BASEMENT IMPACT ASSESSMENT

FOR

PROPOSED DEVELOPMENT

AT

8 ST KATHARINE'S PRECINCT
LONDON
NW1 4HH

FOR

INTERCAT

Project No. P1954

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EXECUTIVE SUMMARY

This executive summary is an overview of the key findings of the report, and the full body of the report should also be consulted for further detail and to give appropriate context.

Brief

This report has been prepared to support the Planning Application at 8 St Katharine's Precinct. It was prepared by Michael Alexander Consulting Engineers and compiled by a Chartered Structural Engineer. It follows the approach laid out in Camden Planning Guidance 'Basements and Lightwells' CPG4 (April 2011) in assessment of the impact of the basement development. It is to be read in conjunction with Crawford Partnership drawings and the Ground Investigation Report prepared by GEA.

Project Description

8 St Katharine's Precinct is a five storey residential property constructed in the early 19th century. The proposed works involve the extension of the existing basement under part of the rear garden, the lowering of the floor of part of the existing basement, together with other internal modifications.

Screening Results

A screening exercise was carried out in accordance with the recommendations of CPG4 in respect of groundwater flow; land stability and surface flow/flooding. Reference was made to the Camden Geological, Hydrogeological and Hydrological Study and other data sources.

In respect of groundwater flow, the underlying soil is not an aquifer and the site is not in close proximity to any surface or subsurface water features. The reduction in soft landscaping to the rear garden was carried forward to the scoping stage.

With regards to ground stability the screening process highlighted a number of issues which are regularly associated with the construction of basements in London Clay in close proximity to adjoining buildings. The removal of existing small trees in the rear garden was also noted.

St Katharine's Precinct was not affected by the 1975 or 2002 floods and therefore a flood risk assessment is not required. There will be an increase in the surface water collection area on the site and this was carried forward to scoping studies.

Scoping

The results of the screening exercise were used to define the scope of further studies and investigations, including a site soil investigation.

Basement Impact Assessment

A hydrogeological assessment carried out by GEA's chartered geologist concluded that there would be no significant impact in ground water levels or flows due to the development.

Ground movements were predicted and were not anticipated to produce any more than very slight damage to adjoining structures. Proposed mitigation measures include early propping of the sides of the excavation and the use of monitoring to verify that movements remain within predicted levels – these have been set out in an outline Construction Method Statement.

It was considered unlikely that the proposed basement would be affected by seasonal shrink-swell action of the clay, nor would the presence of the basement and removal of trees exacerbate this action on the adjoining properties.

The use of SUDS measures will ensure that flow rates into the public combined sewer will not be increased following the development.

1.00 INTRODUCTION

1.01 Michael Alexander Consulting Engineers has been appointed by Mr George Farha of Intercat to prepare a Structural Basement Impact Assessment to support the Planning Application for the extension and modifications to the existing house at 8 St Katharine's Precinct.

1.02 This report has been prepared by Isaac Hudson MEng MA(Cantab) CEng MIStructE, a Chartered Structural Engineer.

1.03 The proposed works involve the extension of the existing lower ground floor under the rear garden with a plant room below. The project will also include the construction of a new conservatory to the rear, lowering the floor of a section of basement and other internal modifications.

1.04 The existing building is a terraced property dating from the early 19th century. The house comprises living areas and bedroom accommodation to the lower ground floor, living areas to the ground and first floors and bedroom accommodation to the second and third floor levels. The external walls are constructed from solid masonry and the internal walls are a combination of solid and load bearing timber stud walls. Upper floors and the roof are of timber construction.

1.05 The existing property is located within the Regents Park Conservation Area.

1.06 The existing property is a grade II* Listed Building.

1.07 The other buildings in St Katharine's Precinct are assumed to be of similar age and construction and are arranged as illustrated in Appendix C.

It is assumed that many of the nearby properties also have lower ground floors, and with reference to figure 25 of the Camden Geological, Hydrogeological and Hydrological Study, it is thought that several of the adjoining properties have applied for new or extended basements since June 2005.

1.08 This document addresses the specific key issues in DP27 as described in Camden Planning Guidance CPG 4 (April 2011).

2.00 BASEMENT PROPOSALS

2.01 The details of the existing building and proposals for the basement and upper floors are shown on Crawford Partnership drawings.

2.02 Outline proposals for the basement are shown on Crawford Partnership drawings, as follows:

2011-269/-2-100	– Site Existing
2011-269/-2-101	– Site Proposed
2011-269/-2-102	– Plant Existing and Proposed
2011-269/-2-103	– Basement Existing and Proposed
2011-269/-2-104	– Ground Existing and Proposed
2011-269/-2-105	– 1st Existing and Proposed
2011-269/-2-106	– 2nd Existing and Proposed
2011-269/-2-107	– Loft Existing and Proposed
2011-269/-2-108	– Roof Existing and Proposed
2011-269/-2-200	– Existing Front/Rear Elevation
2011-269/-2-201	– Proposed Front/Rear Elevation
2011-269/-2-300	– Section AA Existing
2011-269/-2-301	– Section BB Existing
2011-269/-2-302	– Section CC/DD Existing
2011-269/-2-303	– Section AA Proposed
2011-269/-2-304	– Section BB Proposed
2011-269/-2-305	– Section CC/DD Proposed
2011-269/-2-401	– Conservatory Openings
2011-269/-2-402	– Glass Box
2011-269/-2-403	– Lightwell
2011-269/-2-404	– Stairs and Steps

2.03 The details of the existing structure, site boundaries and site soil conditions will be subject to further detailed exploratory work prior to works commencing on site.

2.04 The design and construction of the building structure shall be in accordance with current Building Regulations, British Standards, Codes of Practice, Health and Safety requirements and good building practice.

3.00 GROUNDWATER

3.01 STAGE 1 (SCREENING)

3.01.1 The impact of the proposed development on ground water flows is considered here as outlined in Camden Planning Guidance CPG 4 (April 2011). The references are to the screening chart Figure 1 in CPG4.

3.01.2 (Q1) With reference to the Camden Geological, Hydrogeological and Hydrological Study (Refer figure (a) in Appendix A) the site is above an unproductive strata.

3.01.3 Q2) With reference to the Camden Geological, Hydrogeological and Hydrological Study, (Refer figures (b) and (c) in Appendix A), the nearest surface water is the Regents Canal, which runs approximately 400m to the north of the site. Surface water is also located to the west of the site within Regents Park approximately 500m away. As the site is remote from the stratigraphic boundary, the local geology suggests that the site is not within close proximity of a spring line.

From the British Geological Society 'Geoindex' the nearest water wells are to the north west of the site both located within London Zoo (within Regents Park) approximately 500 metres from the site.

3.01.4 (Q3) With reference to the Camden Geological, Hydrogeological and Hydrological Study, the site is not within the catchment of the pond chains on Hampstead, nor the Golder's Hill Chain.

3.01.5 (Q4) The existing garden, which is partially paved and partially soft landscaped, will be excavated to form the basement extension. (Refer figures (k) and (l) in Appendix A).

3.01.6 (Q5) Soakaways are not considered appropriate to the site, due to the sub-soil conditions, and therefore no collected surface water will be discharged to ground as part of the site drainage.

3.01.7 (Q6) There are no local ponds or spring lines in close vicinity to the site.

3.01.8 On the basis of items 3.01.2 to 3.01.7 above, and in reference to Figure 1 of CPG4, the aspects carried forward to the scoping stage in respect of ground water are:-

- The reduction in surface permeability (Q4)

It is not considered necessary to consider further the other issues raised in the screening stage where a negative response was given.

3.02 STAGE 2 (SCOPING)

3.02.1 The potential impacts, which will need to be considered will include:

- Whether the basement works will impact on the groundwater level locally and whether this will impact neighbouring properties

3.02.2 In response to the issues raised in the scoping stage, a conceptual ground model was developed by Geotechnical and Environmental Associates Ltd (GEA) and is included in Section 6 of their Report 'J11170 Desk Study & Ground Investigation Report' dated January 2012.

3.02.3 The desk study and conceptual ground model were used to inform both the scope of the site soil investigation and the scope of the interpretive report.

3.03 STAGE 3 (SITE INVESTIGATION AND STUDY)

3.03.1 During the ground investigation, the level of water strikes were recorded where they were encountered in the borehole. A standpipe was then installed to a depth of 6 metres. A repeat monitoring visit was made four weeks after installation to check stabilised water levels.

3.03.2 The following was considered in evaluating the potential impact of the basement on groundwater level and flows:

- The levels of seepage recorded in the borehole
- The absence of water in the standpipe
- The low permeability of the London Clay Strata
- The depth of the proposed basement

3.04 STAGE 4 (IMPACT ASSESSMENT)

3.04.1 The hydrogeological impact was assessed by GEA by their Chartered Geologist and their conclusions are included in Section 7.1 of their report 'Desk Study and Ground Investigation Report' reference J11170 dated January 2012.

3.04.2 In summary, the Ground Investigation Report concludes that the ground water table is unlikely to be present at a shallow depth within the London Clay. The seepage within the borehole is likely to be a pocket of trapped water as the standpipe remained dry to 6m. Any ground water flows across the site will therefore occur significantly below the level of the proposed basement.

3.04.3 Since the ground water table is significantly below ground level and capped by the low permeability London Clay strata the local changes to surface permeability will not impact on the ground water table level.

3.04.4 Groundwater is not expected to be encountered within the basement excavation. However, if any 'perched' water is encountered during excavation then construction methods will be adapted accordingly.

4.00 GROUND STABILITY

4.01 STAGE 1 (SCREENING)

4.01.1 The impact of the proposed development on land stability is considered here as outlined in Camden Planning Guidance CPG 4 (April 2011). The references are to the screening chart figure 2 in CPG4.

4.01.2 (Q1) All slopes within the existing site are at less than 1 degree.

4.01.3 (Q2) The surrounding land will generally remain at existing slopes in the permanent condition.

4.01.4 (Q3) With reference to the Camden Geological, Hydrogeological and Hydrological Study, (Refer figure (i) in Appendix A), the neighbouring properties also have slopes less than 7 degrees.

4.01.5 (Q4) The surrounding areas slope towards the south-east of the site. With reference to the Camden Geological, Hydrogeological and Hydrological Study (Refer figure (i) in Appendix A), the closest site with a slope greater than 7 degrees is located approximately 100m to the north-east of the site.

4.01.6 (Q5) The underlying soil strata is London Clay, and with reference to Camden Geological, Hydrogeological and Hydrological Study (Refer figure (e) in Appendix A), the stratigraphic boundary is located approximately 850m to the south of the site (Langley Silt Formation); therefore the site is not considered close to a stratigraphic boundary.

4.01.7 (Q6) Three small trees will be felled as part of the proposed works.

4.01.8 (Q7) London Clay is usually classified as having a high volume change potential and hence can lead to seasonal shrink-swell subsidence where buildings are founded in this strata. We have however no specific evidence of subsidence having been experienced on site or in the immediate surrounding area.

4.01.9 (Q8), (Q11) With reference to the Camden Geological, Hydrogeological and Hydrological Study, (Refer figures (b) and (c) in Appendix A), the nearest surface water is the Regents Canal, which runs approximately 400m to the north of the site. Surface water is also located to the west of the site within Regents Park approximately 500m away. The site is remote from the Hampstead Heath Ponds.

As the site is remote from the stratigraphic boundary, the local geology suggests that the site is not within close proximity of a spring line.

4.01.10 (Q9) The site is not in the vicinity of any recorded areas of worked ground. With reference to the Camden Geological, Hydrogeological and Hydrological Study (Refer figure (e) in Appendix A) the nearest recorded on the geological map are to the east along Mornington Terrace approximately 450m from site.

4.01.11 (Q10) With reference to the Camden Geological, Hydrogeological and Hydrological

Study (Refer figure (a) in Appendix A) the site is above an unproductive strata.

4.01.12 (Q12) The basement works are not within 5m of the nearest public highway, which is the Outer Circle.

4.01.13 (Q13) The works will result in the foundations to No. 8 St Katharine's Precinct being deeper than those to No.7 St Katharine's Precinct and No. 9 St Katherine's Precinct, which have shallower basements.

4.01.14 (Q14) With reference to the British Geological Survey 'Geoindex' (Refer figure (j) in Appendix A), there are no National Rail or Underground tunnels located below the site. The nearest underground tunnel is the National Rail line approximately 400m to the north of the site.

4.01.15 On the basis of items 4.0 to 4.01.14 above and in reference to Figure 2 of CPG4, the aspects that should be carried forward to a scoping stage in respect of land stability are:

- The risk of potential subsidence due to the underlying subsoils being London Clay (Q5, Q7)
- The removal of existing trees (Q6)
- The increase in differential depth of foundation relative to neighbouring properties (Q13)

It is not considered necessary to consider further the other issues in the screening stage where a negative response was given.

4.02 STAGE 2 (SCOPING)

4.02.1 The potential impacts which will need to be considered will include:

- The risk of shrink-swell subsidence due to the presence of the London Clay strata
- The potential for damage to neighbouring properties due to the differential depth of foundations.
- The potential for ground swelling due to the increase in soil moisture content following the removal of trees

4.02.2 In response to these issues, raised in the scoping stage, a conceptual ground model was developed by GEA and is included in their report 'J11170 Desk Study & Ground Investigation Report' dated January 2012.

4.02.3 The desk study and conceptual ground model was used to inform both the scope of the site ground investigation and the scope of interpretive report.

4.03 STAGE 3 (SITE INVESTIGATION AND STUDY)

4.03.1 A ground investigation has been carried out by GEA, which comprised boreholes and window samples and included monitoring of ground water levels. Laboratory tests were carried out on recovered samples to determine geotechnical characteristics and to check for the levels of contaminants.

4.03.2 Trial pits were also carried out to determine the depth and extent of existing foundations to the adjoining boundary walls.

4.03.3 The ground in the vicinity of the site comprises a relatively thin layer of made ground over stiff London Clays, which become stiffer at depth.

4.03.4 Groundwater was not encountered in the 6m deep standpipe.

4.03.5 Foundations to the boundary wall to no. 7 were found to be approximately 1.5m below ground level bearing on the London Clay. The rear boundary wall was founded on the made ground at a depth of 0.7m below ground level. The depth of the foundations to the boundary wall to no. 9 was not proven but they were found to be at least 1.6m below ground level. .

4.03.6 Elevated levels of Polycyclic Aromatic Hydrocarbons, Arsenic and Lead were encountered during laboratory tests on samples from within the made ground. This was considered likely to be due to previous backfill over the site.

4.03.7 Desiccation of the clay subsoils was encountered in the base of trial pits on the eastern and western boundaries which were excavated to 1.5m and 1.6m respectively.

4.03.8 GEA have prepared an interpretative report, following the results of the site investigation, drawing on their understanding of the proposals and the issues raised in the screening stage. The Report makes recommendations regarding basement excavation and foundation design and includes a site specific risk assessment in respect of soil contamination.

4.04 STAGE 4 (IMPACT ASSESSMENT)

4.04.1 The GEA report 'J11170 Desk Study and Ground Investigation Report' dated January 2012 comprises the first part of this impact assessment.

4.04.2 Elements of the basement design were considered in more detail following the findings of this report. The construction will be within London Clay subsoils and there is a potential for uplift forces acting on the basement, due to heave recovery of the soil. There is also the theoretical possibility of hydrostatic pressures if there are locally occurrences of ground water, for example perched water or if there were to be a future leaking water main.

The uplift forces will be resisted by a combination of the self weight of the structure, and by tension the internal lines of piles around the sub-basement plant room.

4.04.3 The approach for maintaining ground stability during the works is demonstrated by the outline method statement provided in Section 6, below.

4.04.4 The design of the new basement will take into account the close proximity of adjoining buildings and boundary walls. Those parts of the adjoining properties which are particularly close to the proposed basement construction will be continually monitored during the substructure works. The monitoring will be carried out using high accuracy measuring devices.

4.04.5 The potential for ground movement during the underpinning of the existing walls has been considered as outlined in Appendix D1 of the Camden Geological, Hydrogeological and Hydrological Study. The highlighted issue is the potential for movement following excavation of the trench adjacent to the foundation about to be underpinned. This is due to the reduced overburden on one side of the foundation. However as illustrated in the Appendix D1 study, for Clay subsoils this effect is not usually significant and results in approximately 10% reduction in the soil capacity locally.

Since there are no current signs of distress in the existing wall foundations it is considered that such short term reductions in soil stiffness are unlikely to cause any significant settlements, and hence any damage to the boundary walls during underpinning should be very slight. In the permanent case the walls will be underpinned into stiffer strata so their foundation capacity will be increased.

4.04.6 The basement will be formed by a combination of underpinning and contiguous piled walls. To estimate ground movements associated with these excavation works, reference has been made to Table 2.4 of CIRIA C580. This gives predicted ground movements assuming piled retaining walls throughout, but can be applied to other forms of basement construction provided the retaining structure is stiff and that high level props are installed prior to excavation.

Location	Excavation depth (m)	Predicted movements	
		Horiz (mm)	Vert (mm)
Main Basement Area	4.0	6	4
Sub-basement plant room	7.0	11	7

Table 4.04.6 - Initial predictions of ground movement from CIRIA C580

These ground movements are small, particularly in comparison to the ground movements which will ordinarily be experienced in clay subsoils due to the seasonal shrinking and swelling.
The actual ground movements at adjoining properties are likely to be significantly lower than these, for the following reasons: -

- These predictions are for ground immediately adjacent to the retaining structure and will reduce with distance from the excavation The ground movements reduce with distance from the excavation
- The deeper plant room is centrally located within the building footprint, maximising its distance from adjoining buildings.

4.04.7 A key consideration in limiting total movements will be the early installation of an effective prop to the structure close to ground level ('high level' as described in CIRIA C580). This will generally be achieved by the use of waling beams fixed at regular centres to the underpinning with steel props spanning across the excavation or across its corners. For the sub-basement capping beams will be installed to the top of the piled retaining walls and props will similarly be installed across the excavation. The props will be installed prior to significant excavations being undertaken. A limit of excavation prior to propping of 1.0 metre depth is usually found to limit pre-propping deflections to acceptable levels, whilst permitting practical working room to construct the capping beams and install the waling beams.

4.04.8 Overburden loads applied at ground level adjacent to excavations can increase ground movements during excavation. The construction method will be interrogated to ensure this is avoided within the site boundaries. Beyond the boundaries the areas adjacent to the basement are paths or soft landscaping so there are unlikely to be significant 'live' overburdens occurring during the excavation works.

4.04.9 Differential movement between the proposed basement and adjoining shallower foundations was highlighted at scoping stage. Whilst the new basement will be founded on slightly stiffer strata than the adjoining property's foundations, since the adjoining property has not been recently constructed, it would not normally be expected to experience further settlement.

It is possible that in the future the shallower foundations to the adjoining properties could experience shrink-swell subsidence as a result of tree root action and this would need to be addressed by the adjoining owners. However this is considered low risk since many of the adjoining buildings have an existing lower ground level and hence relatively deep foundations. In any event it is not considered that the presence of the proposed extended basement to no.8 St Katharine's Precinct would worsen the impact of such movements

4.04.10 It is considered unlikely that the new basement will be affected by shrink-swell subsidence because the construction of the basement will remove any desiccated material. The proposed basement raft will be founded at depths greater than the minimum foundation depth recommended by the NHBC Standards Chapter 4.2 "Building near Trees' given the subsoil type and proximity of existing trees – both those retained and those to be removed.

4.04.11 The trees being removed as part of the works are small and the influence of their roots is unlikely to have been significant outside of the site boundaries. The greatest potential for any ground swelling following their removal would be to the boundary walls, and since these will be underpinned during the works this impact will be mitigated.

5.00 SURFACE FLOW AND FLOODING

5.01 STAGE 1 ASSESSMENT (SCREENING)

5.01.1 The impact of the proposed development on the surface water environment and whether a flood risk assessment is required is considered here as outlined in Camden Planning Guidance CPG 4 (April 2011). The references are to the screening chart figure 3 in CPG4.

5.01.2 (Q1) With reference to the Camden Geological, Hydrogeological and Hydrological Study, the site is not within the catchment of the pond chains in Hampstead, nor the Golder's Hill Chain.

5.01.3 (Q2) On completion of the development the approach for surface water flows will be similar to the existing condition, with rainwater run-off collected in a surface water drainage system and discharged to the combined sewer.

5.01.4 (Q3) There will be a decrease in the amount of paved external areas but this will be replaced by the roof to the extended basement which will comprise both soft landscaped and hard landscaped areas at ground floor –(Refer figures (k) and (l) in Appendix A). There will therefore be a net increase in impermeable area and hence collected surface water.

5.01.5 (Q4) All surface water for the site will be contained within the site boundaries and collected as described in 5.01.3 above; hence there will be no change from the development on the quantity or quality of surface water being received by adjoining sites.

5.01.6 (Q5) The surface water quality will not be affected by the development, as in the permanent condition collected surface water will generally be from roofs, or hard landscaping.

During construction any contaminated arisings will be covered to ensure that the collected surface water is not in contact with contaminated soil.

5.01.7 On the basis of 5.0 to 5.01.6 above, with reference to figure 3 in CPG4, the aspects that should be carried forward to a scoping stage in respect of surface flow and flooding is the increase in the impermeable area (Q4)

5.01.8 (Q6) The site is not surrounded by one of the streets noted within the Camden Planning Guidance CPG 4 (April 2011) as a street "at risk of surface water flooding" (Refer figure (f) in Appendix A). The site is not at risk of static flooding.

5.01.9 From reference to the EA Rivers and Sea Flood Maps (Refer figure (g) in Appendix A), the site is not located within a flood risk zone. The EA Reservoir flood map (Refer figure (h) in Appendix A), shows that the site is not at risk of flooding from reservoirs.

5.01.10 On the basis of 5.01.8 and 5.01.9 above and in accordance with figure 3 in Camden Planning Guidance CPG 4 (April 2011), a flood risk assessment is not required.

5.02 STAGE 2 (SCOPING)

5.02.1 The potential impacts which will need to be considered will include:

- Whether the increase in impermeable area will impact on the rate that surface water is received by the combined sewer.

5.02.2 The impact assessment will consider what measures can be used to mitigate impact of the increase in impermeable area.

5.03 STAGE 3 (SITE INVESTIGATION AND STUDY)

5.03.1 Existing and proposed impermeable areas have been calculated to enable the impact of the proposals to be assessed. (Refer figures (i) and (j) in Appendix A).

5.03.2 The site is approximately 0.019 hectares. The area of roofs to the existing house is approximately 105m^2 (0.011 Ha.). Hard landscaping and lightwells surrounding the building accounts for and additional 55m^2 (0.006 Ha.), giving a total of 160m^2 (0.016 Ha.) impermeable area. This represents approximately 84% of the total site area.

5.03.3 The area of roofs to the proposed house will be similar to before at around 105m^2 (0.011 Ha.). The rear garden will be completely filled by the proposed basement so the total impermeable area where run off will be collected will be 190m^2 (0.019 Ha.) This represents a 19% increase over the current condition.

5.03.4 Soft landscaping will be used over parts the proposed basement box within the rear garden, with a total area of planters and grassed areas representing around 21m^2, 30% of the rear garden area.

5.03.5 With reference to the Asset Search included in Appendix C, the existing surface water drainage is collected by a 510mm diameter combined sewer running in St Katherine's Precinct which in turns connects to a large diameter sewer in Albany Street.

5.04 STAGE 4 (IMPACT ASSESSMENT)

5.04.1 As demonstrated by the assessment in 5.03 above, there is an increase in the area of surface water collection on the site of around 30m^2.

5.04.2 SUDS measures will be adopted to attenuate the flow rates which occur at the connection to the public sewer so that they are no greater than those currently experienced. Measures that will be considered will include:-

- Fixed planters in the rear garden over the basement box
- Grassed areas over the basement box comprising a growing medium over drainage layers with geotextiles to control and filter water flows; similar to that typically adopted for intensive green roofs.
- Rainwater harvesting, to be used for irrigation
- The use of a lined permeable paving system for hard landscaping over the basement box.

5.04.3 On the basis that flow rates will be attenuated as described above there is therefore not considered to be any significant impact to the local surface water collection systems.

6.00 CONSTRUCTION METHOD STATEMENT

6.01 The following provides an outline Method Statement for the construction of the basement. This will be developed and finalised by the appointed Contractor, once the detailed design is complete.

6.02 Prior to commencing works, schedules of condition for the adjoining properties and boundary features should be prepared and agreed by the respective party wall surveyors.

6.03 Due to the scope of the works involved, it is assumed that the existing building will be vacated before the basement construction commences. The works will commence with demolition of the existing conservatory structure. Prior to any excavation or works to the substructure, monitoring measurements will be taken to act as a base level.

6.04 The piling works to the rear and internally will be carried out from a piling platform, likely to be at close to existing garden level. Alternatively it may be that the piling to the sub-basement occurs following the first stage of excavation.

6.05 The first stage of the underpinning to the boundary walls will then proceed. When the first lift of the underpinning is complete then walings and props will be installed across the basement to enable bulk excavation to commence.

6.06 When bulk excavation is complete to the level of first stage underpinning, the second stage of underpinning will proceed down to the proposed basement level. The underpinning to the existing rear addition can also proceed at this time.

During excavation monitoring readings will be regularly taken. If any unexpected movements are recorded either to the sides of the excavation or to the adjoining buildings then the excavation will be stopped and pre-agreed contingency measures implemented to prevent further movements.

6.07 When the bulk excavation is complete to basement level, the bearing strata should be blinded. The central piles around the proposed sub-basement can then be cut down and capping beams installed.

6.08 Prior to excavation of sub-basement, props should be installed between the capping beams. When the ground has been excavated to sub-basement level this lower bearing surface should be blinded.

6.09 The construction of the basement box can then proceed with construction of the Sub-Basement raft, RC retaining walls and then the construction of the Basement slab. The new ground floor slab can then be constructed to complete the basement box.

6.10 During construction of the basement propping should remain in place until the slabs, which act as permanent props, have been cast and reached target strengths.

APPENDIX A - FIGURES

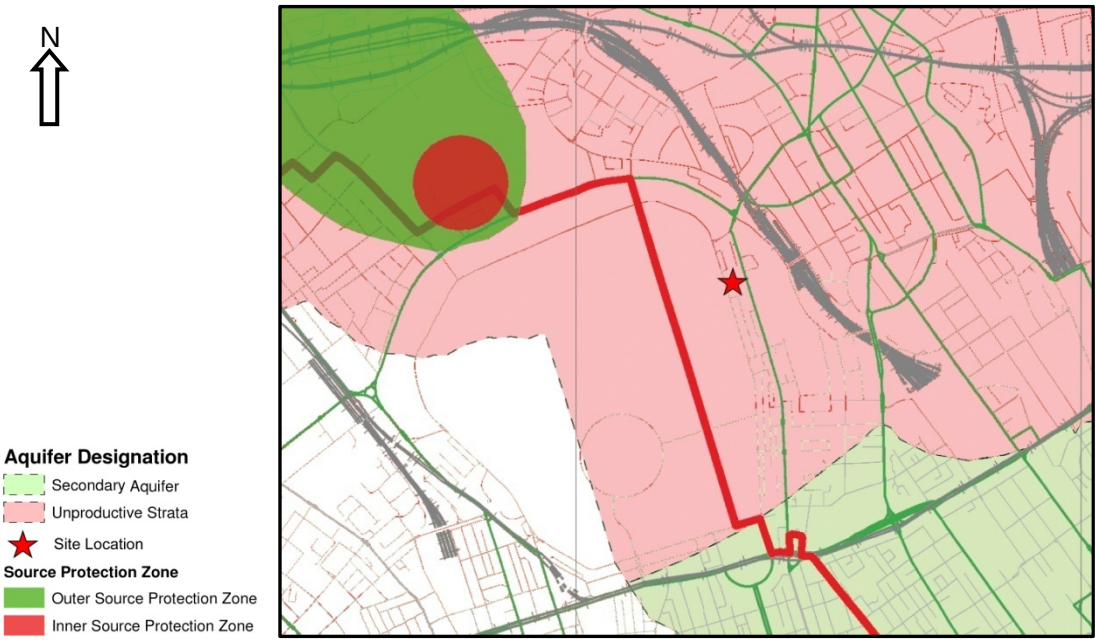

Figure (a)
Acquifer Designation Map
(Extract from Fig 8 of Camden Geological, Hydrogeological and Hydrological Study)

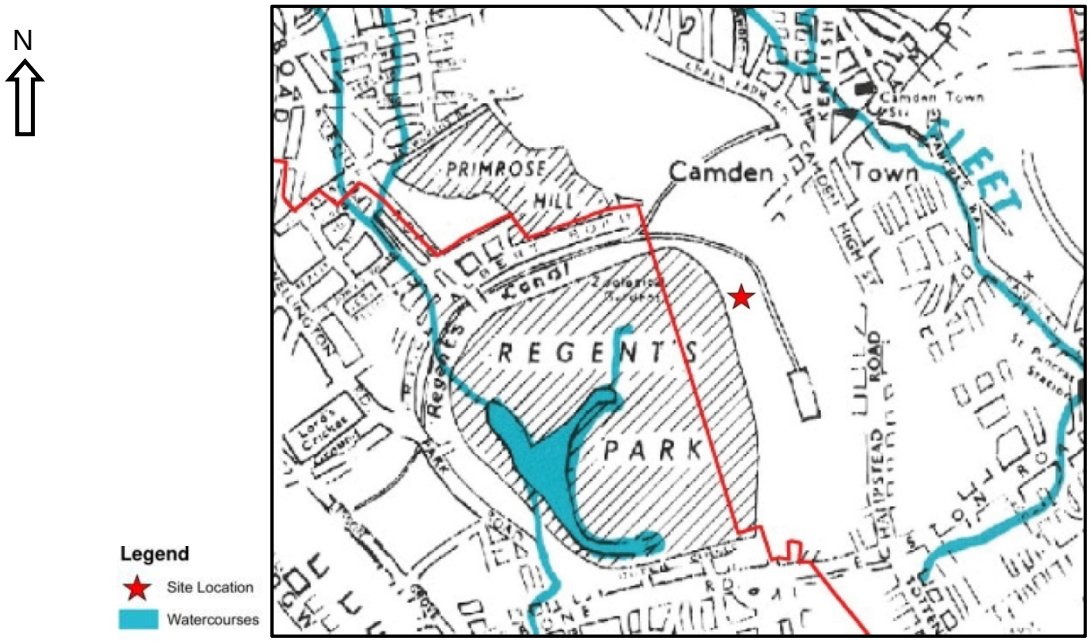

Figure (b)
Watercourses
(Extract from Fig 11 of Camden Geological, Hydrogeological and Hydrological Study)

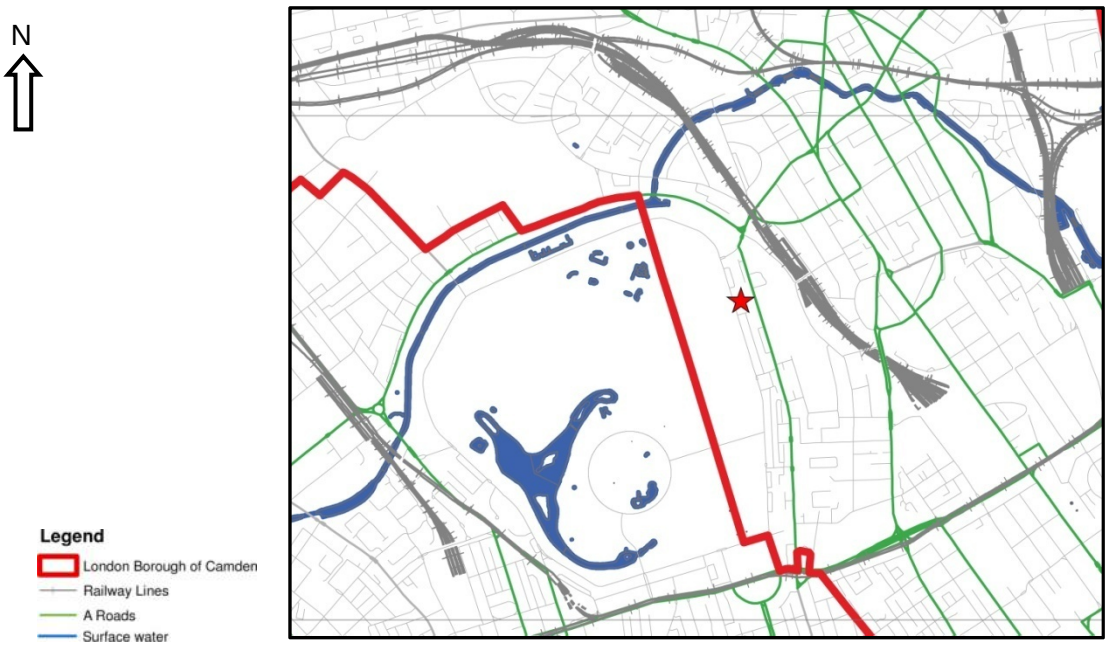

Figure (c)
Surface Water Features
(Extract from Fig 12 of Camden Geological, Hydrogeological and Hydrological Study)

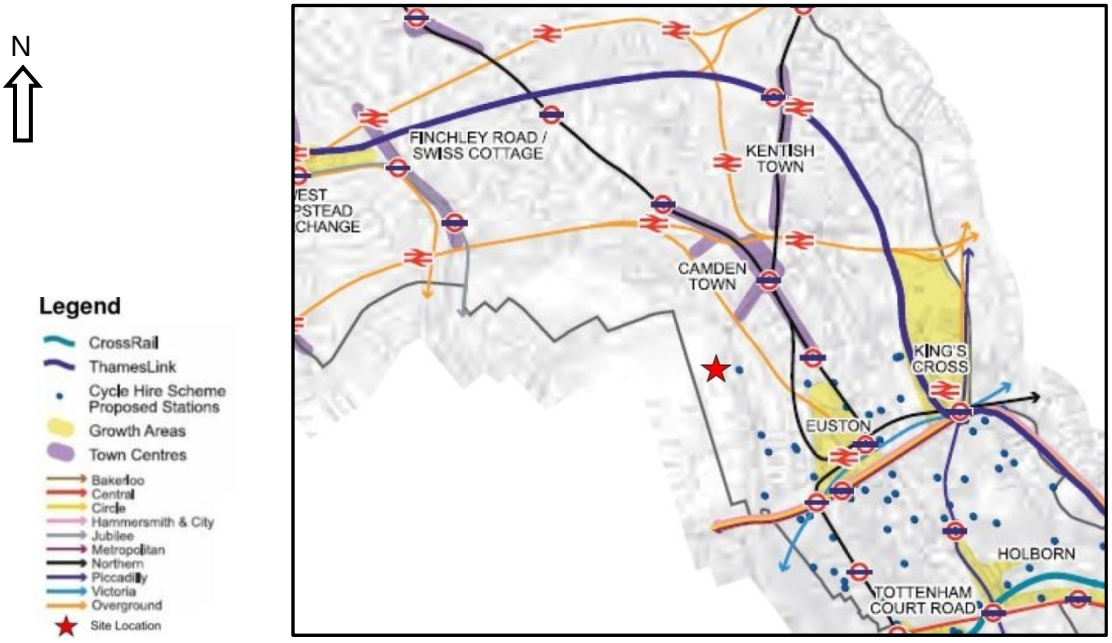

Figure (d)
Map of underground infrastructure
(Extract from Fig 18 of Camden Geological, Hydrogeological and Hydrological Study)

Figure (e)
Geological Map
(Extract from Fig 4 of Camden Geological, Hydrogeological and Hydrological Study)

Figure (f)
Flood Map
(Extract from Figure 15 of Camden Geological, Hydrogeological and Hydrological Study)

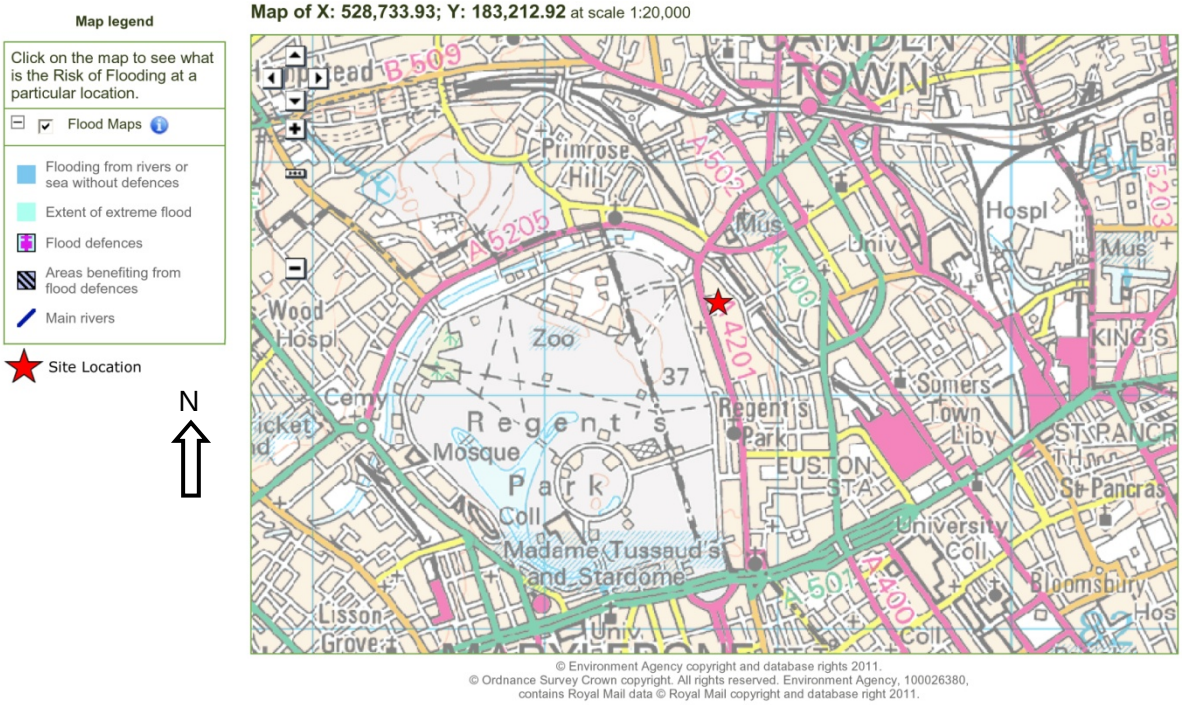

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Figure (g)
Areas at Risk of Flooding from Rivers or Sea
(Extract from Environment Agency flood map)

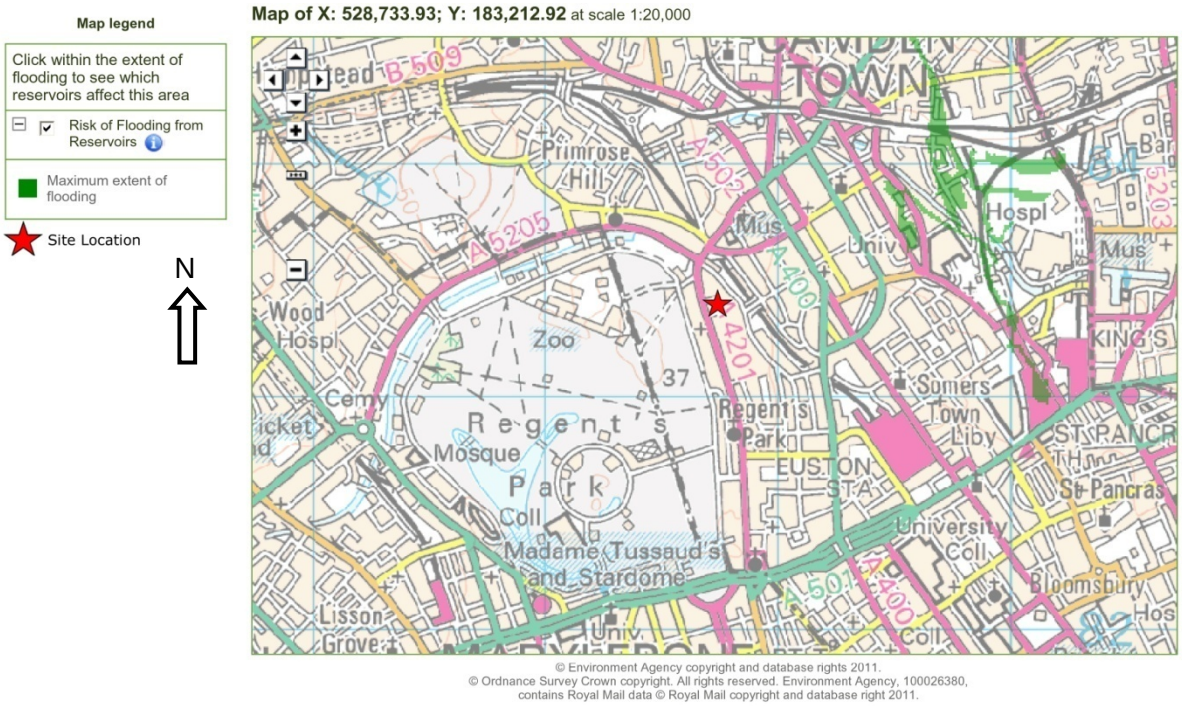

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Figure (h)
Areas at Risk of Flooding from Reservoirs
(Extract from Environment Agency flood map)

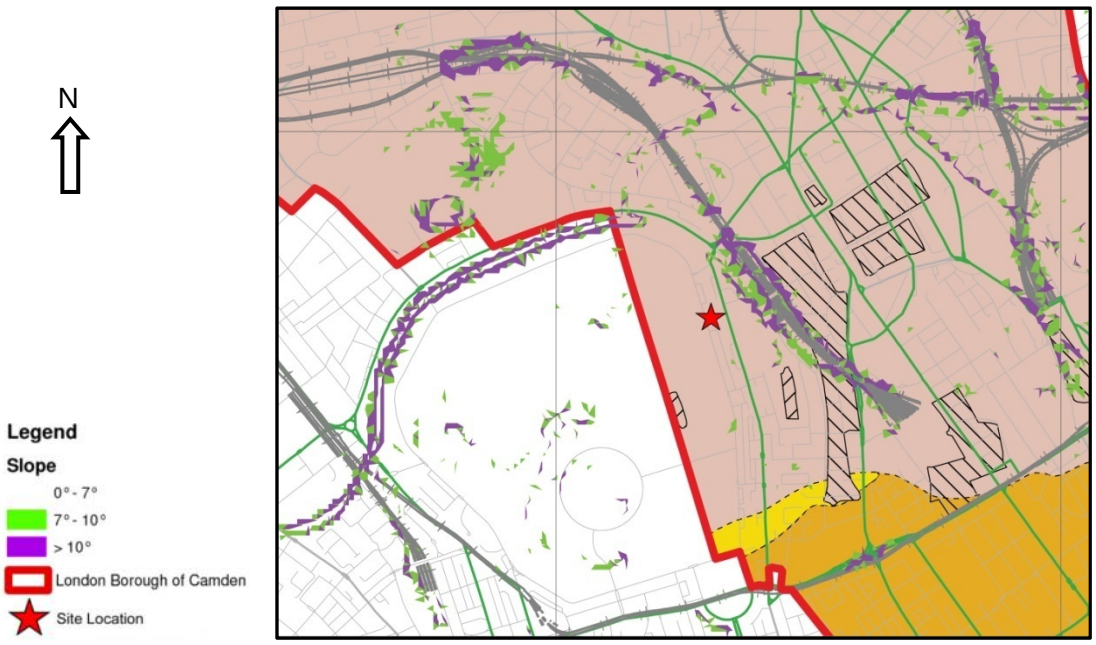


Figure (i)
Slope Angle Map
(Extract from Figure 16 of Camden Geological, Hydrogeological and Hydrological Study)

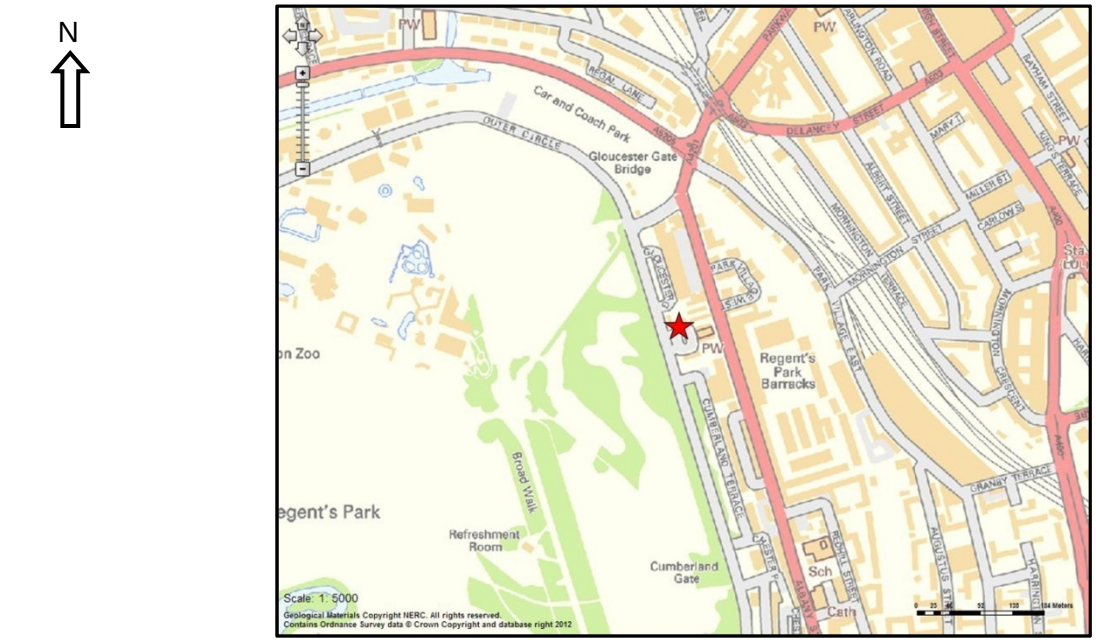


Figure (j)
Map showing National Rail
(Extract from British Geological Survey, Geoindex)

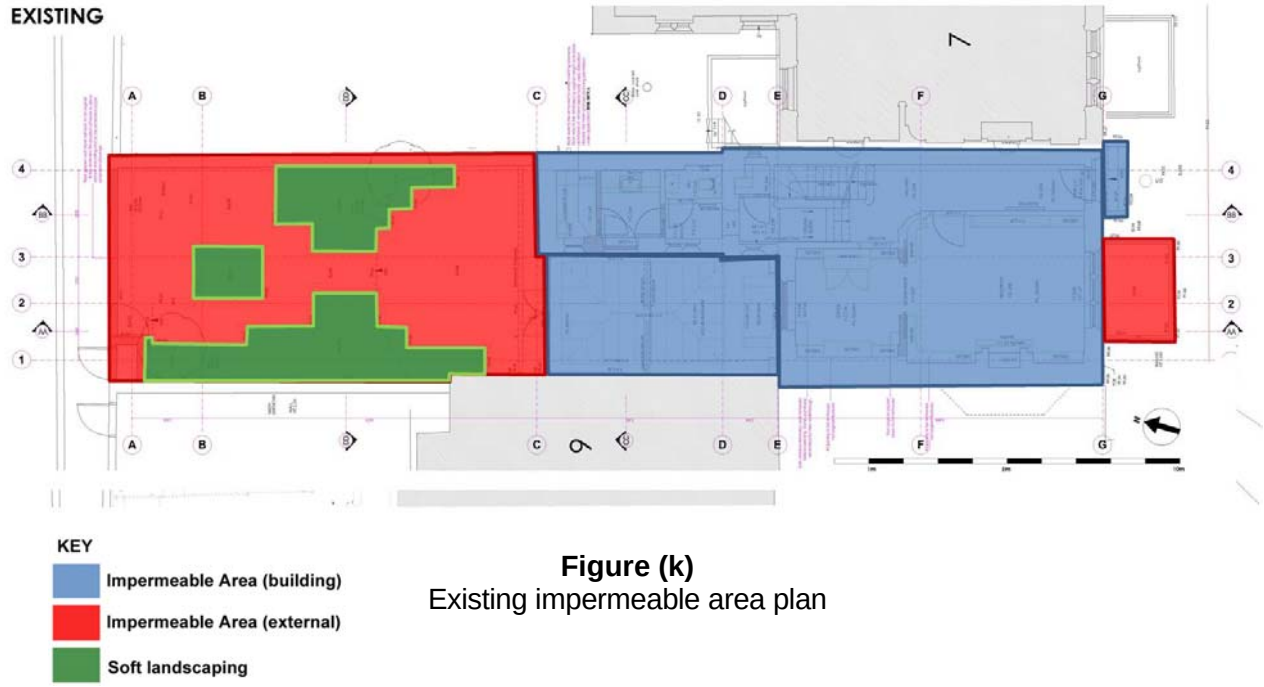


Figure (k)
Existing impermeable area plan

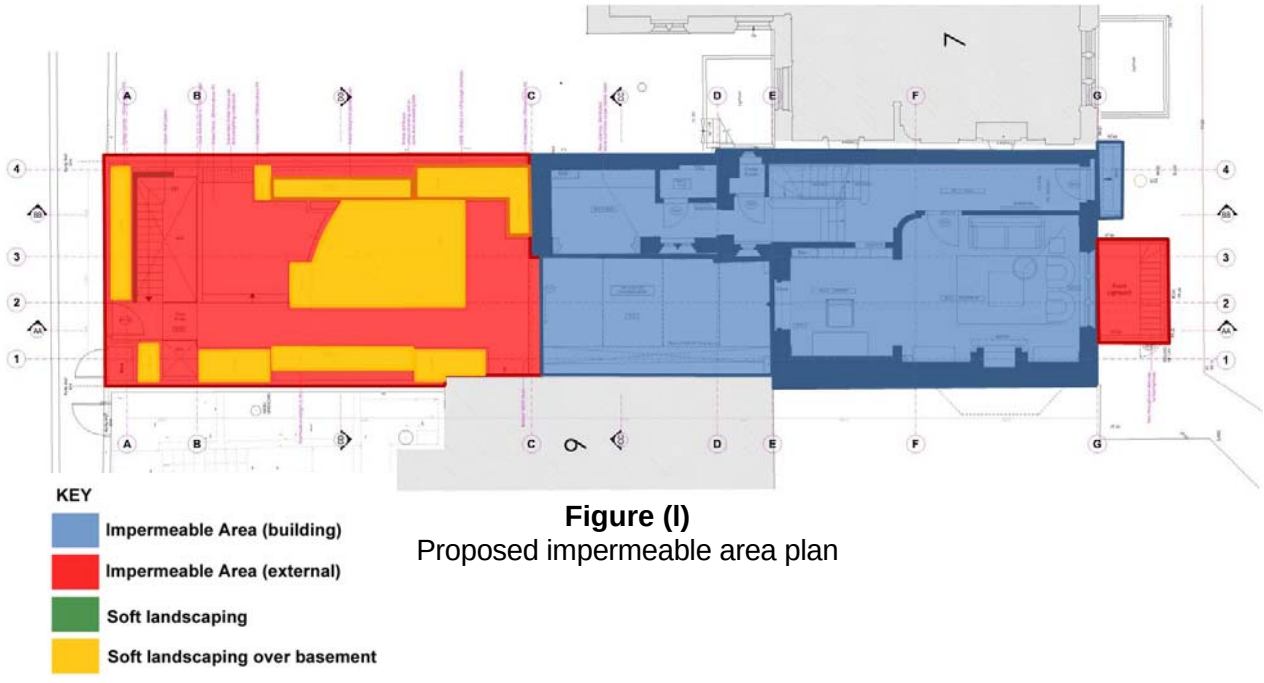


Figure (l)
Proposed impermeable area plan

APPENDIX B - THAMES WATER RECORDS

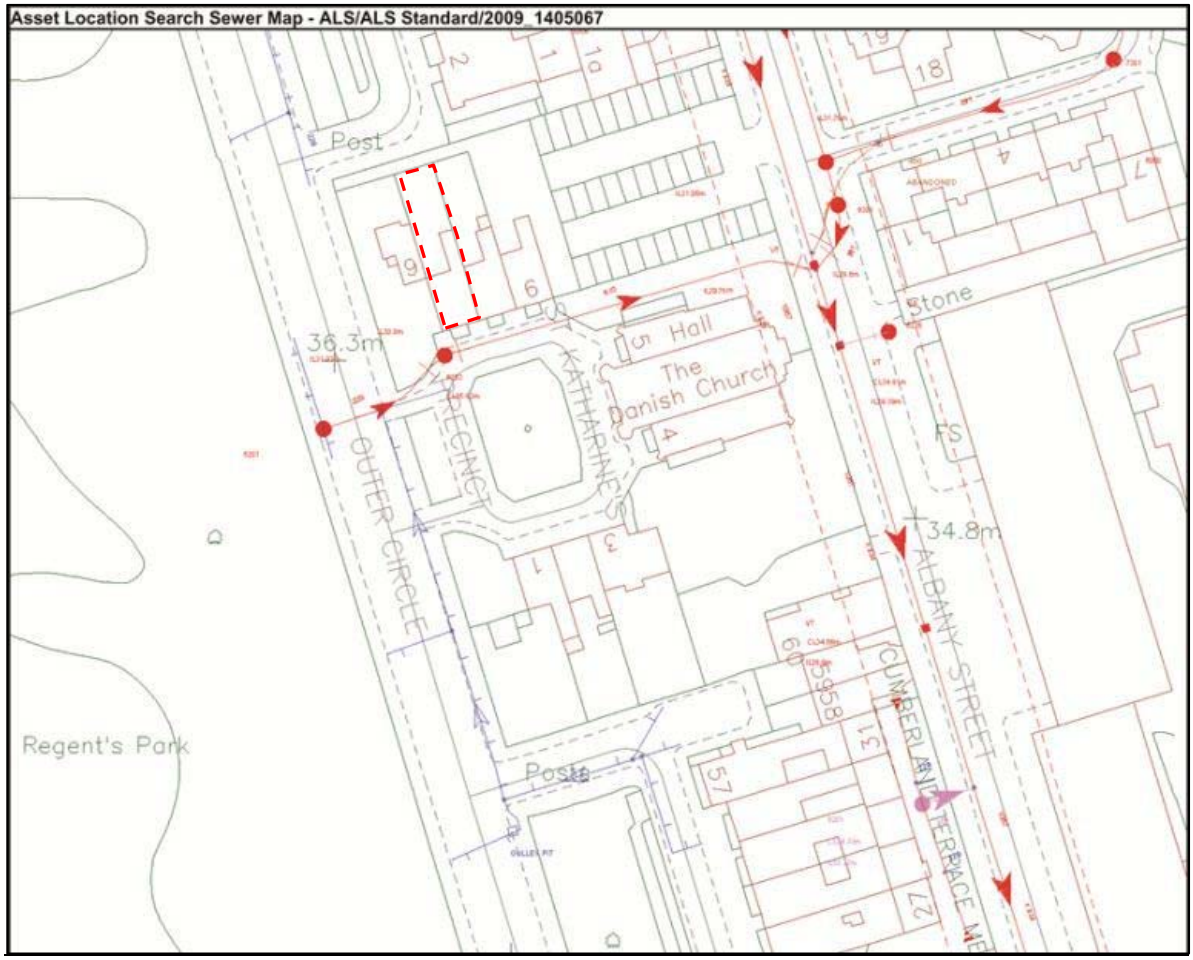
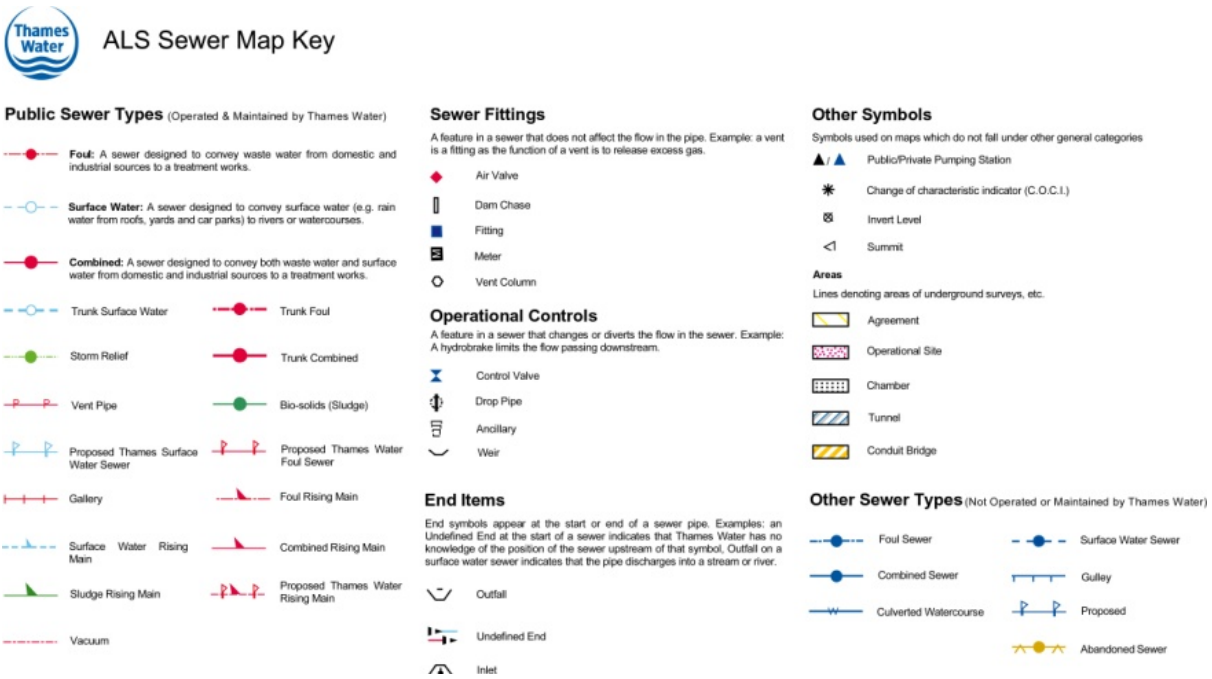


Figure B1 - Extract from Thames Water Asset Search showing a combined sewer



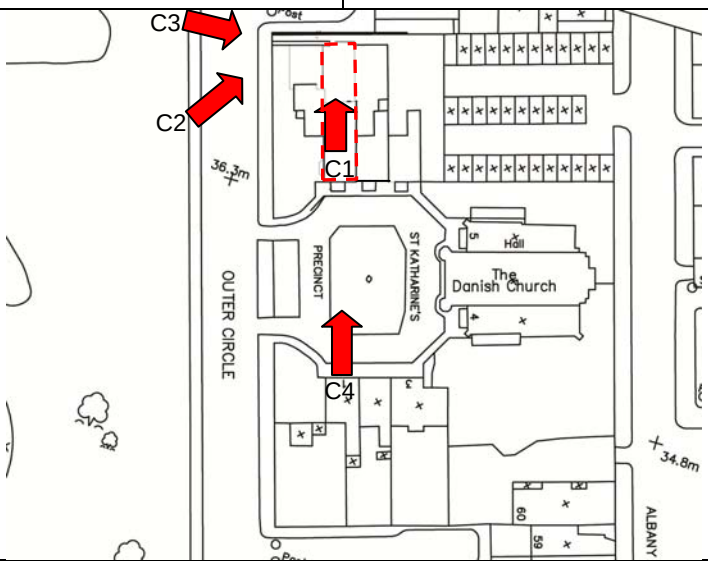
APPENDIX C - PHOTOGRAPHS

Photo C1

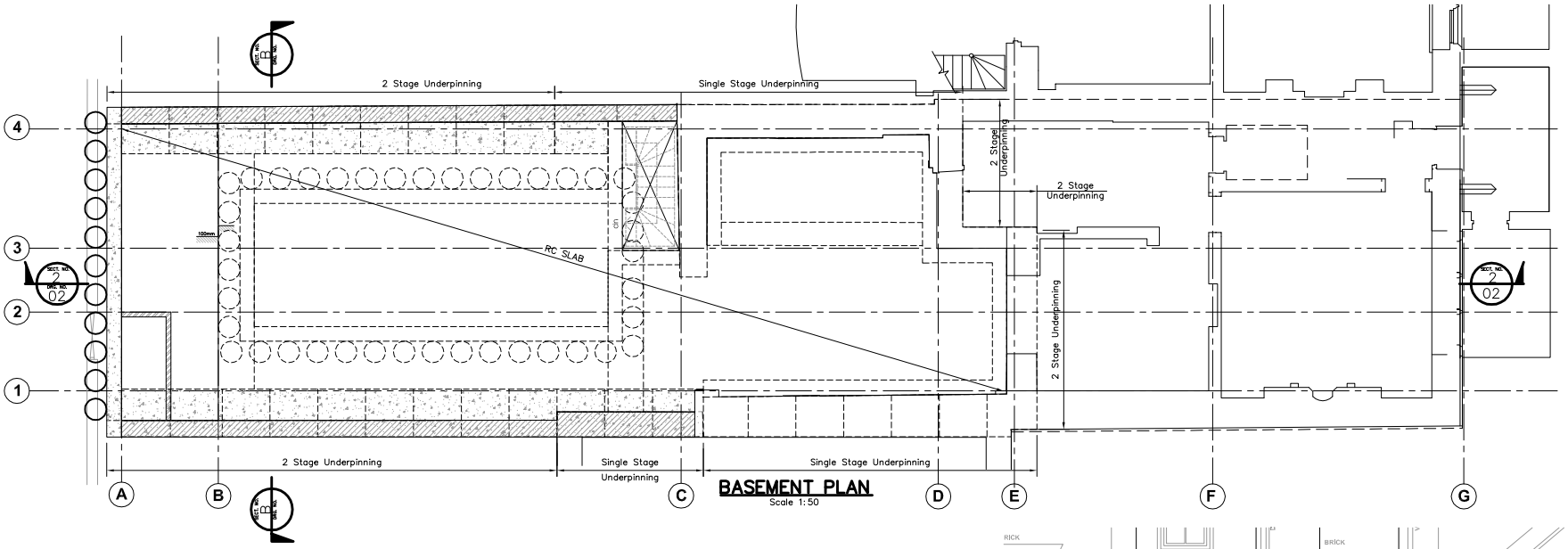
Photo C2

Photo C3

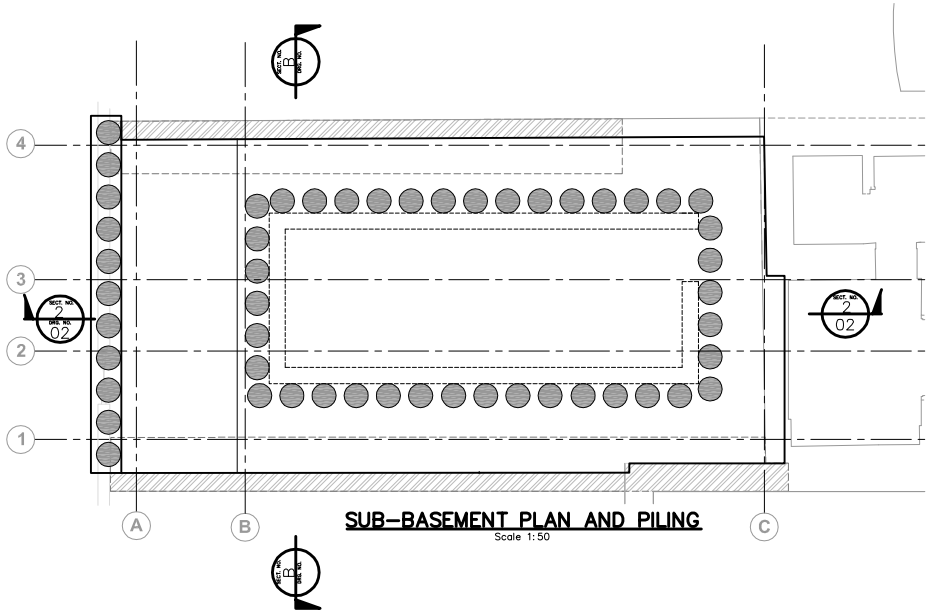
Photo C4



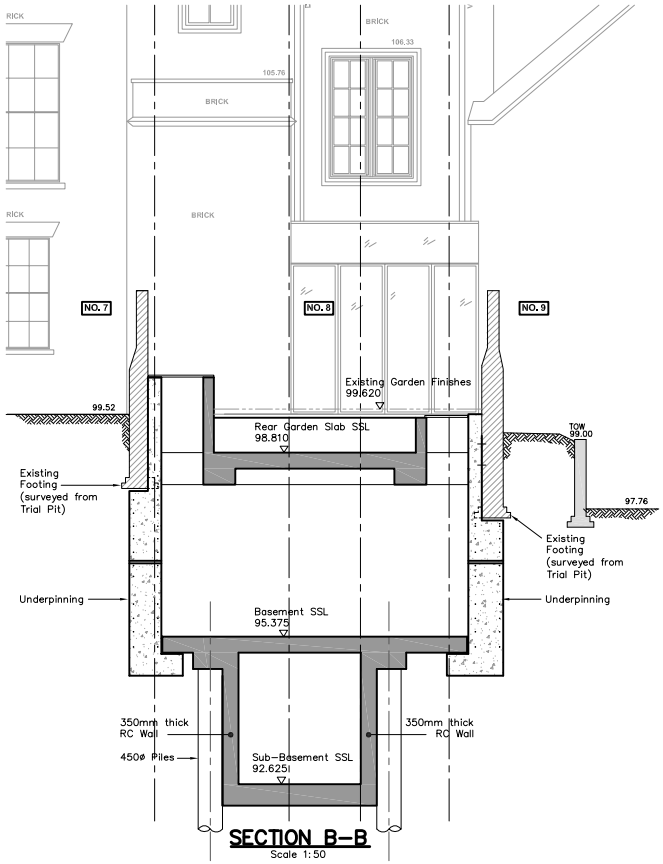
APPENDIX D – OUTLINE STRUCTURAL DRAWINGS



BASEMENT PLAN
Scale 1:50



SUB-BASEMENT PLAN AND PILING
Scale 1:50



SECTION B-B
Scale 1:50

NOTES

1. This drawing is to be read in conjunction with all other Engineer's and Architects drawings, details and specifications.
2. Do not scale any dimensions. Refer to the Architects drawings for dimensional setting out.

Rev.	Date	Description	Signed

Architect
CRAWFORD PARTNERSHIP

Project Title
8 ST. KATHARINE'S PRECINCT
REGENTS PARK, LONDON, NW1

Drawing Title
SUB-BASEMENT AND
BASEMENT PLAN

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Checked	JMcS	11-12
Scale	1:50 / 1:100	Size A1 / A3
Project No.	P1954	
Drawing No.	BIA-01	
Rev.		

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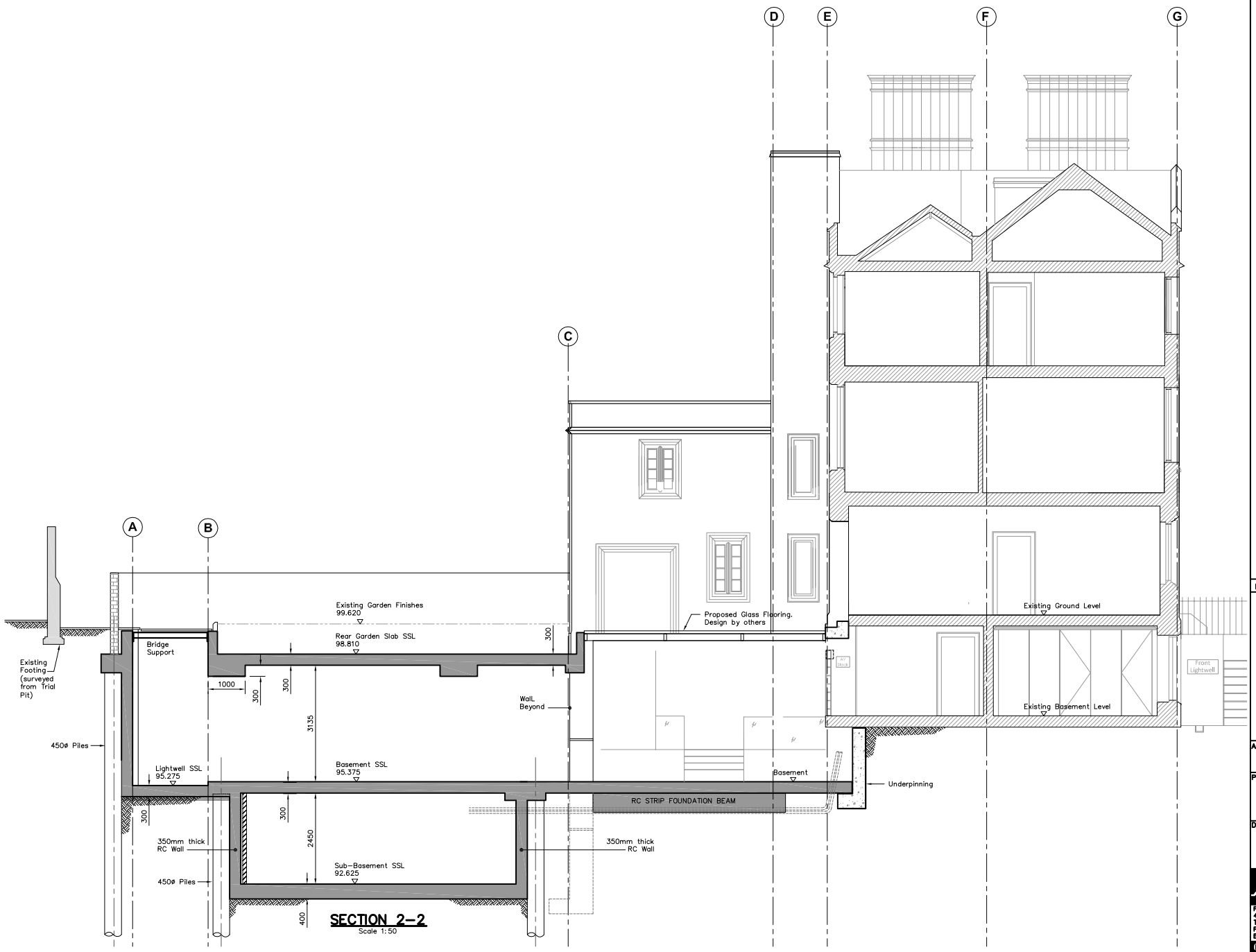

NOTES

1. This drawing is to be read in conjunction with all other Engineer's and Architects drawings, details and specifications.
2. Do not scale any dimensions. Refer to the Architects drawings for dimensional setting out.

Rev.	Date	Description	Signed

Architect
CRAWFORD PARTNERSHIP

Project Title
8 ST. KATHARINE'S PRECINCT
REGENTS PARK, LONDON, NW1

Drawing Title
SECTION 2-2

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Scale	1:50 1:100	Size A1 A3
Project No.	P1954	Drawing No. Rev. BIA-02

0 100mm WHEN PLOTTED @ 1:1 FOR A1 100 50mm WHEN PLOTTED @ 1:2 FOR A3 200