave

The final proposed scheme must:

- Provide stability in the temporary condition to all forces
- Provide stability to all forces in the permanent condition

As part of the planning Croft structural engineers has considered some of the pertinent parts of the basement structure to ensure that it can be constructed. The following calculations are not a full set of calculations for the final design which must be provided for building regulations.

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Project:	Section	Sheet
15 Lyncroft Gardens	L	00

Date	Nov-19	Rev	Date	Description
By	pdh			
Cheked				

Job Number	Status	Rev
190906		

Reference

General Actions on Building Structure

Sloped Roof

Slate =	0.60	
Battens =	0.02	
50x150@400c/c =	0.10	
Felt =	0.02	
Insulation =	0.02	
Plaster & Skim =	0.18	
	0.94	
Roof Angle =	35	deg
Plan perm., g_k =	**1.15**	**kN/m²**
Plan Var., q_k =	**0.60**	**kN/m²**

Flat Roof

20mm Asphalt =	0.46	
Felt underlay =	0.02	
insulation =	0.04	
Ply Sheeting =	0.10	
Firring =	0.10	
oof joists 50x200@400 =	0.13	
Plaster & Skim =	0.18	
Plan perm., g_k =	**1.03**	**kN/m²**
Plan Var., q_k =	**0.75**	**kN/m²**

Mansard Roof

Slate Tiles =	0.40	
Battens =	0.02	
Ply Sheeting =	0.10	
Rafters =	0.12	
100 Insulation =	0.06	
plaster & Skim =	0.18	
Felt =	0.02	
	0.90	
Roof Angle =	75	deg
Plan perm., g_k =	**3.48**	**kN/m²**
Plan Var., q_k =	**0.00**	**kN/m²**

Terrace Floor

Promonade Tiles =	0.40	
20mm Asphalt =	0.46	
Felt underlay =	0.02	
insulation =	0.04	
Ply Sheeting =	0.10	
Firring =	0.10	
oof joists 50x200@400 =	0.13	
Plaster & Skim =	0.18	
Perm., g_k =	**1.43**	**kN/m²**
Var., q_k =	**1.50**	**kN/m²**

Cavity Walls

100 Facing Brick =	2.20	
100 Block (16kN/m³)=	1.60	
Plaster & Skim =	0.18	
Perm., g_k =	**3.98**	**kN/m²**

Internal Walls

140 Block (12kN/m3)=	1.68	
Plaster & Skim =	0.36	
Perm., g_k =	**2.04**	**kN/m²**

Timber Floors

finishes	0.25	
Sound insulation	0.15	
18mm Ply	0.10	
Joists 50x225@400 =	0.15	
100 Insulation =	0.05	
Plaster & Skim =	0.18	
Perm., g_k =	**0.88**	**kN/m²**
Var., q_k =	**1.50**	**kN/m²**

high Specificaiton Houses

25mm Marble=	0.63	
Sound Insulation =	0.75	
18mm Ply	0.10	
Joists 50x225@400 =	0.15	
100 Insulation =	0.05	
Plaster & Skim =	0.30	
Perm., g_k =	**1.98**	**kN/m²**
Var., q_k =	**1.50**	**kN/m²**

Ceiling

50x100 Joists =	0.07	
100 Insulation =	0.06	
Plaster & Skim =	0.18	
Perm., g_k =	**0.31**	**kN/m²**
Var., q_k =	**0.25**	**kN/m²**

Timber Partitions

Height:	2.70	m
50x100 Studs @ 400 =	0.12	
Insulation =	0.04	
Plaster & Skim =	0.36	
Perm., g_k =	**1.40**	**kN/m**

Existing Brick Walls

225 Facing Brick =	4.50	
External Render =	0.35	
Plaster & Lathe =	0.15	
Perm., g_k =	**5.00**	**kN/m²**

PC Ground FloorsFloors

Beam & Block =	3.10	
Screed =	1.40	
Insulation =	0.07	
Finishes =	0.05	
Perm., g_k =	**4.62**	**kN/m²**
Var., q_k =	**1.50**	**kN/m²**

Standing Seam

Roof Sheet =	0.08	
Insulation =	0.07	
Decking =	0.20	
Steelwork =	0.60	
Perm., g_k =	**0.95**	**kN/m²**
Var., q_k =	**0.60**	**kN/m²**

Filler joist Floor

Finishes =	1.20	
Filler Joist Floor =	2.50	
Ceiling =	0.18	
Steel =	0.30	
Perm., g_k =	**4.18**	**kN/m²**
Var., q_k =	**3.50**	**kN/m²**

Moveable Partitions - Additional q_k

Lightweight (screens, etc) ,1 kN/m =	0.5	kN/m²
Timber/metal stud walls , 1<2 kN/m =	0.8	kN/m²
Solid paritions, 2<3 kN/m =	1.2	kN/m²

Table 3 Live Load Reduction

Area		Floors	
	0 0%		1 0%
	50 5%		2 10%
	100 10%		3 20%
	150 15%		4 30%
	200 20%		5 to 10 40%

CROFT STRUCTURAL ENGINEERS
Tel 0208 684 4744
enquiries@croftse.co.uk

Project:		Section	Sheet
15 Lyncroft Gardens		L	03
Date Nov-19	Rev Date	Description	
By pdh			
Cheked			
Job Number 190906	Status		Rev
Reference			

Location	Area			Type	L	Action	Actions, kN or kN/m			
	L	W	m^2			kN/m^2	Perm., g_k	%	Var., q_k	Total
Party Wall										
timber floors	2.5	1	2.5	g_k	4	0.88	8.8			
				q_k		1.50			15.0	
External wall	12	1	12	g_k		5.00	60.0			
							68.8	kN/m	15.0	kN/m
Party Wall										
timber floors	2.5	1	2.5	g_k	3	0.88	6.6			
				q_k		1.50			11.3	
External wall	7.5	1	7.5	g_k		5.00	37.5			
							44.1	kN/m	11.3	kN/m

CROFT STRUCTURAL ENGINEERS

RETAINING WALL A

RETAINING WALL ANALYSIS

In accordance with EN1997-1:2004 incorporating Corrigendum dated February 2009 and the UK National Annex incorporating Corrigendum No.1

Tedds calculation version 2.9.10

Retaining wall details

Stem type	Cantilever
Stem height	h_{stem} = **3000** mm
Stem thickness	t_{stem} = **350** mm
Angle to rear face of stem	α = **90** deg
Stem density	γ_{stem} = **25** kN/m^3
Toe length	l_{toe} = **1200** mm
Base thickness	t_{base} = **350** mm
Base density	γ_{base} = **25** kN/m^3
Height of retained soil	h_{ret} = **3000** mm
Angle of soil surface	β = **0** deg
Depth of cover	d_{cover} = **0** mm

Retained soil properties

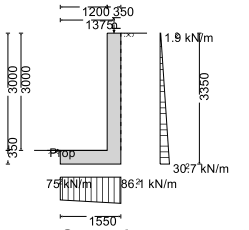
Soil type	Firm clay
Moist density	γ_{mr} = **18** kN/m^3
Saturated density	γ_{sr} = **18** kN/m^3
Characteristic effective shear resistance angle	$\phi'_{r.k}$ = **18** deg
Characteristic wall friction angle	$\delta_{r.k}$ = **9** deg

Base soil properties

Soil type	Firm clay
Soil density	γ_b = **18** kN/m^3
Characteristic effective shear resistance angle	$\phi'_{b.k}$ = **18** deg
Characteristic wall friction angle	$\delta_{b.k}$ = **9** deg
Characteristic base friction angle	$\delta_{bb.k}$ = **12** deg
Presumed bearing capacity	$P_{bearing}$ = **100** kN/m^2

Loading details

Variable surcharge load	Surcharge$_Q$ = **4** kN/m^2
Vertical line load at 1375 mm	P_{G1} = **70** kN/m
	P_{Q1} = **15** kN/m



General arrangement

Calculate retaining wall geometry

Base length	$l_{base} = l_{toe} + t_{stem}$ = **1550** mm
Moist soil height	$h_{moist} = h_{soil}$ = **3000** mm
Length of surcharge load	$l_{sur} = l_{heel}$ = **0** mm
- Distance to vertical component	$x_{sur\_v} = l_{base} - l_{heel} / 2$ = **1550** mm
Effective height of wall	$h_{eff} = h_{base} + d_{cover} + h_{ret}$ = **3350** mm
- Distance to horizontal component	$x_{sur\_h} = h_{eff} / 2$ = **1675** mm
Area of wall stem	$A_{stem} = h_{stem} \times t_{stem}$ = **1.05** m^2
- Distance to vertical component	$x_{stem} = l_{toe} + t_{stem} / 2$ = **1375** mm
Area of wall base	$A_{base} = l_{base} \times t_{base}$ = **0.543** m^2
- Distance to vertical component	$x_{base} = l_{base} / 2$ = **775** mm

Using Coulomb theory

Active pressure coefficient	$K_A = \sin(\alpha + \phi'_{r.k})^2 / (\sin(\alpha)^2 \times \sin(\alpha - \delta_{r.k}) \times [1 + \sqrt{[\sin(\phi'_{r.k} + \delta_{r.k}) \times \sin(\phi'_{r.k} - \beta) / (\sin(\alpha - \delta_{r.k}) \times \sin(\alpha + \beta))]]^2}$ = **0.483**
Passive pressure coefficient	$K_P = \sin(90 - \phi'_{b.k})^2 / (\sin(90 + \delta_{b.k}) \times [1 - \sqrt{[\sin(\phi'_{b.k} + \delta_{b.k}) \times \sin(\phi'_{b.k}) / (\sin(90 + \delta_{b.k}))]]^2}$ = **2.359**

Bearing pressure check

Vertical forces on wall

Wall stem	$F_{stem} = A_{stem} \times \gamma_{stem}$ = **26.3** kN/m

Wall base	$F_{base} = A_{base} \times \gamma_{base}$ = **13.6** kN/m
Line loads	$F_{P\_v} = P_{G1} + P_{Q1}$ = **85** kN/m
Total	$F_{total\_v} = F_{stem} + F_{base} + F_{P\_v}$ = **124.8** kN/m

Horizontal forces on wall

Surcharge load	$F_{sur\_h} = K_A \times \cos(\delta_{r.k}) \times Surcharge_Q \times h_{eff}$ = **6.4** kN/m
Moist retained soil	$F_{moist\_h} = K_A \times \cos(\delta_{r.k}) \times \gamma_{mr} \times h_{eff}^2 / 2$ = **48.2** kN/m
Base soil	$F_{pass\_h} = -K_P \times \cos(\delta_{b.k}) \times \gamma_b \times (d_{cover} + h_{base})^2 / 2$ = **-2.6** kN/m
Total	$F_{total\_h} = F_{sur\_h} + F_{moist\_h} + F_{pass\_h}$ = **52** kN/m

Moments on wall

Wall stem	$M_{stem} = F_{stem} \times x_{stem}$ = **36.1** kNm/m
Wall base	$M_{base} = F_{base} \times x_{base}$ = **10.5** kNm/m
Surcharge load	$M_{sur} = -F_{sur\_h} \times x_{sur\_h}$ = **-10.7** kNm/m
Line loads	$M_P = (P_{G1} + P_{Q1}) \times p_1$ = **116.9** kNm/m
Moist retained soil	$M_{moist} = -F_{moist\_h} \times x_{moist\_h}$ = **-53.8** kNm/m
Total	$M_{total} = M_{stem} + M_{base} + M_{sur} + M_P + M_{moist}$ = **99** kNm/m

Check bearing pressure

Propping force	$F_{prop\_base} = F_{total\_h}$ = **52** kN/m
Distance to reaction	$\bar{x} = M_{total} / F_{total\_v}$ = **793** mm
Eccentricity of reaction	$e = \bar{x} - l_{base} / 2$ = **18** mm
Loaded length of base	$l_{load} = l_{base}$ = **1550** mm
Bearing pressure at toe	$q_{toe} = F_{total\_v} / l_{base} \times (1 - 6 \times e / l_{base})$ = **75** kN/m^2
Bearing pressure at heel	$q_{heel} = F_{total\_v} / l_{base} \times (1 + 6 \times e / l_{base})$ = **86.1** kN/m^2
Factor of safety	$FoS_{bp} = P_{bearing} / \max(q_{toe}, q_{heel})$ = **1.162**

PASS - Allowable bearing pressure exceeds maximum applied bearing pressure

Appendix B: Structural Method Statement

Job Number: 190906

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Rear of 60 Saxon Road
London SE25 5EH

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Basement Method Statement

Property Details: 15 Lyncroft Gardens
London
NW6 1LB

Rev	Date	By	Comment
-	22/11/19	pdh	First Issue

CROFT STRUCTURAL ENGINEERS

Contents

CROFT STRUCTURAL ENGINEERS

15 Lyncroft Gardens

1. Preamble

1.1. This method statement provides an approach that will allow the basement design to be correctly considered during construction. The statement also contains proposals for the temporary support to be provided during the works. Croft Structural Engineers have been employed by the contractor and this method statement has been produced on their behalf.

1.2. This method statement has been written by a Chartered Engineer. The sequencing has been developed using guidance from ASUC (Association of Specialist Underpinning Contractors). Croft Structural Engineers are an Associate Member of ASUC.

1.3. This method has been produced to allow for improved costings and for inclusion in the Party Wall Award. Final site conditions need there to be flexibility in the method statement: Should the site staff require alterations to the Method statement this is allowed once an alternative methodology, of the changes is provided, and an Addendum to the Party Wall Award will be required.

1.4. Contact Party Wall Surveyors to inform them of any changes to this method statement.

1.5. On this development, the approach is: construct the underpin segments that will support the permanent steel work insert the new steelwork remove load from above and place it onto new supporting steelwork cast the remainder of the retaining walls that will form the perimeter of the basement.

1.6. Temporary props will be provided along the height of the pin in the temporary condition. Before the base is cast cross props are needed. The base/ground slab provides propping in the final condition. In the temporary condition, the edge of the slab is buttressed against the soil in the middle of the property. Also, the skin friction between the concrete base and the soil provides further resistance. The central soil mass is to be removed in portions (thirds but no greater than 8m) and cross propping subsequently added as the central soil mass is removed

1.7. A ground investigation has been undertaken. The soil present is London Clay.

1.8. The bearing pressures have been limited to 100 kN/m^2. This is standard loading for the local ground conditions and acceptable to Building Control and their approvals.

1.9. The water table is not expected to be encountered during construction.

1.10. The structural waterproofer (not Croft) must comment on the proposed design and ensure that he is satisfied that the proposals will provide adequate waterproofing.

1.11. Provide engineers with concrete mix, supplier, delivery and placement methods two weeks prior to the first pour. Site mixing of concrete should not be employed apart from in small sections (less than 1m3). The contractor must provide a method on how to achieve site mixing to the correct specification. The contractor must undertake toolbox talks with staff to ensure site quality is maintained.

2. Enabling Works

2.1. The site is to be hoarded with ply board sheets, at least 2.2m high, to prevent unauthorised public access.

2.2. Licences for skips and conveyors should be posted on the hoarding.

2.3. Provide protection to public where conveyor extends over footpath. Depending on the requirements of the local authority, construct a plywood bulkhead over the pavement. Hoarding to have a plywood roof covering over the footpath, night-lights and safety notices.

2.4. Dewater: Water is not expected during construction

2.4.1. No significant dewatering is expected. Localised removal of water may be required to deal with rain from perched water or localised water. This is to be dealt with by localised pumping. Typically achieved by a small sump pump in a bucket.

2.5. On commencement of construction, the contractor will determine the foundation type, width and depth. Any discrepancies will be reported to the structural engineer in order that the detailed design may be modified as necessary.

3. Basement Sequencing

3.1. Excavate lightwell to front of property down to 600mm below external ground level.

3.2. Excavate first front corner of lightwell. (Follow methodology in Section 4)

3.3. Excavate second front corner of lightwell. (Follow methodology in Section 4)

3.4. Continue excavating section pins to form front lightwell. (Follow methodology in Section 4)

3.5. Place cantilevered retaining wall to the left side of front opening. After 48 hours place cantilevered retaining wall to the right side of front opening.

3.6. Needle and prop bay. Insert support

Figure 1 Example of needling to existing wall

3.7. Excavate out first 1.2m around front opening, prop floor and erect conveyor.

3.8. Continue cantilevered wall formation around perimeter of basement following the numbering sequence on the drawings and ensuring that no consecutive pins are excavated before required curing times on adjoining pins:

3.8.1. Excavation for the next numbered sequential sections of underpinning shall not commence until at least 8 hours after drypacking of previous works. Excavation of adjacent pin to not commence until 48 hours after drypacking. (24hours possible due to inclusion of Conbextra 100 cement accelerator to dry pack mix). No more than

3.8.2. Floor over to be propped as excavation progresses. Steelwork to support floor to be inserted as works progress.

3.9. Excavate and cast floor slab

3.9.1. Excavate 1/3 of the middle section of basement floor. As excavation proceeds, place Slim Shore props at a maximum of 2.5m c/c across the basement. Locate props at a third of the height of the wall.

3.9.2. Continue excavating the next 1/3 and prop then repeat for the final 1/3.

3.9.3. Place below-slab drainage. Croft recommends that all drainage is encased in concrete below the slab and cast monolithically with the slab. Placing drainage on pea shingle below the slab allows greater penetration for water ingress.

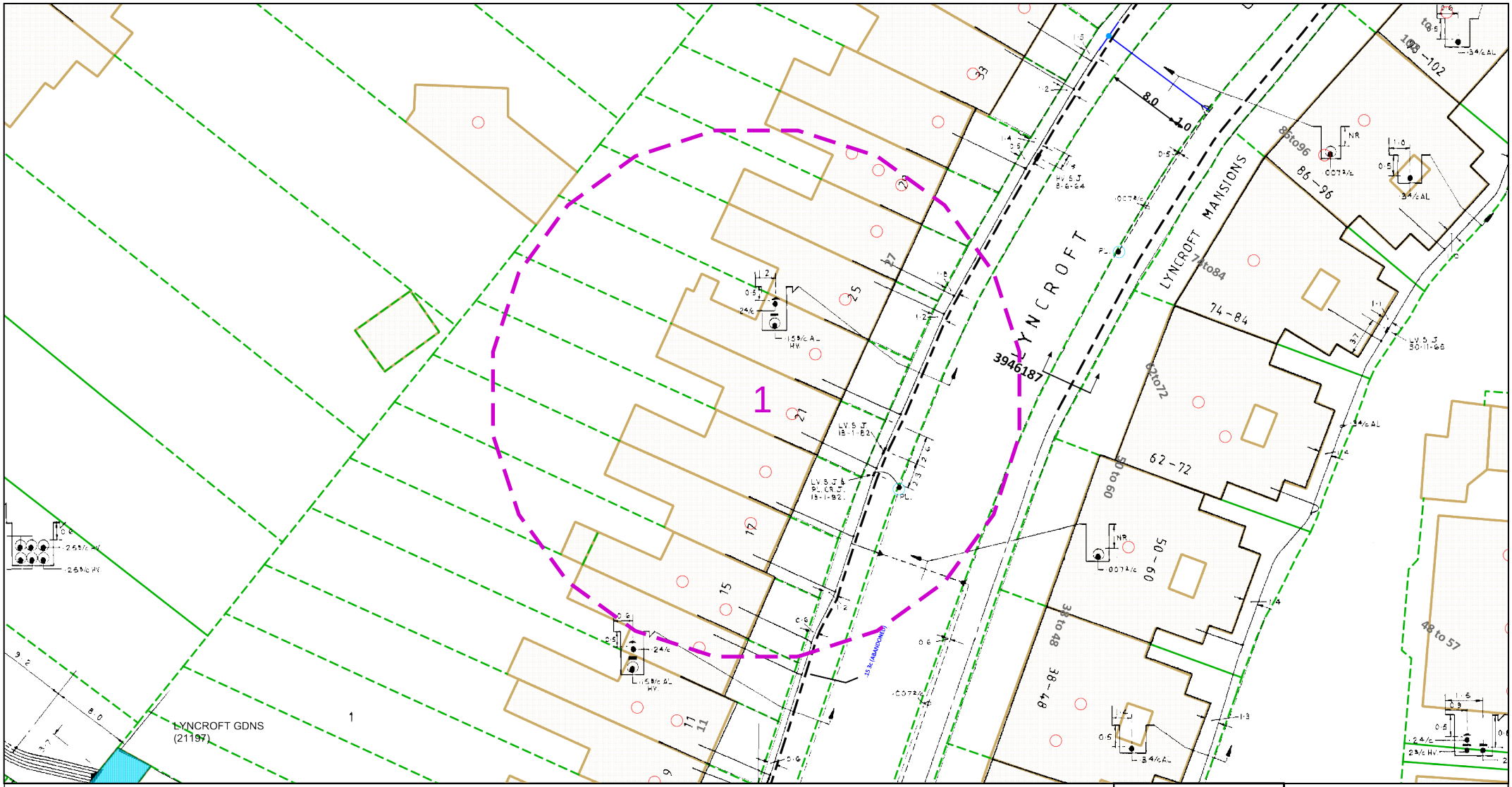
3.9.4. Place reinforcement for basement slab.

3.9.5. Building Control Officer and Engineer are to be informed five working days before reinforcement is ready and invited for inspection.

3.9.6. Once inspected, pour concrete.

3.10. Provide structure to ground floor and water proofing to retaining walls as required. It is recommended to leave 3-4 weeks between completion of the basement and installing drained cavity. This period should be used to locate and fill any localised leakage of the basement

Appendix C: Utilities Searches



0 12.5 25
metres

Dig Sites Area: Line:

The quality and accuracy of any print will depend on your printer, your computer and its print settings. Measurements scaled from this plan may not match measurements between the same points on the ground.

This plan must be used with the attached 'Symbols' document.

Date Requested: 27/11/2019
Job Reference: 17096348
Site Location: 525351 185375
Requested by: Mr Pawel Rogalewicz

Your Scheme/Reference:
190906 Lyncroft PH
Scale: 1:500 (When plotted at A4)

1. The position of the apparatus shown on this drawing is believed to be correct but the original landmarks may have been altered since the apparatus was installed.
2. The exact position of the apparatus should be verified - use approved cable avoidance tools prior to excavation using suitable hand tools.
3. It is essential that trial holes are carefully made avoiding the use of mechanical tools or picks until the exact location of all the cables have been determined.
4. It must be assumed that there is a service cable into each property, lamp column and street sign, etc.
5. All cables must be treated as being live unless proved otherwise by UK Power Networks.
6. The information proved must be given to all people working near UK Power Networks plant and equipment. Do not use plans more than 3 months after the issue date for excavation purposes.
7. Please be aware that electric cables/lines belonging to other owners of licensed electricity distribution systems may be present and it is your responsibility to identify their location.
8. Please be aware the Low Voltage Overhead power lines are not currently displayed for the Eastern Region via this service, if you require records on the location of these please contact our Plan Provision team directly via plans@ukpowernetworks.co.uk.

1. UK Power Networks does not warrant that the information provided to you is correct. You rely upon it at your own risk.
2. UK Power Networks does not exclude or limit its liability if it causes the death of any persons or causes personal injury to a person.
3. Subject to paragraph 2 UK Power Networks has no liability to you in contract, in tort (including negligence), for breach of statutory duty or otherwise for any loss, damage, cost, claims, demands, or expenses that you or any third party may suffer or incur as a result of using the information provided whether for physical damage to property or for any economic loss (including without limitation loss of profit, loss of opportunity, loss of savings, loss of goodwill, loss of business, loss of use) or any special or consequential loss or damage whatsoever.
4. This plan has been provided to you on the basis of the terms of use set out in the covering letter that accompanies this plan. If you do not accept and/or do not understand the terms of use set out in the covering letter you must not use the plan and must return it to the sender of the letter.
5. You are responsible for the security of the information provided to you. It must not be given, sold or made available upon payment of a fee to a third party.
6. Please Note: The Overview map does not display UK Power Networks electricity network and should not be used for the location of UK Power Networks assets. For detail of the electricity network please view the relevant page as highlighted in the Overview map.

N W E S

UK Power Networks

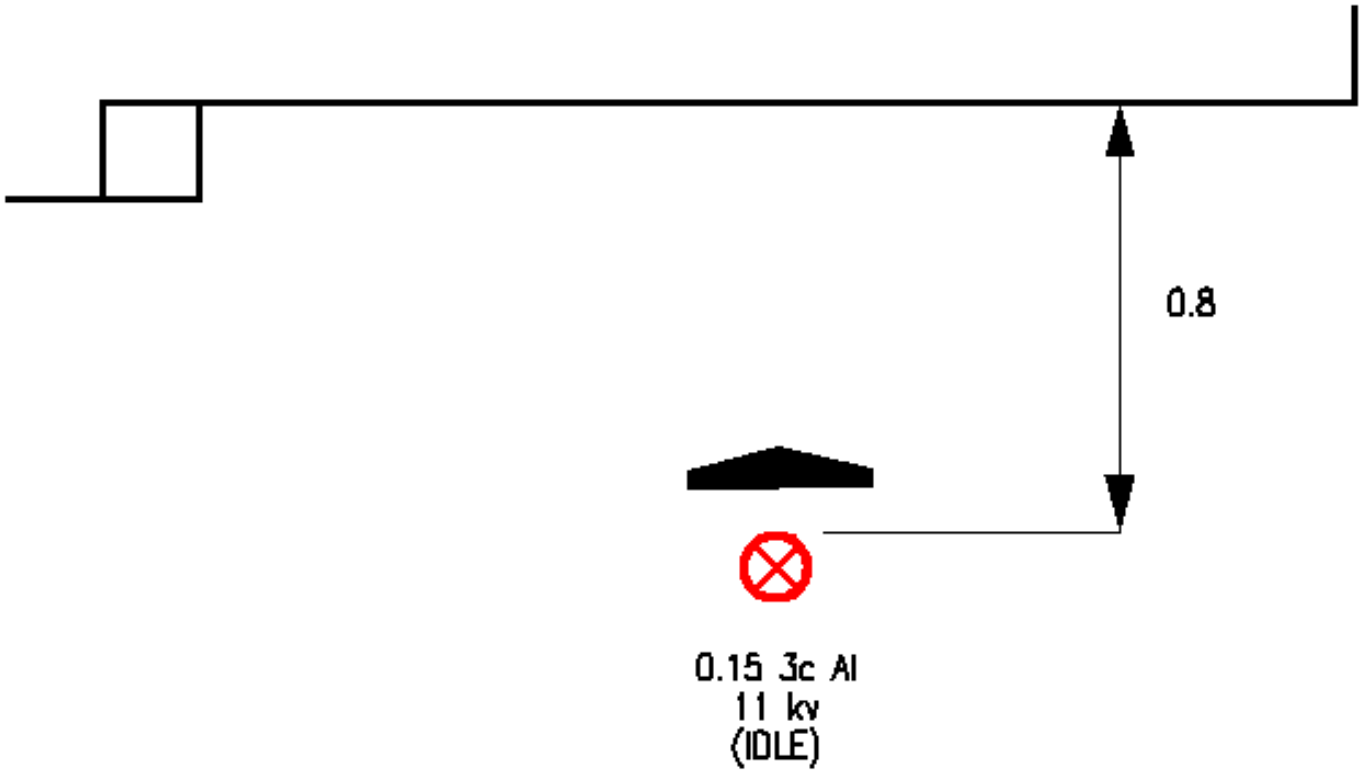
IF IN DOUBT - ASK! PHONE
0800 056 5866
EMERGENCY - If you damage a cable or line
Phone 0800 783 8838 (24hrs)
URGENTLY

LOOK OUT LOOK UP

ALWAYS LOOK UP BEFORE YOU START WORK
Refer to HSE Guidance note GS6

Maps produced at 1:2500 scale are Geo-Schematics which show LV mains cables and overhead lines (in some cases all voltages). Prior to carrying out excavations you must refer to the 1:500 records to determine the location of all known underground plant and equipment.

Cross Section : 3946187



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Cross Section
3946187

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4. This plan has been provided to you on the basis of the terms of use set out in the covering letter that accompanies this plan. If you do not accept and/or do not understand the terms of use set out in the covering letter you must not use the plan and must return it to the sender of the letter.
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URGENTLY

UK Power Networks

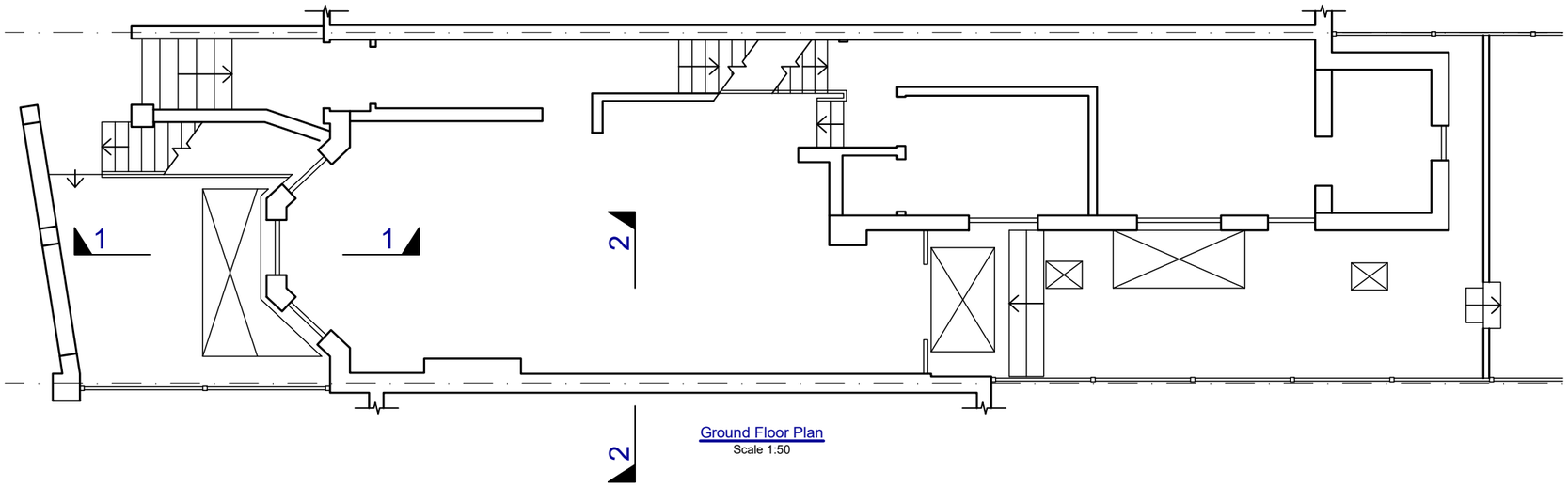
LOOK OUT LOOK UP

ALWAYS LOOK UP BEFORE YOU START WORK
Refer to HSE Guidance note GS6

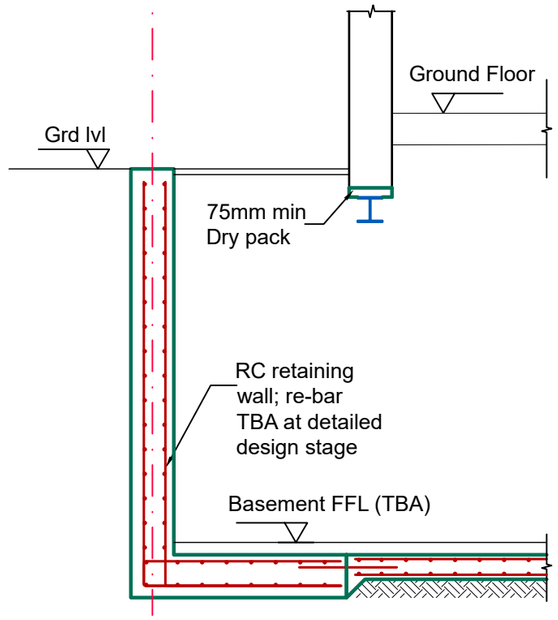
Maps produced at 1:2500 scale are Geo-Schematics which show LV mains cables and overhead lines (in some cases all voltages). Prior to carrying out excavations you must refer to the 1:500 records to determine the location of all known underground plant and equipment.

Appendix D: Structural Drawings

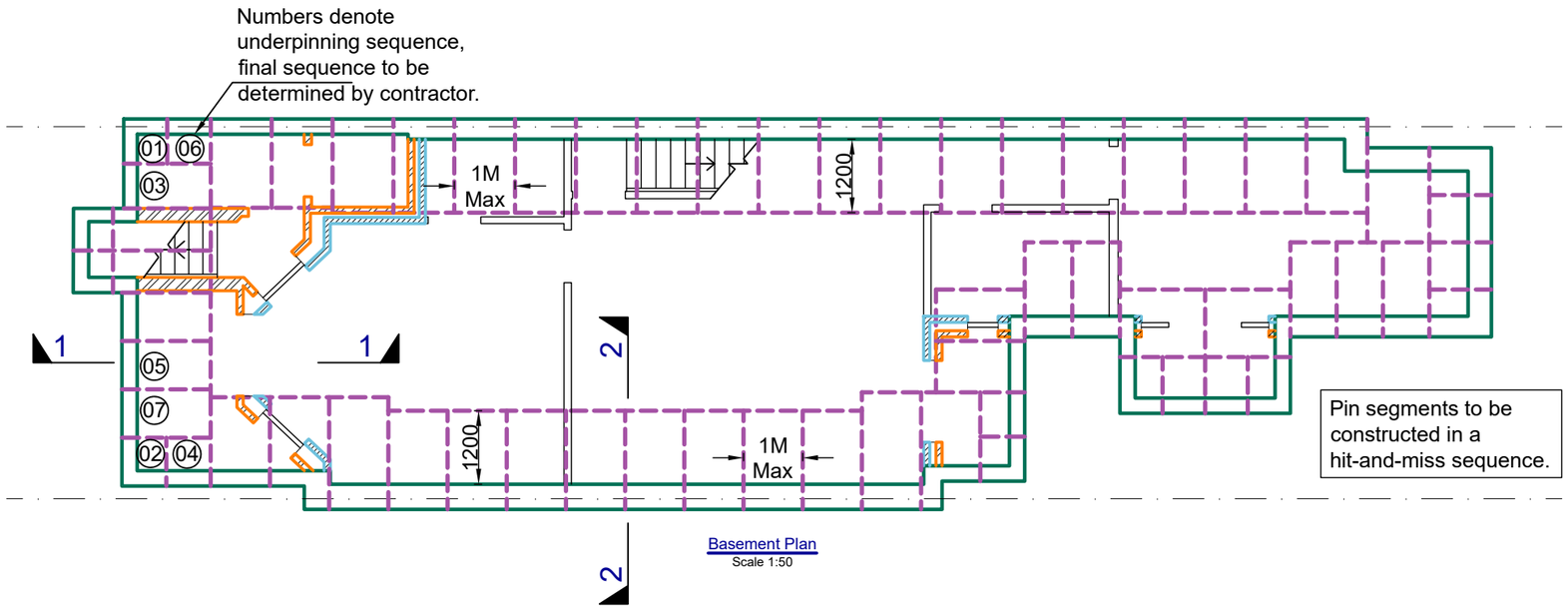
1:100 Basement Plan on A3 Showing Neighbouring basements if present
1:100 Ground Floor plan on A3 Showing Neighbouring property
1:50 Section on A3 Including section through Neighbouring Footings



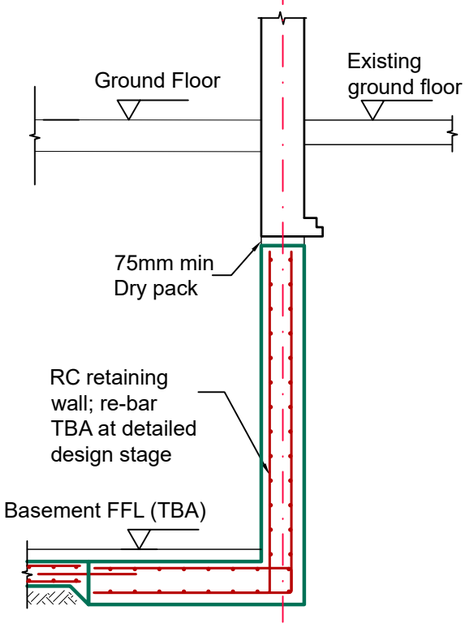
Ground Floor Plan
Scale 1:50



Section 1-1
Scale 1:50



Basement Plan
Scale 1:50



Section 2-2
Scale 1:50

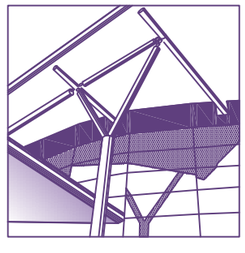
Job Number: 190906	Date: Sept '19
Dwg Number: SL-10	Rev: -
Drawn: sb	Ch'kd: pdh
Scale: As shown @ A3	

Client: Advantage Basement & Cellar Company Ltd

Project: 15 Lyncroft Gardens

Title : Plans and Sections BIA

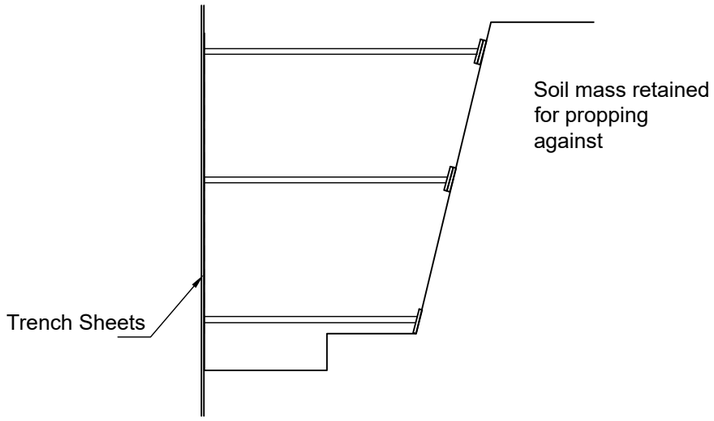
Croft Structural Engineers
Clockshop Mews,
r/o 60 Saxon Rd,
London, SE25 5EH.
020 8684 4744
www.croftse.co.uk



Rev	Date	Amendments
-	27/11/2019	First issue for comment

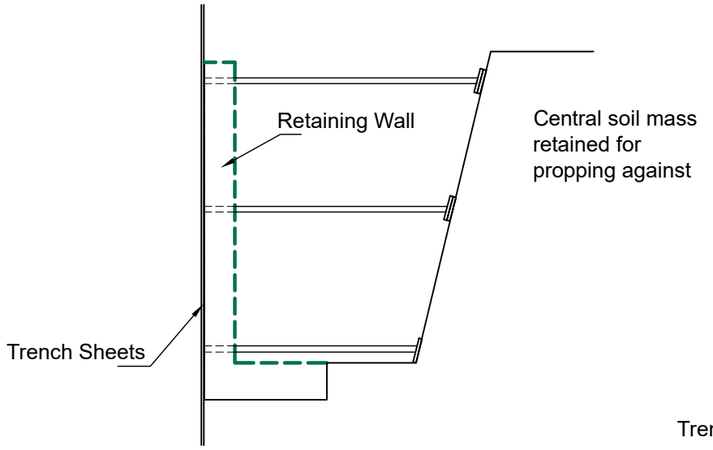
Appendix E: Temporary Works Sequence

- Lateral propping
- Sequencing



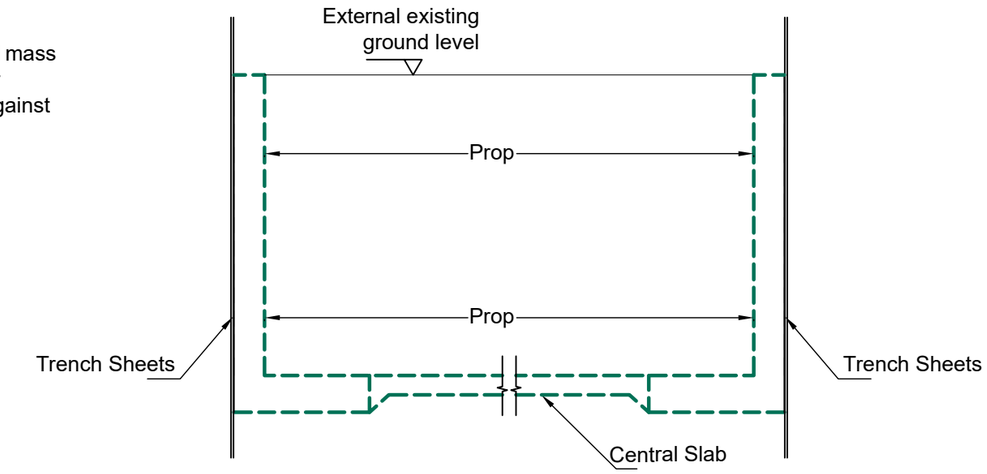
Phase 1

1. Excavate in 1m width maximum and install props and trench sheets and excavation progresses



Phase 2

1. Cast Retaining wall and Base.
2. Remove Props after concrete gain sufficient strength



Phase 3

1. Excavate and cast remainder of base slab. Install full length props while central soil mass is getting removed
2. Proceed with above ground construction

Job Number 190906	Date Nov '19
Dwg Number ST-30	Rev -
Drawn sb	Ch'kd pdh
Scale As shown @ A3	

Client: Advantage Basement & Cellar Company Ltd

Project: 15 Lyncroft Gardens

Title : Temporary works propping

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www.croftse.co.uk

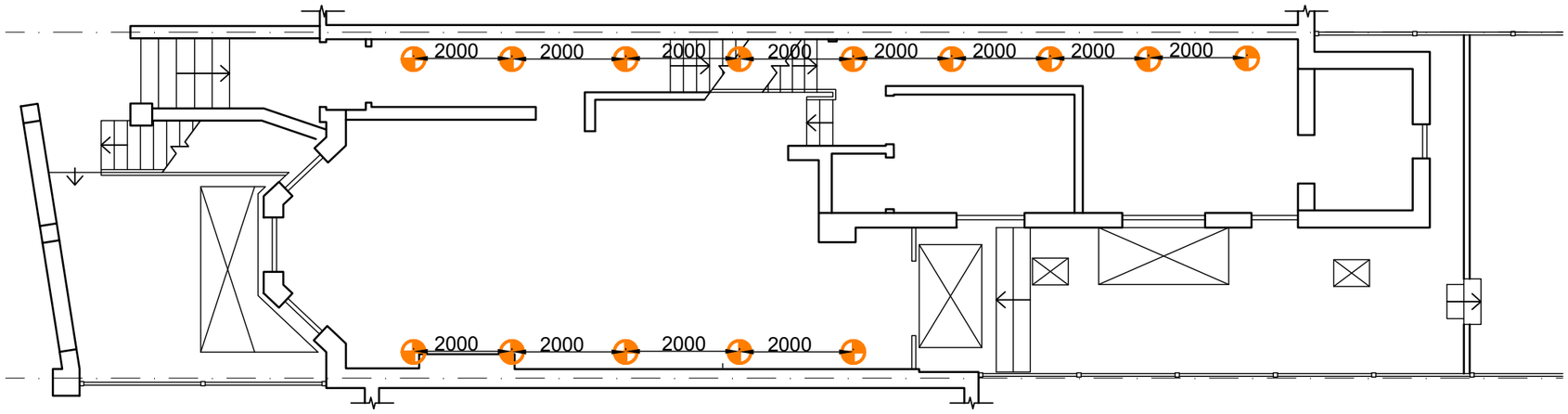
Rev	Date	Amendments
-	27/11/2019	First issue for comment

Appendix F: Monitoring locations

For Trigger values and frequency see BIA report

Key

Denotes position of Leveling Targets, fixed to party wall
500mm & 2000mm above Ground Floor Level.
Additional monitoring may be required for any cracking
noted in the Party Wall Surveyor's survey.
Levels to be checked both vertically and horizontally



Ground Floor Plan
Scale 1:50

Job Number 190906	Date Nov '19
Dwg Number SM-20	Rev -
Drawn sb	Ch'kd pdh
Scale As shown @ A3	

Client: Advantage Basement & Cellar Company Ltd

Project: 15 Lyncroft Gardens

Title : Movement monitoring layout

Croft Structural Engineers
Clockshop Mews,
r/o 60 Saxon Rd,
London, SE25 5EH.
020 8684 4744
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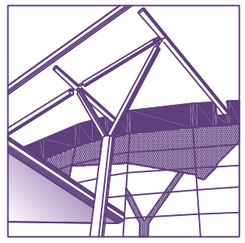

Rev	Date	Amendments
-	27/11/2019	First issue for comment

Appendix G: Flood Risk Assessment

Job Number: 190906

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Flood Risk Assessment

Property Details: 15 Lyncroft Gardens
London
NW6 1LB

Author	Reviewed by
Sam Bunning	Phil Henry CEng MICE

Revision	Date	Comment
-	22.11.2019	First Issue

CROFT STRUCTURAL ENGINEERS

Contents

CROFT STRUCTURAL ENGINEERS

Executive Summary

This flood risk assessment for the basement development at 15 Lyncroft Gardens has explored the potential sources of flooding and compared existing and proposed conditions. The assessment has included a detailed study of the site and the surrounding area. The assessment concludes that the proposals will not increase the risk of flooding to nearby properties. The risk of flooding to 15 Lyncroft Gardens can be suitably mitigated by adopting appropriate construction methods.

1. Introduction

A new basement is proposed below an existing property at 15 Lyncroft Gardens. This report comprises a FRA (flood risk assessment) to support the planning application.

The objectives of the FRA is to establish:

- Whether the basement is likely to be affected by current or future flooding from any source
- Whether the basement will increase flood risk elsewhere
- Whether mitigation measures to deal with these effects and risks are feasible and appropriate

This flood risk assessment includes proposed design measures to reduce any risks associated with flooding and mitigate the impacts for the operation of the building, the users, the surrounding properties and the occupants of nearby properties.

Planning Context

While nowhere in the borough is identified by the Environment Agency as being flood prone from rivers or the sea, there are still parts that are identified as being subject to localised flooding from surface water. This is caused during times of heavy rainfall when the local combined sewer system is unable to deal with the volume and rate of flow.

All applications for a basement extension within flood risk areas identified in the LB Camden Flood Risk Management Strategy or in any future updated Strategic Flood Risk Assessment will be expected to include a Flood Risk Assessment

This report is based on information from a desk study, a site visit and relevant parts of the following documents:

- Basements CPG - March 2018
- Water and flooding CPG - March 2019

The scope of the FRA to be commensurate with the scale, nature and location of the development. This proposal described in this assessment is for a multi-occupancy dwelling. The level of analytical detail is limited accordingly.

2. Existing Site Conditions & Proposed Development

The existing property comprises a traditionally built Victorian end-of-terrace building. The structure is three and a half storeys high, including a partial cellar, and has front and rear gardens. The front garden includes a concrete stairwell to the cellar and is otherwise raised and concreted over.

The rear garden has hard landscaping at the side of the outrigger; beyond the end of the small ground floor extension, the garden is soft landscaped. From borehole investigations carried out by Maund Geo-consulting, the local soil conditions are London Clay.

Flat A, occupies the whole of the Lower Ground Floor and the cellar, and is the subject of this assessment. The site is less than 1 hectare and the site is on a street that was flooded in 2002.

The proposal is to extend the cellar to form a new single-storey basement level below the entire footprint of the existing property. There will also be a lightwell formed in the front and rear gardens.

3. Flood Hazards and Mitigation Measures

The potential hazards related to flooding are as follows:

Tidal and Fluvial Flooding

Given that the site is above 40m AOD, and lies in Flood Risk Zone 1 (defined by the Environment Agency as having low risk of flooding from rivers and seas), the risk of flooding from fluvial and tidal sources is not significant.

Surface Water and Pluvial Flooding

The area surrounding the site has a gentle slope from northeast to southwest.

Figure 1: Extract from Lidar map showing surface topography

The property is on the northwest side of the road. Rainwater accumulating on the road will flow in directions of the slope of the surrounding area, from northeast to southwest, away from the property. Water entering the boundary of the property, in the event of intense rainfall, is more likely to be from wind-blown ingress than from surface flow due to gravity.

The site is adequately drained, as are the surrounding roads (which are drained by gullies maintained by Thames Water). 15 Lyncroft Gardens and the surrounding roads flooded in 2002.

The new basement will not change the area of permeable surfaces. Rainwater will be able to infiltrate into the ground as before and will not migrate to alternative locations above ground level.

Groundwater Flooding

Bore hole records (Maund Geo-Consulting Ltd 18th October 2019) show that the new basement will be founded on, and be surrounded by London Clay. Clay has a very low level of permeability. The inclusion of a basement in this strata will therefore have very little effect on the conveyance of groundwater. The increase in risk of flooding from groundwater is therefore negligible.

During construction perched water may be present in made ground or in pockets of gravel within the clay. This can be discharged with active dewatering on site. it is advisable that the contractor monitors the groundwater prior to the start of works and make suitable arrangements for dewatering as necessary.

Infrastructure Flooding

There are no reservoirs nearby which could cause flooding in the event of failure. Furthermore, these items are assumed to have a high level of maintenance thus the risk of flooding from these is considered very low.

There are no known cases of significant flooding from sewers in the local area other than in 2002, as mentioned previously.

There is always a risk that incoming water mains may break, causing significant flood risk to the occupants of the basement. This risk is inherent with all basement structures. Mitigation measures are proposed in the following section.

Mitigation Measures

During times of high rainfall there will be an increased risk of surface water flooding from the impermeable surfaces of the street and pavement in front of the property. There are however a series of passive defences that help prevent rising surface water levels entering the boundary of 15 Lyncroft Gardens. The kerb line outside the property raises the pavement 65mm from the surface of the road. There is then another two steps up from the pavement to the front garden on 15 Lyncroft Gardens,

as shown below. The garden is also protected in the direction of water flow by garden walls on the boundary lines.

Figure 2: Passive Defences at 15 Lyncroft Gardens

In the unlikely event that water will enter the front lightwell, the sill height of the lightwell windows places another 650mm defence above the base of the lightwells.

There is a low risk of incoming water mains bursting resulting in localised flooding. This would occur at the front of the property and the passive defences stated above would mitigate the risk of flooding into the basement; the majority of the water would run downhill away from the property.

To mitigate the risks associated with flooding from groundwater, Croft would recommend that suitable waterproofing measures be proposed in conjunction with the structural design. A common and anticipated detailed design stage approach is to use internal dimpled membranes (Delta or similar). These will be integral to the waterproofing of the basement.

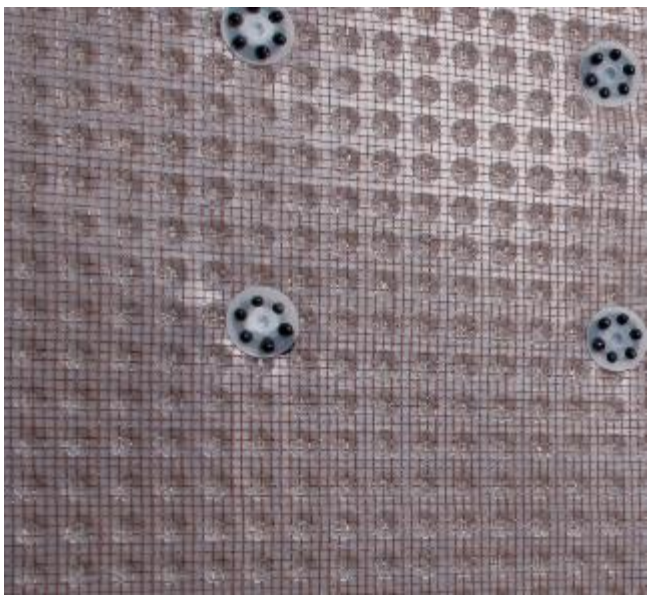

Figure 3: Example of dimpled membrane used for waterproofing basements

Any water from this will enter a drainage channel below the slab. This will be pumped and discharged into the exiting sewer system.

It is recommended that a waterproofing specialist is employed to ensure all the water proofing requirements are met. The waterproofing specialist must name their structural waterproofer. The structural waterproofer must inspect the structural details and confirm that he is happy with the robustness.

Due to the segmental construction nature of the basement, it is not possible to waterproof the joints. All waterproofing must be made by the waterproofing specialist. He should review the structural engineer's design stage details and advise if water bars and stops are necessary.

The waterproofing designer must not assume that the structure is watertight. To help reduce water flow through the joints in the segmental pins, the following measures should be applied:

- All faces should be cleaned of all debris and detritus
- Faces between pins should be needle hammered to improve key for bonding
- All pipe work and other penetrations should have puddle flanges or hydrophilic strips

The design of the services could include the following:

- A pumping system should be installed for the proposed basement. There is a likelihood that this may fail and allow excess water to accumulate. If this were to occur, the build-up of water would be gradual and noticeable before it becomes a significant life-threatening hazard.

- The pumping system should be a dual mechanism to maintain operation in the event of a failure. This should include a battery backup and a suitable alarm system for warning purposes.

Figure 4: Example of sump pump used commonly used for basement drainage

- Non-return valve to avoid the risk of backflow

- Install all electrical wiring at high level

SUDS Considerations

There is plentiful soft landscaping in the rear garden which allow and will continue to allow rainwater to discharge into the ground. This mechanism will be maintained: there are no proposals to change the landscaping in the rear garden. The use of artificial mechanisms such as attenuation tanks is therefore not considered necessary in this development. SUDS will be achieved by the continued use of soft-landscaped areas for infiltration.

Appendix H: Construction Management Plan

Construction Management Plan	
Project Name	**15 Lyncroft Gardens NW6 1LB**

Introduction

On all of Advantage Basement's projects, the safety and welfare of all is of paramount importance. This Document concentrates on how we interface with the existing site operations and how we manage those interfaces to safeguard the general public, construction work force and the project as a whole. The following key topics have been identified which will be developed in more detail and agreed prior to the work commencing on site:

Contents

Licenses and Bay Suspensions

One bay outside of property where a skip will be placed for removal of waste.

Site Access and Traffic Management

The main access to the site will be from the A41 Finchley Road turning onto Lyncroft Gardens. Highway signage will be erected on the surrounding road network warning all site users of the construction site entrance and exit.

On arrival at the site boundary there will be an Advantage Basement representative to meet all visitors, operatives and delivery vehicles. Personnel Access onto to the site will be controlled by a logistics supervisor. This will ensure no unauthorised personnel enter onto site and that everyone can be accounted for at the end of each working shift.

Advanced notice will be required from our supply chain and their suppliers for all multiple or abnormally sized deliveries, such deliveries will be scheduled so as not to interfere with the existing school operations or cause congestion to the adjacent roads. All material and sub-

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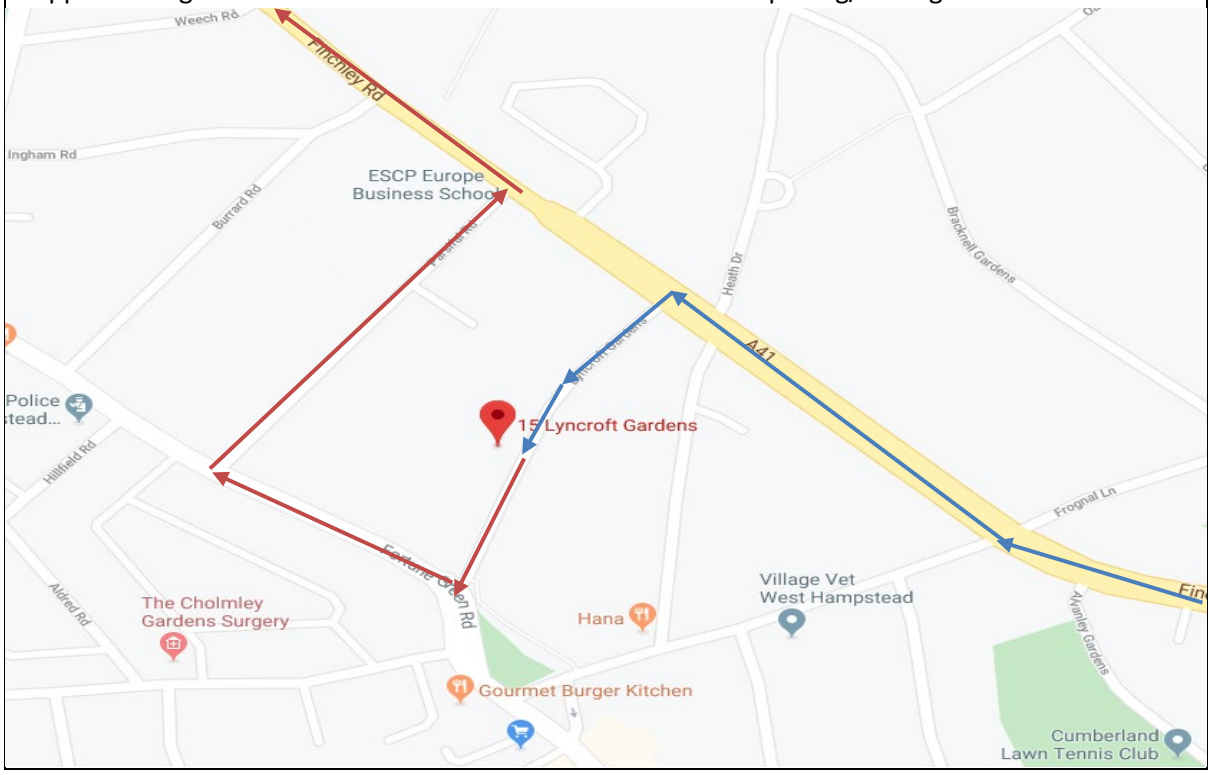
contract orders placed with our supply chain will include the details of the restricted delivery hours.
There will be no construction vehicle movements into or out of the site during the school start and finish times i.e between 08.30-10.00 and 14.00-17.00.
On a typical working day there will be one delivery of materials and one grab lorry to remove spoil. They will be scheduled no to arrive at the same time to avoid congestion in the area.

Site Layout

Below is a drawing showing the site layout and vehicle tracks arriving and leaving the site. All vehicles will approach the site on the Blue arrowed route onto Lyncroft Gardens, they will then leave the site again via the red arrowed route. All materials will be dropped to within the site boundary. No materials or plant will be stored on the public highway.

Lyncroft has a lower amount of traffic between the hours of 9am and 3pm so all deliveries will happen during these times to avoid the rush hour and school opening/closing times.



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Security Hoardings

A 2.4m high timber hoarding will segregate our construction work from the general public and neighbouring properties. The accurate positioning and setting out for the site hoarding will be agreed prior to installation. All hoarding will be branded with Advantage Basement signage (*see below*) and debris netting where needed. The site foreman will make sure it is clean and tidy every day.

Where any existing boundary fence is of appropriate height and condition, we will look to utilise this on site. The proposed site boundary will not impact on any fire exits/routes from surrounding buildings.

There will be a 24hr Emergency contact displayed on the front hoarding

Parking Strategy

Due to the limited amount of parking all operatives will travel to the site via public transport. There are no local car parks therefore on street parking will be strictly in accordance with the highway code. We will encourage shared transport and public transport to limit vehicles arriving at the site.

Logistics Management

We recognise the importance of controlling the construction traffic on accessing the site along with the interface with the local residents. Therefore, it is our intention to deploy a logistics supervisor to control the construction traffic and to ensure there is no congestion entrance/exit to site during construction works.

This person will take full responsibility of controlling the road sweeping operations, ensuring all the approaching roads and footpaths are kept clean at all times and ensure the site is kept in a

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clean and tidy condition throughout all phases of the construction work. There will be wheel washing facilities on site for all construction vehicles. The supervisor will be a fully qualified banksmen and will assist in the safe unloading of vehicles.
Materials will be stored in a manner so as to ensure they are not contaminated by weather or site dirt, where required, materials will be stored off the ground and covered.
Every Care will be taken to liaise with any site of significant level of works in the area. Site managers will be contacted to notify of any impact our site may have to their site or Vice Versa.

Waste Minimisation

A Site waste management plan will be developed prior to works starting on site, which will include the establishment of a waste zone; housing bins for waste segregation prior to removal from site and storage of packaging to be removed from site for ruse or recycling. Located at the rear of the property
The SWMP will consist of a series of targets to ensure that the project team and supply chain stay focused throughout the project to keep waste levels to a minimum. Weekly updates and monthly reports are produced to monitor performance against targets; these reports are taken to site to discuss the sites performance and then archived as a record of how Advantage Basement have minimised their impact on the environment.

Community relations – Considerate Constructor

A liaison and communication strategy will be developed with the local residents and school to ensure that good relations are maintained, we have found that this has been invaluable with similar recent projects.
Short term look-ahead information about the project will be explained and followed by a questionnaire; we have found that this involvement and approach mitigates the effects of the construction activities.
Advantage Basement is a Gold award winning member of the Considerate Constructors scheme therefore our projects are monitored by a third party experienced industry professional to assess performance against a five point code of considerate practise.
Categories include Enhancing the appearance, Respecting the community, Protecting the environment, Securing everyone safety and Caring for the workforce.

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Environmental Considerations

To ensure that the works progress with the minimum disruption to the surrounding area and its neighbours especially those located immediately adjacent to the site; all works will comply with the Advantage Basement Health, Safety and environment policy. Giving particular consideration to the constraints of the project we would address noise, dust vibration and summarise our solutions below.

Noise

The considerate constructor's scheme is a national initiative, set up by the construction industry to encourage best practice beyond statutory requirements in the main areas of the environment, the workforce and general public. As "Gold Award Winners" of this scheme, we will always be proactive and maintain open dialogue with those affected by our works through regular meetings to ensure we do not disrupt any special planned activities or critical working arrangements that may be adversely affected by noise.

Noise levels will be fully recorded and logged prior to commencing the works and be diligently monitored throughout the duration of the site works. Equipment selection, materials and systems will contribute to noise control strategy together with the careful timing of inherently noisy activities such as excavating the basement and breaking existing concrete. The timing of such operations will be carried out by prior agreement with the local residents. Noise reduction measures include

- Comply or surpass recommendations of BS5228-1
- Effective silencing of plant and processes, including the use of well maintained equipment
- Use of mains electricity in place of generators where practicable
- Personal radios banned from site
- Sirens / Bells for emergency use only
- Base line noise survey to be carried out prior to the work
- Process/Plant utilisation method statements to take account of noise control including the switching off of machinery during idling time, work breaks etc

Movement

Horizontal and Lateral Movement Monitoring will be carried out on site using targets these will then have a base reading and will be monitored weekly for any change.

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Dust

We will consider the spread and effect of airborne dust during the works at every supply chain pre-order interview and ensure mitigation/prevention strategy is agreed and presented within the method statements for every applicable trade and operation

Following the pre-order interview, method statements will be reviewed by Advantage Basement and finalised by a sign off by the site manager to ensure compliance with the requirements to prevent / mitigate environmental nuisances such as dust.

The installation of a wind sock on site will be used as highly visual indicator of the wind direction. The sock affords site management and operatives a quick indication of wind direction which will be used as an aid in monitoring the displacement of dust. Further dust prevention measures include: Pollution sensors will be placed around site to monitor levels of dust accordingly to the *Supplementary Planning Guidance by the GLA (2014) for The Control of Dust and Emissions during Construction and Demolition and the BS 5228-1:2009 + Amendment 1 2014 Approved Code of Practice for noise and BS 5228-2:2009 + Amendment 1 2014 Approved Code Of Practice For Vibration control on construction and open site*

- Consideration at material procurement stage to reduce the need for the cutting of materials and then only allowing site cutting in designated areas
- Dampening down of dust generating activities
- Covered wagons to be used for the transportation of dust generating materials
- Existing roads will be kept clean and maintained
- The management of dust generating activities to be stated in appropriate methods
- 10mph vehicle speed limit

Vibration

Any plant on site will be audited and whilst in use, will maintain a 10mph speed limit around the immediate area of the site. Vibration reduction measures include:

- Omit/limit vibrating activities where possible
- Control working hours of vibrating activities
- Tracked vehicles to be routed away from neighbouring properties and wheeled machine to be used wherever practicable

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Light Pollution

- Site lighting will only be utilised when necessary, and of sufficient intensity to progress the works and maintain security.
- Flood lights will be located to provide the necessary site illumination with lamp heads directed so as not to shine onto/into adjacent properties and therefore not to be a nuisance, in particular to the adjacent buildings.

Ground and Watercourse Contamination

- Method Statements for the works will be devised to take account of contamination risk and the effective management of that risk
- All materials / processes will be handled / undertaken in accordance with the suppliers / manufacturers recommendations
- All bulk solid, granular, liquid materials will only be stored on site in (limited) quantities necessary to meet the requirements of the construction process
- All liquid materials to be stored in suitable containers, adequately bunded to comply with Health, Safety and Environmental legislation / recommendations
- Sensitive areas will be subjected to specific regimes
- Spillage reaction / clean up plans will be in place to be undertaken by a trained squad of personnel
- Specialist cleaning equipment will be placed in key locations around site to minimise any spillage should it occur
- All waste materials will be controlled / sorted into the appropriate waste containers on site prior to removal by an authorised / licensed waste carrier
- Interceptors will be used to remove solids etc from any site discharges, which may, with the agreement of local authority be made into the surface water drainage system

Site Housekeeping

Throughout the project we will encourage and enforce a “Good Housekeeping” regime. A strategy will be developed and incorporated into the site rules which will be sent to suppliers and supply chain partners alike.
We will ensure that all operatives engaged on the works are familiar with the work in progress, skilled at their task, aware of their duties and responsibilities to others and knowledgeable of the site rules.
Special attention will be given to confined spaces and deep excavations as well as working at height. The work package specific method statement will be devised during the project in conjunction with the appropriate supply chain partner.

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All excavations and work areas will be adequately fenced and sign posted. All personnel on site will wear full Personal Protection Equipment at all times.

Hours of Working

Monday to Friday: 8am - 6pm
Saturday: 8am – 1pm (Prior agreement with clients approval)

There will be no Construction vehicle movements into or out of the site during the school start and finish times i.e. 8.30am-10am and 2pm – 5pm

Extended working hours may be required for one off operations should the exception arise we will seek advance agreement from the client and neighbouring properties.

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