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South Lodge

Heathside

London NW3 1BL

Structural Engineering Report and Subterranean Construction Method Statement

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B	Proposed Drainage Drawings
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Non-Technical Summary

If the above measures and sequence of works are taken into account in the eventual design and construction of the proposed works and are properly undertaken by suitability qualified contractor, these works will pose no significant threat to the structural stability of the adjoining properties or surrounding grounds.

The attached report and Basement Impact Assessment (BIA) state that the proposed basement will have no significant adverse effect on the local hydrogeology. They also state that both ground water and surface water will not be affected or cause significant adverse effects to the surrounding properties.

Based on the Ground Movement Assessment carried out by Site Analytical Services (SAS), if the works are carried out in the prescribed manner, then the likelihood of damage to the adjacent properties should be limited to 'very slight or less' as set out in CIRIA Report 580.

To this end, EW will have an on-going role during the works on site to monitor that the works are being carried out generally in accordance with our design and specification. This role will typically involve weekly site visits at the beginning of the project and fortnightly thereafter.

1.0 Introduction

1.1 Elliott Wood (EW) is a firm of consulting civil and structural engineers based across offices in Central London, South West London and Nottingham. Residential developments of all scales have been central to the workload of the practice with many in the Greater London area. In particular EW have been producing designs for basements to both existing and new buildings. To date, this numbers approximately 500 sites, many of which have been in the Borough of Camden. Our general understanding of the development of London, its geology and unique features together with direct experience on many sites puts us in a strong position to advise clients on works to their buildings and in particular the design and construction of their basement.

1.2 EW have been appointed to advise on the structural implications of the proposed remodelling of the Grade 2 listed Georgian House, including a new extension with a basement and lowering the existing basement slab levels elsewhere. The following report has been prepared to ensure that the property and neighbouring properties are safeguarded during the works.

This report follows the guidance given in the Camden Planning Guidance on Basements and Lightwells and has been prepared in accordance with Policy A5: Basements and CPG: Basements. A Basement Impact Assessment has been carried out by Site Analytical Services (SAS).

1.3 The Contractor will provide a detailed method statement including all temporary works before the works can commence on site. The Contractor is to accept full responsibility for the stability and structural integrity of the works during the Contract and provide temporary support as necessary. The Contractor shall also prevent overloading of any completed or partially completed elements.

1.4 This statement should be read in conjunction with all relevant Architects and Specialists supporting documents.

2.0 Description of Existing Building and Site Conditions

2.1 The existing Grade 2 listed building at South Lodge is a semi-detached five storey Georgian house, including an existing basement. The building is assumed to be a traditional construction based on its age with timber floors and roofs, and load-bearing masonry walls.

2.2 The existing building and neighbouring properties are registered on the Camden Borough listed building register as Grade 2 listedand are situated in the Hampstead conservation area.

2.3 A site investigation was carried out at the property by SAS. The investigation comprised of one borehole to a depth of 15m, a 6m deep window sample and 7 trial pits.

2.4 The site investigation indicated that the ground comprises approximately 1m of made ground above Claygate Formation over London Clay at depth. There was slight seepage in the borehole at 4.0m deep and also in the window sample at 5.8m deep. The groundwater found within the unproductive clay formation is likely to be a result of fissure flow which will be at a very low rate due to the low permeability of the Claygate Formation layer and the lack of sand bed horizons.

2.5 There are a number of mature trees in the vicinity resulting in a number of root protection zones to some areas of the rear garden. In order to mitigate damage to the trees, suitable precautions will be made in accordance with Landmark Tree's Agricultural Report No works are proposed within the tree protection zone of the Apple Tree, T8. The works will result in an encroachment of around 7% of the existing RPA which has been assessed as having a very low impact on the tree.

2.6 The site is not located within the flood plain or at risk from surface water flooding.

2.7 There is no record of historical bomb damage to the property or the neighbouring buildings (reference, The LCC London Bomb Damage Maps 1939 – 1945, LTS, map 27).

3.0 Proposed Alterations

3.1 The proposed work involves replacing the existing non-original extension, adding a new basement and lowering some of the existing basement slab levels. Refer to Appendix A for proposed structural drawings and sections.

3.2 The new single storey basement extension will be approximately 3.5m below ground level. The perimeter walls of the new extension will be RC formed in 1m sections in a hit and miss sequence.

3.3 The new basement extension slab will be 250mm thick, rising to 350mm thick towards the wall perimeters. The 250mm thick slab will be suspended (over a suitable heave protection board) between the 350mm thick slabs which are ground bearing.

3.4 The new single storey extension above the basement will have a new 275mm thick flat RC slab spanning across the basement perimeter walls. The slab will provide propping to the RC basement walls in the permanent case.

3.5 The north most facing walls of the new extension over the basement will be reclaimed bricks and the south most facing walls will be new frameless glass walls, with the roof likely supported by a steel or Corten frame.

3.6 Elsewhere in the building, the basement slabs are to be lowered by a maximum of approximately 430mm by removing the existing slabs and casting new 150mm thick ground bearing RC slabs. The existing walls will be retained using RC underpins formed in 1m sections in a hit and miss sequence.

4.0 Proposed Below Ground Drainage

4.1 For below ground drainage information, please refer to separate SUDs report and Flood Risk Assessment by Elliott Wood.

5.0 Party Wall Matters

5.1 The proposed works development falls within the scope of the Party Walls Act 1996. Procedures under the Act will be dealt with in full by the Employer's Party Wall Surveyor. The Party Wall Surveyor will prepare and serve necessary Notices under the provisions of the Act and agree Party Wall Awards in the event of disputes. The Contractor will be required to provide the Party Wall Surveyor with appropriate drawings, method statements and other relevant information covering the works that are notable under the Act. The resolution of matters under the Act and provisions of the Party Wall Awards will protect the interests of all owners.

5.2 The structural design for South Lodge will be developed so as not to preclude or inhibit similar, or indeed any, works on the adjoining properties. This will be verified by the Surveyors as part of the process under the Act.

6.0 Basement Impact Assessment Summary

6.1 The land stability, surface flow and groundwater assessments been carried by SAS. The assessments conclude that the proposed development is unlikely to result in any specific land/slope stability issues or surface flooding issues. Further the proposed development is unlikely to affect the groundwater regime beneath, or adjacent to the site.

6.3 A Ground Movement Assessment has been carried out within SAS' report. The report concludes that the likelihood of damage to the adjacent properties will be limited to 'very slight or less' as set out in CIRIA Report 580.

7.0 Hydrogeological Statement Summary

7.1 Groundwater was not encountered during the boring operations carried out by SAS in October 2017, however slight seepage was found in the borehole at 4.0m deep and in the window sample at 5.8m deep.

7.2 The structural slab level of the basement slab is approximately 3.5m bgl. It is therefore unlikely that perched water will be encountered during the construction of the basement. Localised grouting or sealing may be required if seepages occur. Localised pumping should not be required during the construction of the basement. However, as the ground has a low permeability, this would be a suitable method of controlling any water. Relevant filters would need to be installed on the pumps to ensure migration of fines was limited.

8.0 Conclusions

8.1 It is intended that the above measures and sequence of works are adopted for the eventual design and construction of the proposed works.

8.2 Detailed method statements and calculations for the enabling and temporary works will need to be prepared by the Contractor for comment by all relevant parties including party wall surveyors and their engineers. Elliott Wood Partnership will ensure that adequate supervision and monitoring is provided throughout the works particularly during the excavation and demolition stages. A specification and indication of monitoring requirements is given in Section 9.0.

9.0 Monitoring during Excavation and Construction

9.1 The Contractor shall provide monitoring to all structures and infrastructure adjacent to the basement excavation at the time of excavation and construction.

9.2 Monitoring shall be completed as follows:

1) One month prior to any works being started to provide a base reading.
2) At the start and end of every shift during the excavation and until the basement slab and lining wall has been cast.
3) Monthly thereafter for a 6-month period following completion of the notifiable works.

9.3 Cumulative movement of survey points must not exceed:

a. *Settlement and Lateral displacement*
Code amber trigger values: +/-4mm
Code red trigger values: +/-8mm

9.4 Movement approaching critical values:

Code Amber trigger value:

All interested parties, including the Adjoining Owner's Surveyor and his Engineer should be informed and further actions immediately agreed between two of the three Surveyors and implemented by the Building Owner. Notwithstanding the Party Wall requirements, the Contractor is to appoint, and to have permanently on site, a suitably qualified Structural Engineer who will be responsible for the reviewing of the movement monitoring results at the start and end of each day and provide immediate advice, remedial works and design as necessary in the event of movement being noted. The Contractor is to ensure that he has 24 hour / 7 days a week access to emergency support provision including but not limited to additional temporary props, needles, waling beams and concrete supply at the start of the excavation and prior to any likelihood of this trigger value being reached. If this value is reached the Contractor, and his Engineer, must without delay provide all interested parties with his plan to implement any emergency remedial and supporting works deemed necessary. The Contractor must be ready to carry out these works without delay if the movement continues and approaches the trigger value below.

Code Red trigger value:

All interested parties including Adjoining Owner's Surveyor and Engineer will be informed immediately. Works will stop and be made safe using methods and equipment agreed at the above stage. The Contractor is to ensure that the movement has stopped as a result of the implemented remedial works designed and installed at this stage. The requirements of the Party Wall Act will also ensure that, two of the three Surveyors and their advising Engineers shall then enter into an addendum Award, setting out whether or not the Building Owner's works can re-commence and when, and if so agree additional precautions or modifications to the proposals prior to re-commencement.

10.0 Subterranean Construction Method Statement

10.1 Construction generally

It is assumed that the above measures and assumed sequence of works are taken into account in the eventual design and construction of the proposed works.

Detailed method statements and calculations for the enabling and temporary works will need to be prepared by the Contractor for comment by all relevant parties including Party Wall Surveyors and their Engineers. Elliott Wood will need to ensure that adequate supervision and monitoring is provided throughout the works particularly during the excavation and demolition stages.

To this end, EW will have an on-going role during the works on site to monitor that the works are being carried out generally in accordance with our design and specification. This role will typically involve weekly site visits at the beginning of the project and fortnightly thereafter. A written site report is provided to the design team, Contractor and Party Wall Surveyor.

Access onto the site will be from Heathside and must be coordinated in a sensible manner to minimise disruption to the neighbouring residents; and provide a safe working environment.

10.2 Assumed Sequence of Construction

Stage 1: Site Set-up

- Erect a fully enclosed painted plywood site hoarding around the site, this should not impede on the neighbouring properties.
- The services within the site should be identified and isolated as necessary. All below ground obstructions should also be removed to allow the works to progress.
- The principles for the removal of spoil shall be agreed. Given the scope of the works it is likely that conveyors will be used to move the spoil from within the building to a holding skip located in the back garden/driveway. Grab lorries will be used to remove the material from the skip.
- Tree Protection methods to be agreed and installed to all retained trees.
- Monitoring points should be installed to all neighbouring structures and infrastructure and a base reading should be taken prior to any construction works starting on the site.

Stage 2: Internal Soft Strip & Demolition

- Complete soft strip of relevant internal finishes within the building.
- Carefully demolish the existing back of the building down to ground floor level in a staged sequence (tbc by the Contractor).

Stage 3: RC Underpins to Rear Extension

- Form RC underpins in 1m sections in an agreed hit and miss sequence for the new basement extension to the rear of the building. Provide contractor-designed propping to the wall, designed to resist sliding and overturning to the earth, surcharge and hydrostatic pressures.
- Maintain adequate support to the new RC wall as necessary and excavate down to formation level.

Stage 4: Cast Rear Extension Basement Slab

- At formation level lay blinding and void former and install below ground drainage as required.
- Install reinforcement for the basement slab and dowel this into the toes of the underpins.
- Cast reinforced concrete basement slab.
- Once the basement slab has cured, it will act as a prop in the permanent case to the underpins.

Stage 5: Cast Rear Extension Ground Floor Slab

- Install reinforcement for the ground floor slab.
- Cast reinforced concrete ground floor slab.
- Once the ground floor slab has cured, it will act as a prop in the permanent case to the tops of the underpins.

Stage 6: Construct Superstructure

- Once the slabs and underpins have cured, the remaining superstructure of the single storey extension can be constructed.

Stage 7: Underpins for Existing Basement Lowering

- Form RC underpins in 1m sections in an agreed hit and miss sequence for the new basement extension to the rear of the building. Provide contractor-designed propping to the wall, designed to resist sliding and overturning to the earth, surcharge and hydrostatic pressures.
- Maintain adequate support to the new RC wall as necessary and excavate down to formation level
- Demolish the remaining existing basement slabs.

Stage 8: Cast Basement Slab for Existing Basement Lowering

- At formation level lay blinding and void former and install below ground drainage as required.
- Install reinforcement for the basement slab.
- Cast reinforced concrete basement slab.
- Once the basement slab has cured, it will act as a prop in the permanent case to the underpins.

11.0 Noise, Vibration and Dust

Below we have described the mitigation measures that are proposed to keep noise, dust and vibration to acceptable levels during construction.

11.1 Mitigation Measures for Demolition of Existing Building

Breaking out existing structures shall be carried out by diamond saw cutting and hydraulic bursting where possible to minimise noise and vibration to the adjacent properties. All demolition and excavation work will be undertaken in a carefully controlled sequence, considering the requirement to minimise vibration and noise. The contractor will need to utilise non-percussive breaking techniques where practicable.

As the property is semi-detached, noise and vibrations may transfer via the connecting slabs and walls to the neighbouring building. The contractor should ensure that slabs connecting to the neighbouring property are diamond saw cut first along the boundary to isolate the slab.

Dust suppression equipment should be used during the demolition process to ensure that any airborne dust is kept to a minimum.

11.2 Mitigation Measures for Bulk Excavation

Due to the size of the basement it is likely that mechanical plant will be required to complete the bulk excavation. The contractor should ensure that any mechanical plant is switched off when not in use and is subject to regular maintenance checks and servicing.

11.3 Mitigation Measures for the Construction of the concrete shell

The contractor should ensure that any concrete pours are completed within the permitted hours for noise generating works. The contractor should allow for a contingency period to ensure that concrete pours can be completed within these hours regardless of unforeseen circumstances such as batching plant delays and traffic congestion.

The fabrication and cutting of steelwork for the reinforced concrete walls and underpins shall take place off site. If any rebar needs to be trimmed on site this should be completed using hydraulic or pneumatic tools instead of angle grinders.

11.4 Dust Control

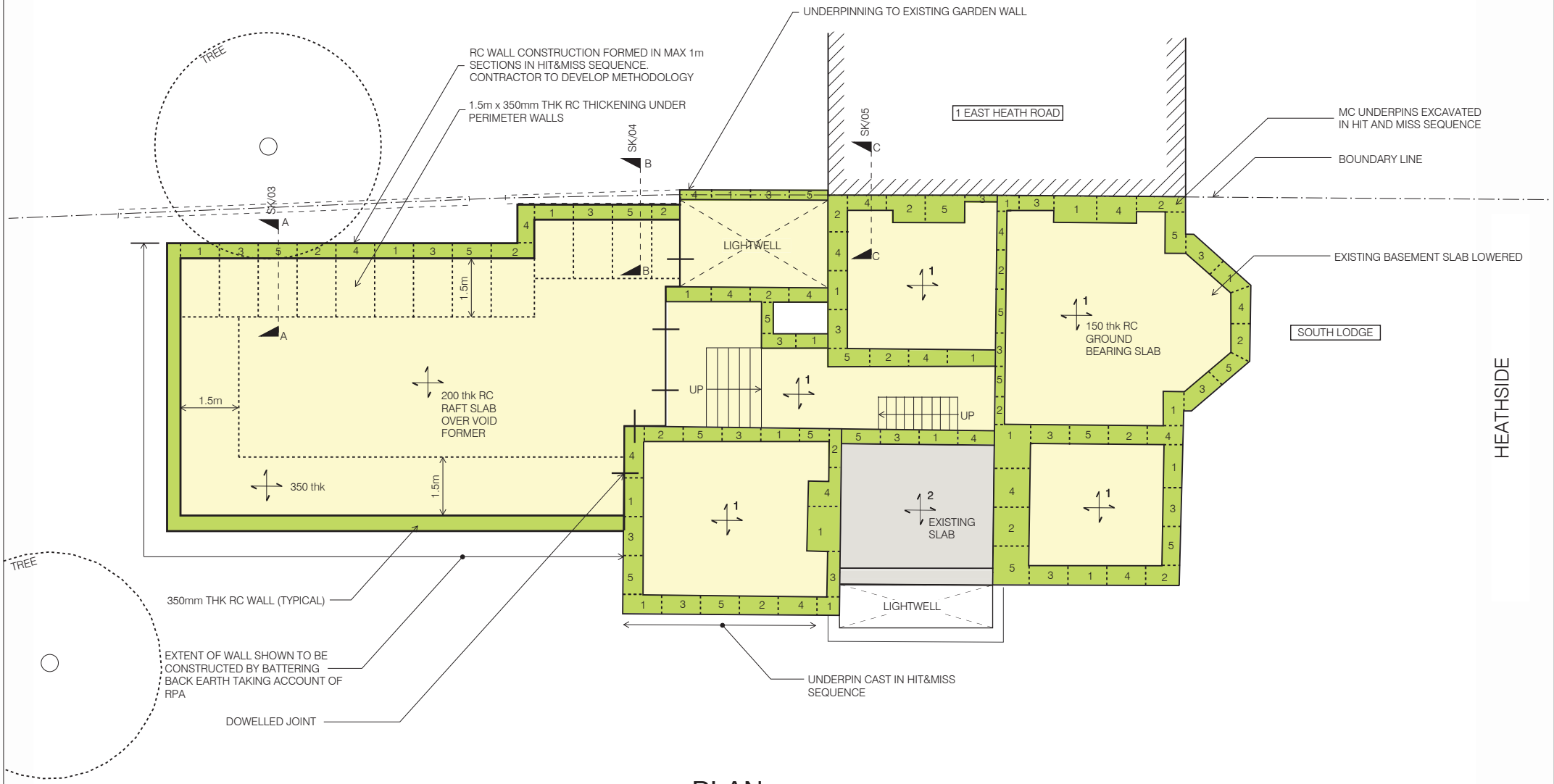
To reduce the amount of dust generated from the site, the contractor should ensure that any cutting, grinding and sawing should be completed off site where practicable. Any equipment used on site should be fitted with dust suppression or a dust collection facility.

The contractor will be responsible for ensuring good practice with regards to dust and should adopt regular sweeping, cleaning and washing down of the hoardings and scaffolding to ensure that the site is kept within good order. The contractor selected will be a member of the Considerate Contractors Scheme. Contact details of the contractor who will be responsible for containing dust and emissions within the site will be displayed on the site boundary so that the local residents can contact the contractor to raise any concerns regarding noise and dust.

The building will be enclosed within suitable scaffold sheeting and any stockpiles of sand or dust-generating materials will be covered. Cement, fine aggregates, sand and other fine powders should be sealed after use.

APPENDICES

APPENDIX A – PROPOSED STRUCTURAL DRAWINGS



PLAN

rev	date	by	chk	description
P2	08/05/18	WB	GS	Preliminary
P1	23/04/18	OB	AM	Preliminary

sketch title
PROPOSED BASEMENT PLAN

SKETCH

scale (s)	date	drawn
1:100@A3	23/04/18	OBa

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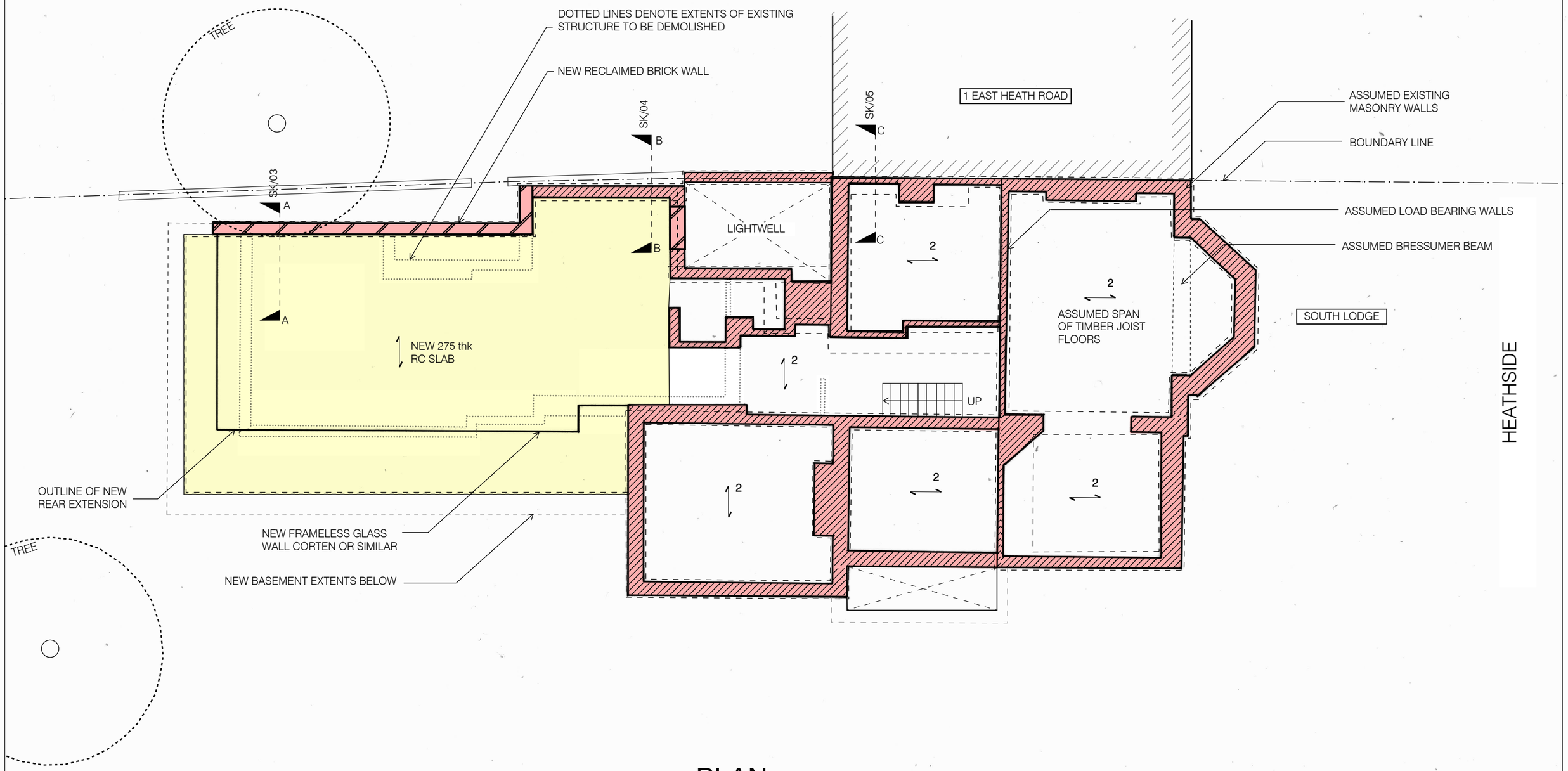
Project no.	
2170605	
Sketch no.	revision
SK/01	P2



PLAN

rev	date	by	chk	description
P1	23/04/18	OB	AM	Preliminary

sketch title
PROPOSED GROUND FLOOR PLAN

SKETCH

scale (s)	date	drawn
1:100@A3	23/04/18	OBa

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2170605	
Sketch no.	revision
SK/02	P1

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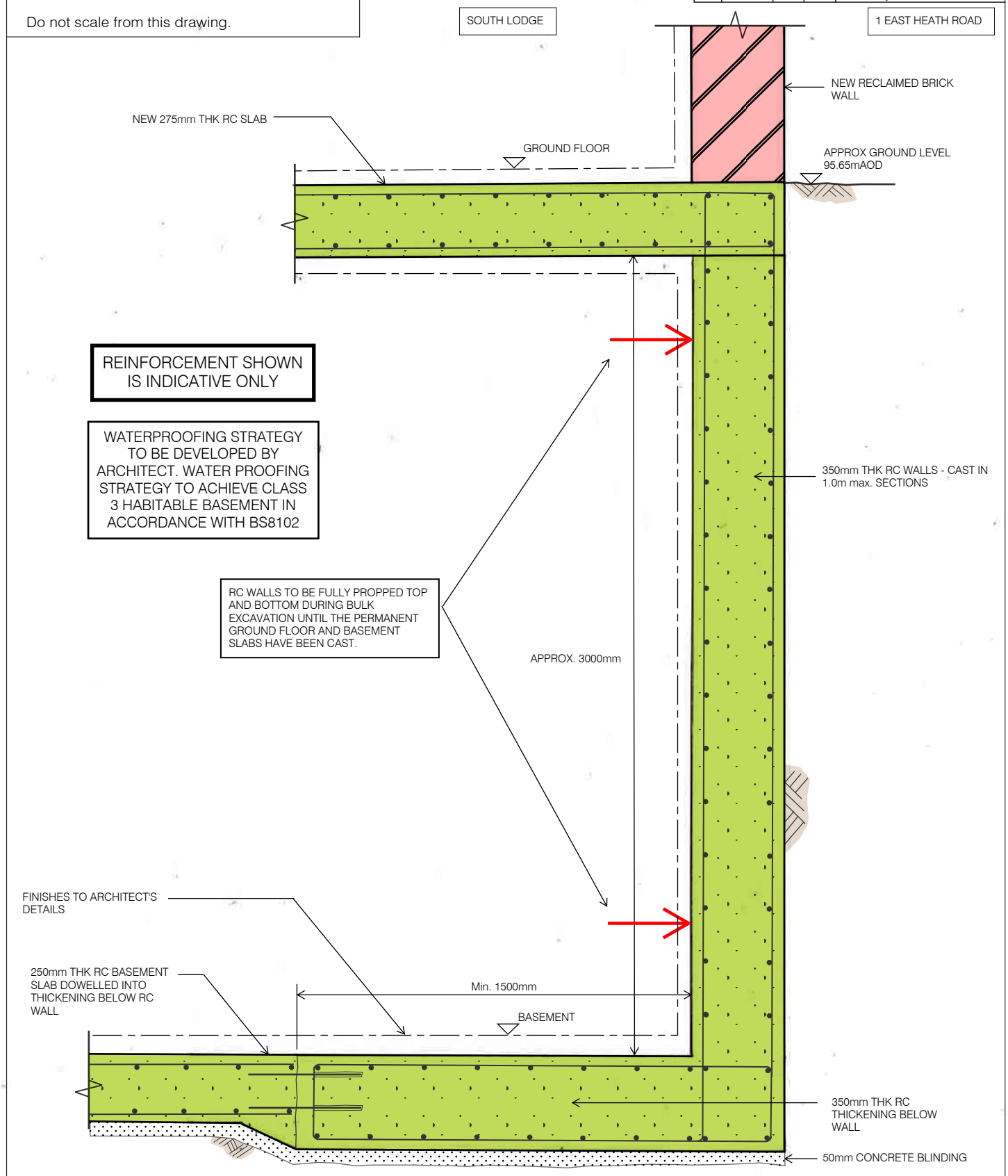

drawing title

PROPOSED SECTION A-A
RC WALL - TYPE 1

scale (s)	date	drawn
1:20@A4	23/04/18	OBa

drawing status
PRELIMINARY

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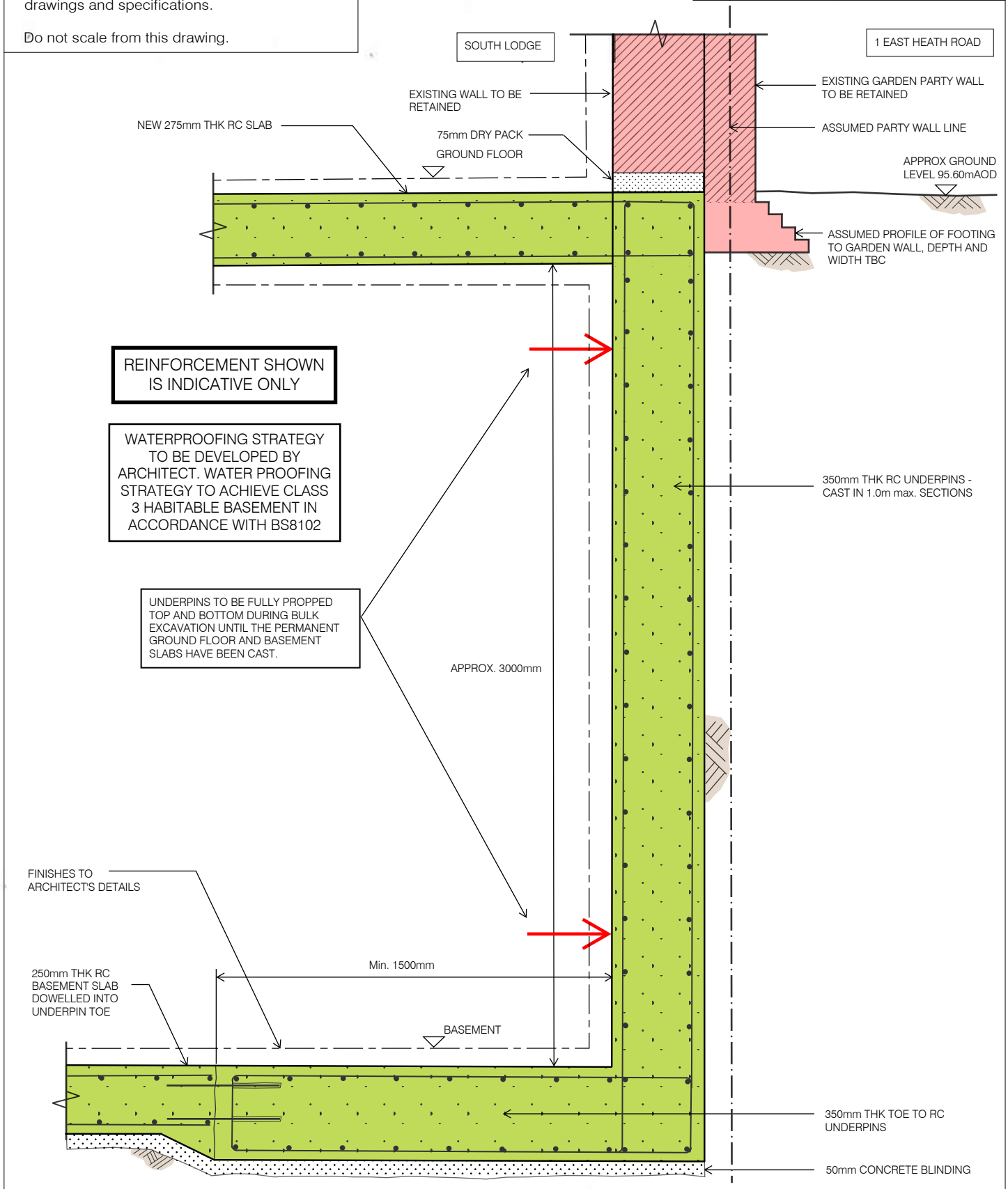

drawing title

PROPOSED SECTION B-B
UNDERPIN TYPE 2

scale (s)	date	drawn
1:20@A4	23/04/18	OBa

drawing status

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job no	drawing no	revision
2170605	SK/04	P1

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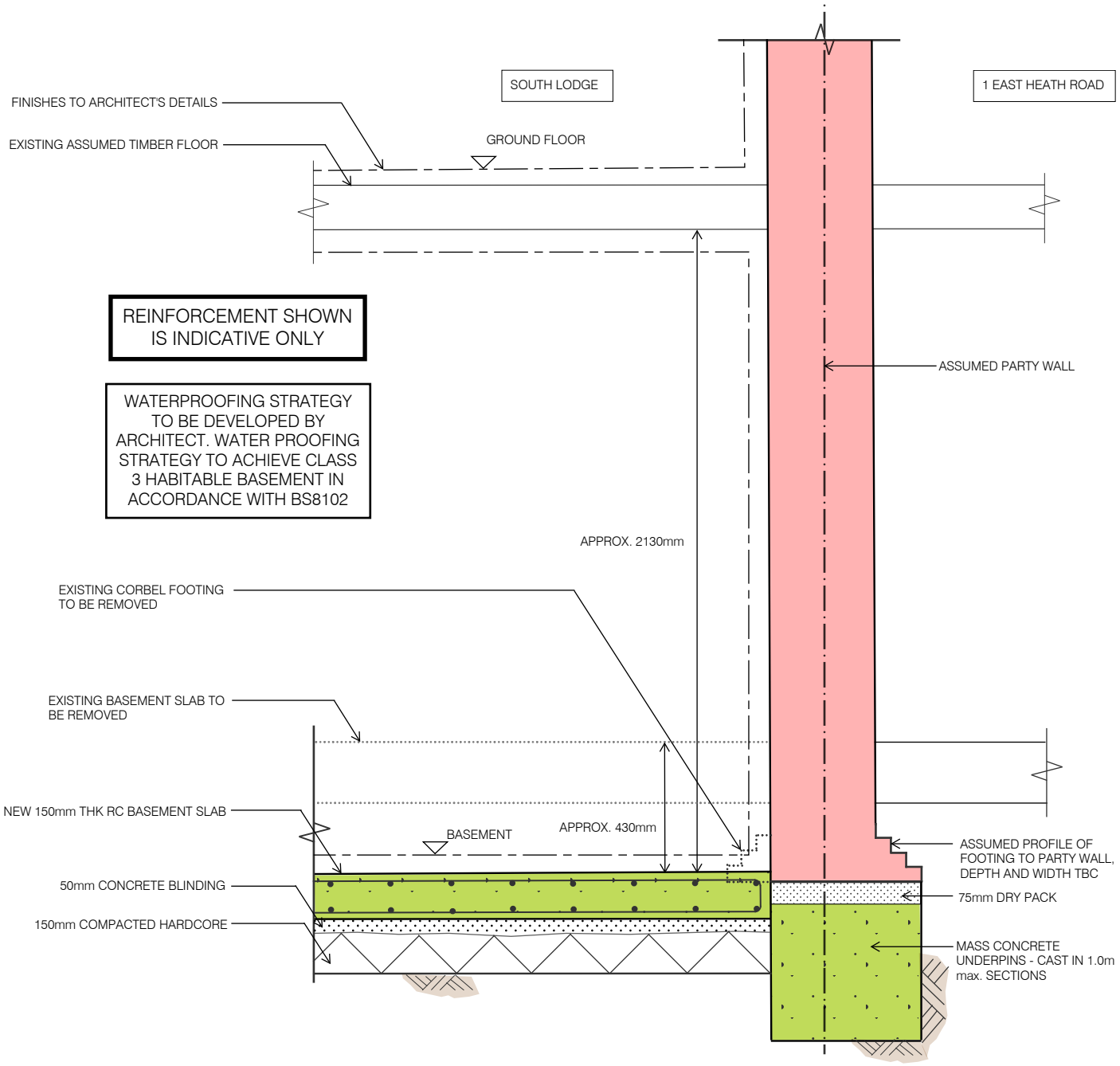

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PROPOSED SECTION C-C
UNDERPIN TYPE 3

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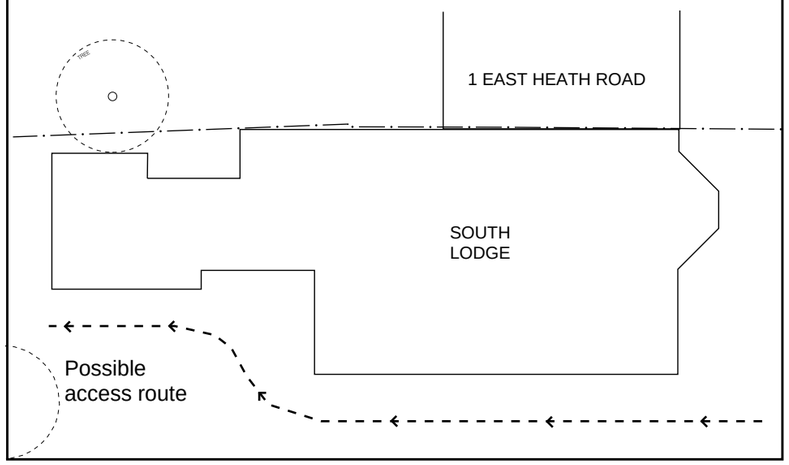
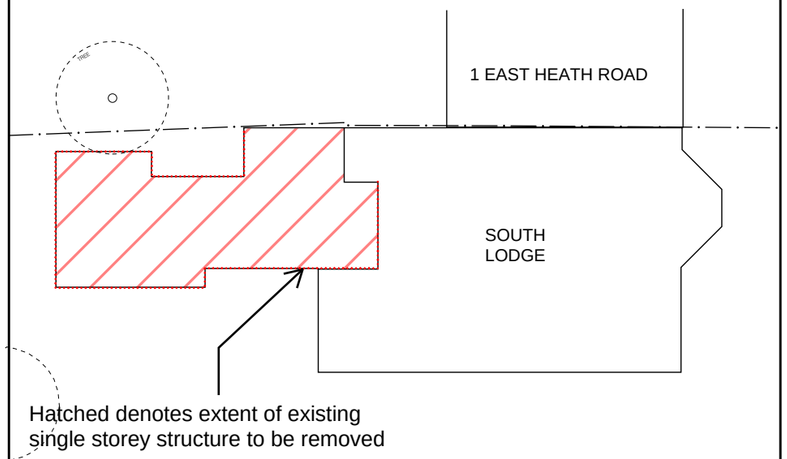
job no	drawing no	revision
2170605	SK/05	P1

APPENDIX C – ASSUMED SEQUENCE OF CONSTRUCTION

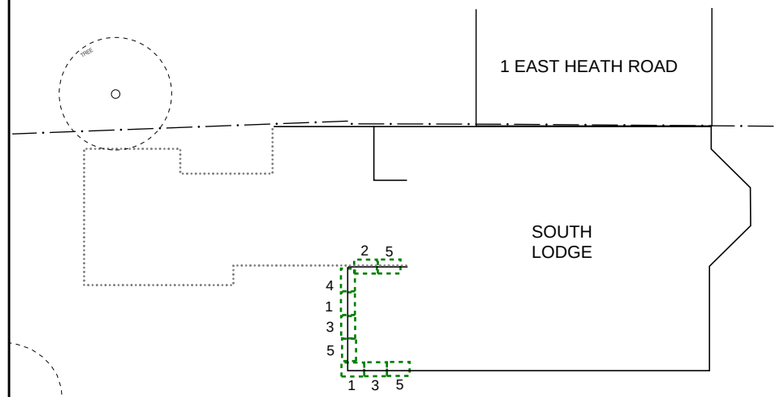
1 Site set up
- Provide protection to trees if required
- Install hoarding



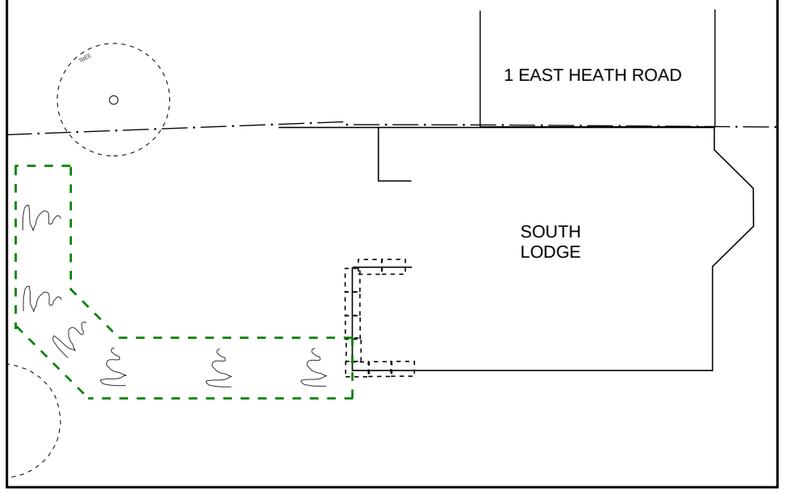
2 Demolish existing rear portion of building



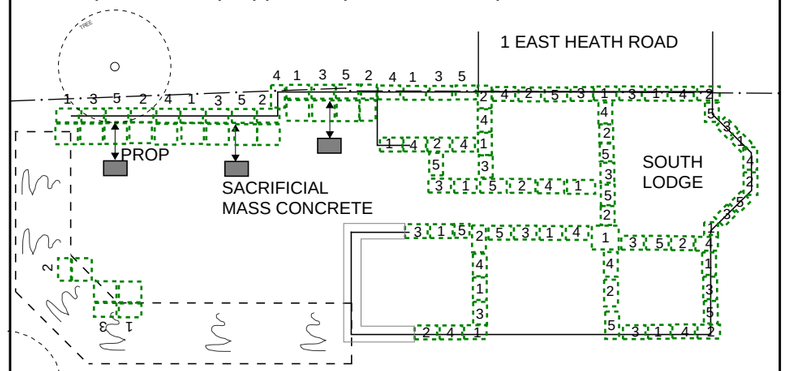
3 Underpin extent of existing property shown to enable new basement construction to commence



4 Commence battering back of earth in extent indicated for access to underpins against 1 East Heath Road

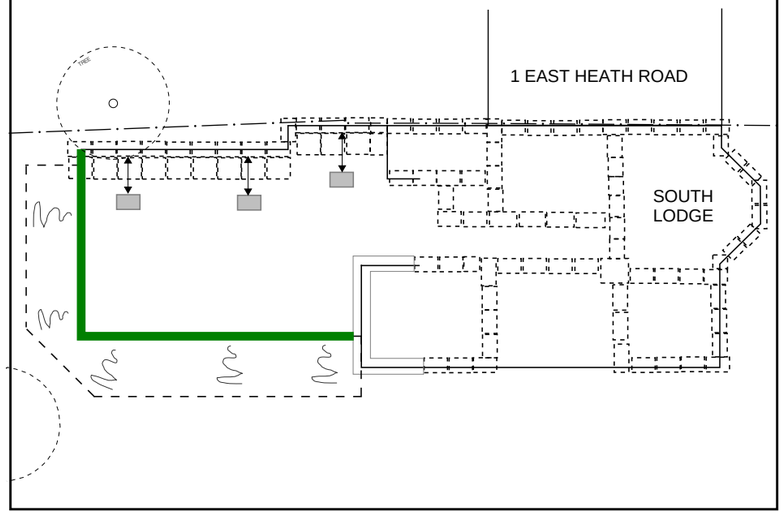


5 Underpin remaining extent of new basement as well as existing walls below main house. Discrete underpins to be excavated to avoid tree roots. RC basement walls to also be formed in 1m sequence and propped as per basement plan.



(note: propping of retaining wall and sacrificial foundation to be provided)

6 Build remaining RC wall



PLANS

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sketch title
SUGGESTED SEQUENCE OF CONSTRUCTION
- SHEET 1/2

SKETCH

scale (s)	date	drawn
NTS	23/04/18	OBa

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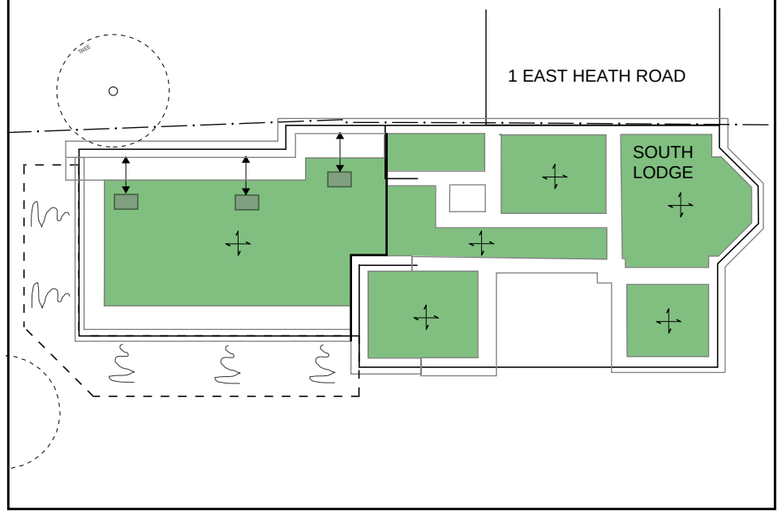
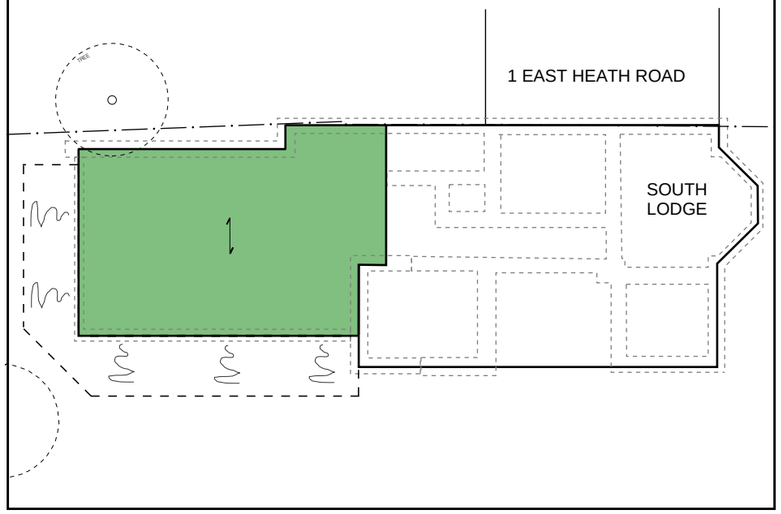
Sketch no.
SK/06

revision
P2

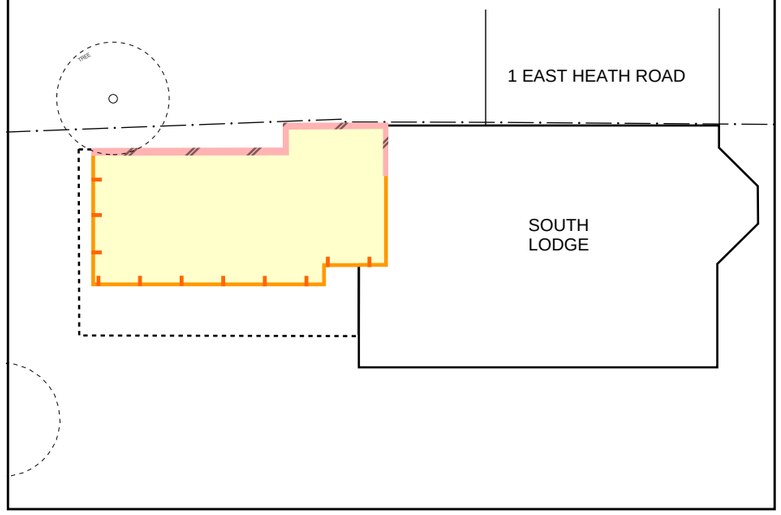
7 Cast basement slabs. Remove temporary props to once slab has gained strength



8 Cast ground floor slab, and remove all props



9 Complete superstructure construction



PLANS

rev	date	by	chk	description
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P1	23/04/18	OB	AM	Preliminary

sketch title
SUGGESTED SEQUENCE OF CONSTRUCTION
- SHEET 2/2

SKETCH

scale (s)	date	drawn
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