



AXIS TOWER MANCHESTER



DESIGN STATEMENT

Architecture | Interiors | Master Planning | Landscape | Client Representation

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Project Sign off

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1.0 Introduction

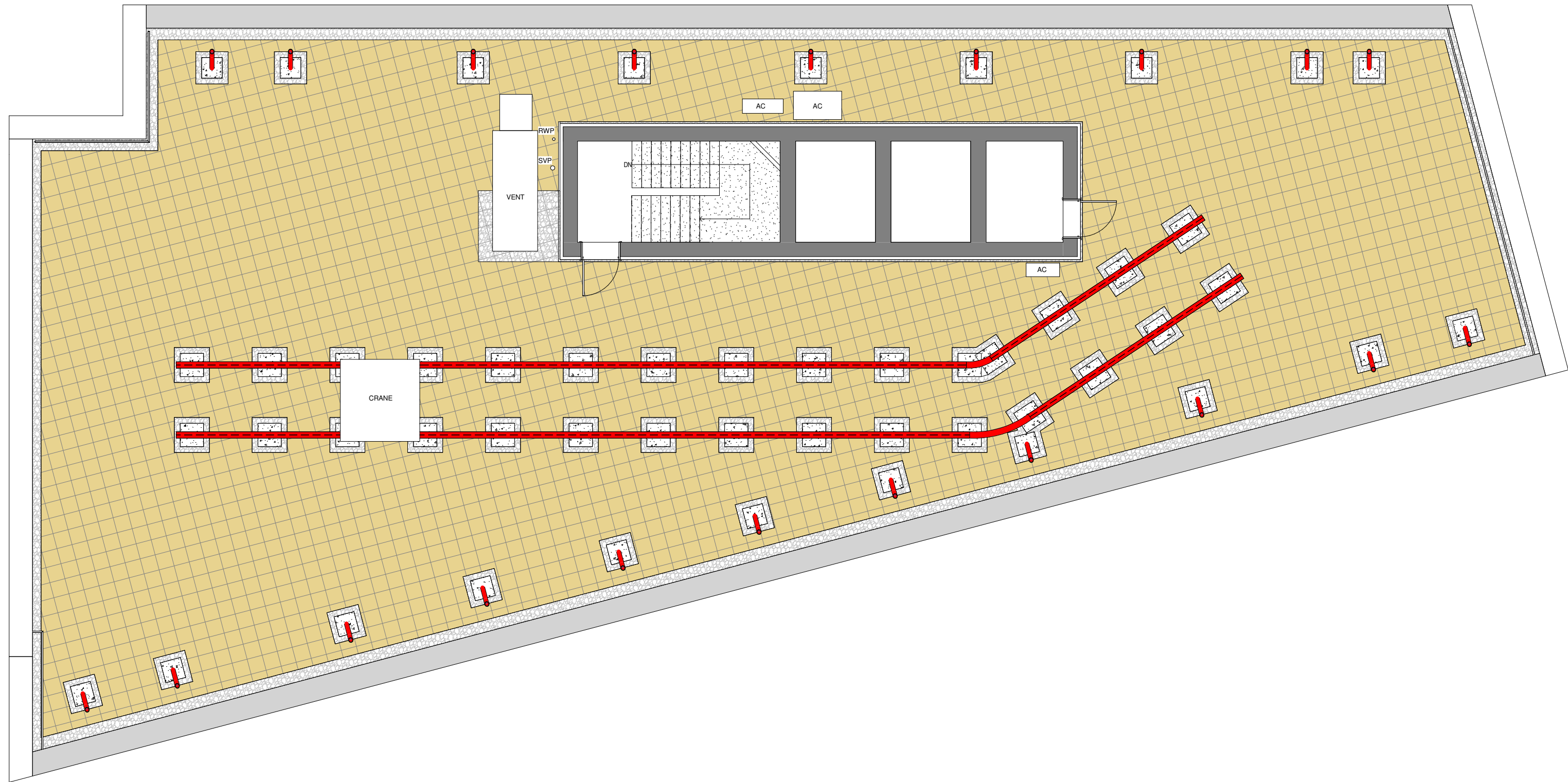
1.1 Introduction

Fairhursts Design Group have been appointed to progress the development of a roof top scheme at Axis Tower in keeping with visuals produced by A-cero. The scheme provides a small pool, gym and social space to the roof top of the tower situated in central Manchester.



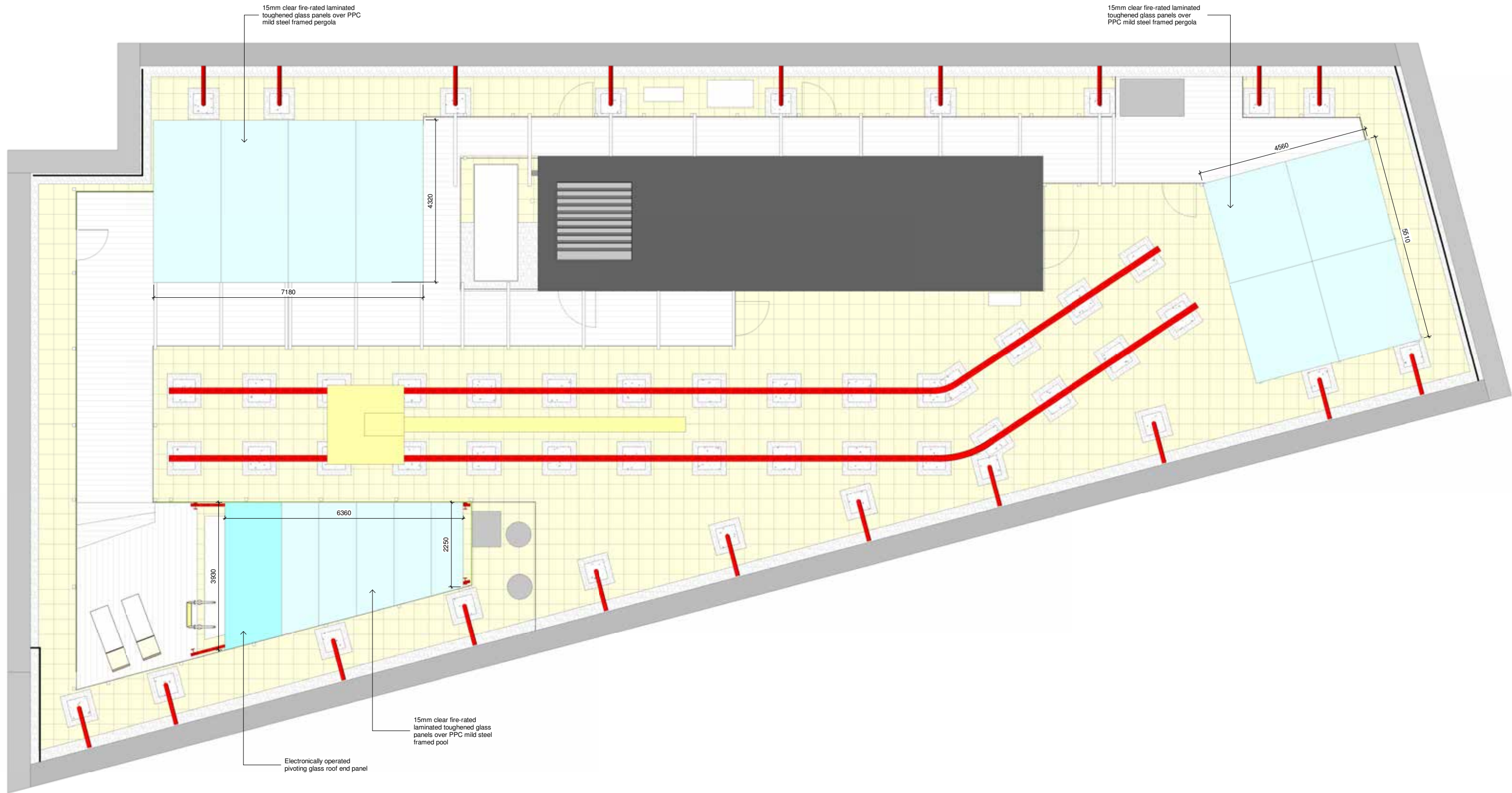
2.0 Architectural Design

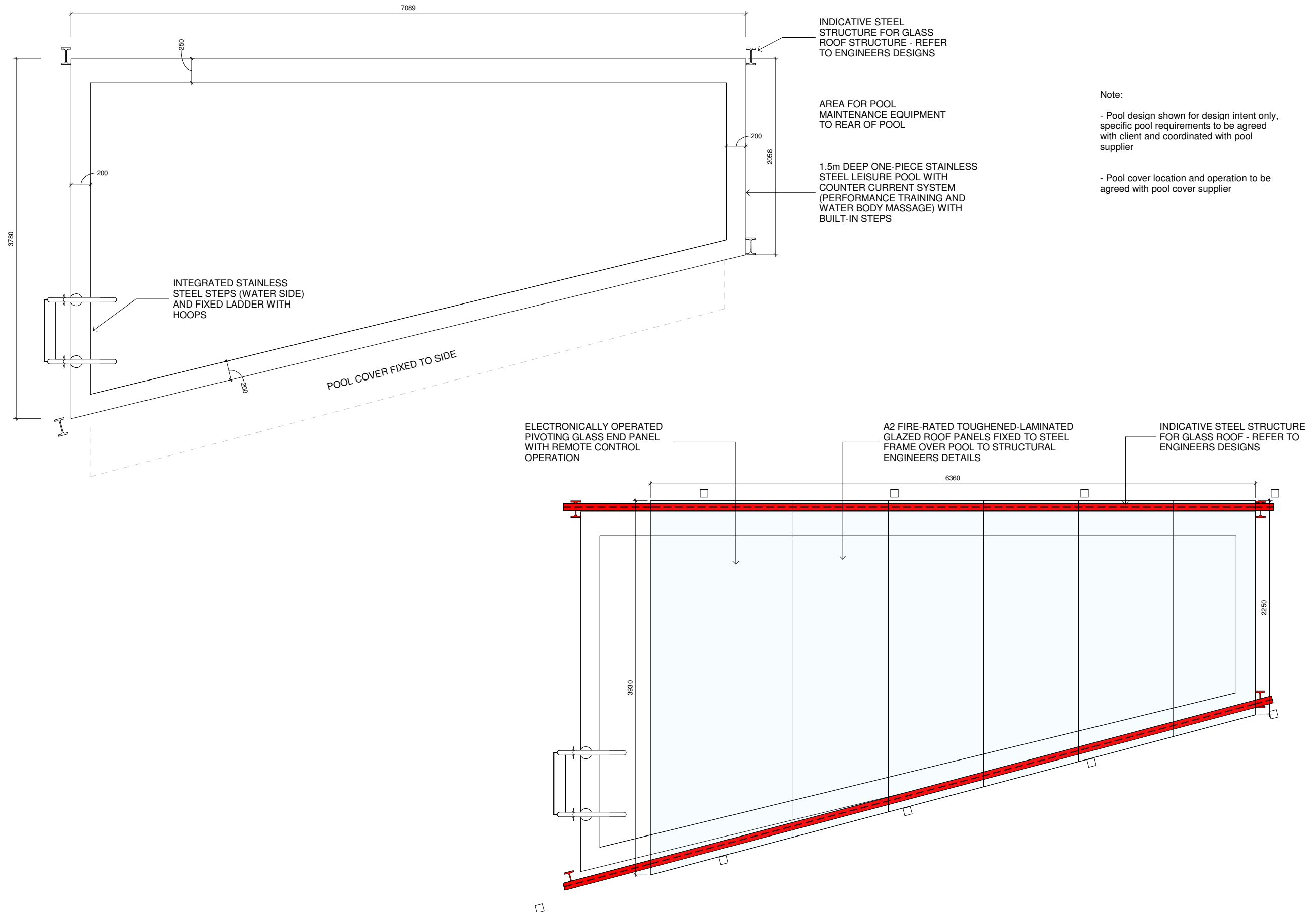
2.1 Existing Roof Plan



2.0 Architectural Design

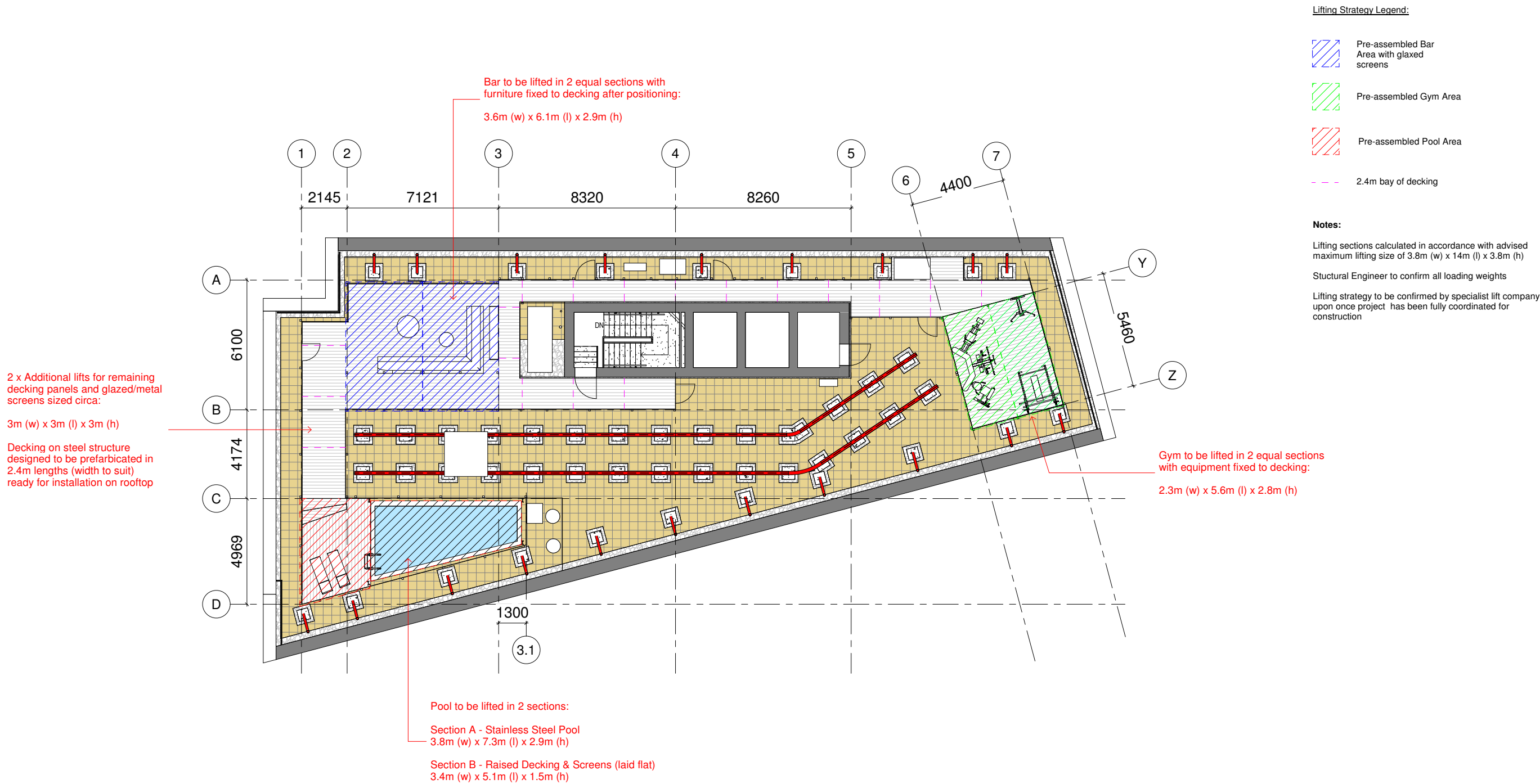
2.3 Proposed Roof - Upper Level





2.0 Architectural Design

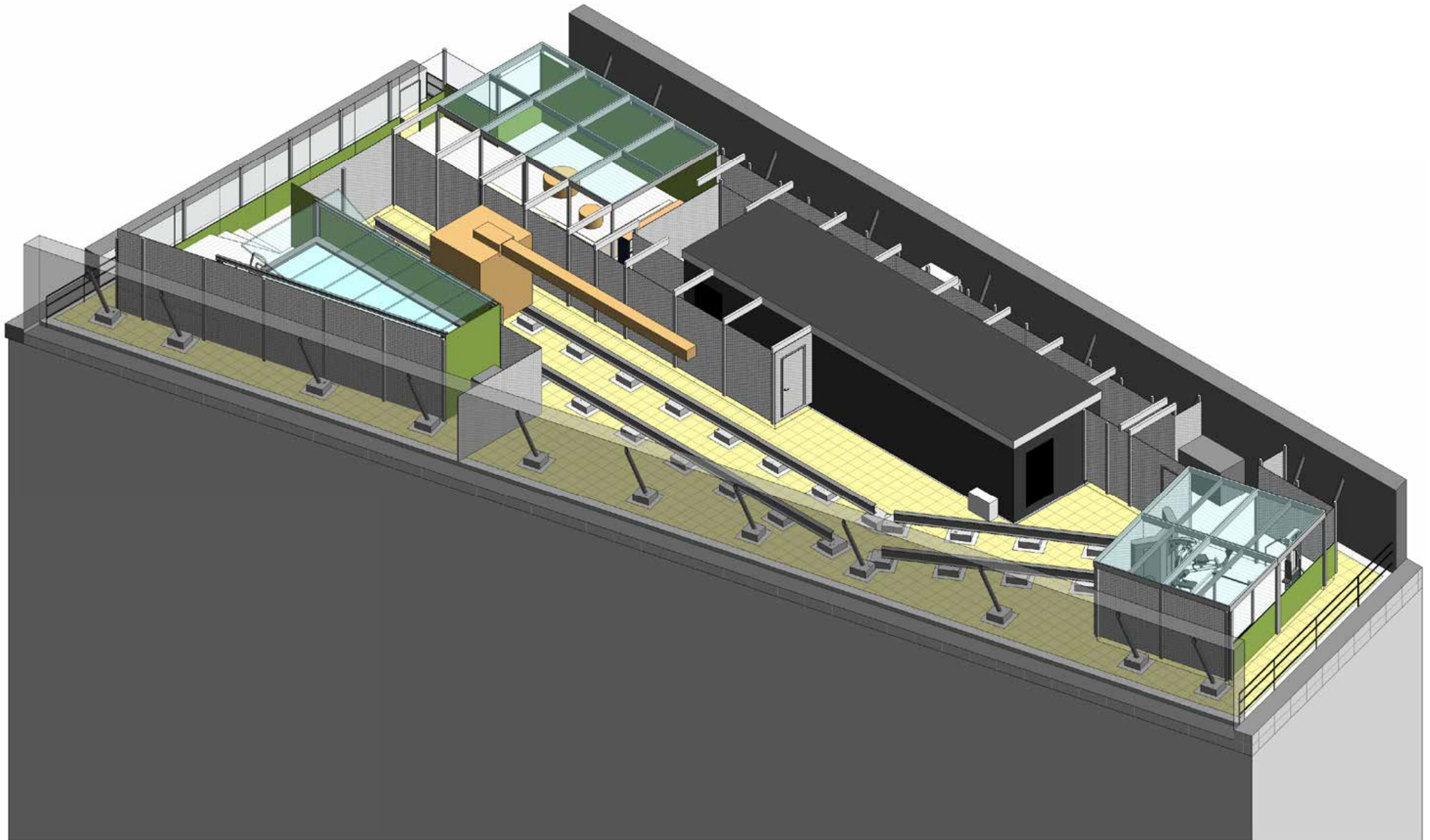
2.5 Proposed Lifting Strategy



Proposed Roof - Lifting Strategy

2.0 Architectural Design

2.6 3D Visual



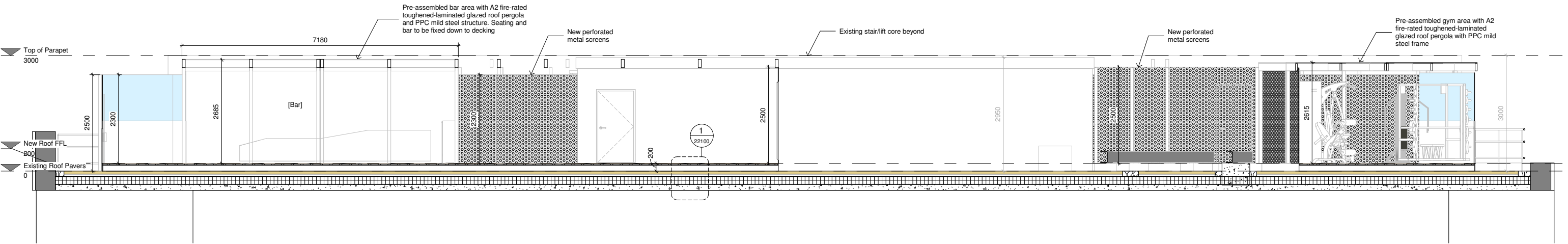
2.0 Architectural Design

2.7 3D Visual

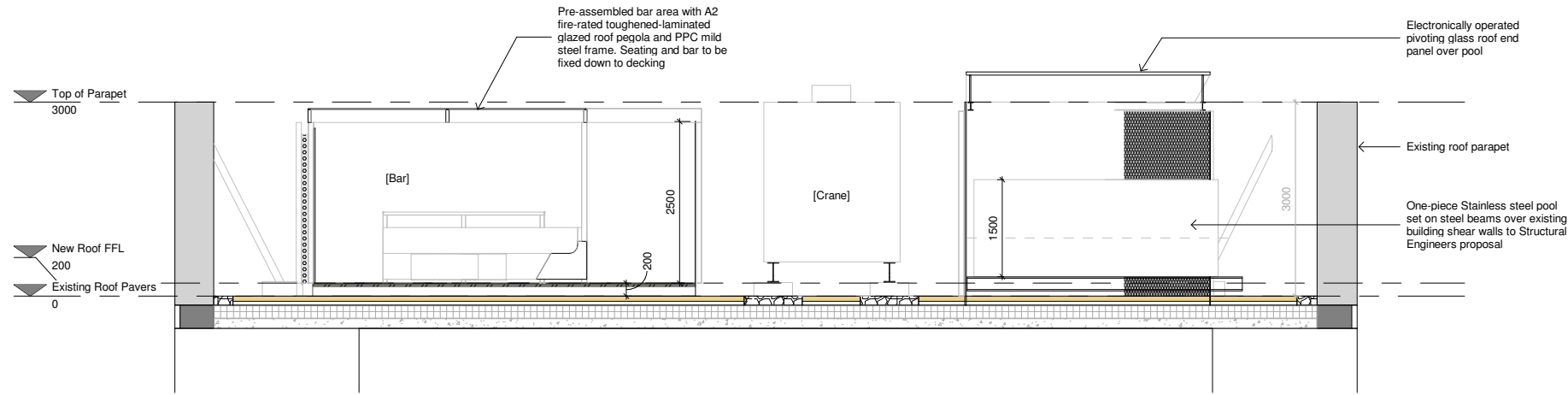


2.0 Architectural Design

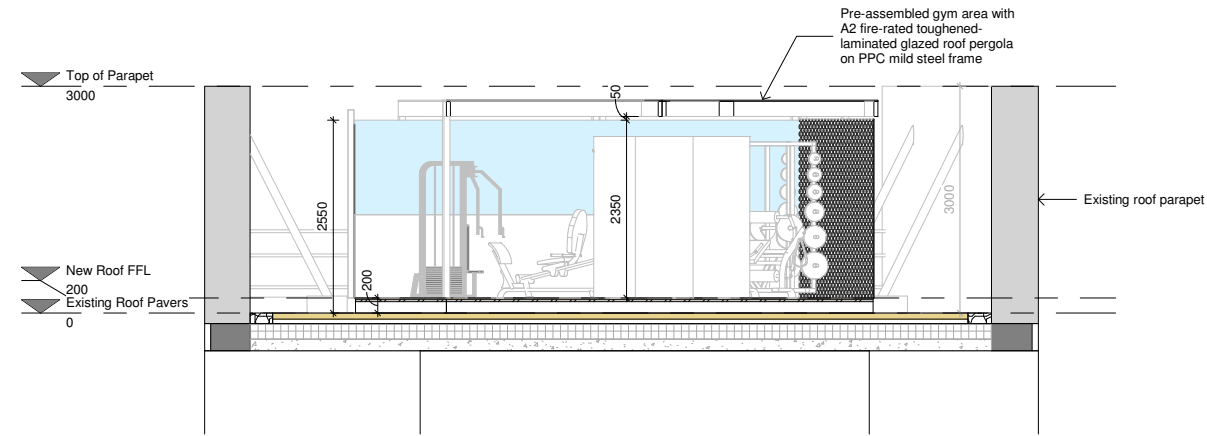
2.8 GA Sections



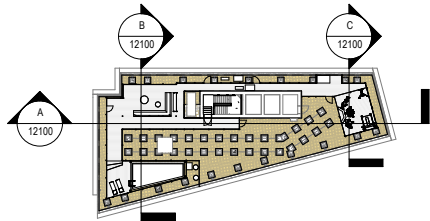
A GA Section A



B GA Section B

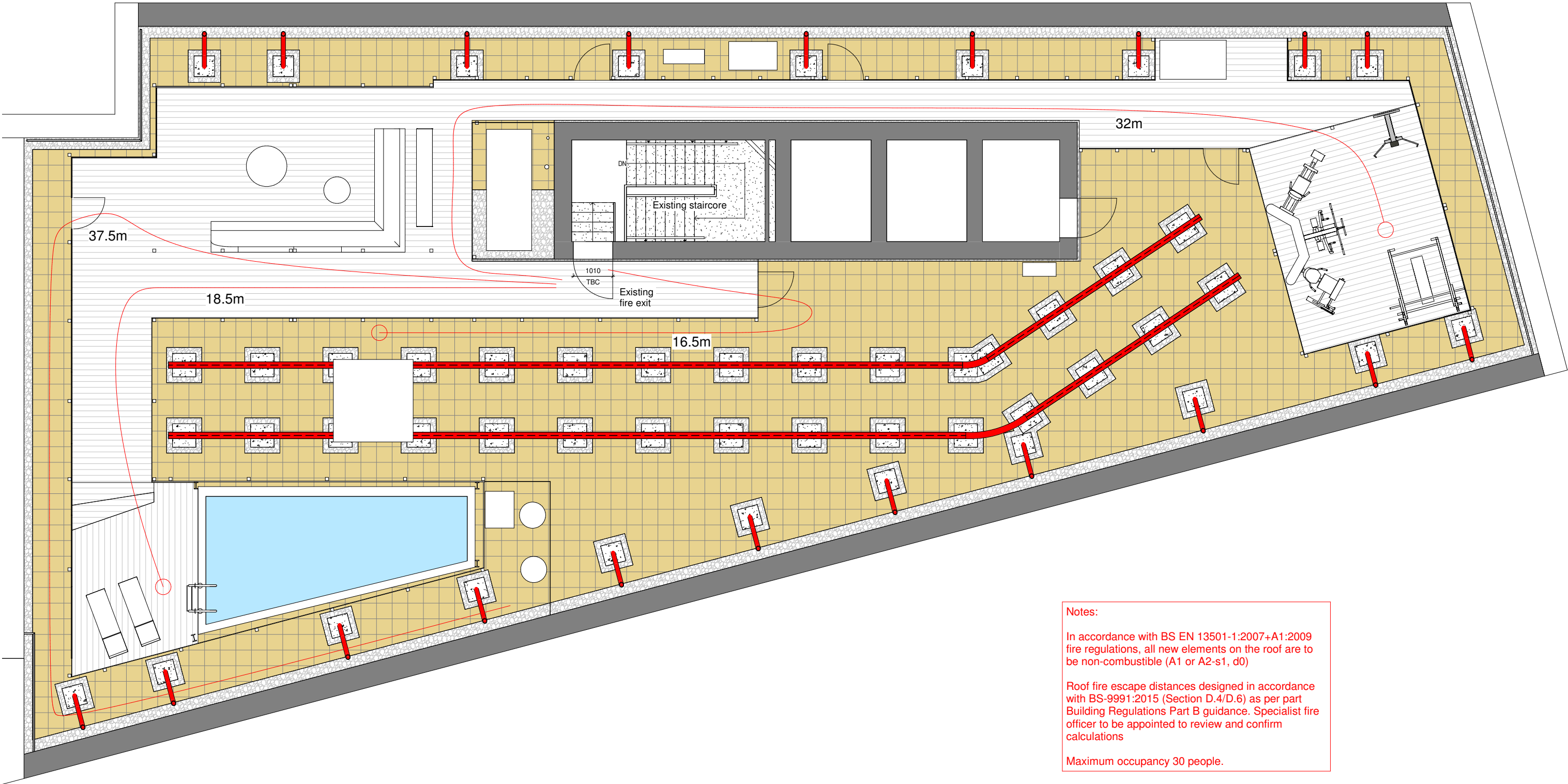


C GA Section C



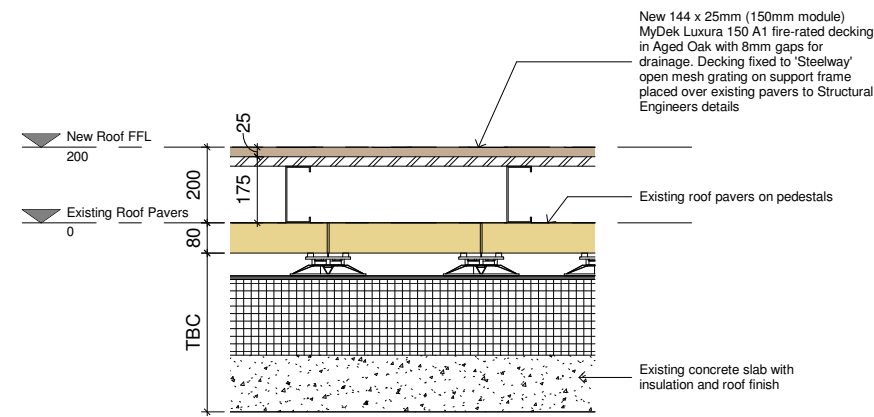
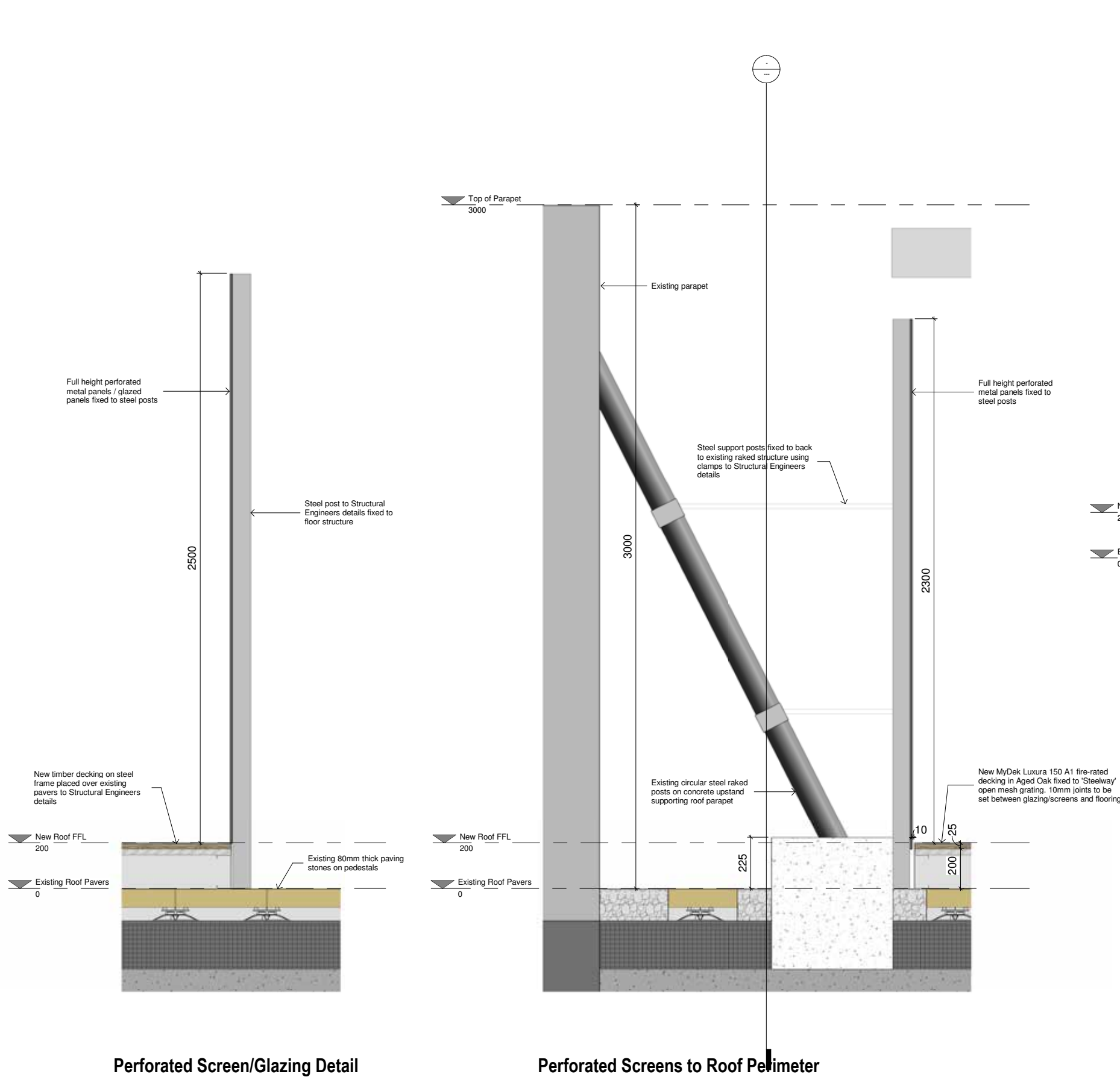
2.0 Architectural Design

2.10 Proposed Fire Strategy

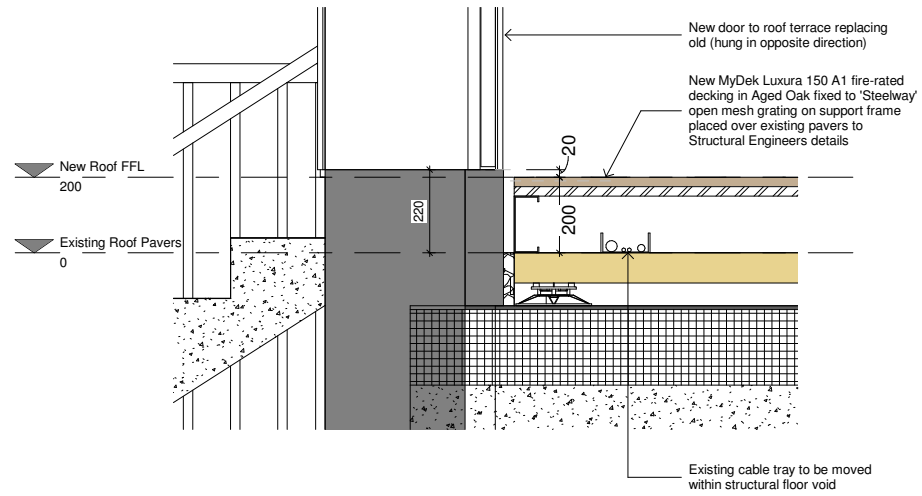


2.0 Architectural Design

2.11 Proposed Typical Construction Details



Roof Timber Decking Buildup



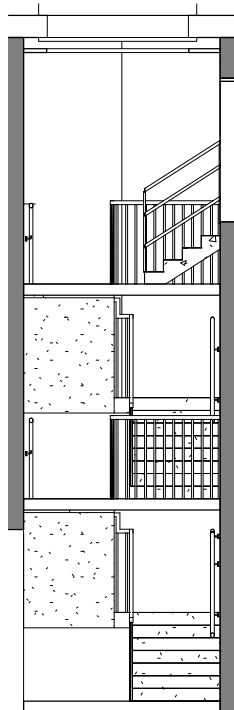
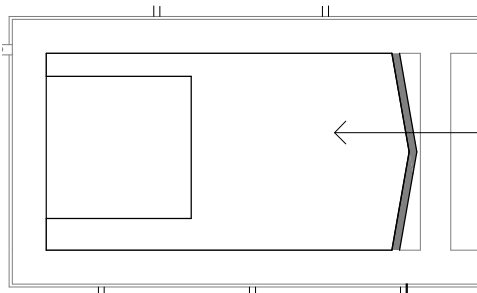
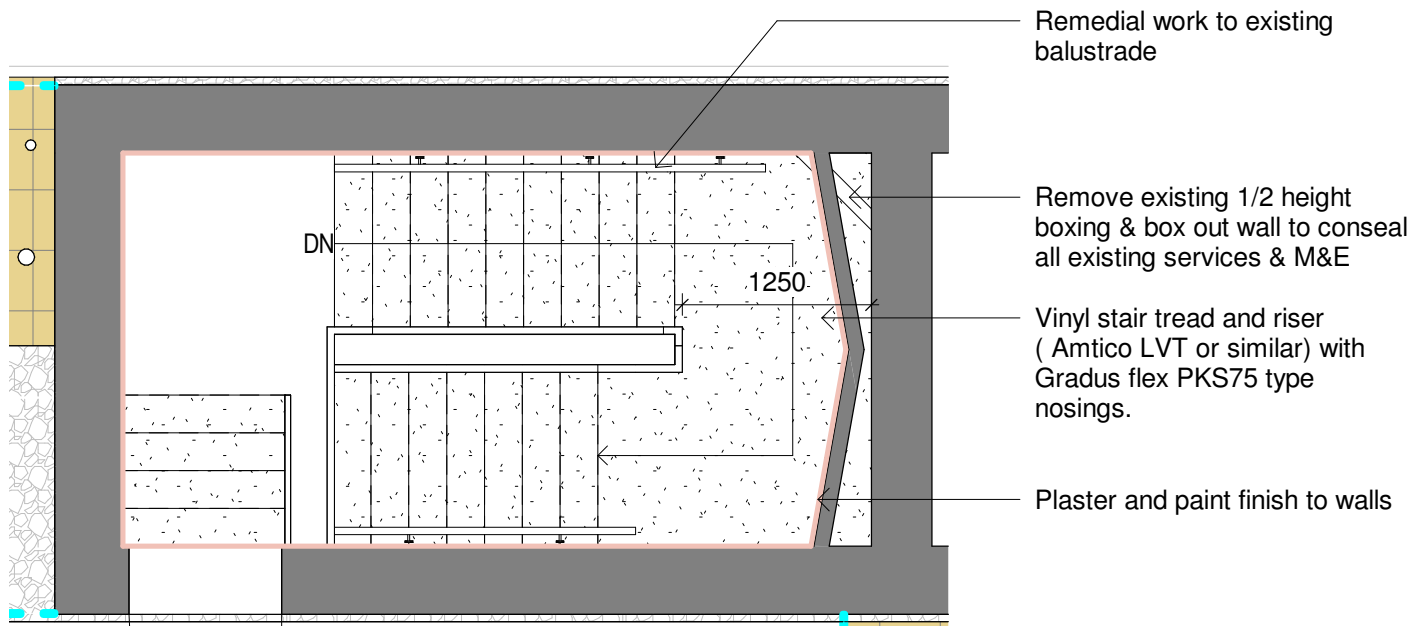
Stair Core/ Fire Escape Section

Perforated Screen/Glazing Detail

Perforated Screens to Roof Perimeter

2.0 Architectural Design

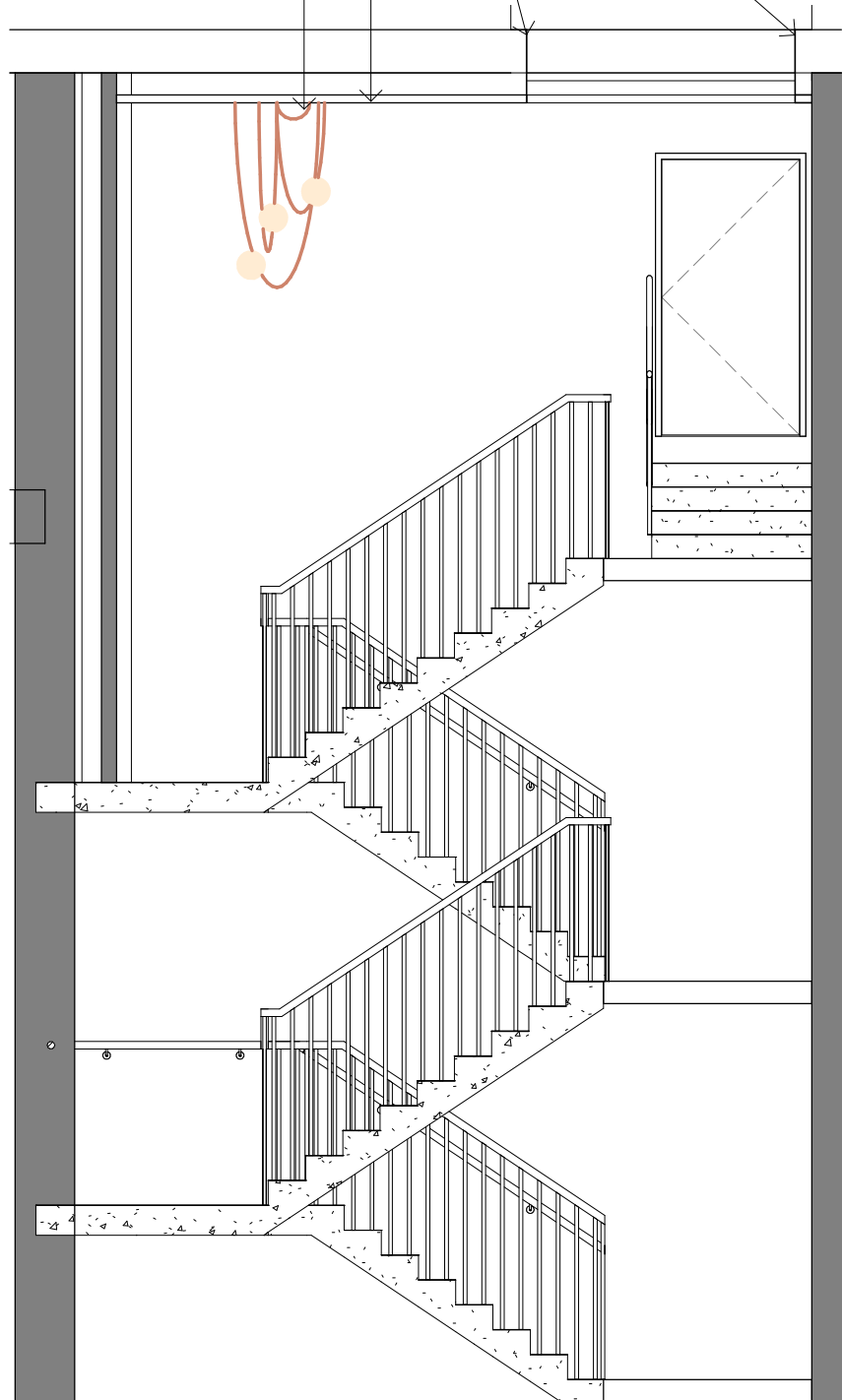
2.12 Proposed Stair Core Alterations



Sides of AOV to be lined in 2mm
PPC aluminium in white.

Nauf Armstrong perforated metal
tile in white.

Feature lighting by Vibia
plusminus system.



2.0 Architectural Design

2.12 Visibility of the Proposal.

In order to see the proposed canopy roof structures of the bar, gym or pool from ground level the viewer would need to be approximately 500m away from Axis Tower to the North East or South West ends of the building. This would only be possible from New Wakefield Street, or Duke Street if the view was completely unobstructed.

In all other areas the proposed structure is below the height of the existing sides to the roof.



2.0 Architectural Design

2.13 Proposed Specification

Building Fabric

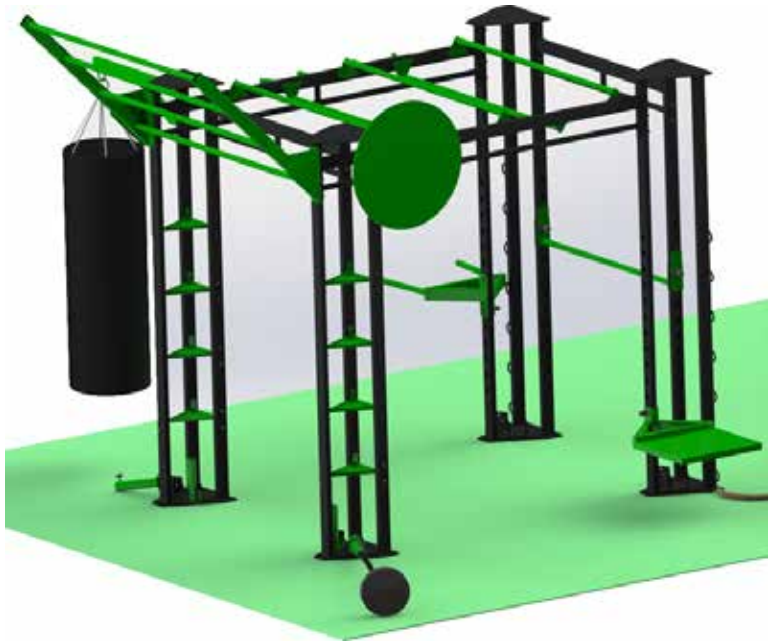
Item	Description	Image	Manufacturer & Model
Rooftop Decking Finish	A1 Fire-rated oak effect mineral composite decking		MyDek Luxura 25x150mm wide planks in Aged Oak
Steel Grating	Open mesh steel grating – non combustible		Steelway - Bespoke
Metal Screens	4mm Thick perforated aluminium panels with small scale cutout graphics. All PVDF Coated to suit chosen graphic. Visually matching doors to be included within the system		Graepels – Bespoke design (graphic TBC)

Windbreaker Glass Screens	Fire-rated 15mm Laminated toughened glazed screens fixed to PPC steel posts with stainless steel grade 316 clamps. Glazed doors to be included within the system. Lower 1.1m section of glazing to be digitally printed - graphic TBC		Glass Designs – Bespoke
Swimming Pool	One-piece stainless steel leisure pool with counter current system (performance training and water body massage) with built-in steps and external ladder. Option for built in pool water maintenance tanks and filters. Stainless steel panel finish to exterior		Wellness Consult – Mirrorclass range (bespoke construction due to shape)
Steel Canopy	Bespoke fabrication - A2 fire-rated toughened laminate glazed screens on PPC mild steel frames with integrated mood lighting		Hallmark Glazed Extensions - Bespoke

Furniture

Item	Description	Image	Manufacturer & Model
Sun lounge chairs	Aluminium and wooden lounge on castors with a rustic and warm style		Vondom – Vineyard sun longer
Bar Sofa	Modular outdoor sofa finished with a choice of colours		Vondom – Faz modula sofa
Bar	Matching geometric side bar finished with a choice of colours		Vondom – Faz side bar

Gym

Item	Description	Image	Manufacturer & Model
Optional fixed gym equipment	Outdoor training gym – custom colours		GymWarehouse - Small Gym Training Rig

2.0 Architectural Design

2.14 Axis Tower – Architectural comments on potential terrace area over penthouse.

Mills & Co. are acting for a high net worth and profile client (“the Client”) who has purchased the penthouse apartment (“the Apartment”) at the Axis Tower in Manchester.

Our understanding is that the roof spaces not used by developers plant and specialist cleaning units had been agreed as beneficial to the penthouse apartment subject to viability of structure and planning. Works planned for the roof; a small pool, bar and training area which at date have not been fitted. The Client’s proposals were shown on concept drawings with 3D images by A-cero Architects and interior design studio, Madrid.

I am a Chartered Architect and a Director of a Royal institute of British architects chartered practice in Manchester city centre. I am instructed by Mills & Co. to provide architectural advice input as to how the Client’s proposals might be realised

During the first site visit it was interesting to note that unless concierge is available no roof access is allowed on the grounds of health and safety as balustrades to the East and West sides could be climbed. The design by A-cero largely addresses the UK regulations but minor changes have allowed us to retain the design while complying with design regulations and possibly reducing cost elements. The apartment is the whole of the top floor and the developer has separated the stair from the lower floors to prevent access from these levels (without key) to the roof level in anticipation of further work.

The developers information shows the apartment is designed for an occupancy of 60 persons but we suggest a limit on the roof of 30 persons to ensure all regulation matters are fully observed. The client envisages that the space will be used for his training and by family only.

A set of images have been taken to allow us to verify our views on the works taken over two visits and reviewed again at ground level to consider access. We have visited a third time to review with a specialist the services elements of the works and consider how elements of work not compliant with the base build design architects details can be corrected.

We have looked through the documents on contract and claims and have considered the A-cero scheme only modified to make it more achievable in what is now a post completion situation. We are confident that the scheme is entirely achievable and capable of construction in a very short programme with minimal disruption to any existing construction.

The building is virtually axial West East with the wider end facing West - out of Manchester and looking along the canal and rail line.

Access to the roof is via a very basic stairway which can easily be enhanced but does need to acknowledge the use by service engineers and window cleaners performing essential duties on plant and the cradle system (which we understand is not in use at present due to water ingress from a damaged door). We recognise there will need to be a defined use schedule to avoid the building maintance and penthouse owner using the roof at the same time.

Entering the stair from the apartment shows a very basic environment which can be enhanced but must recognise the needs of maintance use. The route to the roof is through an acceptable but reduced height door where you must step over cables in a tray on the roof surface and look directly at the cradle crane system.

The (circa) 3m side screens to the roof are supported by raking tubular steel structure to concrete cubes on the roof deck; there are no screens on the short sides facing East/West but a basic balustrade which being easy to climb is certainly part of the reason why there are at present limitations on use of this space.

A large fan motor lies next to the clad core of the stair to the West side with a controls panel further West .This fan can stay in location but for safety needs the termination hood repositioning vertically or returning across itself to a cowl termination; see notes on drawing and report from Futureserv.

Along the North side there are two AC condenser units which restrict access along the North side as the screen structure rakes across open space. We plan to turn these through 180 degrees and position them with the same free area and distances to the outer screen; refer to drawings.

The narrow East side is very open with good views over Manchester but access is compromised by the plant to the North and the cleaning cradle rails.

The existing roof is made up of insulation, a water proof membrane and concrete pavers which act as ballast and to protect the membrane from UV and user error such as maintenance men with screwdrivers. The intent is to avoid fixing into the roof or the ballast as the structure below the bar is post tensioned and would need care (not impossible) to fix through.

Looking at the A-cero scheme we suggest some amendments to simplify construction, but the concept remains as given.

- The area to be used by the client should be covered in a system of grating such as Steelway flooring - this to be laid over the existing concrete slabs (which cover the roof membrane surface giving protection against UV and users) at a level 25mm below the raised core bund wall at the door allowing rainwater to run as at present but giving a platform over all existing small pipes and cables and any minor servicing to the three activity zones. This grille deck mounted on galvanized steel rails set on 10mm EPDM blocks will be bolted together to form a uniform sheet of flooring and avoid any direct fixing to existing surfaces. The system would then be covered with decking such as cladco (non-combustible) to give a walking surface without the "need" for shoes but this material set with open 8mm joints to allow free water flow leaving drainage unaffected and set 100mm away from the core cladding and any new screens trimmed with an upstand extrusion to edge the decking giving a single platform across the whole roof. Images attached for clarity.
- The short elevations should have a new clear glass and glass fin screen in toughened/laminated glass (if required Pyran fire glass can be used to assist the developer) at a height of 2.3m to give a safety wall. An access door in glass to give maintenance use would be incorporated with access by concierge only. The whole system to have a 20x12mm dark grey anodised cap to give an edge to the upper line reducing damage risks from the cradle basket. This screen will be fixed directly to the substructure of the new metal raised floor system.
- The AC units to the North would be moved towards the screen between structure (piped below decking) to allow an access route. The gap behind the units to match that existing and the frontage to have a grille removable panel not less than 70% free air. Grille positioned there to give security to landlord owned items.
- The large fan outlet cowl would be redesigned to head vertically to reduce its effect on the walkway. MEP advice needed on the cowl specification see MEP report by Futurserv.

- New glazed screens around the pool, bar and would be applied as per the A-cero scheme at a height of "say" 3m (as side screens existing dimension) with an aluminium upper edge to minimise damage risks from window cleaners. Bespoke laminate to the A-Cero proposal are available via Glass Design www.glass-design.net
- The soil and vent pipe will need raising approximately 1m above the core structure or have a flue dilution system added to prevent down drafts to the bar even though this is beyond the 3m regulation limit.
- Work is needed to the final balustrade from the stair to the roof door and also within this final lift of the stair to bring this to an acceptable domestic standard but many base build "snags" exist which would be corrected. We suggest plastered wall finishes in hardcoat, vinyl stair tread and riser (Amtico LVT or similar) with Gradus flex PKS75 type nosings.
- Stair to have ceiling of Nauf Armstrong perforated metal tile in white with feature lighting by Vibia plusminus system.
- The 2hr fire wall shown on the base build architects drawings but not installed would be fitted.
- Any external electrical fittings needed for the training area, bar or pool lounge area to be external grade IP66 with RCD and be LED units
- Any external lighting must be low light pollution and set such that it is not visible to ground.

The scheme has been amended from the extensive glass screen A-cero proposal to simplify construction, reduce weight and minimise cost. The focus is however on defined elements which retain the same concept. The screens around the window cleaning system facing the stair are changed from the glass proposed to perforated 3mm aluminium panels PPC finished. Similar to those by Proteus at west Yorkshire history centre.

Following discussion with the access consultant , we believe positioning the crane in Whitworth Street West will have the least impact on the rail and tram infrastructure, as well as road closure / diversion routes. There is confidence in this as the building used similar cranes in its construction.

The crane we are looking at is a 500te mobile telescopic unit similar to those used on the building during its construction. See report from Techlift.

The crane is more than capable of lifting loads of at least 7 tonnes to any part of the Axis Tower roof area.

Assembly / disassembly of the crane can be achieved in a matter of hours. So, it would be possible to arrive early on a Sunday morning, assemble the crane, carry out the lifts then be gone by Sunday evening.



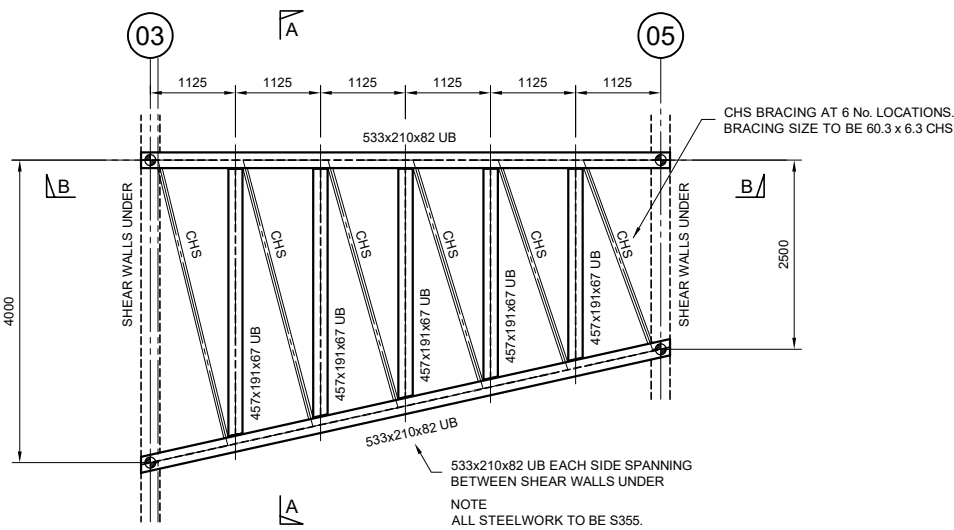
- Storage boxes have been relocated from the A-cero proposal to the building edge to minimise cost and screens which block views.
- Unlike the A-cero proposal the panels of the pool enclosure alongside the crane will be perforated aluminium ppc finished as will the back wall of the training area facing the crane. This for cost and ease of maintenance.
- A fire alarm to the roof, currently a sounder adjacent to the door, will be extended with visual beacons to give greater surety.

Approximate programme of events in construction.

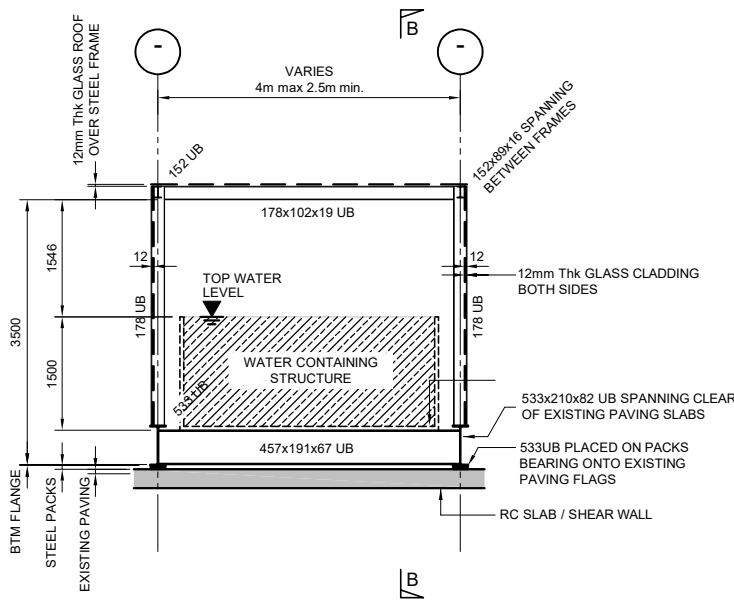
- Relocate existing AC units on roof
- Locate any new services and drainage systems
- Lift new roof surfaces to be fitted over existing surface and lock surface together ensure the three gaps for bar, training and pool are accurately positioned with services located.
- Lift east and west screens for fixing
- Lift structure for new screens to developers plant.
- Lift primary structure for new pool.
- Resolve existing stair finishes and fire wall.
- Modular units for training (2 units), Bar (2 units) and pool (1 unit) lounge deck and pool treatment units to be lifted and placed in position . lock into main deck.
- Remove any waste from stage one construction.
- Complete all remaining finishes, electrics , clean and commission.

3.0 Structural Proposals

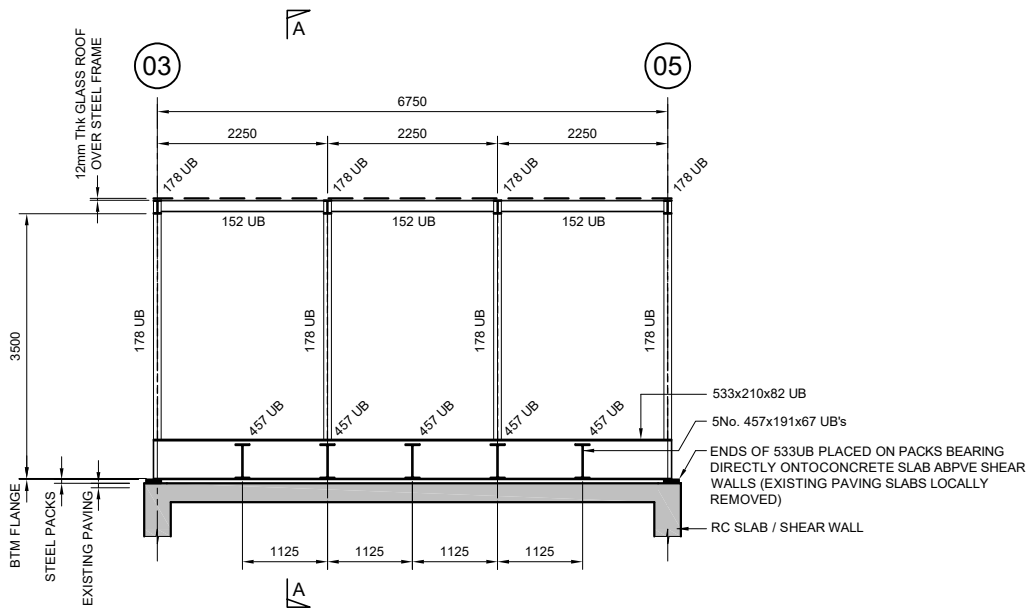
3.1 Pool Structural GA - Westlakes Engineering



STEELWORK PLAN AT BASE LEVEL



SECTION A-A

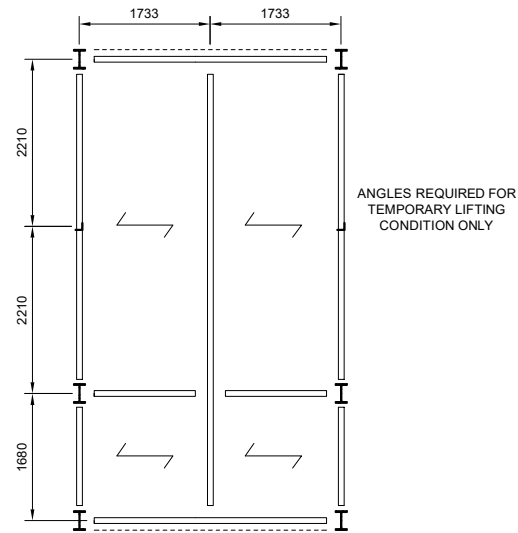


SECTION B-B

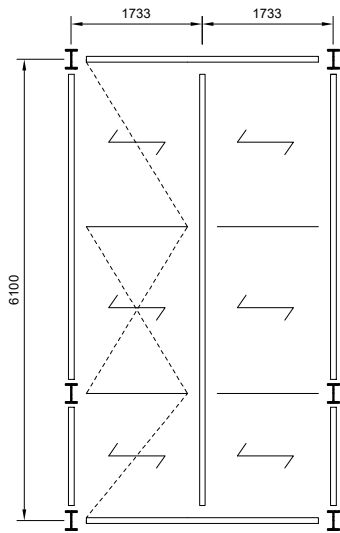
3.0 Structural Proposals

3.2 Bar Unit Structural GA - Westlakes Engineering

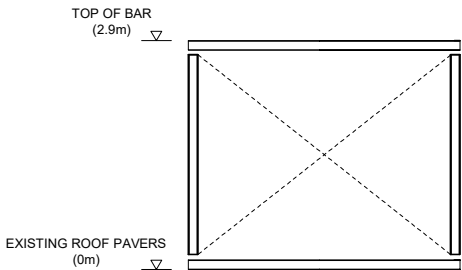
BAR UNIT GA's AND ELEVATIONS
2 UNITS REQUIRED



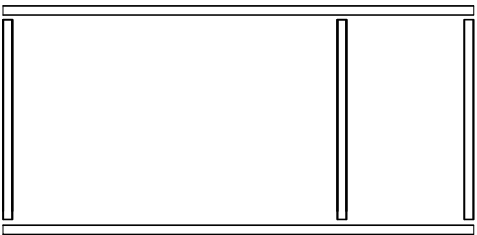
0M LEVEL GA



2.9M LEVEL GA



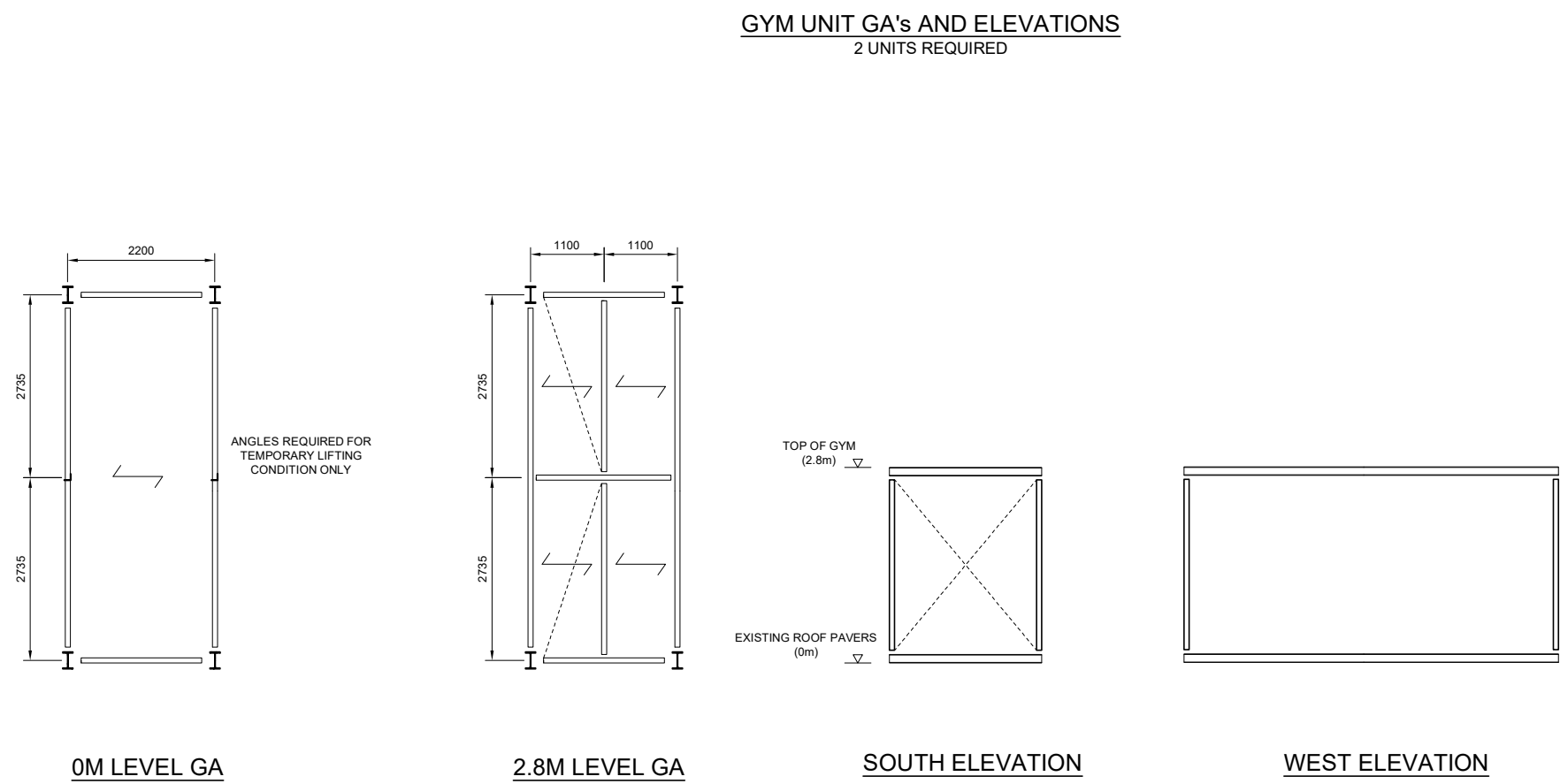
SOUTH ELEVATION



WEST ELEVATION

3.0 Structural Proposals

3.3 Gym Unit Structural GA - Westlakes Engineering



3.0 Structural Proposals

3.4 Structural Report – Westlakes Engineering

By email only

Mills & Co.
107 Cheapside
London
EC2V 6DN

Our ref 2043/CRP/L003

Date 14/03/2023

FAO: Mr Richard Mills

RE: Apartment 27, Axis Manchester

Independent Review of Proposed Alterations at Roof Level

Dear Richard

With reference to your instruction of 27/04/2022, and the drawings issued recently by Fairhursts Design Group (FDG) I have undertaken a review of your Client's proposed alterations to the roof of the Axis Tower and am now pleased to report as below.

1.0 Terms of Reference

Mills & Co. are acting for a Client ("the Client") who has recently purchased the penthouse apartment ("the Apartment") at the Axis Tower in Manchester. I understand that, as part of the purchase, the Client wished to make use of part of the roof space above and accordingly entered discussions with the Developer of the building ("the Developer"). The Client's proposals were shown on concept drawings by A-cero Architects (See References 1-4) but I understand that the Developer advised that these works were not feasible (see Reference 5) and that a dispute then arose between the parties.

I am a Chartered Structural Engineer and a Director of a Consulting Engineering practice in Manchester city centre. I am instructed by Mills & Co. to provide structural engineering input as to how the Client's proposals might be realised, as well as to review the Developer's response and provide an opinion as to the structural viability of using the roof for the purposes proposed.

No details of the original structural design have been provided. I have based my views on an assessment report by CCL (Reference 6) and the assumption that the structural calculations included at least the standard allowances for imposed loadings as required by current design codes, particularly Eurocode 1 : Actions on Structures ("EC1", Reference 7). Some additional relevant information has become available through disclosure as further referenced within this report.

2.0 The Existing Building

The Axis Tower is a 28-storey residential building in Manchester city centre. The structure of the tower is a reinforced concrete (rc) frame, comprising slabs supported on a combination of columns and walls. In order to minimise their thickness, the floor slabs were constructed using post-tensioned (pt) concrete. This is a specialist technique and, as is normal when this system is used, the final calculations for the floor slabs themselves were prepared by CCL (GB) Ltd. ("CCL") who were the specialist concrete contractor employed to construct them. The structural design of the rest of the building was undertaken for the Developer by WSP Group ("WSP").

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The Apartment occupies the whole of the 27th floor of the tower. The 28th floor is the roof and, apart from an enclosure over the core area, is open space with storey height screens along the north and south elevations. A mobile crane, referred to as the Building Maintenance Unit ("BMU"), is mounted on a fixed track along the centre of the roof slab and has a cradle which can be suspended over the side of the roof to allow maintenance or cleaning of the tower façade. I understand that most of the roof slab is of pt construction, designed by CCL, but that the narrow ("prow") end was designed by WSP in rc on downstand beams.

3.0 The Client's Proposals

The Client's proposal is that his use of the roof would be limited to defined areas only, specifically those which are not required for plant or equipment, and that Client and Plant areas be separated by use of lightweight screens/partitions. The Client's proposals for the roof comprise three elements:

- To use part of the roof level as a terrace for private recreation purposes and social gatherings. I understand that this would involve the creation of a "bar" in the north west corner of the roof (gl's A-C/3-5). The bar would be a covered space ca 7m x 6m with fixed furniture.
- To use part of the roof level for private exercise and training. I understand that this would involve the creation of a "gym" at the east end of the roof (gl's B-D/10-12). The gym would be a largely enclosed space ca 5.5m x 4.5m with fixed gym equipment such as an exercise bike or weights.
- To build a swimming pool on the south side of the roof (gl's D/3-5). I understand that the depth of this pool could be up to 1.5m deep and that it would be enclosed.

Recently, the Client's proposals have been further developed by FDG acting under instruction from Mills & Co. As the building is now completed and occupied, consideration has also been given as to how the Client's proposals might be realised. In order to minimise impact to, or alteration of, the existing building it has been proposed that each of the three enclosed elements above would be formed, off-site, as pre-fabricated modules which would be delivered to the site and lifted into place by a large, telescopic mobile crane sited on Whitworth Street West.

The FDG drawings on which this review is based are collectively Reference 12 whilst the structural proposals based on those drawings are References 13-15. My views on the structural viability of using the roof for each of the purposes proposed are presented in the following sections.

4.0 Use of the Roof Level as a Terrace for Private Recreation Purposes ("Bar")

4.1 General

I understand that the roof level was originally designed for maintenance access only, which I would expect to typically involve only one or two personnel being on the roof at any time. Clearly, the Client's proposals could involve greater numbers of people being on the roof together and I will first consider this point in general.

In their report (Reference 6), CCL state that the pt roof slab was designed for an imposed/live load of 1.0 kN/m² (para 2.4, page 4). This is consistent with the requirements of EC1 table 6.10 for this situation and means that the roof is designed to take the weight of a maintenance worker (and, say, his tools) at any point. In practice, therefore, there could be multiple maintenance workers all on the roof at the same time, in different locations, and the pt roof slab would not be overloaded.



For assessment purposes, an occupancy limit of 60 people has been assumed for the roof. That limit is taken from a report prepared for the Developer on Fire Strategy (Reference 16) which included assessment of the proposed use of the roof for social purposes. Assuming an average weight per person of 75kg, or 0.75kN (Reference 8), 60 people would equate to a total load of 45kN. The roof slab has a total area of ca 450m² so spreading those people over the whole area would result in live loading no worse than could be envisaged from multiple visiting maintenance workers. The bar module has an area of approximately 43m² (see below) so even if 60 people were concentrated within that space, the resulting load would still only equate to about the live loading allowed for by CCL.

On this basis I consider that the general principle of having greater numbers of people on the roof is structurally acceptable and that by limiting occupancy to the levels suggested in Reference 16 there would be no need to consider crowd loading.

4.2 Bar Proposals

The bar enclosure would comprise a lightweight, single-storey steel structure with a glass roof and screen walls to the north elevation only. Other sides would be open. Structurally, the module would be integral with the passageway and screening to the south making a unit 7m x 6m. Furniture would be fixed in place to the floor which would comprise a composite board laid over steel floor beams. The modules would be lifted into place and laid onto the top of the existing paving/ballast slabs. Reaction forces would be imposed onto the roof via multiple baseplates so as to spread the weight as evenly as possible.

The total load imposed by the bar module onto the roof has been calculated to be 2.6kN/m², of which 1.1kN/m² is additional self-weight and 1.5kN/m² is live load (occupancy). The figure adopted for live load is the same as CCL had used in their design of apartment slabs below and would be inclusive of people and furniture.

As noted above, the pt roof slab was designed by CCL for an imposed/live load of 1.0kN/m². However, in reference 6, CCL investigated whether the slab could in fact carry a greater imposed load than it was originally designed for. For their investigation they tested the application of an additional imposed load of 1.5kN/m², i.e. CCL checked the capacity of the roof pt slab to carry a total imposed load of 2.5kN/m². Thus, the figures used by CCL for their investigation are directly comparable to the total load that would be imposed by the proposed bar module.

CCL analysed 3 different load cases and found that the controlling factor in the capacity of the roof was the use of the BMU. In Load Case 1 the BMU was assumed to be positioned to the right of gl 5 (i.e. south of the core structure) whilst in Load Cases 2 and 3 it was located respectively midway between gl's 3-5 and directly over the end of the wall on gl 3. CCL concluded that the roof slab would be able to carry the increased load of 2.5kN/m² except in Load Cases 2 and 3 when the pt roof slab west of gl 5 (i.e. in the bar area) would be overstressed. Therefore, it can be seen that:

- the addition of the self-weight of the bar module, which is approximately equal to the original CCL design allowance of 1.0kN/m², would not result in any overload of the roof pt slab.
- the addition of the self-weight plus live load from the bar module, which is approximately equal to the increased load capacity of 2.5kN/m² tested by CCL would not result in any overload of the roof pt slab when the BMU is not in use or positioned west of gl 5.
- Whilst the BMU is in use, or if it needs to be positioned west of gl 5, the bar module should simply not be used, thereby avoiding any overload of the pt roof slab.



5.0 Use of the Roof Level for Private Exercise and Training ("Gym")

The gym enclosure would comprise a lightweight, single-storey steel structure with a glass roof and glass wall to the east elevation only. The south and west elevations would be clad with a lightweight perforated steel mesh screen whilst the north would be open. Equipment would be fixed in place to the floor which would comprise a composite board laid over steel floor beams. The modules would be lifted into place and reaction forces would be imposed onto the roof via multiple baseplates so as to spread the weight as evenly as possible.

The total load imposed by the gym module onto the roof has been calculated to be 2.95kN/m², of which 1.45kN/m² is additional self-weight and 1.5kN/m² is additional live load allowance (occupancy). The figure adopted for live load is the same as was used in the design of the apartment slabs below and would be inclusive of people and furniture.

As noted above, the roof slab in this area is understood to have been designed for an imposed/live load of only 0.75kN/m² which, by inspection, would be insufficient to accommodate the load from the proposed gym. However, the final roof finishes in this area comprise 80mm thick concrete paving slabs which are understood to act as ballast. The self-weight of these paving slabs would be approximately 1.9kN/m² so it is proposed that, within the footprint of the gym module, they be taken up and removed prior to installation of the gym module to provide additional load capacity. The ballast function would then be fulfilled by the self-weight of the gym module.

On this basis the available load capacity would be $(0.75 + 1.9) = 2.65\text{kN/m}^2$. As this is still slightly less than the total additional load calculated above, it is considered that use of the gym would have to be controlled and limited to sufficiently few people at a time that the design live load could be reduced to avoid exceedance of the design capacity in this area.

6.0 Use of the Roof Level for a Swimming Pool

The proposed pool would be an enclosed, private swimming pool on the south side of the roof between gridlines 3 and 5. The pool would be trapezoidal on plan, about 7m long and varying in width between 2 and 3.75m, with a water depth of 1.5m. The pool enclosure would comprise a lightweight, single-storey steel structure with a glass roof and walls. The height of the structure would not exceed that of the existing side screens to the roof.

Water is heavy. At that depth the proposed pool would exert an additional load on the roof of 15kN/m² excluding the self-weight of the pool construction and finishes and, by reference to discussion above, it is obvious that the roof slab could not carry this extra weight without significant strengthening. However, there are substantial rc shear walls located on both gridlines 3 and 5, i.e. at each end of the pool. The pool structure has therefore been designed to span from one wall to the other, without imposing any load onto the roof itself, so that the capacity of the slab would not be an issue. It is then a question of whether or not the rc walls have the capacity to carry the extra weight.

As I do not have access to the original structural design calculations by WSP, it has been necessary to do an approximate analysis of the current building layout to assess the impact of the pool. Assuming that the floor slabs span east to west directly onto the walls, I estimate the approximate loads currently carried by the rc walls on gridlines 3 and 5 in the area of the pool to be respectively 1,900 kN/m and 2,200kN/m (unfactored, at ground level). The increase in loads due to the pool would be about 60kN/m and 85kN/m respectively, i.e. an increase of only about 3.0%.



Although I have no details of the foundation design, I would concur with a comment made by WSP in an email to Matthews Architects from July 2019 that such a small increase would be likely to have “negligible” effect at that level.

No report from WSP has been received for review and my understanding of WSP’s assessment is therefore limited to quotes within in the letter from DAC Beachcroft (Reference 9) as follows:

- It is stated that, due to problems with the as-built strength of the concrete in the raking columns at the front of the building (i.e. those at low level on the Whitworth Street elevation), WSP “*strongly advised against introducing any more load into them*”. However, it is not clear whether, in its proposed position at roof level, the pool would exert any load onto these columns – more information would be needed regarding the structural framing to determine the loadpaths. As can be seen from street level, the columns in question are located to the left of the windows in the east gable wall. By approximate comparison of the line of these windows with the drawings, it appears that the additional weight would be carried by the walls on gridlines 3 and 5 (which I assume continue all the way down the building) rather than by the raking columns. This would need to be clarified by WSP.
- It is then stated that the walls would “*unfortunately be overstressed by the new load*” such that strengthening would be needed to the uppermost ten storeys. It is difficult to verify this statement based on the limited information currently available. In my opinion, whilst the increase in load is too much to be simply deemed acceptable by a Structural Engineer, it is also too little to be dismissed as unacceptable when imposed onto shear walls which are understood to be 350mm thick and formed in high strength (60N/mm²) concrete. At roof level, the additional gravity load applied to such shear walls would on average be no more than 0.5N/mm². Furthermore, in my experience rc shear walls such as these are working hardest at the base of the building rather than the top, so a more detailed explanation should be requested from WSP as to why the structure cannot tolerate such a modest increase in load.

I also note the following issues which would need to be addressed in final design:

- Wind. In a tower of this height the wind loading is a critical aspect of the structural design and is determined by the overall height of the building. The pool needs to be enclosed to be usable but the roof of the new enclosure structure has been designed to be no higher than the screen walls that currently shield the roof level so as to avoid attracting extra wind load onto the building structure.
- Drainage. A pool requires a water supply and a means of drainage. As the water contains chemicals it would have to be drained into the foul water system. It is understood that the pool drainage would be pumped across the roof and would discharge into the building foul drainage system at the core so as to avoid any penetration through the roof slab and waterproofing.
- Risk Assessment. A risk assessment for change of use would address aspects such as balustrades and management. I note that the FDG proposals include for full height glazed screens at each end which would be integrated into the structural proposals.



7.0 Summary

- 7.1 Use for social gatherings – It is considered that, structurally, this would be acceptable in principle but it is recommended that occupancy be limited to 60 people as recommended previously by others.
- 7.2 Use for private recreation – “bar”. The proposed arrangement is considered to be structurally acceptable and its self-weight is within design allowances for that part of the roof. However, use of the bar and roof would not be permissible when the BMU was in use or positioned west of gridline 5.
- 7.3 Use for private exercise and training – “gym”. The proposed arrangement is considered to be structurally acceptable if the existing concrete paving/ballast is removed beneath the footprint of the gym module. Occupancy of the gym should also be limited to avoid exceeding the design allowances in this part of the roof.
- 7.4 Use for private recreation – “pool” – the proposed arrangement would avoid imposing load onto the pt roof slab so would not overload the roof slab. Additional loads would instead pass directly onto the top of the shear walls beneath which are understood to be 350mm thick and to have been built using high strength (60N) concrete. Whilst the comments from WSP, regarding a potential need for strengthening of the upper levels of the shear walls below the pool, are noted, the additional loads at roof level are considered to be modest for such substantial structural elements. As such further substantiation of the Developer’s position that the load cannot be carried without strengthening should be requested.

If you have any further queries please do not hesitate to contact me directly.

Yours sincerely

Chris Pratt

Director



References

1. Client Proposals – “Reform and Interior Design Project Axis Tower” by A-cero Architects, document dated 11/10/19
2. Client Proposals – A-cero drawing AP.01.02(1) Penthouse Dimensions, dated October 2019
3. Client Proposals – A-cero drawing AP.01.03(1) Penthouse Finishes, dated October 2019
4. Client Proposals – A-cero drawing AP.01.04(1) Solarium, dated October 2019
5. Letter from DAC Beachcroft to Mills & Reeve dated 13/10/2021
6. CCL Report on Roof Structure – Reference Axis-CCL-ZZ-RF-RP-Y-0001 dated 05/08/2019
7. EN1-1991-1-1 : Eurocode 1 ; Actions on Structures
8. BS EN 13814-1:2019 : Safety of Amusement Rides and Devices: Design and Manufacture
9. Developer Proposals – “Axis Rooftop” comprising 4 3D sketch drawings issued by Property Alliance Group September 2019
10. Construction Agreement “for certain works to Penthouse, Flat 170 Axis Tower”, dated 19/02/2020
11. Email correspondence between the parties, various, 2020-2021
12. Client Architectural Proposals – GA Plans and Section drawings by Fairhursts Design Group dated March 2023
13. Client Structural Proposals – Pool Structure GA, WL_2043_SK01 rev P1 by Westlakes Engineering dated March 2023
14. Client Structural Proposals – Bar Structure GA, WL_2043_SK02 rev P1 by Westlakes Engineering dated March 2023
15. Client Structural Proposals – Gym Structure GA, WL_2043_SK03 rev P1 by Westlakes Engineering dated March 2023
16. Axis Tower Penthouse Fire Safety Strategy, Issue 1 by Ove Arup & Partners dated 19/06/2020

4.0 Mobile Crane Information

4.1 Lifting Strategy – Techlift

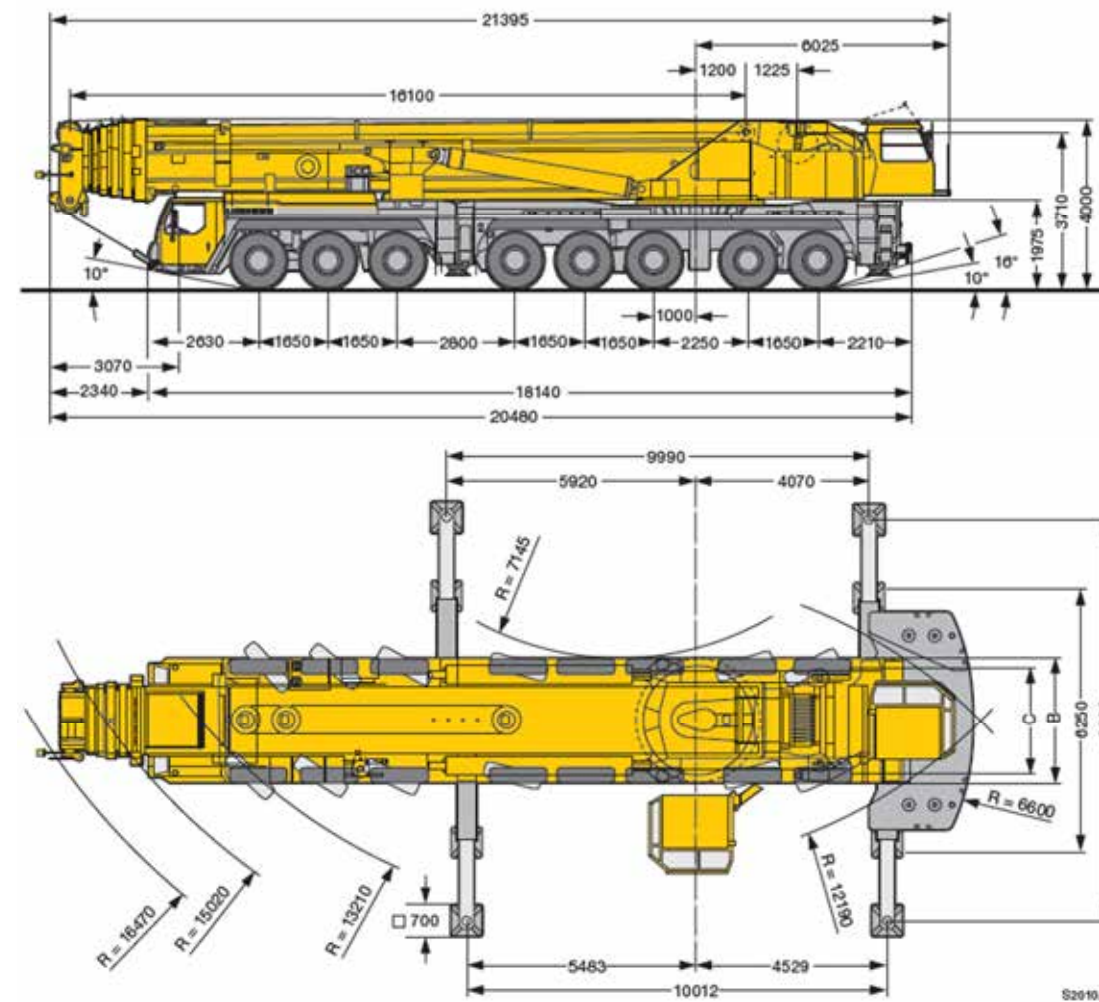
Mobile Crane Information

Liebherr LTM 1500-8.1 – mobile telescopic crane

Multiple cranes available for hire in the UK.



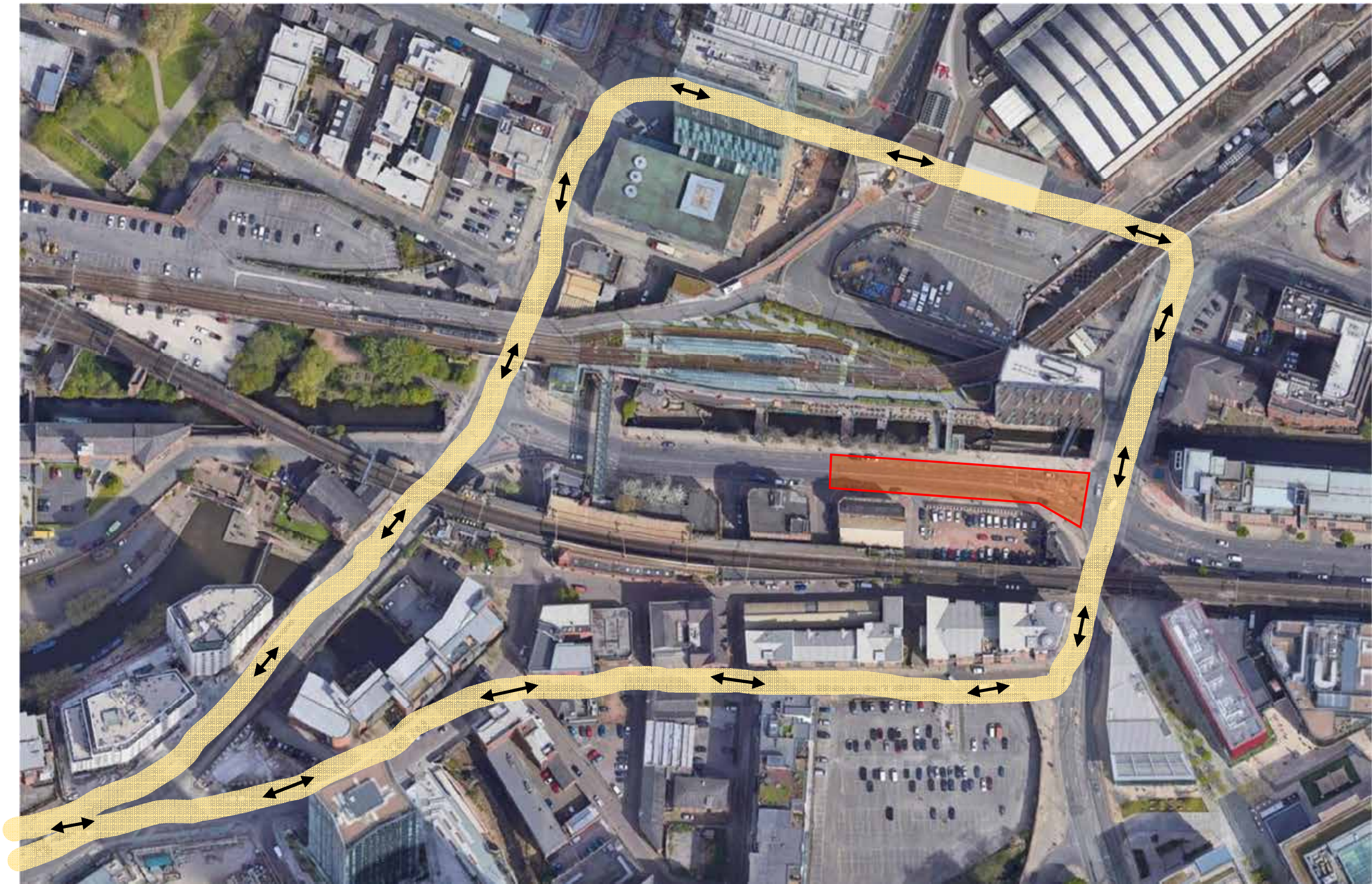
Outline dimensions of the crane



Proposed section of Whitworth Street West (B6469) to be closed during the assembly/disassembly of the crane and lifting operations



Indicative Diversion route



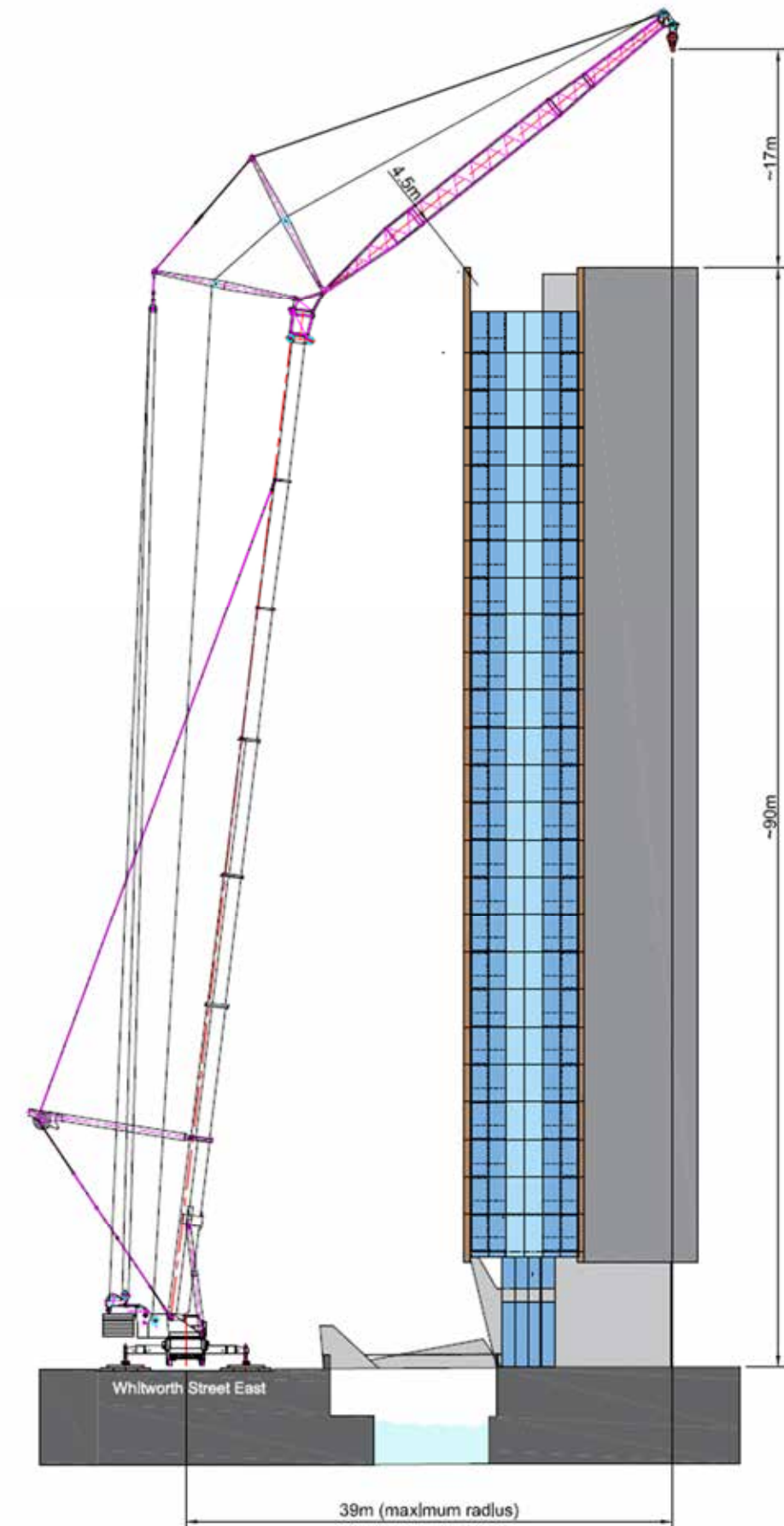
AXIS Tower Construction

The same crane (Liebherr LTM1500-8.1) was used during the construction of Axis Tower between 2016 and 2019 (tower crane installation/removal).

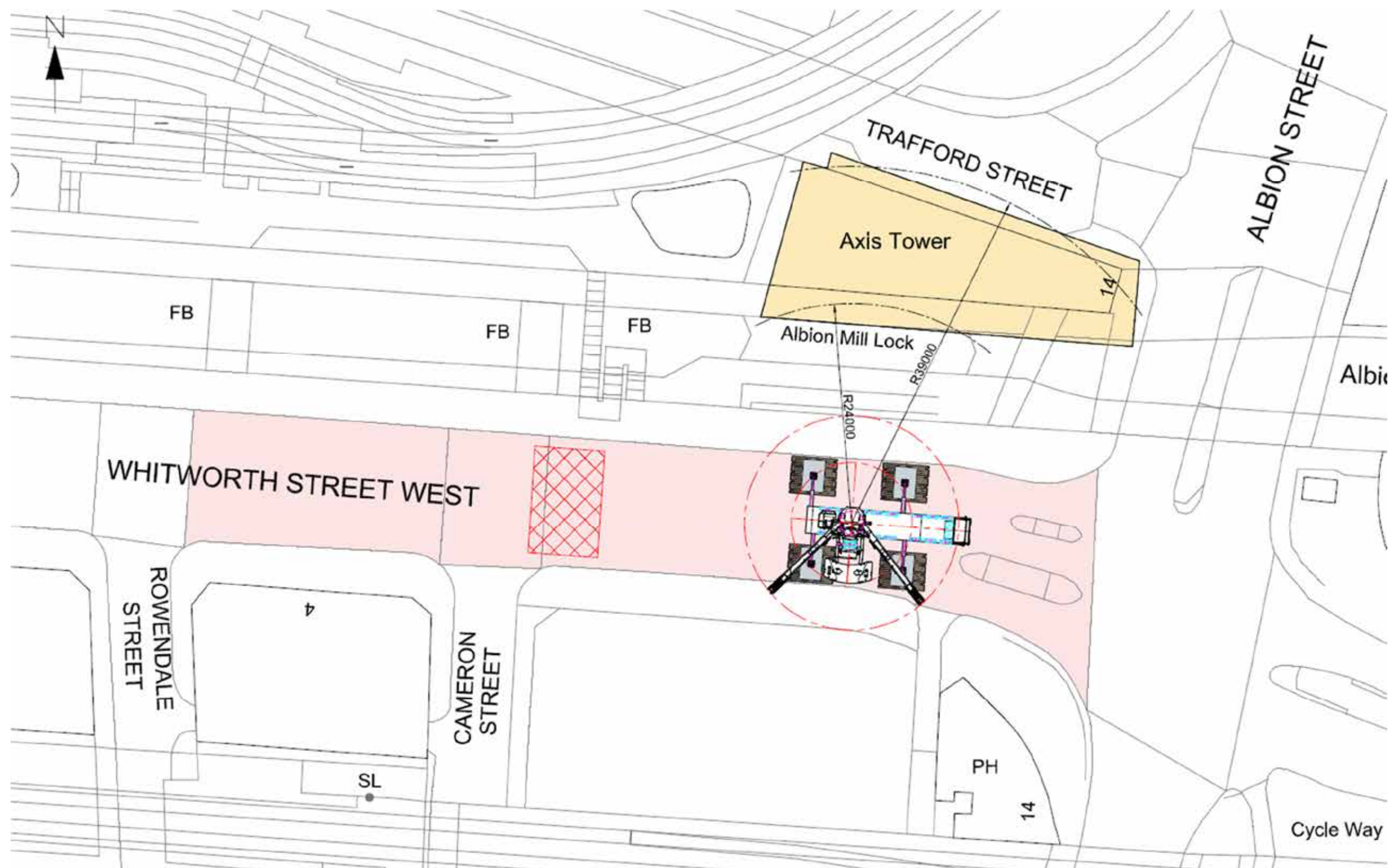
The crane was positioned in a similar location to our proposal, on Whitworth Street West (B6469)



Elevation showing crane accessing roof of Axis Tower



Plan showing position of crane on Whitworth Street West



5.0 MEP Information

4.1 Building Services Modifications - FutureServ

Title: Axis Building Penthouse Works

Project Ref: P7515

Date: 21st March 2023

Ref: 17.1

1.0 Summary

As part of a proposal to introduce a number of rooftop amenity facilities to the Axis Building Penthouse that is located at Level 26 of the Axis Building in Central Manchester, there are a number of Building Services modifications that need to be made and this Technical Note has been written to validate the feasibility of these amendments.

These amendments may be itemised as follows:

- 1. Relocate three air conditioning external condenser units.
- 2. Reconfigure the discharge air plenum from the buildings smoke extract system.
- 3. Relocate the soil and ventilation pipe discharge terminal.

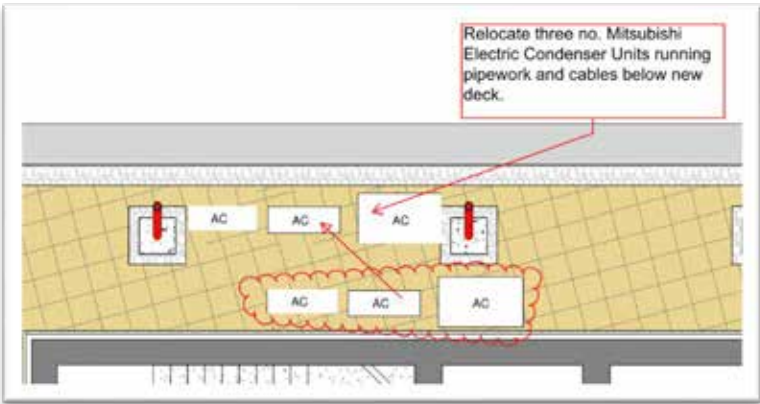
2.0 Required Building Services Amendments

2.1 External Condenser Units

There are currently three no. Mitsubishi Electric external condenser units located at roof level that serve the penthouse apartment directly below the roof at Level 26. Two of the condensers are refrigerant based City Multi and Mr Slim type units and the third is a hydraulic Ecodan unit.

The two refrigerant based units would require the refrigerant gas to be decanted out of the system and the refrigerant pipework, power and controls cables extending to allow the units to be moved 1.5 metres so they sit adjacent the parapet wall between the two structural struts as shown below, the refrigerant gas would then be recanted into the system and the units recommissioned.

The hydraulic Ecodan unit would require the system water to be drained down and then the unit could be moved to sit alongside the two refrigerant units whereby the pipework and cabling could be extended and then the hydraulic system refilled with water and the unit re-energised and recommissioned.



Technical Note P7515/1

Project Name: Axis Building Penthouse Works

Design Phase: Planning



DESIGN ENGINEER SUSTAIN

FutureServ Ltd
10 Oxford Court
Manchester. M2 3WQ
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The units are currently sitting directly on the roof paving slabs using insulated StrutFoot supports, and we would suggest the same supports could be reused to sit on top the new deck.

The works associated with this relocation are minor in their nature and a budget cost of £5K to £7.5K should be allocated to facilitate the works, we would expect the works to take two or three days to complete.

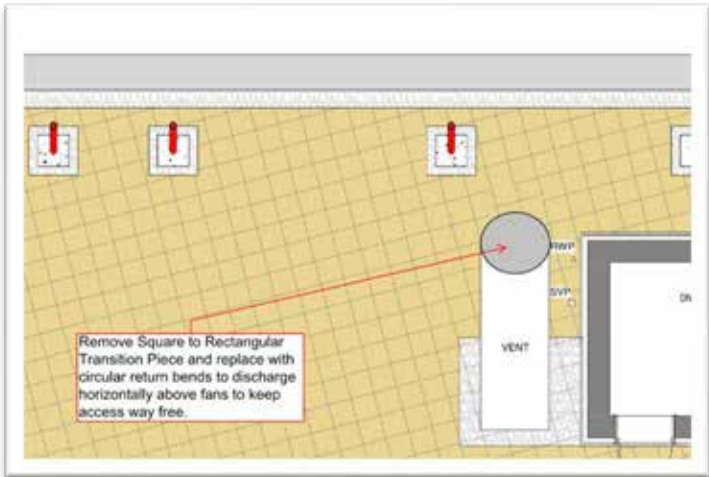
2.2 Smoke Extract Discharge

The Axis building is served by a single stair with smoke extract system as designed and installed by SE Controls as part of the Base Build works to keep the escape corridors at each level free from smoke in the event of fire.

This system comprises a rising vertical duct that is served by run and standby smoke extract fans at roof level and the system discharges smoke horizontally on the roof through an open ended duct discharge.

This discharge location currently conflicts with the proposed access route for the roof amenity facilities and so it is proposed that the final 1 metre of existing galvanised rectangular ductwork is removed and a circular 90 degree bend fitted to allow the system to run vertically for 1m before then turning 90 degrees and discharging horizontally again away from the access route, see sketch.

This work is essentially the removal of a square to round ductwork transition piece together with circa 1 metre of galvanised steel ductwork and the addition of two 90 degree bends and 1 metre of galvanised steel ductwork adding around 15Pa to 20Pa of resistance to the system which is unlikely to have any effect on the system in operation.



The works associated with this ductwork configuration are minor in their nature and a budget cost of £4K to £6K should be allocated to facilitate the works, we would expect the works to take one or two days to complete and the system should be retested on completion.

Technical Note P7515/1

Project Name: Axis Building Penthouse Works

Design Phase: Planning

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Futureserv Ltd
10 Oxford Court
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2.3 Soil Ventilation Pipe Discharge

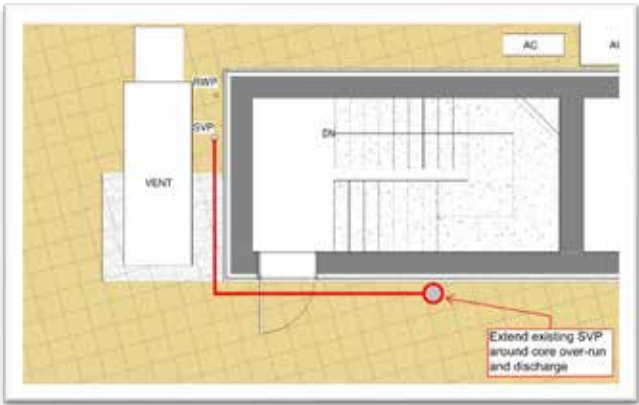
The existing Soil and Ventilation pipework stacks that serve the Axis Building have been linked together below roof level and are now ventilated by a single discharge point fixed to the side of the core over-run with a proprietary cowl at approximately 2,000 mm above finished roof level.

This discharge point is located close to the space where one element of the proposed amenity space is planned and could potentially lead to odours from the drainage system being detected when the amenity space is in use.

This soil ventilation pipe discharge is well above the flood level of the current drainage system and also well above any planned connections to the stack to serve the new amenity spaces and is only acting as a path for air to leave the stack when the appliances below are in use.

In terms of restrictions on the location of this terminal, Part H of the Building Regulations and also BS:12056 Part 2 stipulate that the discharge from Soil and Ventilation pipework must be at least 900mm above and 3,000mm horizontally from any opening windows that serve the building and both of these restrictions would be satisfied in the proposed new discharge location.

It would be a minor piece of work to extend the current discharge point so it runs horizontally around the core over-run to discharge well away from any of the planned amenity spaces, see sketch.



The works associated with this soil ventilation pipework modification are minor in their nature and a budget cost of £1K to £2K should be allocated to facilitate the works, we would expect the works to take one or two days to complete.

Technical Note P7515/1

Project Name: Axis Building Penthouse Works

Design Phase: Planning

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3.0 Conclusions

The three Building Services modifications required to facilitate the implementation of the roof top amenity space at Axis Building, Manchester are relatively minor in their nature, and could all be easily completed with a total cost in the region of £10K to £15K and the works should take no more than two weeks to complete.

It is unlikely that any of these works will require planning permission, but it is important that Building Control are notified for the works to modify the smoke extract and also the drainage systems and plans should be put in place to protect the building whilst these services are modified.

6.0 Construction Cost Estimate

6.1 Construction Cost Estimate - SDA Consulting

Chartered Quantity Surveyors
Chartered Building Surveyors
Project Managers
Principal Designer



Construction Cost Estimate Nr 2

Axis Tower Roof Fit Out

Prepared for:

Mills & Co

21 March 2023

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Job Nr 2569

Executive Summary

Project Scope

The creation of amenity space on the roof of Axis Tower, a high rise residential building in Manchester including pool, bar and fitness areas. The works will include also finishes upgrade work in the access stairwell, and minor modifications to roof mounted services equipment

Estimate Nr1

Project GIFA N/A

Estimate Purpose Feasibility

Estimate Summary

The project estimate is £1,154,994 including VAT. Please refer to the following page for a full list of Assumptions and Exclusions.



Project Cost Summary £1,154,994

	Total
Construction	0.76m
Professional Fees	0.11m
Client Directs	0.00m
Risk Allowances	0.09m
VAT	0.19m
Total	1.15m

Top 5 Key Cost Drivers

Element	£	% of Project Cost
9 Main Contractors Preliminaries	148,881	15.4%
8.5 External Fixtures	117,314	12.2%
11 Design Fees	111,801	11.6%
13 Design & Construction Risks	87,681	9.1%
2.1 Frame	84,150	8.7%
Total	549,829	57%

Assumptions

1. The materials and waste lift / removal can be completed on two separate days (not consecutive days but over two weekends)
2. Works will continue between lifting days to install the modular decking, panelling / glazed screens and service connections
3. All works to move and adjust existing services will be complete ahead of the first lift
4. Water, drainage and power are all available at roof level to be connected into
5. All materials will be weighted and connected together to form a stable structure but not mechanically fixed to the roof

Exclusions

1. Amendments to the existing roof crane, track or roof supports
2. Works to existing parapet walls and structural supports
3. Temporary fall restraint system during construction works
4. Bolting / mechanically fixing materials to the roof to avoid penetrating the waterproof laying impacting roof weather integrity
5. Provision of temporary air conditioning while roof units are repositioned
6. Access control and communications systems (such as Wi-Fi)
7. Specific roof drainage, it assumed water will drain through the decking and utilise existing roof drainage
8. Overnight working, as Axis Tower is residential all works will be completed during daytime hours

Basis of Estimate

- Fairhurst's drawings 11000-P01, 11100-P02, 11110-P02, 11150-P02, 11200-P02, 11300-P02, 12100-P02, 12101-P02, 19100-P01 and 22100-P02
- Westlake Engineering drawings WL_2043_SK01 P1, WL_2043_SK02 P2 and WL_2043_SK03 P2
- Techlift drawings T-23-UK158-ELE-001A and T-23-UK158-PLN-001A

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Elemental Summary

Elemental Summary
Mills & Co
Axis Tower Roof Fit Out
21 March 2023



Element	£	£/m2	% of Total	Comments
0.1 Toxic / Hazardous / Contaminated material	0	0	0.0%	
0.2 Major Demolition Works	0	0	0.0%	
0.3 Temporary Support to Adjacent Structures	0	0	0.0%	
0.4 Specialist Groundworks	0	0	0.0%	
0.5 Temporary Diversion Works	0	0	0.0%	
0.6 Extraordinary Site Investigation Works	0	0	0.0%	
0 Facilitating Works	0	0	0.0%	
1.1.1 Standard Foundations	0	0	0.0%	
1.1.2 Specialist foundations	0	0	0.0%	
1.1.3 Lowest floor construction	0	0	0.0%	
1.1.4 Basement excavation	0	0	0.0%	
1.1.5 Basement Retaining Walls	0	0	0.0%	
1 Substructure	0	0	0.0%	
2.1 Frame	84,150	0	8.7%	
2.2 Upper Floors	0	0	0.0%	
2.3 Roof	55,500	0	5.8%	
2.4 Stairs and ramps	0	0	0.0%	
2.5 External walls	52,625	0	5.5%	
2.6 Windows and External Doors	3,500	0	0.4%	
2.7 Internal Walls and Partitions	0	0	0.0%	
2.8 Internal Doors	0	0	0.0%	
2 Superstructure	195,775	0	20.3%	
3.1 Wall finishes	1,410	0	0.1%	
3.2 Floor Finishes	6,345	0	0.7%	
3.3 Ceiling Finishes	600	0	0.1%	

Elemental Summary
Mills & Co
Axis Tower Roof Fit Out
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Element	£	£/m2	% of Total	Comments
3 Internal Finishes	8,355	0	0.9%	
4 Fittings, Furnishings and Equipment	2000	0	0.2%	
5.1 Sanitary Appliances	0	0	0.0%	
5.2 Services Equipment	0	0	0.0%	
5.3 Disposal Installations	5,500	0	0.6%	
5.4 Water Installations	5,000	0	0.5%	
5.5 Heat Source	0	0	0.0%	
5.6 Space Heating and Air Conditioning	5,000	0	0.5%	
5.7 Ventilation Systems	3,000	0	0.3%	
5.8 Electrical Installations	46,900	0	4.9%	
5.9 Gas and other fuel installations	0	0	0.0%	
5.10 Lift and Conveyor Installations	0	0	0.0%	
5.11 Fire Fighting and Lightning Protection	0	0	0.0%	
5.12 Communication, Security and Control Systems	3,000	0	0.3%	
5.13 Specialist Installations	0	0	0.0%	
5.14 Builders Works in Connection With Services	7,700	0	0.8%	
5 Services	76,100	0	7.9%	
6 Complete Buildings and Building Units	43480	0	4.5%	
7.1 Minor Demolition and Alteration Works	750	0	0.1%	
7.2 Repairs to Existing Services	0	0	0.0%	
7.3 Damp-proof Course / Fungus and Beetle Eradication	0	0	0.0%	
7.4 Façade Retention	0	0	0.0%	
7.5 Cleaning Existing Surfaces	0	0	0.0%	
7.6 Renovation Works	0	0	0.0%	
7 Works to Existing Buildings	750	0	0.1%	

Elemental Summary
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Axis Tower Roof Fit Out
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Element	£	£/m2	% of Total	Comments
8.1 Site Preparation works	0	0	0.0%	
8.2 Roads, Paths and Paving's	45,460	0	4.7%	
8.3 Planting	0	0	0.0%	
8.4 Fencing, Railings and Walls	57,350	0	5.9%	
8.5 External Fixtures	117,314	0	12.2%	
8.6 External Drainage	0	0	0.0%	
8.7 External Services	0	0	0.0%	
8.8 Minor Building Works and Ancillary Buildings	0	0	0.0%	
8 External Works	220,124	0	22.8%	
SUB TOTAL: Building Works	546,584	0	56.7%	
9 Main Contractors Preliminaries	148,881	0	15.4%	
SUB TOTAL: Building Works (incl Prelims)	695,466	0	72.1%	
10 Main Contractors OH&P	69,547	0	7.2%	
SUB TOTAL: Building Works (Incl Prelims & OH&P)	765,012	0	79.3%	
11 Design Fees	111,801	0	11.6%	
Construction Cost Estimate (incl design fees)	876,814	0	90.9%	
12 Other Development / Project Costs / Client Directs	0	0	0.0%	
13 Design & Construction Risks	87,681	0	9.1%	
Construction Cost Estimate	964,495	0	100%	

Estimate Detail

Element	Item	Quantity	Unit	Rate	Total
Pool Module					
Module 1					
2.1 Frame	Steel packs for pool module to sit on roof over shear walls including removing paving slabs; no change to rood waterproofing system; details to be confirmed by Structural Engineer	4.00	Nr	300.00	1,200
2.1 Frame	Steel frame set on existing building shear walls to house pool structure and glazed panels (included separately below); galvanised finish; including frame assembly and paint finish; details to be confirmed by Structural Engineer.	1.00	item	20,000.00	20,000
2.3 Roof	Fixed clear glazed roof panels with digitally printed artwork; 15mm A2 fire rated laminated toughened glass (fixing to steel structure included below)	14.00	m2	650.00	9,100
2.3 Roof	Openable clear glazed roof panels with digitally printed artwork including motorized opening mechanism; 15mm A2 fire rated laminated toughened glass (fixing to steel structure included below)	1.00	item	10,000.00	10,000
2.5 External walls	2500 high clear glazing panels with 1100 high digitally printed artwork (fixing to steel structure included below); 15mm A2 fire rated laminated toughened glass	27.00	m2	550.00	14,850
2.5 External walls	2mm perforated aluminium panels with polyester powder coat finish; up to 3m high; Proteus or similar (fixing to steel structure included below)	19.00	m2	175.00	3,325
5.8 Electrical Installations	Allowance for low light level lighting built into modular structure (fixing to steel structure included below)	1.00	item	3,000.00	3,000
8.5 External Fixtures	One-piece stainless steel leisure pool with counter current system (performance training and water body massage); pool cover to one side and steel access ladders including all pool filtration and chemical equipment; specification TBC but similar to Dolphin All-in-one Ultraflow	1.00	item	67,814.40	67,814
6 Complete Buildings and Building Units	Assembly of module walls, floor and roof including all fixing details and containment of services	80.00	hrs	60.00	4,800
6 Complete Buildings and Building Units	Temporary strapping and support of module to protect module during lift	1.00	item	1,000.00	1,000
6 Complete Buildings and Building Units	Installation of module on roof	8.00	hrs	60.00	480
Module 2					
2.1 Frame	Steel frame to form sun lounge area with steelway floor deck cladding over	1.00	item	7,500.00	7,500

Estimate Detail
Mills & Co
Axis Tower Roof Fit Out
21 March 2023



Element	Item	Quantity	Unit	Rate	Total
2.1 Frame	Steel deck on steel frame for MyDek to be laid on, including stair treads and risers (fixing to steel structure included below)	15.00	m2	200.00	3,000
5.8 Electrical Installations	Allowance for low light level lighting built into modular structure (fixing to steel structure included below)	1.00	item	3,000.00	3,000
8.2 Roads, Paths and Paving's	New MyDek Luxura 150 Aged Oak A1 fire rated decking to clad sun lounge area (fixing to steel structure included below)	15.00	m2	165.00	2,475
6 Complete Buildings and Building Units	Assembly of module walls, floor and roof including all fixing details and containment of services	80.00	hrs	60.00	4,800
6 Complete Buildings and Building Units	Temporary strapping and support of module to protect module during lift	1.00	item	1,000.00	1,000
6 Complete Buildings and Building Units	Installation of module on roof and attachment of walls	16.00	hrs	60.00	960
Loose Items					
8.5 External Fixtures	Allowance for sun loungers including weighting system (water or sand)	2.00	Nr	750.00	1,500
Bar Module					0
Module 1					
2.1 Frame	Steel frame set on existing roof paving to create gym structure incorporating glazed and metal panels walls and roofs (included separately below); galvanised finish; including bracing	1.40	t	7,500.00	10,500
2.1 Frame	Angles required for lifting; temporary only	6.00	m	200.00	1,200
2.1 Frame	Steel deck on steel frame for MyDek to be laid on (fixing to steel structure included below)	22.00	m2	200.00	4,400

Element	Item	Quantity	Unit	Rate	Total
2.3 Roof	Fixed clear glazed roof pergola panels; 15mm A2 fire rated laminated toughened glass (fixing to steel structure included below)	16.00	m2	650.00	10,400
2.5 External walls	2500 high clear glazing panels with 1100 high digitally printed artwork (fixing to steel structure included below); 15mm A2 fire rated laminated toughened glass	13.00	m2	550.00	7,150
2.5 External walls	2500 high 2mm perforated aluminium panels with polyester powder coat finish; up to 3m high; Proteus or similar (fixing to steel structure included below)	9.00	m2	175.00	1,575
5.8 Electrical Installations	Allowance for low light level lighting built into modular structure (fixing to steel structure included below)	1.00	item	3,000.00	3,000
8.2 Roads, Paths and Paving's	New MyDek Luxura 150 Aged Oak A1 fire rated decking fixed to steel sections in steel bar module (fixing to steel structure included below)	22.00	m2	165.00	3,630
6 Complete Buildings and Building Units	Assembly of module walls, floor and roof including all fixing details and containment of services	80.00	hrs	60.00	4,800
6 Complete Buildings and Building Units	Temporary strapping and support of module to protect module during lift	1.00	item	1,000.00	1,000
6 Complete Buildings and Building Units	Installation of module on roof	8.00	hrs	60.00	480
					0
	Module 2				
2.1 Frame	Steel frame set on existing roof paving to create gym structure incorporating glazed and metal panels walls and roofs (included separately below); galvanised finish; including bracing	1.40	t	7,500.00	10,500
2.1 Frame	Angles required for lifting; temporary only	6.00	m	200.00	1,200
2.1 Frame	Steel deck on steel frame for MyDek to be laid on (fixing to steel structure included below)	22.00	m2	200.00	4,400
2.3 Roof	Fixed clear glazed roof pergola panels; 15mm A2 fire rated laminated toughened glass (fixing to steel structure included below)	16.00	m2	650.00	10,400
2.5 External walls	2500 high clear glazing panels with 1100 high digitally printed artwork (fixing to steel structure included below); 15mm A2 fire rated laminated toughened glass	9.00	m2	550.00	4,950

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Element	Item	Quantity	Unit	Rate	Total
2.5 External walls	2500 high 2mm perforated aluminium panels with polyester powder coat finish; up to 3m high; Proteus or similar (fixing to steel structure included below)	9.00	m2	175.00	1,575
5.8 Electrical Installations	Allowance for low light level lighting built into modular structure (fixing to steel structure included below)	1.00	item	3,000.00	3,000
8.2 Roads, Paths and Paving's	New MyDek Luxura 150 Aged Oak A1 fire rated decking fixed to steel sections in steel bar module (fixing to steel structure included below)	22.00	m2	165.00	3,630
6 Complete Buildings and Building Units	Assembly of module walls, floor and roof including all fixing details and containment of services	80.00	hrs	60.00	4,800
6 Complete Buildings and Building Units	Temporary strapping and support of module to protect module during lift	1.00	item	1,000.00	1,000
6 Complete Buildings and Building Units	Installation of module on roof	8.00	hrs	60.00	480
					0
	Loose Items				
8.5 External Fixtures	Allowance for monolithic bar area seating and tables including weighting system (water or sand)	1.00	item	10,000.00	10,000
8.5 External Fixtures	Allowance for bar including weighting system (water or sand)	1.00	item	25,000.00	25,000
Gym Module					
	Module 1				0
2.1 Frame	Steel frame set on existing roof paving to create gym structure incorporating glazed and metal panels walls and roofs (included separately below); galvanised finish; including bracing	0.87	t	7,500.00	6,525
2.1 Frame	Angles required for lifting; temporary only	6.00	m	200.00	1,200
2.1 Frame	Steel deck on steel frame for MyDek to be laid on (fixing to steel structure included below)	12.00	m2	200.00	2,400
2.3 Roof	Fixed clear glazed roof panels; 15mm A2 fire rated laminated toughened glass (fixing to steel structure included below)	12.00	m2	650.00	7,800

Element	Item	Quantity	Unit	Rate	Total
2.5 External walls	2500 high clear glazing panels with 1100 high digitally printed artwork (fixing to steel structure included below); 15mm A2 fire rated laminated toughened glass	14.00	m2	550.00	7,700
2.5 External walls	2500 high 2mm perforated aluminium panels with polyester powder coat finish; Proteus or similar (fixing to steel structure included below)	6.00	m2	175.00	1,050
5.8 Electrical Installations	Allowance for low light level lighting built into modular structure (fixing to steel structure included below)	1.00	item	3,000.00	3,000
3.2 Floor Finishes	New MyDek Luxura 150 Aged Oak A1 fire rated decking fixed to steel sections in steel gym module (fixing to steel structure included below)	12.50	m2	165.00	2,063
6 Complete Buildings and Building Units	Assembly of module walls, floor and roof including all fixing details and containment of services	80.00	hrs	60.00	4,800
6 Complete Buildings and Building Units	Temporary strapping and support of module to protect module during lift	1.00	item	1,000.00	1,000
6 Complete Buildings and Building Units	Installation of module on roof	8.00	hrs	60.00	480
Module 2					
2.1 Frame	Steel frame set on existing roof paving to create gym structure incorporating glazed and metal panels walls and roofs (included separately below); galvanised finish; including bracing	0.87	t	7,500.00	6,525
2.1 Frame	Angles required for lifting; temporary only	6.00	m	200.00	1,200
2.1 Frame	Steel deck on steel frame for MyDek to be laid on (fixing to steel structure included below)	12.00	m2	200.00	2,400
2.3 Roof	Fixed clear glazed roof panels; 15mm A2 fire rated laminated toughened glass (fixing to steel structure included below)	12.00	m2	650.00	7,800
2.5 External walls	2500 high clear glazing panels with 1100 high digitally printed artwork (fixing to steel structure included below); 15mm A2 fire rated laminated toughened glass	19.00	m2	550.00	10,450
5.8 Electrical Installations	Allowance for low light level lighting built into modular structure (fixing to steel structure included below)	1.00	item	3,000.00	3,000
3.2 Floor Finishes	New MyDek Luxura 150 Aged Oak A1 fire rated decking fixed to steel sections in steel gym module (fixing to steel structure included below)	12.50	m2	165.00	2,063

Element	Item	Quantity	Unit	Rate	Total
6 Complete Buildings and Building Units	Assembly of module walls, floor and roof including all fixing details and containment of services	80.00	hrs	60.00	4,800
6 Complete Buildings and Building Units	Temporary strapping and support of module to protect module during lift	1.00	item	1,000.00	1,000
6 Complete Buildings and Building Units	Installation of module on roof	8.00	hrs	60.00	480
Loose Items					
8.5 External Fixtures	Allowance for gym storage box	1.00	item	3,000.00	3,000
8.5 External Fixtures	Allowance for gym equipment; mats, bars and rails etc	1.00	item	10,000.00	10,000
Walkways					
8.2 Roads, Paths and Paving's	Steel C-sections to raise floor level from existing paving; to Structural Engineer's detail; to be pre-constructed in 2.4m bays (assembly included below)	80.00	m	150.00	12,000
8.2 Roads, Paths and Paving's	Steelway floor decking mounted on galvanised steel C-sections on 10mm EPDM blocks; to be pre-constructed in 2.4m bays (assembly included below)	65.00	m2	200.00	13,000
8.2 Roads, Paths and Paving's	New MyDek Luxura 150 Aged Oak A1 fire rated decking laid on steel floor deck; to be pre-constructed in 2.4m bays (assembly included below)	65.00	m2	165.00	10,725
8.4 Fencing, Railings and Walls	2500 high 2mm perforated aluminium panels with polyester powder coat finish to walkway; Proteus or similar fixed to existing parapet raked structure with steel members and clamps per Structural Engineer's specification (rate includes assembly on roof)	98.00	m2	150.00	14,700
8.4 Fencing, Railings and Walls	3000 high 2mm perforated aluminium panels with polyester powder coat finish around roof crane; Proteus or similar (rate includes assembly on roof)	64.00	m2	175.00	11,200
8.4 Fencing, Railings and Walls	Extra over perforated metal panels for metal doors to match panelling in polyester powder coated frame including lockable handle	4.00	Nr	1,000.00	4,000
8.4 Fencing, Railings and Walls	Glass wall to open building end with no parapet structure; 2500 high with 20x12 dark grey anodised cap fixed to the metal deck and 1100 high digitally printed artwork; 10.2mm thick A2 fire rated laminated toughened glass (rate includes assembly on roof)	39.00	m2	550.00	21,450

Element	Item	Quantity	Unit	Rate	Total
8.4 Fencing, Railings and Walls	Extra over glass wall to building end for lockable access door; 2100 high with 1100 high digitally printed artwork 10.2mm thick A2 fire rated laminated toughened glass	2.00	Nr	3,000.00	6,000
6 Complete Buildings and Building Units	Assembly of decking bays including all fixing details and service containment	40.00	hrs	60.00	2,400
6 Complete Buildings and Building Units	Temporary strapping and support of bays into a lifting pallet to protect bays during lift	1.00	item	1,000.00	1,000
6 Complete Buildings and Building Units	Installation of bays on roof	32.00	hrs	60.00	1,920
General Construction					
Access to Roof from Penthouse					
2.6 Windows and External Doors	Remove and dispose of existing roof access door and provide new metal door to open outwards for fire escape and access purposes	1.00	Nr	3,500.00	3,500
3.1 Wall finishes	Plaster internal stairwell walls	47.00	m2	20.00	940
3.1 Wall finishes	Apply 1 mist and 2 full coats emulsion paint finish to newly plastered walls	47.00	m2	10.00	470
3.3 Ceiling Finishes	Nauf Armstrong perforated metal tile ceiling	6.00	m2	100.00	600
3.2 Floor Finishes	Provide vinyl floor to stair treads and risers; Amtico LVT	34.00	m	40.00	1,360
3.2 Floor Finishes	Provide vinyl floor to stair landings; Amtico LVT	2.00	m2	250.00	500
3.2 Floor Finishes	Provide Gradus flex PKS75 stair nosings	18.00	m	20.00	360
4 Fittings, Furnishings and Equipment	Provide boxing in to existing vertical services to one corner of stairwell including forming access panel	1.00	item	2,000.00	2,000
5.8 Electrical Installations	Allowance for Vibia Plusminus lighting system to stair access	2.00	Nr	3,500.00	7,000
General Construction Works on Roof					
5.3 Disposal Installations	Provide foul drain from pool to existing foul drain stack adjacent core	1.00	item	3,000.00	3,000
5.3 Disposal Installations	Provide flue dilution system to existing soil and vent pipe to prevent down drafts to bar area	1.00	item	2,500.00	2,500
5.4 Water Installations	Provide junction and sub meter to roof level water supply (assumed window washing supply) and extend water supply to pool area including pump	1.00	item	5,000.00	5,000

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Element	Item	Quantity	Unit	Rate	Total
5.6 Space Heating and Air Conditioning	Temporarily disconnect air conditioning condenser units and relocate to edges of roof and reconnect	1.00	item	5,000.00	5,000
5.7 Ventilation Systems	Termination hood adjacent core on roof to be amended and extended vertically with new cowl reorientated to face away from bar area	1.00	item	3,000.00	3,000
5.8 Electrical Installations	Provision of sub-meter and external grade distribution board off landlords roof power supply to feed power and lighting	1.00	item	3,500.00	3,500
5.8 Electrical Installations	Provision of IP66 RCD sockets to various areas of roof; wired under steel decking from sub-meter connected to existing landlords supply (refer item below; item for sockets only); allow 2 Nr per zone	6.00	Nr	150.00	900
5.8 Electrical Installations	Provide IP rated floor mounted power supplies to each module and walkway panel length; wired under steel decking from sub-meter connected to existing landlords supply (refer item above); allow 2 Nr per zone	11.00	Nr	500.00	5,500
5.8 Electrical Installations	Low light pollution lighting to walkways at floor level; fixed to steel supports for perforated metal panel system	24.00	Nr	500.00	12,000
5.12 Communication, Security and Control Systems	Extend building fire alarm with visual beacons to each module	3.00	Nr	1,000.00	3,000
5.14 Builders Works in Connection With Services	Steel structure to form boxing in for water and drain pipes from pool to core at foot of perforated metal screens clad in New MyDek Luxura 150 Aged Oak A1 fire rated decking	30.00	m	250.00	7,500
5.14 Builders Works in Connection With Services	Remove and dispose of existing paving slabs to facilitate installation of pool frame as per Structural Engineer's drawings	1.00	item	200.00	200
7.1 Minor Demolition and Alteration Works	Form holes in core walls for water, and electrical services; assumed 300 thick reinforced concrete including making good and sealing holes	1.00	item	750.00	750

9 Main Contractors Preliminaries

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Element	Item	Quantity	Unit	Rate	Total
9 Main Contractors Preliminaries	Temporary traffic regulation order and crane permit; budget provided by Techlift	1.00	item	2,500.00	2,500
9 Main Contractors Preliminaries	Diversion route survey, road closure / diversion signage, barriers; budget provided by Techlift	2.00	days	10,000.00	20,000
9 Main Contractors Preliminaries	500te capacity crane and lifting team with all ancillary equipment on 10 hour shift	2.00	days	30,000.00	60,000
9 Main Contractors Preliminaries	Application to canals and river trust and negotiation on temporary closure during lifting and marshalling; allow 2 days of Specialist Consultant time	2.00	days	1,000.00	2,000
9 Main Contractors Preliminaries	Application to Network Rail; allow 2 days of Specialist Consultant time	2.00	days	1,000.00	2,000
9 Main Contractors Preliminaries	Network Rail fees; budget provided by Techlift	1	item	5,000.00	5,000
9 Main Contractors Preliminaries	Application to GMPTE / Metrolink; allow 2 days of Specialist Consultant time	2.00	days	1,000.00	2,000
9 Main Contractors Preliminaries	GMPTE / Metrolink fees; budget provided by Techlift	1	item	5,000.00	5,000
9 Main Contractors Preliminaries	Main contractor site management, banksman, design management, waste management, insurances and contractor coordination	645,084	%	7.5%	48,381
9 Main Contractors Preliminaries	Temporary facilities during the works including WCs and mess facilities on lifting days (including set up and removal for each lift)	2	Nr	1,000.00	2,000
10 Main Contractors OH&P					
10 Main Contractors OH&P	Allowance for main contractor overheads and profit	695,466	%	10%	69,547
11 Design Fees					

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Element	Item	Quantity	Unit	Rate	Total
11 Design Fees	Allowance for design fees on project costs	765,012.30	%	12%	91,801
11 Design Fees	Allowance for survey costs	1.00	item	20,000.00	20,000
12 Other Development / Project Costs					
12 Other Development / Project Costs / Client Directs	None identified	1.00	item		0
13 Design & Construction Risks					
13 Design & Construction Risks	Allowance for project risk allowance	876,813.78	%	10%	87,681

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