4.7.3 Case 3 - Opening clashes with primary beam

The third case relates to the condition where the riser location clashes with an existing primary beam.

In this case it is recommended that the opening locations are relocated to avoid interfering with the primary beams. In that way, stripping out the whole bay and rebuilding a new slab can be avoided.

As already discussed the exact location of the existing beams is unknown. However there is a good indication, particularly for the perimeter bays of the structure, about the configuration of the primary beams. There is no information about the structural width of those beams, and is to be identified with the structural surveys. At this stage a 300mm structural width has been assumed.

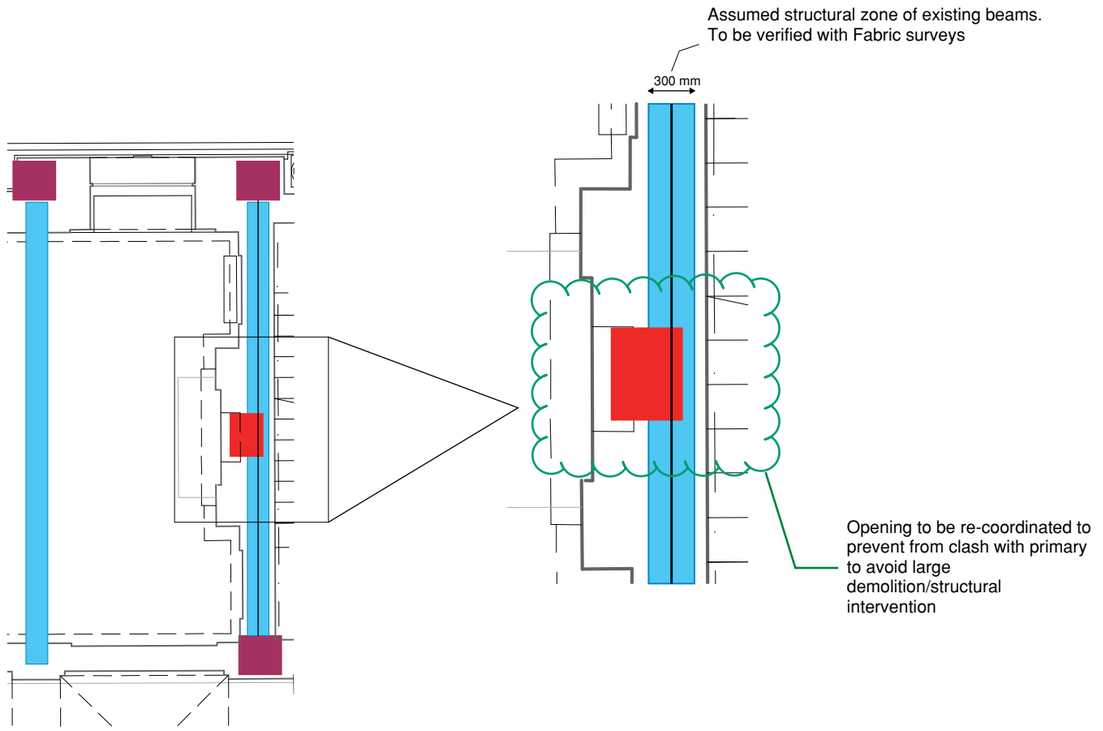


Figure 4.32 Case 3 - Opening clashes with primary beam

4.7.4 Case 4 - "L" Shape opening

The last case that has been identified refers to the locations where an "L" shape riser or opening is needed.

For such riser configurations it is required to divide the opening into two segments as shown in the Figure. Each segment can then be treated as one of the aforementioned cases and subcases.

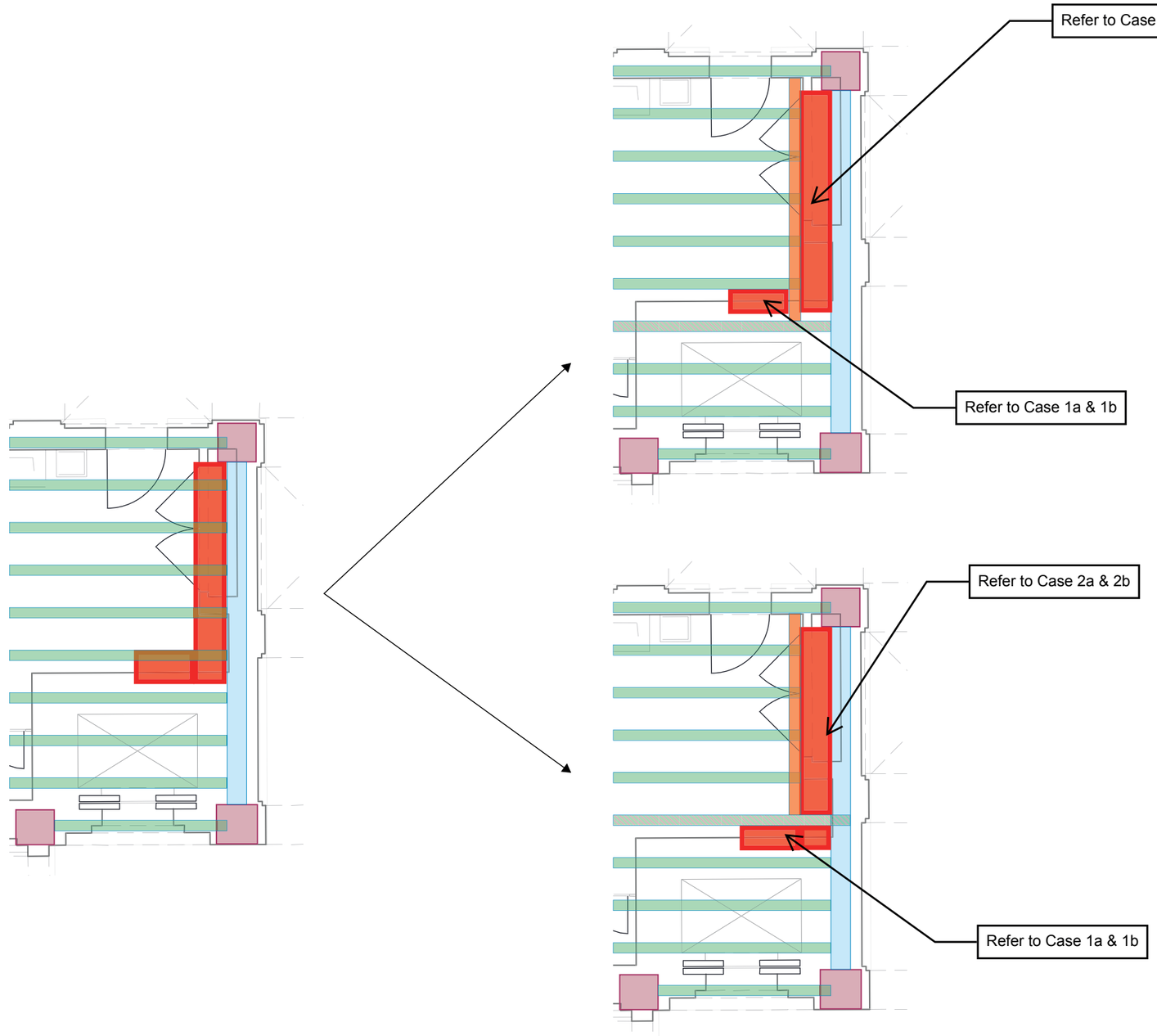


Figure 4.33 Case 4 -"L" shape opening

4.8 Tonbridge Walk Alterations

In the architectural scheme two new primary entrances to the Camden Centre from Tonbridge Walk are proposed in order to implement improvement works to the eastern part of the town hall.

From a structural perspective the creation of these new doorways requires the removal of two existing steel columns due to clashes with the proposed opening locations. Four new replacement columns are then located either side of the doorway to frame the openings. Figure 4.34 shows the existing facade with the existing columns and Figure 4.37 shows the new columns highlighted in purple.

It is assumed that two of the new columns are located above a concrete retaining wall and as such these can be founded on the top of the wall. The other two columns will be connected to a beam at the bottom to spread the loadings across the existing pad foundations. This is shown in Figure 4.37. These structural proposals are subject to the results of the fabric survey.

To remove the existing columns, temporary propping will be required to support the roof beam until the new columns are installed.

Furthermore, a new opening at the ground floor slab and roof level will be created. A number of existing steel beams would need to be trimmed and new steel beams would be introduced to frame the opening as shown on Figure 4.35 and Figure 4.36.

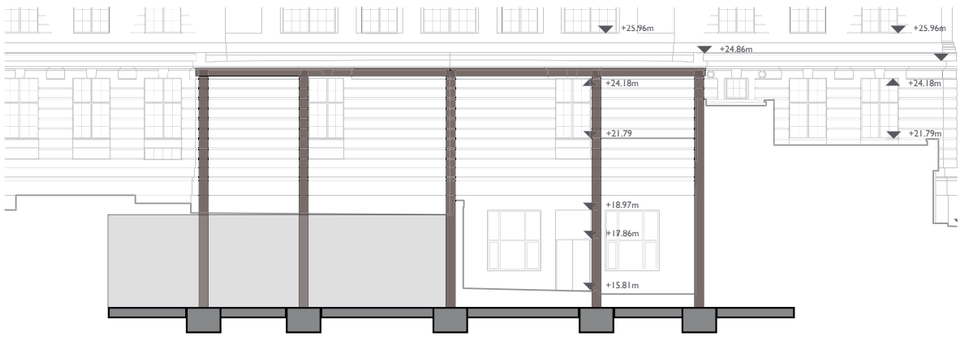
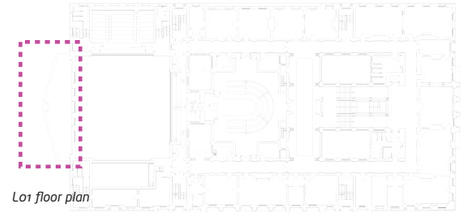
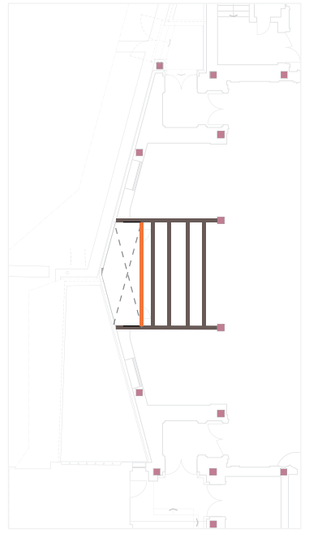


Figure 4.34 Existing structure at Tonbridge walk



L01 floor plan



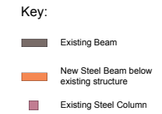


Figure 4.35 Proposed structural works for opening at GF slab

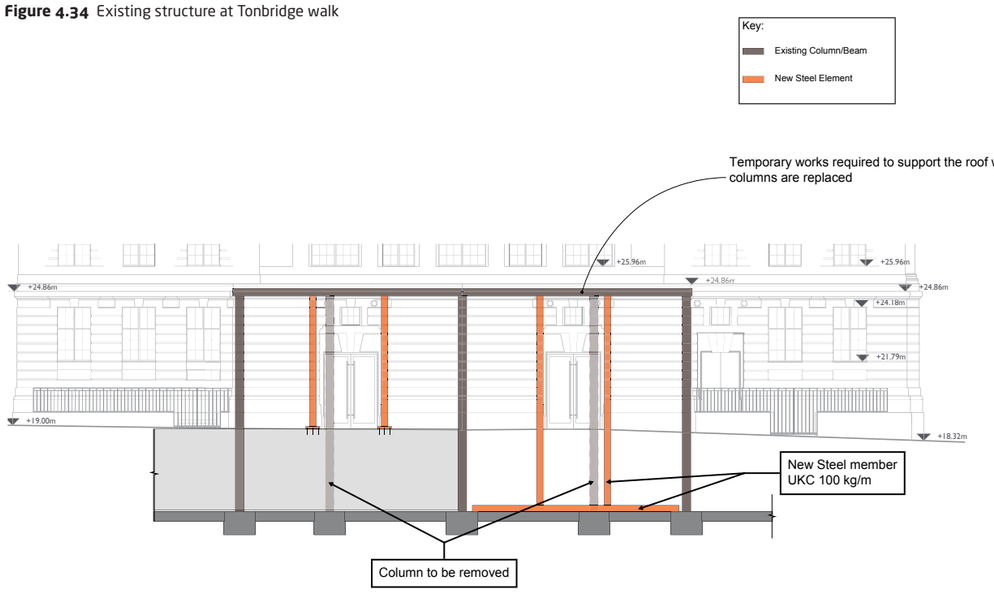


Figure 4.37 Proposed structure at Tonbridge Walk

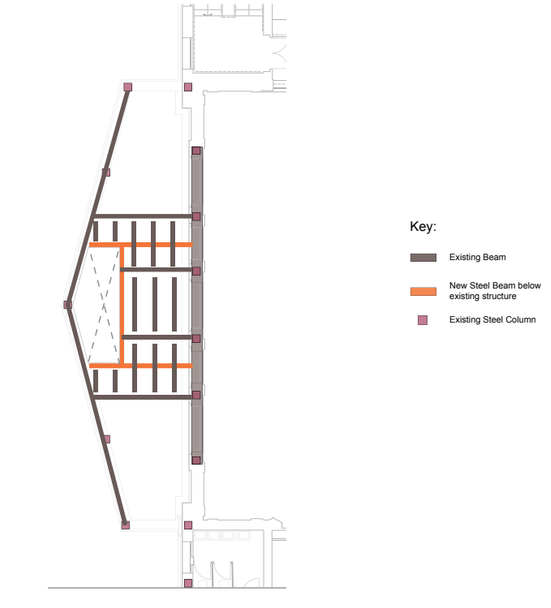


Figure 4.36 Proposed structural works for opening at L01 slab

4.9 Foundations

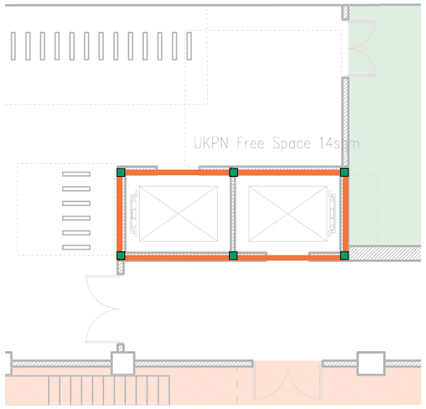
Under the current design proposal there are a number of vertical elements for which new foundations need to be formed. The size and layout of the new foundations is constrained by the presence of the existing substructure layout and they have been designed in a way to maintain the existing global load path and to avoid potential clashes with the existing pads.

Moreover two attenuation tanks are introduced as part of the drainage strategy. Those tanks will be made of reinforced concrete and are placed away from the existing foundation pads in order to avoid potential underpinning requirements. However it should be noted that the depth of the existing pads is based on the archive drawings and should be verified with the Fabric surveys.

4.10 Conclusions

The structural interventions have been developed to support the architectural requirements. Areas where works are required have been carefully considered to minimise the impact to the existing building whilst still making changes that will accommodate the proposed future use. The structural works are typically localised and seek to maintain the global load path thus avoiding further works.

The extent of the structural works presented in this document are not expected to change, however the level of detail is subject to refinement as the outcome of the structural fabric surveys becomes available and design is further developed in the following RIBA stages.



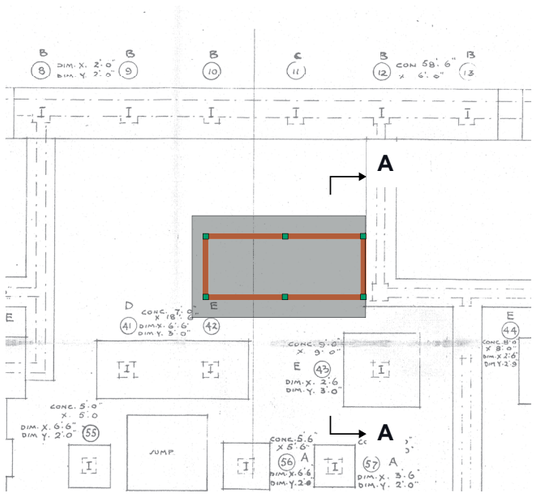


Figure 4.38 Plan of new foundation for BL1 and GL2

Proposed Basement Plan

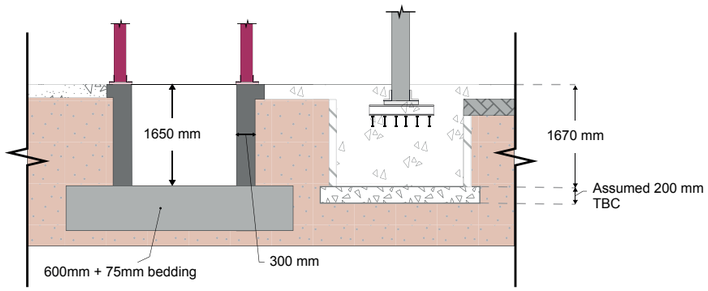


Figure 4.39 Section of new foundation for BL1 and GL2

Appendix 1

Design Criteria

Design Criteria

Design Standard

The new build elements will be designed in accordance with the following standards:

- BS EN 1990 – Basis of structural design
- BS EN 1991 – Action on structures
- BS EN 1992 – Design of concrete structure
- BS EN 1993- Design of steel structures
- BS EN 1994 – Design of composite steel and concrete structure
- BS EN 1997- Geotechnical design

The following guides and current British Standards will be used for the design of the proposed drainage elements and any remedial works:

- BS EN 752 : 2017 Drain and Sewer Systems Outside Buildings. Sewer System Management
- BS EN 12056 Gravity Drainage Systems Inside Buildings: Part 2
- Building Regulations 2010 Part H1 – Foul Water Drainage (2015 Edition)
- Building Regulations 2010 Part H2 – Wastewater Treatment Systems and Cesspools (2015 Edition)
- Building Regulations 2010 Part H3 – Rainwater Drainage (2015 Edition)
- Building Regulations 2010 Part H4 – Building Over Sewers (2015 Edition)
- Building Regulations 2010 Part H5 – Separate Systems of Drainage (2015 Edition)
- Building Regulations 2010 Part H6 – Solid Waste Storage (2015 Edition)
- Environment Agency "Control of Runoff from New Developments Interim Regional Guidance"
- National Planning Policy Framework
- Planning Practice GuidanceMovements

Design Loads

The Superimposed Dead Loads (SDL) and Imposed Loads (LL) calculated in accordance with BS-EN-1991-1-1:2002.

New floors

The new floors have been designed for the following loads:

- Live Load: 2.5 + 1.0 kN/m² (Partiions)
- Super Imposed Load: 1.0 kN/m²

New roofs

The following loads have been allowed for the design of the new roofs:

- Live Load: 0.6 kN/m²
- Super Imposed Load: 0.5 kN/m²

Movements

Major movement joints

With reference to CIRIA Technical note 107 pp. 35 major movement joints in non-exposed structures may be typically located at 60–70 m centres. The proposed dimensions of this building are below this level therefore we do not anticipate that a building movement joint will be required.

Deflections

Vertical deflections

As per BS EN 1990:2002 Eurocode – Basis of structural design A.1.4.3

w_c Precamber in the unloaded structural member

w_1 Initial part of the deflection under permanent loads of the relevant combination of actions according to expressions (6.14a) to (6.16b)

w_2 Long-term part of the deflection under permanent loads

w_3 Additional part of the deflection due to the variable actions of the relevant combination of actions according to expressions (6.14a) to (6.16b)

w_{tot} Total deflection as sum of w_1, w_2, w_3

w_{max} Remaining total deflection taking into account the precamber

The deflection of the structure with spans up to 10 m will be designed to meet the following criteria:

Total long-term deflection (quasi-permanent loads)		= L/250 or 20 mm
Imposed load deflection	General	= L/360 or 20 mm
	Edge beams supporting cladding	= L/360 or 20 mm
	Cantilevers	= L/180

For spans over 10 m the deflection criteria will be developed with the architect and cladding consultant.

Horizontal deflections

As per BS EN 1990:2002 Eurocode – Basis of structural design A.1.4.3

Lateral deflection	= H/500		
Balustrades (CDP design item)			
Imposed load deflection for glass balustrades	= L/65	< 25 mm	(BS 6180 6.4.1)
Otherwise according to material design code		< 25 mm	(BS 6180 6.4.1)

Dynamics

There is no advice provided by BS EN 1990:2002 for limits on floor vibration. Therefore, guidance for vibration response performance for various building types is taken from the SCI publication 354 'Design of Floors for Vibration' and guidance from the Concrete Centre:

SCI P354 (2007), Table 5.3

	Response Factor (R)
Offices generally	< 8.0*
Stairs	< 32.0
Auditorium	TBC
Sports hall	TBC

* The response factor R will be kept at a value below 8.0 at a minimum of 95% of the floor plate.

The new office floors will be designed for a response factor of <8.0.

Materials

Material grades for the structural elements are as follows:

Structural steel (for primary elements)

Design code:	BS EN 1993-1-1:2005 Eurocode 3: Design of steel structures
Material code:	BS EN 10025-2
General assumed grade:	S355

For bolts and welds refer to SCI P212.
Steelwork subgrade will depend on exposure of element.

Concrete

Design code:	BS EN 1992-1-1:2004 Eurocode 2: Design of concrete structures
Material code:	BS EN 1992-1-1:2004 Eurocode 2: Design of concrete structures
Density:	25 kN/m³ for standard reinforced concrete
	20 kN/m³ for lighweight reinforced concrete

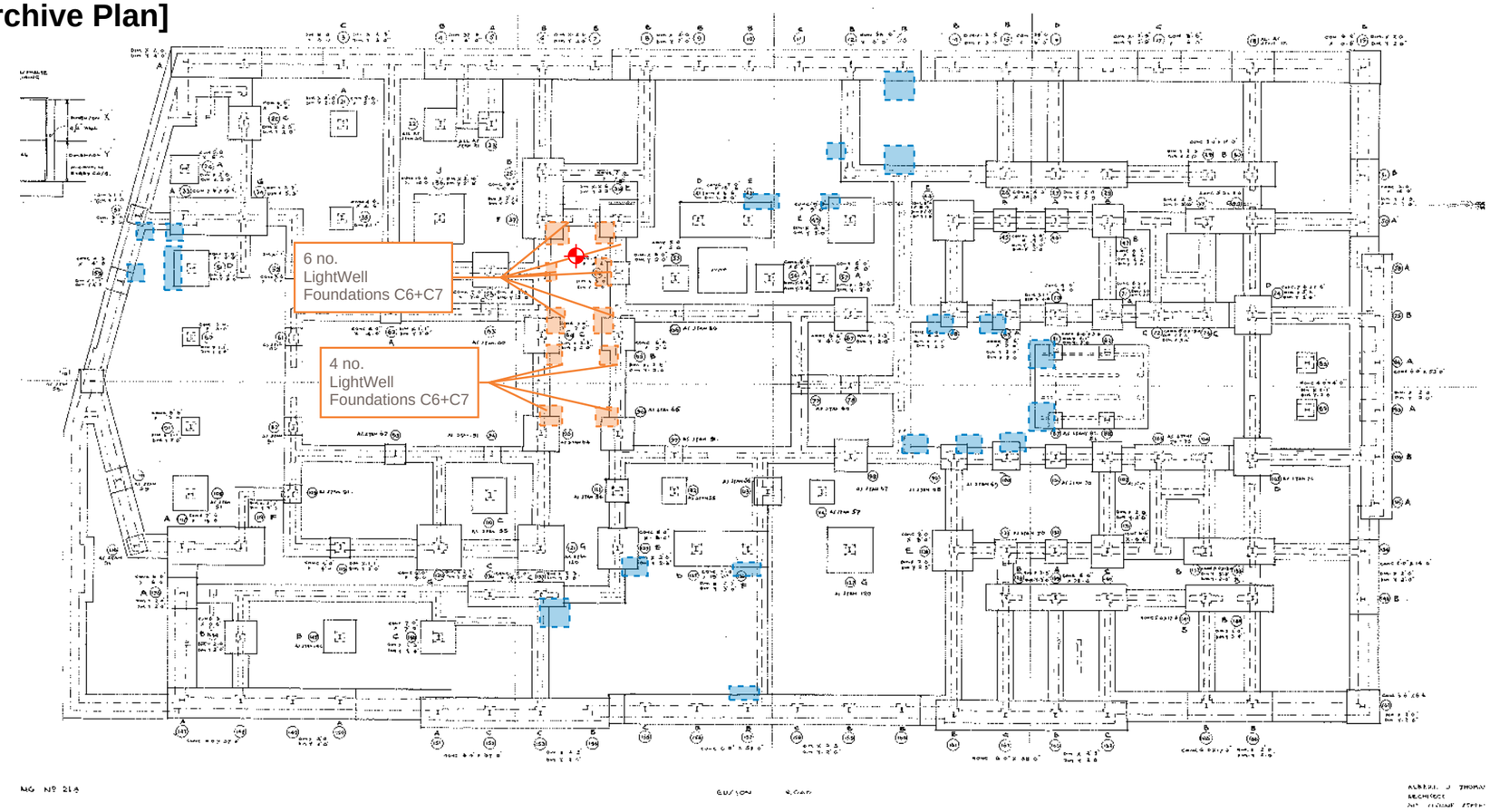
Reinforcement steel to concrete

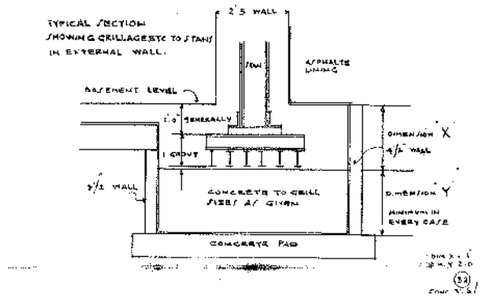
Design code:	BS EN 1993-1-1:2005 Eurocode 3: Design of steel structures
Material code:	BS EN 10025-2
General assumed grade:	B500B generally

Appendix 2

Fabric Brief

Foundations
[Archive Plan]

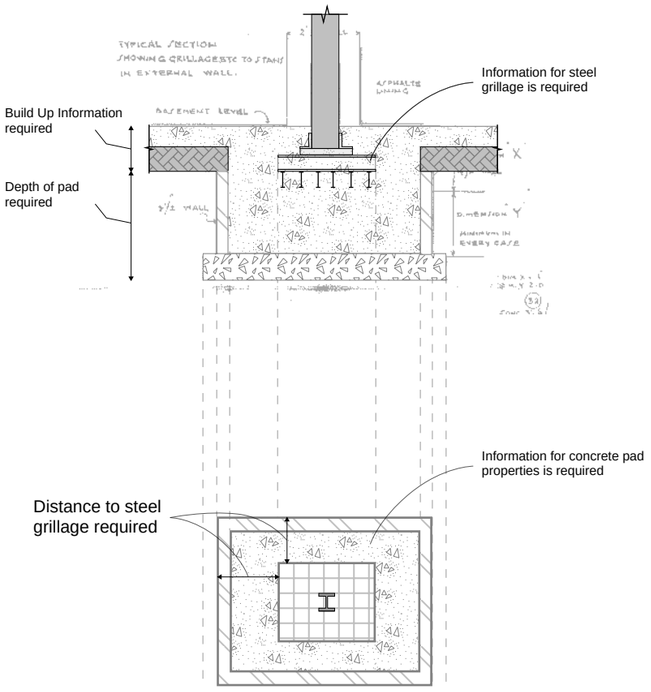




Trial pit, dug from inside the building to identify location and depth of the existing foundations

25m deep borehole

Additional information for orange highlighted locations



Note:
Final extent of investigations may vary (increase/decrease) according to design development and/or initial survey findings. Contractor to provide rates per type of survey to facilitate this process.

Note:
Level of Reinstatement of non structural elements to be defined by others

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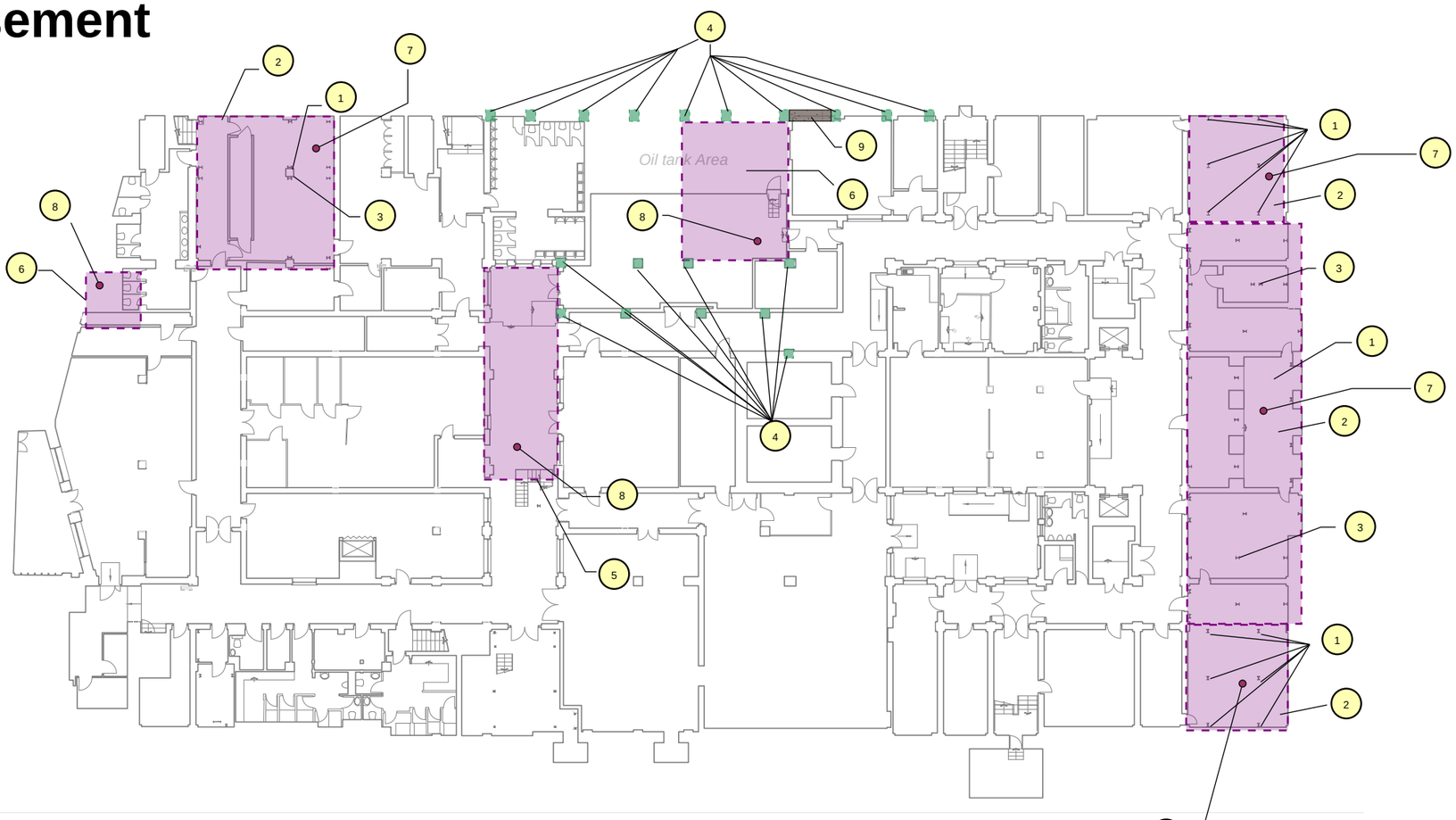
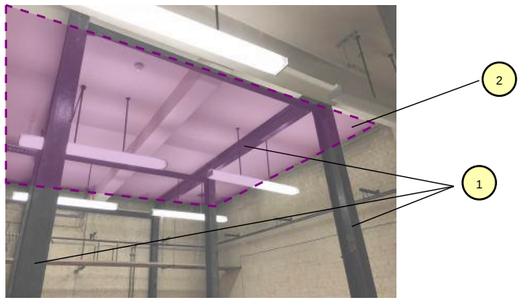
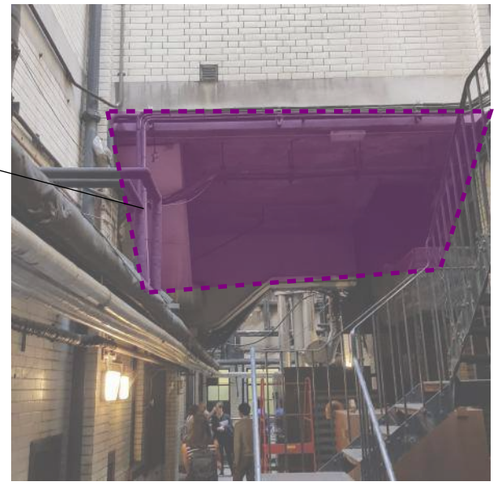
Basement







1 C4
Information for steel beam & column properties - connection with the slab above.

2 C4
Information for beam properties/layout at the ground floor slab - concrete encased beams and columns to be opened.

3 Footing of steel column to be exposed - information for footings dimensions

4 C4
Information for column properties.

5 C4
Information and beam properties/layout on ground floor and basement slab

6 C4
Information and beam properties/layout for basement slab

7 Information for floor build up at ground floor slab - Number may be reduced if results are consistent.

8 Information for floor build up at basement slab

9 C2
Information for Retaining Wall thickness and buildup

Note:
Final extent of investigations may vary (increase/decrease) according to design development and/or initial survey findings. Contractor to provide rates per type of survey to facilitate this process.

Note:
Level of Reinstatement of non structural elements to be defined by others

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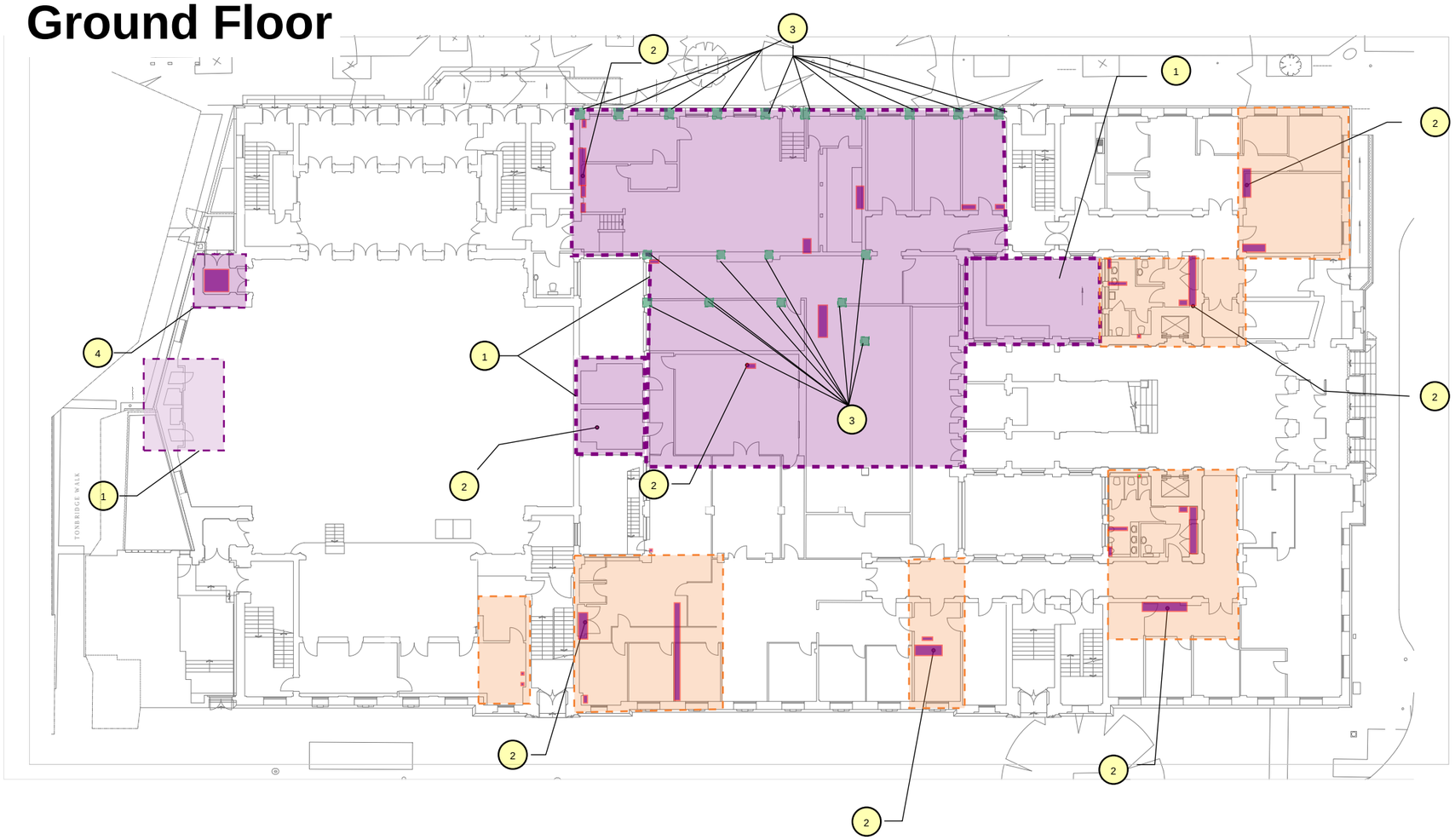
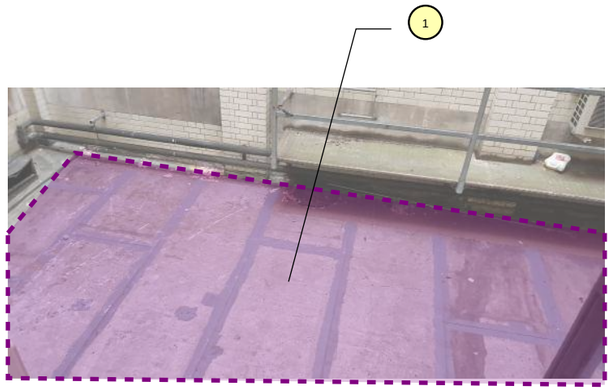
Ground Floor





Key:

Openings for Services

Information for floor build up and beam layout.
[MEP required openings]

Option 1 - Scan at the orange locations

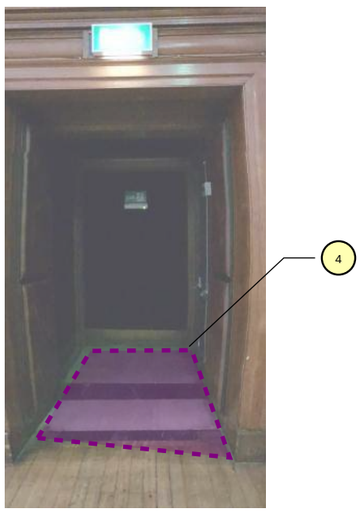
Option 2 - If the scan is not sufficient, then opening up on red locations.

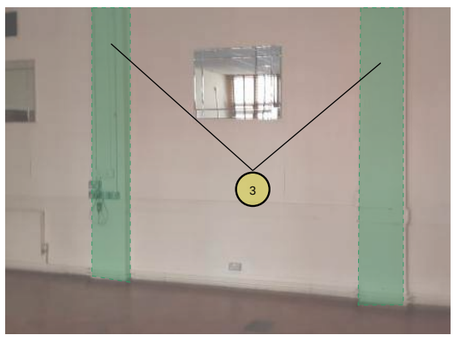
1 Information for beam layout at ground floor slab

2 Information for floor build up at ground floor slab - Number may be reduced if results are consistent.

3 C4
Information for Column Properties

4 Information floor build-up and beam layout.





Note:
Final extent of investigations may vary (increase/decrease) according to design development and/or initial survey findings. Contractor to provide rates per type of survey to facilitate this process.

Note:
Level of Reinstatement of non structural elements to be defined by others

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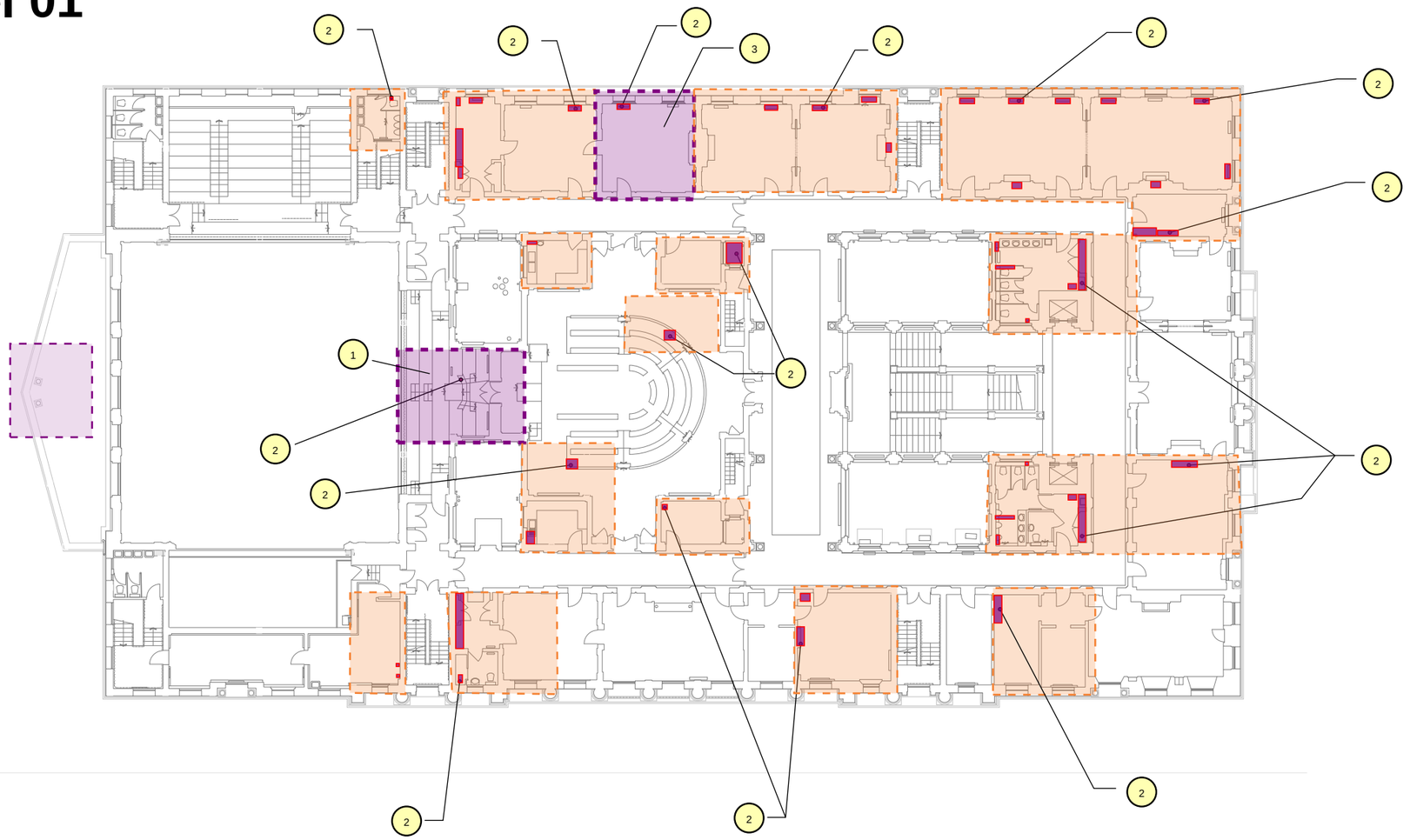
Level 01



Key:

Openings for Services

Information for floor build up and beam layout.
[MEP required openings]

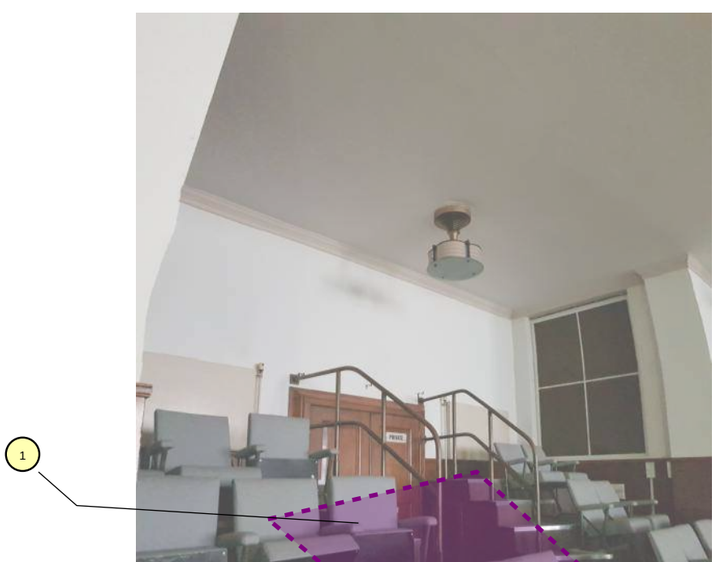
Option 1 - Scan at the orange locations

Option 2 - If the scan is not sufficient, then opening up on red locations.

1 Information for beam layout. -
[New Lift Location]

2 Information for floor build up at L01 Slab -Number may be reduced if results are consistent.

3 C4
Information for beam layout & beam properties. Either from Ground Floor Soffit or L01 floor.
[To hang UKPN equipment]



Note:
Final extent of investigations may vary (increase/decrease) according to design development and/or initial survey findings. Contractor to provide rates per type of survey to facilitate this process.

Note:
Level of Reinstatement of non structural elements to be defined by others

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Level 02

Key:

- Openings for Services
- Existing columns

Information for floor build up and beam layout.
[MEP required openings]

- Option 1 - Scan at the orange locations
- Option 2 - If the scan is not sufficient, then opening up on red locations.

1 C4
Information for beam layout & beam properties.

2 Information for floor build up

3 C4
Information for Column Properties

Note:
Final extent of investigations may vary (increase/decrease) according to design development and/or initial survey findings. Contractor to provide rates per type of survey to facilitate this process.

Note:
Level of Reinstatement of non structural elements to be defined by others

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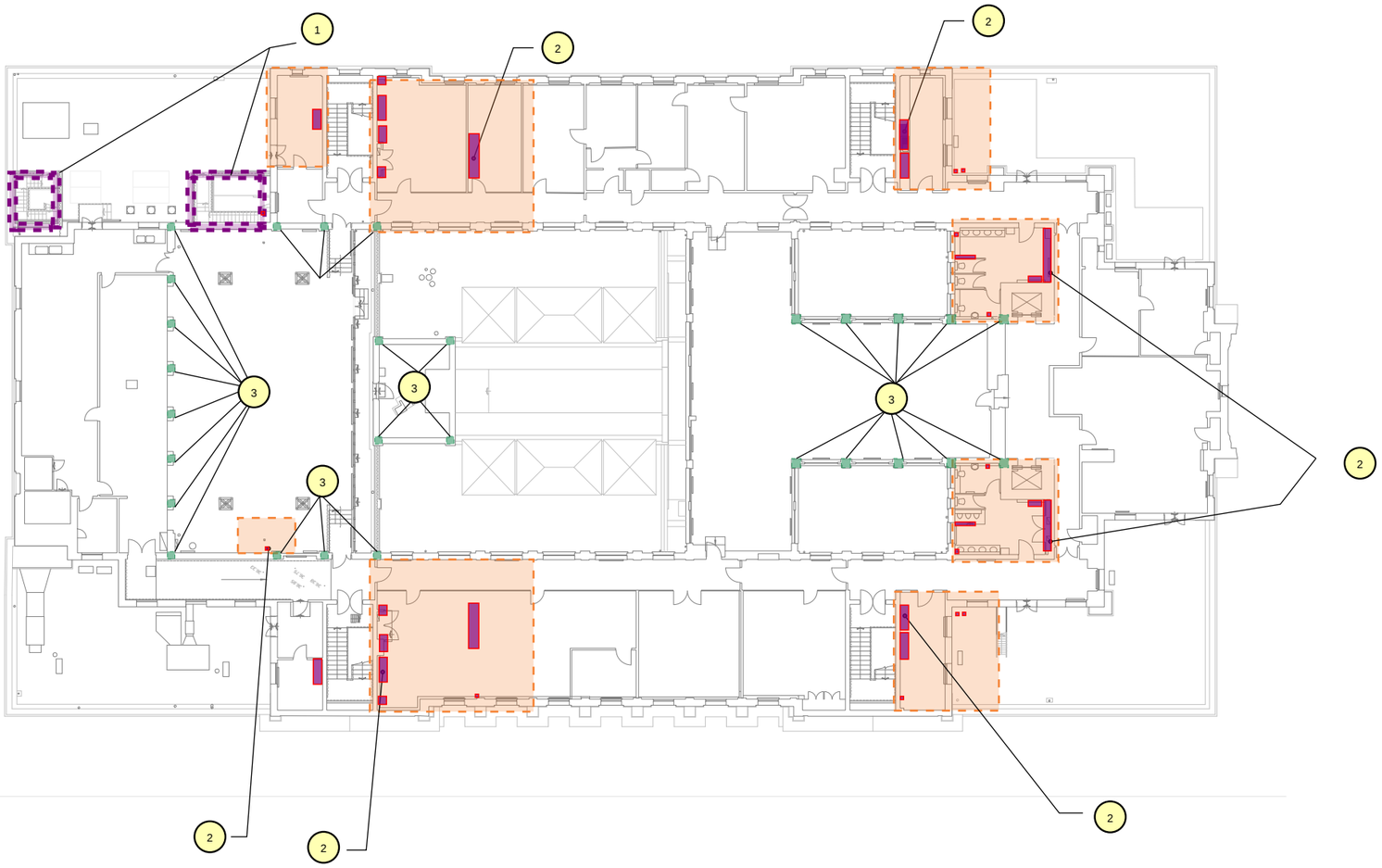
Level 03



Key:

Openings for Services

Existing columns

Information for floor build up and beam layout.
[MEP required openings]

Option 1 - Scan at the orange locations

Option 2 - If the scan is not sufficient, then opening up on red locations.

1 C3+C4
Information for floor build up and beam/column properties & layout.

2 Information for floor build up

3 C4
Information for Column Properties

Note:
Final extent of investigations may vary (increase/decrease) according to design development and/or initial survey findings. Contractor to provide rates per type of survey to facilitate this process.

Note:
Level of Reinstatement of non structural elements to be defined by others

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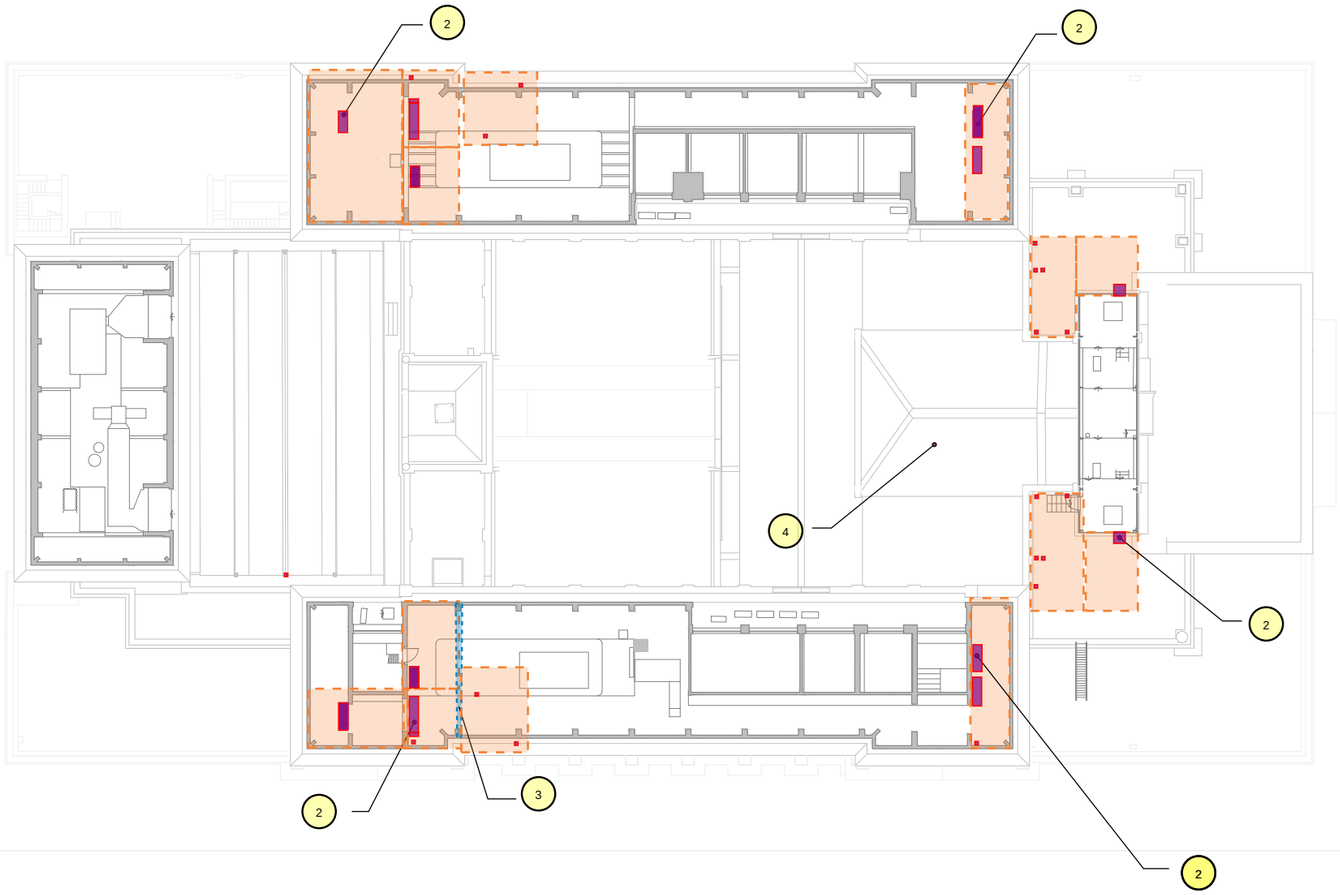
Level 04



Key:

Openings for Services

Information for floor build up and beam layout
at 4th floor slab
[MEP required openings]

Option 1 - Scan at the orange locations

Option 2 - If the scan is not sufficient, then opening up on red locations.

1 C4
Information for beam layout & beam properties.

2 Information for floor/roof
build up

3 C4
Information for beam properties.

4 Information for pitched roof
build up

Note:
Final extent of investigations may vary (increase/decrease) according to design development and/or initial survey findings. Contractor to provide rates per type of survey to facilitate this process.

Note:
Level of Reinstatement of non structural elements to be defined by others

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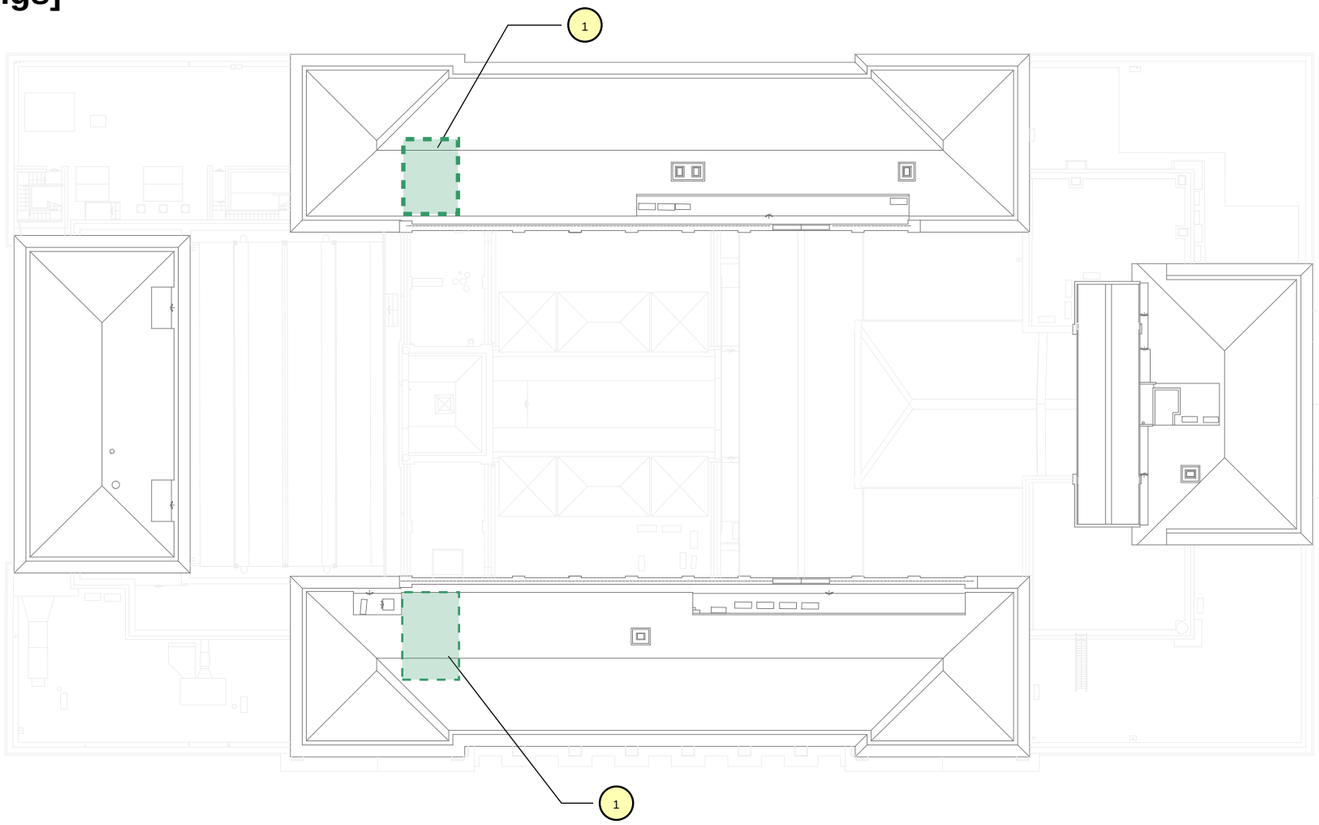
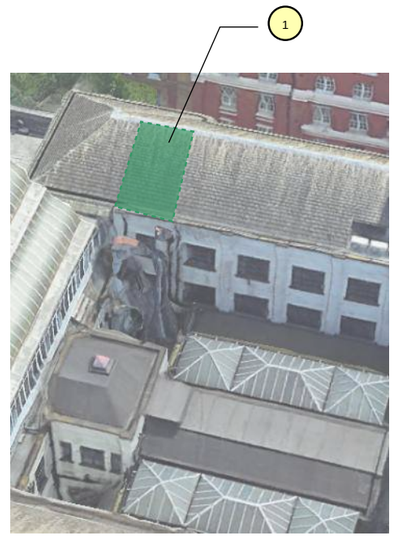
Roof
[Survey Drawings]





1 Information for beam layout & roof build-up on pitched roof [for new access to roof]

Note:
Final extent of investigations may vary (increase/decrease) according to design development and/or initial survey findings. Contractor to provide rates per type of survey to facilitate this process.

Note:
Level of Reinstatement of non structural elements to be defined by others