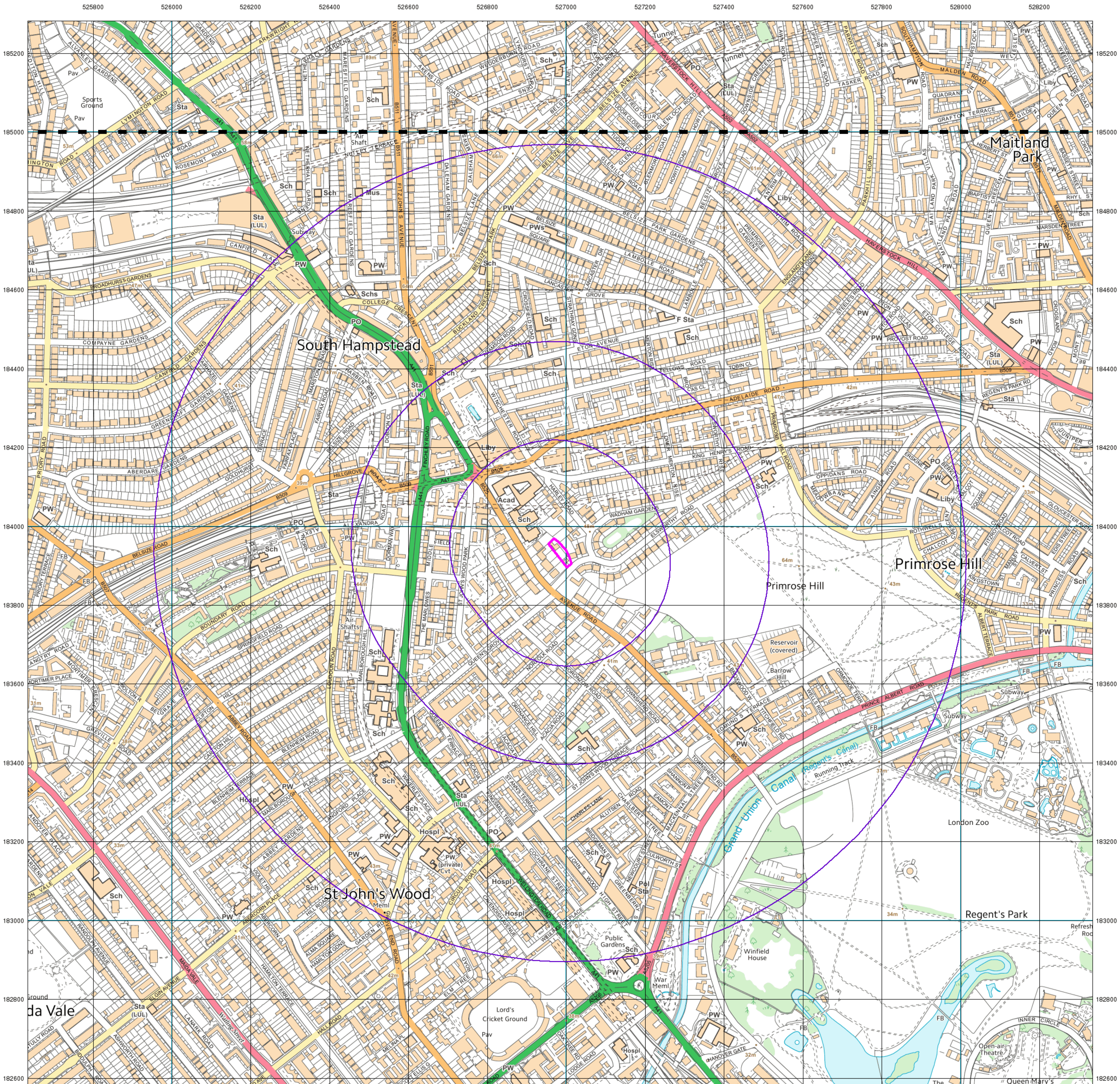

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0 400 m

VectorMap Local

Published 2015

Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities),1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

Map Name(s) and Date(s)

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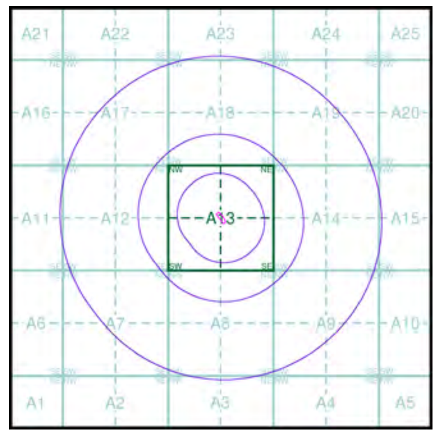
2015
Variable

TQ28SE
2015
Variable

Historical Map - Slice A



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Order Details

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Customer Ref: j15143
National Grid Reference: 526990, 183930
Slice: A
Site Area (Ha): 0.18
Search Buffer (m): 1000

Site Details

70 Elsworthy Road, LONDON, NW3 3BP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

PROPOSED BASEMENT AT 70 ELSWORTHY ROAD, LONDON, NW3 3BP

FLOOD RISK ASSESSMENT

NOVEMBER 2015

REPORT REF: 1523/RE/11-15/01

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CONTRACT

Evans Rivers and Coastal Ltd has been commissioned by Geotechnical and Environmental Associates to carry out a Flood Risk Assessment for a proposed basement at number 70 Elsworthy Road, London, NW3 3BP.

QUALITY ASSURANCE, ENVIRONMENT AND HEALTH AND SAFETY

Evans Rivers and Coastal Ltd operates a Quality Assurance, Environmental, and Health and Safety Policy.

This project comprises various stages including data collection; hydrological and hydrogeological assessments; surface water drainage designs; and reporting. Quality will be maintained throughout the project by producing specific methodologies for each work stage. Quality will also be maintained by initiating internal quality procedures including the validation of third party deliverables; creation of an audit trail to record any changes made; and document control using a database and correspondence log file system.

To adhere to the Environmental Policy, data will be obtained and issued in electronic format and alternatively by post. Paper use will also be minimised by communicating via email or telephone where possible. Documents and drawings will be transferred in electronic format where possible and all waste paper will be recycled. Meetings away from the office of Evans Rivers and Coastal Ltd will be minimised to prevent unnecessary travel, however for those meetings deemed essential, public transport will be used in preference to car journeys.

The project will follow the commitment and objectives outlined in the Health and Safety Policy operated by Evans Rivers and Coastal Ltd. All employees will be equipped with suitable personal protective equipment prior to any site visits and a risk assessment will be completed and checked before any site visit. Other factors which have been taken into consideration are the wider safety of the public whilst operating on site, and the importance of safety when working close to a water source and highway. Any designs resulting from this project and directly created by Evans Rivers and Coastal Ltd will also take into account safety measures within a “designers risk assessment”.

Report carried out by:

…….
Rupert Evans, BSc (Hons), MSc, CEnv, C.WEM, MCIWEM, AIEMA

DISCLAIMER

This report has been written and produced for Geotechnical and Environmental Associates. No responsibility is accepted to other parties for all or any part of this report. Any other parties relying upon this report without the written authorisation of Evans Rivers and Coastal Ltd do so at their own risk.

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CONTENTS

1. INTRODUCTION

1.1 Project Scope

1.1.1 Evans Rivers and Coastal Ltd has been commissioned by Geotechnical and Environmental Associates to carry out a Flood Risk Assessment for a proposed basement at number 70 Elsworthy Road, London, NW3 3BP.

1.1.2 Specifically, this assessment intends to:

1) Carry out an appraisal of flood risk from all sources such as fluvial/tidal, groundwater, surface water/sewers, artificial sources in accordance with NPPF and other documents such as the SFRA and SWMP;

2) Recommend mitigation measures where appropriate;

3) Report findings and recommendations.

1.1.3 This assessment is carried out in accordance with the requirements of the National Planning Policy Framework (NPPF) dated March 2012. Other documents which have been consulted include:

- DEFRA/EA document entitled *Framework and guidance for assessing and managing flood risk for new development Phase 2 (FD2320/TR2)*, 2005;
- DEFRA/Jacobs 2006. *Groundwater flooding records collation, monitoring and risk assessment (ref HA5)*.
- National Planning Practice Guidance – Flood Risk and Coastal Change.
- London Borough of Camden Preliminary Flood Risk Assessment (PFRA) Version 0.2 dated 2011.
- London Borough of Camden Strategic Flood Risk Assessment (SFRA) dated 2014.
- London Borough of Camden Surface Water Management Plan (SWMP) Version 1 dated 2011.
- London Borough of Camden flood risk management strategy (FRMS) dated 2013.
- London Borough of Camden, Camden geological, hydrogeological and hydrological study – Guidance for subterranean development dated 2010.
- London Borough of Camden, Camden Planning Guidance – Basements and Lightwells (CPG 4) dated July 2015.
- Woods-Ballard., et al. 2015. *The SUDS Manual, Report C753*. London: CIRIA.
- National SUDS Working Group. 2004. *Interim Code of Practice for Sustainable Drainage Systems*.

2. DATA COLLECTION

2.1 To assist with this report, the data collected included:

- Geotechnical and Environmental Associates desk study, ground investigation and Basement Impact Assessment (BIA) dated July 2015.
- 1:250,000 *Soil Map of South East England* (Sheet 6) published by Cranfield University and Soil Survey of England and Wales 1983.
- 1:625,000 *Hydrogeological Map of England and Wales*, published in 1977 by the Institute of Geological Sciences (now the British Geological Survey).
- Structural Engineering Report and Subterranean Construction Method Statement carried out by Elliot Wood Partnership LLP in August 2015.
- Below Ground Drainage/SUDS Assessment carried out by Elliot Wood Partnership LLP in August 2015.
- Information and data from:
    - London Borough of Camden Preliminary Flood Risk Assessment (PFRA) Version 0.2 dated 2011.
    - London Borough of Camden Strategic Flood Risk Assessment (SFRA) dated 2014.
    - London Borough of Camden Surface Water Management Plan (SWMP) Version 1 dated 2011.
    - London Borough of Camden Flood Risk Management Strategy (FRMS) dated 2013.
    - London Borough of Camden, Camden geological, hydrogeological and hydrological study – Guidance for subterranean development dated 2010.

2.2 All third party data used in this study has been checked and verified prior to use in accordance with Evans Rivers and Coastal Ltd Quality Assurance procedures.

3. SITE CHARACTERISTICS

3.1 Existing Site Characteristics and Location

3.1.1 The site is located at number 70 Elsworthy Road, London, NW3 3BP. The approximate Ordnance Survey (OS) grid reference for the site is 526980 183937 and the location of the site is shown on Figure 1.

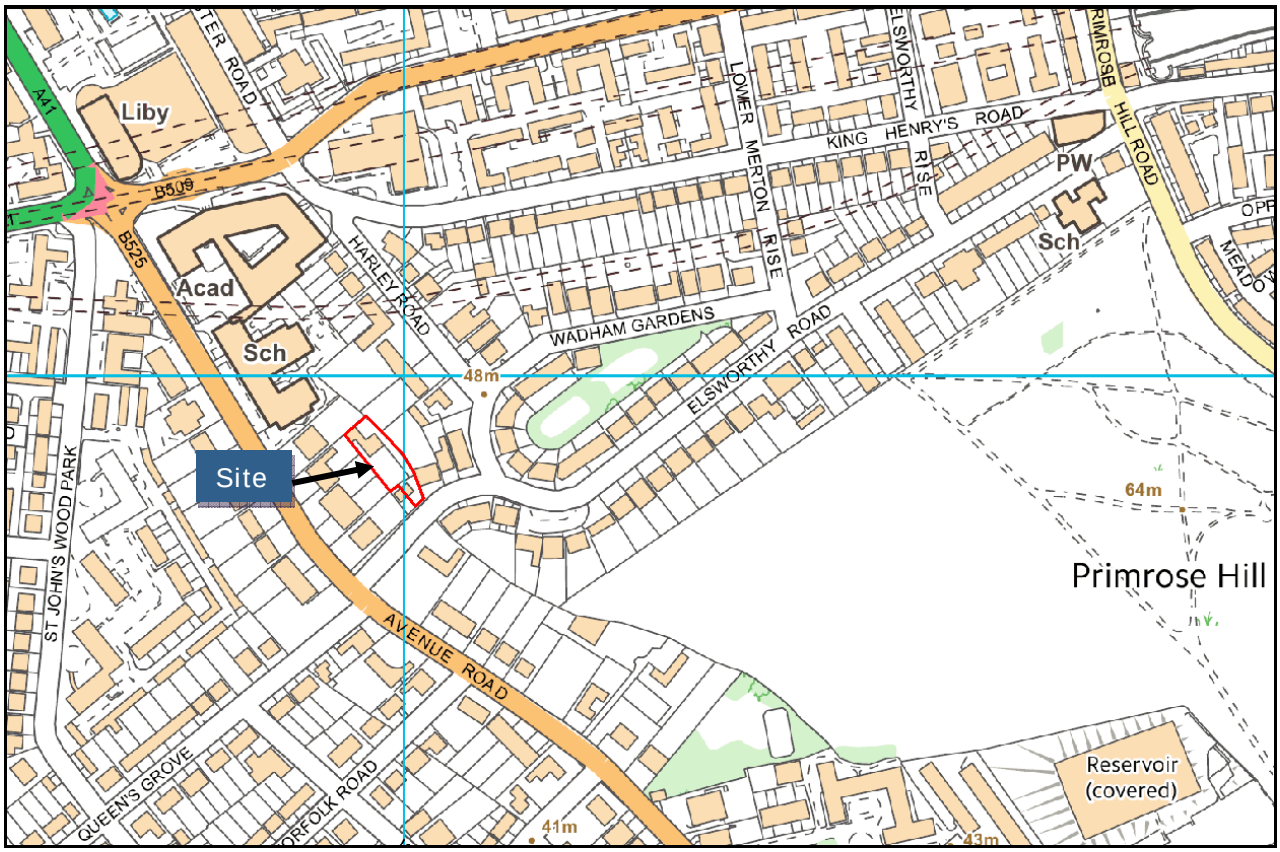

Figure 1: Site location plan (Source: Ordnance Survey, 2015)

3.1.2 The site is located within a residential area and comprises a large detached two-storey house which occupies the north of the site. A driveway along the length of the western boundary provides access to a semi-detached mews building in the south of the site which is accessed directly from Elsworthy Road. The mews house is a two-storey structure that is used for residential purposes.

3.1.3 A large garden/landscaped area is located between the main building and the mews building and consists of a large lawn area with perimeter flower beds.

3.1.4 The site and immediate surrounding area are essentially level at an Ordnance Datum (OD) level of approximately 49.1 m OD with a slight gradient from north to south to 47.3 m OD.

3.2 Site Proposals

3.2.1 The proposals include the demolition of the existing detached dwelling and construction of a new three-storey building in its place. The mews dwelling will be retained. A new single-storey basement will be constructed below the footprint of the new detached

dwelling and will extend below the garden/landscaped area to the retained mews building.

3.2.2 The majority of the basement will extend approximately 6m below ground level with a portion extending 7.5m below the ground level to form a pool area.

3.2.3 In addition to the swimming pool, the basement will be used for recreational purposes and will not have any bedrooms. The basement will be accessed via internal staircases which lead up to the ground floor level of the main detached dwelling.

3.2.4 It is understood that this Flood Risk Assessment needs to assess the flood risk to the basement level only. The site proposals can be seen on Drawing Numbers 1422-PL-301, 1422-PL-303 and 1422-PL-321.

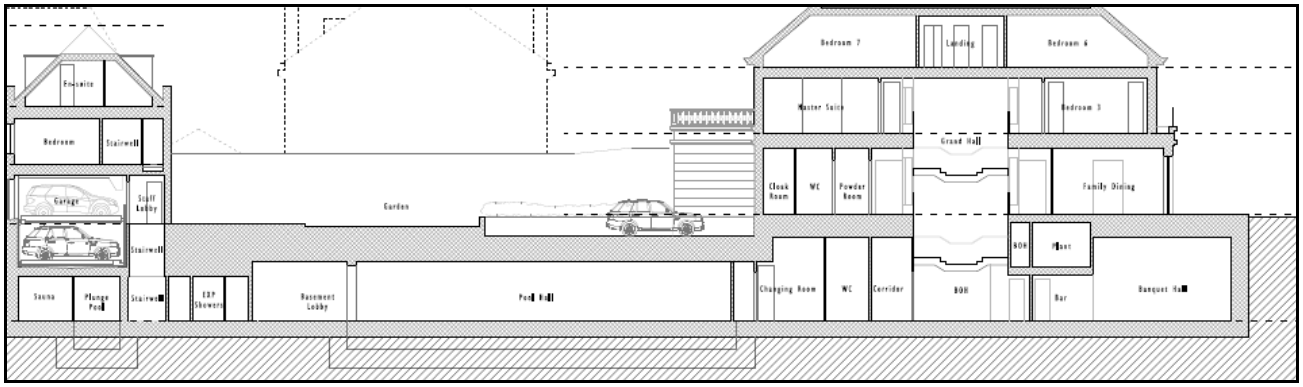

Figure 2: Section through proposed site (Source: taken from Drawing Number 1422-PL-321)

4. SOURCES OF FLOODING

4.1 Fluvial/Tidal

4.1.1 The Environment Agency Flood Map shows that the site is located within the NPPF Flood Zone 1, 'Low Probability' which comprises land as having less than a 1 in 1000 year annual probability of fluvial or tidal flooding (i.e. an event more severe than the extreme 1 in 1000 year event). NPPF states that all uses of land, including basements, are appropriate in this zone.

4.1.2 The SFRA also states that there has been no historical flooding within the Borough from fluvial or tidal sources. Furthermore, the SWMP confirms that the Borough does not fall within the Environment Agency's flood zones and therefore is not at significant risk from fluvial or tidal flooding.

4.1.3 The SFRA and SWMP states that all main rivers historically located within the Borough are now culverted and incorporated into the sewer network. The SWMP discusses the River Fleet which is one of London's "lost rivers" and which historically originates from springs on Hampstead Heath and drains to the Thames through the Borough. The Fleet is entirely incorporated within the sewer network.

4.1.4 The SFRA continues to discuss the Borough's historic rivers and in addition to the Fleet, the Tyburn, Kilburn and Brent were also located in the area of Hampstead Heath. All of these "lost rivers" are also now incorporated into the local sewer system maintained by Thames Water. It is for these reasons that the Borough is located entirely within Flood Zone 1.

4.2 Critical Drainage Areas (CDA)

4.2.1 Despite the site being located within Flood Zone 1, it is understood from Figure 6/Rev 2 of the SFRA and Figure 3.1 of the SWMP, that the site is located within the Group3-005 Critical Drainage Area (CDA).

4.2.2 The SWMP defines the CDA as:

"A discrete geographic area (usually a hydrological catchment) where multiple and interlinked sources of flood risk (surface water, groundwater, sewer, main river and/or tidal) cause flooding in one or more Local Flood Risk Zones during severe weather thereby affecting people, property or local infrastructure."

4.3 Groundwater Flooding

4.3.1 In addition to the information provided in the SFRA and SWMP, in order to assess the potential for groundwater flooding, the Jacobs/DEFRA report entitled *Strategy for Flood and Coastal Erosion Risk Management: Groundwater Flooding Scoping Study*, published in May 2004, was consulted, together with the guidance offered within the document entitled *Groundwater flooding records collation, monitoring and risk assessment (ref HA5)*, commissioned by DEFRA and carried out by Jacobs in 2006.

4.3.2 The BIA report carried out by Geotechnical and Environmental Associates (GEA) indicates that the soils beneath the site comprise Made Ground (clay) overlying London Clay. Groundwater seepages were encountered during the GEA investigation and within the London Clay at 3.7m. Seepages were also encountered within the Made Ground at 0.3m depth which is suspected to be a perched water table as concluded by the BIA report.

4.3.3 Subsequent monitoring has confirmed seepage depths of between 1.7m and 4.1m and as the underlying soils have a low permeability, it is considered that the seepages are likely to be due to a localised permeable soil layer rather than actual groundwater. Paragraphs 2.10.4 and 2.10.6 of the SFRA states that the London Clay has a low permeability but is likely to permit moderate infiltration. Paragraph 6.4.8 of the SFRA suggests that there could be perched water within sand pockets of the London Clay.

4.3.4 Figure 4e/Rev 1 of the SFRA shows that the site has not been affected in the past from groundwater flooding incidents and that the site is not located within an area of increased susceptibility to elevated groundwater and is therefore expected to remain at depth. Figure 4a/Rev 1 of the SFRA also shows that the site is not located across an area with superficial (and more permeable) deposits beneath the surface.

4.3.5 The results from the groundwater monitoring exercise suggest that groundwater is likely to be encountered within the basement excavation and at variable depths (but as pockets of water not continuous layers). The evidence suggests that it is unlikely that the water table has the potential to breach the ground surface and flow into the building and basement via the ground floor.

4.3.6 It is understood that the basement will be designed to achieve a Grade 3 level of waterproofing protection as outlined in BS8102:2009. A new reinforced concrete lining wall and ground-bearing concrete slab will be constructed using water resistant concrete to form the primary barrier. An internal drained cavity system will act as a secondary barrier against water ingress.

4.3.7 The groundwater flooding risk to the property and basement is considered to be overall low and the risk reduced further by the appropriate mitigation measures stated within this section.

4.4 Surface Water Flooding and Sewer Flooding

4.4.1 Surface water and sewer flooding across urban areas is often a result of high intensity storm events which exceed the capacity of the sewer thus causing it to surcharge and flood. Poorly maintained sewer networks and blockages can also exacerbate the potential for sewer flooding.

Surface Water Flooding

4.4.2 It has been established that the site lies within the Group3-005 Critical Drainage Area. The SFRA notes that the surface water mapping indicates that the surface water flood extent broadly follows the natural topography of the borough and man-made features such as roads and rail lines. During extreme modelling scenarios, the SFRA states that there is increased ponding in areas of properties. For example, the SWMP indicates that the modelling shows deep flooding at Gospel Park, affecting Oak Village, Lamble St, Grafton Road and Kiln Place, caused by railway embankments creating a “basin” into which surface water collects.

4.4.3 The SFRA discusses the two large surface water flooding events in the Borough, which occurred in 1975 and 2002 and caused widespread damage. It is understood that during these events the sewers reached maximum capacity, however, Figure 3ii/Rev 1 of the SFRA shows that the site, adjacent properties and the adjacent highway of Elsworthy Road were not affected during these events.

4.4.4 Figure 3ii/Rev 1 of the SFRA also shows that the site and the adjacent highway of Elsworthy Road are not at risk from surface water flooding during events up to and

including the 1 in 1000 year event. In fact, the site is located across an area with a less than 1 in 1000 year return period of surface water flooding.

4.4.5 It is considered that the site is not at risk of surface water flooding as indicated by the maps.

Sewer Flooding

4.4.6 The SFRA states that the majority of the Borough is served by a combined surface and foul water system which is designed to accommodate rainfall events of up to 1 in 30 years return period.

4.4.7 The combined sewer network outfalls into the River Thames during intense rainfall events when the sewer network reaches capacity. The evidence suggests that as the sewer capacity becomes exceeded this results in surcharging of the network prior to sufficient discharge into the Thames.

4.4.8 Figure 5a/Rev 1 of the SFRA indicates that the site is located across an area which has had between 1 and 6 recorded internal sewer flooding incidents. Figure 5b/Rev 1 of the SFRA that the site is located across an area which has had no external sewer flooding incidents.

4.4.9 It is understood that foul water from the basement level will be drained to a submersible packaged pumping station and pumped to ground level where it will flow into the surrounding sewer system via gravity. It is understood that a non-return valve (e.g. http://www.forgevalves.co.uk/) will be installed so that the basement (and upper floors) will be protected further from sewer flooding.

4.4.10 This approach also complies with paragraph 5.11 of the Camden Planning Guidance CPG4 dated 2015. Therefore, if the sewer in the road becomes completely full during a heavy storm, foul water does not backflow into the property.

4.5 Reservoirs, Canals And Other Artificial Sources

4.5.1 The failure of man-made infrastructure such as flood defences and other structures can result in unexpected flooding. Flooding from artificial sources such as reservoirs, canals and lakes can also occur suddenly and without warning, leading to high depths and velocities of flood water which pose a safety risk to people and property.

4.5.2 The Environment Agency's "Risk of flooding from reservoirs" map suggests that the site is not at risk from reservoir flooding. This supported by the SFRA which also states that the risk of flooding from the Regent's Canal is low.

5. SURFACE WATER DRAINAGE

5.1 The Below Ground Drainage/SUDS Assessment carried out by Elliot Wood Partnership LLP in August 2015, states that the existing runoff rate into the existing public sewers is approximately 13.4 l/s and that there will be a net reduction in impermeable area across the site by 15 sq m which will have a positive impact on surface water runoff rates.

5.2 Furthermore, as infiltration SUDS are not viable at the site due to the poorly draining soils, the SUDS assessment report proposes that surface water from the site is attenuated using geocellular systems or similar, and discharged into the local public sewer system at a reduced rate of 5 l/s (in order to reduce blockage). This is lower than the existing runoff rate from the site and therefore runoff from the post-development site will be reduced sufficiently.

6. CONCLUSIONS

- A review of the relevant guidance documents and various types of data collected at the site has enabled a full assessment of the flood risks to be quantified.
- The site is located within the Flood Zone 1 therefore all uses of land are appropriate in this zone.
- This assessment has investigated the possibility of groundwater flooding and flooding from other sources at the site. It is considered that there will be low risk of groundwater flooding across the site providing the basement is tanked.
- There is a low risk of flooding from other sources such as surface water and sewers, however, as a precaution; the risk from sewer flooding should be mitigated further by introducing a non-return valve to the pumped system.
- Surface water will be attenuated using SUDS and drained into the existing public sewer system at a reduced runoff rate.

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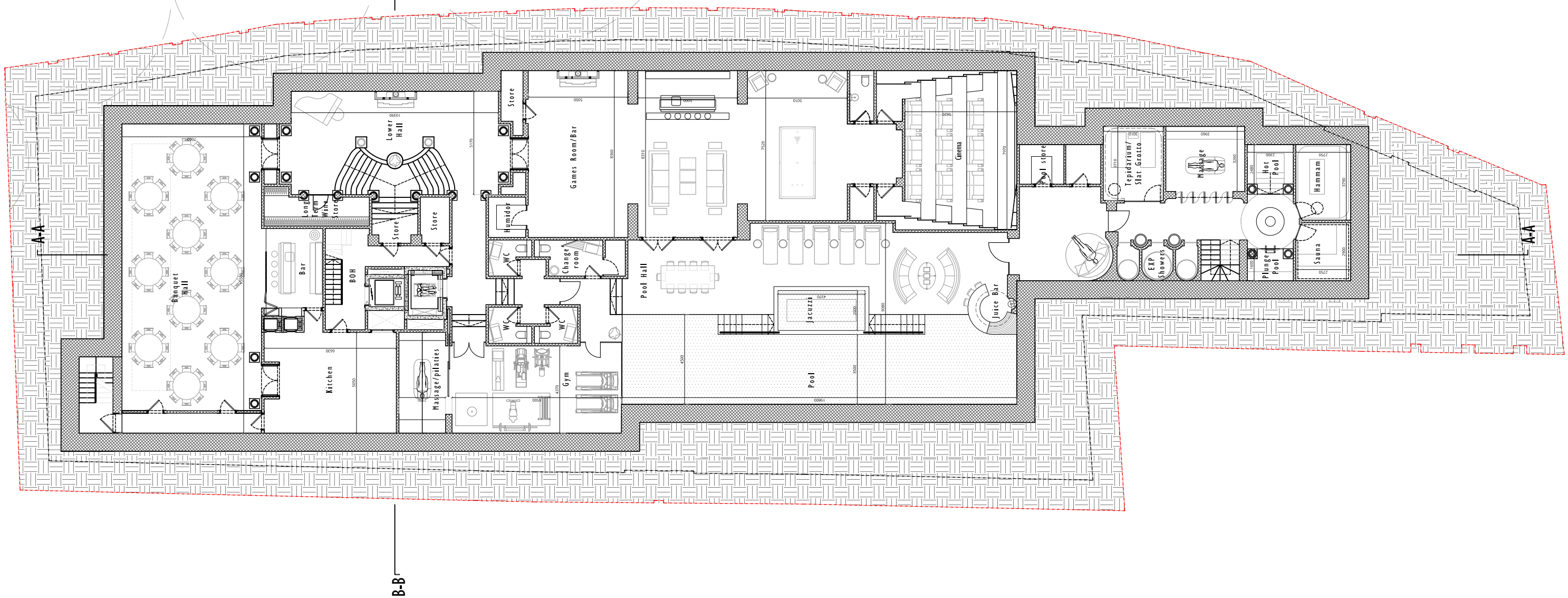
DRAWINGS



PROPOSED: Basement Plan

1:200 at A3
1:100 at A1

0m 10m 20m

wolff ARCHITECTS

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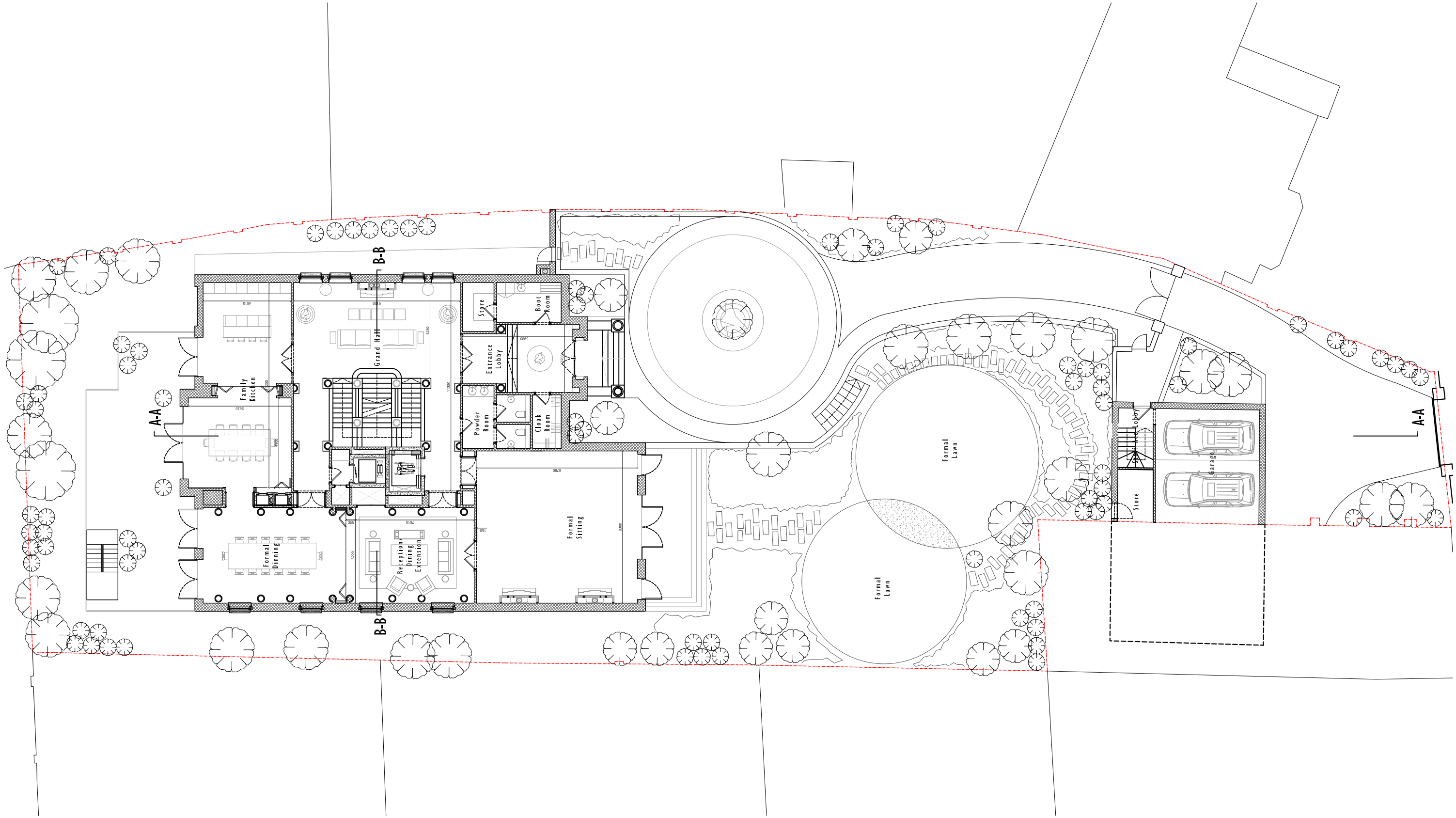
no:	rev:	date:
0	PLANNING SUBMISSION	04.08.15

status: PLANNING

project: 70 Elsworthy Road, London, NW3

drawing title: PROPOSED Basement Floor Plan

date: 19/02/15 | scale: 1:200 (A3) | dwg no: 1422-PL-301 | rev no: -



PROPOSED: Ground Floor Plan

1:200 at A3
1:100 at A1

0m 10m 20m

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no:	rev:		date:
0	PLANNING SUBMISSION		04.08.15

status: PLANNING

project:	70 Elsworthy Road London, NW3			drawing title:	PROPOSED Ground Floor Plan
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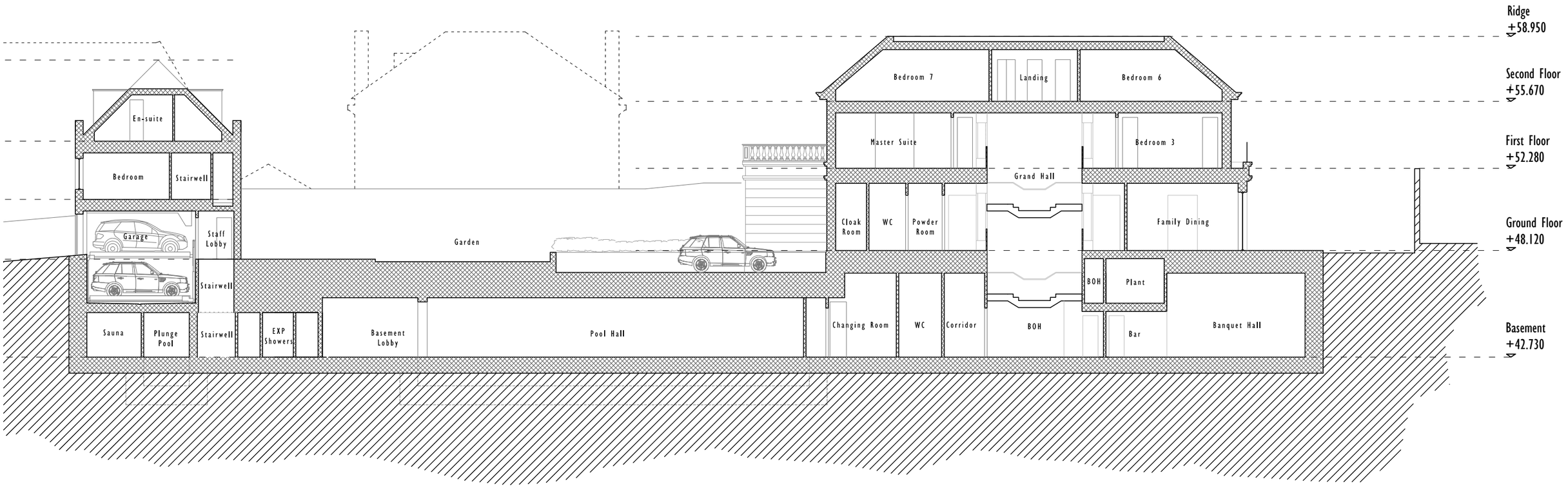

PROPOSED: Section AA

1:250 at A3

0m 10m 20m

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no:	rev:	date:
0	PLANNING SUBMISSION	04.08.15

status: PLANNING

project: 70 Elsworthy Road, London, NW3

drawing title: PROPOSED Section AA

date: 19/02/15 scale: 1:250 (A3) dwg no: 1422-PL-321 rev no: -


EVANS
Rivers and Coastal

GEA Geotechnical & Environmental Associates

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Site Plan

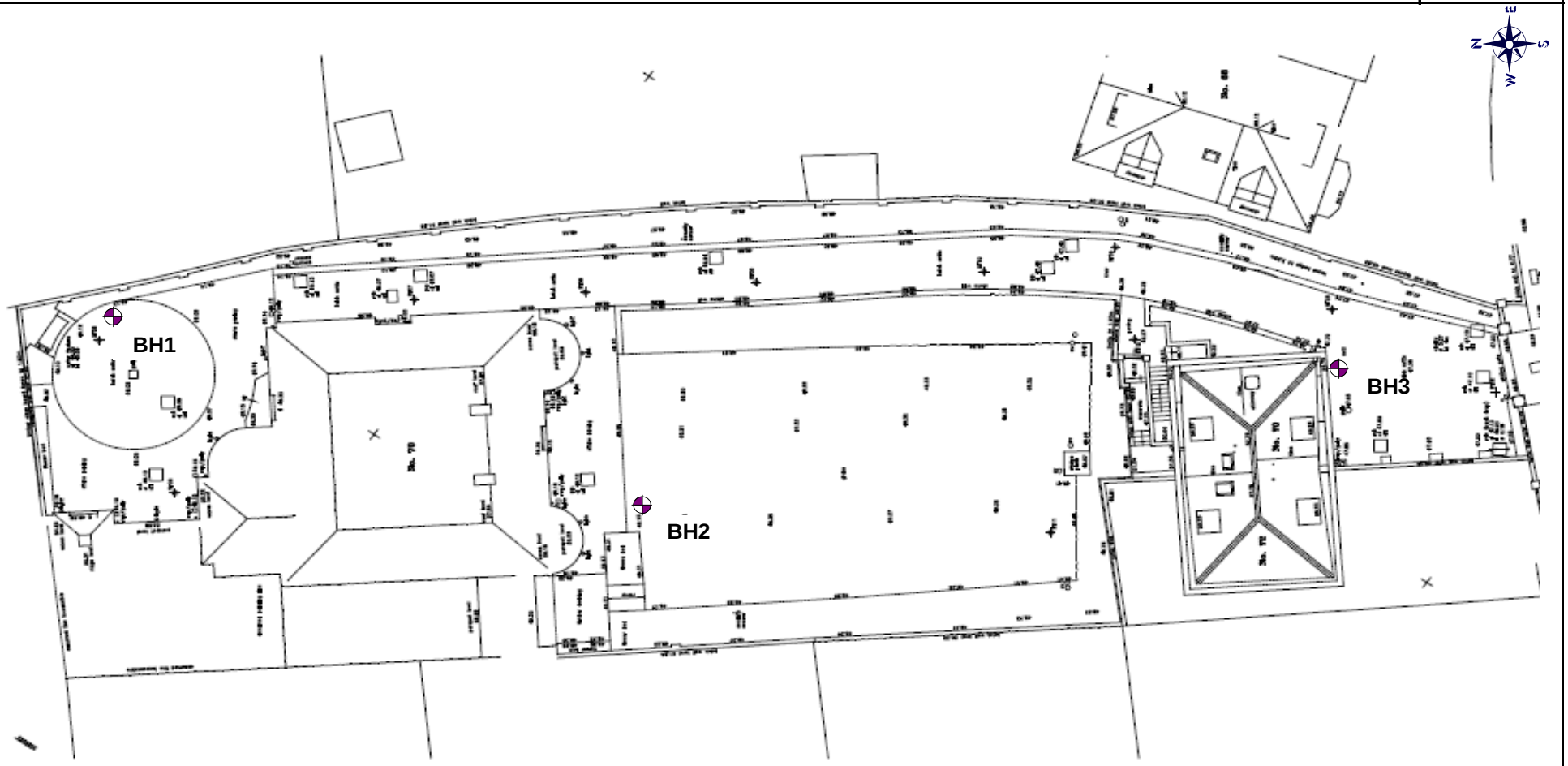
Site 70 Elsworthy Road, London, NW3 3BP

Client Elliott Wood

Engineer

Job Number J15143

Sheet 1 / 1



Geotechnical & Environmental Associates (GEA)
is an engineer-led and client-focused independent specialist providing a complete range of geotechnical and contaminated land investigation, analytical and consultancy services to the property and construction industries.

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