CampbellReith
consulting engineers

10 Agamemnon Road, London, NW6 1DY

Basement Impact Assessment Audit

For

London Borough of Camden

Project Number: 12466-02

Revision: F1

September 2016

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Contents

1.0 Non-technical summary 1
2.0 Introduction 3
3.0 Basement Impact Assessment Audit Check List 5
4.0 Discussion 8
5.0 Conclusions 10

Appendix

Appendix 1: Residents' Consultation Comments
Appendix 2: Audit Query Tracker
Appendix 3: Supplementary Supporting Documents

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 10 Agamemnon Road, London, NW6 1DY (planning reference 2015/6064/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 was undertaken by Chelmer Consultancy Services. The author's qualifications are in accordance with CPG4 requirements. In the revised submission a Basement Impact Statement is presented by David Joseph Consulting and comments (via email) from Kruszelnicki Leetch Architects.

1.5. The proposal includes increasing the depth of the existing basement and extending to cover the entire building footprint. An underpinning sequence and sketches to illustrate construction sequence were not originally presented, but have been in the revised submission, along with indicative structural calculations for the proposed basement.

1.6. It was requested that the figures representing the relevant map extracts are revisited to ensure the correct site location is presented. These have been presented for flood risk in the revised submission.

1.7. It is generally considered that hand shear vane test results over-estimate the strength of the ground. However, it is accepted that they are adequate for the purposes of this impact assessment.

1.8. Whilst the full input and output from the Pdisp analysis has not been presented, it is accepted that the predicted ground movements and building damage are reasonable, assuming good workmanship and that the affected structures are in sound condition.

1.9. Mitigation measures are discussed within the BIA, but the effects and residual impacts were not included in the original submission. These have been addressed further in the revised submission, specifically to address waterproofing and flood risk.

1.10. It is identified that SuDS measures are required to address the increase in flows off site. Outline details of any proposed drainage/SuDS should be included within the BIA. These have not been presented in the revised submission and should be addressed as a planning condition.

1.11. Flood risk has been identified as a potential risk. The revised submission addresses flood risk and states there is a very low risk of surface water flooding. Whilst this is not accepted, as Environment Agency data suggests both the rear garden and the public highway to the front of the property have a low risk of flooding, suitable mitigation measures have been submitted and it is accepted that these will be implemented both in detailed design and construction.

1.12. An outline works programmed was requested with a detailed programme to be provided by the appointed contractor. This has not been addressed in the revised submission and should be addressed as a planning condition.

1.13. It is accepted that the surrounding slopes to the development site are stable and that there are no other surface or groundwater considerations regarding the proposed development.

1.14. Queries and requests for clarification are discussed in Section 4 and summarised in Appendix 2. Whilst the criteria of CPG4 have not been addressed in full, it is considered that the outstanding information required can be addressed as conditions of planning, if the application is granted.

2.0 INTRODUCTION

2.1. CampbellReith was instructed by London Borough of Camden (LBC) on 24 August 2016 to carry out a Category B Audit on the Basement Impact Assessment (BIA) submitted as part of the Planning Submission documentation for 10 Agamemnon Road, London, NW6 1DY, planning reference 2015/6064/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 *"Change of use from 7 individual studio flats and 2 bedsits, to 4 x 2 bedroom flats, extension to existing basement, including new lightwells to the front and rear. Extension of ground floor extensions, new front bin storage unit and boundary fence."*

The Audit Instruction also confirmed 10 Agamemnon Road is not listed, nor is it neighbour to a listed building.

2.6. CampbellReith accessed LBC's Planning Portal on 19 September 2016 and gained access to the following relevant documents for audit purposes:

- Basement Impact Assessment Report (BIA)
- Planning Application Drawings consisting of

  Location Plan

  Existing Plans

  Proposed Plans

  Existing Elevations and Sections

  Proposed Elevations and Sections
- Design & Access Statement
- Geo-environmental Interpretative Report

2.7. CampbellReith were provided with the following documents for audit purposes on 25 November 2016:

- Basement Impact Statement (ref 2707/BIS/001/DP) issued November 2015 by David Joseph Consulting
- Email dated 24 November 2016 from Kruszelnicki Leetch Architects

3.0 BASEMENT IMPACT ASSESSMENT AUDIT CHECK LIST

Item	Yes/No/NA	Comment
Are BIA Author(s) credentials satisfactory?	Yes	See BIA Section 1.2
Is data required by Cl.233 of the GSD presented?	No	See Audit paragraph 4.2
Does the description of the proposed development include all aspects of temporary and permanent works which might impact upon geology, hydrogeology and hydrology?	Yes	See BIA Sections 2 to 6
Are suitable plan/maps included?	No	See Audit paragraph 4.3 – partially addressed in revised submission
Do the plans/maps show the whole of the relevant area of study and do they show it in sufficient detail?	Yes	See BIA Section 5
Land Stability Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See BIA Section 7.3
Hydrogeology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See BIA Section 7.2
Hydrology Screening: Have appropriate data sources been consulted? Is justification provided for 'No' answers?	Yes	See BIA Section 7.4
Is a conceptual model presented?	No	Further detail required, see Audit paragraph 4.5
Land Stability Scoping Provided? Is scoping consistent with screening outcome?	Yes	See BIA Section 8.3

Item	Yes/No/NA	Comment
Hydrogeology Scoping Provided? Is scoping consistent with screening outcome?	Yes	See BIA Section 8.2
Hydrology Scoping Provided? Is scoping consistent with screening outcome?	Yes	See BIA Section 8.4
Is factual ground investigation data provided?	Yes	Included within BIA Appendix C and in separate Geoenvironmental Interpretative Report (GIR)
Is monitoring data presented?	Yes	Included within separate GIR and discussed in BIA Section 9.8
Is the ground investigation informed by a desk study?	Yes	See BIA Section 2 – 6
Has a site walkover been undertaken?	Yes	
Is the presence/absence of adjacent or nearby basements confirmed?	Yes	See BIA Section 10.2
Is a geotechnical interpretation presented?	Yes	See BIA Section 10.1 and separate GIR
Does the geotechnical interpretation include information on retaining wall design?	Yes	See BIA Audit paragraph 4.5
Are reports on other investigations required by screening and scoping presented?	No	See Audit paragraph 4.13
Are the baseline conditions described, based on the GSD?	Yes	See BIA Sections 2.0 to 6.0
Do the base line conditions consider adjacent or nearby basements?	Yes	See BIA Section 10.2.3
Is an Impact Assessment provided?	Yes	See BIA Section 10

Item	Yes/No/NA	Comment
Are estimates of ground movement and structural impact presented?	Yes	See BIA Section 10.5 and 10.6 However there are comments on the approach used, see BIA Audit paragraph 4.7 to 4.10
Is the Impact Assessment appropriate to the matters identified by screen and scoping?	Yes	See BIA Section 10
Has the need for mitigation been considered and are appropriate mitigation methods incorporated in the scheme?	Yes	See BIA Section 10.9 for summary
Has the need for monitoring during construction been considered?	Yes	See BIA Section 10.7
Have the residual (after mitigation) impacts been clearly identified?	Yes	Addressed in revised submission
Has the scheme demonstrated that the structural stability of the building and neighbouring properties and infrastructure will be maintained?	Yes	See BIA Section 10 and Audit paragraphs 4.7 to 4.9
Has the scheme avoided adversely affecting drainage and run-off or causing other damage to the water environment?	Yes	See BIA Section 10.8
Has the scheme avoided cumulative impacts upon structural stability or the water environment in the local area?	Yes	See BIA Section 10
Does report state that damage to surrounding buildings will be no worse than Burland Category 2?	Yes	Category 1 (Very Slight) damage has been predicted for the two neighbouring properties, however there are queries on the GMA.
Are non-technical summaries provided?	Yes	See BIA sections 7, 8, 9 and 11

4.0 DISCUSSION

4.1. The Basement Impact Assessment (BIA) has been carried out by a firm of engineering consultants, Chelmer Consultancy Services and the individuals concerned in its production have suitable qualifications. In the revised submission a Basement Impact Statement is presented by David Joseph Consulting and comments (via email) from Kruszelnicki Leetch Architects.

4.2. The proposed basement consists of a single storey construction formed by lowering an existing lower ground floor area and extending it to cover the entire building footprint. It is stated in the BIA that the walls will be formed by underpinning the existing foundations although a construction sequence, works programme or underpinning methodology have not been included. In the revised submission structural details of the proposed basement have been provided, including sketches and outline structural calculations to confirm the feasibility of the proposals.

4.3. Whilst relevant map extracts have been included within Sections 2 to 6 of the BIA, a number of figures appear to show the location of the site in the wrong place.

4.4. The BIA has identified that ground conditions comprise thin layer of Made Ground over London Clay to the front of the property and Made Ground, over, Head Deposits, and London Clay in turn to the rear of the house. Whilst groundwater was not encountered during the site investigation, two subsequent monitoring visits recorded water at 2.53mbgl and 1.70mbgl in boreholes BH1 and BH2 respectively. The BIA has recommended a design groundwater level equivalent to ground level for design.

4.5. The BIA includes Section 10.1 titled 'Conceptual Ground Model'. Whilst this section discusses the strata encountered, a ground model with strata design depths is not presented. Suggested geotechnical design parameters are included in BIA Sections 10.4 and 10.5. The BIA provides retaining wall parameters and stiffness values for London Clay in section 10.5 for use in the PDisp analyses. There are no suggested stiffness parameters for Made Ground or Head Deposits.

4.6. It is noted that undrained shear strength parameters have been derived from the in-situ hand shear vane tests undertaken within the boreholes. Whilst it is generally considered that these can over-estimate the strength of the soils, it is accepted that they are adequate for the purposes of this impact assessment.

4.7. The BIA presents a ground movement assessment which considers settlement/heave due to the excavation using the computer program Pdisp by Oasys and horizontal movements due to excavation and wall installation, based on the method by Burland in CIRIA SP200.

4.8. The BIA includes contour plots and a summary of predicted displacements. However, the BIA does not contain the full input and output from the software analysis. Predicted movements have been included within the damage assessment.

4.9. The damage category to the two neighbouring properties, along with the associated ground movement assessment (GMA), has been presented in section 10.6. A damage category 1 has been determined for both No.8 and No.12 Agamemnon Road based on the results of the GMA. It is accepted that, on the basis of good control of workmanship, ground movements and resultant building damage should have limited impact.

4.10. Structural mitigation measures are discussed in BIA Section 10.9 with suggested monitoring and associated trigger levels being discussed in Section 10.7. The author has not included discussion on the effects of the mitigation measures or any remaining residual risk if implemented.

4.11. A works programme has not been submitted as required by Cl.233 of the GSD. This has not been addressed in the revised submission and should be addressed as a planning condition.

4.12. Both the hydrogeology and hydrology screening identified that the proposed basement is likely to increase the proportion of hard surfaced/paved areas. This has been carried through to scoping with the action to review appropriate types of SuDS for use as site-specific mitigation. These have not been presented in the revised submission and should be addressed as a planning condition.

4.13. The hydrology screening identified that part of Agamemnon Road flooded in 2002. This has been carried through to scoping where the BIA recommends further review of the flood risk and the provision of protection measures if deemed necessary. The revised submission addresses flood risk and states there is a very low risk of surface water flooding. Whilst this is not accepted, as Environment Agency data suggests both the rear garden and the public highway to the front of the property have a low risk of flooding, suitable mitigation measures have been submitted and it is accepted that these will be implemented both in detailed design and construction. Mitigation includes non-return valves to prevent sewer surcharge flooding, raised upstands to all entrances to the basement, and adequate drainage (which will need to be addressed in detail, as 4.12).

4.14. It is accepted that there are no slope stability concerns regarding the proposed development. In the absence of significant groundwater flows, it is accepted there are no potential impacts to the wider hydrogeology.

5.0 CONCLUSIONS

5.1. The BIA was undertaken by Chelmer Consultancy Services. The author's qualifications are in accordance with CPG4 requirements. In the revised submission a Basement Impact Statement is presented by David Joseph Consulting and comments (via email) from Kruszelnicki Leetch Architects.

5.2. The proposal includes increasing the depth of the existing basement and extending to cover the entire building footprint. An underpinning sequence and sketches to illustrate construction sequence were not originally presented, but have been in the revised submission, along with indicative structural calculations for the proposed basement.

5.3. It was requested that the figures representing the relevant map extracts are revisited to ensure the correct site location is presented. These have been presented for flood risk in the revised submission.

5.4. Whilst the BIA has provides some geotechnical and retaining wall parameters, stiffness parameters for all relevant strata will be required at detailed design stage, to the satisfaction of the Engineer.

5.5. It is generally considered that hand shear vane test results over-estimate the strength of the ground. However, it is accepted that they are adequate for the purposes of this impact assessment.

5.6. Whilst the full input and output from the Pdisp analysis has not been presented, it is accepted that the predicted ground movements and building damage are reasonable, assuming good workmanship and that the affected structures are in sound condition.

5.7. Mitigation measures are discussed within the BIA, but the effects and residual impacts were not included in the original submission. These have been addressed further in the revised submission, specifically to address waterproofing and flood risk.

5.8. It is identified that SuDS measures are required to address the increase in flows off site. Outline details of any proposed drainage/SuDS should be included within the BIA. These have not been presented in the revised submission and should be addressed as a planning condition.

5.9. Flood risk has been identified as a potential risk. The revised submission addresses flood risk and states there is a very low risk of surface water flooding. Whilst this is not accepted, suitable mitigation measures have been submitted and it is accepted that these will be implemented both in detailed design and construction.

5.10. An outline works programmed was requested with a detailed programme to be provided by the appointed contractor. This has not been addressed in the revised submission and should be addressed as a planning condition.

5.11. It is accepted that the surrounding slopes to the development site are stable.

5.12. It is accepted there are no other surface or groundwater considerations regarding the proposed development.

5.13. Queries and requests for clarification are summarised in Appendix 2. Whilst the criteria of CPG4 have not been addressed in full, it is considered that the outstanding information required can be addressed as conditions of planning, if the application is granted.

Appendix 1: Residents' Consultation Comments

None

Appendix 2: Audit Query Tracker

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Audit Query Tracker

Query No	Subject	Query	Status	Date closed out
1	BIA	Construction information not provided	Closed – Construction Sequence, underpinning details and structural details of basement provided.	November 2016
2	BIA	Works programme not included	Open – outline duration to be provided with detailed programme submitted at a later date by appointed Contractor.	Open – recommended to be subject to a condition of planning.
3	BIA	Residual impacts following mitigation measures not included	Closed – flood risk mitigation measures provided	November 2016
4	Hydrogeology	Probable increase in hard surfacing/pavement	Open – outline details of proposed mitigation (ie drainage / SUDs proposals) to be included with BIA submission.	Open – recommended to be subject to a condition of planning.
5	Hydrology	Review of Flood Risk included in scoping	Closed – Flood risk assessment updated.	November 2016 – FRA not accepted. However, suitable mitigation is proposed for low risk site.

Appendix 3: Supplementary Supporting Documents

Basement Impact Statement

Email dated 24 November 2016 from Kruszelnicki Leetch Architects

david joseph consulting
structural engineering and construction consultants

29 Dartmouth Place, London SE23 3AU
mail@djc.london
020 8699 7750

2707/BIS/001/DP

November 2015

BASEMENT IMPACT STATEMENT FOR THE PROPOSED BASEMENT EXTENSION

AT

10 AGAMEMNON ROAD LONDON NW6 1DY

Synopsis

The property is a three-storey terrace house with an existing partial basement, which we assume was an old coal cellar, under the ground floor hallway. It is apparent that the house was converted into nine separate studio flats at some point in the past. It is of traditional construction with timber floors and roof spanning between load-bearing masonry external walls and internal timber stud walls. The house consists of a main terraced section as well as an outrigger located on the rear left hand side.

It is proposed to reconfigure the house into four flats. This will involve carrying out various internal alterations of the upper floors, as well as constructing a rear extension to the outrigger. It is also proposed to lower the existing basement level, extend the basement under the new footprint of the house, as well as under the courtyard to the side of the outrigger and extension.

It is assumed that the existing footings are shallow corbel brickwork, which is common for the age of the property. The depth will be verified prior to the full design being carried out.

Appraisal

This appraisal of the basement construction has been carried out for the purposes of making a planning application for the proposed works. Should the planning application be approved, a full appraisal of the existing structure would need to be carried out and a full design of the substructure alterations would then take place.

This appraisal contains a brief method statement, preliminary sketch proposals for the basement works, as well as preliminary calculations for the basement retaining walls.

Flood Risk

With reference to the Environmental Agency's Flood Risk Map, the application property is outside any flood risk zone. It is also shown as a very low risk of flooding from rivers and seas, with very low meaning that it has a 1 in 1000 (0.1%) of flooding each year. The site is on higher ground than the areas that historically experienced flooding, most recently in 1975. As such no Flood Risk Assessment is therefore deemed required.

Flood records dating back to 1927 show no recorded incidence of flooding at this site. Flood barriers protect the site with crest heights above calculated worse case tidal levels.

Surface Water

The Environmental Agency's risk from flooding from surface water is very low meaning that it has a 1 in 1000 (0.1%) of flooding each year.

The proposed development comprises the enlargement of a lower ground floor enlargement, and a light wells.
The extensions will provide an enlarged living space for the dwelling house.

There is no material increase in hard surfacing or roof areas as a result of the development. The enlargement will occupy an area, which is currently, largely hard surfaced. As part of the site drainage, the surface water flows (volume of rainfall and peak run-off) will not be changed from the existing route, or result in changes to the quality of the surface water received by the adjoining properties or watercourses.

Surface waters will be discharged to the existing combined drainage system.
Foul waters will be discharged to the existing combined drainage system.

The site is not within the risk areas of West and South Hampstead, and is not below the static water level of a nearby feature.

Groundwater/Risk of Flooding from Reservoirs

The Environmental Agency's Maps also show that the site is not in a Groundwater protection zone, or that it is extremely unlikely to be at risk from flooding from reservoirs.

The site is not directly above an aquifer, nor is it below the water table. It is not within 100m of a watercourse or spring, nor is the site within the catchment of the ponds of Hampstead Heath. Also the lowest point of the excavation (allowing for any drainage and foundation space under the basement floor) close too, or lower than, the mean water level of any local pond or spring line.

Once trials pits are undertaken and are found to be dry and stable, the specific ground water can be ascertained to determine the affect of the works at the site.

Generally

All gaps to accommodate services such as gas, electricity and telephone cables to the lower ground and ground floor will be sealed with silicone sealant.
Brickwork joints and cracks will be re-pointed, and all joists will be sealed between new walls and doors.

Non-return valves will be installed at all connection pipes to the main sewer to prevent backing up of foul waters should the outlet become submerged under extreme flood conditions.

Low level up stands will be constructed around light wells to reduce the risk of surface water ingress.

A rodable rainwater gulley will be installed in the base of the light well.

The new floor levels will match the internal floor levels.

The basement will be tanked to prevent water ingress of groundwater and surface water.

The proposed works will not have any effect on the watercourse, floodplain or its flood defences nor impede any access to flood defences and management facilities.

These measures are intended to protect the building and its contents and to safeguard the occupiers of the building.

Temporary Works

The Contractor will be responsible for the design of the temporary works for the design of the temporary works for both the basement construction and superstructure works. The following method statement and suggested construction sequencing shown on the sketches should be finalised by the Contractor prior to works beginning. The temporary works would need to be designed to minimise ground movement and any effects on the adjoining properties. The Contractor's method statement and temporary works design should be reviewed and approved by the design engineer prior to any works taking place.

During excavation, ground movement should be regularly monitored, as is standard practice. We would recommend a specialist company carry out the monitoring works.

Basement Construction

The works would involve the underpinning of the existing external and party ground floor walls in order to minimise disruption to neighbouring properties. Internal walls are to be supported by steel beams spanning between the underpinning. Retaining walls would also be constructed to form the lowered front courtyard. Further retaining walls would be constructed to form the back of the basement. All of these retaining walls should be constructed using an underpinning sequence so as to minimise disruption to the adjoining properties.

The underpinning would consist of short sections of reinforced concrete retaining walls, excavated in sequence and tied together with dowel bars. They would be designed to carry both the vertical loads of the walls above, as well as lateral loads from the adjoining soil. They would be designed to be inherently stable during the construction stage, as well as in the final stage. It is assumed at this stage that neither of the adjoining properties has excavated a basement but this will be confirmed prior to the full design taking place.

Following review of the British Geological Survey maps (1:50,000 scale), we have assumed the founding soil to be London Clay for the purposes of the design of the proposed basement. The founding soil appears to be relatively homogenous in the surrounding area and we therefore do not believe the soil will be unstable. We have also assumed the water table to be one metre above basement slab for the purposes of the structural appraisal. We would recommend a site investigation be carried out prior to construction so as to determine the exact make-up of the founding soils and water table level.

Enabling Works

The site is to be suitably hoarded to prevent unauthorised access.

Licenses for skips and conveyors are to be obtained and displayed in suitable locations.

Design Standards and Reference Documents

The relevant Eurocodes, Building Regulations and Codes of Practice should be used in the design.

Design Parameters

The internal steelwork and underpinning should be designed for an imposed floor load of 1.5 kN/m^2, as well as calculated dead loads. The retaining wall adjacent to the highway in the front courtyard should be designed for an imposed load of 10 kN/m^2 to allow for HGV loading on the road.

We would propose an allowable bearing pressure of 100 kN/m^2 for London Clay, the assumed founding soil.

PRELIMINARY METHOD STATEMENT

1 External and party walls to be underpinned at location of internal steelwork supports.

2 Temporarily prop internal load-bearing ground floor walls, and bay window.

3 Install internal steelwork to support load-bearing ground floor walls.

4 Remove ground-floor floor structure

5 Underpin remaining external and party walls in sequence – see underpinning sequence below.

6 As underpinning is being carried out, form basement slab at appropriate stages.

7 Excavate front courtyard in underpinning sequence.

8 Construct basement bay window.

9 Excavate rear section of basement in underpinning sequence.

10 Construct rear extension on top of new basement structure

11 Construct new internal ground floor structure.

Underpinning Sequence

1. Underpinning to be carried out in standard 1, 3, 5, 2, 4 sequence. See sketches for suggested layout.

2. Each leg is to be excavated in bays not exceeding 1.0m in length, concreted and pinned tight to existing footing before commencing next leg. Similarly numbered bays can be carried out consecutively.

3. The construction of each underpinning block shall be commenced immediately after the bottom of the excavation has been exposed. The bottom shall be sealed with concrete blinding immediately after inspection has shown it to be satisfactory.

4. The underside of the existing footing shall be thoroughly cleaned.

5. At least 24 hours after concrete pour, semi-dry pinning sand/cement pack to be rammed in hard.

6. At least 48 hours to elapse before excavation of next pin in sequence.

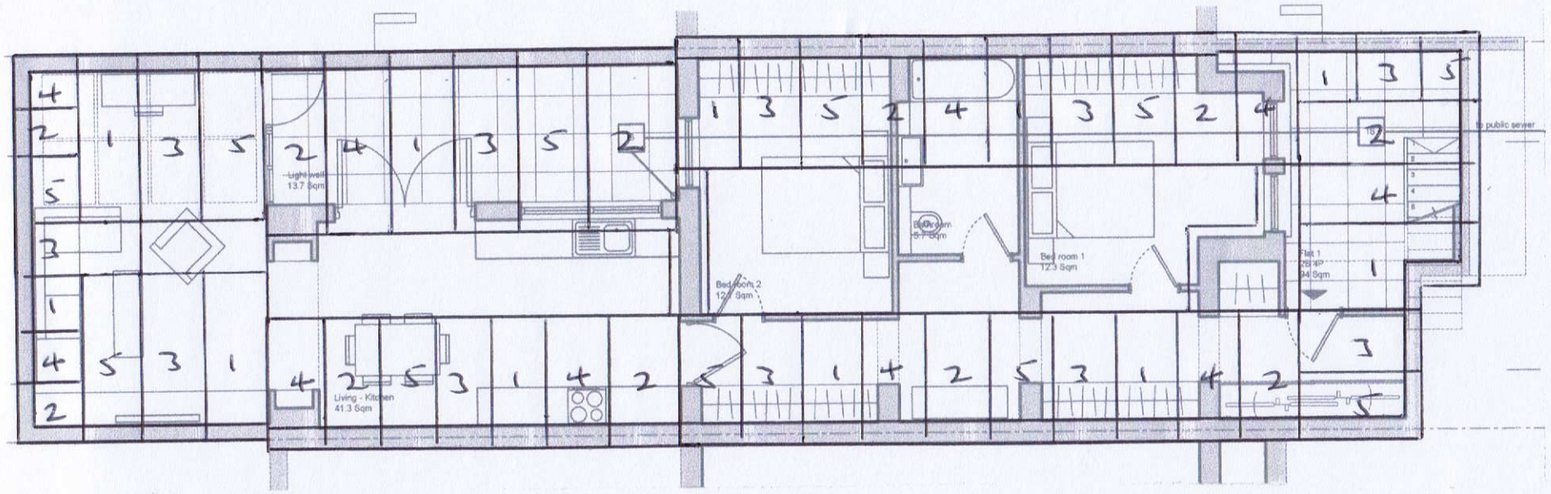
7. Sides of previously poured pins to be thoroughly cleaned and joined together with 20mm. diameter dowel bars, 1.0m long.

8. Concrete to be grade C40 minimum.

PRELIMINARY SKETCH PROPOSALS

PRELIMINARY

FOR PLANNING ONLY



BASEMENT PLAN SHOWING
PROPOSED UNDERPINNING

10 AGAMEMNON ROAD
LONDON NW3 6JT

2707/sk01

PRELIMINARY

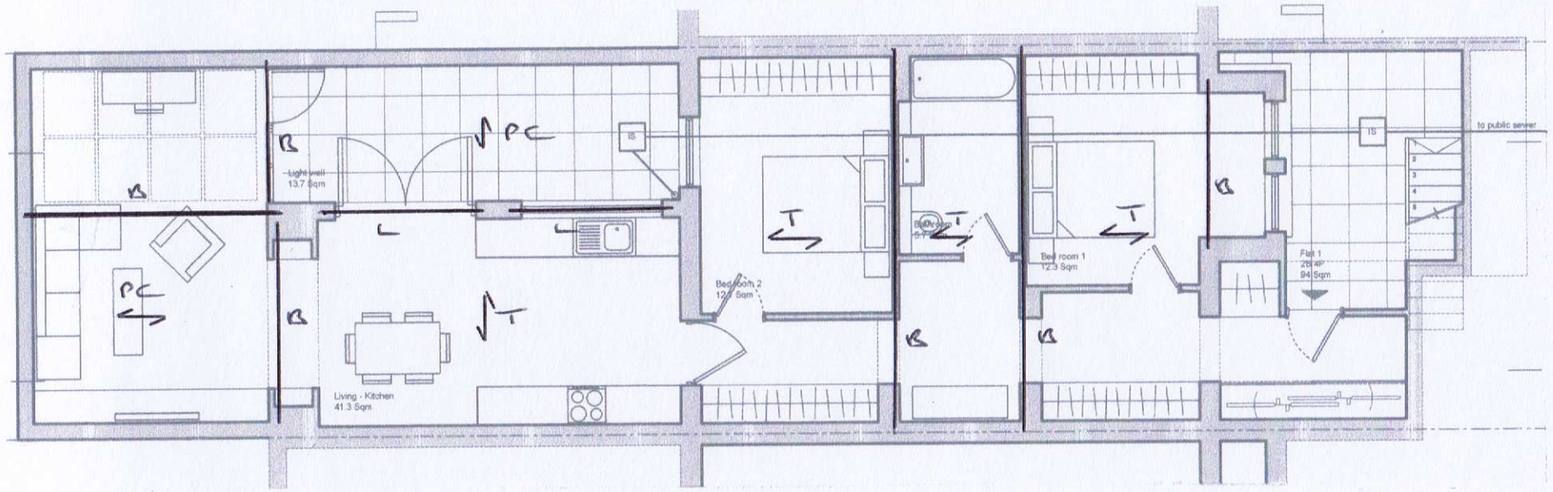
FOR PLANNING ONLY

T : TIMBER JOISTS

PC : PRECAST PLANKS / BEAM & BLOCK FLOORING

L : LINTEL

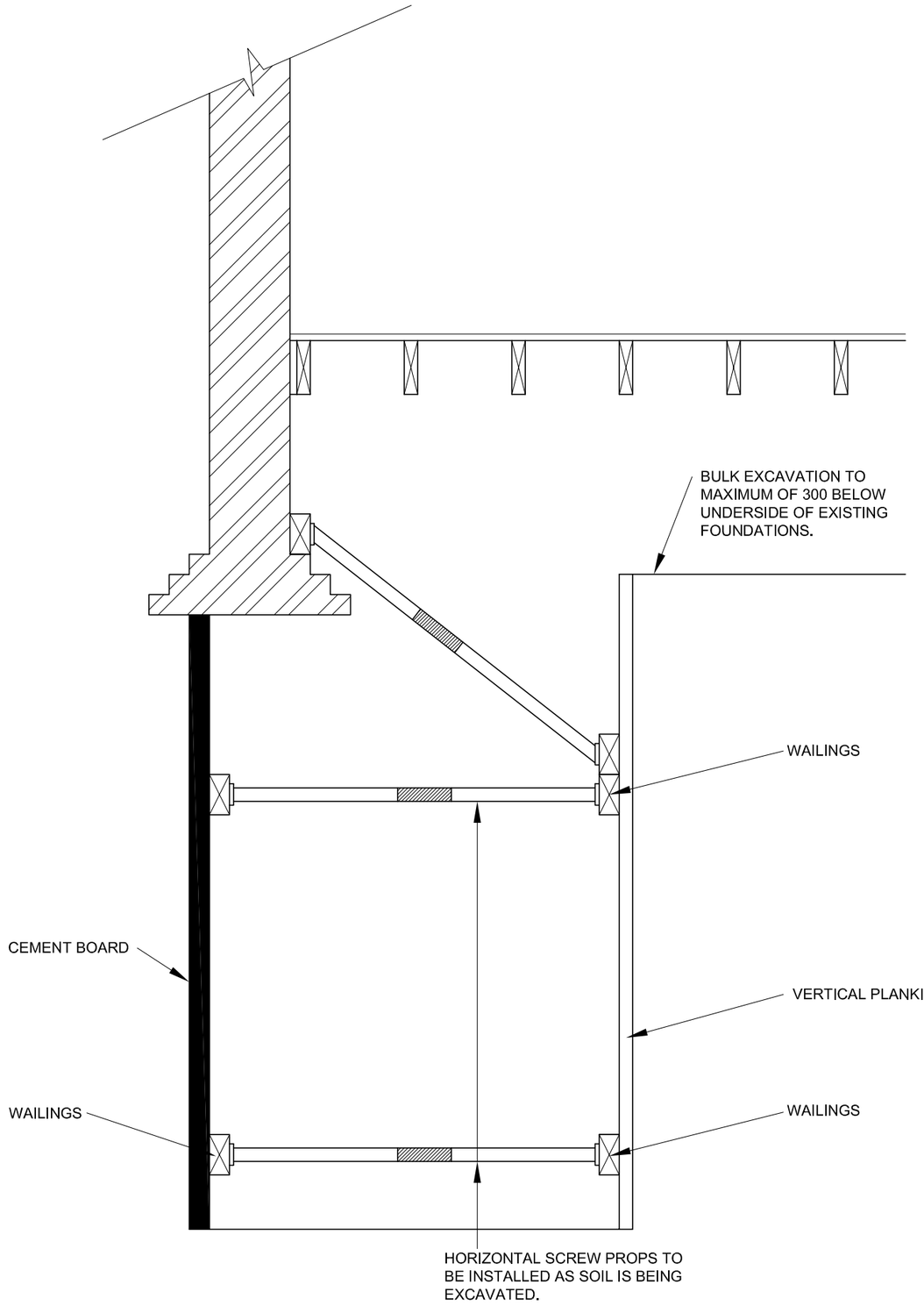
B : BEAM



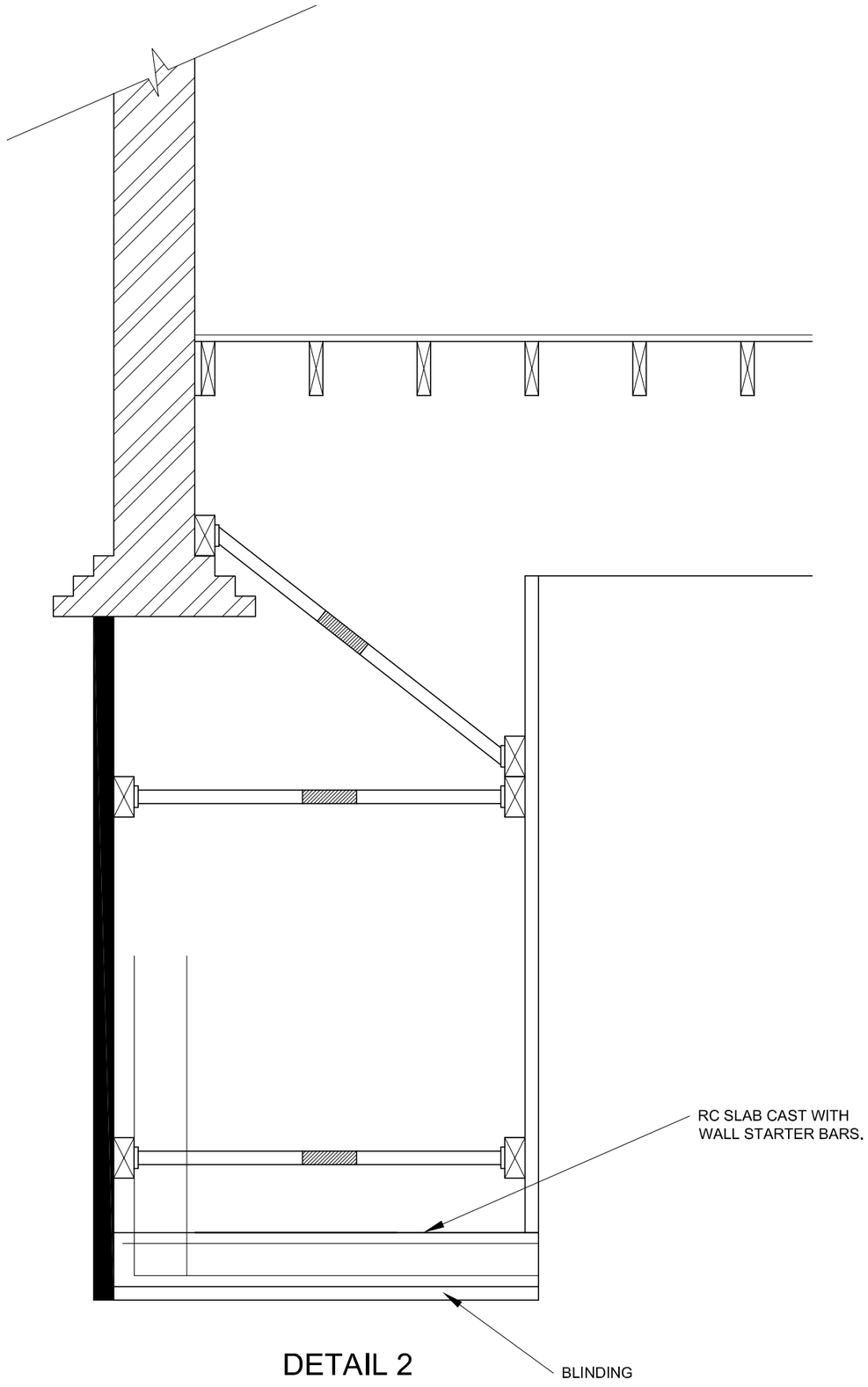
BASEMENT PLAN SHOWING
PROPOSED STRUCTURE OVER

10 AGAMEMNON ROAD
LONDON NW6 1DT

2707/SK02



DETAIL 1



DETAIL 2

Notes

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Revisions

-	-	-

Client
Kruszelnicki Leetch Architects

Address
10 AGAMEMNON ROAD
LONDON
NW6 1DY

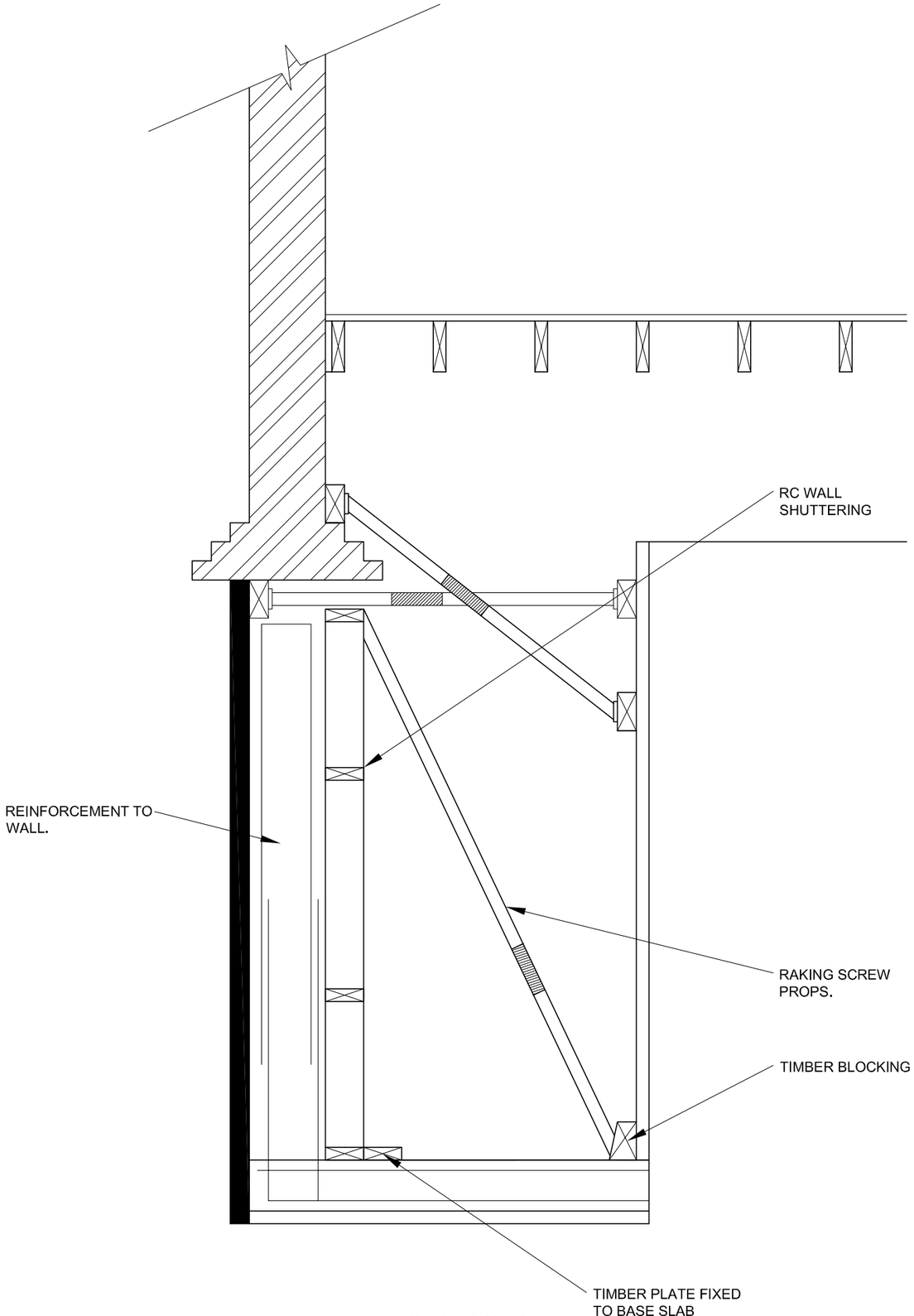
Drawing Title
CONSTRUCTION OF UNDERPINNING FOR NEW BASEMENT.

Date
NOV '15

Scale

Drawing Number
2707 - sk 03

Revision
-



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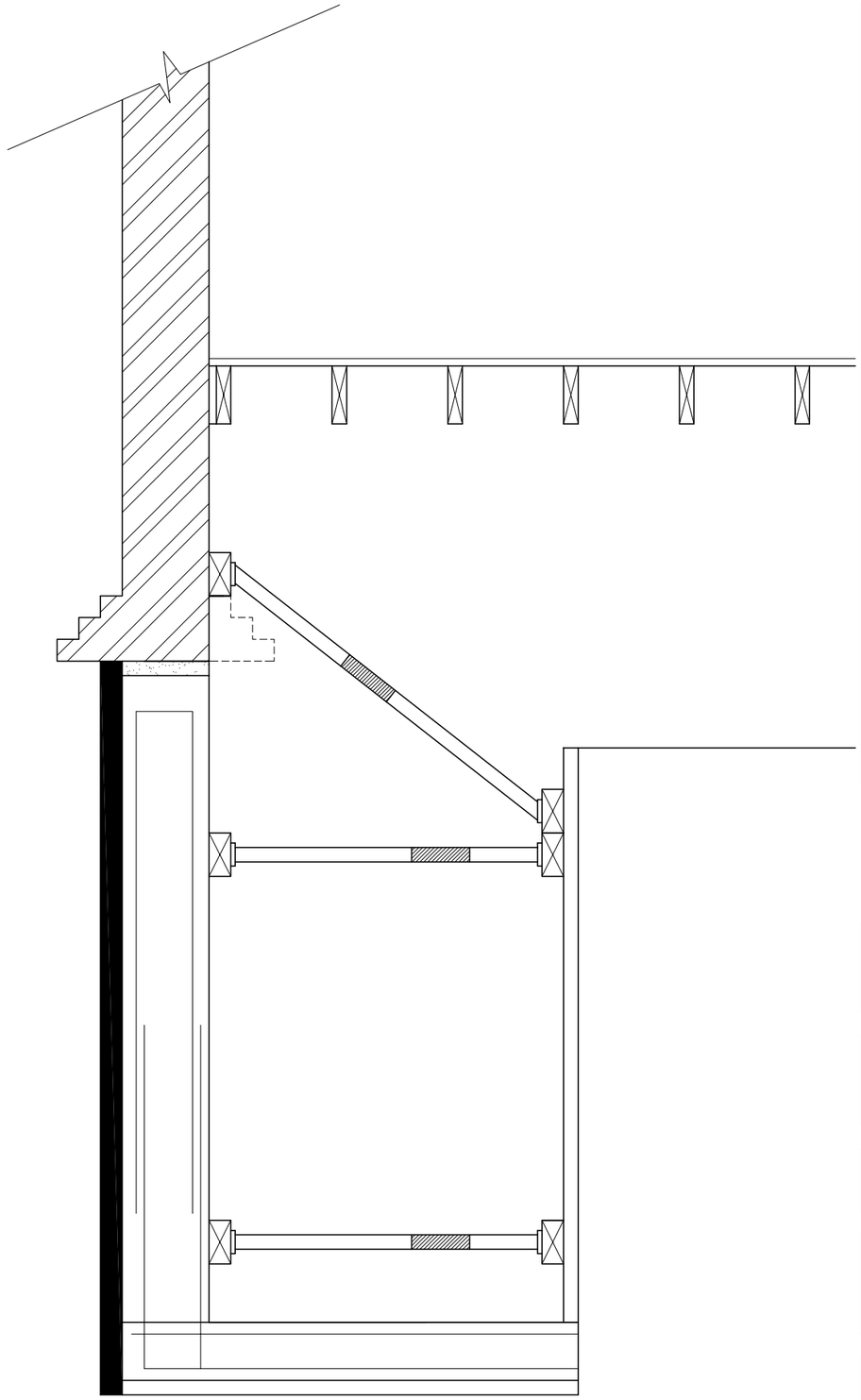

DETAIL 4
SCALE 1:20

Notes

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Revisions

-	-	-

Client
Kruszelnicki Leetch Architects

Address
10 AGAMEMNON ROAD
LONDON
NW6 1DY

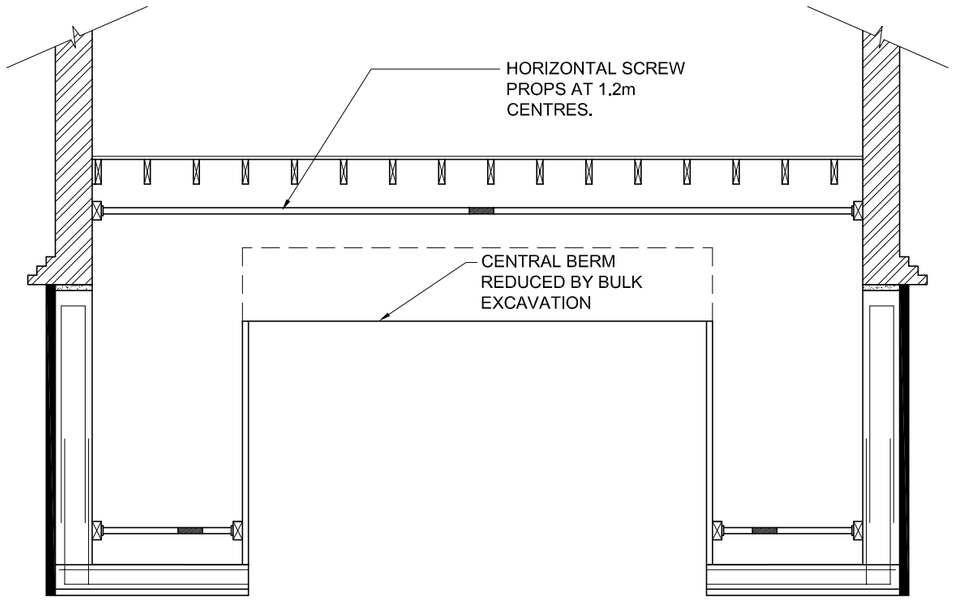
Drawing Title
CONSTRUCTION OF UNDERPINNING FOR NEW BASEMENT.

Date
NOV '15

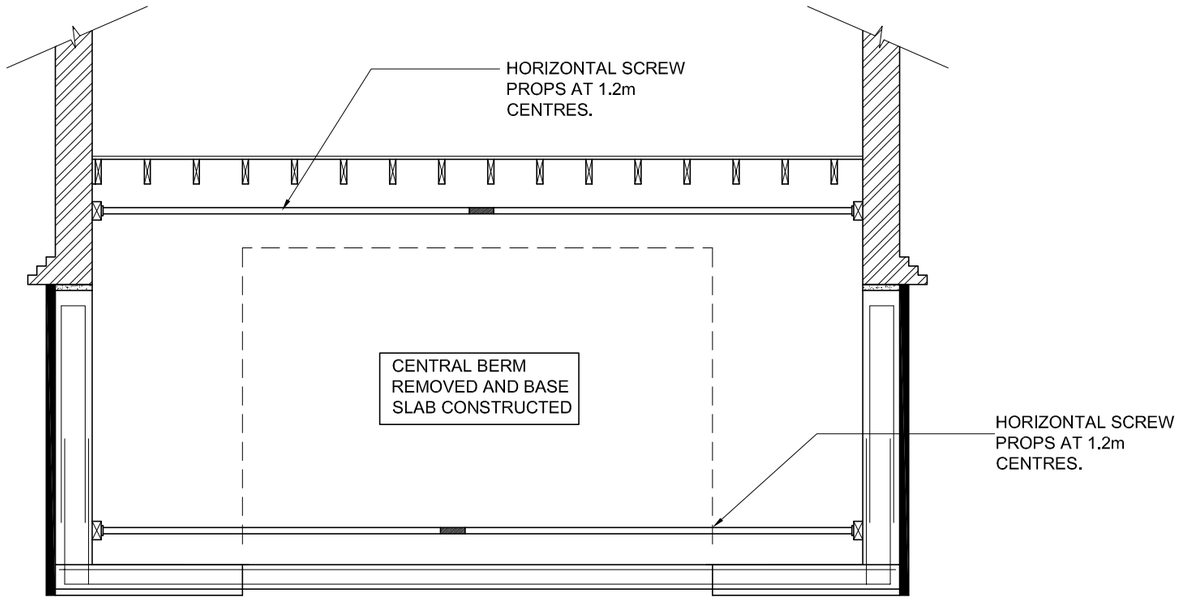
Scale

Drawing Number
2707 - sk 04

Revision
-



DETAIL 5



DETAIL 6

METHOD STATEMENT

1) EXCAVATE ACCESS PIT AND UNDERMINE EXISTING FOUNDATION FOR FIRST UNDERPIN IN ACCORDANCE WITH THE SEQUENCE SHOWN ON THE DRAWING. INSTALL TEMPORARY PLANKING AND STRUTTING AS SOIL IS BEING EXCAVATED. BLIND EXCAVATION BASE WITH 75mm CONCRETE.

2) INSTALL PREFORMED REINFORCEMENT CAGE TO BASE AND WALL AND CAST BASE SLAB.

3) INSTALL WALL REINFORCEMENTAND FRONT SHUTTER, ADAPT PLANKING AND PROPS AND CAST CONCRETE UNDERPIN AND CURE FOR A MINIMUM OF 24 HOURS.

4) STRIP SHUTTERING AND INSTALL TEMPORARY PROPS. DRY PACK BETWEEN TOP OF NEW UNDERPIN AND EXISTING FOUNDATIONS WITH 3:1 SAND/CEMENT AND CONBEX100 ANTI SHRINK ADDITIVE.

5) EXCAVATE ACCESS PIT AND UNDERMINE EXISTING FOUNDATIONS FOR NEXT UNDERPIN IN ACCORDANCE WITH THE SEQUENCE SHOWN ON THE DRAWING. INSTALL TEMPORARY PLANKING AND STRUTTING AS NECESSARY.

6) REPEAT STEPS 2 TO 7 UNTIL ALL UNDERPINNING HAS BEEN COMPLETED.

7) BULK EXCAVATE CENTRAL BERM AND INSTALL TOP AND BOTTOM HORIZONTAL PROPS.

8) EXCAVATE CENTRAL BASE, BLIND EXCAVATION WITH 75mm CONCRETE AND INSTALL PREFORMED REINFORCEMENT CAGE. CAREFULLY CUT BACK CORBEL BRICKWORK FOUNDATION.

9) CAST CONCRETE TO FORM NEW BASEMENT FLOOR SLAB AND ALLOW TO CURE FOR 7 DAYS.

Notes

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construction and structural engineering consultants

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020 8699 7750

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PRELIMINARY CALCULATIONS

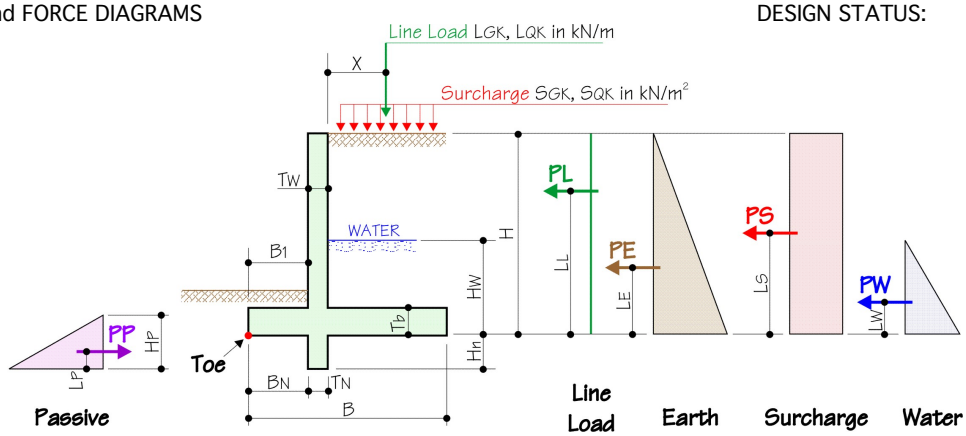
Project	10 Agamemnon Road, London NW6	The **Concrete** Centre	
Client			
Location	underpinning	The Concrete Centre	
	RETAINING WALL design to BS 8110:2005		
	Originated from 'RCC62.xls' v3.1 © 2006 TCC		

Made by	Date	Page
dp	Nov-15	1
Checked	Revision	Job No
		2707

IDEALISED STRUCTURE and FORCE DIAGRAMS

DESIGN STATUS: VALID

WARNING :
Passive pressure should only be considered if it can be guaranteed that there will be no future excavation in front of the wall.



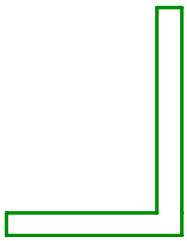
DIMENSIONS (mm)

H =	3000	B =	2100	Tw =	300
Hw =	1000	Bl =	1800	Tb =	300
Hp =	0	BN =	0	TN =	0
Hn =	0				

MATERIAL PROPERTIES

			steel class	A	
fcu =	40	N/mm²	γm =	1.5	concrete
fy =	500	N/mm²	γm =	1.15	steel
			cover to tension steel =	70	mm
			Max allowable design surface crack width (W) =	0.2	mm
			Concrete density =	24	kN/m³

(0.2 or 0.3 mm only)



Wall Geometry

SOIL PROPERTIES

Design angle of int'l friction of retained mat'l (Ø) =	30	degree
Design cohesion of retained mat'l (C) =	0	kN/m²
Density of retained mat'l (q) =	20	kN/m³
Submerged Density of retained mat'l (qs) =	13.30	kN/m³
Design angle of int'l friction of base mat'l (Øb) =	30	degree
Design cohesion of base material (Cb) =	20	kN/m²
Density of base material (qb) =	19	kN/m³
Allowable gross ground bearing pressure (GBP) =	100	kN/m²

(Only granular backfil considered, "C" = zero)

[default=2/3*q (only apply when Hv 13.33

ASSUMPTIONS

a) Wall friction is zero
b) Minimum active earth pressure = 0.25qH
c) Granular backfill
d)Does **not** include check of rotational slide/slope fai
e)Does **not** include effect of seepage of ground water beneath the wall.
f)Does **not** include deflection check of wall due to lateral earth pressures
h) Design not intended for walls over 3.0 m high
i) Does **not** include check for temp. or shrinkage effe

LOADINGS

Surcharge load -- live (SQK) =	1.5	kN/m²
Surcharge load -- dead (SGK) =	0	
Line load -- live (LQK) =	0	kN/m
Line load -- dead (LGK) =	40	kN/m
Distance of line load from wall (X) =	-100	mm

LATERAL FORCES (unfactored)

Ko =	0.50	[default ka = (1-SIN Ø)/(1+SIN Ø)] 0.33
Kp =	3.00	[default kp = (1+SIN Øb)/(1-SIN Øb 3.00
Kpc =	3.46	[default kpc = $2kp^{0.5}$] = 3.46
Kac =	1.41	[$2ka^{0.5}$]

	Force (kN)	Lever arm (m)	Moment about TOE (kNm)	γf	F_{ult} (kN)	M_{ult} (kNm)
PE =	43.33	LE = 1.026	44.44	1.40	60.66	62.22
PS(GK) =	0.00	LS = 1.50	0.00	1.40	0.00	0.00
PS(QK) =	2.25	LS = 1.50	3.38	1.60	3.60	5.40
PL(GK) =	0.00	LL = 3.08	0.00	1.40	0.00	0.00
PL(QK) =	0.00	LL = 3.08	0.00	1.60	0.00	0.00
PW =	5.00	LW = 0.33	1.67	1.40	7.00	2.33
Total	50.58		49.48		71.26	69.95
PP =	0.00	(LP-HN) = 0.00	0.00	1.00	0.00	0.00

Project	10 Agamemnon Road, London NW6	The Concrete Centre	
Client	0		
Location	underpinning		
	RETAINING WALL design to BS 8110:2005		
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Made by	Date	Page
dp	Nov-15	2
Checked	Revision	Job No
0	0	2707

EXTERNAL STABILITY

STABILITY CHECKS : OK

OVERTURNING about TOE F.O.S = 1.50

(using overall factor of safety instead of partial safety factor)

LOADING OPTION

(select critical load combination)

✓EARTH

☒ PS(GK)
☒ PS(QK)
☒ PL(GK)
☒ PL(QK)
☒ PW

Warning:

Overturning Moments	Lateral FORCE (kN)	Lever arm (m)	Moment (kNm)
	PE = 43.33	LE = 1.00	43.33
	PS(GK) = 0.00	LS = 1.50	0.00
	PS(QK) = 2.25	LS = 1.50	3.38
	PL(GK) = 0.00	LL = 3.08	0.00
	PL(QK) = 0.00	LL = 3.08	0.00
	PW = 5.00	LW = 0.33	1.67
	P = 50.58		
	Pp = 0.00	(LP-HN) = 0.00	0.00
			Mo = 48.37

Restoring Moments	Vertical FORCE (kN)	Lever arm (m)	Moment (kNm)
	Wall = 17.34	1.95	33.81
	Base = 8.82	1.05	9.26
	Nib = 0.00	0.00	0.00
	Earth = 0.00	2.10	0.00
	Water = 0.00	2.10	0.00
	Surcharge = 0.00	2.10	0.00
	Line load = 40.00	2.00	80.00
	V = 66.16		**Mr** = 123.07

Warning:

☒ ALLOW BUOYANCY OF BASE

Factor of Safety, Mr / Mo = 2.54 > 1.50 OK

SLIDING (using overall factor of safety instead of partial safety factor) F.O.S = 1.50

Sum of LATERAL FORCES, **P** = 50.58 kN

PASSIVE FORCE, Pp x Reduction factor (1) = 0.00 kN

Red'n factor for passive force = 1.00

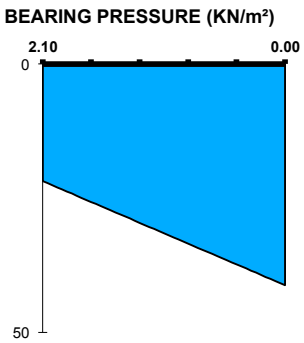
BASE FRICTION (**V** TANØb + B Cb) = -80.20 kN

Sum of FORCES RESISTING SLIDING, **Pr** = -80.20 kN

Factor of Safety, Pr / P = 1.59 > 1.50 OK

GROUND BEARING FAILUR Taking moments about centre of base (anticlockwise "+") :

Vertical FORCES (kN)	Lever arm (m)	Moment (kNm)
Wall = 19.44	-0.90	-17.50
Base = 15.12	0.00	0.00
Nib = 0.00	1.05	0.00
Earth = 0.00	-1.05	0.00
Water = 0.00	-1.05	0.00
Surcharge= 0.00	-1.05	0.00
Line load = 40.00	-0.95	-38.00
V = 74.56		**Mv** = -55.50



Moment due to LATERAL FORCES, **Mo** = 48.37 kNm

Resultant Moment, **M** = **Mv** + **Mo** = -7.13 kNm

Eccentricity from base centre, **M** / **V** = -0.11 m

Therefore, MAXIMUM Gross Bearing Pressure (**GRP**) = 41 kN/m² < 100 OK

Project	10 Agamemnon Road, London NW6	The Concrete Centre		
Client	0	Made by	Date	Page
Location	underpinning	dp	Nov-15	3
	RETAINING WALL design to BS 8110:2005	Checked	Revision	Job No
	Originated from 'RCC62.xls' v3.1 © 2006 TCC	0	0	2707

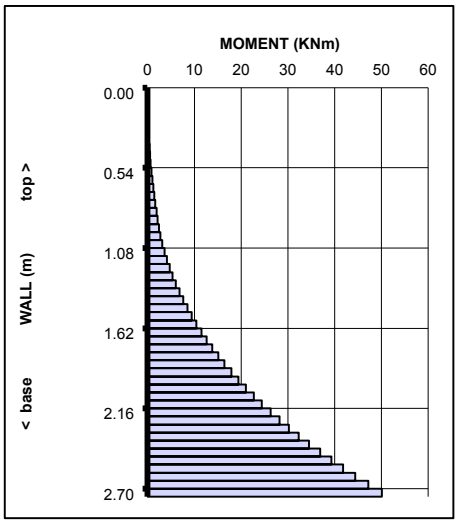
STRUCTURAL DESIGNS (ultimate)

DESIGN CHECKS : OK

WALL (per metre length)

	Force (kN)	Lever arm (m)	Moment (kNm)	γ_f	V ult (kN)	M ult (kNm)
EARTH	35.63	0.92	32.61	1.4	49.88	45.66
SURCHARGE(GK)	0.00	1.35	0.00	1.4	0.00	0.00
SURCHARGE(QK)	2.03	1.35	2.73	1.6	3.24	4.37
LINE LOAD(GK)	0.00	2.78	0.00	1.4	0.00	0.00
LINE LOAD(QK)	0.00	2.78	0.00	1.6	0.00	0.00
WATER	2.45	0.23	0.57	1.4	3.43	0.80
Total	40.10		35.92		56.55	50.83

BS8110 reference



Ultimate Bending Moment Diagram

MAIN REINFORCEMENT :

Min. As =	390	mm^2			Table 3.25
ϕ =	12	mm			
centres =	200	mm	< 587	OK	3.12.11.2.7(b)
Asprov =	565	mm^2	> 390	OK	

MOMENT of RESISTANCE :

d =	224	mm			
z =	212.80	mm			3.4.4.4
As' =	0	mm^2			
Mres =	52.32	kNm	> 50.83	OK	

SHEAR RESISTANCE:

100 As/bd =	0.25%				
vc =	0.54	N/mm^2			Table 3.8
Vres =	120.97	kN	> 56.55	OK	3.5.5.2

CHECK CRACK WIDTH TO BS8110/BS8007 :
(Temperature and shrinkage effects not included)

X =	52.30	mm			
Acr =	119.60	mm			
ε_m =	0.000638				BS8007
W =	0.16	mm	< 0.20	OK	App. B.2

REINFORCEMENT SUMMARY for WALL

	Type	ϕ mm	Centres mm	As mm^2	Min. As mm^2	
VERTICAL EXT. FACE	H	10	200	393	390	OK
VERTICAL INT. FACE	H	12	200	565	390	OK
TRANSVERSE	H	10	200	393	390	OK

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Made by	Date	Page
dp	Nov-15	4
Checked	Revision	Job No
0	0	2707

BASE - unloaded side (per metre length)

BS8110 reference

γ_f = 1.41 (default = ult mt / non-factored mt 1.41

V ult = 55.89 kN

M ult = 53.93 kNm ('+' TENSION AT BOTTOM FACE)

BOTTOM REINFORCEMENT :	Min. As =	390	mm^2			Table 3.25
	ϕ =	16	mm			
	centres =	200	mm	< 678	OK	3.12.11.2.7(b)
	Asprov =	1005	mm^2	> 390	OK	
MOMENT of RESISTANCE :	d =	222	mm			
	z =	209.77	mm			3.4.4.4
	As' =	0	mm^2			
	Mres =	91.69	kNm	> 53.93	OK	
SHEAR RESISTANCE:	100 As/bd =	0.45%				
	vc =	0.66	N/mm^2			Table 3.8
	Vres =	146.00	kN	> 55.89	OK	3.5.5.2

CHECK CRACK WIDTH TO BS8110/BS8007 : (Temperature and shrinkage effects not included)

X =	66.38	mm	ε_m =	0.000553		BS8007
Acr =	118.82	mm	W =	0.14	mm < 0.20 OK	App. B.2

BASE - loaded side (per metre length)

V ult = 41.67 kN

M ult = -3.10 kNm (TENSION - TOP FACE)

TOP REINFORCEMENT :	Min. As =	390	mm^2			Table 3.25
	ϕ =	10	mm			
	centres =	200	mm	< 685	OK	3.12.11.2.7(b)
	Asprov =	393	mm^2	> 390	OK	
MOMENT RESISTANCE :	d =	225	mm			
	z =	213.75	mm			3.4.4.4
	As' =	0	mm^2			
	Mres =	36.50	kNm	> -3.10	OK	
SHEAR RESISTANCE:	100 As/bd =	0.17%				
	vc =	0.48	N/mm^2			Table 3.8
	Vres =	107.33	kN	> 41.67	OK	3.5.5.2

CHECK CRACK WIDTH to BS8100/ BS8007 : (Temperature and shrinkage effects not included)

X =	44.66	mm	ε_m =	-0.00249		BS8007
Acr =	120.00	mm	W =	-0.64	mm < 0.20 OK	App. B.2

REINFORCEMENT SUMMARY for BASE

	Type	ϕ mm	Centers mm	As mm^2	Min. As mm^2	
TOP (DESIGN)	H	10	200	393	390	OK
BOTTOM (DESIGN)	H	16	200	1005	390	OK
TRANSVERSE	H	10	200	393	390	OK

From: Luke Kruszelnicki [mailto:luke@klarchitects.co.uk]
Sent: 24 November 2016 16:12
To: I.Gold
Cc: John Leetch; Jacob
Subject: Re: 10 Agamemnon Road 2015/6064

Israel

I have reviewed the audit query tracker prepared by Campbell Reith you have forwarded to me yesterday and would like to comment as follows using the same referencing points as these in the actual audit:

Query No 1 - The construction sequence, underpinning details etc - all of this has been provided with the initial Basement Impact Statement prepared by David Joseph Consulting (see attached) on 18/11/2015. Campbell Reith should have a copy of this and the more detailed BIA prepared by Chelmers has been carried out in addition upon request from the planners.

Query No 2 - This can be a condition as they suggest that a detailed construction programme to be submitted at a later date by the appointed Contractor.

Query No 3 - This is something that I would envisage Chelmer need to address in their report.

Query No 4 - This is something that I would envisage Chelmer need to address in their report. However most likely they will most likely require input from a third party consultant if they do not have the facility in house, so someone like Suds Smart Pro whom you have used on Westbank. Once again I do not see a reason why this could not be addressed by a planning condition following approval where we would simply submit further details and a report.

Query No 5 - Our site is not located even close to a flood area (extract of environmental agency map attached) therefore I do not see any reasoning for a Flood Risk Assessment, which would cost you around £1,200 + VAT.

I trust that this helps and I trust that you appreciate what we have been dealing with on such small project. You can discuss my response directly with the planning officer and obtain his views on these and agree on a way forward.

Kind Regards

Luke Kruszelnicki RIBA: Director
for Kruszelnicki Leetch Architects
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