OUR TOWN HALL PROJECT

Technical Submission – Zone P5

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Status: S6

Rev: P02

Document Type: Technical Submission

Date: 01/10/2019

Issue History:

| Revision Nr | Details | Date | Created by | Check by |
|---|---|---|---|---|
| P01 | Document created | 01/10/20 | M Howard | |
| P02 | Revised following TSB Presentation meeting | 27/10/2020 | Simon Ball | |
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| | | | | |

**Technical Submission Review Meeting**

On Monday 26th October, 14:00 – 16:30, a virtual meeting was held using Microsoft Teams and was in the format of a Technical Submission Presentation. The purpose of the meeting was to review the first issue technical submission and to discuss any required changes with a view to approving the document with a status B, and any required changes to be agreed during the meeting and amendments to be made to the document and highlighted as changes for clarity and transparency.

It was agreed generally that future technical submissions would feature 'Global' submissions along with 'Zonal' submissions. Global submissions will be used to address repetitive works where the principle and methodology remains the same in various locations. Where the specific location presents situations that require a change in methodology, a Zonal submission will be produced. The Zonal submission will consider all location specific factors and the methodology will be tailored as such.

It was also agreed generally that future technical submission documents that refer to other technical submissions will have relevant extracts taken from the reference document. This is to enable the reader to familiarise themselves / refresh their memory without the need to bring up the entire submission document.

Meeting Attendees:

| Name | Company | Name | Company |
|---|---|---|---|
| Simon Ball | Murraywood Construction Ltd | Paul Mason | Manchester City Council |
| Billy Murray | Murraywood Construction Ltd | Steve Hannon | Manchester City Council |
| Luke Eddowes | Lendlease | Jamie Coath | Purcell |
| Kostas Karageorgos | Lendlease | Paul Maddison | Ramboll |

# Our Town Hall

# Works Technical Submission

| | |
|---|---|
| **Works Package Name:** Internal Substructure<br><br>40032.01 | **Task/Activity**<br>• Heritage Removal and Storage<br>• Dismantling and removal of existing stone stairs<br>• Builders Work (both for load and non-load bearing walls)<br>• Alterations in conjunction with Dwg LG-0364. Load bearing not exceeding 2.7m and all non-load bearing openings.<br>• Removal and reinstatement of existing timber flooring<br>• Saw cutting and concrete slab removal<br>• Reduced level excavation for concrete slab<br>• Remove/Grout up abandoned existing drainage<br>• Installation of drainage<br>• Installation of ducting<br>• Construction of lift pit<br>• Construct new concrete floor<br><br>**Location:** Zone P5 |

| | |
|---|---|
| **Date:** 1st October 2020 | **Start Date of Activity:** 12th October 2020 |

## Scope/Overview:

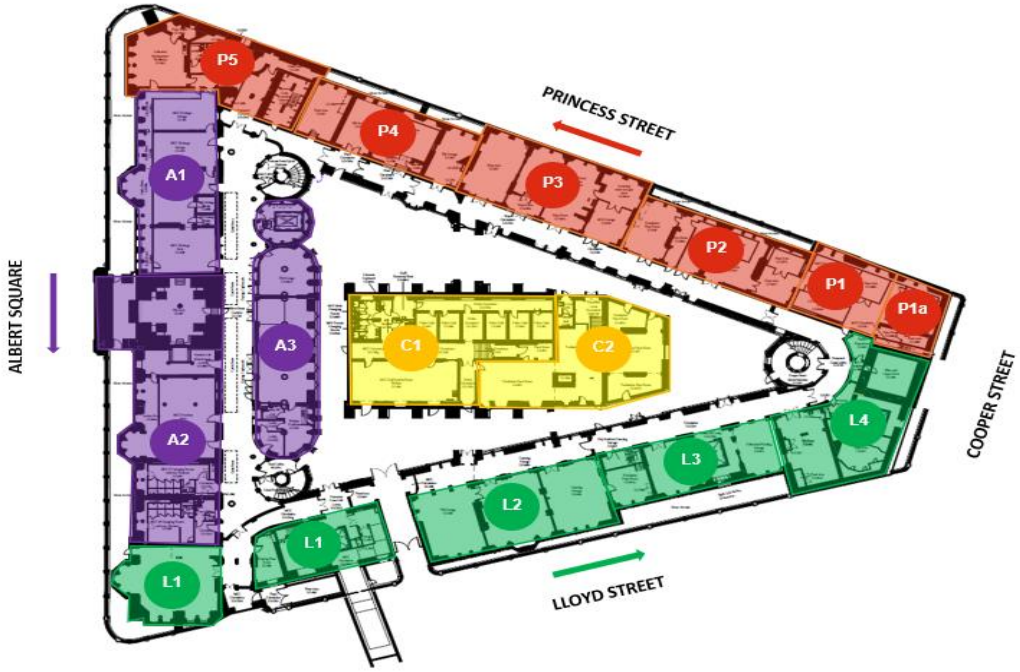
**Zone Plan Overview for Lower Ground Floor:**

This technical submission covers all elements of work to be carried out in Zone P5. The existing rooms within this zone are:

| | | |
|---|---|---|
| A2.61 | A2.62 | 18b.c |
| 19b.a | 20b | P011 |
| A1 | P003 | 22b |
| 22b.a | A40 | AS.1_3 |

New rooms to be formed are:

| | |
|---|---|
| LG-012 Collection Management Workshop | LG-S05 Protected Cores Evacuation Staircase |
| LG-012a Plant Room | LG-044 Store |
| LG-013 Accessible WC-left | LG-L04 Princess Lift |
| LG-014 Plant Area | LG-C01m Protected Cores Lift Lobby |




In order to complete the works within zone P5 the following will be carried out:

- Careful removal and storage of Heritage Assets in conjunction with OTH-PUR-TH-LG-SCH-A-2432 Lower Ground Revision 01.
- Dismantling and removal of existing stone stairs (LG-L04-Alt 02)
- Builders work includes forming service penetrations for:

| | | | |
|---|---|---|---|
| LG-012-BW06 | LG-012-BW04 | LG-C01m-BW01 | LG-C01n-BW06 |
| LG-012-BW05 | LG-013-BW01 | LG-012-BW07 | LG-S05-BW01 |
| LG-012a-BW01 | LG-012-BW01 | LG-012-BW02 | |

- Installation of alterations:

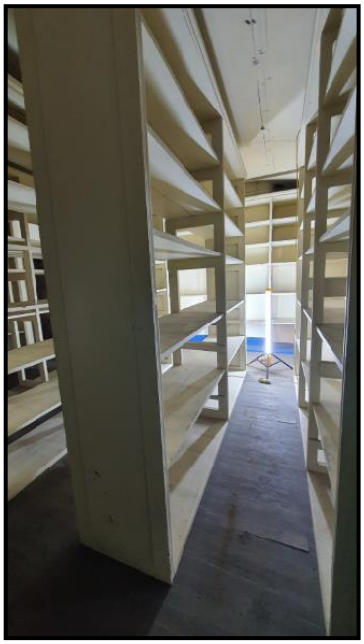
| | | | |
|---|---|---|---|
| LG-C01n-ALT 11 | LG-012-ALT 01 | LG-013-ALT 01 | LG-014-ALT 02 |
| LG-011-ALT 01 | LG-C01m-ALT 01 | LG-C01n-ALT 04 | LG-014-ALT 01 |
| LG-011-ALT 03 | LG-012-ALT 02 | LG-L04-ALT 01 | LG-C01n-ALT 06 |
| LG-011-ALT 02 | LG-012-ALT 03 | LG-L04-ALT 02 | LG-C01n-ALT 07 |
| LG-C01n-ALT 03 | LG-012a-ALT 01 | LG-L04-ALT 03 | LG-S05-ALT 02 |
| LG-C01n-ALT 15 | LG-012a-ALT 02 | LG-C01n-ALT 05 | LG-S05-ALT 01 |
| LG-C01n-ALT 09 | LG-C01n-ALT 10 | | |

- Removal and reinstatement of existing timber flooring
- Saw cutting and removal of concrete slab
- Reduced Level Excavation
- Remove and/or grout up abandoned existing drainage
- Installation of Drainage
- Installation of Ducting
- Construction of Lift Pit
- Construct New Concrete Floor

**Sequence (incl. hold/inspection points):**

**Careful removal and storage of existing heritage**

**Remove Shelving / Racking Units**

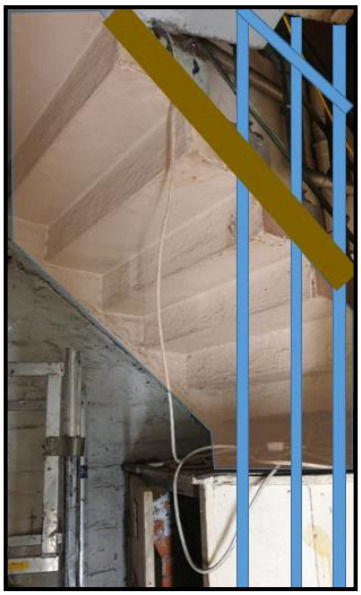


1. There are a number of wooden shelves / rack units to be carefully dismantled, itemised and stored elsewhere.
2. The units consist of 2x end panels which are stud frame, clad with tongue and groove. There is also a centre stud.
3. There are no screw fixings joining sections together. The only visible fixings are nails, down through the shelves into the stud.
4. Stud frames appear to be joined using mortise and tenon joints.
5. At the head of the unit there are wooden supporting straps connecting each unit together and also to the wall.
6. Before any work is carried out, record photographs will be taken of the room showing the number of units and locations / layout.
7. Supporting straps will be removed first of all. This will be done one at a time as the individual units are dismantled. They will not be removed from every unit straight away. This will ensure that units remain stable prior to being dismantled.
8. Straps will be removed by tapping the strap away from the unit using a wooden tapping block and small hammer. By tapping, an opening will be formed as the nail fixing is loosened, and a pry bar will then be used to further open / loosen the strap.
9. A spreader clamp will be used to progressively loosen the mortise and tenon joints to the centre stud. The spreader will push the common stud's apart, opening the joint.
10. The shelves will then be freed up by tapping the underside of the shelf where they are nail fixed into the end panel stud. This will be done using a small hammer and wooden knocking block.
11. As the shelving is removed, the end studs are gradually becoming free. One person must stand at each end of the unit to hold the end panels to keep stable and prevent from falling when removing the shelves.
12. As the last shelf is removed the end panels will be completely isolated and free.
13. The panels will then be laid down in a safe position.
14. All items will be labelled with reference numbers and bubble wrapped for protection and storage.

**Dismantling and Removal of existing Stone Stairs**

**Structure Details**

**Alteration Reference – LG-L04-ALT02**
**Drawing PURCELL A-0364**



There is an existing staircase constructed from stone steps which appear to cantilever from the existing wall. In order to construct the lift pit the stairs need to be removed.

**Outline Demolition Approach**

1. There is a small timber boxing to the bottom of the staircase which has served as a cupboard or similar in the past. This will be dismantled and removed prior to the removal of the staircase. Where there are any mechanical fixings securing the timber to the existing structure a cordless screw driver will be used to release the timbers, with the dismantling of the timbers being undertaken by hand using small demolition hand tools to cut the timbers into sections enabling it to be placed into a rubble truck and placed into a designated skip.
2. An angled ranch board scaffold will then be installed to the underside of the stone steps. This will be used as a crash deck to support the steps during removal and to prevent them from falling to the ground.
3. A handrail system will also be installed as part of the crash deck to prevent falls from height.

4. The existing metal banister is made up of spindles anchored into the stone step. It is unknown how the spindles are fixed due to a decorative 'shoe' that appears to cover the base of the spindle. It is believed that the spindle may be 'sweated' with lead.

5. There are 2 intermediate rails attached to every spindle with a threaded bolt and decorative 'rosette' style nut. The bolt head is rounded and heavily covered in paint. To remove the rails each nut and bolt must be removed. The rails are jointed so will be removed in sections. The rosette nut will be grasped with mole grips and turned to release.

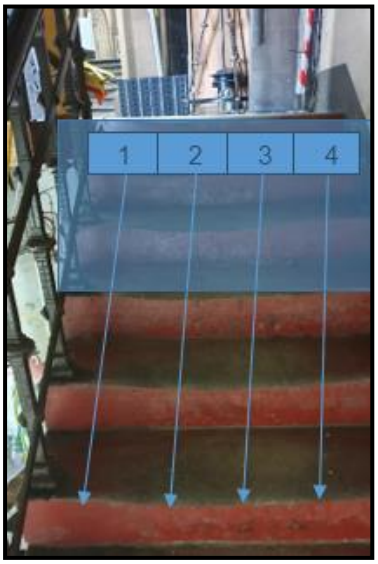
6. The wooden handrail is also jointed, and is screw fixed from the underside through the top metal rail. A hand driver will be used to remove the screw fixings, releasing the handrail in sections. Screw fixings will be bagged and stapled to the underside of the handrail for storage.

7. A top metal rail is seated on top of the spindles, beneath the wooden handrail. The metal rail is jointed and assumed fixed down into the tops of the spindles, however the exact method cannot be seen until the wooden handrail is removed. Assuming that the rail is screw fixed, a hand driver will be used to remove the rail in sections.

8. At this stage, the intermediate metal rails have been removed, along with the wooden handrail and also the metal rail beneath the wooden handrail. This leaves just the spindles protruding upwards out of the stone steps.

9. ~~The existing iron handrail will be removed.~~ The spindles will now be removed individually. This will be done by cutting out the areas where the rail is inserted into the stone. The stone step will be cut using a battery powered circular cut off saw with a water dust suppression attachment. ~~The timber handrail will then be cut, and the rail removed in sections.~~

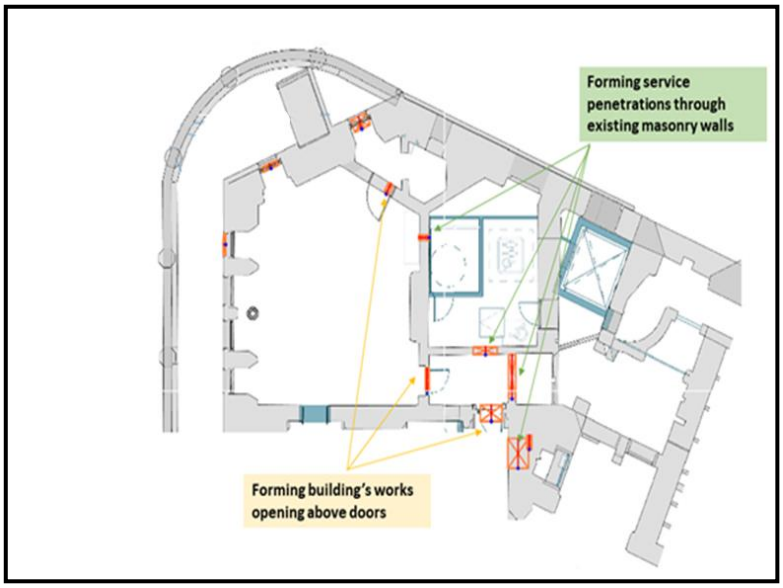
10. The stone steps will then be removed. This will be done by systematically working from the top step, left to right, and by cutting each step into 4 300mm pieces, again using the battery powered circular saw. The cut off saw will only cut to a depth of 80mm, so the step will be fractured using a hammer and bolster chisel.
11. Steps will be removed 3 at a time. When the third step is removed, the circular cut off saw will then be used to make an angled cut into the wall so that the step can be removed at least flush with the wall.
12. The same process will be followed for the landing section, being cut into pieces and removed.



**Builders Work - Form Service Penetrations within P5**

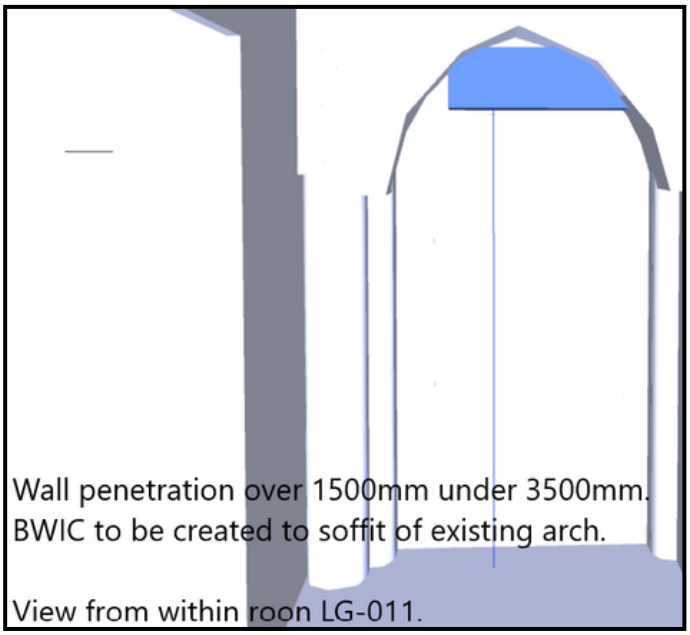
Within this area there are twelve service penetrations to be formed as detailed on Drawing No: OTH-PUR-TH-LG-DWG-A-0364 and noted as listed within the scope of works.

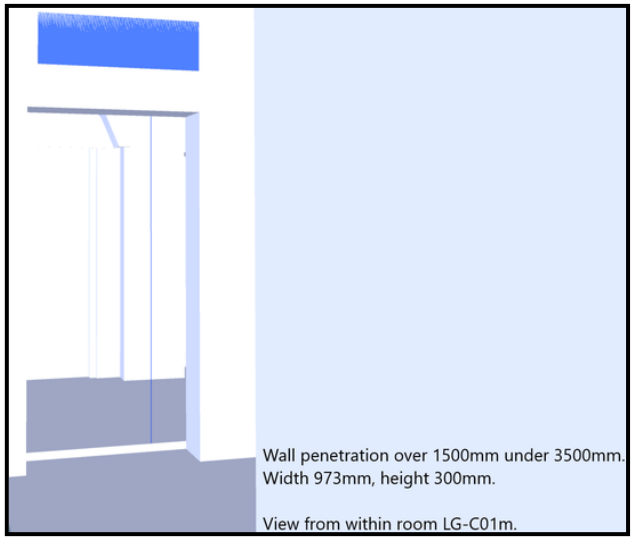
Please refer to Technical Submission 002 which gives specific sequence details for construction of all types of builders works.

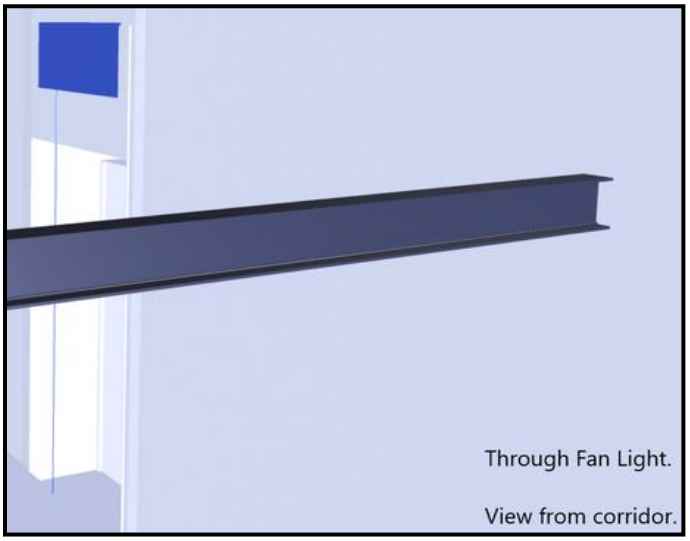



**Example Service penetration images captured from model**

Window Builders work image omitted from here.



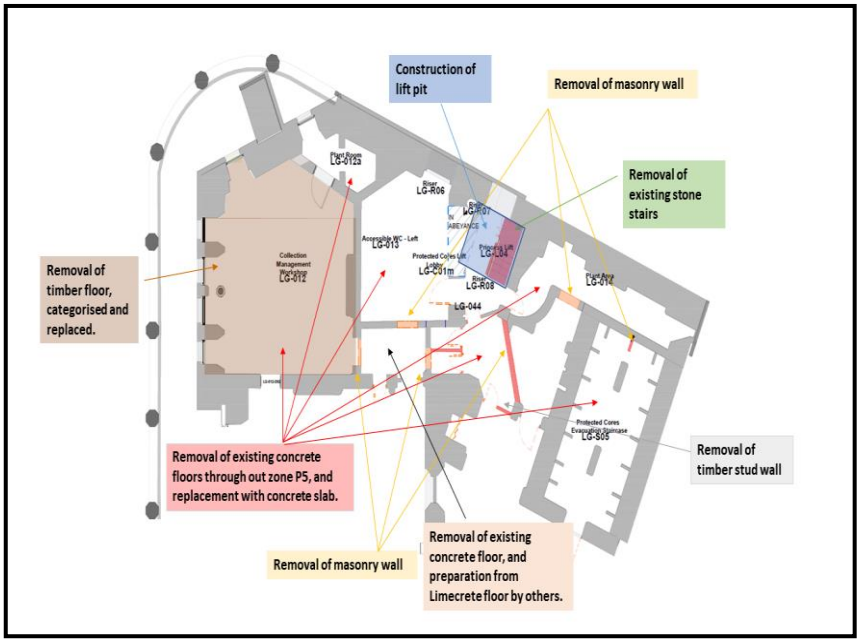



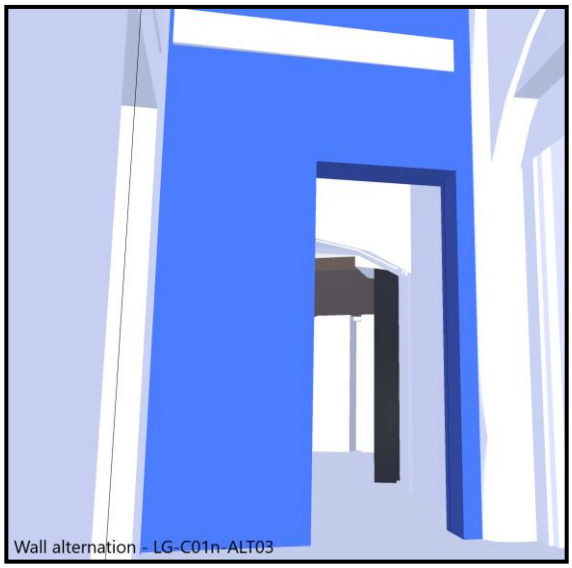
## Alterations

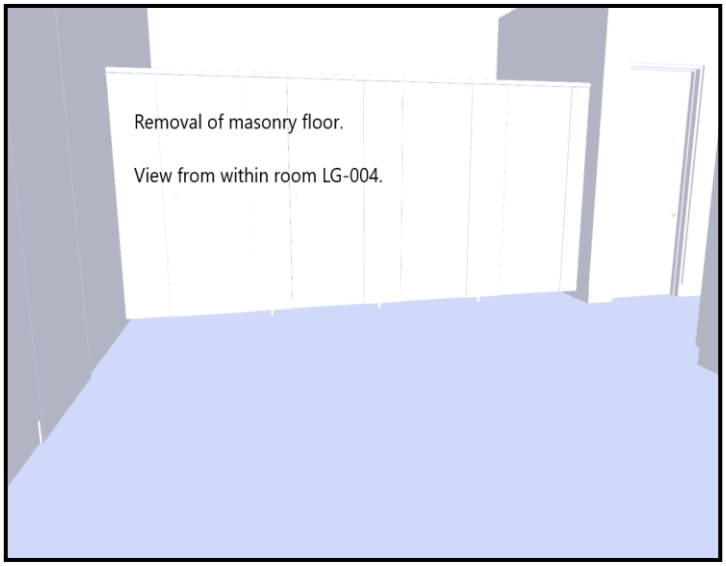
Within this zone there are numerous alterations as listed in the scope of works to be formed. All are of varying sizes, as detailed on Purcell Drawing Nos: LG-0364 and Purcell Alterations Demolitions schedule SCH-A-0395.

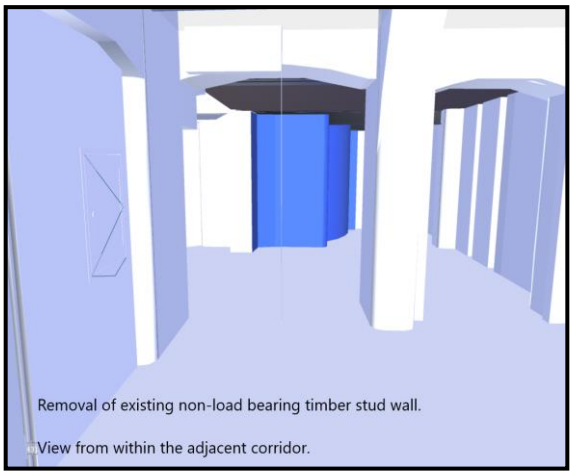
Please refer to Technical Submission 002 which gives specific sequence details for construction of Types 1 to 4 alterations.

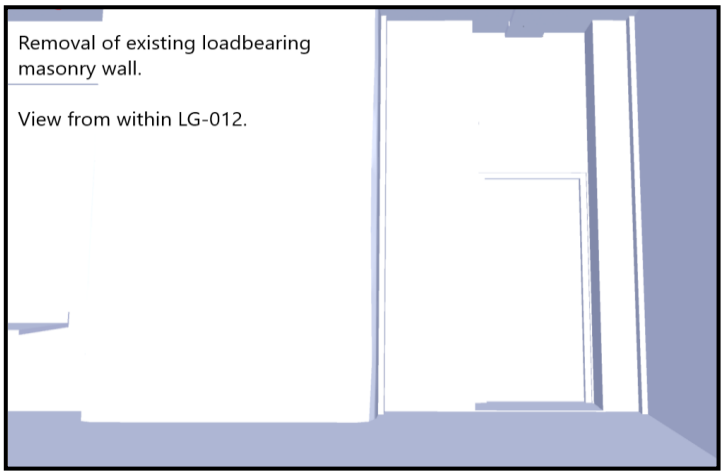



## Example Alterations images captured from model for this zone

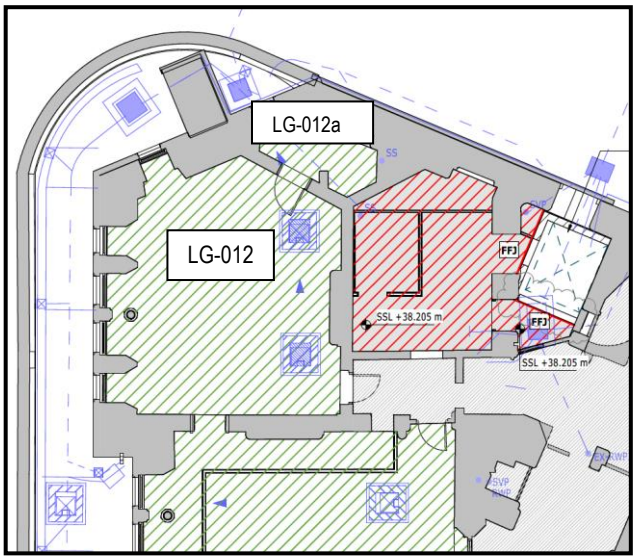


**Removal and Reinstatement of existing timber flooring**



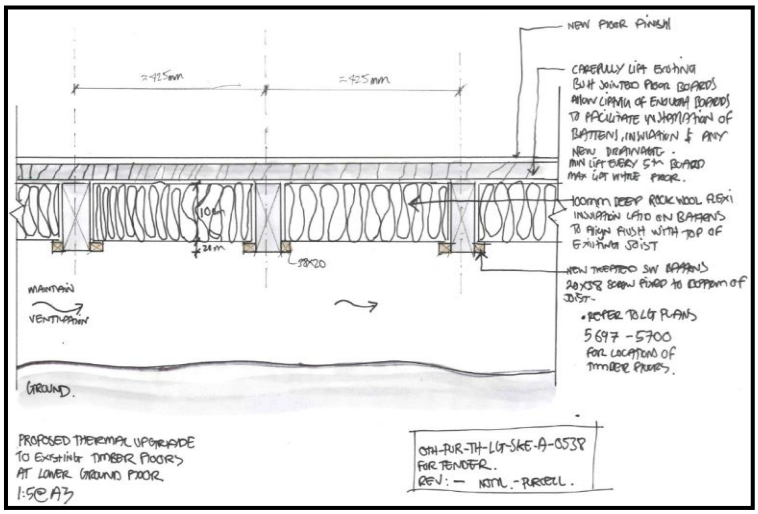

Room LG-012 and LG-012a require removal of timber floor to allow other works to proceed, and to allow installation of insulation in line with the proposed thermal upgrades.

The floors will be surveyed prior to removal which will involve recording the exact location of each board. This will then be used when reinstating the floor with the original material.

1. Record photos of the room will be taken and saved electronically in a logical format.
2. An existing flooring layout survey will be carried out to capture exact positions and locations of every floorboard in the room.
3. Floorboards will then be ~~stickered so that unique~~ given unique reference numbers ~~can be used~~ to identify each individual board and its designated location. Labels will be made and will be stapled to the face of the floorboard.
4. A visual inspection will be made to ascertain fixing location / method.
5. Due to the boarding being tongue and groove, it is required to either find a place where a cut board has been used, or permanently remove a tongue from the board by cutting off using a multi tool. This is to free up one board initially so that other boards can then be accessed.
6. It is unknown whether the floorboards have separate tongues, and / or metal tongues. If the tongues are separate, they must be kept with the same floorboard that they came from.
7. Small pry bars will be used to pry up the floorboards, making use of small timber packers behind the pry bar to act as a lever, and to protect the floorboard that is being levered off. Where required, claw hammers will be used to carefully push the pry bar underneath the floorboard to achieve enough overlap to allow the floorboard to be lifted.
8. Floorboards will be levered up progressively.
9. Where fixings appear to protrude through the top/side of the floorboard they will be removed using the pry bar and timber packer and disposed of. Nail fixings that are pulled through the floorboard and remain in the floor joist will be removed in the same way and be disposed of.
10. As floorboards are removed, they will be carefully stacked on a flat, level surface. Where flooring is to be re-laid in the same room, the floorboards will be stored in the same room (where possible). Where it is not possible to store the timber in the same room, a different location will be agreed with Lendlease.
11. When stacked, timber packers will be placed in between each board to prevent friction between the boards.
12. **HOLD POINT** - When flooring has been lifted, checks will be made of what sub-floor work will be carried out, and whether floor joists and sleeper walls need to be removed to facilitate that work. (Sub-floor work may consist of installation of drainage, installation of ducting etc).
13. Floor joists will then be photographed, surveyed, and recorded in the same way as the floorboards.
14. When it is time to reinstate the flooring, floor joists will be reinstated.
15. As joists are installed, new treated timber battens 20 x 38mm will be screw fixed to the side of the floor joist 100mm down from the top. This will take place on both sides of each joist. The battens will be used

to retain underfloor insulation boards.

16. When all joists are replaced and timber battens fixed, 100mm thick floor insulation will then be placed in the void between floor joists.
17. For an interim period, ply board will be used as a temporary floor surface. This will be pre-drilled, and screw fixed to the floor joists. Checks will be made to detail ply thickness, number of fixings required, support at joints etc.
18. Original floorboards will be returned to original room for storage.




~~19. When it is time, ply boarding will be removed and replaced with original floorboards. This will be done by others.~~

## Saw Cutting and Removal of Concrete Slab

Existing concrete floors slabs within LG-C01m, LG-C01n, LG-014, LG-S05 and LG-R05 are to be saw cut and removed.

1. Prior to start a check will be made of the concrete floor location against construction issue floor plan drawings to ensure that the floor is scheduled as being removed. If there is a query regarding whether the floor should be removed, the work will not start until the query is adequately resolved.
2. The floor slab will be marked out into an 800mm x 500mm grid, using a string line and temporary spray paint. Care will be taken not to over spray from the floors to the walls, and in any event the walls will be protected using visqueen sheet material.
3. The grid will be set out, and will be kept at 200mm away from all walls. This is to allow a 'perimeter cut' to take place.
4. The concrete floor slab is not expected to be reinforced, and the general condition is unknown. If the above grid size is too large and the concrete sections are not able to be lifted safely, the grid size will be reduced.
5. The floor slab will then be cut into sections as per the grid making use of a WAKRA B515ATE Floor Saw as shown opposite.
6. The floor saw is powered by a 3-phase electrical connection to the mains power, carefully running out the leads so as to not create any trip hazards, and to avoid contact with the saw during operation.
7. Mains water supply with then be connected to the floor saw to control dust produced and to cool the cutting blade.
8. A sawcut will then be carried out to a depth of approximately 150mm along all marked out cut lines leaving a 200mm edge around the perimeter of the floor.

9. As work progresses a 110v wet vac will be utilised to collect any excess water residue and slurry. This will be emptied at an agreed location outside of the building to be removed off site at a later date.
10. Once the sections have been saw cut the Hilti TW 60 110v drill (shown opposite) will be connected to the power supply and a 16mm diameter tungsten drill bit attached.
11. The centre of each block will then be carefully drilled, and HKD anchors fitted to allow easy lifting of the concrete blocks.

12. A lifting eye is then attached to the anchor and then to a counterbalance lift crane. The crane will then be used to lift out the concrete sections.
13. Each section will then be carefully lifted out and placed onto a pallet truck. The pallet truck will then transport the concrete sections to the agreed storage area awaiting removal off site.
14. This is repeated until all cut sections have been removed.

15. To remove the 200mm perimeter edge a Hilti DD 350 core drill will be set up attached to the 110v power supply and mains water supply. A 150mm diameter core will then be attached and carefully cored through the reinforced concrete floor slab to enable the 200mm perimeter strip to be removed in 1.0 to 1.6m length sections.
16. These will be removed in line with section 10 above and placed onto the pallet truck and stored locally awaiting removal off site.

17. Should the concrete not fall away from the face of the brickwork then a flush cut will be required. This will be done with a Pentruder Wall Saw (as shown opposite). This will also be connected to the mains water supply, with any water residue again being vacuumed up with the 110v wet vac and disposed off-site.

At internal corners, the flush cutting technique cannot be applied, therefore a 150mm diameter core hole will be cut in each corner to facilitate removal of the concrete slab.

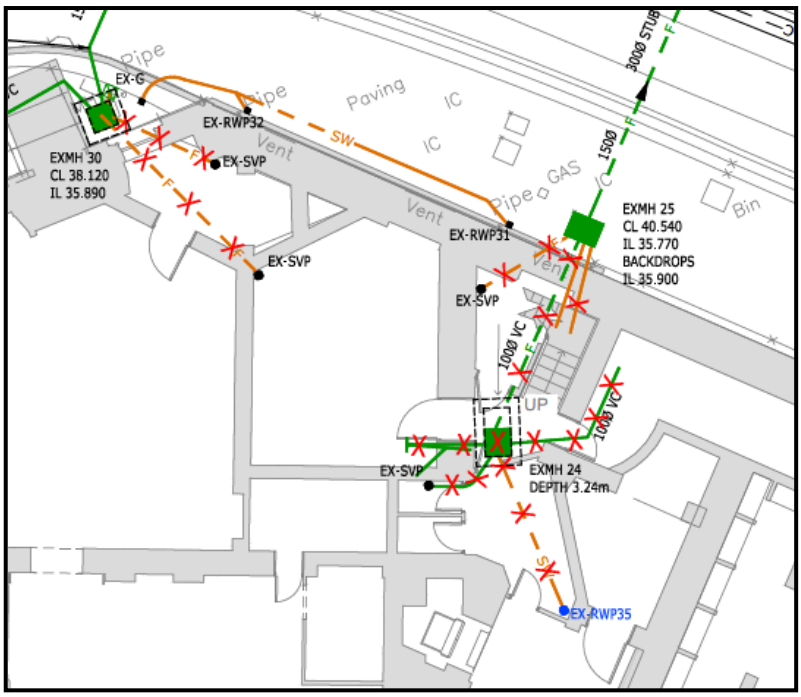
**Reduced Level Excavation and Stone Formation for Concrete Floor Slabs**

1. Following removal of the concrete floor slab, a reduce level excavation of up to 500mm is to take place to allow construction of the new concrete floor slab.
2. This involves excavating the ground to a specified level using the JCB 19C-1E/Brokk 90, and removing the excavated material using an electric wheelbarrow. https://truxta.com/truxta-products-mini-dumpers/quadro-mini-dumper-by-truxta
3. This activity will take place after completion of previous activities such as installation of drainage and ducting.
4. The new floor slab requires 300mm of new aggregate material to be placed in ~~two~~ compacted layers. This includes 2x layers of 90mm Type 1 MOT, followed by 120mm of glasscrete insulation (by others) and then the installation of reinforced concrete. This will be imported using electric wheelbarrows and spread and levelled using electric excavator.
5. Compaction will be carried out in accordance with the specification using a vibrating plate compactor.
6. Excavated material will be removed from the building via the courtyard or conveyor within Room LG-009.

**Reduced Level Excavation and Stone Formation for Limecrete Floor Slabs**

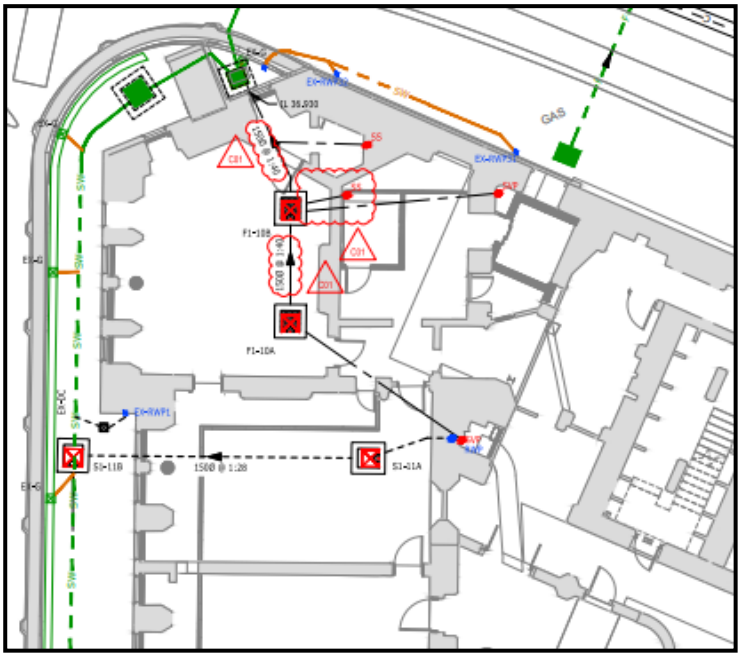
1. Following removal of the concrete floor slab, a reduce level excavation of up to 500mm is to take place to allow construction of the new concrete floor slab.
2. This involves excavating the ground to a specified level using the JCB 19C-1E/Brokk 90, and removing the excavated material using an electric wheelbarrow. https://truxta.com/truxta-products-mini-dumpers/quadro-mini-dumper-by-truxta
3. This activity will take place after completion of previous activities such as installation of drainage and ducting.
4. The new floor slab requires 300mm of new aggregate material to be placed in two compacted layers as detailed above, followed by 120mm of glasscrete insulation (by others) and then the installation of limecrete concrete (by others).
5. Excavated material will be removed from the building via the courtyard or conveyor within Room LG-009.

**Remove/Grout Up abandoned existing drainage**



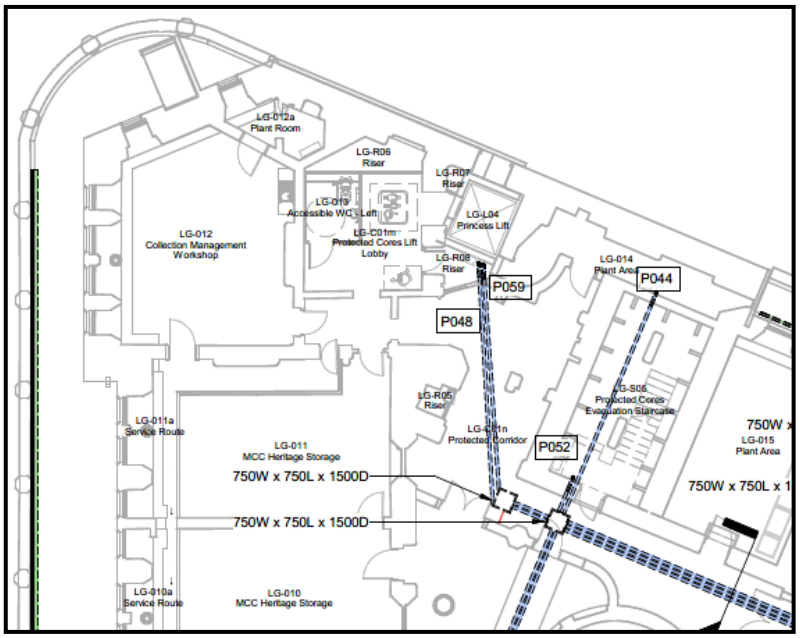

1. Due to room layout changes there are instances where the existing drainage is redundant and therefore it is to either be removed or grouted up.
2. The depth of the drainage will be taken from the existing service drawings. Where the depth is unknown a sonde will be used (picture) in conjunction with a CAT to ascertain the depth. This will be done by fixing a sonde to the end of a cobra reel to feed down the drain. The CAT scan will then be used to detect the signal emitted from the sonde.
3. Where the depth is up to 850mm below existing slab level the drains within the building footprint will be removed as part of the reduce level dig works.
4. Where the drainage exceeds 850mm depth drains will be capped off within the inlet of the downstream manhole and grouted up.
5. Before grouting, drains will be jet washed clean. This will be done using a proprietary JetVac unit outside of the building. The unit will run hoses from the external manhole, cleaning the drain lines as it goes.
6. Prior to mixing grout, a designated mixing enclosure will be setup. All mixing will take place inside the enclosure protecting the building fabric from splashes of grout.
7. Powder grout will be brought into the building using electric wheelbarrows to save manual labour.
8. Powder will be poured into a mixing barrel, then water added.
9. A paddle mixer will then be used to mix to consistency.
10. A cone / funnel will then be used to aid controlled pouring of grout into the drain.
11. Grout will continue to be poured until drains are full.

## Installation of Drainage



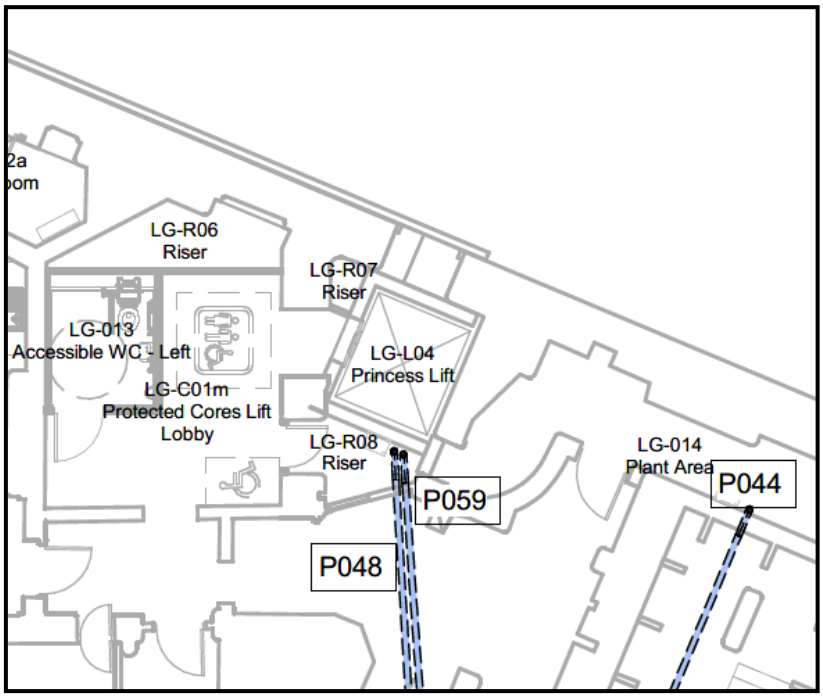

1. Due to room layout changes there are instances where new drainage is required as detailed on Ramboll drawing C100.
2. The drainage is to be installed once the removal of the concrete slab and / or timber floor and reduce level dig is complete.
3. Trenches will be excavated using the JCB 19C-1E electric mini tracked excavator. Where drainage is located beneath existing timber floors, the trenches will be excavated by hand.
4. Trenches will vary in depth and width in up to a maximum of 1.5m deep and approximately 600mm wide.
5. Excavated material will be removed from the building using electric wheelbarrows and conveyor systems through window openings.
6. When the trench is excavated a layer of pipe bedding will be installed in the trench. This will be brought into the building using conveyors and electric wheelbarrows, and will be installed in the trench by hand ~~using elctric excavator~~.
7. Clay drainage pipes will then be installed in the trench in line with the design and specification. Pipes will be carried into the building manually, and laid in the trench manually.
8. Where pipes need to be cut to length a number of techniques will be used depending on the pipe size and material.
9. 100mm clay pipes will be cut using a manual pipe cutter along with manual pipe trimmer to smooth the edges. See Pic.
10. Cast iron pipes are to be used when laid through / under walls. These pipes will be cut using a petrol cut off saw. The cut off saw will be fitted connected to a water supply which will suppress sparks during cutting. All cutting will take place in the courtyard within the confines of a dedicated enclosure to control spray off from water suppression.
11. Clay pipes greater than 150mm will also be cut using a petrol cut off saw. The cut off saw will be fitted connected to a water supply which will suppress dust during cutting. All cutting will take place in the courtyard within the confines of a dedicated enclosure to control spray off from dust suppression.
12. Trenches will be backfilled using stone aggregate material. This will be carried out using the electric excavator and electric wheelbarrows to cart material into the building and the pour into the trench.
13. The trench compaction will take place using an 110v electric whacker plate (compacting plate).

**Installation of Ducting**



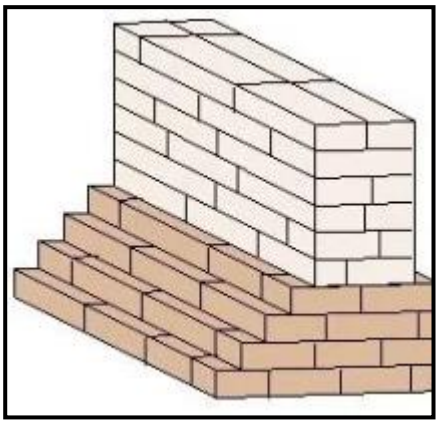

1. Due to the M & E requirements for the newly renovated building ducting will be be installed as per ARUP Drawing E-22499.
2. Ducting will be installed once the concrete floors have been removed and the reduced level dig is complete.
3. Trenches will be excavated using the JCB 19C-1E electric mini tracked excavator.
4. Trenches will vary in depth and width in up to a maximum of 1.5m deep and approximately 500mm wide. The width and depth of the trench depends on the number of ducts to be installed and the design.
5. Excavated material will be removed from the building using electric wheelbarrows and conveyor systems through window openings.
6. When the trench is excavated a layer of sand blinding will be installed in the trench. This will be brought into the building using conveyors and electric wheelbarrows, and will be installed in the trench using elctric excavator.
7. Plastic pipes will then be installed in the trench in line with the design and specification. Pipes will be carried into the building manually, and laid in the trench manually.
8. Trenches will be backfilled using stone aggregate material. This will be carried out using the electric excavator and electric wheelbarrows to cart material into the building and the pour into the trench.
9. The trench compaction will take place using an 110v electric whacker plate (compacting plate).

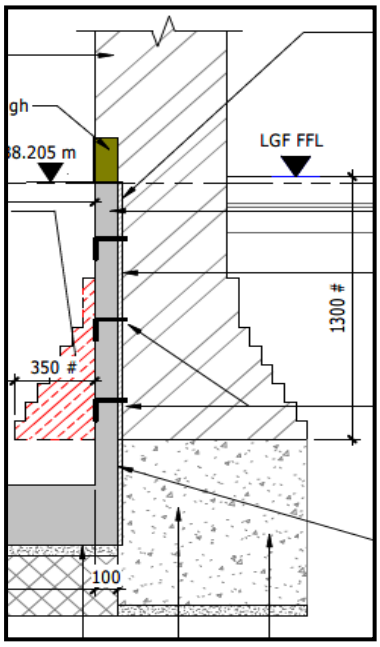
**Construction of Lift Pit (Princess Lift)**




The lift pit is a concrete structure that facilitates installation of the lift shaft and passenger lift.

The new lift pit will be located in LG-04 Princess Lift Room. There is an existing sandstone stairway that will be removed before starting works, along with a concrete floor slab.






1. The footprint of the lift pit will be set out on the ground using non-permanent line marking spray.
2. A preliminary excavation will then take place to a depth of circa 1.25m. This will be done making use of the electric excavator.
3. During excavation, a brick corbelled foundation will be encountered. This is the foundation for the existing walls. Excavation will progress to just above underside of foundation.
4. All arisings from the excavation will be removed from the building using electric wheelbarrow and conveyor system.
5. On the wall dividing LG-L04 and LG-014, circa 100mm must be removed from the face of the wall to allow the lift pit to be built. This will be done using an Arbortech Allsaw AS175. This tool uses dry cutting with vacuum attachment to remove dust at source. The Allsaw will be used to remove the mortar joint allowing brickwork to be removed. https://www.arbortechtools.com/en/allsaw-as175/
6. A concrete lintel will then be installed to support the brickwork above the broken-out section.
7. The corbelled foundation must also be broken out. This will be done in short local sections of no greater than 900mm as indicated by the underpin sequence. See below. This will also be removed making use of the Allsaw. Vertical mortar joints will be removed to weaken the brick bond, and a small electric breaker will be used to impact the horizontal mortar joint, breaking the bond and releasing the brick.
8. When the section of the corbel foundation is removed, the underpin needle will be excavated beneath the wall (undermined). This will be done using a hydraulically powered clay spade.
9. The underside of the brickwork will be cleaned off using a stiff brush.

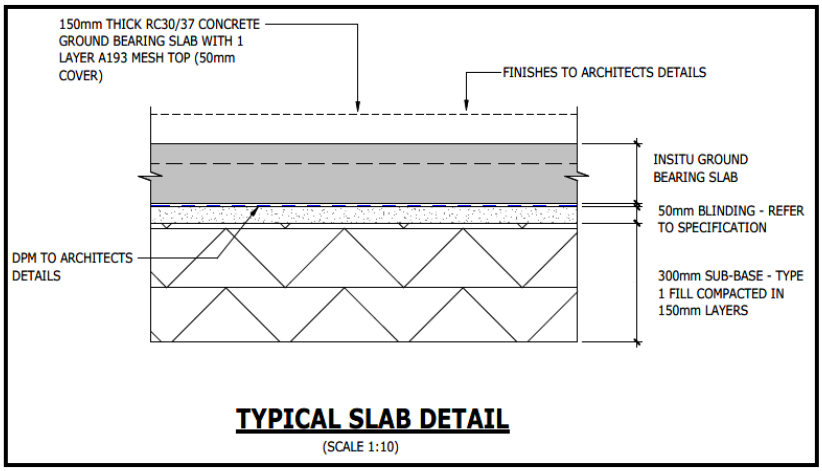
10. A timber shutter will then be formed in front of the opening. The shutter will have a 'letterbox' built in to allow concrete to be poured under the wall into the underpin needle excavation.
11. The shutter will be left 75mm below the underside of the wall.
12. Ready mixed concrete will be delivered to site and will be imported into the building using the electric wheelbarrows.
13. Buckets will then be filled with concrete and poured into the needle excavation, keeping the concrete 75mm below the underside of the wall. An electric vibrating poker will be used to compact the concrete and eliminate air pockets.

14. The concrete will then be left to cure for 3 days.
15. After curing, the timber shutter will be removed.
16. Drypack (sand and cement) will then packed into the 75mm void between the new concrete foundation and the underside of the brickwork. This will be rammed into the void making as compact as possible to ensure there are no remaining voids or air pockets and there is full contact between the brickwork and foundation.
17. This process will be repeated in line with the underpin sequence.
18. The lift pit base will then be formed. This involves fabricating a reinforced steel mat. Rebar will be carried into the building manually and tied manually.
19. Timber shuttering will then be installed to form the concrete base.
20. Concrete will be poured to form the base. This will be done by pumping concrete from outside of the building using a concrete pump. Hoses will be laid out as required and fed into the building via an opening in the moat wall.
21. When the base has been poured, steel reinforcement will be fabricated in the walls.
22. Dowel bars will be fixed into the existing wall and lapped onto rebar. Holes will be drilled into wall using an SDS percussion drill. A permit to drill will be obtained prior to carrying out this work.

23. Proprietary shutters will then be used to form the walls.
24. Concrete will then be poured into the shutters, allowed to cure and shutters removed.

## Concrete Slab Pour

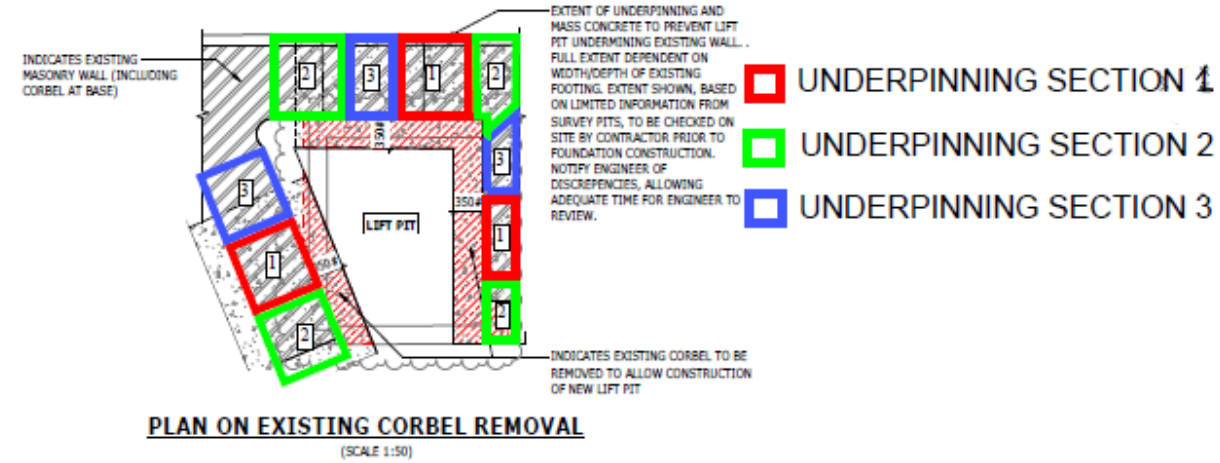
1. After completion of all sub floor activities such as drainage, ducting, reduce level excavation etc, new concrete floor slabs will be poured where required.
2. 50mm of concrete blinding Gen 3 will then be laid on top of the sub-base. This will be laid by hand and levelled as required using shovels and spazzles.




3. 40mm cork board insulation will then be positioned along the perimeter of the slab next to the existing wall and an isolation joint formed alongside the newly constructed substation foundation/trench.
4. A layer of DPM sheeting (visqueen) will then be laid on top of the blinding. The visqueen will be rolled out as required and cut to shape using a retractable utility knife. The visqueen will be laid with overlaps of 300mm. Joints will then be taped and weighed down with concrete spacer blocks.

5. 1 layer of A193 mesh will then be laid on top of the concrete spacer blocks and fixed using tie wire.
6. To isolate the pour from the next section to be constructed, road form shutters or similar will be used.
7. Existing walls will be protected using visqueen taped to the walls using low tack tape.

8. Concrete will then be pumped into the building via the service penetration at the perimeter. The pipes for the pump will be connected to a scaffold ladder rack isolated from the moat wall. See protection details below.




**PLAN ON EXISTING CORBEL REMOVAL**

(SCALE 1:50)

**NOTE:**
ALL DIMENSIONS/EXTENTS ARE TO BE CONFIRMED ON SITE. NOTIFY ENGINEER OF ANY DISCREPENCIES BETWEEN DRAWINGS AND ONSITE CONDITIONS AND ALLOW TIME FOR ENGINEER TO REVIEW.

| Benchmark/Samples: |
|---|
| N/A |

| Heritage Considerations: | Controls: |
|---|---|
| **Materials: (New, existing and waste streams)** | All waste generated will be stored locally until a designated waste route and disposal area has been agreed with Lendlease. Propose waste routes including conveyor systems to be used to transport excavated material outdoors.<br><br>Waste streams include brick, concrete, excavated spoil. This material will not be stored up against existing walls. |
| **Protection: (Exceptions to project strategy)** | When removing timber floors, small hand tools will be used sympathetically. This will consist of small pry bars and claw hammers. Timber packers will be used to protect timber floorboard surfaces when levering / prying up timber boards. Timber packers will be placed between boards during stacking/storage to protect individual floorboards surfaces from friction.<br><br>In line with the works detailed above the fabric of the building will require protection from splash events from water, slurry and concrete. Protection will be achieved by utilising 500 gauge visqueen taped and draped to the existing fabric.<br><br>Where it is required to use a petrol cut off saw, this will be done in a designated cutting enclosure which will prevent water suppression from splashing onto the building fabric.<br><br>Protection to the existing fabric from plant movement will be carried out using Class 0 low level hoarding protection. This will be placed to mimic a corridor from the work zone to external door reference LG-C02-ED03.<br><br>Any service penetration through an external wall will be protected with a timber frame wedged into the opening with Visqueen stapled to the frame.<br><br>The pipe joints to the concrete pump main will be secondary secured utilising a circlip pin. In the event of a blockage within the pump line the existing fabric of the building will be protected using visqueen prior to any joints being opened.<br><br>Once the concrete has been poured the lines will be cleaned utilising a sponge ball inserted at the open end of the line and drawn back by vacuum towards the pump unit. The lines will then be split and each open end of the pipe will be capped off to prevent any residue of grout leaking out of the pipes whilst in transit from the building. |
| **Building Impact: (Vibration, dust, noise etc.)** | **Vibration:**<br>• Vibration monitoring provided by Lendlease, monitored by SRL as per agreed with the client.<br>• HOLD POINT: If the vibration level exceeds the upper threshold alternative methodology needs to be considered. |

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| | • No tools or processes are anticipated to cause excess vibration to the fabric of the building.<br><br>**Dust:**<br>• Dust will be suppressed utilising water. Where the water main is to be connected directly to the cutting equipment, the discharge will be collected by a wet vac. Where the water is supplied via a wate collection unit the water will be recycled within the unit for reuse after the slurry has been separated.<br><br>**Noise:**<br>• This will be monitored and recorded on a daily basis.<br>• Noise exclusion zones will be setup to prevent other people from entering the work area.<br>• Hearing protection will be provided to all within the work area if required. |
| **Tools/Equipment: (Type, use and calibration)** | All tools and equipment have been described in detail in the sequence section. |
| **Storage: (During works for reinstatement, long term off site)** | Heritage Assets will be stored in an allocated room on the ground floor as dictated by Lendlease.<br><br>Original brickwork will be stored externally in an allocated area ~~room on the lower ground floor~~ as directed by Lendlease.<br><br>Spoil will be removed from the building via the courtyard or conveyor belt within Room LG-009 as agreed prior with Lendlease. |
| **Discovery: (Type to be expected and visual signs)** | All personnel will be made aware of any heritage assets and any requirements for pre-approved protection. Care must be taken at all stages of the removal process and supervision must monitor the integrity of protection as the works progress. Photographs of each element/area will be taken before works commence and once works have been completed. These photographs will be issued to Lendlease. Were required Lendlease will issue permits to work.<br><br>In the event of any unknown heritage items/assets are discovered whilst carrying out our works, an immediate hold point will be implemented and Lendlease informed. Works will not be able to recommence until a written instruction is received from Lendlease. |
| **Workforce Awareness: (Tool box talks and briefing by design consultants prior to works)** | In line with Lendlease's protocols, the Murraywood site teams will undergo project inductions to outline site rules, welfare arrangements and emergency procedures of the site. The Murraywood workforce will be briefed on the OTH project objectives, the Town Hall's history, heritage/protection requirements and the work team's responsibilities.<br><br>In addition, there will also be a ½ day Incident and Injury Free inductions and supervisors must also attend a Frontline Leadership 1-day training course. These inductions/courses are dependent on Lendlease protocol for COVID 19.<br><br>Prior to a new work area being released to Murraywood, a room walk around will be completed with the Murraywood site team and Lendlease to discuss the rooms specific heritage items/assets and any safety concerns to ensure the full site team is aware of what the rooms protection will consist of.<br><br>At the start of each shift the site team will be briefed on the day's targets and strategy of the day's events (Smart Start). This will include a discussion on heritage protection required through a 'Start Right Briefing' method given by the site manager/supervisor.<br><br>Various other TBTs will also take place weekly, which will include topics on Health and |

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| | Safety, Environmental and Occupation health.<br><br>The day to day running of the site will be closely monitored and recorded by the Murraywood Manager/Supervisor throughout the whole work package. This will include the Site Manager/Supervisor completing a daily diary of the day's events and the Quality Manager/Site Engineers' recording the daily progresses and keeping detailed records and photographic evidence.<br><br>Throughout the works, the Murraywood site team will attend daily Smart Start Meetings and progress meetings when required, as well as completing internal/external audits throughout the whole project. |

| **Project Team Approval to Commence Works** | | | |
|---|---|---|---|
| **Organisation** | **Name** | **Signature** | **Date** |
| MCC | | | |
| Purcell | | | |
| ARUP | | | |
| Ramboll | | | |
| Planit | | | |
| Lendlease | | | |
| Works Contractor | | | |