Eastwood&Partners
CONSULTING ENGINEERS

BASEMENT IMPACT ASSESSMENT

47 DOUGHTY STREET, LONDON, WC1N 2LW

FOR

TG STUDIO

39053-01 **March 2016**

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Eastwood & Partners (Consulting Engineers) Limited Registered No 1835021

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APPENDICES

1.0 INTRODUCTION

Proposals to refurbish 47 Doughty St include an extension to the existing basement at the rear, both in plan size and depth. Eastwood and Partners have been asked by TG Studios to prepare a Basement Impact Assessment to satisfy the requirements of Camden Development Policy 27.

All information, comments and opinions given in this report are based on the ground conditions encountered during the site work and information gained from a historical, geological and environmental desk study. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata and water conditions between or below investigation points. It should also be noted that groundwater levels vary due to seasonal or other effects, and may at times differ from those measured during the investigation.

This report is prepared by Nicholas Bailes MEng MICE.

This report is prepared for TG Studios in response to particular instructions. Any other parties using the information in this report do so at their own risk and any duty of care is excluded.

We now have pleasure in presenting our findings.

2.0 DESCRIPTION OF THE EXISTING BUILDING

The site location is described in detail in the Archaeological Desk Based Assessment and the Heritage Statement.

A sample of drawings by TG Studio showing the existing structure is included in Appendix 1.

47 Doughty St is a Grade II listed mid-terrace town house of five storeys including a basement and mansard. The property dates from c.1807-1809. It has a traditional construction of load bearing brick walls and timber floors. At the rear of the property there is a wing occupying half the width of the house of three storeys plus basement providing additional spaces adjacent to a dropped courtyard. Beyond this wing a single storey pavilion houses the end of the kitchen with a patio extending to the rear boundary. At the front of the property there are arched storage spaces underneath the pavement with a typical basement access well between the pavement and the front of the house.

From external observations the adjacent properties are contemporary with number 47 and take the same layout, including rear wings on the same side of the house rather than being mirrored. The

precise extent of the basements of the adjacent properties at the rear are not yet known but it is likely that there are vaults and basements occupying the same plan size.

The properties immediately to the south, No.s 48 and 49, are occupied by the Dickens House Museum and are Grade 1 listed.

3.0 DESCRIPTION OF THE PROPOSED BASEMENT

A sample of drawings by TG Studio showing the proposed development is included in Appendix 2.

The existing basement beyond the main rear façade of the house is to be extended to reach the rear boundary of the property and also downwards by approximately 1.2m.

The basement structure will consist of concrete lining walls monolithic with the basement slab and will have waterproofing treatment. The lid to the basement will utilise steel beams that perform a propping function to the side walls. The basement structure will be required to carry loads from the steel frame which forms the extended ground floor above and the replacement rear wing above that.

4.0 STAGE 1 – SCREENING

The question numbers in the sections below relate to the flow charts in Figures 3, 4 and 5 of the Camden Planning Guidance – Basement and Lightwells.

4.1 Ground water flow

Q1a: Figure 8 of the Camden Geological, Hydrogeological and Hydrological Study (CGHHS) indicates that 47 Doughty Street is towards the upper edge of “Secondary A Aquifer”, approx. 100m from the Unproductive Strata to the north. This figure and a number of other figures from CGHHS which have been marked up to indicate the site location are included in Appendix 3.

Q1b: It is unknown whether the proposed basement will intrude into the water table.

Q2: Figure 11 of the CGHHS indicates that there is a culverted tributary of the Fleet river running along the line of Great Ormond St, Doughty Mews and Roger St to the south of Doughty St, approximately 100m away – an overlay is included in Appendix 3.

Q3: The site is not within the catchment of the pond chains on Hampstead Heath

Q4: The proposed basement development includes an area of green roof at first floor level over the extension in addition to a shallow bed along the rear wall of the property over the basement where there is currently a ground bed. The area of hard standing is therefore not increased.

Q5: The proposals include a drainage provision for the hard standing at ground level over the basement. This provision ensures that the surface water is directed into the sewer and not allowed to run into the ground.

Q6: There are no ponds local to the site. The nearest surface water features are approximately 1.5km away to the north, west and south of the site. These features are the Grand Union Canal, the lakes at the Barbican and the Thames river respectively.

As noted in the previous section, there are nearby culverted tributaries to the Fleet river. The final figure in Appendix 3 shows an overlay of an excerpt from Figure 11 of the CGHHS with a modern image from Google Maps. This appears to show that the culverted tributaries spring at approximately 350-600m away to the west and south of the site, although the level that these occur at is not clear. These springs are not marked on the Ordnance Survey map but they are also shown on the 1920's Geological Map in Figure 2 of the CGHHS, albeit in a slightly different location and arrangement – refer also to Appendix 3.

4.2 Land stability

Q1-4: The site is in an area of generally level ground with no significant slopes in or around the site.

Q5: The shallowest strata on the site is not London Clay but is the Hackney Gravel Formation, as evidenced by Figure 6 of the CGHHS which is marked up and included in Appendix 3.

Q6: No trees will be removed as part of the development.

Q7: From an inspection of the site, there is no evidence that the existing basement suffers from any issues associated with water ingress or ground movements, despite the age of the building. No reports or observations have been made of seasonal shrink-swell in the local area. The shallow strata of Hackney Gravel Formation rather than London Clay may be contributing to this stability.

Q8: There is a culverted water course approximately 100m to the south of the site.

Q9: Previously worked ground was found to a depth of 3m below the existing basement and the garden.

Q10: The site sits on the second (shallow) aquifer but the ground water level is thought to be deep from the ground investigation data as previously discussed.

Q11: The site is not near Hampstead Heath

Q12: The front of the site is underneath a pedestrian right of way.

Q13: The basement will occupy the rear of the property. The neighbouring properties in the terrace have existing basements which extend beyond the rear of the main house. There will therefore be no significant increase in differential depth of foundations with these structures – only that resulting from the 1200mm drop in floor level in this area. At the rear boundary the basement will be immediately adjacent to 21a Brownlow Mews which is thought to be founded at Ground Level according to the planning submission drawings for the alterations to that adjacent property. Also the garden walls to 46 and 48 Doughty St on either side have shallow foundations. The basement will therefore significantly increase the differential depth of foundations at these three interfaces. The difference in founding level will be approximately 3m.

Q14: The site is not over or within the exclusion zone of any overground or underground rail lines.

4.3 Surface flow and flooding

Q1: The site is not near Hampstead Heath.

Q2&3: The provision of the green roof and replication of the rear bed mean that the amount of hard standing provided is reduced. The run-off from the remaining hard standing is being actively drained into the sewer rather than being allowed in part to run into the ground.

Q4: Because the hard standing is being actively drained, the proposals will reduce the surface water flows being received by adjacent properties or downstream watercourses.

Q5: The proposals will not result in a change to the quality of surface water being received by adjacent properties or downstream watercourses.

Q6: The Environment Agency website indicates the site is not within or near a flood plain and is at very low risk of surface water flooding. Figure 15 of the Camden Geological, Hydrogeological and Hydrological Study also indicates that the site is not within an area with the potential to be at risk of surface water flooding. As previously discussed, the proposed basement is not below any nearby static water levels or below the ground water table.

4.4 Non-technical summary

The vast majority of the issues to do with surface or ground water are “No” answers. Two potential issues remain:

- Culverted tributaries are springing at a distance of 350-600m away. This might suggest a high water level at the site.

- The likelihood of encountering ground water is unknown.

Issues regarding land stability that have been highlighted are:

- There is a significant depth of made ground on the site that appears to extend under surrounding existing structures
- The work to the vaults at the front of the building are underneath a pavement
- The interfaces with the garden walls of the neighbouring Doughty St properties and with 21a Brownlow Mews at the rear will have significant differential depths of foundations.

5.0 STAGE 2 – SCOPING

5.1 Scoping

The screening assessment shows that there are a few issues relating to land stability to be addressed, as summarised. These issues are investigated further in the next section.

The presence of culverted springs in the area are considered to be far enough away that they do not suggest that the water table is likely to be high at the site location, especially when considered in relation to the borehole data. Nevertheless the groundwater levels will be recorded in the site investigation.

Local residents have been consulted, with copies of the Construction Management Plan being distributed to them and comments invited. The consultation is ongoing.

5.2 Non-technical summary

The land stability issues as previously summarised will be taken forward for investigation. Site investigations will be done that will include recording of the groundwater levels.

6.0 STAGE 3 – SITE INVESTIGATION AND STUDY

Site Investigations and desk study have been undertaken, which has included the following activities:

- A site walkover

- Desk study, including an Archeological Desk-Based Assessment, a Heritage Statement (see other documents), retrieval of planning drawings (refer to Appendix 6) and examination of online geological records (refer to text and Appendix 4)
- Intrusive investigations into the ground conditions at the rear (refer to Appendix 5)
- A drainage level and CCTV condition survey (refer to Appendix 8)
- An Asset Location Search has been purchased from Thames Water (refer to Appendix 7)
- A dimensional survey of the property has been obtained (not included in this report)

6.1 The site

The site and surrounding context is described in detail in the other reports submitted. It is a mid-terrace 5-storey Georgian house in a suburban area. The site is approximately 27m x 6m including the front vaults under the pavement. The rear basement is approximately 11m x 6m including structure.

The history of the site is described in detail in the Archaeological and Heritage reports. It is thought to be open farmland until the building of the houses on Doughty St c.1800. The potential for contamination of the ground is deemed to be low.

During the site walkover no evidence was found of water ingress issues to the house or any structural damage caused by ground movements. Some minor cracking was observed in the stair well at the top floor.

6.2 Ground Investigation and foundations

6.2.1 Foundations

Intrusive investigations were made by AP Geotechnics on 13th October 2015 and again on 4th February 2016 to excavate five trial pits on the property; two within the existing basement and three in the patio area including the rear bed. AP Geotechnics provided sections showing the existing foundations in each location, as well as the logs of the soil profiles. These are included in Appendix 5. No investigations have been made in the adjacent properties.

From the trial pit dug in the basement the party wall with No.48 was observed to be founded at approximately 500mm below the basement floor level on a wide brick foundation that extends down a further 400mm.

The rear basement courtyard was found to have a 350mm thick concrete slab and concrete on the faces of the party wall to No.46 and the retaining wall to the rear garden. This concrete around the dropped courtyard is presumed to be an alteration to open up a traditional vault that is shown to occupy this space on historical drawings.

At the higher level on the patio two trial pits demonstrated that the party walls on either side of the patio are founded at about 800mm below the patio level on simple brick foundations that step out from the wall by 30-190mm. The rear wall, which is immediately adjacent to the neighbouring building, was found to have a concrete foundation at 1m depth extending forward 270mm from the face of the wall.

The planning drawings for alterations to the adjacent building at the rear are included in Appendix 6, which includes a generalised section indicating above ground storeys only and the adjacent gardens of Doughty St. This is consistent with the finding of a shallow concrete foundation under the rear wall.

6.2.2 Geology

Made ground was found in all trial pits to the full 3m depth, which clearly extends well below the founding level of the structures.

The British Geological Survey (BGS) website indicates the site to be underlain by superficial deposits of the Hackney Gravel Member (Sand and Gravel) over bedrock of the London Clay Formation (Clay, Silt and Sand). This is in agreement with the CGHHS.

The nearest recorded boreholes on the BGS website are from 1989 and are approximately 40m away to the east of the site in Brownlow Mews. They extended to a depth of about 25m and were separated by 15-20m. Borehole 1 recorded Made Ground to 3.2m over Sand and Gravel to 11m over Clay. Borehole 2 also recorded Sand and Gravel to 11m with a thin layer of very sandy Clay at 3.5-4.5m. The location of these boreholes and the logs are included in Appendix 4.

Figure 2 of the CGHHS shows a 1920 Geological Map which is marked up to indicate the site and included in Appendix 3. There is a borehole record 125m away from site, in Millman St in the opposite direction to the more recent boreholes in Brownlow Mews. This historic record from Figure 2 indicates a thickness of Made Ground of 11 feet over 8 feet of Sand over 48 feet of Clay.

6.2.3 Groundwater

No water was found in the site investigations which were taken to a level of 3m below the existing basement floor during October. The nearby boreholes from 1989 extended to a depth of about

25m. Borehole 2 recorded no water levels to the finished depth of 25m. Borehole 1 was done 1-2 weeks later and recorded water levels at 11m, 4m and 5m on the 7th, 8th and 15th December (1989) respectively. Note that records show that December 1989 was an extremely wet month.

The underlying sands and gravels are expected to allow water to drain away from the surface relatively freely.

From this data it is concluded that the proposed basement is unlikely to reach groundwater.

6.3 Infrastructure

We have obtained an Asset Location Search from Thames Water – refer to Appendix 7. This indicates that there is a combined sewer running down the centre of Doughty St as well as a water main. No Thames Water assets are indicated in the site.

A survey of the below ground drainage has been carried out – refer to Appendix 8 which shows the existing below ground drainage on plan. Currently the majority of the drainage is combined and drops at the rear of the house before going under to meet the manhole in the front courtyard. The drain then outlets to the sewer in the street. The CCTV survey is not included in this report but it indicated that the condition of the existing drainage is generally very good.

Apart from the drainage indicated in the survey, there is no evidence of any infrastructure situated under the proposed basement at the rear of the property.

At the front of the property a new connection will be formed to the drain underneath that connects to the sewer. This will enable drainage of the appliances within the new utility space.

6.4 Non-technical summary

A substantial depth of made ground exists on the site, overlaying the sands and gravels. The excavated ground is expected to be dry.

The foundations of the surrounding structures are all found to be relatively shallow and on made ground but stable.

There is not expected to be any infrastructure obstructions to the basement. The existing drainage is in good condition.

7.0 STAGE 4 – IMPACT ASSESSMENT

7.1 Hydrogeology and Hydrology

From the Screening assessment it can be seen that the basement will have a negligable effect on the hydrogeology and hydrology of the surrounding area and that they should not present a significant issue for the development.

Excessive rainfall during construction may require pumping to prevent unwanted water flows although rapid soak away is expected through the made ground and underlying sands and gravels.

7.2 Geology

The investigations and borehole records consistently show sand and gravels to a considerable depth over London Clay. The degree of made ground varies. This is addressed in the following section.

7.3 Engineering interpretation and approach

7.3.1 Foundations and retaining structures

The diagram below shows the site in the context of the surrounding structures:

Figure 1 : Structures surrounding the site

The trial pit results show that the existing structures at the rear of the house are founded on made ground, including the closet wing, the garden walls and 21a Brownlow Mews to the rear. Despite this, no significant detriment to the structure due to ground movement was apparent on the site walkaround.

The final form of the basement structure will be finalised after the award of the contract. The development will generally cause a reduction in load on the made ground due to the excavation of the ground and removal of many of the solid walls of the existing closet wing. The basement slab may therefore be relied upon to bear directly onto the ground with sufficient designed thickness to span over soft spots and spread any concentrated loads. If the superficial river deposits of the Hackney Gravel Formation are encountered, it would be expected to be dense or medium dense sand and gravel and provide an allowable bearing capacity of over 200 kN/m2, subject to confirmation on site.

The existing basement area adjacent to the rear of the house corresponds approximately with existing basements in the neighbouring properties. In this area the only retention that will be required results from the lowering of the basement floor level by 1200mm. This will be achieved either by traditional underpinning or by a new retaining wall against the boundary.

The main houses of 46 and 48 Doughty St are therefore expected to experience a negligable amount of movement. The site only interfaces with them at a corner and the depth of excavation in this area is relatively small. Underpinning is preferred as a method that minimises the movement of the existing building due to the stiff vertical load path provided by the underpinning blocks as opposed to relying on horizontal restraint being provided by a retaining wall which will always allow some small degree of settlement. Underpinning is often used to prevent settlement of buildings and has been successfully used by Eastwood and Partners on many projects including Roehampton House (Grade 1 listed) and multiple houses of various ages in the Camden Borough.

The proposals include the suspension of the new rear closet wing at No.47 on steelwork that will span across the width of the property to columns which are situated adjacent to No.s 46 and 48 Doughty St. Adjacent to the rear of the Dickens museum to the south, the existing solid party wall is to be retained with lighter modern cavity walls to be used to extend the closet wing upwards and outwards from the first . The closet wing overall is becoming significantly lighter but the load is more concentrated adjacent to the boundary and we are introducing steel and concrete construction at ground and first floor levels. These factors cause an increase in load applied at the boundary with No.48 of approximately 30%. The basement slab will therefore be designed to carry the loads

from the steel frame away from the edge to counteract any increase in load to the area of ground beneath the shared boundary.

Adjacent to the closet wing of No.46 Doughty St to the north there will be a similar increase in load and the same principle will be adopted; the basement slab will be designed to carry the new loads being applied through the steel frame away from the edge to avoid any theoretical increase in load to the ground below the shared boundary.

By this method, any settlement experienced by the neighbouring properties adjacent to the rear of the main house will be kept to a minimum. Some small movements may occur as the new load paths are established in the revised structural arrangement but these are expected to be minimal with any resulting cracking being limited to aesthetic cracking only (category (i) on the Burland scale).

The rear of the main house on the site, No.47, will be underpinned to achieve the required depth of the new basement. The signifcant load already applied to the foundation provides stability during the underpinning process. There is a new column to be placed against the rear of the house in the centre of the elevation but the load applied is a very small percentage compared to the existing load from the rear wall of the house and is not expected to have a significant effect. Thus in the same way no significant movement is expected.

In the area of deeper excavation to the rear, the walls of the basement will be formed by continuous pile walls adjacent to the site boundary or by staged traditional underpinning below the surrounding structures. In both cases a lining wall will be cast for waterproofing and finishing. The final form of the construction will be finalised after the award of the contract and may utilise a proprietary piled system.

Some small settlement of the foundation to 21a Brownlow Mews is to be expected, as is the case adjacent to any excavation. It may cause some aesthetic cracking to occur (category (i) on the Burland scale) but nothing more significant. It is noted that the site represents a relatively short length (approximately 5.5m) in a long wall that backs onto multiple properties.

In the final design the slabs at the top and bottom of the basement will prop the walls on three sides. The composite action of the lining walls and the piles or underpinning will in turn provide the retention to the surrounding ground. Stability during construction will be the responsibility of the contractor and is likely to require temporary propping.

If underpinning is utilised to form the structure along any of the party walls then the details are to be agreed with the Adjoining Owners or their appointed surveyors as provided under the Party Wall Etc act 1996.

Details of the foundations in the surrounding properties are not yet known. They are highlighted as a risk which will be carried through to the building phase of the project if it is not possible to do investigations beforehand.

7.3.2 Hydrology

Surface water run-off will be routed into the house to join the existing drainage system. Foul waste will be routed to the front and rear of the house in the same way as the existing arrangement. At the rear it will be combined with the surface water as it is routed through the existing drainage provision under the house.

The small dropped courtyard adjacent to the rear of the house requires a pumped solution to discharge into the existing drainage through the house. A pumping chamber will be provided in the courtyard.

In this way the surface run-off is actively managed and prevented from affecting the neighbouring properties.

7.4 Non-technical summary

The proposed development will have no significant effect on groundwater related issues. It will improve the management of the surface water run-off.

The structure of the proposals will be designed to minimise the effect of the new structural arrangements on the surrounding properties. No cracking is expected to occur that would affect the serviceability and function of the nearby structures.

8.0 STRUCTURAL STABILITY REPORT FOR LISTED BUILDINGS

The presence of listed buildings requires particular attention to the stability of the surrounding structures. The site, No.47, and the neighbour to the north, No.46, are Grade 2 listed properties. The Charles Dickens Museum to the south at No.48 (and 49) is a Grade 1 listed property. 21a Brownlow Mews to the rear is not listed.

The proposed basement consists of an area with a small retention height of approximately 1.2m adjacent to the rear of the house and a larger area with approximately 3.3m of retained height to surrounding properties on three sides.

In the shallower section, facing retaining walls or traditional underpinning will be used to provide the necessary retention to the neighbouring properties. A retaining wall would cantilever up from the base slab whereas an underpinning solution would work by being wide enough to act as a vertical arch between the underside of the existing structure and the base slab. The lining wall when applied would act compositely with the underpinning block to increase this effect.

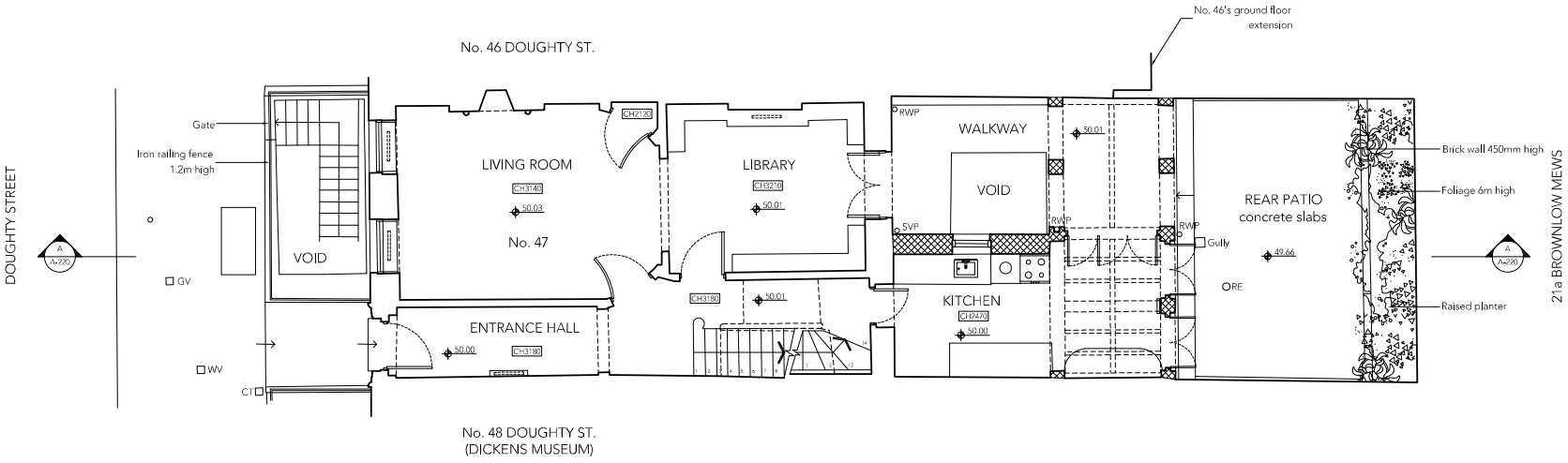
In the deeper section the basement slab and the ground floor steelwork and slab will provide a propping effect across the basement in the final condition, providing a balanced restraint to the walls of the basement adjacent to the neighbouring properties, No.s 46 and 48. These walls will similarly be formed of an initial pile wall or underpinning blocks with a facing wall cast against it.

In the other direction, along the length of the garden, the forces applied by the retained structure of 21a Brownlow Mews to the rear will be resisted in the final case by using the side walls of the basement as shear walls with the forces being transmitted to them by the top and bottom slabs. Additional resistance may in reality be provided by the substantial weight of the main house, in particularly the solid party walls on either side of the house which will be given a direct connection to the basement structure at both levels.

Stability of the basement during construction is a matter for the contractor and will depend on the method of construction chosen. It is anticipated that temporary propping will be required to stabilise the excavation.

Stability to the superstructure in the final scheme is provided in a variety of ways. The remaining floors of the closet wing, the 1st and 2nd floors, are stabilised by the masonry walls around the perimeter with the timber floors acting as diaphragms in the traditional sense. Between Ground level and 1st floor level the steel frame is stabilised by braced bays on either side of the structure, orientated along the property. In the lateral direction, stability is provided by a portal frame at the rear as well as through connections to the rear façade of the main house. Below ground level stability is provided predominantly by the new basement structure as previously discussed. Composite slabs at ground and first floor level over the steelwork act as diaphragms to transmit horizontal forces between the vertical stability structures.

Appendix 1 – Sample of drawings showing existing structure



1 EXISTING GROUND FLOOR PLAN

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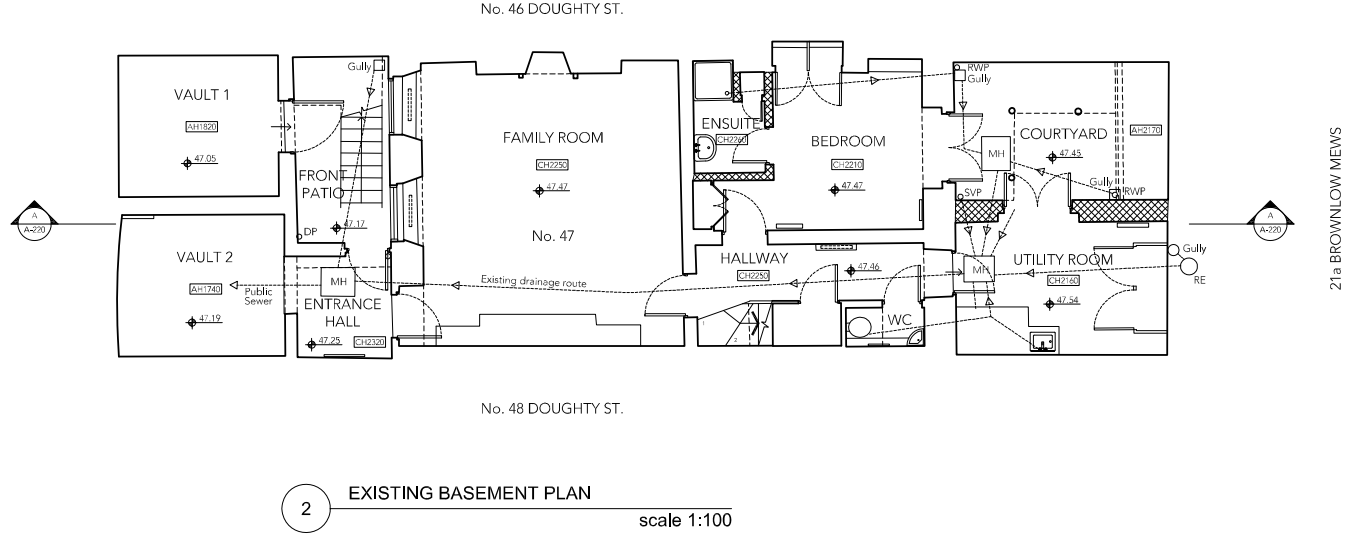

2 EXISTING BASEMENT PLAN

scale 1:100

0 2m 4m

NOTE

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REVISION		DATE
-	PRE-PLANNING	18.09.2015
A	PLANNING SUBMISSION	12.02.2016

LEGEND

	Existing structures
	Structures to be demolished
CH---	Ceiling height
AH---	Arch height

STUDIO
Architecture & Interior Design
10 PATHBONE PLACE LONDON W1T 1HP T 020 7636 3838 F 020 7636 5659 WWW.TG-STUDIO.CO.UK

PROJECT: 47 DOUGHTY STREET, LONDON WC1N 2LW

DRAWING: EXISTING BASEMENT & GROUND FLOOR PLAN

DATE	DRAWN BY	CHECKED BY
12.02.2016	EG	TG

STATUS	SCALE @ A3	
PLANNING	1:100	

JOB NO.	DWG NO.	REV
163	A-200	A

1 EXISTING SECTION AA

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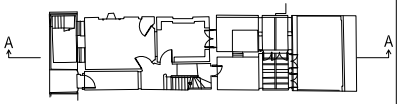
A	PLANNING SUBMISSION	19.02.2016



SECTION LOCATION PLAN

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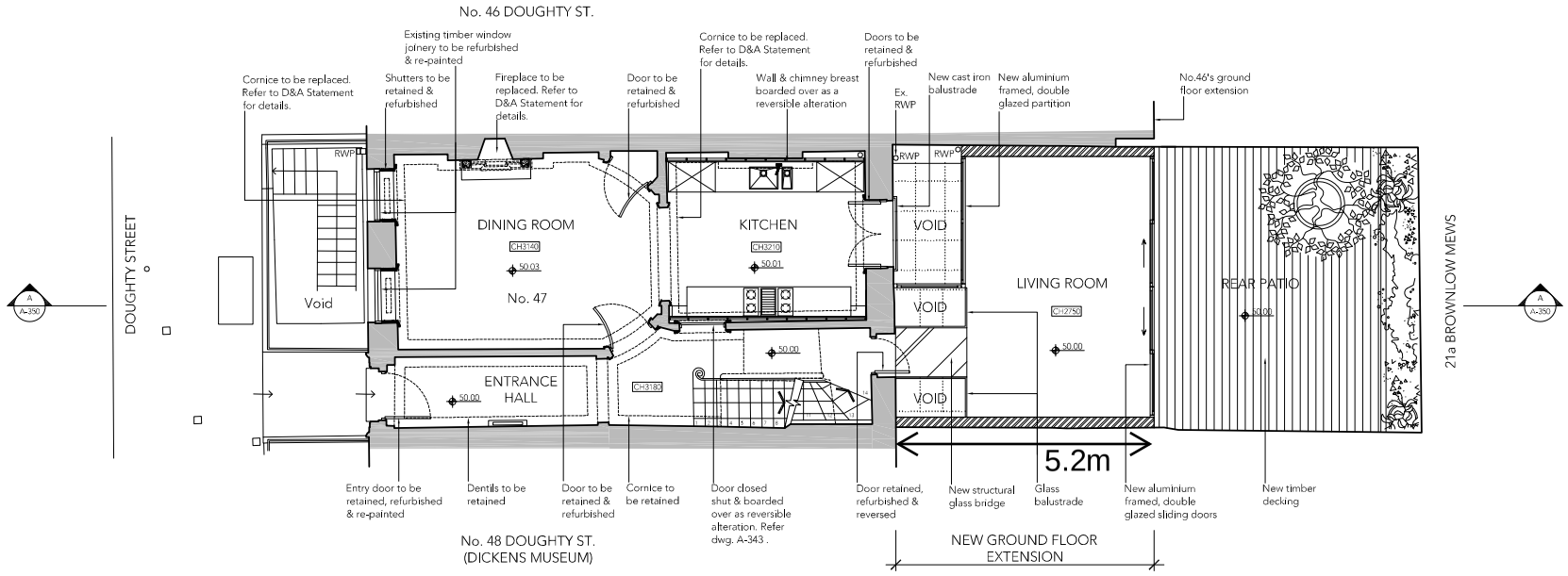
10 RATHBONE PLACE LONDON W1T 1HP T 020 7636 3838 F 020 7636 5659 WWW.TG-STUDIO.CO.UK

PROJECT: 47 DOUGHTY STREET, LONDON WC1N 2LW

DRAWING: EXISTING SECTION AA

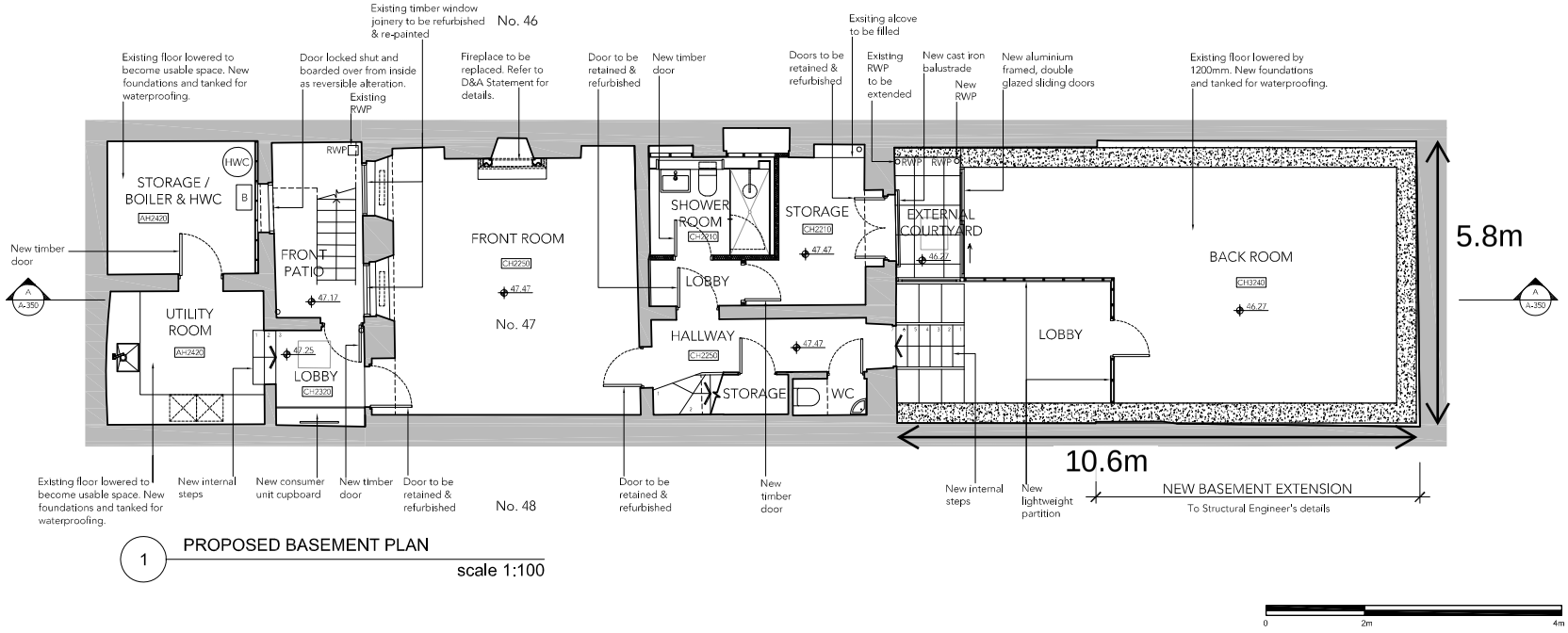
DATE	19.02.2016	DRAWN BY	EG	CHECKED BY	TG
STATUS	PLANNING	SCALE @ A3	1:100		
JOB NO.	163	DWG NO.	A-220	REV	A

Appendix 2 – Drawings showing the proposed development



2 PROPOSED GROUND FLOOR PLAN

scale 1:100



1 PROPOSED BASEMENT PLAN

scale 1:100

0 2m 4m

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REVISION		DATE
-	PRE-PLANNING	18.09.2015
A	PLANNING SUBMISSION	12.02.2016

LEGEND

	Existing structures
	New structures
	New basement extension walls
	New internal partitions

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10 PATHBONE PLACE LONDON W1T 1HP T 020 7636 3838 F 020 7636 5659 WWW.TG-STUDIO.CO.UK

PROJECT: 47 DOUGHTY STREET LONDON WC1N 2LW

DRAWING: PROPOSED BASEMENT & GROUND FLOOR PLANS

DATE	12.02.2016	DRAWN BY	EG
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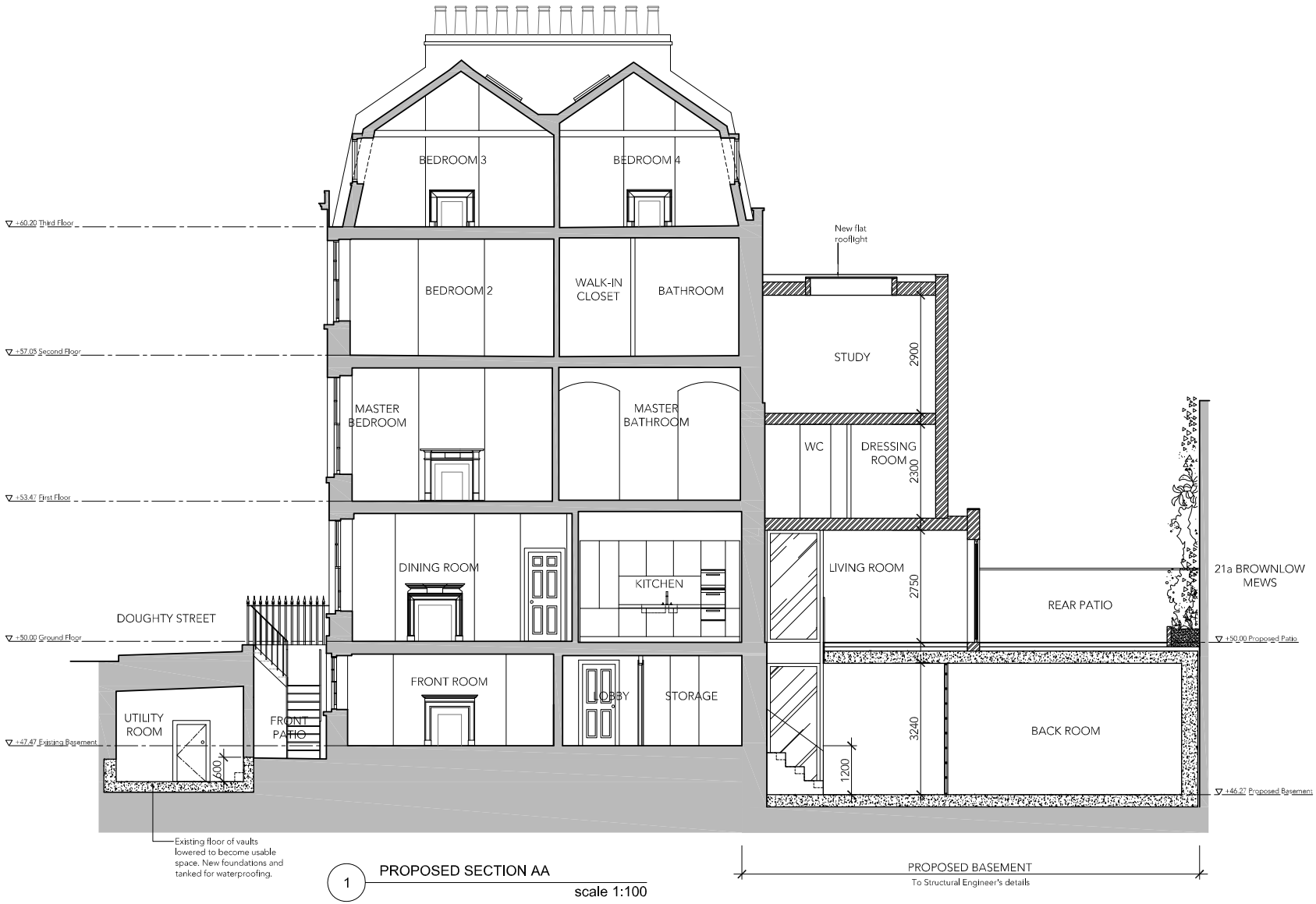
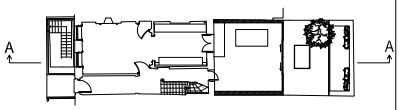
REV	A		



1 PROPOSED SECTION AA

scale 1:100

REVISION		DATE
-	PRE-PLANNING	18.09.2015
A	PLANNING SUBMISSION	12.02.2016



SECTION LOCATION PLAN

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Architecture & Interior Design
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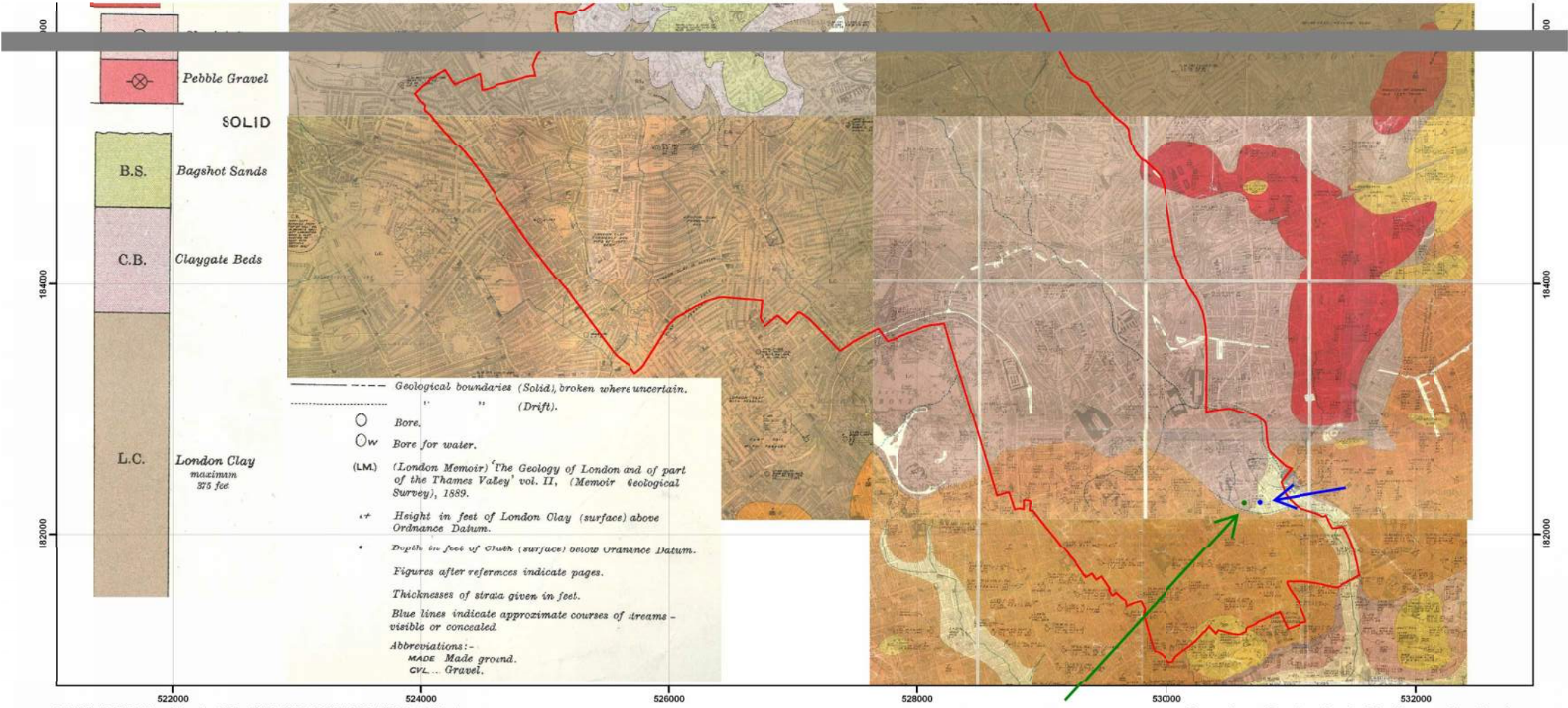
PROJECT: 47 DOUGHTY STREET, LONDON WC1N 2LW

DRAWING: PROPOSED SECTION AA

DATE	12.02.2016	DRAWN BY	EG	CHECKED BY	TG
STATUS	PLANNING	SCALE @ A3	1:100		
JOB NO.	163	DWG NO.	A-350	REV	A

Appendix 3 – Figures 2, 6, 8 and 11 from the Camden Geological, Hydrogeological and Hydrological Study (CGHHS) marked up to highlight site location



BGS 1:10,560 Map Sheets 1SE, 2SW, 4NE, 5SW, 5NW 1920 Edition)

N

Scale at A3: 1:30,000

Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.4 0.8 1.6 2.4
Kilometers

Legend

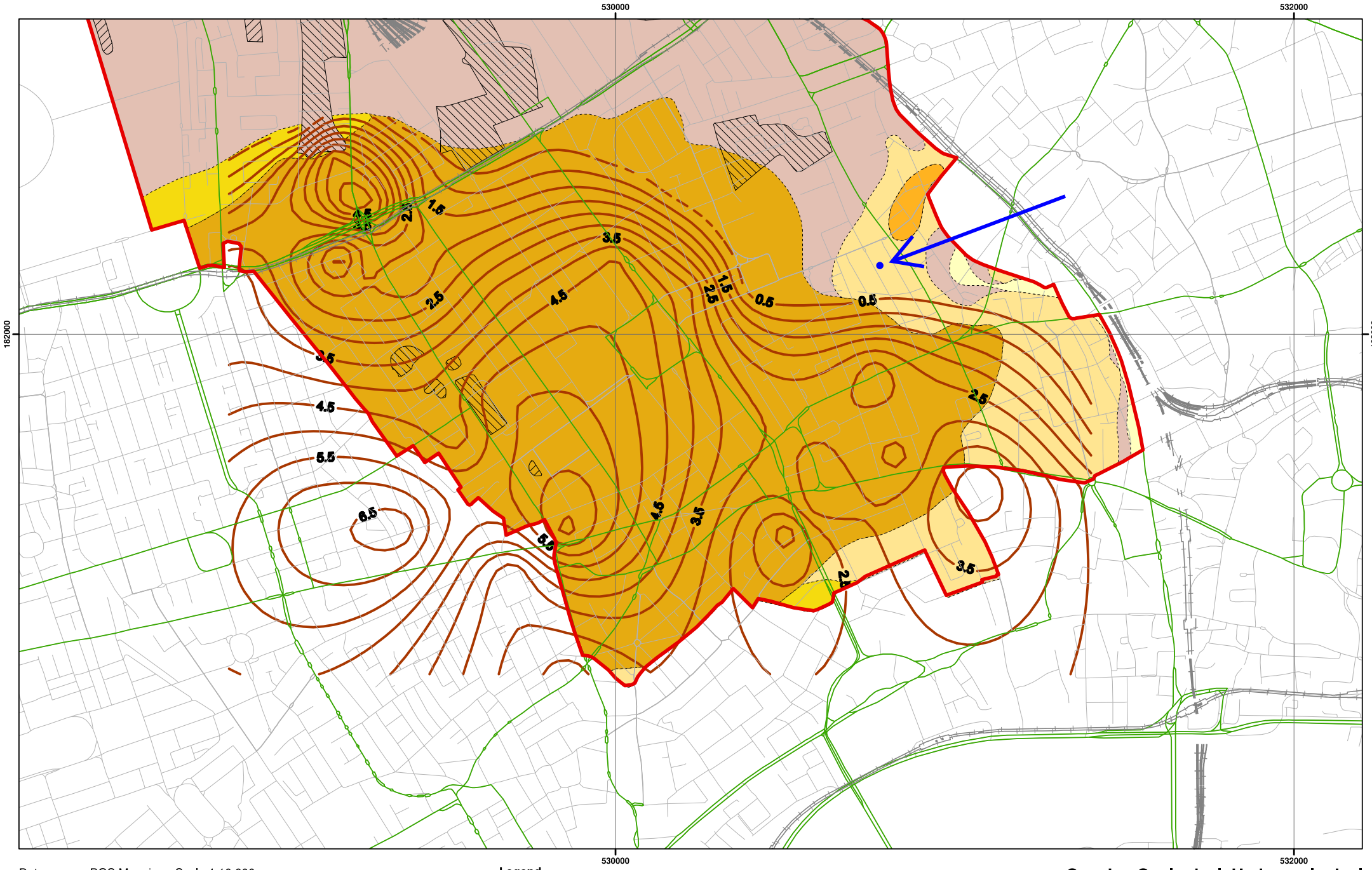
London Borough of Camden

Text at adjacent borehole
(location shown with green dot) :
L + 59
Made ___ 11
Sand ___ 8
L.C. ___ 48
R B ___ 11

Camden Geological, Hydrogeological and Hydrological Study

Camden 1:10,560 Geological Map (1920)

213923 FIGURE **2**



Data source: BGS Mapping - Scale 1:10,000

N

Scale at A3: 1:10,000

Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.2 0.4 0.8 1.2
Kilometers

Legend

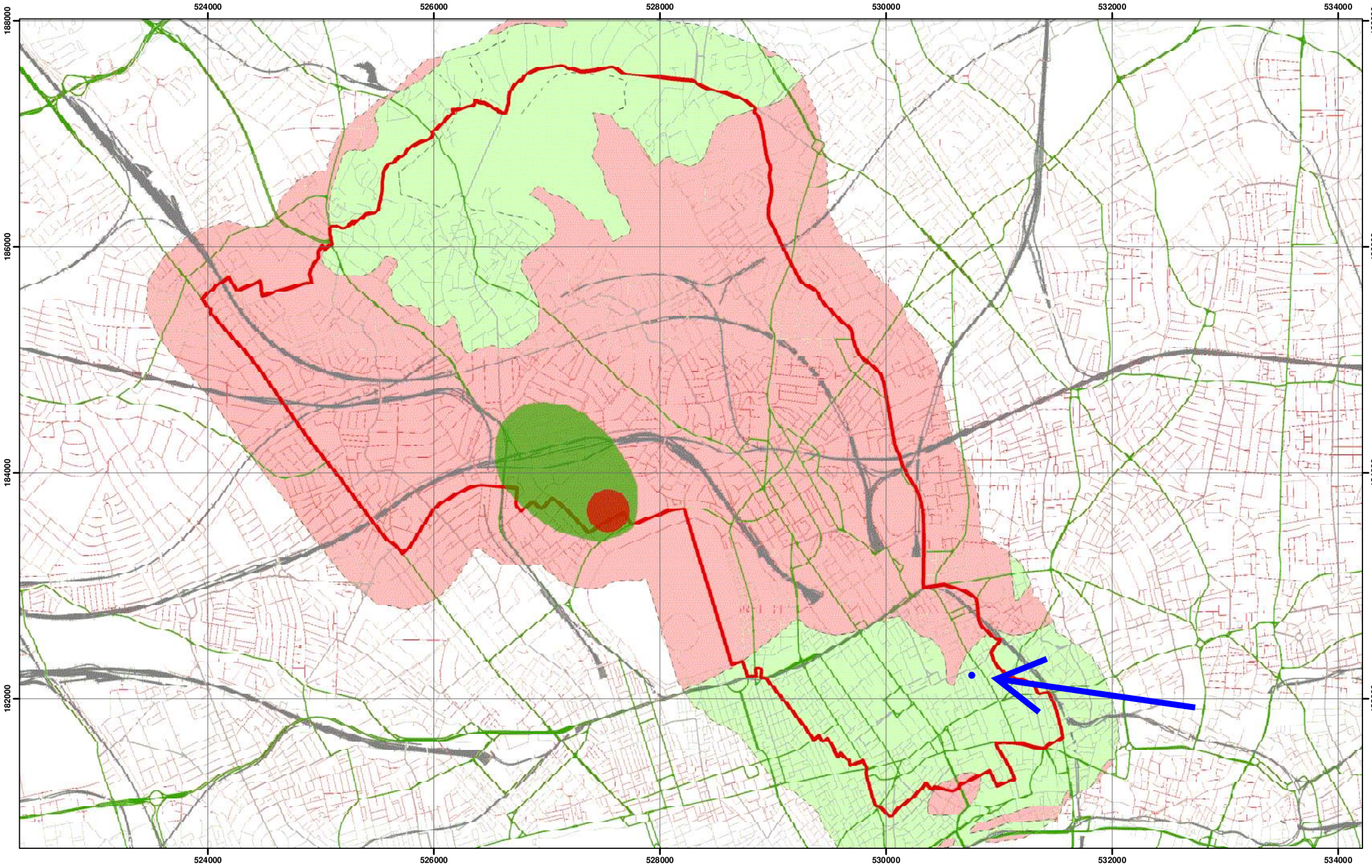
- London Borough of Camden
- Railway Lines
- A Roads
- RTD Thickness Contours
- BGS 1:10K Artificial Ground
  - MADE GROUND
  - WORKED GROUND
- BGS 1:10K Drift Geology
  - ALLUVIUM
  - HACKNEY GRAVEL FORMATION
  - LANGLEY SILT FORMATION
  - LYNCH HILL GRAVEL FORMATION
  - STANMORE GRAVEL FORMATION
- BGS 1:10K Solid Geology
  - BAGSHOT FORMATION
  - CLAYGATE MEMBER
  - LAMBETH GROUP
  - LONDON CLAY FORMATION

NB. Geological boundaries are largely indicative based on available geological mapping data

Camden Geological, Hydrogeological and Hydrological Study

River Terrace Deposit Thickness Contours

213923 **FIGURE** **6**



Environment Agency Aquifer Designation based on BGS Mapping

N

Scale at A3: 1:30,000

Coordinate System:
British National Grid
GCS_OSGB_1936

0 0.5 1 2 3
Kilometers

Legend

Borough of Camden
Railway Lines
A Roads

Aquifer Designation

Secondary A Aquifer
Unproductive Strata

Source Protection Zone

Outer Source Protection Zone
Inner Source Protection Zone

NB. Aquifer boundaries are indicative based on available geological mapping data

Camden Geological, Hydrogeological and Hydrological Study

Camden Aquifer Designation Map

213923

FIGURE 8

An excerpt from the following figure including an overlay of a modern map highlighting the site location:

Camden Geological, Hydrogeological and Hydrological Study
Watercourses

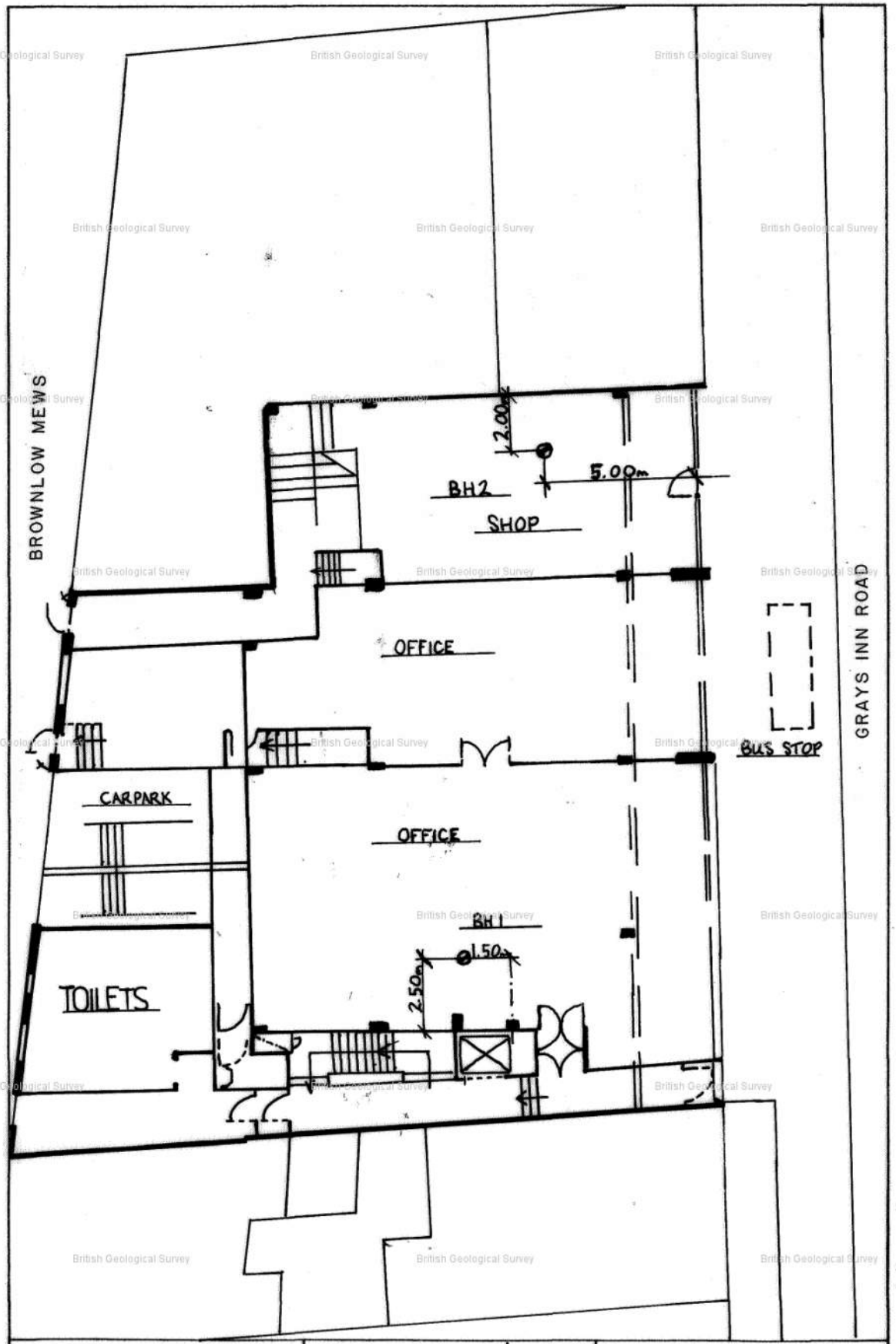
213923

FIGURE **11**

Appendix 4 – Results from adjacent Boreholes

● Site location

Results from boreholes at this location included overleaf



Terresearch Limited	Report No. S90/709	Figure No. 1

A4 Admel P6472

Contract: Grays Inn Road

Client: Gazeley Properties Limited

Borehole No. 1

Sheet No. 1 Of 3.
Depth 0 to 10 metres.

Equipment and Methods
Light Cable Percussion Boring
150mm Diameter

Orientation : Vertical

Ground Level : (m.O.D.)

Coordinates :

Job Number : S39/709

Location :

Dates : 5/12/89
15/12/89

Daily Prog.	Water Levels	Remarks	In Situ Tests	Samples Taken	Depth (Thick)	Reduced Level	Description	Legend
					0.00			
					(0.50)		MADE GROUND (concrete)	
					0.50			
							MADE GROUND (clay and rubble fill)	
				B 46	(1.00)			
				U 47	1.50			
				J 48			MADE GROUND (Dense very clayey SAND with fine to medium gravel, traces of ash and brick)	
					(1.70)			
				U 49	3.20			
5/12				J 50			Dense fine to coarse SAND with fine to coarse subangular gravel	
5/12								
	▽ 8/12/89		C 45	B 51				
				J 44				
	▽ 15/12/89		C 53	W 45				
				B 52				
				J 46				
					(7.80)			
			C 48	B 53				
				J 48				
			C 49	B 54				
				J 50				
					10.00		Continued	

Operator
WI

General Remarks:
Water added to assist boring from 10.5m to 11.0m. Water level observation tube installed to 12.45m.

Appendix
1

Scale
10m/sheet

Sheet No.
1

Contract: Grays Inn Road

Client: Gazeley Properties Limited

Borehole No. 1

Sheet No. 2 Of 3.
Depth 10 to 20 metres.

Equipment and Methods
Light Cable Percussion Boring
150mm Diameter

Orientation : Vertical

Ground Level : (m.O.D.)

Coordinates :

Job Number : S39/709

Location :

Dates : 5/12/89
15/12/89

Daily Prog.	Water Levels	Remarks	In Situ Tests	Samples Taken	Depth (Thick)	Reduced Level	Description	Legend
			C 54	B 55	10.00			
				J 52	(7.80)		Dense fine to coarse SAND with fine to coarse subangular gravel	
6/12								
6/12								
	7/12/89			U 56	11.00			
				J 57			Firm to stiff grey very sandy silty CLAY	
					(2.00)			
				U 58				
				J 59	13.00			
							Very stiff fissured grey silty CLAY with lenses of fine sand	
				U 60				
				J 61	(3.00)			
				U 62				
7/12				J 63	16.00			
							Stiff grey brown silty CLAY with lenses of fine sand and occasional plant remains	
				U 64				
				J 65				
					(4.50)			
				J 66				
					20.00			
							Continued	

Operator
WI

General Remarks:
Water added to assist boring from 10.5m to 11.0m. Water level observation tube installed to 12.45m.

Appendix
1

Scale
10m/sheet

Sheet No.
2

Contract: Grays Inn Road

Client: Gazeley Properties Limited

Borehole No. 1

Sheet No. 3 Of 3.
Depth 20 to 30 metres.

Equipment and Methods
Light Cable Percussion Boring
150mm Diameter

Orientation : Vertical

Ground Level : (m.O.D.)

Coordinates :

Job Number : S39/709

Location :

Dates : 5/12/89
15/12/89

Daily Prog.	Water Levels	Remarks	In Situ Tests	Samples Taken	Depth (Thick)	Reduced Level	Description	Legend
				J 67	20.00			
					(4.50)		Stiff grey brown silty CLAY with lenses of fine sand and occasional plant remains	
				J 68	20.50			
				J 69			Stiff brown silty CLAY with pockets of blue grey silty clay	
					(4.00)			
				U 70				
				J 71				
15/12				J 72	24.50		End of Borehole	

Operator
WI

Scale
10m/sheet

General Remarks:
Water added to assist boring from 10.5m to 11.0m. Water level observation tube installed to 12.45m.

Appendix
1

Sheet No.
3

Contract: Grays Inn Road

Client: Gazeley Properties Limited

Borehole No. 2

Sheet No. 1 Of 3.
Depth 0 to 10 metres.

Equipment and Methods
Light Cable Percussion Boring
150mm Diameter

Orientation : Vertical

Ground Level : (m.O.D.)

Coordinates :

Job Number : S39/709

Location :

Dates : 29/11/89
1/12/89

Daily Prog.	Water Levels	Remarks	In Situ Tests	Samples Taken	Depth (Thick)	Reduced Level	Description	Legend
					0.00			
					(0.50)		MADE GROUND (concrete)	
					0.50			
			C 44	B 1			Dense fine to coarse SAND with fine to coarse GRAVEL	
				J 2				
			C 47	B 3	(3.00)			
				J 4				
			C 32	B 5				
29/11				J 6	3.50			
				U 7			Firm brown very sandy silty CLAY with fine to coarse rounded and subangular gravel	
29/11		(Brickearth band)		J 8	(1.00)			
			C 54	B 9	4.50		Dense fine to coarse SAND with fine to coarse rounded and subangular GRAVEL	
				J 10				
			C 52	B 11				
				J 12				
			C 52	B 13				
					(4.50)			
				J 14				
			C 55	B 15				
				J 16				
29/11			C 62	B 17				
29/11				J 18	9.00		Stiff fissured grey silty CLAY with lenses of fine sand and selenite and occasional pockets of pyritised wood	
				U 19	(5.50)			
					10.00			
							Continued	

Operator
WI

General Remarks:
Water added to assist boring from 9.0 to 9.5m.

Appendix
1

Scale
10m/sheet

Sheet No.
6

Contract: Grays Inn Road

Client: Gazeley Properties Limited

Borehole No. 2

Sheet No. 2 Of 3.
Depth 10 to 20 metres.

Equipment and Methods
Light Cable Percussion Boring
150mm Diameter

Orientation : Vertical

Ground Level : (m.O.D.)

Coordinates :

Job Number : S39/709

Location :

Dates : 29/11/89
1/12/89

Daily Prog.	Water Levels	Remarks	In Situ Tests	Samples Taken	Depth (Thick)	Reduced Level	Description	Legend
30/11				J 20	10.00		Stiff fissured grey silty CLAY with lenses of fine sand and selenite and occasional pockets of pyritised wood	
				U 21				
				J 22				
					(5.50)			
				U 23				
				J 24				
				U 25				
				J 26	14.50			
			S 66	J 27			Very stiff brown silty CLAY with pockets and lenses of red brown and grey silty clay	
30/11					(2.50)			
				U 28				
				J 29				
			S 72	J 30	17.00		Stiff brown silty CLAY with pockets of fine grey sand	
			S 14	B 31	(2.00)			
				U 32	19.00		Stiff brown silty sandy CLAY with pockets of blue grey silty clay	
				J 33	(1.00)			
					20.00		Continued	

Operator
WI

General Remarks:
Water added to assist boring from 9.0 to 9.5m.

Appendix
1

Scale
10m/sheet

Sheet No.
7

Contract: Grays Inn Road

Client: Gazeley Properties Limited

Borehole No. 2

Sheet No. 3 Of 3.
Depth 20 to 30 metres.

Equipment and Methods
Light Cable Percussion Boring
150mm Diameter

Orientation : Vertical

Ground Level : (m.O.D.)

Coordinates :

Job Number : S39/709

Location :

Dates : 29/11/89
1/12/89

Daily Prog.	Water Levels	Remarks	In Situ Tests	Samples Taken	Depth (Thick)	Reduced Level	Description	Legend
					20.00		Very stiff brown silty CLAY with pockets and lenses of red brown and grey silty clay	
			S 64	J 34				
				U 35				
				J 36	(5.00)			
1/12								
			S 70					
1/12					25.00		End of Borehole	

Operator
WI

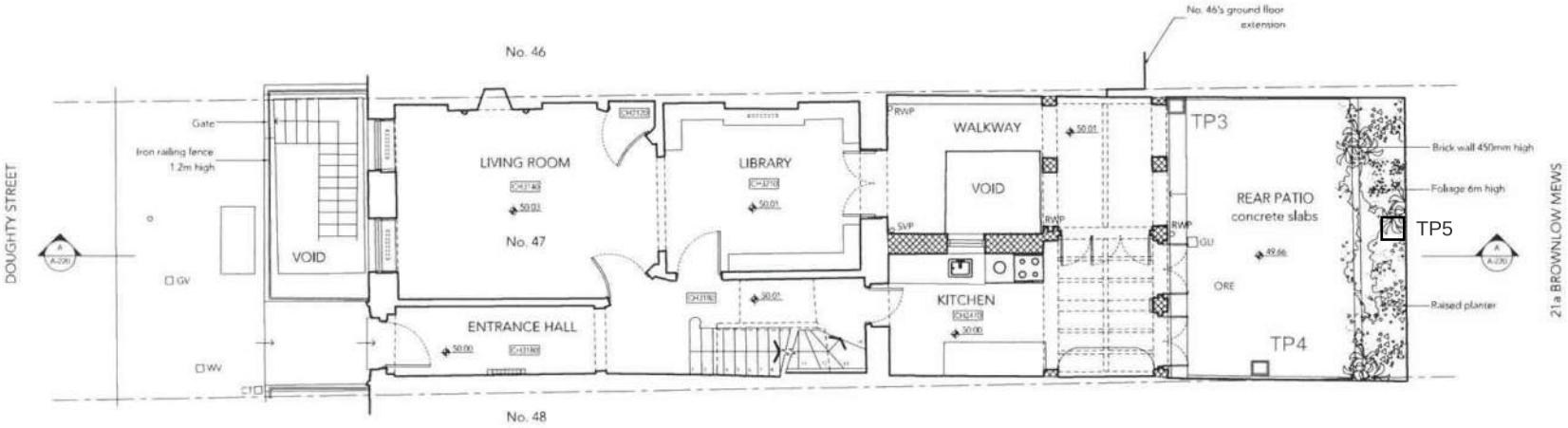
General Remarks:
Water added to assist boring from 9.0 to 9.5m.

Appendix
1

Scale
10m/sheet

Sheet No.
8

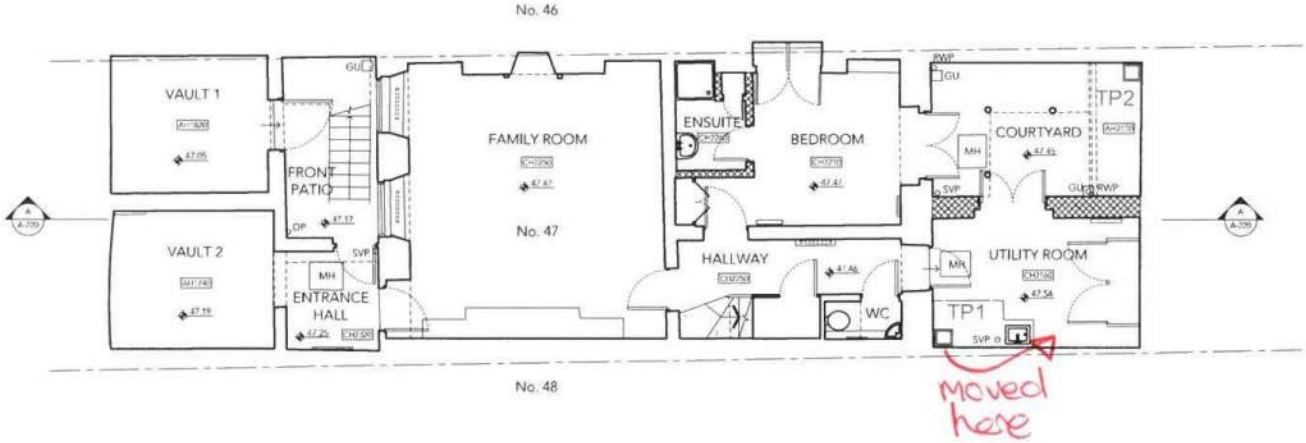
Appendix 5 – Trial pit location plan and logs



1 EXISTING GROUND FLOOR PLAN

scale 1:100

Trial pits in corners to establish foundations for both walls



2 EXISTING BASEMENT PLAN

scale 1:100

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STATUS: - PRE-PLANNING DATE: 18.09.2015

N

LEGEND

	Existing structures
	Structures to be demolished
CH---	Ceiling height
AH---	Arch height

STUDIO
Architecture & Interior Design

10 RATHBONE PLACE LONDON W1T 1HP T 020 7636 3030 F 020 7636 3659 W WWW.TG-STUDIO.CO.UK

PROJECT: 47 DOUGHTY STREET, LONDON WC1N 2LW

DRAWING: EXISTING BASEMENT & GROUND FLOOR PLAN

DATE	18.09.2015	DRAWN BY	EG
CHECKED BY	TG	STATUS	PRE-PLANNING
SCALE @ A3	1:100	JOB NO	163
DWG NO	A-200	REV	-

0 2m 4m

AP GEOTECHNICS
T 01932 848460
F 01932 851255
E mail@apgeotechnics.co.uk

Site	Trial Pit Number
47 DOUGHTY STREET, WL1N 2LW	TP1

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Excavated by hand			Eastwood & Partners Consulting Engineers	4376
	Location	**Dates**	**Engineer**	**Sheet**
	See site plan	13/10/2015		1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.03)	Brick tiles		
					0.03			
					(0.03)	Screed		
					0.06			
					(0.16)	Concrete		
					0.22			
0.50	D1					MADE GROUND: Light becoming dark brown silty sand with some gravel sized fragments of brick, shell and flint		
					(1.02)			
0.90	D2							
1.00	D3							
					1.24			
						MADE GROUND: Dark brown very sandy clay with some gravel sized fragments of brick, concrete, shell and flint		
1.50	D4							
2.00	D5				(1.76)			
2.50	D6							
					3.00			
3.00	D7					Complete at 3.00m		

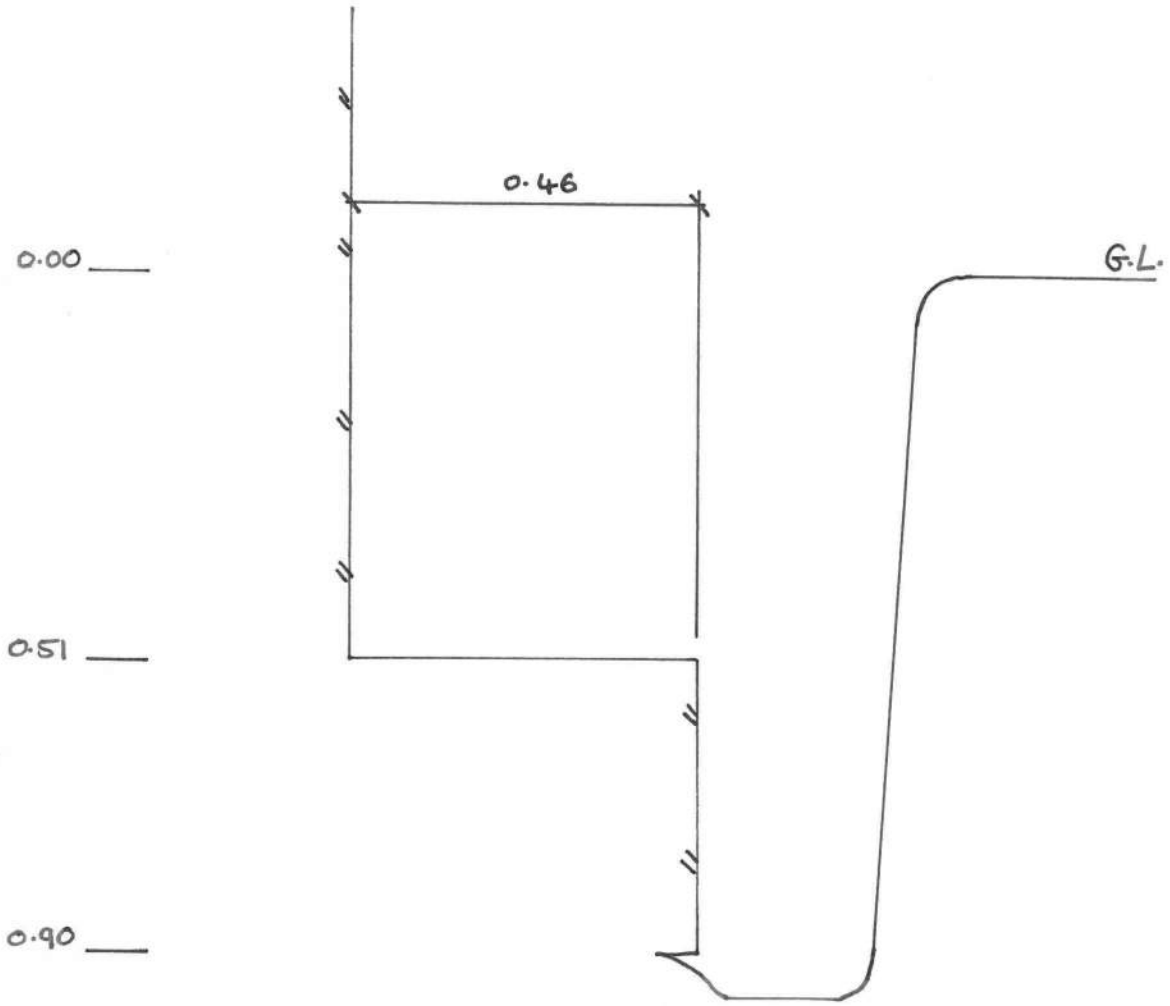
Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	AB	4376.TP1

AP GEOTECHNICS	T 01932 848460 F 01932 851255 E mail@apgeotechnics.co.uk	Site 47 DOUGHTY STREET, WL1N 2LW	Trial Pit Number TP1

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Excavated by hand			Eastwood & Partners Consulting Engineers	4376
	Location See site plan	**Dates** 13/10/2015	**Engineer**	**Sheet** 2/2



	Scale (approx)	Logged By	Figure No.
	1:10	AB	4376.TP1

AP GEOTECHNICS
T 01932 848460
F 01932 851255
E mail@apgeotechnics.co.uk

Site	Trial Pit Number
47 DOUGHTY STREET, WL1N 2LW	TP2

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Excavated by hand			Eastwood & Partners Consulting Engineers	4376

Location	Dates	Engineer	Sheet
See site plan	13/10/2015		1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.03)			
					0.03	Brick tiles		
					(0.36)	Concrete ...steel at 0.15m depth ...steel at 0.2m depth		
0.40	D1				0.39			
0.50	D2					MADE GROUND: Dark brown silty sandy gravelly clay with some gravel sized fragments of brick, concrete and flint		
1.00	D3					...layer of clayey silty gravelly sand (~100mm)		
					(1.86)			
1.50	D4							
2.00	D5							
					2.25			
						MADE GROUND: Dark brown very sandy gravelly clay with some gravel sized fragments of brick and flint		
2.50	D6							
					(0.75)			
3.00	D7				3.00			
						Complete at 3.00m		

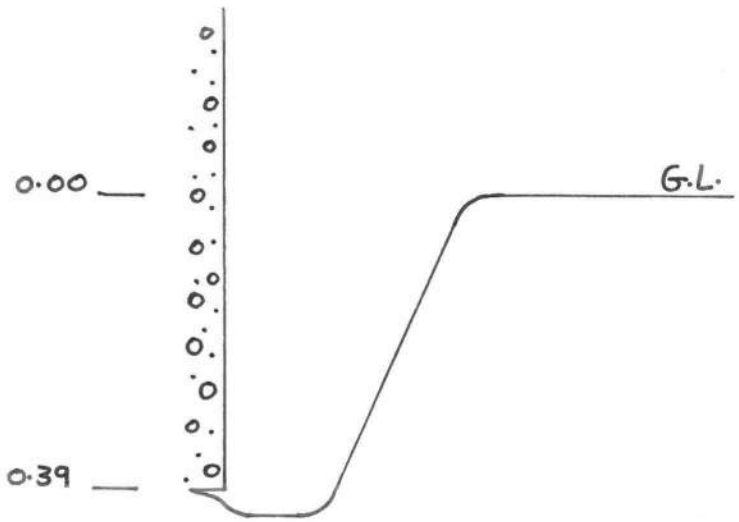
Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	AB	4376.TP2

AP GEOTECHNICS	T 01932 848460 F 01932 851255 E mail@apgeotechnics.co.uk	Site 47 DOUGHTY STREET, WL1N 2LW	Trial Pit Number **TP2**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Excavated by hand			Eastwood & Partners Consulting Engineers	4376
	Location See site plan	**Dates** 13/10/2015	**Engineer**	**Sheet** 2/2



	Scale (approx)	Logged By	Figure No.
	1:10	AB	4376.TP2

AP GEOTECHNICS
T 01932 848460
F 01932 851255
E mail@apgeotechnics.co.uk

Site	Trial Pit Number
47 DOUGHTY STREET, WL1N 2LW	TP3

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Excavated by hand			Eastwood & Partners Consulting Engineers	4376
	Location	**Dates**	**Engineer**	**Sheet**
	See site plan	13/10/2015		1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.04)	Concrete		
					0.04	MADE GROUND: Dark brown silty sand with some gravel sized fragments of brick, shell and flint		
					(0.66)			
0.50	D1							
					0.70	MADE GROUND: Dark brown silty sand with abundant gravel sized fragments of brick and flint		
0.90	D2							
1.00	D3							
					(1.05)			
1.50	D4							
					1.75	MADE GROUND: Dark brown silty sand with some gravel sized fragments of brick, concrete and shell		
2.00	D5							
					(1.25)			
2.50	D6							
					3.00			
3.00	D7					Complete at 3.00m		

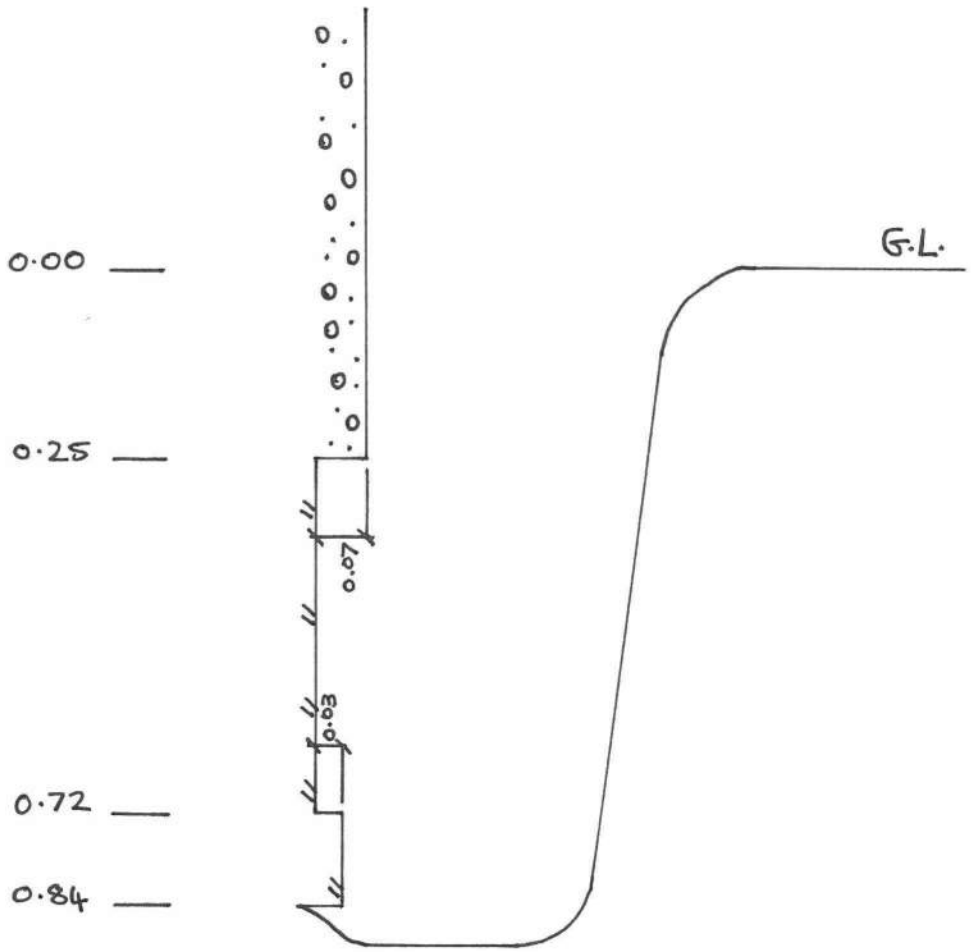
Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	AB	4376.TP3

AP GEOTECHNICS	T 01932 848460 F 01932 851255 E mail@apgeotechnics.co.uk	Site 47 DOUGHTY STREET, WL1N 2LW	Trial Pit Number TP3

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Excavated by hand			Eastwood & Partners Consulting Engineers	4376
	Location See site plan	**Dates** 13/10/2015	**Engineer**	**Sheet** 2/2



	Scale (approx)	Logged By	Figure No.
	1:10	AB	4376.TP3

AP GEOTECHNICS
T 01932 848460
F 01932 851255
E mail@apgeotechnics.co.uk

Site	Trial Pit Number
47 DOUGHTY STREET, WL1N 2LW	TP4

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Excavated by hand			Eastwood & Partners Consulting Engineers	4376
	Location	**Dates**	**Engineer**	**Sheet**
	See site plan	13/10/2015		1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.04) 0.04	Concrete		
						MADE GROUND: Brown silty sand with abundant gravel sized fragments of brick and flint		
0.30	D1							
0.50	D2				(1.21)			
0.82	D3					...layer of sandy gravel of brick and flint (~100mm)		
1.00	D4							
					1.25	MADE GROUND: Brown very silty sand with some gravel sized fragments of brick, concrete and flint		
1.50	D5							
2.00	D6				(1.75)			
2.50	D7							
					3.00			
3.00	D8					Complete at 3.00m		

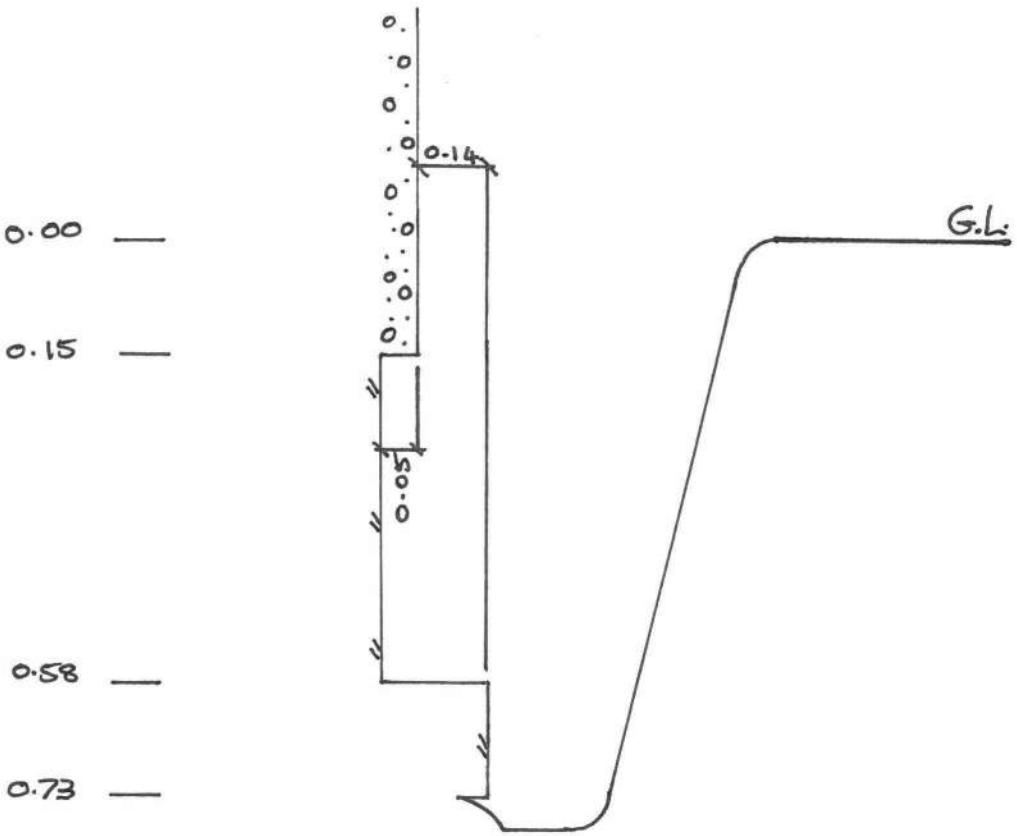
Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	AB	4376.TP4

AP GEOTECHNICS	T 01932 848460 F 01932 851255 E mail@apgeotechnics.co.uk	Site 47 DOUGHTY STREET, WL1N 2LW	Trial Pit Number TP4

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Excavated by hand			Eastwood & Partners Consulting Engineers	4376
	Location See site plan	**Dates** 13/10/2015	**Engineer**	**Sheet** 2/2



	Scale (approx)	Logged By	Figure No.
	1:10	AB	4376.TP4

AP GEOTECHNICS
T 01932 848460
F 01932 851255
E mail@apgeotechnics.co.uk

Site	Trial Pit Number
47 DOUGHTY STREET, WL1N 2LW	TP5

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Excavated by hand			Eastwood & Partners Consulting Engineers	4376
	Location See site plan	**Dates** 04/02/2016	**Engineer**	**Sheet** 1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(2.55)	MADE GROUND: Dry dark brown mottled red and cream organic silty gravelly sand with abundant fine to medium and occasionally coarse gravel sized fragments of flint, brick, concrete, plastic and waste		
					2.55	Complete at 2.55m		

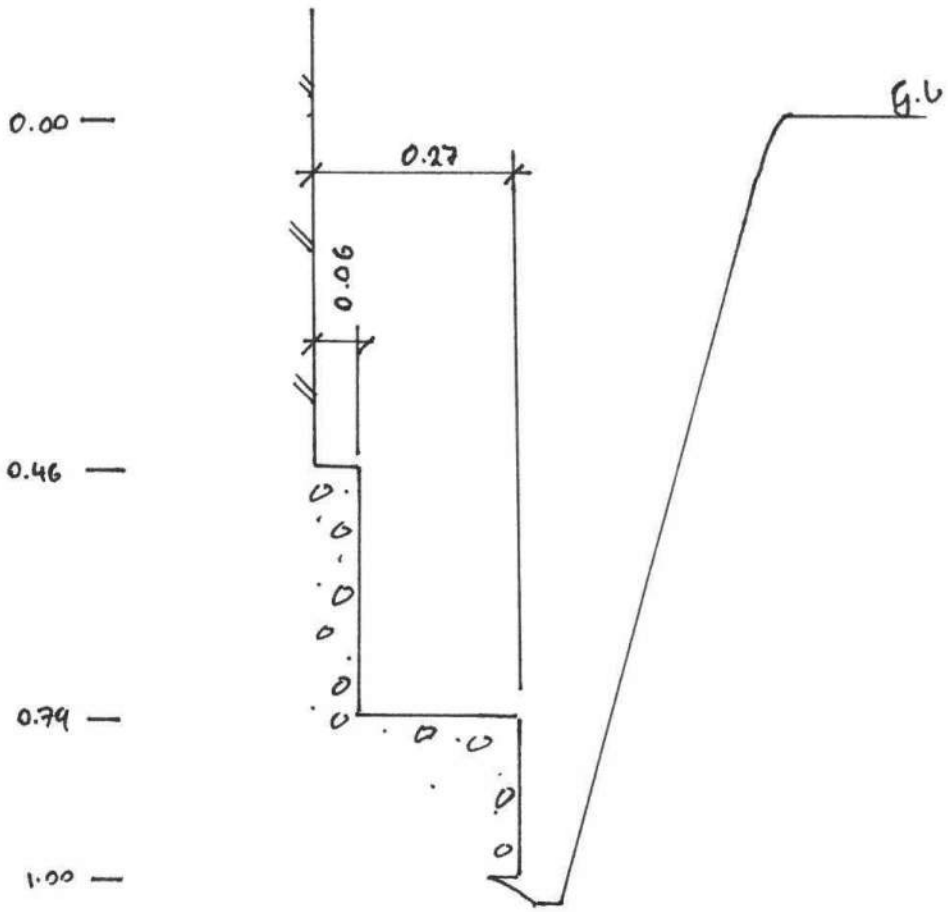
Plan

Remarks

Scale (approx)	Logged By	Figure No.
1:25	AB	4376.TP5

AP GEOTECHNICS	T 01932 848460 F 01932 851255 E mail@apgeotechnics.co.uk	Site 47 DOUGHTY STREET, WL1N 2LW	Trial Pit Number **TP5**

Excavation Method	Dimensions	Ground Level (mOD)	Client	Job Number
Excavated by hand			Eastwood & Partners Consulting Engineers	4376
	Location See site plan	**Dates** 01/01/2016	**Engineer**	**Sheet** 2/2



	Scale (approx)	Logged By	Figure No.
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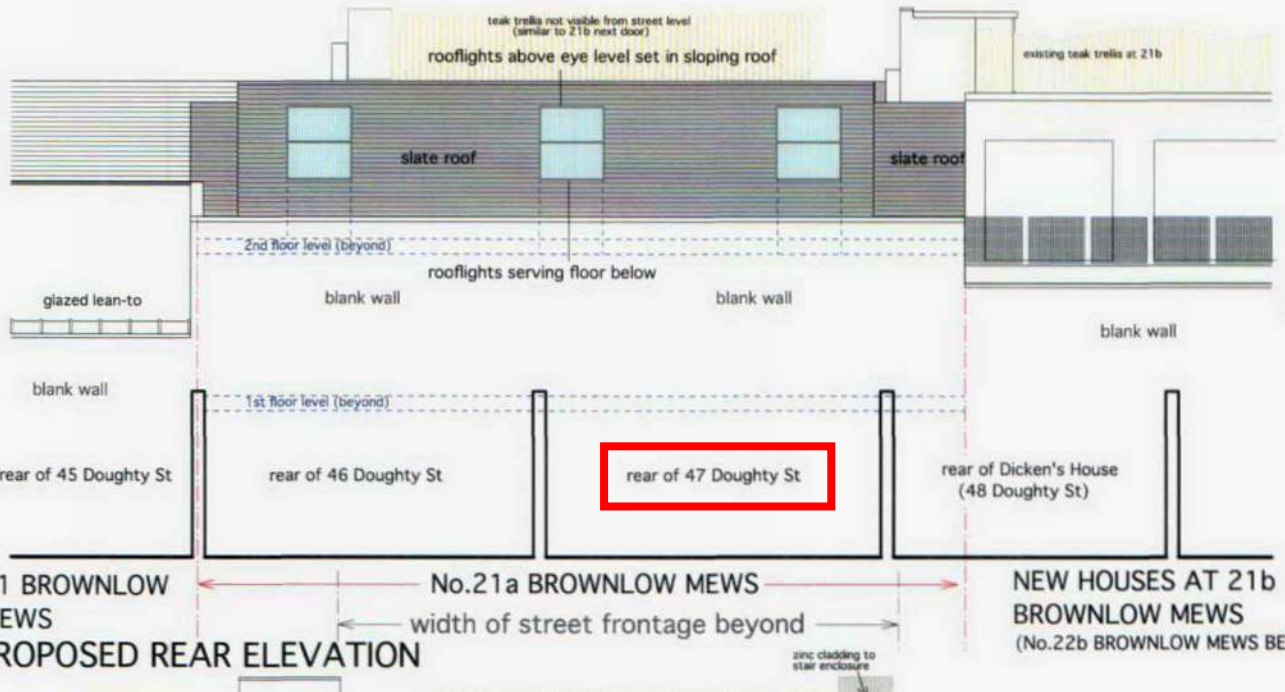
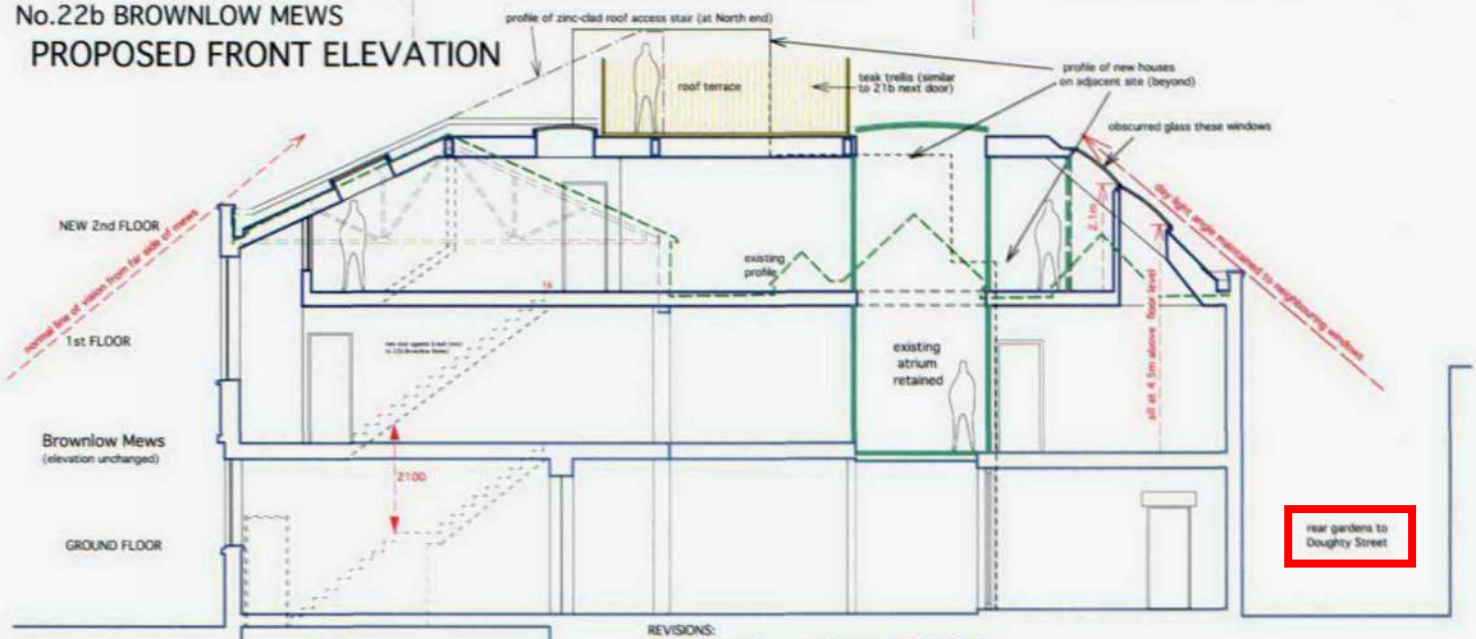
Appendix 6 – Planning drawings for alterations to 21a Brownlow Mews



PROPOSED REAR ELEVATION

PROPOSED FRONT ELEVATION



PROPOSED SECTION

REVISIONS:
(A) Notes on roof terrace and materials added. 26.3.07
(B) Four rooflights removed from rear elevation. 19.6.07

21a BROWNLOW MEWS WC1
PROPOSED ELEVATIONS & SECTION

DWG. No. 21aBM-P-7(B)
DATE FEB. '07
SCALE 1:100
DRAWN BY JF

JONATHAN FREEGARD ARCHITECTS 5 TREDEGAR SQ. LONDON E3 020-8981 5665

Appendix 7 – Thames Water Asset Location Search

Asset Location Search

Eastwood and Partners
Principle House 121 - 123,

FLEET
GU51 3PD

Search address supplied	47 Doughty St 47 Doughty St London WC1N 2LW
Your reference	47 Doughty St
Our reference	ALS/ALS Standard/2015_3213752
Search date	9 December 2015

You are now able to order your Asset Location Search requests online by visiting
www.thameswater-propertysearches.co.uk

searchcode

Asset Location Search

Search address supplied: 47 Doughty St, 47, Doughty St, London, WC1N 2LW

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Asset Location Search

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arran e [redacted] low and

Asset Location Search

pressure test to be carried out for a fee.

For your guidance:

- [redacted]sets other t[redacted] vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Asset Location Search

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0845 850 2777
Email: developer.services@thameswater.co.uk

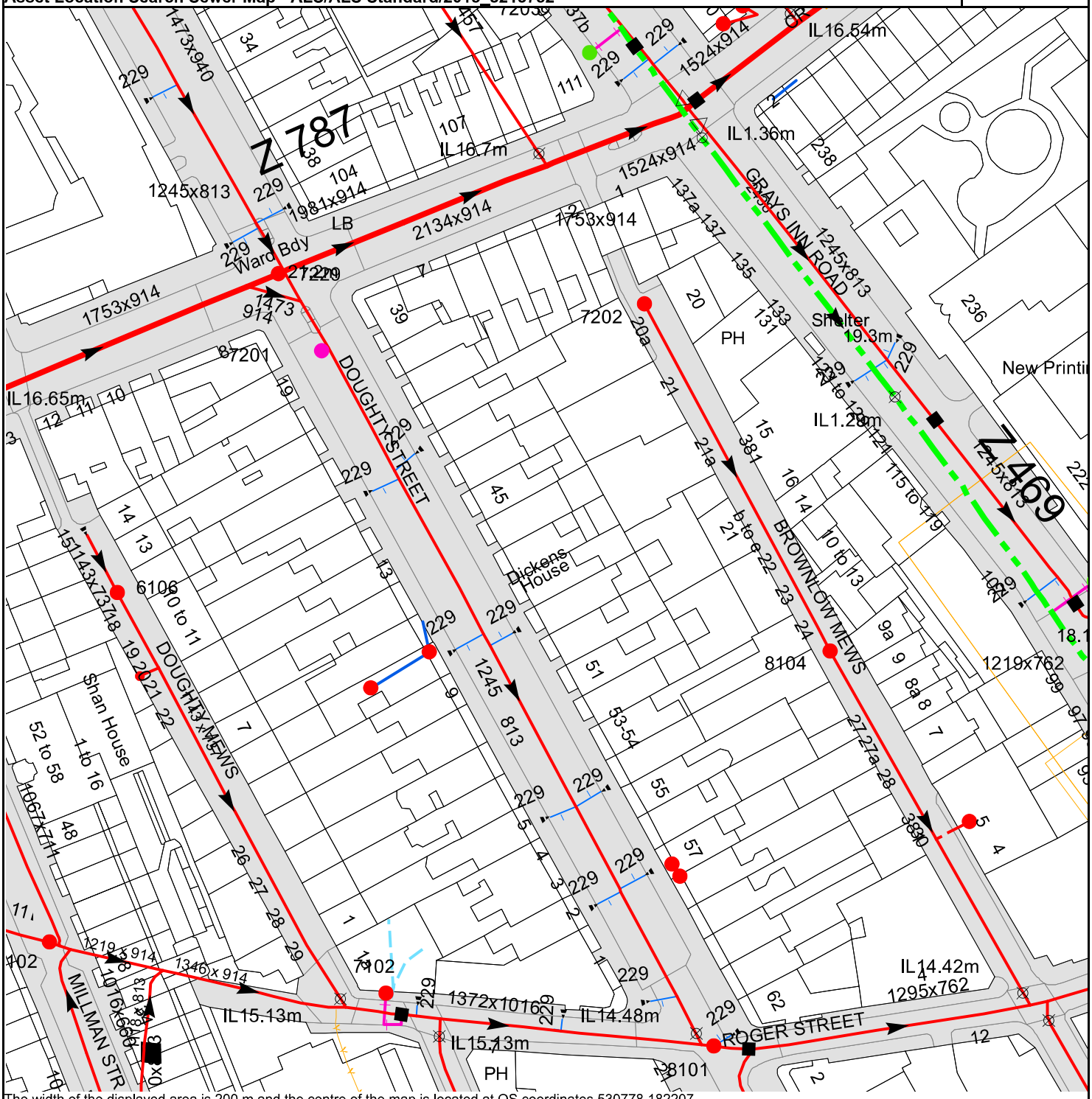
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0845 850 2777
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2015_3213752



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 530778,182207

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
8101	20.43	14.38
7102	n/a	n/a
81BJ	n/a	n/a
81CA	n/a	n/a
8195	n/a	n/a
71FJ	n/a	n/a
71GA	n/a	n/a
8104	19.12	16.56
7201	21.05	n/a
7202	20.25	19.49
7229	21.17	16.49
7203	20.55	n/a
83IH	n/a	n/a
6102	20.49	15.73
6106	20.63	17.22
711A	n/a	n/a

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve

Drop Pipe

Ancillary

Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

Outfall

Undefined End

Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

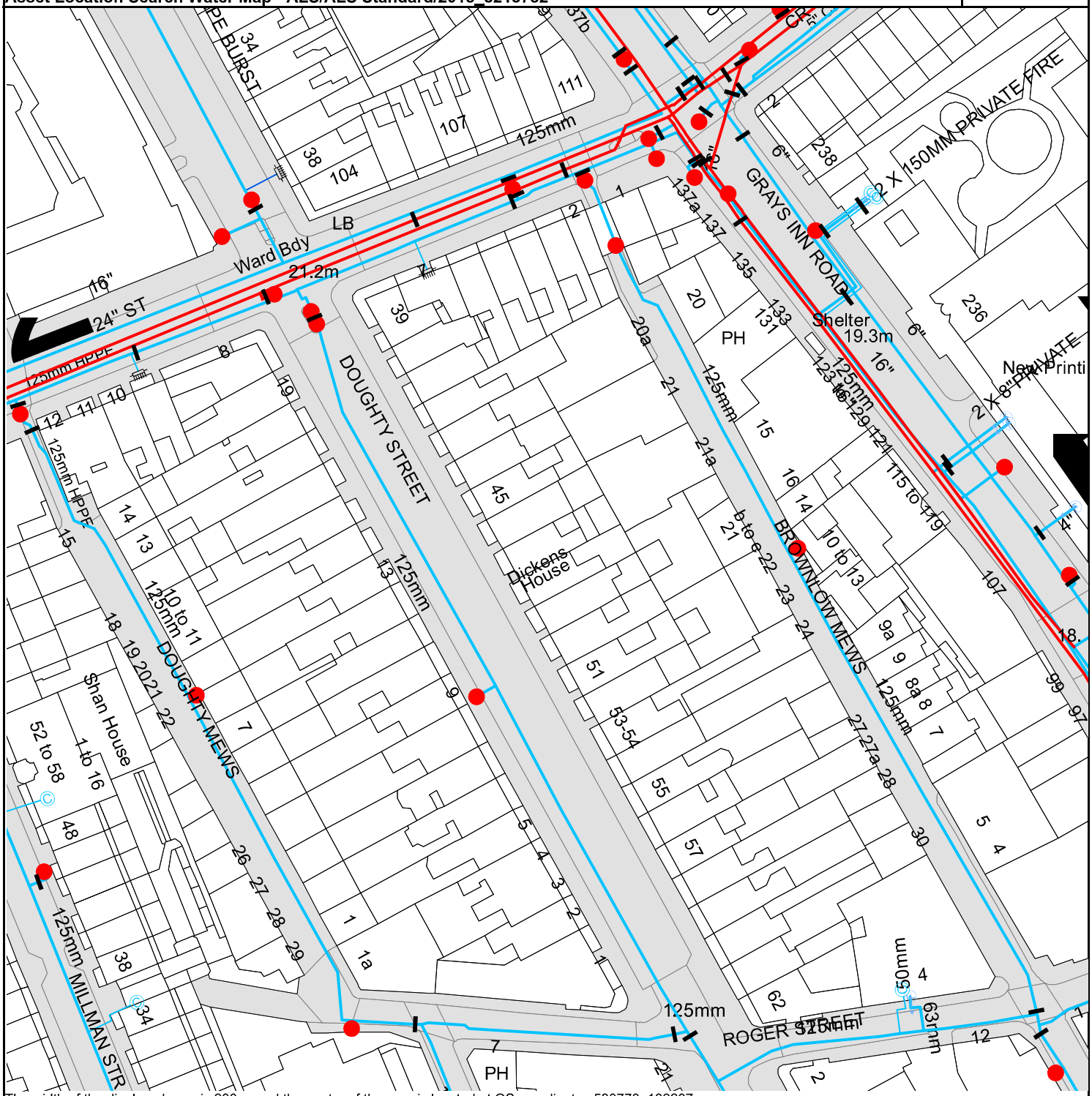
Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plans are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole level indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Asset Location Search Water Map - ALS/ALS Standard/2015_3213752



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 530778, 182207.

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to him at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0845 070 9148** quoting your invoice number starting CBA or ADS.	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Search Code

IMPORTANT CONSUMER PROTECTION INFORMATION

This search has been produced by Thames Water Property Searches, Clearwater Court, Vastern Road, Reading RG1 8DB, which is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom
- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practise and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.

By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports
- act with integrity and carry out work with due skill, care and diligence
- at all times maintain adequate and appropriate insurance to protect consumers
- conduct business in an honest, fair and professional manner
- handle complaints speedily and fairly
- ensure that products and services comply with industry registration rules and standards and relevant laws
- monitor their compliance with the Code

Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if he finds that you have suffered actual loss as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

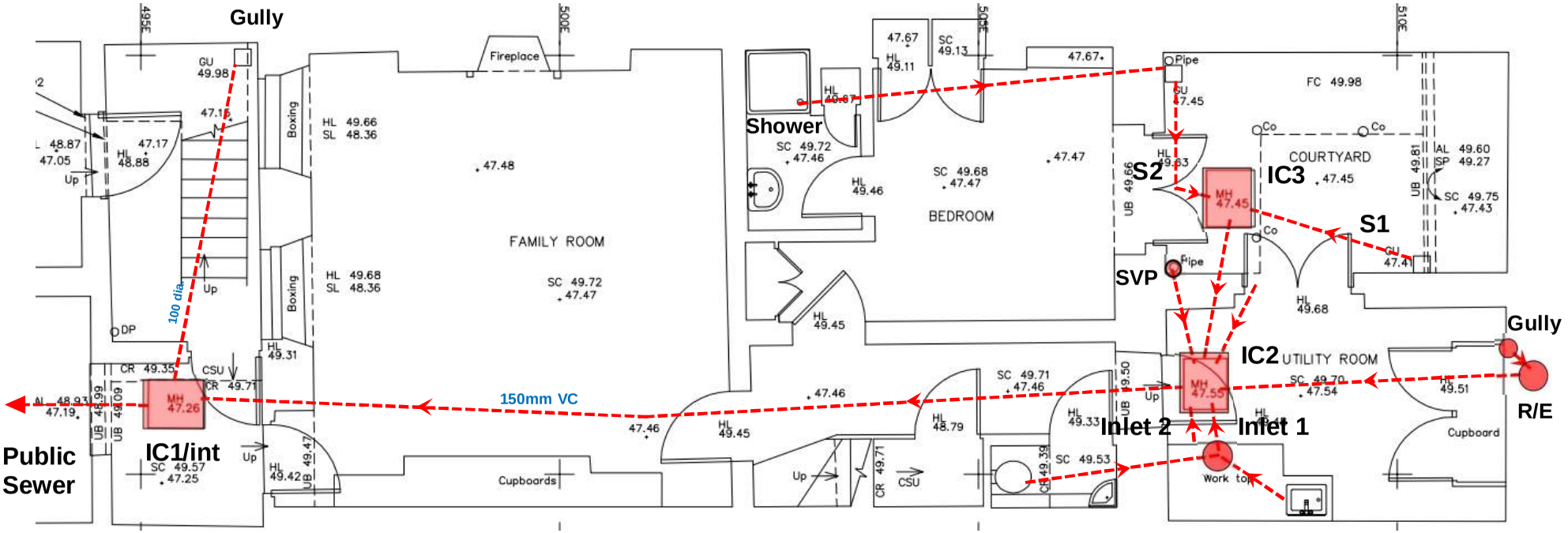
TPOs Contact Details

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk

PLEASE ASK YOUR SEARCH PROVIDER IF YOU WOULD LIKE A COPY OF THE SEARCH CODE

Appendix 8 – Drainage survey plan drawing



CW Drain | CW Manhole | SVP

Drawing by DRAINCAD

Site:
47 Doughty Street
WC1N 2LW

Scale
NTS