



OUR TOWN HALL PROJECT

Technical Submission - Zone P1a

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P01	Document created	21/09/20	M Howard	
P02	Amended as per comments received.	09/10/2020	Simon Ball	



Our Town Hall

Works Technical Submission

Works Package Name: Internal Substructure

Works Package Number: 40032.01

Task/Activity:

- Heritage Removal and Storage
- Dismantling of the Air Raid Shelter
- Service Penetrations (both for loading and non-load bearing BW)
- Saw cutting and concrete slab removal
- Reduced level excavation
- Construct foundation and trenches for new substation
- Construct new concrete floor

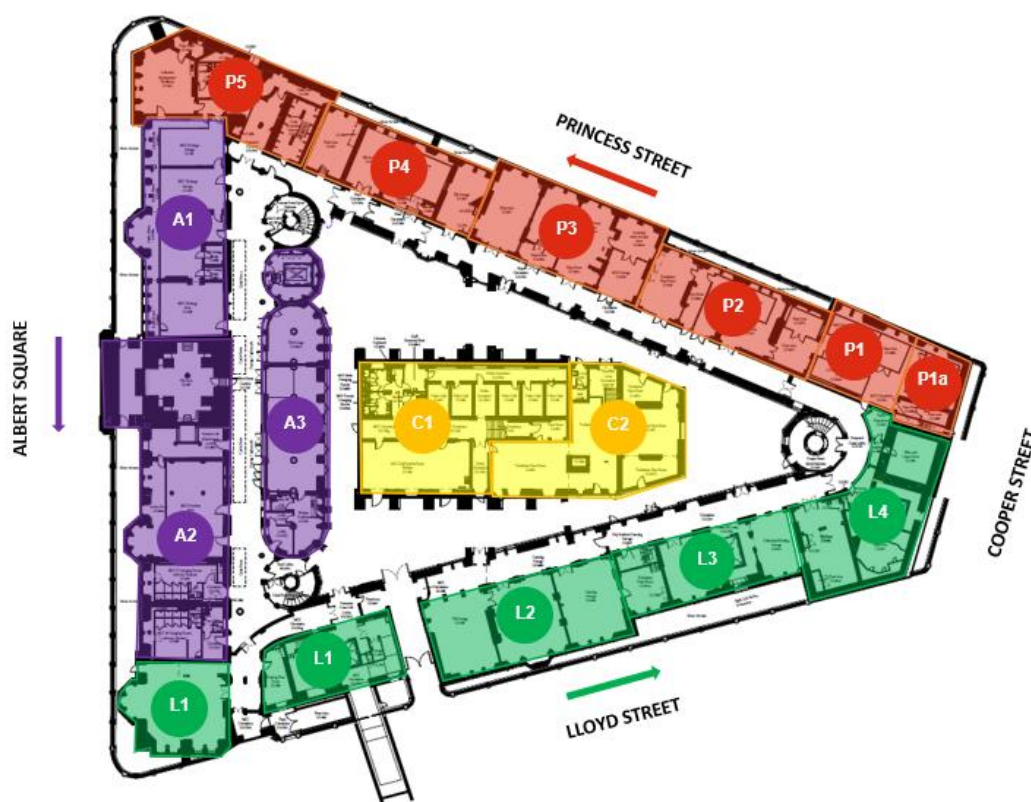
Location: Zone P1a

Date: 06/10/20

Start Date of Activity: 19/10/20

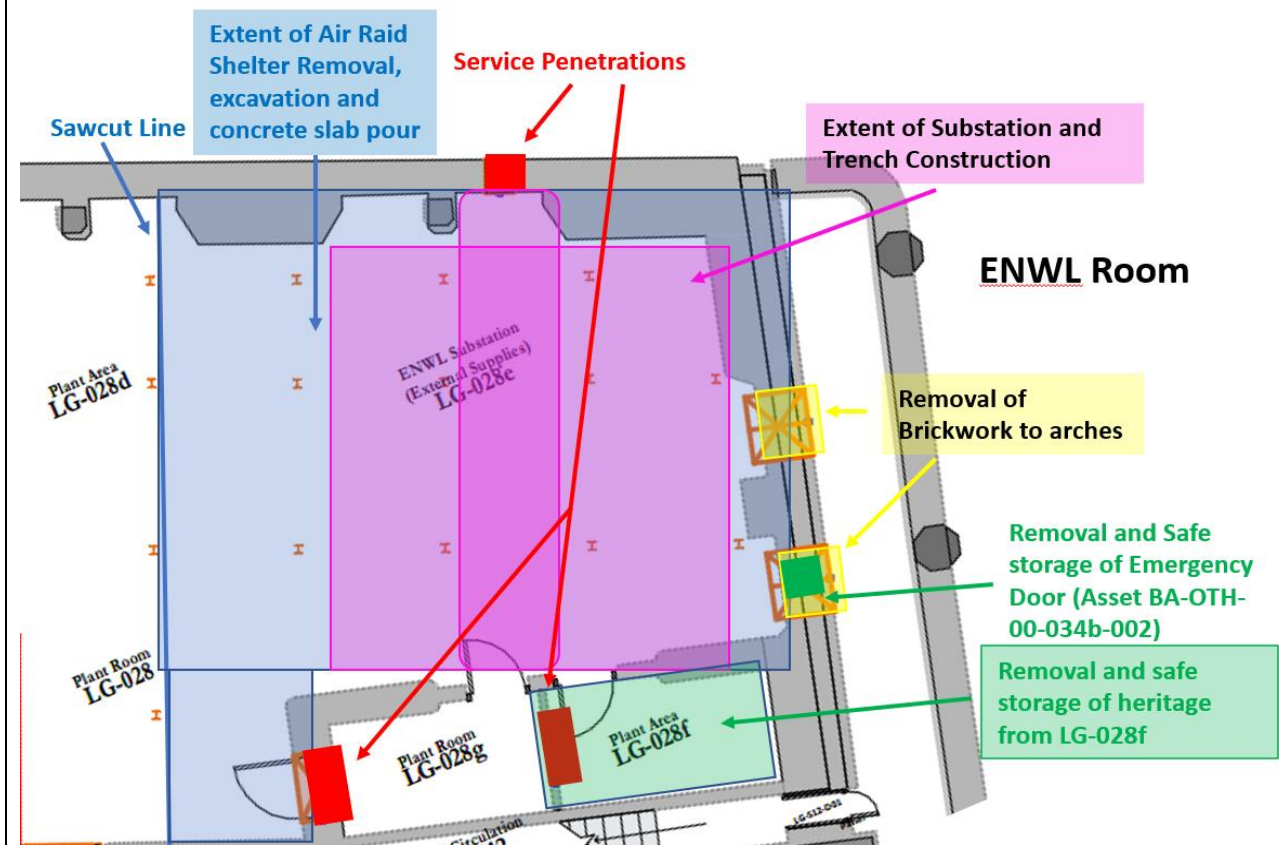
Scope/Overview:

Zone Plan Overview for Lower Ground Floor:



At present there is an existing Electricity North West Ltd (ENWL) substation located in the lower ground floor. This room is to be decommissioned and a new room constructed to house new substation equipment. The new room is located at LG028e. In order to construct the new ENWL substation, the following work will be carried out:-

- Careful removal and storage of Emergency Door (Asset BA-OTH-00-034b-002)
- Careful removal and storage of existing heritage from LG-028f (Asset BA-OTH-00-034B-001)
- Dismantling of Air Raid Shelter in LG-028e
- Form Service Penetrations (LG-028-BW01 Type 17, LG-028g-BW01 Type 7, LG-028f-BW01 Type 7, LG-028e-BW01 & BW02 Type 18)
- Saw cutting and removal of concrete slab
- Reduced Level Excavation
- Construct foundation and trenches for new substation
- Construct new concrete Floor



Sequence (incl. hold/inspection points):

Careful removal and storage of Emergency Door (Asset BA-OTH-00-034b-002)

1. An existing window archway has been bricked up. The brickwork houses an Emergency Door which is to be catalogued, removed and stored as a heritage asset. (See picture).
2. **HOLD POINT** - Prior to removal of heritage assets, a check of the Building Asset Schedule (OTH-PUR-TH-LG-SCH-A-2432) must take place to ensure that the asset has been identified for removal.
3. On visual inspection of the door installation it is suspected that the door frame is installed using welded frame cramps / ties into the brickwork. Unfortunately, without further intrusive inspection, the actual installation method cannot be confirmed.
4. At this point ensure that the door is closed and secure.
5. A palette knife will be pushed into the small gap between the brickwork and the door frame. The palette knife will be used to remove the silicon strip and try to locate the cramps / ties. This is simply by feeling for obstructions when inserting the knife and removing the joint.
6. **HOLD POINT** – If ties are found the following methodology will take place. If not, the methodology will be revisited.
7. The horizontal locations of the cramps / ties will be marked on the brickwork using chalk.
8. Brickwork will then be stitch drilled making use of a 110v percussion drill with class M vacuum attachment to remove dust at source.
9. Stitch drilling will then isolate the cramps / ties from the brickwork making the frame loose.
10. The door will now be opened to allow the unit to be slid out of the opening and placed on a pallet for removal and storage. Storage will be within the Consolidation Room on the ground floor.



Careful removal and storage of existing heritage (Bookcase) from LG-028f (Asset BA-OTH-00-034B-001)

1. There is an existing bookcase to room LG-028f, with above asset number.
2. The bookcase is freestanding and will be transported using a heavy duty sack truck (pictured).
3. This will be removed to storage within the Consolidation Room on the ground floor, photographed and catalogued.



Dismantling of the Air Raid Shelter in LG-028e/LG-028f and LG-028g

Structure Details

1. An existing air raid structure is present in the new ENWL substation room.
2. The structure is made up of a steel supporting column and beam framework, carrying a protective deck above. The protective deck is made from profiled steel sheets laid loose on top of the supporting steel beams.
3. Works will be carried out by NDTG trained demolition operatives and supervised by Demolition Gold Card Supervisors.
4. The methodology will be appraised by our structural engineers prior to commencement with all weights and loads being calculated and assessed.
5. **HOLD POINT:** Prior to any sheets being removed the space between the steel deck/soffit and original ceiling is to be surveyed using an endoscope to check for unrecorded assets.
6. The profiled sheets will be removed using hydraulic table lifts. Table lifts will be jacked up either side, to the underside of the sheet.
7. The sheet will then be secured to the table lift using ratchet straps.
8. Table lifts will then be raised above the steel beams, then on the manoeuvrable casters moved left or right to enable a clear zone at the edge of the sheet to lower tables down progressively.
9. This will be repeated as required to strip the entire deck.
10. **HOLD POINT:** If at any time any unrecorded asset is found within the space between the steel deck/soffit and original ceiling then work is to stop to seek further guidance.
11. Once the sections are placed on the floor, they will be cut into smaller more manageable pieces using a robotic Brokk machine with metal shear/concrete pulveriser attachment.
12. Smaller sections will then be placed on to pallet trucks or similar equipment to be taken from the works area to the skip location via the agreed egress route.
13. When all the deck sections have been removed the steel beam sections will be dismantled in a similar method to the above
14. Operatives working from a tower scaffold will unbolt the steel beams from the columns using spanners. Should the bolts be too difficult to undo then we will use a hydraulic bolt splitter to split the bolts.
15. The steel beams will be lifted down using the Beam Lifters on to the floor ready to be processed. The dismantling works will be done progressively with the removal of beams followed by columns. The columns held in an upright position, will be unbolted from the floor, and then lowered to the floor manually.
16. The steel sections will be cut into smaller more manageable pieces to be loaded onto skids and pull trucks, to be taken from the works area to the skip location via the agreed egress route.
17. This methodology will be repeated on all sections of the air raid structure until its full demise.



Form Service Penetrations within ENWL Room

LG028-BW01 Type 17

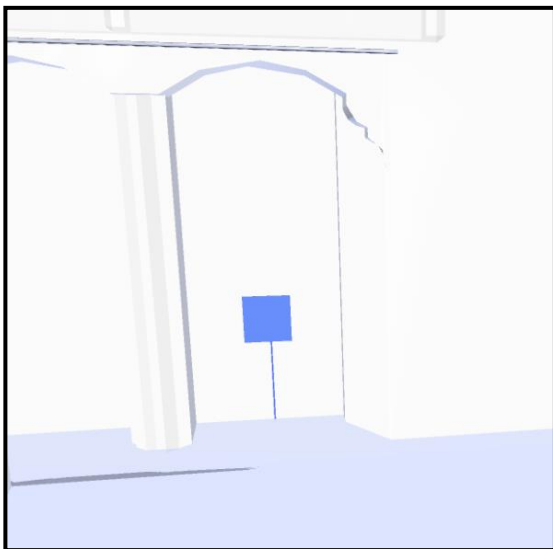
LG-028g-BW01 Type 7

LG-028f-BW01 Type 7

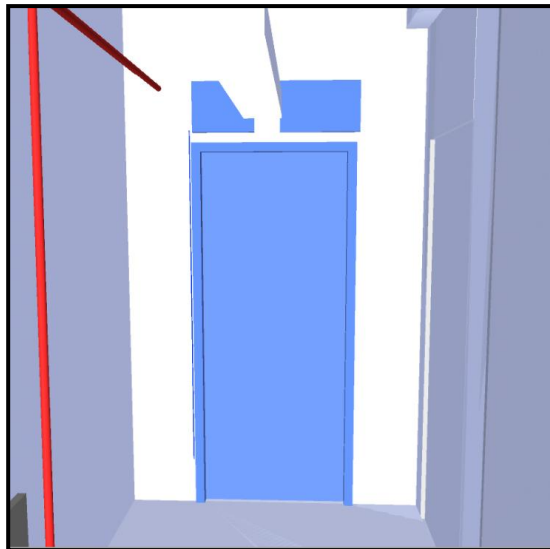
LG-028e-BW01 & BW02 Type 18

Within this area there are five service penetrations to be formed as detailed on Drawing No: OTH-PUR-TH-LG-DWG-A-0365 and noted as listed above.

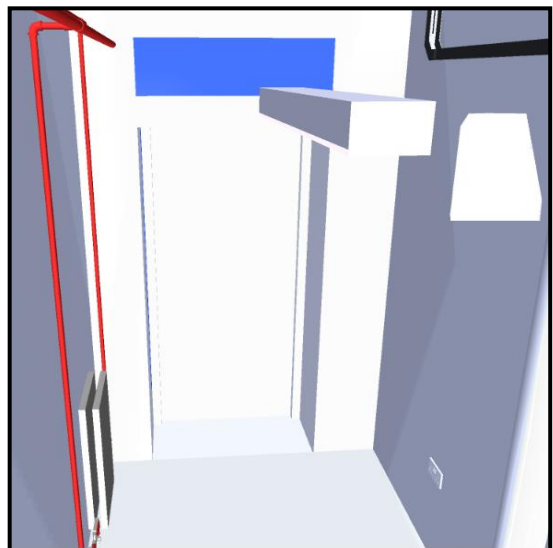
Service penetration images captured from model



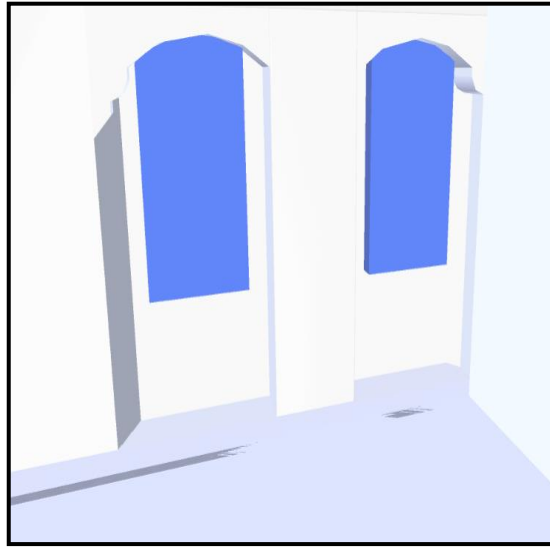
LG-028 BW01 Type 17



LG-028g BW01 Type 7



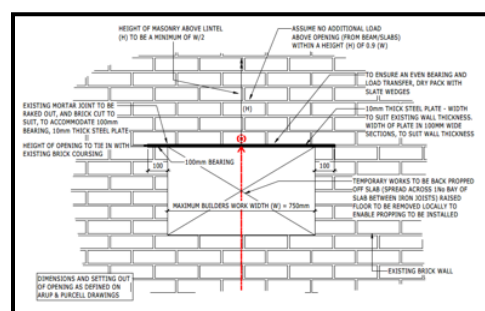
LG-028f-BW01 Type 7



LG-028e-BW01 & BW02 Type

Methodology for service penetrations incorporating steel plates not exceeding 750mm wide

1. Setting out of these penetrations will be carried out by NG Bailey and agreed with Lendlease.
2. **HOLD POINT** – Once setting out has been completed and agreed, record photographs will be taken prior to commencement of any works.
3. LG-028-BW01 Type 17 comprises a 400mm x 400mm square circa 500mm deep (estimated) service penetration with a 10mm flat steel plate in the head of the opening for support of brickwork above.
4. At this moment in time the exact depth of the opening is unknown. The depth is required to ascertain the number of steel plates to use in the head of the opening.
5. Once the positioning has been agreed the construction of the service penetration will be as follows:
6. Where both sides of the wall are accessible a Hilti PX10 Transpointer as shown opposite will be used to ascertain the depth of the wall.
7. Where both sides of the wall are not accessible a 32mm diameter core will be drilled through the wall (central to the proposed service penetration) using Weka 16 Rotary diamond drill 110v.
8. The drill will be connected up to a temporary water supply which will act as a coolant and also suppress any dust particles whilst the core drilling is in operation. <https://www.youtube.com/watch?v=LhDm976E7hs>
9. A water collection system (WCS67) will also be used attached to a 110v wet vac. This will collect slurry created during the coring and damping process. The wet vac separates the slurry from the water whereby the water is reused, and the slurry is collected in a bag. This allows easy disposal of slurry in the containment bag.
10. The wall will then be carefully core drilled to ascertain the depth of the wall.
11. A demonstration of the core drill water collection system can be arranged. The demonstration will involve a physical example and as such an actual core drill hole will need to be made to a surface.
12. **HOLD POINT:** Where a 'check dimension' is noted on the setting out drawings, this will be checked and any discrepancies reported to Lendlease prior to continuing of any works.
13. Saw cut mortar line for installation of 10mm flat steel plates using Arbortech Allsaw AS175. This tool uses dry cutting with vacuum attachment to remove dust at source. <https://www.arbortechtools.com/en/allsaw-as175/>
14. The vertical edges of the service penetration will then be cut using a hydraulic handheld circular saw with water dust suppression.
15. Slurry and water produced by water dust suppression from the circular saw will be constantly controlled and cleaned up using 110v wet vac during the cutting process.
16. Surfaces will be protected from spray using visqueen sheeting or corex sheet. Where possible this will be taped to the building, or where tape cannot be used a stud frame will be made with visqueen sheet to act as a screen that can be leant up against the walls.
17. Slurry and water produced by water dust suppression from cutting activities will be constantly controlled and cleaned up using 110v wet vac during the cutting process.
18. The top layer of brickwork will then be removed. This will be done making use of the Arbortech AS175 to cut vertically in the mortar



joints to weaken the bond between the bricks. A small electric percussive breaker will then be used to carefully impact the mortar joint, breaking the bond and freeing up the brick.

19. This process will continue course by course, with first bricks weakened to make a start, then removed by breaking the mortar joints.
20. The steel plate will be pushed into place and then dry packed with slate wedges.
21. Once the steel plate is in position and secured, the rest of the brickwork will be removed from the service penetration.
22. Any service penetration through an external wall will be protected with a timber frame wedged into the opening with visqueen stapled to the frame
23. Any original brickwork that is full or half brick with be palletted and saved in an agreed location for future works. Debris and modern brickwork will be disposed of.

Methodology for service penetrations incorporating pre-cast concrete lintels not exceeding 2500mm wide:

1. Setting out of these penetrations will be carried out by NG Bailey and agreed with Lendlease.
2. **HOLD POINT** – Once setting out has been completed and agreed, record photographs will be taken prior to commencement of any works.
3. LG-028g BW01 Type 7 comprises a 300mm x 1010mm rectangular opening circa 584mm deep (estimated) service penetration with a pre-cast concrete lintel in the head of the opening for support of brickwork above.
4. At this moment in time the exact depth of the opening is unknown. The depth is required to ascertain the number of concrete lintels to use in the head of the opening.
5. Once the positioning has been agreed the construction of the service penetration will be as follows.
6. Where both sides of the wall are accessible a Hilti PX10 Transpointer as shown opposite will be used to ascertain the depth of the wall.
7. **HOLD POINT:** Due to varying wall thickness a number of temporary works designs have been produced, submitted and pre-approved by Lendlease. These designs cater for wall thickness up to 350mm, from 350 to 550mm and from 550 to 750mm. Once the wall thickness has been ascertained a suitable temporary works design will be chosen.
8. **HOLD POINT:** Once a suitable temporary works design has been chosen, a permit to load will be sought and issued by Lendlease before any further works can be carried out.
9. The wall will then be core drilled above the head of the lintel to enable the insertion of the temporary works needles.
10. **HOLD POINT:** Where a 'check dimension' is noted on the setting out drawings, this will be checked and any discrepancies reported to Lendlease prior to continuing of any works.
11. The vertical edges of the service penetration will then be cut using a hydraulic handheld circular saw with water dust suppression.
12. Slurry and water produced by water dust suppression from the circular saw will be constantly controlled and cleaned up using 110v wet vac during the cutting process.
13. Surfaces will be protected from spray using visqueen sheeting or corex sheet. Where possible this will be taped to the building, or where tape cannot be used a stud frame will be made with visqueen sheet to act as a screen that can be leant up against the walls.
14. Slurry and water produced by water dust suppression from the circular saw will be constantly controlled and cleaned up using 110v wet vac during the cutting process.
15. The top layer of brickwork will then be removed. This will be done making use of the Arbortech AS175 to cut vertically in the mortar joints to weaken the bond between the bricks. A small electric percussive breaker will then be used to carefully impact the mortar joint, breaking the bond and freeing up the brick.
16. This process will continue course by course, with first bricks weakened to make a start, then removed by breaking the mortar joints.
17. The temporary works needles will then be inserted along with the props.
18. Brickwork will then be removed to form the opening for the seating of the lintel.
19. This will be done making use of the Arbortech AS175 to cut vertically in the mortar joints. The brickwork to the opening will then be removed by the same method as mentioned in number 15 above.
20. This process will continue course by course, with first bricks weakened to make a start, then removed by breaking the mortar joints.
21. The lintel will be lifted into place utilising a genie lift.
22. Once the lintel is in place it will be slate wedged and dry packed.
23. Once the pre-cast lintels are in position the props and needles will be removed and the opening made good.
24. Any original brickwork that is full or half brick will be palletted and saved in an agreed location for future works. Debris and modern brickwork will be disposed of.



Saw Cutting and Removal of Concrete Slab

1. The existing floor slab to proposed ENWL room will now be removed.
2. The floor slab will be marked out into an 800mm x 500mm grid, using temporary spray paint. The building fabric will be protected using visqueen to prevent overspray.
3. 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 bale to be lifted safely, the grid size will be reduced.
4. The floor slab will then be cut into sections as per the grid making use of a WAKRA B515ATE Floor Saw as shown opposite.
5. 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 connected to the floor saw.
6. Mains water supply with then be connected to the floor saw to control dust produced.
7. 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.
8. As work progresses a 110v wet vac will be utilised to collect any excess water residue. This will be emptied at an agreed location to be removed off site at a later date.
9. 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.
10. The centre of each block will then be carefully drilled, and HKD anchors fitted to allow easy lifting of the concrete blocks.
11. A lifting eye is then attached to the anchor and then to a counter balance lift crane will be used to lift out the concrete sections.
12. 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.
13. This is repeated until all cut sections have been removed.
14. 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.
15. These will be removed in line with section 10 above and placed onto the pallet truck and stored locally awaiting removal off site.
16. 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 Pentrunder 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.
17. 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.

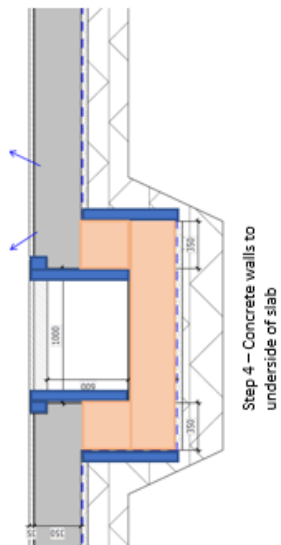
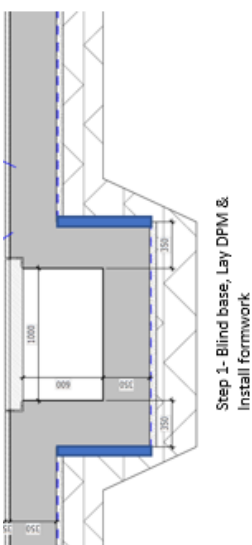
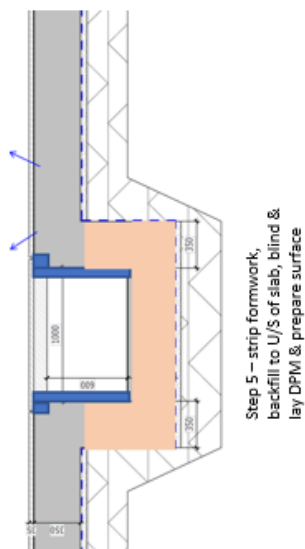
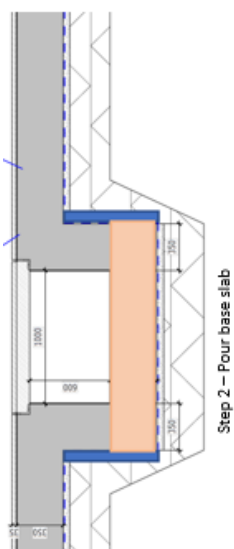
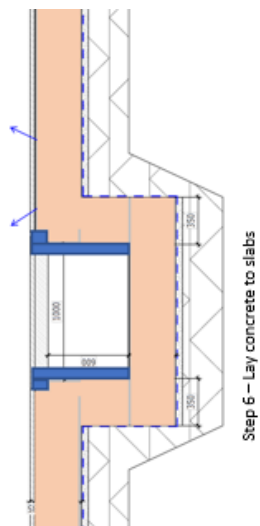
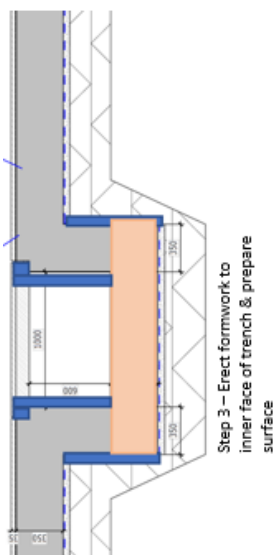


Reduced Level Excavation

1. Following removal of the concrete floor slab, a reduce level excavation is to take place to allow construction of the new concrete floor slab.
2. The new floor slab requires 300mm of new aggregate material to be placed in two compacted layers, followed by installation of reinforced concrete.
3. This involves excavating the ground to a specified level using the JCB EC19 and removing the excavated material using an electric wheelbarrow. <https://truxta.com/truxta-products-mini-dumpers/quadro-mini-dumper-by-truxta>
4. Excavated material will be stored within Zone P2 prior to removal from the building. The new floor slab requires 300mm of new aggregate material to be placed in two compacted layers, 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.



Construct Foundation and Trench for new Substation



NB- All concrete will be pumped through the service penetration at the perimeter of the building. The pipes for the pump will be connected to a scaffold ladder rack isolated from the moat wall.

Concrete Slab Pour

1. Once the substation trench and foundations have been completed a concrete slab will be constructed to complete the rest of the room.
2. The ground will then be compacted using a Wacker Plate.
3. The concrete slab will then be constructed following the typical ground concrete slab detail shown on Drawing No: OTH-RAM-TH-XX-DWG-S-5100, Rev CO1.
4. Type 1 subbase will then be installed to a depth of 300mm which will be compacted in 150mm layers as per specification.
5. Insulation will then be placed on top of the subbase.
6. 50mm of concrete blinding Gen 3 will then be laid on top of the insulation. This will be laid by hand and levelled as required using shovels and spazzles.
7. 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.
8. 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 blade knife. The visqueen will be laid with overlaps of 300mm. Joints will then be taped and weighed down with concrete spacer blocks.
9. 1 layer of A193 mesh will then be laid on top of the concrete spacer blocks and fixed using tie wire.
10. To isolate the pour from the next section to be constructed, road form shutters or similar will be used.
11. Existing walls will be protected using visqueen taped to the walls using low tack tape.
12. 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.

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. Waste streams include brick, concrete, spoil. This material will not be stored up against existing walls.
Protection: (Exceptions to project strategy)	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 500mm gauge visqueen taped and draped to the existing fabric. 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. Any service penetration through an external wall will be protected with a timber frame wedged into the opening with Visqueen stapled to the frame 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. 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: - Vibration monitoring provided by Lendlease, monitored by SRL as per agreed with the client. Levels (over 10mm/s for amber and over 15mm/s for red). HOLD POINT: If the vibration level exceeds the upper threshold alternative methodology needs to be considered. - No tools or processes are anticipated to cause excess vibration to the fabric of the building. Dust: - 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 supplied via a water collection unit the water will be recycled within the unit for reuse after the slurry has been separated. Noise: - This will be monitored and recorded on a daily basis. - Noise exclusion zones will be setup to prevent other people from entering the work area. - Hearing protection will be provided to all within the work area if required.

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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 the Consolidation Room on the ground floor as dictated by Lendlease. Original brickwork will be stored in an allocated area as directed by Lendlease. Spoil will be stored within Zone P2 until such a time that it can be removed from the building.
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. 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. 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. 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. 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. Various other TBTs will also take place weekly, which will include topics on Health and Safety, Environmental and Occupation health. 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. 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			