London - The Court

Visual Structural Survey - Rev 1

Ref: G24167

Date: 21st January 2019

THOMASONS

Contents

Appendices

Revision	Date	Written by	Checked by
1	21.01.2019	J Breed	D Vaughan
0	16.11.2018	J Breed	D Vaughan

1. Introduction

Thomasons was instructed by Kim Wiper of Mitchells and Butlers, the client, on 5th November 2018, to undertake a visual structural survey of the pavement lights and supporting structure at The Court, 108a Tottenham Court Road, London, W1T 5AA.

The purpose of the survey was to inspect the condition of the pavement lights and supporting structure and to provide recommendations with outline proposals for remedial action as required.

Our engineer, James Breed, met with Peter, the duty manager, at 09:00am on Tuesday 6th November.

2. Description

The court is a four-storey building with a basement situated on the corner at the junction between Tottenham Court Road and Maple Street (Photos 1-2). The basement extends beyond the line of the building façade and underneath the pavement on the south and east elevations. The building is primarily of masonry construction. It is understood that the building is partly listed.

The ground and first floor levels are used as a restaurant/bar. The upper floors are understood to be used as residential apartments. The basement is primarily used for storage.

Upon arrival at site, our engineer located the area of concern, being situated in the basement on the south side of the building, directly below and extending east from the side entrance (Photos 3-5). It was noted that there are two pavement lights to the west of the side entrance (Photo 6) and that the basement almost certainly extends below them. Access was not provided to this area of the basement, which is understood to be behind a locked door at the west end of the basement.

3. Findings

Refer to Appendix A – Photographs and Appendix B – Sketches.

The basement south extends approximately 4.5m beyond the south elevation. A corridor projecting approximately 1.6m beyond the south elevation is bordered by masonry walls at least one-brick thick which support the external floor structure including a steel pavement light at ground floor level (Photos 7-8). The corridor is located directly below the seating area. The head room in the corridor is typically 2.3m. The corridor houses numerous services, including a gas metre and a heat dump. The corridor is also used for access to several barrel vaulted rooms, which are approximately 2.9m wide and have a span of approximately 2.3m. The barrel vaults are understood to be located directly below the pavement and partially beneath Maple Street. The barrel vaults are used for storage.

The external floor structure at ground floor level over the corridor consists of a various forms of construction along its length. At the west end, a length of approximately 2.2m of the ground floor is a filler joist floor of approximate thickness 250mm (Photo 9). The joists span approximately 1.6m and are supported by a masonry wall at the south end and a masonry wall or a steel beam at the north end (Photos 10-11). The filler joists are likely to be an historic 127x80mm I section. The bottom flanges of the filler joists are severely corroded and the steel is delaminating.

The steel beam supporting several filler joists, which spans approximately 2.4m between two masonry piers on either side of the side entrance, is most likely an historic steel 152x131mm I section. The beam is likely to also support a portion of the internal ground floor. The beam is severely corroded and the steel is delaminating.

There is a steel pavement light supported on an arrangement of steel trimmer beams on the east side of the side entrance (Photos 12-14). The pavement light is approximately 1x1.1m on plan. The pavement light lattice has numerous small openings by design. The soffit of the pavement light has corroded (Photo 15). The trimmer beams supporting the pavement light are most likely an historic

steel 127x80mm I section. The beams are severely corroded and the corrosion section loss is equal to the full thickness of the web for at least one of the beams (Photo 13).

To the east of the pavement lights, over a length of approximately 2.9m the ground floor is typically a reinforced concrete (RC) slab, approximately 100mm deep, supported on the masonry walls and several downstand steel beams. The downstand beams are most likely an historic steel 121x46mm I section. The beams are severely corroded and the steel is delaminating. The RC slab has spalled at several locations and the reinforcement in the bottom of the slab is exposed and visibly corroded (Photo 16).

There is a one-brick thick masonry partition wall, in which an opening has been formed, approximately 3.1m to the east of the side entrance (Photo 17). A strip of brickwork, approximately 215mm wide over the top of the opening has been left unsupported (Photo 18).

On the east side of the partition wall the basement corridor continues to the south east corner of the building. The ground floor is most likely a reinforced concrete slab spanning between the masonry walls, however it has a rendered soffit and as such could not be inspected. Approximately 2.8m to the east of the partition wall the ground floor is supported on a one-brick thick bonded masonry arch (Photo 19).

The surfaces including soffits, walls and floors in the basement are generally damp. A thick coat of dirt and plant matter has accumulated on the majority of the walls. The bricks and mortar in the masonry walls generally feel solid.

4. Conclusion

The damp environment has been caused by a combination of penetrating damp, rising damp and condensation. Water is able to penetrate the slab at ground floor level via holes in the pavement lights and at the joints between the different components. Water is also able to rise up the masonry walls, which probably have an inadequate or perished DPC, and around the edges of the basement slab via capillary action. The heat dump, which discharges into the corridor will also result in condensation as the warm air condenses on the cold surfaces in the unheated basement.

The corrosion of the steelwork has occurred as a result of the damp environment. The corrosion of all of the steel beams is severe. The steel has delaminated and there has been significant loss of section. As a result, the load carrying capacity of the steelwork has effectively been reduced to below safe limits. The steel beams should therefore be replaced. For the most part, the external ground floor and steel beams are integral so the replacement of the steel beams will also necessitate the replacement of the external ground floor structure.

The RC slab is most likely to have spalled due to carbonation of the concrete leading to a reduction in pH. The depth of carbonation is likely to exceed the cover to the reinforcement and the lower pH, in combination with the presence of water, has caused it to corrode. This corrosion has led to swelling and expansive forces causing the concrete slab soffit to spall. Verification of the cause for the spalling would require carbonation testing to be undertaken.

5. Recommendations

Refer to sketches SK101 and SK102. The following actions are recommended:

1. Install props to provide temporary support to the external floor structure at ground level in the location identified on SK101 immediately.
2. Undertake intrusive survey to establish the direction of span and supporting element(s) for the internal ground floor. Subject to the results of the intrusive survey, prop the ground floor as identified on SK101.
3. Obtain access to basement west (as identified on SK101) and undertake visual survey of structural elements.

4. Isolate/re-route existing services as required.
5. Remove the existing external ground floor structure (including corroding steel beams) below the seating area, in the region identified on SK101.
6. Install new, galvanised steel beams and new composite slab with waterproof coating/damp proof membrane, as identified in outline scheme on SK102. Beam and slab design shown is indicative only. Detailed design, which is yet to be undertaken, is to consider highways loading subject to agreement with local authority. Re-use of existing pavement light (featuring perforations) is dependent on the above and whether water ingress is accepted.
7. Repair/replace loose brickwork in pier adjacent to access door.
8. Install new steel beam to support brickwork over opening in wall in basement south. Alternatively, infill opening with masonry around existing services.

Thomasons would be able to provide detailed design services for the above recommendations if so instructed.

6. Further survey

Further to recommendations 1 and 3 above, Thomasons was instructed by Kim Wiper of Mitchells and Butlers, the client, on 5th December 2018, to undertake a visual structural survey of the pavement lights and supporting structure in the basement west at The Court, 108a Tottenham Court Road, London, W1T 5AA. Thomasons were also instructed to produce a scope of works. The survey was carried out by James Breed on Monday 10th December.

For findings, refer to Appendix A – Photographs and Appendix B – Sketches. The basement west is of similar size and construction to the basement south (Photos 21-28). The external floor structure at ground floor level over the corridor is typically a reinforced concrete (RC) slab, approximately 100mm thick, supported on the masonry walls and several downstand steel beams. The downstand beams are most likely an historic steel 121x46mm I section. The beams are severely corroded and the steel is delaminating. The RC slab has minimal cover to reinforcement and the reinforcement in the bottom of the slab is exposed and visibly corroded. There is a slight crack through the slab at the west end. There are two pavement lights in the concrete slab. The pavement lights are approximately 1x0.6m on plan. The pavement light lattices have numerous small openings by design. The soffits of the pavement lights have corroded. At the west end of the corridor there is a masonry arch over the corridor. The arch is constructed of two bonded rings of masonry. Several bricks are missing from the arch intrados.

The deterioration of the structural elements has occurred due to the reasons identified in Section 4 above. The load carrying capacity of the steelwork has been reduced below safe limits and the steelwork therefore needs to be replaced. The reinforced concrete slab has inadequate cover to reinforcement, which is corroding, and is cracked at the west end. Whilst it may be possible to install corrosion inhibitors and increase the cover to the reinforcement, the extent of the corrosion is not fully known, this approach may not provide for a satisfactory design life and it would require a higher level of ongoing maintenance and repair.

It is therefore considered sensible to replace the concrete slab particularly given the cost savings to be made by replicating the design and detailing and set-up works required for the basement south. The pavement lights are corroding, are not sufficient to take the highways agency point loads and allow the ingress of water. The pavement lights should therefore be replaced.

The adoption of accidental loading due to HGV's is in the absence of advice to the contrary. This is to ensure that sufficient allowance has been included for tended pricing. Previous experience has necessitated compliance with Highways approval to BD2/12.

Temporary propping was provided to the ground floor slab in the basement south and west (Photos 20-28).

7. Scope of works

Refer to SK100-A, SK101-A, SK102-A, SK103, SK104 and SK105.

8. Standard section

This report is the property of Thomasons Ltd and is confidential to the client designated in the report. Whilst it may be shown to his professional advisors, the contents are not to be disclosed to, or made use of, by any third party, without our express written consent. Without such consent, we can accept no responsibility to any third party.

Whilst every effort will be made to fully inspect those parts of the building requested of us, no permanent or secured fixtures and fittings will have been removed. We will not have inspected woodwork or other parts of the structure which were covered, unexposed or inaccessible and we are unable to report that any such part of the property is free from defect.

Thomasons certify that they have carried out the works contained herein with due care and diligence to their best belief and knowledge based on the time and information available.

This report is made on behalf of Thomasons. By receiving it and acting on it, the client – or any third party relying on it – accepts that no individual is personally liable in contract, tort or breach of statutory duty (including negligence).

Appendix A
Photographs

Photograph 1 – The Court, looking northwest

Photograph 2 – The Court, looking west along south elevation

Photograph 3 – Entrance (over basement south), South elevation (1)

Photograph 4 – Entrance (over basement south), South elevation (2)

Photograph 5 – Seating area (over basement south), South elevation

Photograph 6 – Seating area (over basement southwest) - access to basement not provided

Photograph 7 – Basement south, looking west

Photograph 8 – Basement south, looking east

Photograph 9 – Filler joist floor in basement south

Photograph 10 – Masonry pier with missing bricks in basement south

Photograph 11 – Corroded primary beam in basement south

Photograph 12 – Corroded beams in basement south

Photograph 13 – Corroded pavement light trimmer beam in basement south (1)

Photograph 14 – Corroded pavement light trimmer beam in basement south (2)

Photograph 15 – Corroded pavement light soffit

Photograph 16 – Exposed and corroded reinforcement in RC slab in basement south

Photograph 17 – Opening in masonry wall in basement south

Photograph 18 – Unsupported brickwork over opening in basement south

Photograph 19 – Masonry arch in basement south corridor

Photograph 20 – Temporary props installed in basement south

Photograph 21 – Basement west, looking east

Photograph 22 – Basement west, looking west (1)

Photograph 23 – Basement west, looking west (1)

Photograph 24 – Crack in ground floor slab soffit, basement west

Photograph 25 – Pavement/steps over basement west

Photograph 26 – Pavement light in basement west

Photograph 27 – Missing lintel in basement west

Photograph 28 – Temporary prop installed in basement west

Appendix B
Sketches

1. Design Standards

- EC1: Actions on structures.
- EC2: Design of concrete structures.
- EC3: Design of steel structures.
- EC5: Design of timber structures.
- EC6: Design of masonry structures.

2. Key

- U.N.O. = Unless noted otherwise
- All dimensions in mm (U.N.O)

3. Steelwork

- Exact dimensions for of all new steelwork to be determined by fabricator/ builder on site prior to fabrication.
- Steelwork fabrication is to be in accordance with the NSSS for Building Construction 6th Edition CE Marking Version and include CE marking.
- Minimum Grade S275JO.
- All new steel beams supporting existing masonry walls to be pre-deflected by driving steel wedges between the bottom of the wall and the top flange of the beam and packing with dry pack mortar.
- Twin beams to be bolted back to back via M20 bolts at 0.5m max horizontal centres, aligned centrally.
- All steelwork to be hot dip galvanised.
- Elements exposed within external wall cavities to receive 2 additional coats of bituminous emulsion locally.
- All beams bearing onto masonry to have a minimum end bearing of 225mm (see also padstones)
- All bolts to be grade 8.8. Minimum 2 No M16 bolts per steel to steel connection.
- All welds to be 6 mm fillet weld or full strength butt weld.
- Provide 30 minute fire protection to internally exposed steel beams via 15 thick 'Firecase' system by British Gypsum (or similar approved).
- Existing bearings to be enhanced and used where possible (as opposed to breaking out additional brickwork to create new bearings).

4. Masonry

- All new brickwork to have a minimum compressive strength of 20 N/mm^2.
- Depth of any chases in walls not to exceed 30mm.
- All mortar below dpc: Designation (ii)/ Strength Class M6.
- All dry pack mortar: 1:3 OPC:Sharp sand.
- New walls to be tied to existing walls via proprietary stainless steel wall starters (WS090 by Expamet or similar approved) or block bonding.
- All external facing bricks to match existing.

5. Concrete

- All concrete to conform to BS 8500-2
- All mass concrete below ground: Designated mix GEN3.
- All mass concrete above ground: Designated mix RC25/30 (1:2:4 by volume OPC/ Sand/ Aggregate).
- All reinforced concrete: Designated mix RC25/30. Minimum $300kg/m^3$ cement, 0.6w/c, 3.5% air entrainment with freeze/thaw resistant aggregate.

6. Precast Concrete

- All precast concrete solid composite planks at ground floor level to specialist detail.
- Design Loadings:
  - DL (finishes) = $1.75kN/m^2$
  - IL (flooring) = $5.00kN/m^2$ UDL or 60kN CL
- New composite slab at ground level to be 100mm thick RC25/30 concrete on 100mm thick Bison solid precast planks. A393 mesh top, 35mm cover.
- New pavement lights to cater for 60kN point load. Use Luxcrete P150-100 or similar.

7. Construction/ proprietary products

- All construction products used in the works are to carry the CE mark in accordance with the Construction Products Regulation (CPR).
- All proprietary products to be installed in accordance with manufacturer's recommendations.

8. Lintels

- Minimum end bearings 150 mm placed onto full brick/ block.
- All proprietary steel lintels to be hot dip galvanised & insulated.
- All fabricated steel lintels to be hot dip galvanised and insulated.
- Where steel or concrete lintels are specified an equivalent lintel by Catnic may be used if available.

9. Padstones

- Mass concrete padstones to be cast in-situ as bearings for all new steel beams supported on masonry.
- Padstones to be 460mm long, 200mm (min.) wide & 225mm high (U.N.O).
- Pre-fabricated concrete padstones (if used) must be bedded onto full bricks or blocks and depth increased accordingly. Bearing onto cut bricks/blocks less than 65mm thick will not be acceptable.

10. Drainage

- All rainwater drainage to connect to existing mains drainage.

11. Existing services

- All existing services to be re-routed temporarily (not all services are shown on drawings).
- Gas to be cut off temporarily & pipe route purged in accordance with suppliers health and safety requirements.

12. Miscellaneous

- All proposed works are subject to intrusive investigation during the remedial works phase. All elements to be removed or altered should be fully exposed as soon as possible once works begin on site and proposals reviewed. The existing construction may require modifications to proposals shown. If required, refer back to Thomasons for further advice.

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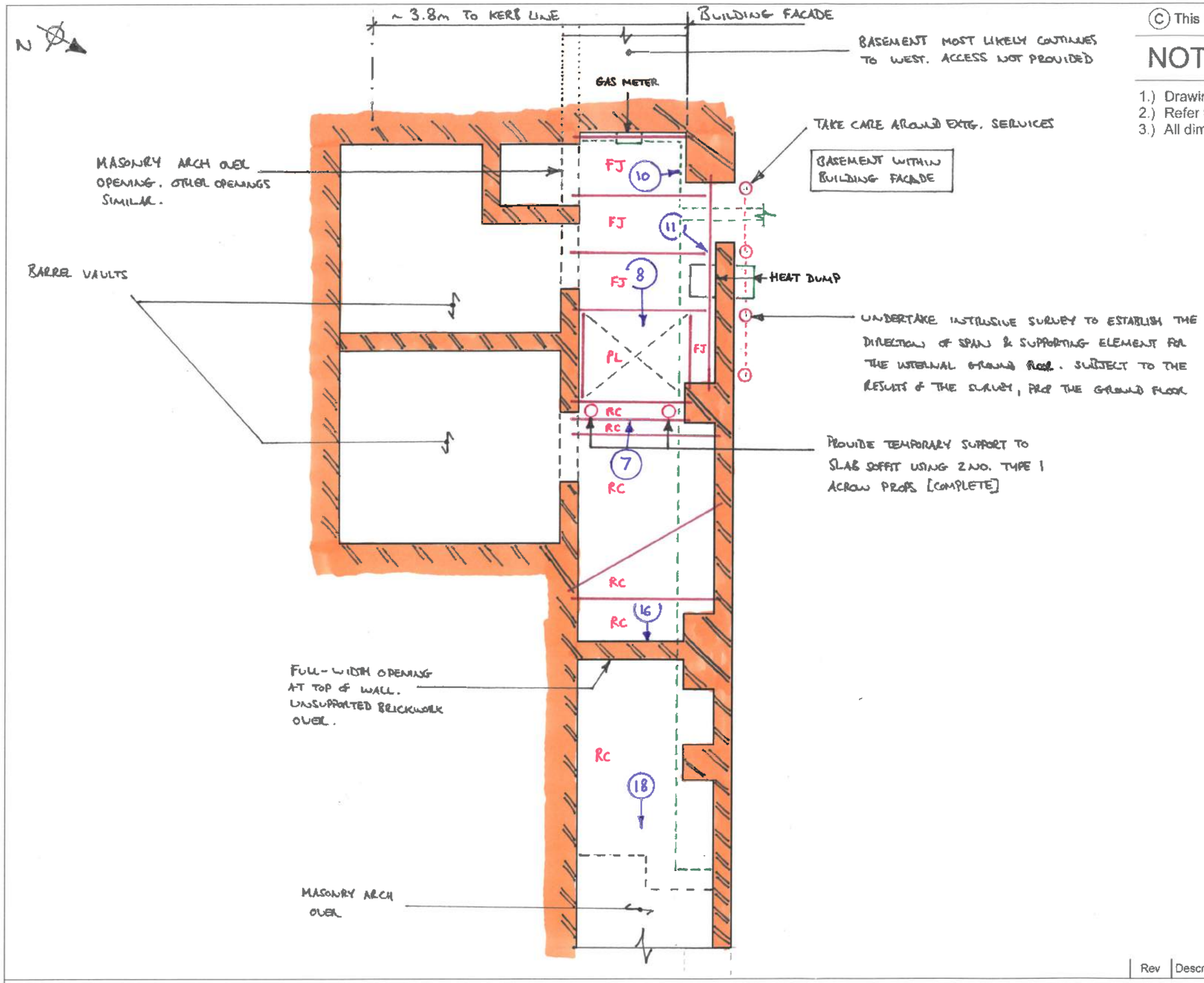
86 Epsom Road, Guildford, Surrey GU1 2BX | Tel: 01483 565 886

Project: The Court, London			
Description: General notes			
Status: Tender		Scale: N.T.S.	Rev: A
Originator: JBB	Checked: DV	Passed: RM	
Project/Sk no: G24167/SK100		Date: Nov-18	



NOTES

1.) Drawing to be read in conjunction with all others.
2.) Refer to G24167/SK100 for general notes.
3.) All dimensions in mm unless noted otherwise.

LEGEND

- DENOTES EXTG. STEEL BEAM
- FJ — DENOTES FILLER JOIST FLOOR @ GRD.
- PL — DENOTES PAVEMENT LIGHT AT GRD.
- RC — DENOTES REINFORCED CONCRETE SLAB AT GRD.
- (#) — DENOTES PHOTO LOCATION (SELECTED)
- - - - DENOTES EXTG. SERVICE RUN
- (!) — DENOTES NEW ACROW PROP & SPREADER PLATE

Rev	Description	By	Date	Chkd

Status: INFORMATION

Project No.	Zone	Level	Role	Drawing No.	Revision
G24167				SK101	A

Scale	Drawn	Chkd	Passed	Date	Size
N.T.S.	JBB	DJV		NOV-18	A3

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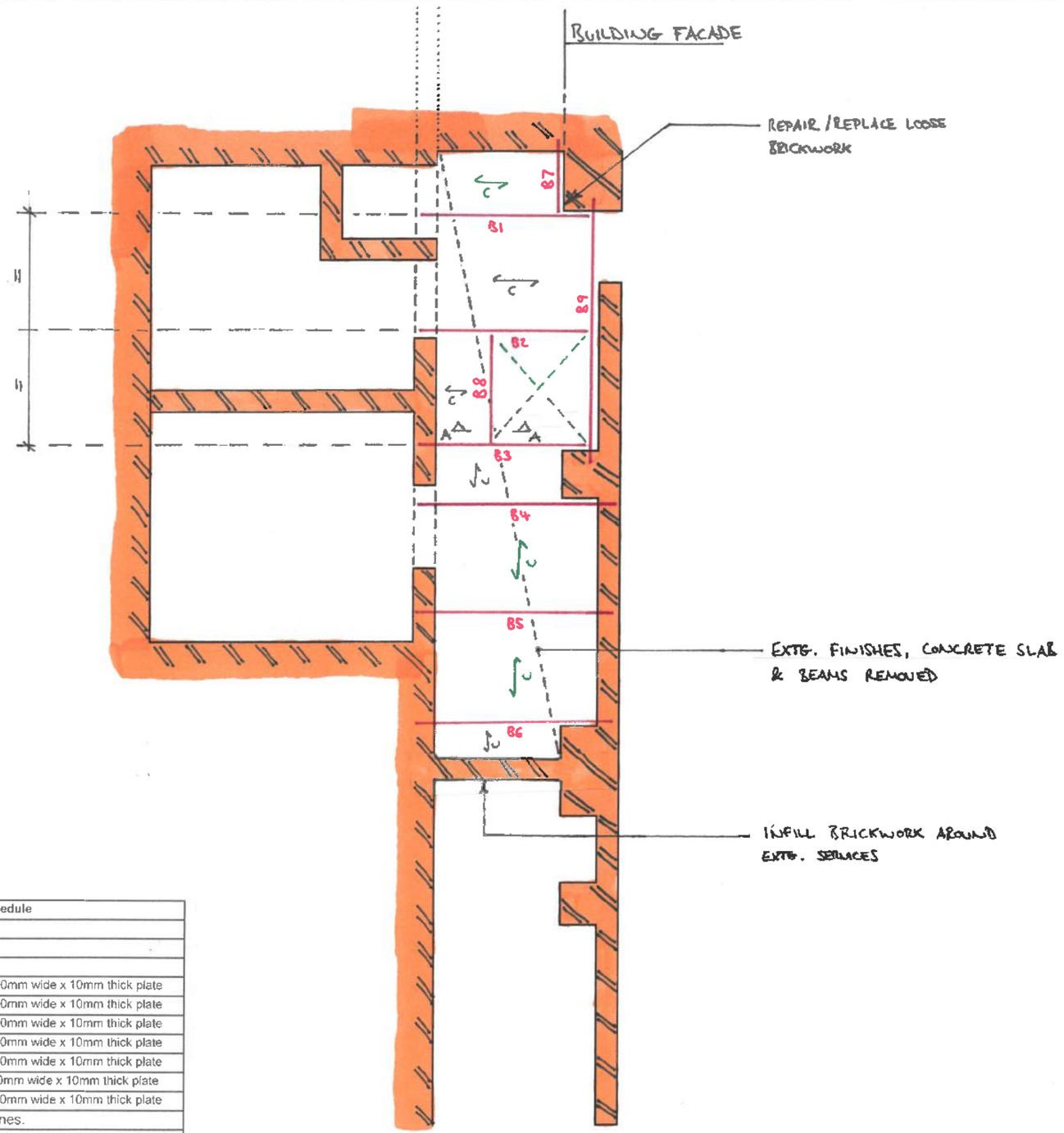
THE COURT, LONDON

BASEMENT PART PLAN SHOWING SURVEY LOCATIONS



NOTES

1.) Drawing to be read in conjunction with all others.
2.) Refer to G24167/SK100 for general notes.
3.) All dimensions in mm unless noted otherwise.

LEGEND

- DENOTES NEW BEAM
- DENOTES NEW COMPOSITE SLAB
- DENOTES NEW PAVEMENT LIGHT

* ALL BEARING DETAILS SUBJECT TO INSPECTION ON SITE OF LOADING FROM STRUCTURE OVER. ALTERNATIVE SUPPORT REQUIRED FOR BEAMS WHERE IT IS FOUND THAT BEARING FOR STRUCTURE OVER IS UNDERMINED. ALTERNATIVELY, VERTICAL STEEL PROPS BOLTED TO THE WALL CAN BE ADOPTED. *

Member Schedule	
Ref.	Section
B1	152x152x37 UKC
B2	152x152x37 UKC
B3	152x152x37 UKC + 1No. 150mm wide x 10mm thick plate
B4	152x152x37 UKC + 2No. 150mm wide x 10mm thick plate
B5	152x152x37 UKC + 2No. 150mm wide x 10mm thick plate
B6	152x152x37 UKC + 2No. 150mm wide x 10mm thick plate
B7	152x152x37 UKC + 1No. 150mm wide x 10mm thick plate
B8	152x152x37 UKC + 1No.150mm wide x 10mm thick plate
B9	152x152x37 UKC + 1No. 150mm wide x 10mm thick plate
All steel beams to bear onto padstones.	
All steelwork to be hot dip galvanised.	

Rev	Description	By	Date	Chkd

Status: TENDER

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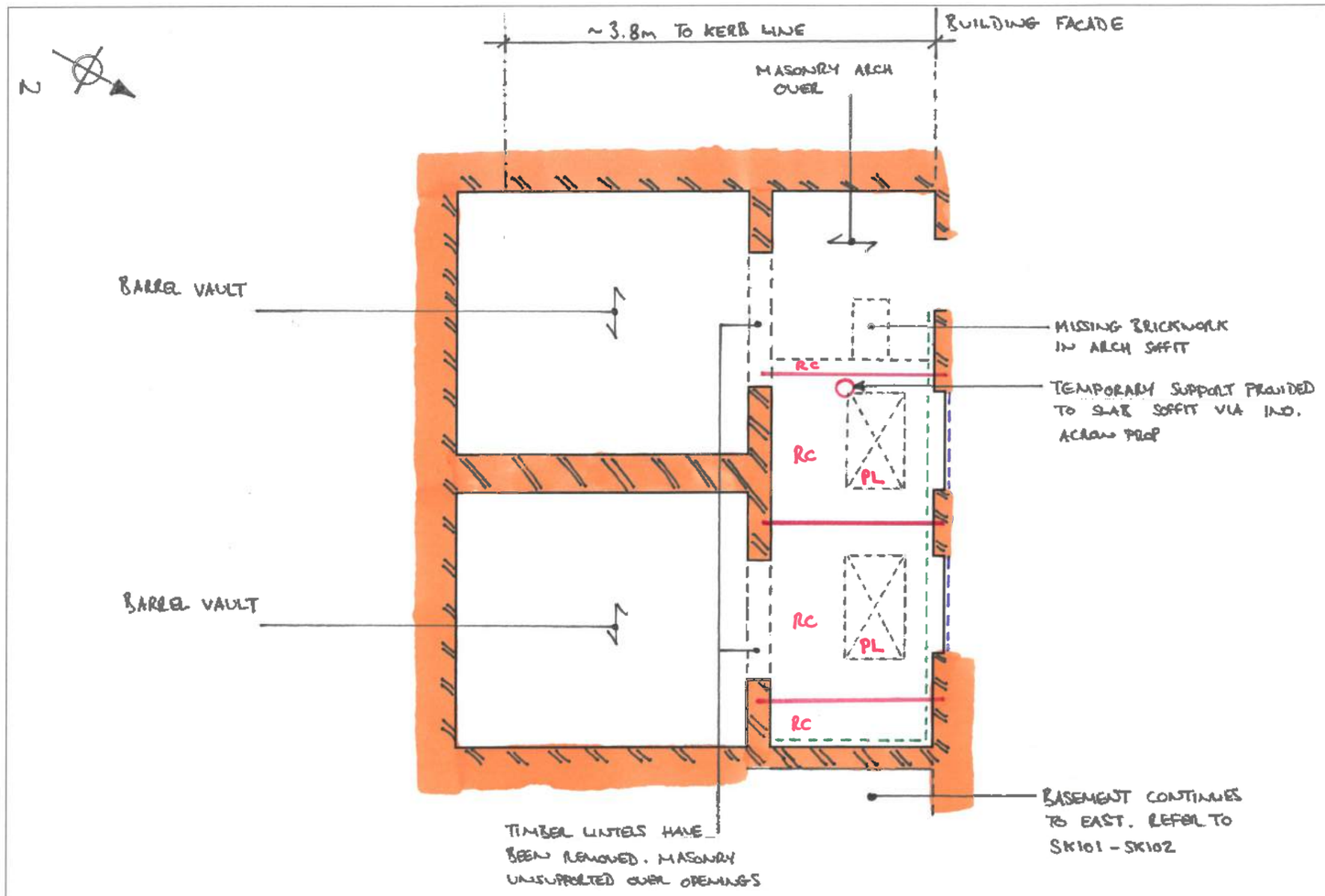
BASEMENT PART PLAN SHOWING NEW ELEMENTS OVER

Project No.	Zone	Level	Role	Drawing No.	Revision
G24167				SK102	A

Scale	Drawn	Chkd	Passed	Date	Size
N.T.S.	JBB	DW	RLM	NOV-18	A3



NOTES

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2.) Refer to G24167/SK100 for general notes.
3.) All dimensions in mm unless noted otherwise.

LEGEND

- DENOTES EXTG. STEEL BEAM
- DENOTES WINDOW
- PL — DENOTES PAVEMENT LIGHT AT GROUND
- RC — DENOTES REINFORCED CONCRETE SLAB AT GROUND
- DENOTES NEW ACROW PROP
- DENOTES EXTG. SERVICE RUN

Rev	Description	By	Date	Chkd

Status: INFORMATION

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BASEMENT WEST PART PLAN SHOWING SURVEY LOCATIONS

Project No.	Zone	Level	Role	Drawing No.	Revision
G24167				SK103	

Scale	Drawn	Chkd	Passed	Date	Size
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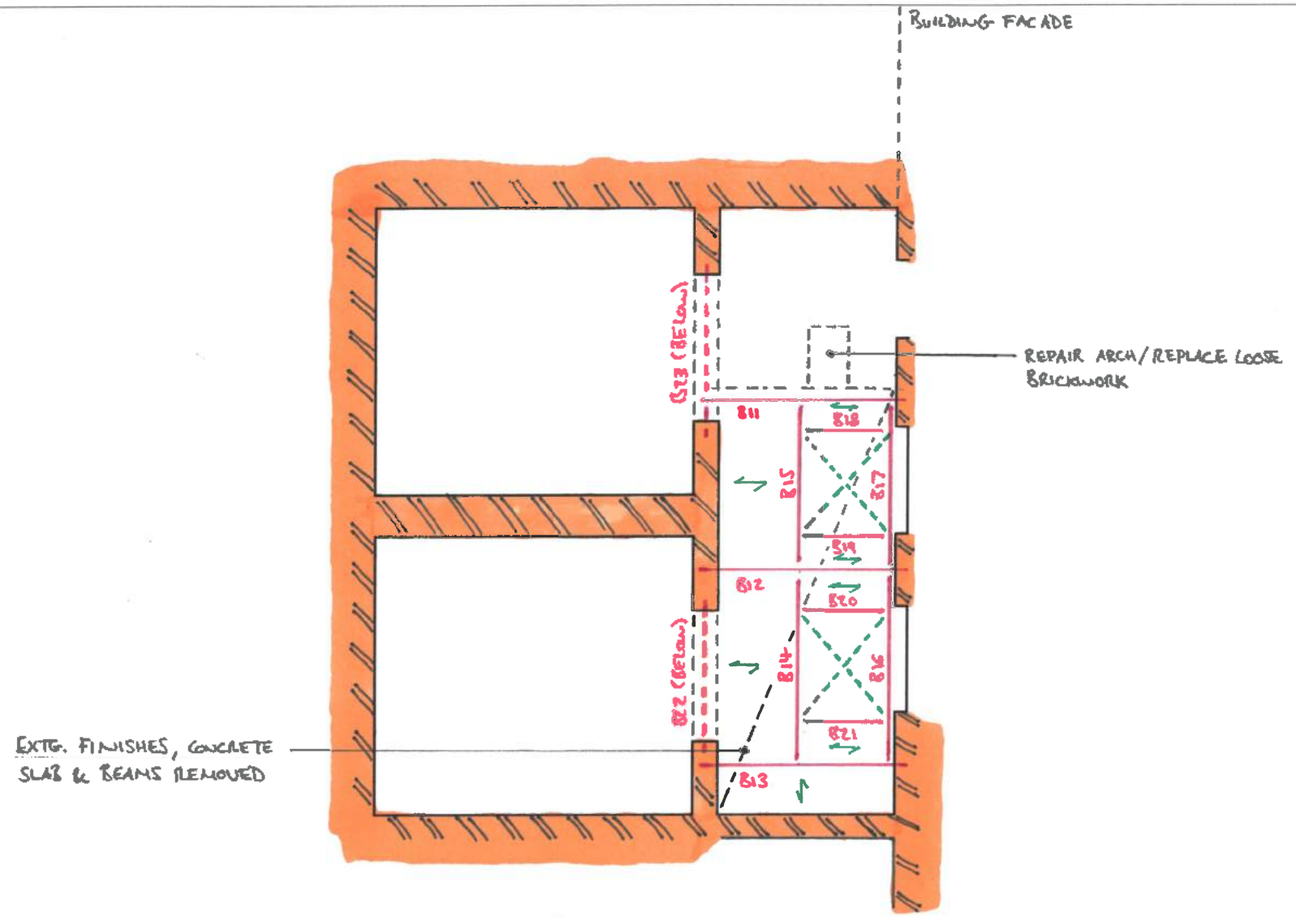

NOTES

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LEGEND

- DENOTES NEW BEAM
- DENOTES NEW COMPOSITE SLAB
- DENOTES NEW PAVEMENT LIGHT

* ALL BEARING DETAILS SUBJECT TO INSPECTION ON SITE OF LOADING FROM STRUCTURE OVER. ALTERNATIVE SUPPORT REQUIRED FOR BEAMS WHERE IT IS FOUND THAT BEARING FOR STRUCTURE OVER IS UNDERMINED. ALTERNATIVELY, VERTICAL STEEL PROPS BOLTED TO THE WALL CAN BE ADOPTED. *

Member Schedule	
Ref.	Section
B11	152x152x37 UKC
B12	152x152x37 UKC
B13	152x152x37 UKC + 1No. 150mm wide x 10mm thick plate
B14	152x152x37 UKC + 2No. 150mm wide x 10mm thick plate
B15	152x152x37 UKC + 2No. 150mm wide x 10mm thick plate
B16	152x152x37 UKC + 1No. 150mm wide x 10mm thick plate
B17	152x152x37 UKC + 1No. 150mm wide x 10mm thick plate
B18	152x152x37 UKC
B19	152x152x37 UKC
B20	152x152x37 UKC
B21	152x152x37 UKC
B22	Naylor P215 Hi-Spec concrete lintel
B23	Naylor R7 Hi-Spec concrete lintel
All steel beams to bear onto padstones.	
All steelwork to be hot dip galvanised.	

Rev	Description	By	Date	Chkd

Status: TENDER

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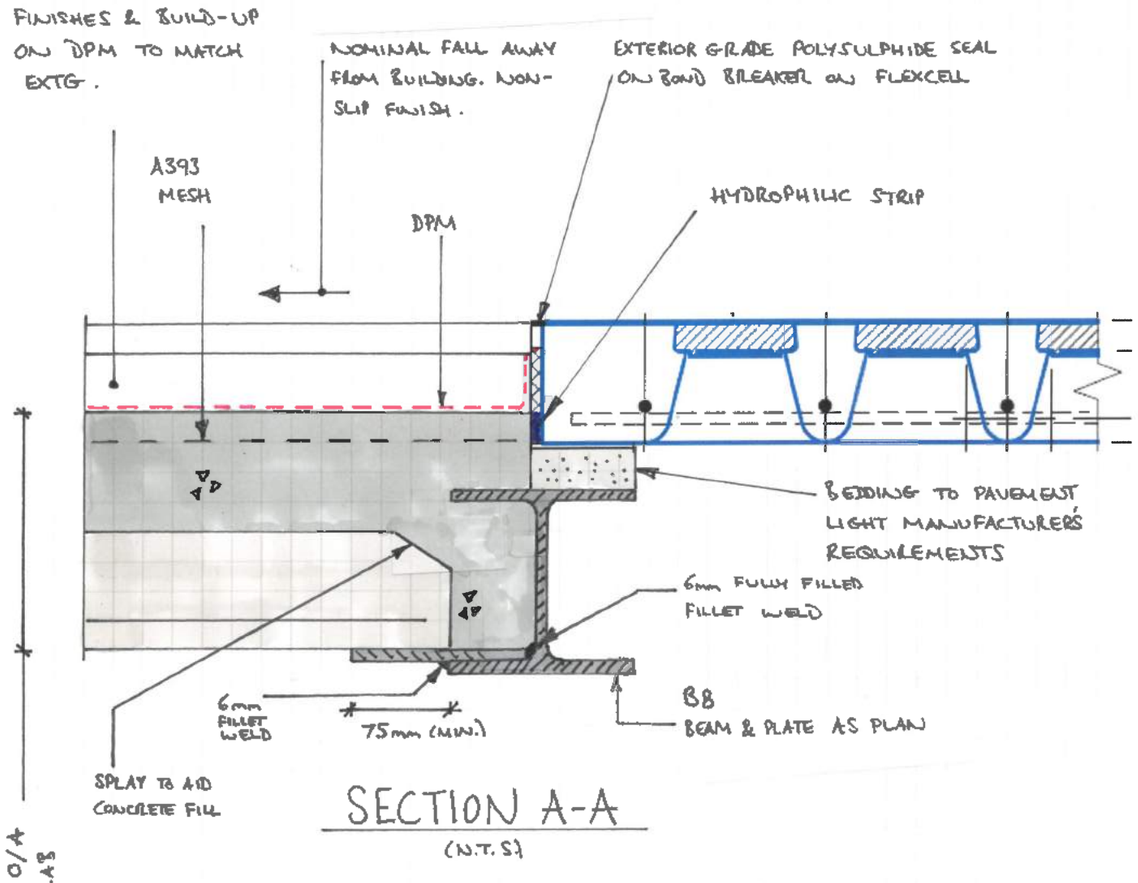
THE COURT, LONDON

BASEMENT WEST PART PLAN SHOWING NEW ELEMENTS OVER

Project No.	Zone	Level	Role	Drawing No.	Revision
G24167				SK104	

Scale	Drawn	Chkd	Passed	Date	Size
N.T.S.	JBB	DJV	RLM	JAN-19	A3



SECTION A-A
(N.T.S.)

Notes:
1.) Drawing to be read in conjunction with all others.
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Rev	Description	By	Date	Chkd

Status: TENDER

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THE COURT, LONDON
SECTIONS & DETAILS

Project No.	Zone	Level	Role	Drawing No.	Revision
G24167				SK105	

Scale	Drawn	Chkd	Passed	Date	Size
N.T.S.	JBB	DJV	RLM	JAN-19	A3

Thomasons Limited
86 Epsom Road, Guildford, Surrey GU1 2BX
T: 01483 565 886
E: guildford@thomasons.co.uk
W: www.thomasons.co.uk

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