CampbellReith
consulting engineers

14D Avenue Road, NW8 6BP

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12466-84
Revision: D2

April 2018

Campbell Reith Hill LLP
Friars Bridge Court
41-45 Blackfriars Road
London
SE1 8NZ

T:+44 (0)20 7340 1700
E:london@campbellreith.com
W:www.campbellreith.com

Document History and Status

Revision	Date	Purpose/Status	File Ref	Author	Check	Review
D1	July 2017	Comment	AGrm12466-84-190717-14D Avenue Road-D1.doc	A Gleeson	R Morley	R Morley
D2	April 2018	Comment	AGrm12466-84-130418-14D Avenue Road-D2.doc	A Gleeson	R Morley	R Morley

Document Details

Last saved	12/04/2018 15:38
Path	AGrm12466-84-130418-14D Avenue Road-D2.doc
Author	A Gleeson
Project Partner	E M Brown, BSc MSc CGeol FGS
Project Number	12466-84
Project Name	14D Avenue Road
Planning Reference	2017/2347/P

Contents

Appendix

1.0 NON-TECHNICAL SUMMARY

1.1. CampbellReith was instructed by London Borough of Camden, (LBC) to carry out an audit on the Basement Impact Assessment submitted as part of the Planning Submission documentation for 14D Avenue Road (planning reference 2017/2347/P). The basement is considered to fall within Category B as defined by the Terms of Reference.

1.2. The Audit reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development in accordance with LBC's policies and technical procedures.

1.3. CampbellReith was able to access LBC's Planning Portal and gain access to the latest revision of submitted documentation and reviewed it against an agreed audit check list.

1.4. The BIA and FRA have been carried out by SC Structures Ltd consulting engineers, using individuals who either possess suitable qualifications in compliance with the requirements of CPG4, or have carried out the relevant assessments satisfactorily where not.

1.5. It is proposed to construct the new basement by forming reinforced concrete underpins in a hit and miss sequence, as noted on the Basement Construction Methodology drawings SQ001…009. There are discrepancies between the Architectural and Structural drawings which need to be rectified.

1.6. The BIA has confirmed that the proposed basement will be founded within the London Clay.

1.7. It is likely that the ground water table will not be encountered during basement foundation excavation.

1.8. Designs have been provided for the retaining walls however it is unclear which walls the designs relate to and the loading path. There are discrepancies between the calculations and the structural drawings. This should be clarified.

1.9. It is proposed to underpin the existing perimeter walls in a hit and miss sequence, extending the foundations into the clay to a depth of approximately 4m deep.

1.10. The BIA proposes to carry out foundation trial pits have been carried out to identify the existing footings.

1.11. The BIA has identified a shared basement carpark and garage to the front of the property and a shared public highway to the rear of the property.

1.12. The GMA indicates the potential damage to neighbouring properties and infrastructure as no higher than Category 2 on the Burland scale, 'Slight Damage'. The calculation provided to determine horizontal movement is considered conservative and can be accepted given these movements are unlikely to be realised.

1.13. A movement monitoring strategy has been provided

1.14. It is accepted that the proposed basement construction will not impact on the wider hydrogeology of the area.

1.15. Trial pits identified a number of drainage runs beneath the building, possibly indicating that a public sewer will pass through the basement. The applicant is consult with Thames Water in order to gain their approval for the proposal.

1.16. It is accepted that there are no slope stability concerns regarding the proposed development.

1.17. The FRA confirms that despite the high risk of surface water flooding in the area the risk of flooding of the proposed development is very low.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 19 June 2017 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 14D Avenue Road, NW8 6BP (2017/2347/P).

2.2. The Audit was carried out in accordance with the Terms of Reference set by LBC. It reviewed the Basement Impact Assessment for potential impact on land stability and local ground and surface water conditions arising from basement development.

2.3. A BIA is required for all planning applications with basements in Camden in general accordance with policies and technical procedures contained within

- Guidance for Subterranean Development (GSD). Issue 01. November 2010. Ove Arup & Partners.
- Camden Planning Guidance (CPG) 4: Basements and Lightwells.
- Camden Development Policy (DP) 27: Basements and Lightwells.
- Camden Development Policy (DP) 23: Water.

2.4. The BIA should demonstrate that schemes:

a) maintain the structural stability of the building and neighbouring properties;

b) avoid adversely affecting drainage and run off or causing other damage to the water environment;

c) avoid cumulative impacts upon structural stability or the water environment in the local area, and;

evaluate the impacts of the proposed basement considering the issues of hydrology, hydrogeology and land stability via the process described by the GSD and to make recommendations for the detailed design.

2.5. LBC's Audit Instruction described the planning proposal as *"Excavation of basement under footprint of existing house and part of rear garden."*

The Audit Instruction also confirmed 14D Avenue Road does not involved, or neighbour, a listed building.

2.6. CampbellReith accessed LBC's Planning Portal on 28 June 2017 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA) by SC Structures Ltd dated November 2016
- Basement Construction Methodology by SC Structures dated October 2016
- Design and Access Statement by Chelsea Consultants Rev A dated June 2017
- Construction Management Plan
- Flood Risk Assessment and Drainage Strategy by SC Structures dated October 2016
- Planning Application Drawings consisting of

  Land Registry Site Plan

  SK100A Existing Ground Floor – First Floor dated November 2016

  SK200A Existing Front Elevation dated November 2016

  SK201A Existing Rear Elevation dated November 2016

  SK202A Existing Side Elevation dated November 2016

  SK300A Existing Section AA dated November 2016

  SK301A Existing Section BB dated November 2016

  P100A Proposed Basement – Ground Floor dated November 2016

  P200A Proposed Front Elevation dated November 2016

  P202A Proposed Side Elevation dated November 2016

  P300B Proposed Section AA dated November 2016

  P301A Proposed Section BB dated November 2016

- Planning Comments and Response

2.7. CampbellReith received the following documents for audit purposes in September 2017:

- Outline Movement Monitoring Strategy by SC Structures dated August 2017
- Trial Pit Record and Visible Existing Services by Metbase dated September 2017

2.8. CampbellReith received the following documents for audit purposes in March 2018:

- Basement Impact Assessment Report (BIA) Rev. B by SC Structures Ltd dated February 2018
- Basement Construction Methodology Rev. B by SC Structures Ltd dated February 2018
- Outline Movement Monitoring Strategy Rev. A by SC Structures Ltd dated February 2018

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	
Is data required by Cl.233 of the GSD presented?	Yes	
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	
Are suitable plan/maps included?	Yes	
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	
Is a conceptual model presented?	Yes	
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	
Is factual ground investigation data provided?	Yes	
Is monitoring data presented?	No	
Is the ground investigation informed by a desk study?	Yes	
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	No	
Is a geotechnical interpretation presented?	Yes	
Does the geotechnical interpretation include information on retaining wall design?	Yes	However calculation require clarification.
Are reports on other investigations required by screening and scoping presented?	Yes	Flood Risk Assessment provided.
Are the baseline conditions described, based on the GSD?	Yes	However present of neighbouring basements unknown.
Do the base line conditions consider adjacent or nearby basements?	No	
Is an Impact Assessment provided?	Yes	

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	However calculation to be revised as per comments in Section 4.??
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	No	
Has the need for monitoring during construction been considered?	Yes	
Have the residual (after mitigation) impacts been clearly identified?	Yes	
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	N/A	Thames Water approval to be sought.
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	
Does report state that damage to surrounding buildings will be no worse than Burland Category 1?	No	The BIA calculates worst case damage of category 2 to the neighbouring properties.
Are non-technical summaries provided?	Yes	

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by SC Structures Ltd, consulting engineers. The BIA includes a Construction Method Statement (CMS), Ground Movement Assessment (GMA), a Ground Investigation Report (GI) by Fastrack and a Flood Risk Assessment. The qualifications of the author of the BIA and the associated reports are in compliance with the requirements of CPG4 for the surface water and land stability aspects of the assessment, however a Chartered Geologist has not been involved as required for the hydrogeological aspects of the report.

4.2. The BIA includes screening, scoping, site investigations and impact assessment stages as defined and required in the LBC Planning Guidance document 'Basements and Lightwells (CPG4)', dated July 2015.

4.3. 14D Avenue Road is a three storey end of terrace house with a rear garden. 14D Avenue Road is part of a small development of eight modern townhouses at the southern end of Avenue Road. The eight terrace houses are arranged in two rows of fours and share an area of underground parking with garages.

4.4. The LBC Instruction to proceed with the audit identified that the basement proposal did not involve or neighbour a listed building. The Design and Access Statement identified that 14D Avenue Road is not located in a Conservation Area.

4.5. The proposed works include the excavation of a new single storey basement beneath the footprint of the rear of the existing building and part of the rear garden to a depth of approximately 4m below ground level. The depth of the proposed basement is to match the depth of the existing basement carpark to the front of the property. It is proposed to construct the new basement by forming reinforced concrete underpins in a hit and miss sequence, as noted on the Basement Construction Methodology drawings SQ001…009. There are discrepancies between the Architectural and Structural drawing. Previously the Architectural drawings showed the basement beneath the footprint of the house however the Structural drawings show the basement extending into the rear garden of the property. The Structural drawings have been revised to show the basement beneath the footprint of the house, however the profile of the basement varies from the Architectural drawings. Revised Architectural drawings have not been provided. The Structural drawings are more recent, and Revision B of the BIA notes 'updated to revised architectural drawings', therefore we have assumed them to be current for the purpose of this audit. This should be clarified and revised Architectural drawings provided.

4.6. A GI has been undertaken at the site by Fastrack, August 2016. 1No. borehole to a depth of 5m and insitu strength tests in the form of hand held shear vane and mackintosh probe tests were

carried out. No trial pit investigations were undertaken. The borehole identified made ground to a depth of 450mm bgl, underlain by gravel to 800mm bgl, underlain by London Clay. Gravel layers and sand pockets were noted in the LC to a depth of 2.5m. Roots were noted form 2.8mbgl. Five number foundation trial pits were carried out in September 2017, two to the front of the property and three to the rear of the property. These trial pits identified the existing footing to 14D Avenue Road and the boundary wall as shallow concrete strip footings. The trial pits identified an existing cast iron duct and drainage which runs beneath the property.

4.7. It has possibly been identified that a public sewer runs beneath the rear extension, as has also been raised as a concern by a neighbouring resident. This requires further investigation with Thames Water building over approval to be obtained should this be necessary.

4.8. The basement will be founded in London Clay which has a high shrink/swell potential. The GI notes that testing has confirmed the soil sample to very high plasticity and therefore has high susceptibility to shrinkage and swelling. The depth of the desiccated soil should be determined and the foundation depth should be taken below the zone of influence.

4.9. The BIA notes that the basement slab will be designed to resist the effects of Long – term heave in the London Clay and water uplift pressures.

4.10. The BIA confirms that no groundwater strikes were recorded during the ground investigations. Groundwater monitoring has not been carried out. The basement retaining wall designs should assume the ground water level at 1.0m bgl, in line with good practice procedures. Designs have been provided for the retaining walls however it is unclear which walls the designs relate to and the loading path. The design allows for a large heel, which due to the neighing properties, will not be possible to construct. This does not match the Structural drawings. This should be clarified.

4.11. While a Chartered Geologist has not been involved with the production of the report, it is felt that the hydrogeological assessment has been carried out satisfactorily and that reasonable evidence has been provided to indicate that ground water will not be affected by the proposal.

4.12. The proposed construction sequence is to remove the existing ground floor and underpin the existing walls in a hit and miss sequence, extending the foundations into the clay to a depth of approximately 4m deep. The perimeterunderpin wall is to be laterally propped in the temporary condition, allowing the reinforced concrete basement slabs and walls to be constructed. It is assumed that the face of any brick or concrete corbel foundations will need to be broken back flush with the face of the underpin wall. Care is to be taken when breaking back corbel to minimise damage to adjacent properties. Proposed construction techniques should be agreed as part of the Party Wall agreement.

4.13. The BIA does not confirm the neighbouring foundation depths, however it has assumed fairly that there is no existing basement to the adjoining property 14C Avenue Road. The foundations to 16 Avenue Road should be confirmed prior to construction and the GMA updated accordingly if required.

4.14. The BIA has identified a shared basement carpark and garage to the front of the property and a shared public highway to the rear of the property.

4.15. Temporary works propping and sequencing proposals are provided. Assuming that the works are carefully controlled and monitored, the detail of temporary works and construction method can be considered in accordance with CPG4.

4.16. A Movement Monitoring Strategy has been provided which details monitoring proposals for the neighbouring property 16C Avenue Road. These monitoring proposal are to be agreed as part of the party wall award.The GMA indicates the potential damage to neighbouring properties and infrastructure as no higher than Category 2 on the Burland scale, 'Slight Damage'. The calculation provided to determine horizontal movement has been carried out in affordance with CIRIA 580 which provides a method for calculating movements in embedded retaining walls, for which the applicant has used values that represent high wall stiffness indicating a high level permanent prop. In reality when a basement is constructed beneath the footprint of an existing building the selfweight of the existing structure limits the horizontal movement and based on experience, generally a total horizontal movement from both installation and excavation of 0.2% can be accepted in this instance which is broadly in accordance with the values taken by the applicant.

4.17. While damage category 2 is higher than the typically accepted damage category 1 by LBC, it is accepted that given the calculated method utilised is likely to be conservative and the realistic ground movements are likely to be less than this assuming good workmanship, and the basement is proposed to be of typical depth as basements which are commonly constructed without generating excessive ground movements.

4.18. It is accepted that there is no increase in the hardstanding area and therefore no increased surface water runoff. It is accepted that the proposed basement construction will not impact on the wider hydrogeology of the area.

4.19. It is accepted that there are no slope stability concerns regarding the proposed development.

4.20. The FRA confirms that despite the high risk of surface water flooding in the area the risk of flooding of the proposed development is very low. The proposal does not included habitable rooms in the proposed basement.

4.21. Given a number of queries raised about it is recommended that the BIA or supporting documents be revised and resubmitted. A summary of open queries can be found in appendix 2.

5.0 CONCLUSIONS

5.1. The Basement Impact Assessment (BIA) has been carried out by SC Structures Ltd consulting engineers, using individuals who possess suitable qualifications in compliance with the requirements of CPG4 accept for hydrogeology, however the hydrogeological aspects of the assessment have been carried out satisfactorily.

5.2. It is proposed to construct the new basement by forming reinforced concrete underpins in a hit and miss sequence, as noted on the Basement Construction Methodology drawings SQ001…009. There are discrepancies between the Architectural and Structural drawings. This should be clarified and the BIA updated accordingly.

5.3. The BIA has confirmed that the proposed basement will be founded within the London Clay and water uplift and heave forces are to be taken into consideration when designing the slab.

5.4. It is likely that the ground water table will not be encountered during basement foundation excavation.

5.5. The basement will be founded in London Clay which has a high shrink/swell potential. However the BIA notes that there are no significant trees in the locality. The depth of the basement should be below the zone of influence of any roots.

5.6. Designs have been provided for the retaining walls however it is unclear which walls the designs relate to and the loading path. There are discrepancies between the design calculations and the structural drawings. This should be clarified.

5.7. It is proposed to underpin the existing perimeter walls in a hit and miss sequence, extending the foundations into the clay to a depth of approximately 4m deep. The walls are to be laterally propped in the temporary condition, allowing the reinforced concrete basement slabs and walls to be constructed.

5.8. Trial pits to identify existing foundations have been carried out which identified the existing foundations as concrete shallow strip footings.

5.9. The BIA has identified a shared basement carpark and garage to the front of the property and a shared public highway to the rear of the property.

5.10. The GMA indicates the potential damage to neighbouring properties and infrastructure as no higher than Category 2 on the Burland scale, 'Slight Damage'. While category 2 is higher than typically accepted by Camden, ground movements are to be controlled with good workmanship.

5.11. An outline movement monitoring strategy has been provided and is to be agreed as part of the party wall award.

5.12. It is accepted that there is no increase in the hardstanding area and therefore no increased surface water runoff. It is accepted that the proposed basement construction will not impact on the wider hydrogeology of the area.

5.13. The presence of any public drainage through or within the vicinity of the proposed basement should be confirmed. With Thames Water building over approval obtained where necessary.

5.14. It is accepted that there are no slope stability concerns regarding the proposed development.

5.15. The FRA confirms that despite the high risk of surface water flooding in the area the risk of flooding of the proposed development is very low.

Appendix 1: Residents' Consultation Comments

Residents' Consultation Comments

Surname	Address	Date	Issue raised	Response
Ganenda	14B Avenue Road, NW8 6BP	11.06.17	Drainage	Refer to section 4.7
Khan	14E Avenue Road, NW8 6BP	10.06.17	Drainage	Refer to section 4.7
Ganendra Investments Limited	2nd Floor, St George's Court, Upper Street, Douglas, Isle of Man	13.06.17	Ground Movement	Refer to section 4.16
Lalvani	14H Avenue Road	11.06.17	Drainage	Refer to section 4.7
Parissis	14A Avenue Road	13.06.17	Drainage and Structural Damage	Refer to section 4.16 to 4.7
Watertrade Limited	14 Avenue Road	14.06.17	Drainage	Refer to section 4.7
Sobhkhiz	14C Avenue Road	14.06.17	Drainage and Structural Damage	Refer to section 4.7

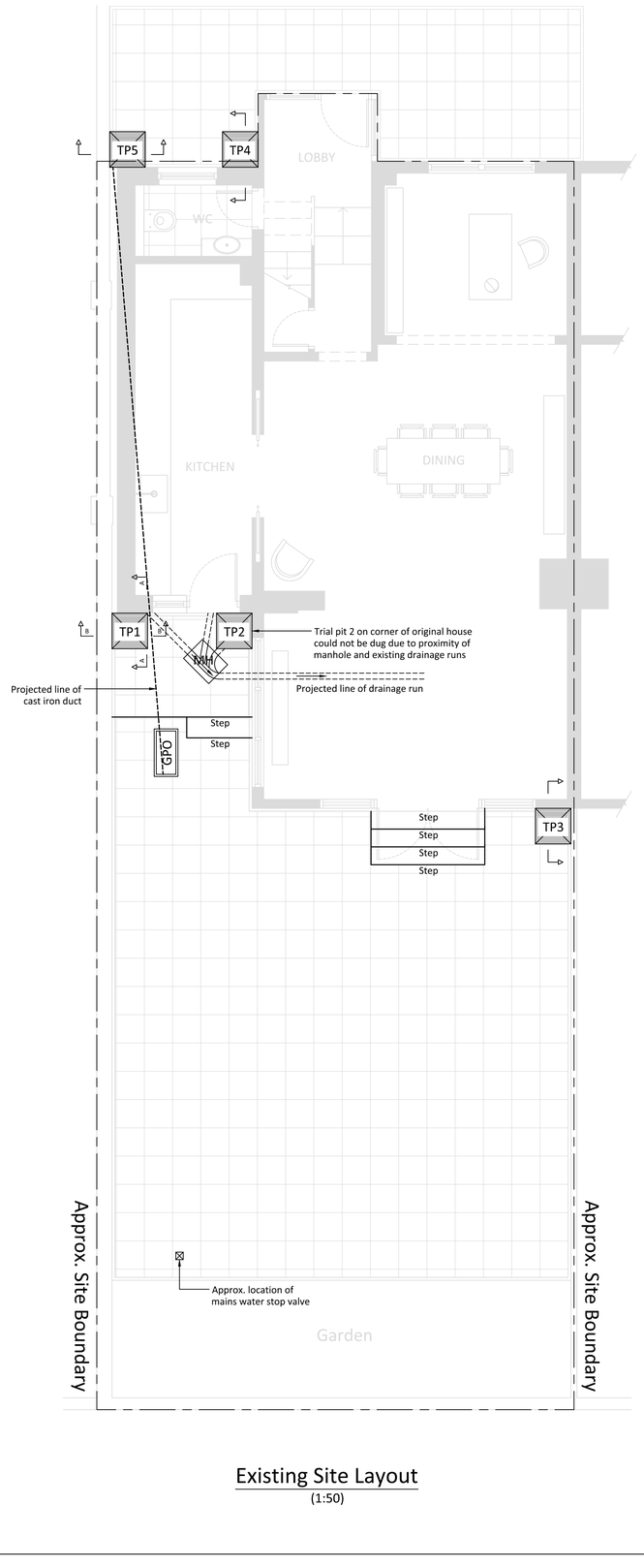
Appendix 2: Audit Query Tracker

Audit Query Tracker

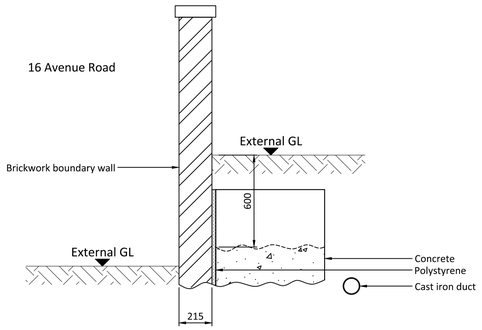
Query No	Subject	Query	Status	Date closed out
1	BIA General	Discrepancies between the Architectural and Structural proposals. This should be revised for consistency.	Open – Further information required	
2	Stability	Retaining wall calculations to be referenced to clarify load path and location of calculations provided.	Open – Further information required	
3	Stability	GMA horizontal and vertical movements to be reviewed in line with comments on Section 4.	Closed	April 2018
4	Hydrogeology	Details of existing below ground drainage in relation to proposed basement	Closed	April 2018
5	Stability	Trial pits are required to identify the existing foundations.	Closed	September 2018
6	Stability	An outline movement monitoring strategy is required.	Closed	September 2018

Appendix 3: Supplementary Supporting Documents

Trial Pit Record and Visible Existing Services Plan

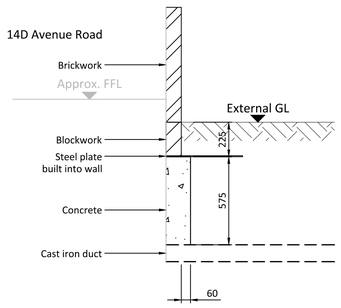


Existing Site Layout
(1:50)



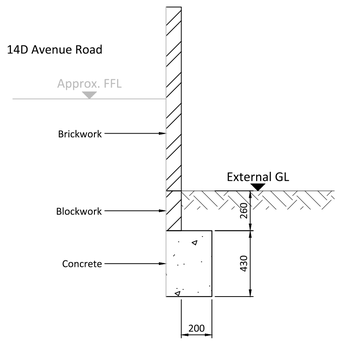
TP1A
(1:20)

Trial Pit could not be safely progressed further due to restrictive working space around fragile cast iron duct

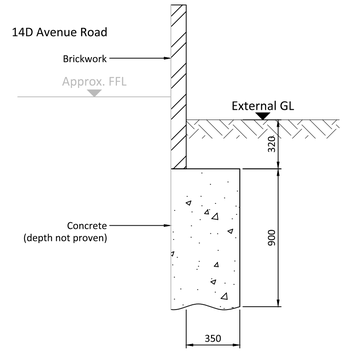


TP1B
(1:20)

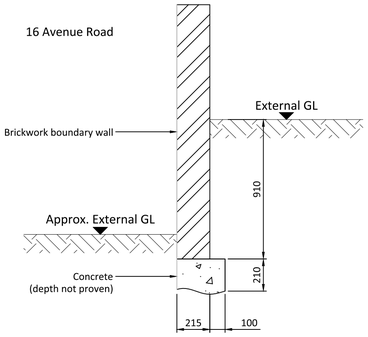
Trial Pit could not be safely progressed further due to restrictive working space around fragile cast iron duct



TP3
(1:20)



TP4
(1:20)



TP5
(1:20)

SCALE 1 : 20 0m 0.5 1 1.5 2

SCALE 1 : 50 0m 1 2 3 4 5

HEALTH, SAFETY & ENVIRONMENT

It is the responsibility of the client to ensure that those undertaking the works are competent and experienced in the type of work to be undertaken.

In addition to the hazards usually associated with the types of work detailed on this drawing, the following specific hazards have been identified through design risk assessment. The planning and execution of the works should take into account all usual and specific hazards.

Hazards should also be taken into account in the maintenance, operation, decommissioning and demolition of the works.

NOTES

1. All dimensions are in millimetres (mm) and levels in metres Above Ordnance Datum (mAOD) unless noted otherwise.
2. Do not scale from this drawing.
3. The copyright in this drawing belongs to SC Structures Ltd; the designs and details may not be used on any project other than that indicated in the titleblock.
4. Where CAD or BIM files of the drawing are issued, they are provided for the convenience of others, and shall not be used for construction purposes or relied upon for accuracy or completeness.
5. This drawing is based on A J Browne R.I.B.A. Architects drawing number 5011 SK100 Revision A entitled Existing Ground Floor - First Floor dated November 2016.

Rev.	Date	Description	Drawn	Checked
P2	08.09.17	UPDATED WITH A J BROWNE COMMENTS	AP	SC
P1	01.09.17	FIRST ISSUE	AP	SC

PRELIMINARY

14D Avenue Road

Trial Pit Record and Visible Existing Services

MET BASE

Drawing No: 0018-TP001

Revision: P2

A1

London

Friars Bridge Court
41- 45 Blackfriars Road
London, SE1 8NZ

T: +44 (0)20 7340 1700
E: london@campbellreith.com

Birmingham

Chantry House
High Street, Coleshill
Birmingham B46 3BP

T: +44 (0)1675 467 484
E: birmingham@campbellreith.com

Surrey

Raven House
29 Linkfield Lane, Redhill
Surrey RH1 1SS

T: +44 (0)1737 784 500
E: surrey@campbellreith.com

Manchester

No. 1 Marsden Street
Manchester
M2 1HW

T: +44 (0)161 819 3060
E: manchester@campbellreith.com

Bristol

Wessex House
Pixash Lane, Keynsham
Bristol BS31 1TP

T: +44 (0)117 916 1066
E: bristol@campbellreith.com

UAE

Office 705, Warsan Building
Hessa Street (East)
PO Box 28064, Dubai, UAE

T: +971 4 453 4735
E: uae@campbellreith.com