TECHNICAL INVESTIGATION

CHAPTER **06**

TECHNICAL INVESTIGATION

introduction

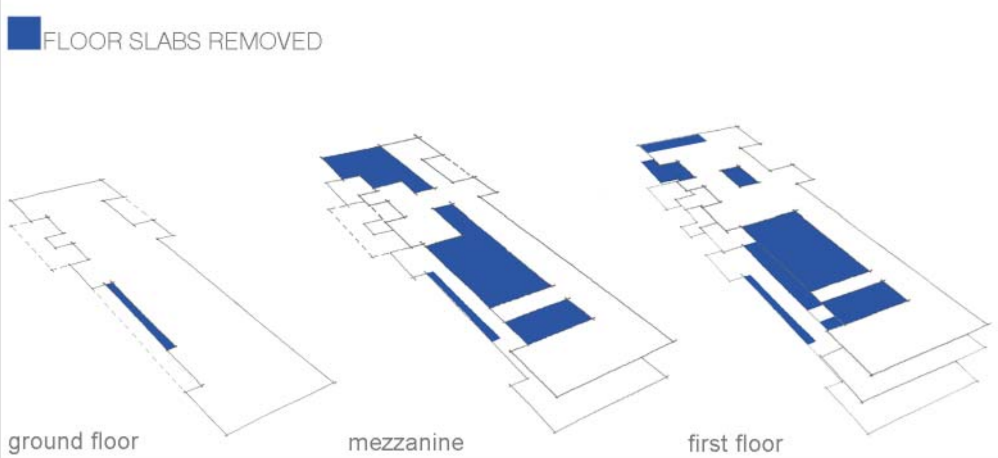
The efforts of *legibility between the lines* are only realised through the combination of the theoretical, design and technical investigations. The lines which promote phenomenal transparency are determined by material choices, fixings to the existing and legibility of form. The legibility of adaptation is refined by connections, finishes and maximising the users' exposure to the distinctive new work. Adaptation is considered an inevitability where considered design reveals the layers of meaning, the existing and the solution and therefore forms the focus of the investigation. In order to achieve volumetric variation and awareness of the 'everyday' environment, the process of construction must become apparent and responsive to developing an architecture of opportunity.

To *walk along a line...so often near falling* questions the destination experiences of the line and develops a hierarchy about the path through the building. The manipulation of the existing building, new structural interventions and efficiencies of services support the notion of walking along a line and enhance the 'everyday' as revealed entities.

adaptation

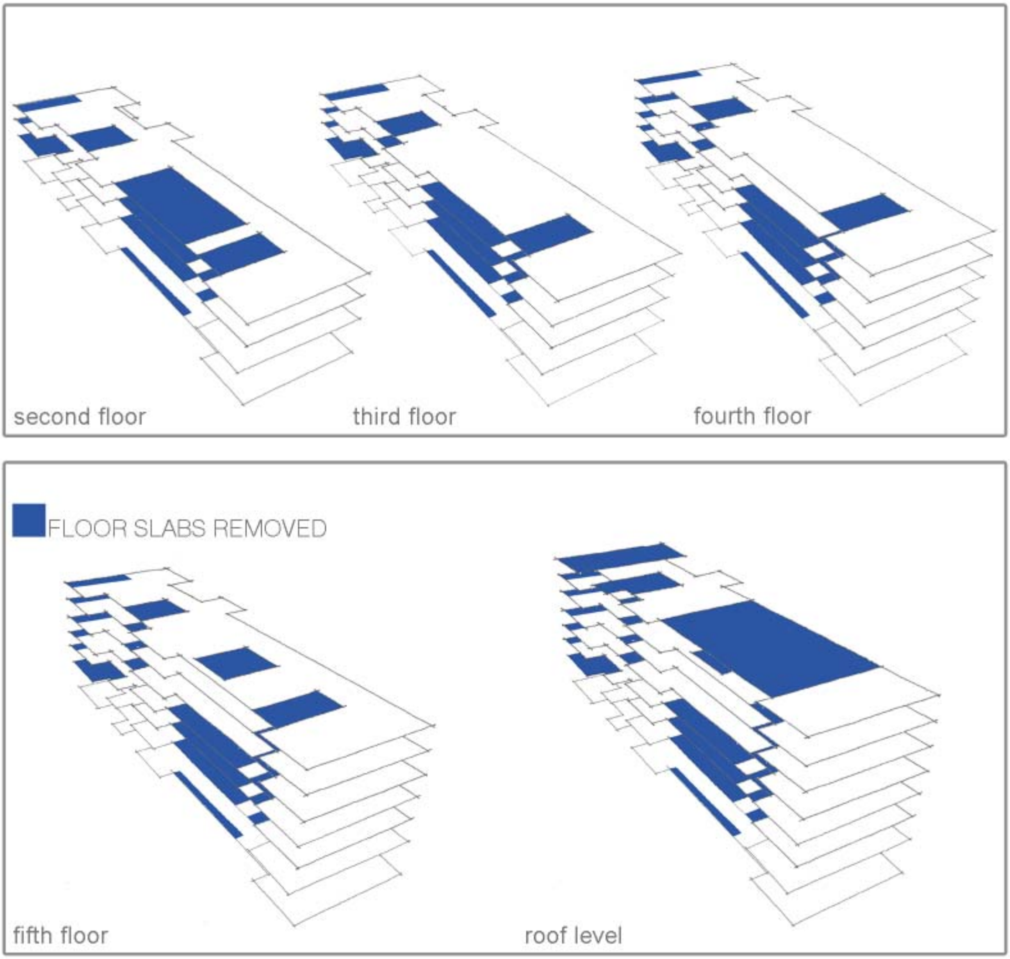
In three zones spread across the existing building, a series of beams and floor slabs are removed to create new volumes and vary the spatial dimensions. The first volume is the street front to Pretorius Street. The slab is cut away from the existing concrete columns by 2500mm to vary the facade conditions of the urban canyon, create literal layers of meaning and this cut away demands new facade and structural resolution, allowing for distinctive new character. The second volume is the Information Centre. In order to respond to the existing conditions in a feasible and economic manner, the slab is cut away between existing beams to reveal a slab edge which is incorporated into the new balustrade condition. The third major volume forms the college atrium, where the slabs and beams are cut away within the structural grid and the building envelope is extended. However, due to the reduced span of existing beams and the remaining slabs, new structure is required to support the floors. This is marked as distinctive new suspended columns to the existing slabs and new structure to the extended envelope.

6.01 FLOOR SLAB REMOVAL PER LEVEL



The final resolution of these adapted floor plates are projected in the roofscape. The existing roof slabs within the corresponding volumes and existing structural grid are removed in response to the new spatial and structural requirements.

The adaptation enhances the fabric of building within the central business district of Pretoria, allowing for a flexible spatial environment which acknowledges change as necessity.



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ADAPTATION OF THE PRINCIPAL FACADE

The process in which the new facade is constructed responds to maintain the structural integrity of the existing building by manipulating the existing from the ground floor upwards.

The existing first floor slab and beams are removed for the three western structural bays, leaving the remaining slab as the new mezzanine level. New 152 x 152 x 6mm hot dipped galvanised H-profile steel columns are then positioned 2500mm from the existing concrete columns in line with the existing 3500mm structural grid. The columns are bolted to new steel base plates and joints epoxied to the underside of the existing second floor slab. This floor slab is then broken back 2000mm from the existing concrete columns, leaving the reinforcing exposed, whereby the remainder of the slab is cut away to match the line of the new steel columns. New 200 x 90 x 6mm hot dipped galvanised C-profile steel beams are bolted to the new edge of the cut slab with the channel section exposed. In order to brace the existing concrete columns as a result of the slabs being cut away, new 200 x 90 x 6mm hot dipped galvanised C-profile steel beams must be positioned between the existing columns. Where the facade remains recessed from the existing, the new beams must be positioned at the same level. Where the new facade projects forward into the street, these beams must line up with the underside of the C-profile beams to the edge of the cut away slabs, thus forming an intermediary support for the new projecting floor slabs.

Steel columns are then positioned between the existing second and third floor slabs and the entire process is repeated for the full height of the building.

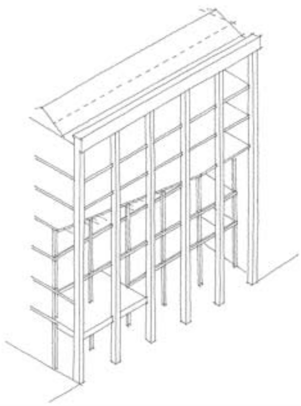
Once the new structure of the recessed facade is assembled, the steel frame of the projecting element can be bolted in place. This consists of 203 x 102 x 6mm hot dipped galvanised I-profile steel beams bolted to the existing concrete columns and welded to the new perpendicular beams and 100 x 100 x 4mm hot dipped galvanised RHS steel columns between these new beams. The steel frame must be assembled from its lowest point upwards for ease of access, bracing and scaffolding purposes. Permanent shuttering with a profile of 54mm is then laid between the assembled C-profile steel beams and temporary bracing put in place. The new 200mm deep concrete slab is then poured in place. The various glazing strategies can then be fitted in order to seal the building.

6.02 BEAMS REMOVED

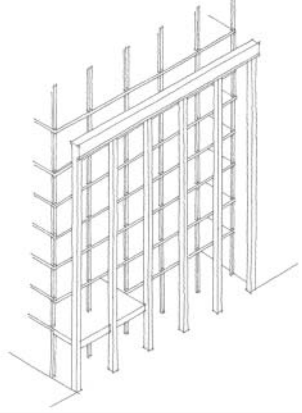
6.03 VOLUMES CREATED

6.04 EXISTING FACADE

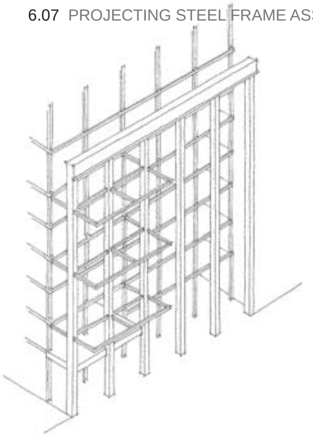
6.05 STEEL COLUMNS INSERTED. SLABS BROKEN BACK



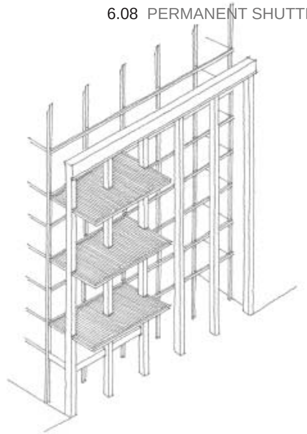
6.06 STEEL BEAMS TO SLAB EDGE.



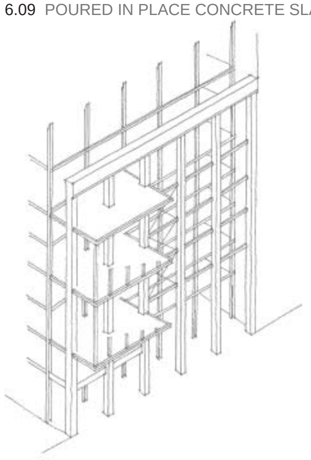
6.07 PROJECTING STEEL FRAME ASSEMBLED



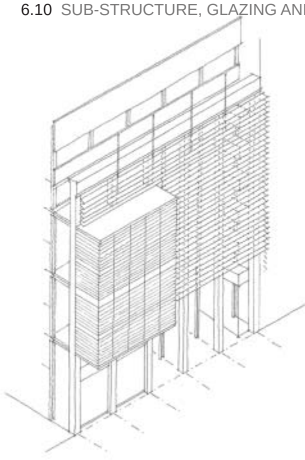
6.08 PERMANENT SHUTTERING LAID



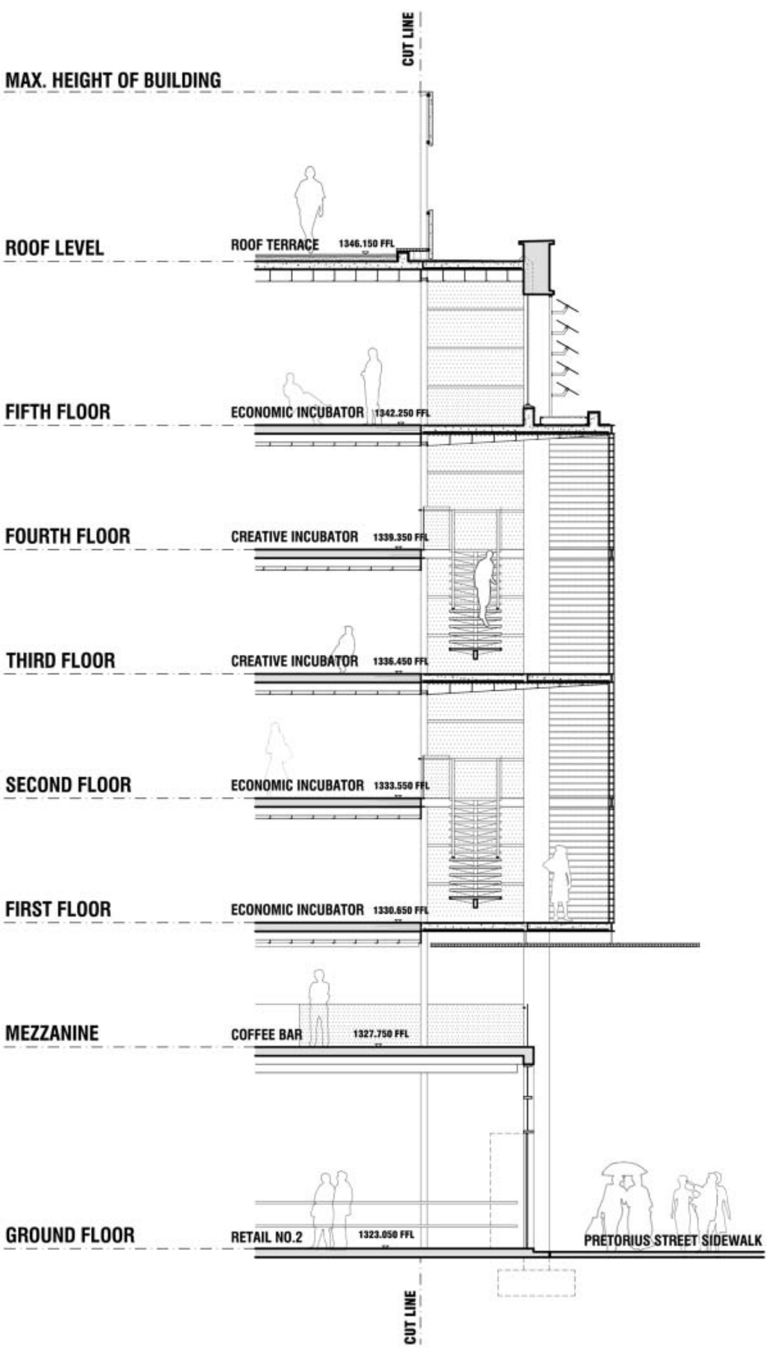
6.09 POURED IN PLACE CONCRETE SLABS CAST



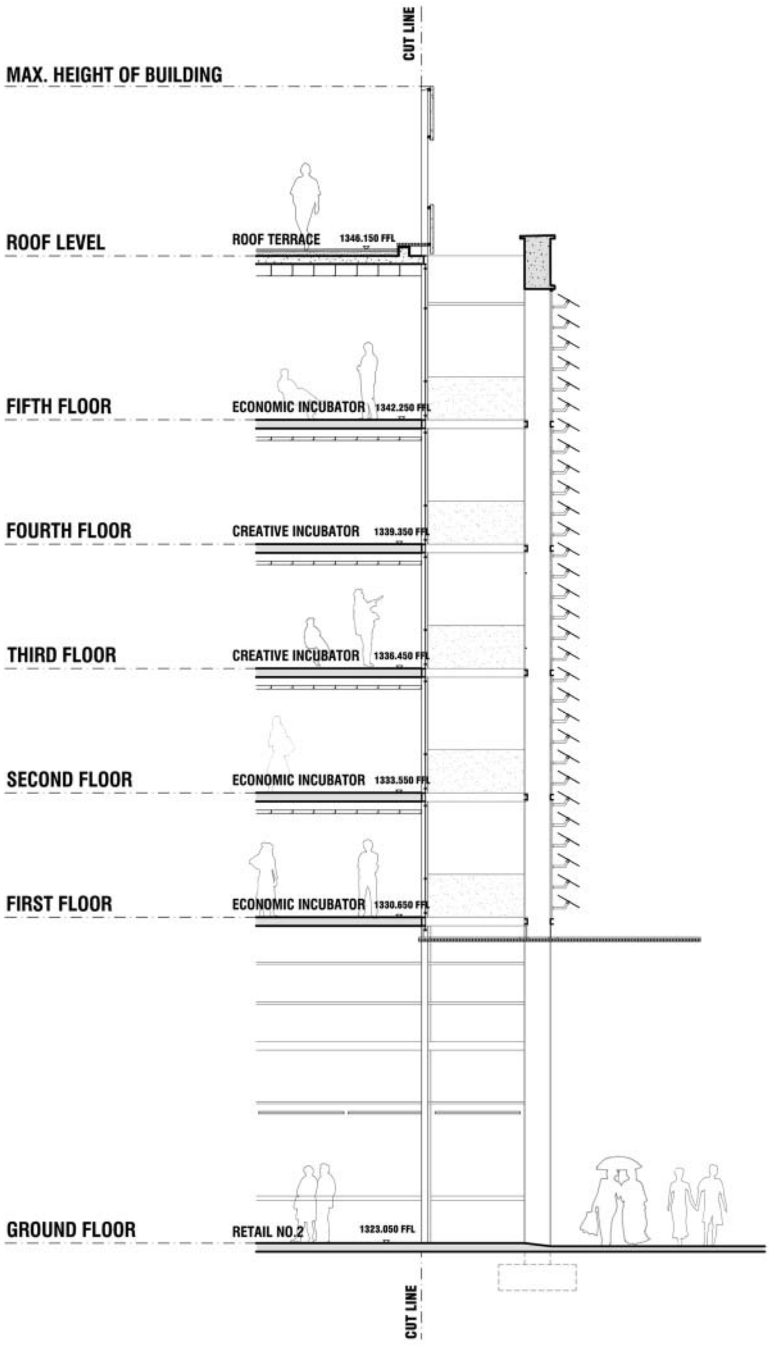
6.10 SUB-STRUCTURE, GLAZING AND FINISHING



6.11 STRIP SECTION. NEW PROJECTING FACADE



6.12 STRIP SECTION. NEW RECESSED FACADE



glazing strategy

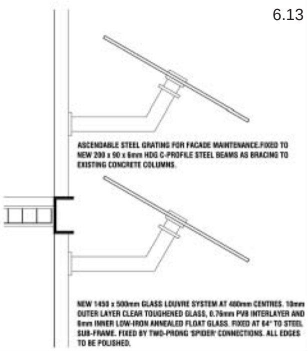
As the form projects in the street already, further projections of external solar control would decrease the legibility of form. Accordingly a double glazed solution is suggested, whereby the solar control is incorporated into the system. The 100 x 100 x 4mm hot dipped galvanised RHS steel columns form the structure for both the glazing and the solar control within the cavity. A Sealed Insulated Glazed Unit (SIGU) system is proposed, where the internal glazing panel could be removed if necessary in order to clean the internal faces of the glazing and the louvres. The system comprises an outer panel of 8mm clear toughened glass with a 120mm cavity and inner panel of 6mm clear toughened glass. The outer skin is flush glazing, fixed to the RHS steel columns with structural silicone and a silicone seal between glazing panels. The internal skin is fitted within an aluminium sub-frame and fixed to the inside of the RHS steel columns.

The solar control within the 120mm cavity is formed by a laminated bamboo grille. As the louvres will be exposed to direct sunlight and thermal variations, bamboo was chosen for its durability and increased product life span. The 75 x 22mm horizontal laminated louvres will be spaced at 150mm centres to provide shading to the internal office spaces whilst allowing views to Pretorius Street. The grille is fixed within the cavity to the RHS steel columns.

The glazing strategy of the new recessed facade is a single skin system, fitted within an aluminium sub-frame and fixed to the new 152 x 152mm H-profile steel columns. The glazing is a repetitive form varying between 6mm clear, translucent and opaque toughened glass panels for the full height of the facade. The 400mm high opaque panels are fitted in front of the existing floor slabs, 800mm high translucent panels are fitted above serving as privacy panels to the office environment and 1700mm high clear glass forms the top panel.

Projecting in front of the existing facade, a large scale glass louvre veil is fixed to a steel sub-frame, fixed in turn to the existing concrete columns. The fixing angle determined by the 64.2° summer sun angle, the veil serves as solar control to the offices as well as an aesthetic and transparency device. Fixed to the sub-frame with custom SHS steel spider fixings, the louvres are a glazed sandwich system comprising of a 10mm outer layer clear toughened glass, a 0.76mm PVB film and a 6mm inner layer of low-iron annealed float glass. The outer layer is acid etched with an abstract rendering, tracing the existing facade and all edges are to be polished.

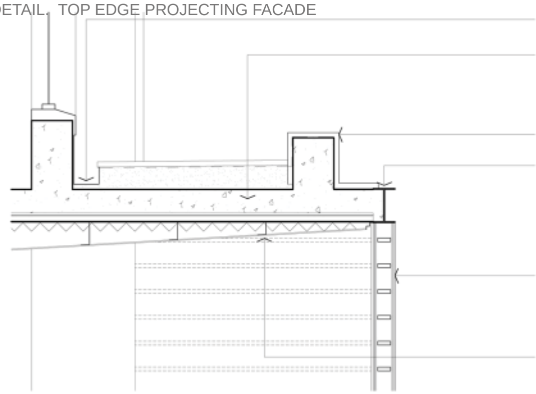
6.13 GLASS LOUVRE DETAIL
6.14 TIMBER GRILLE WITH GLAZING
6.15 GLAZING CONDITION VARIATIONS

6.13


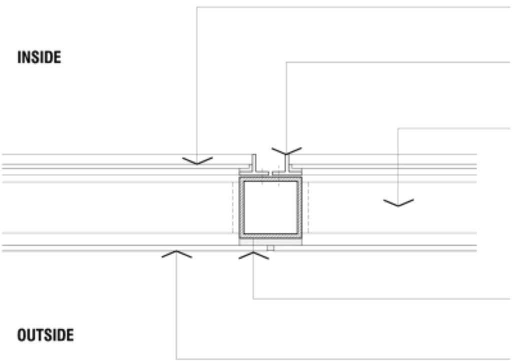
6.14


6.15

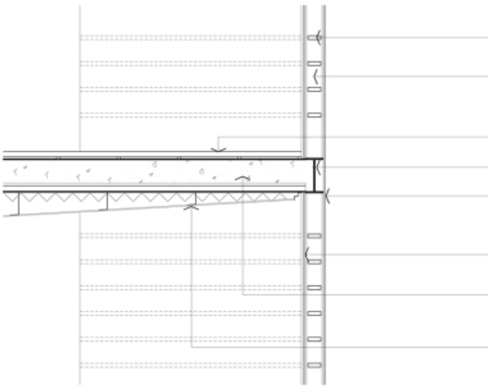

6.16 DETAIL. TOP EDGE PROJECTING FACADE



6.17 DETAIL. DOUBLE GLAZING CONNECTION IN PLAN



6.18 DETAIL. GLAZING TO SLAB IN PROJECTING FACADE



material palette in new connections

New 4300mm high aluminium framed glazed shopfronts are to be installed to the retail outlets on the ground floor. Clear safety glass is to be fitted within the white powder coated frames. The composition of the shopfront is detailed in 2700mm high bi-folding doors with two 750mm high equal panes above, the bottom of which is designated for advertising panels, which should be installed flush with the aluminium frame. No projecting signage will be allowed on the facades as an architecture of opportunity resists commodification.

As the existing first floor slab, which now forms the mezzanine level, is remotely exposed to the elements the existing tiles are to be removed and a new 30mm layer of polished concrete screed mixed with a water resistant sealant is to be laid to fall. New full bore outlets, integrated into the permanent concrete display units, channel the water to ground level. The slab is protected by the 1500mm projecting structure as well as the new sidewalk canopy, which extends by 2500mm from the existing facade line. This 4000 x 2700 x 50mm high painted 'Mentis' grid is fixed within a 100 x 75 x 4mm hot dipped galvanised steel angle frame, suspended from the new steel structure above by 16mm diam. stainless steel droppers. Associated legibility as seen by the pedestrian is a layered and transparent experience and reads as the new canopy, the underside of the projecting slab with exposed shuttering and the new steel structure.

In order to clearly identify the legibility between the lines of the new work and existing conditions, the interior detailing becomes important. In the offices where new slabs extend from the cut away line, the floor finishes are adapted to mark the distinctive new work. The existing carpeted floor finish which is in a poor condition is removed and a 40mm level polished concrete screed is laid. The floor finish to the new poured in place concrete floor slab is 30mm high timber flooring on 15mm high battens. Above the new 200 x 90 x 6mm C-profile beams, the timber is laid on a 10mm high neoprene strip for expansion.

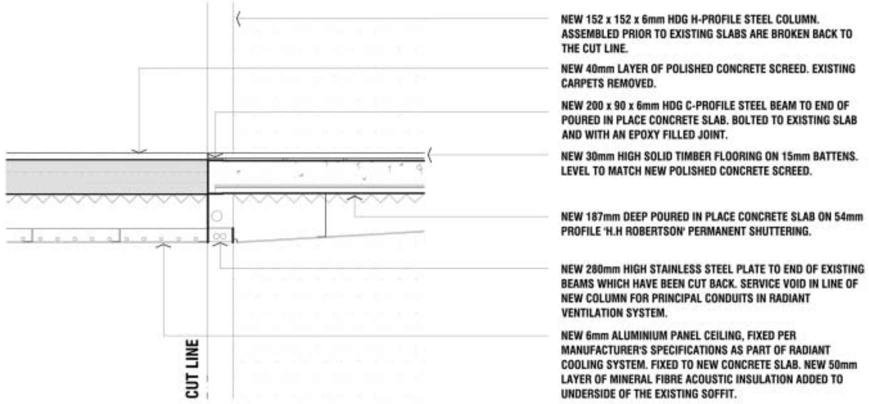
The ceiling detail also marks the junction between new and old. The existing plasterboard ceiling at 2400mm above finished floor level is cut back to the new line of the beams. A steel plate is fixed to the edge of the cut away concrete beams and the threshold marked by a recessed ceiling void for electrical conduits, lighting and radiant ventilation pipes. A new angled plasterboard ceiling is then fixed to the underside of the steel structure for legibility of the external form.

6.19 FLOOR CONNECTION

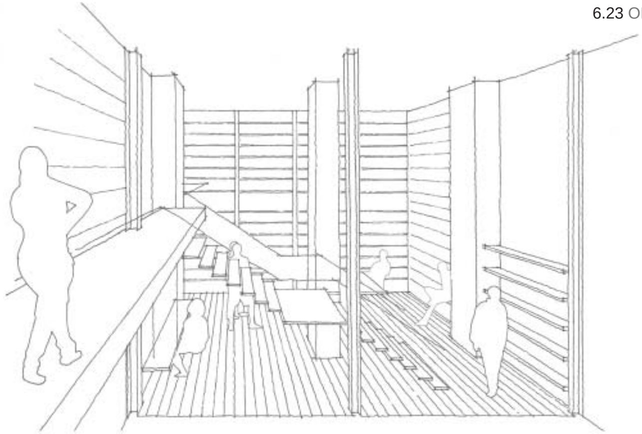
6.20 TIMBER FLOOR

6.21 MENTIS GRATING

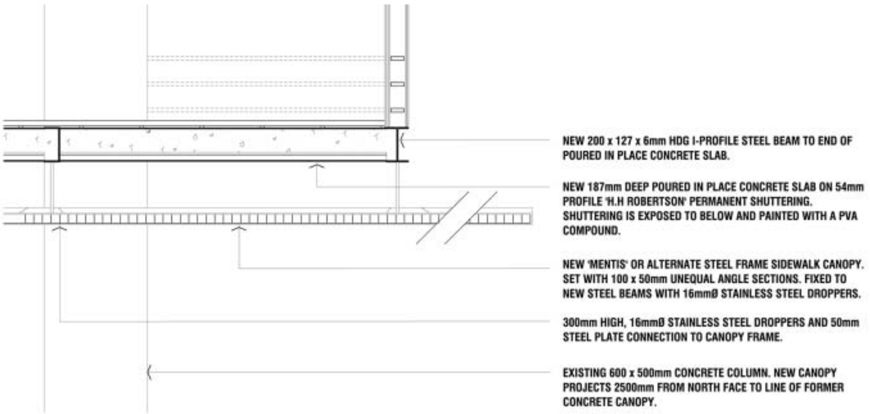
6.22 DETAIL. EXTENDING THE FLOOR SLAB BEYOND THE CUT LINE



6.23 OFFICE PERSPECTIVE



6.24 DETAIL. NEW SIDEWALK CANOPY



roof connection

The adaptation of the facade and improvement of the spatial conditions of the offices requires the removal of the existing timber truss roof which covers the first structural bay. The floor to soffit height is increased from 2700mm to 3600mm and a new poured in place concrete slab is proposed to connect back to the existing concrete structure. A new screed which is laid to fall, channels the rainwater to a shallow gutter and the existing full bore system, which formerly managed water off the double pitched roof. The existing concrete roof beam, entablature, downpipes, coping and flagpoles are all maintained, such that new roof structure is still hidden behind the layers of the facade of the building. The opportunity lies in the use of the roof, as a revealed element for functional and service use.

The resolution of the roof terrace is the apex of the new steel columns which support the new facade of the building. The 152 x 152 x 6mm hot dipped galvanised H-profile steel columns are fixed to the new roof slab and extend for 4000mm above slab level. 50 x 50mm horizontal steel purlins are fixed to the north side of the new steel columns and 75mm thick white rough-textured pre-cast concrete facade panels are fixed with lugs to the purlins. These panels form both the balustrade for the roof terrace and the skyline expression of the new facade. The threshold between the up-stand and the new pre-cast panel screen as a viewpoint to the existing line of the facade is proposed as a 50mm thick 'Mentis' grate to form a viewing platform of the city centre.

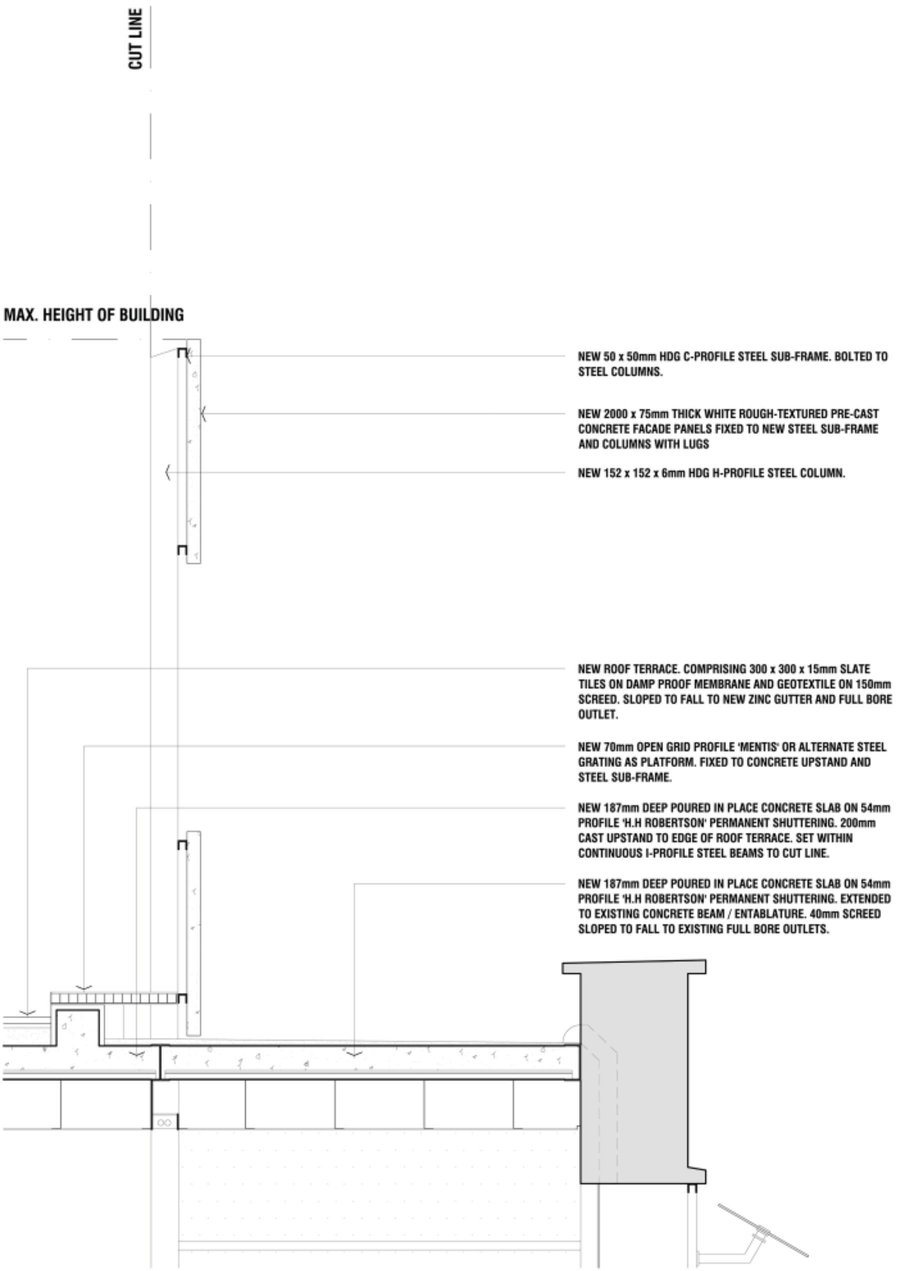
The floor surface of the roof terrace is sloped to fall to a new 150 x 75mm rectangular profile aluminium gutter and the existing full bore outlets. The new roof slab casts 200mm high up-stands at the perimeter of the slab and accessible floor surface is accordingly built up above the new 200mm deep poured in place concrete slab. Composed of a 100mm thick concrete screed (at its highest point) laid to fall, with a double bitumen layer above and 300 x 300 x 15mm thick sealed slate tiles with flush cement grouting as the floor finish, the surface increases the slab thickness as a thermal barrier to the office space below. This new roof slab composition is repeated above the Information Centre, where the roof slab is raised by 1800mm above the original roof slab level to allow light into the six storey void below. Slate is used for all habitable roof surfaces and is a locally available material.


6.25 SLATE TILES


6.26 WHITE ROUGH-TEXTURED PRE-CAST CONCRETE PANEL


6.27 EXISTING SURFACES

6.28 DETAIL. ROOF TERRACE



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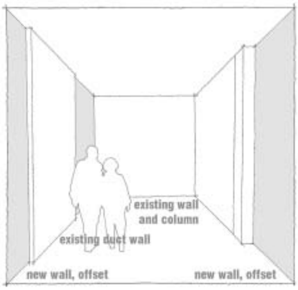

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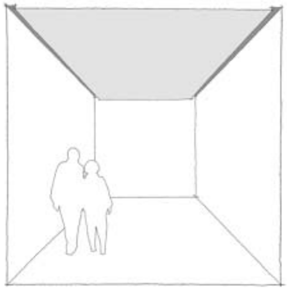

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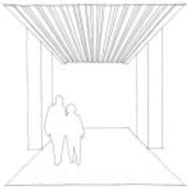
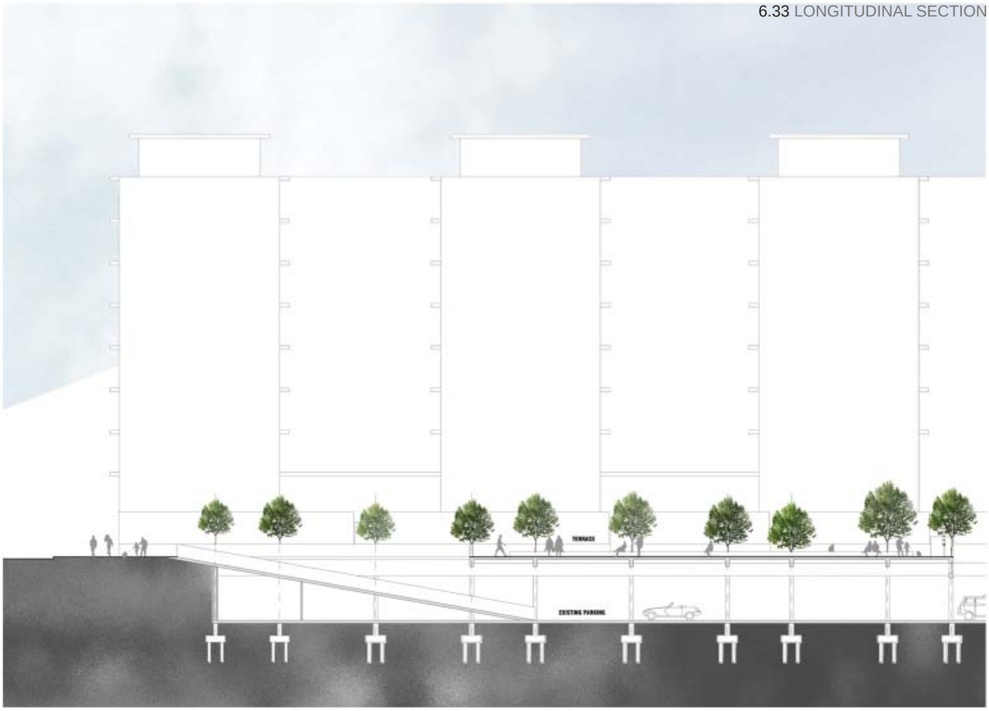


6.29 LEGIBILITY OF NEW WALLS AGAINST EXISTING
6.30 LEGIBILITY OF FLOORS
6.31 LEGIBILITY OF CEILINGS
6.32 LEGIBILITY OF MATERIALS - EXPOSED SHUTTERING
6.33 LONGITUDINAL SECTION

6.33 LONGITUDINAL SECTION



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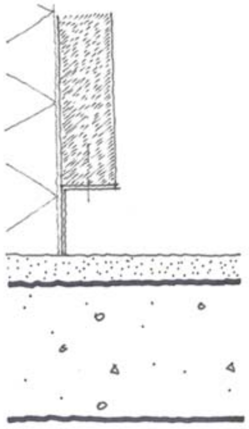

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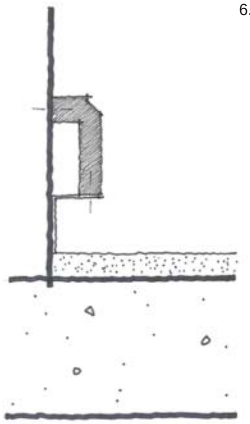

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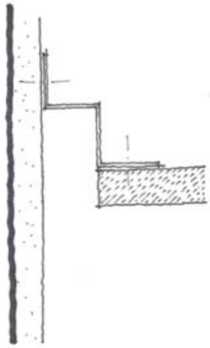
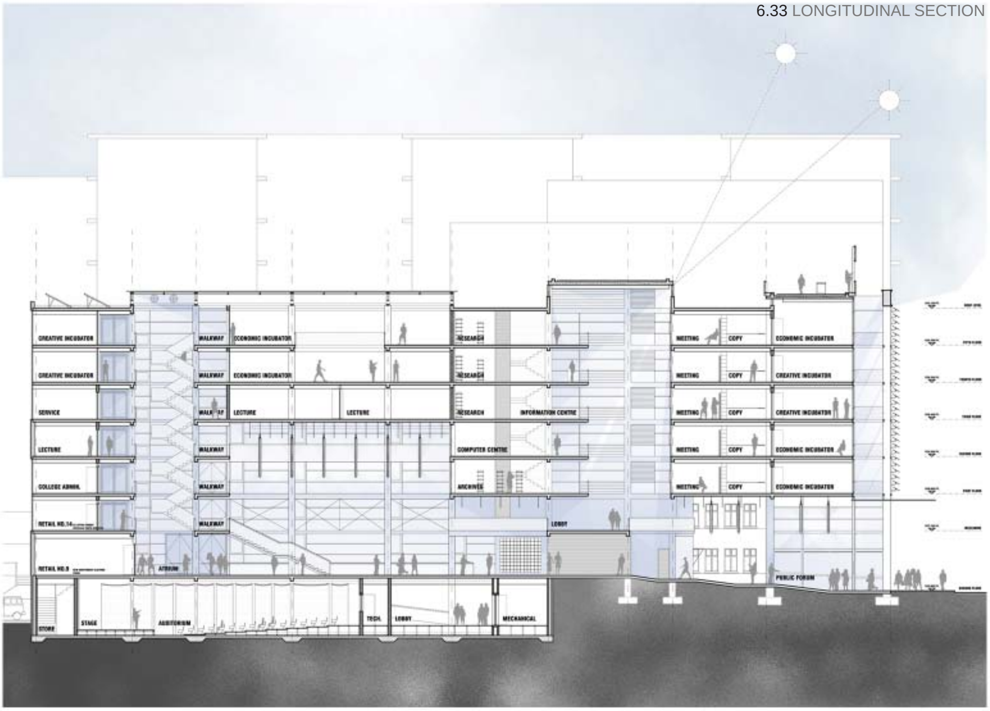


6.34 SKETCH SKIRTING DETAIL. NEW FLOOR SURFACE MEETS NEW WALL
6.35 SKETCH SKIRTING DETAIL. NEW FLOOR SURFCE MEETS EX. WALL
6.36 SKETCH CORNICE DETAIL

6.33 LONGITUDINAL SECTION



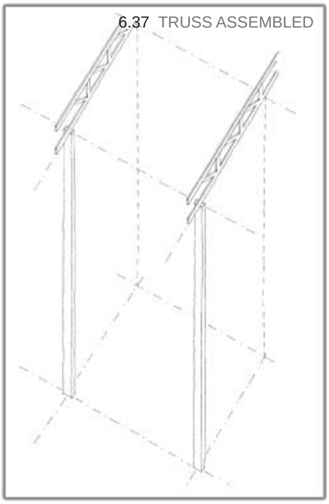
ADAPTATION OF THE COLLEGE ATRIUM

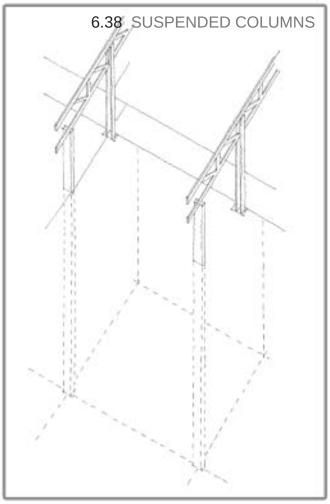
The process of adaptation in the college atrium works differently from the principal facade. Firstly the process will be safer and the waste collection more manageable for construction in terms of pedestrians and site size, as the atrium can be closed off during construction whereas the front facade has a continually active edge. This system considers the existing slabs in terms of the stationary loads and a means of support and progresses from the top downwards.

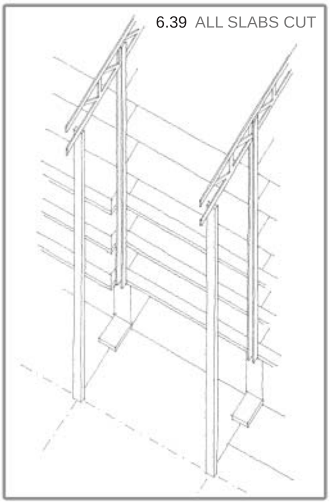
Before the slabs are broken back and beams cut away, the supports for the remaining slabs need to be assembled. As an auditorium is proposed for the existing basement, columns which run through the ground floor slab and basement are undesirable. Accordingly the columns which will support the remaining slabs need to be suspended. The first phase of adaptation requires that the existing concrete roof slab be removed for the structural bays concerned. A new 850mm deep steel truss is formed of 230 x 90 x 6mm hot dipped galvanised RHS steel top and bottom chords with 100 x 50 x 6mm RHS steel diagonal bracing members, where all junctions are bolted with the use of cleats. This truss is assembled off site and positioned on top of the existing 500 x 230mm reinforced concrete columns by crane. The bracing positioning is determined by the loading moments and position of the new suspended columns.

Before the fifth floor slab and beams are removed, temporary bracing should be installed beneath the slab to support the remaining floor slab. A custom steel end plate is be fixed to the end of the slab and the void filled with epoxy grout. Subsequently the 2 x 230 x 75 x 6mm hot dipped galvanised C-profile steel suspended columns are bolted to the truss and steel end plate. The process of removing the slabs and beams continues downwards until the columns are fixed to the end plates of the new mezzanine level beams. A covering base plate should then be fixed to the underside of the suspended columns and the steel coated with a fire retardant paint. The remaining revealed existing structure should be plastered where necessary and painted white.

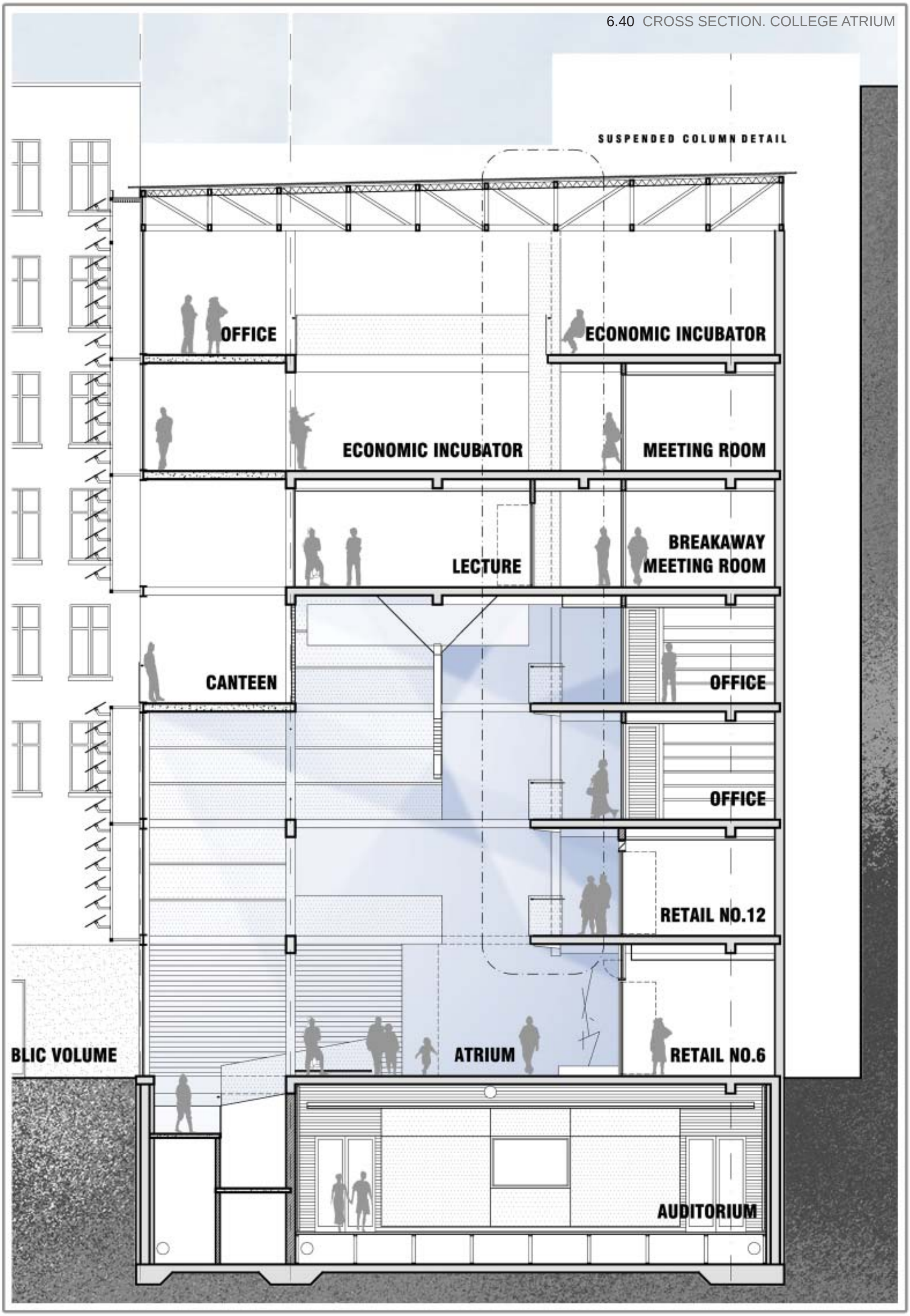
To finish the new edge of the slabs, two aluminium channel sections are fixed to the new cut away edge. This is in turn fixed to a 250mm high white opaque glazed panel. The upper channel is used as a track in conjunction with neoprene setting blocks to support a 1000mm clear toughened safety glass balustrade which runs for the length of the atrium void. A 30mm RHS stainless steel flat section forms the handrail and is fixed to the glazing.


6.37 TRUSS ASSEMBLED


6.38 SUSPENDED COLUMNS


6.39 ALL SLABS CUT

6.40 CROSS SECTION. COLLEGE ATRIUM



glazing strategy

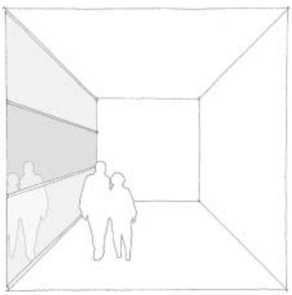
The college atrium is one of the largest volumetric variances in the project and constitutes the element of surprise; therefore the spatial quality and material choices are important to convey the new intervention. For the entire atrium the western facade is opened up to maximise lighting conditions. The new steel structure comprises of 254 x 254 x 6mm hot dipped galvanised H-profile steel columns with 254 x 102 x 6mm hot dipped galvanised I-profile steel beams bolted to the columns. A charcoal powder coated aluminium frame sits within the steel structure and fixed and openable clear toughened glass panels within the frame. The western facade is sheltered from extreme late afternoon sun by the neighbouring Wachthuis and Southern Life Association buildings. However, the facade will be exposed to direct sunlight and accordingly a louvreed system is proposed.

A steel sub-frame of 100 x 50mm and 50 x 50mm C-profile steel is bolted to the new steel columns and beams. Using the same louvre system and architectural language as the principal facade, custom 30mm SHS steel spider fixings are fixed to the sub-frame and to the large scale glass louvres. However, the louvres on the west are primarily for shading and therefore a translucent toughened safety glass is proposed.

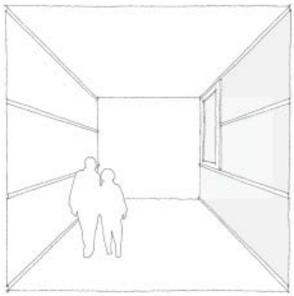
As a result of the high level openings within the atrium which are inaccessible for manual opening, the openings will be motorised and set to a thermal sensor system working in conjunction with the displacement ventilation system. The pivoting doors which continue the route out of 239 Pretorius Street towards Polley's Arcade or Schoeman Street will be self closing and set between a structural bay of the new steel columns. The legibility of openings within the atrium is defined by the use of timber within the opening's frame. The pivoting doors are solid timber, a bamboo laminate to match the language of the new facade interventions and the window openings are edged with timber as distinctive from fixed glazed panels.

All new balustrades within the atrium are glazed and internal partitions between circulation routes and offices and meeting spaces will also be glazed. Divided into three panels the bottom panel will be clear toughened safety glass, where as the top two panels are standard float glass, with the centre panel translucent for relative privacy into the offices. Pale blue coloured glazing is used to define the wet cores that border the atrium.

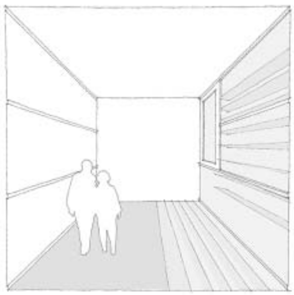
6.41 CLEAR AND TRANSLUCENT GLASS IN OFFICE FENESTRATION



6.42 LEGIBILITY-OPENING SECTIONS

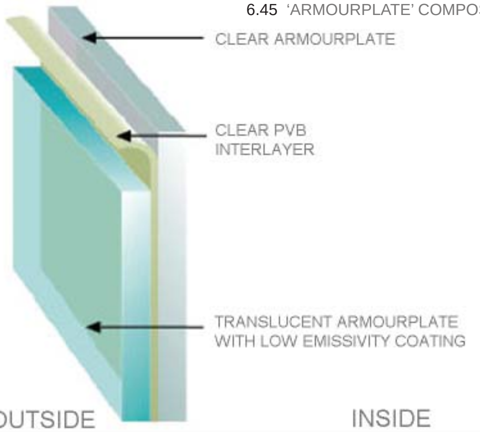


6.43 GLASS LOUVRES AND SHADOWS



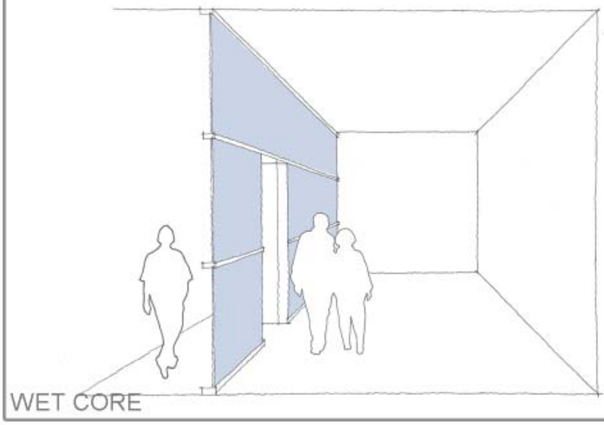
6.44 GLASS LAYERING EFFECT

6.45 'ARMOURPLATE' COMPOSITION

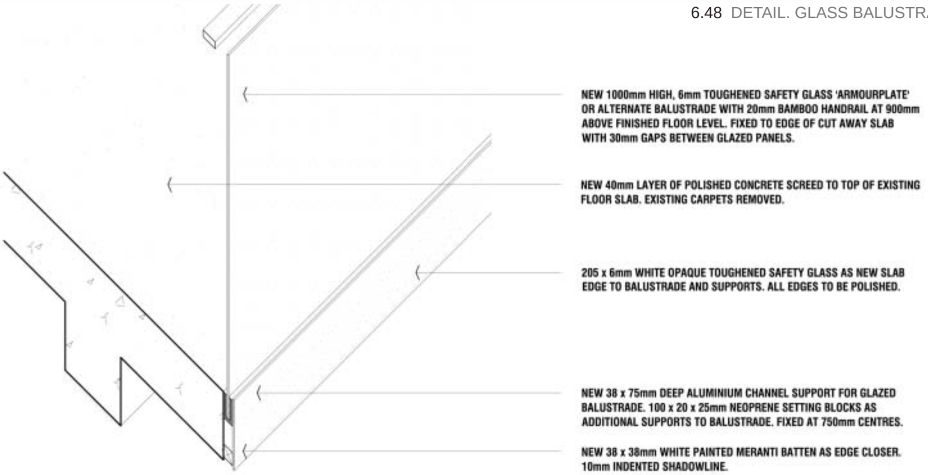


6.46 'COLOURVUE' GLAZING

6.47 LEGIBILITY OF WET CORES THROUGH COLOURED GLAZING



6.48 DETAIL. GLASS BALUSTRADE



material palette in tracing the existing

In order to make the arcade spaces inviting and elude that the route continues through the building, the standard darkness of the depths of the block should be anomalised. The new glazed facade provides ample lighting to the atrium and the colour palette of materials aims to continue this lightness while adding to the element of surprise. To trace the meaning of the adaptation and existing conditions the floor surface of the atrium distinguishes between the old line of the arcade and the new atrium space. To accommodate daily pedestrian traffic the ground floor will be tiled with porcelain tiles. The old line of the arcade will be marked with a tile of varying hue compared to the constant new tiling conditions. A variety of tile sizes are used to create a patterned floorscape, which include 300 x 300mm, 300 x 900mm, 300 x 1200mm and 600 x 600mm tiles. The pattern is influenced by the longevity of Norman Eaton's paving in Polley's Arcade and the paving in Koedoe and Burlington Arcades.

The reflective plane, which impacts to walk along a line in the 'sky' dimension, traces the line of the old arcade on the ceiling level. Vertical lighting tubes within a steel sub-frame are suspended from the underside of the new third floor slab. Spaced at 2500mm centres, the fluorescent tubes and reflective light shelves provide supplementary lighting for the entire atrium space if required during the day and at night.

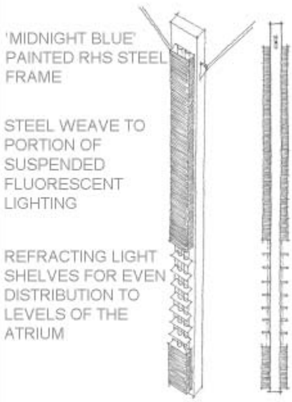
In addition to the suspended lighting, the legibility of new interventions is exposed at ceiling level. The ducts for the new mechanical ventilation system will be exposed to the pedestrians moving through the arcade system as the soffit will form the hard surface. A steel sub-frame suspended from the existing concrete slab and fixed to the existing concrete columns will support an intermediary layer of 1500mm high coloured fabric banners. The variance of spatial dimensions and material surfaces between the new volumes develops the concept of programmatic legibilities, to walk along a line and the continuation of associated layers of meaning.

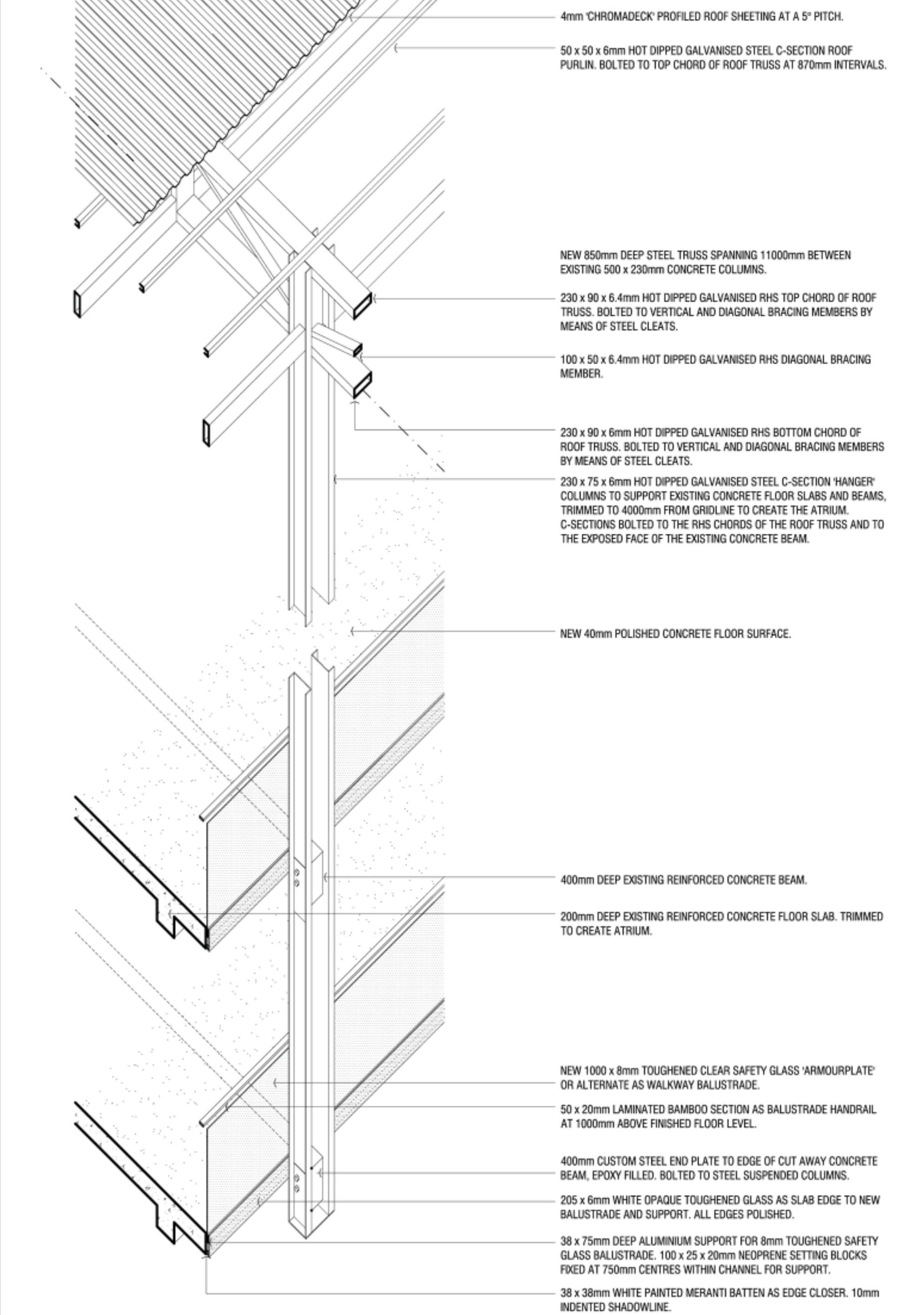
The circulation within the space is an emphasized element. An internal glazing system between the existing concrete columns reveals the new service elevator which runs the full height of the building. The principal staircase of the college atrium which is visible for its full height is supported by a single RHS steel stringer and has laminated timber treads and open risers.

6.49 FABRIC CEILING

6.50 PORCELAIN TILES

6.51 SUSPENDED LIGHTING





6.52 DETAIL. SUSPENDED COLUMN SYSTEM

VENTILATION STRATEGY

The adaptation responds to the existing conditions of the building and the context. The office environment demands flexibility and in conjunction with the new volumes and office spaces created, a variety of ventilation systems, suited to specific zones of the building are proposed. The existing building has a typical 2700mm floor to soffit height on the upper floors which does not allow for a traditional mechanical ventilation system, therefore the strategy responds to a building which was not originally designed for long term flexibility.

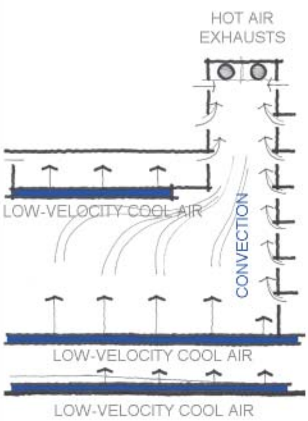
The available duct space as a result of the existing volumes is below the slabs and in consideration of the new intervention, is ideal for ventilating from below into the high traffic spaces. A displacement ventilation system is chosen as a result of these existing conditions. The system is more economical than traditional air-conditioning as it doesn't require energy to recycle the air three times daily. Displacement ventilation introduces cool air into the spaces at low velocities through floor mounted diffusers which are individually controllable. More successful in larger volumes, the system lowers running costs as it uses fresh air which moves through the building once, has low noise generation and improves thermal comfort as a means of convection.

The mechanical plant room will be located in the basement with fresh air inlets provided at high level to the eastern facade of the building and at ground level next to the Southern Life Building. Rainwater from the roofs is collected, bottled in recycled glass bottles and stored in a tank through which the fresh air passes. The plant then pressurises the air into the system and distributes the cool air through ducts under the floor surfaces. A dedicated mechanical ventilation service duct allows for vertical ducting within the building. The auditorium, college atrium and associated retail outlets on ground and mezzanine floor, information centre and lecture venues on the third floor are provided with cool air in this system. The diffusers are integrated into the patterned floorscape and are suitable in pedestrian traffic zones. By means of convection and the stack effect, the hot air rises out of the college atrium to exhausts in the new roof volume. These exhausts would also be manually openable. Displacement ventilation is a successful closed system, however motorised openings are provided in the college atrium to introduce cool night air to the space for air mixing and quality. These openings also conform to the national building regulations for smoke exhausts in the event of fire. Hot air which is released within the mechanical plant room is exhausted through a new duct on the eastern edge of the building.

6.53 DISPLACEMENT PRINCIPLE

6.54 DISPLACEMENT DIFFUSER

6.55 ATRIUM VENTILATION



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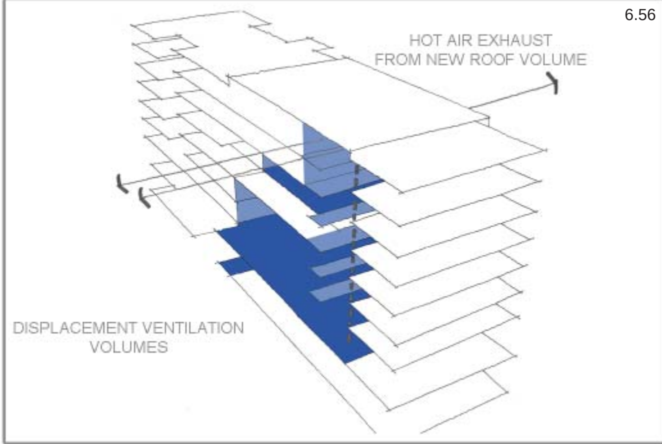

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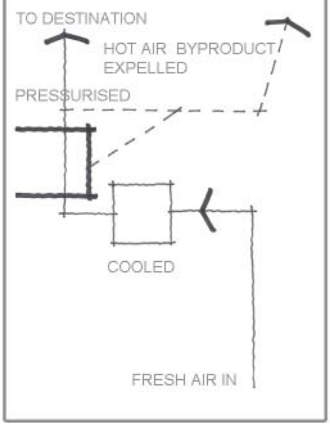

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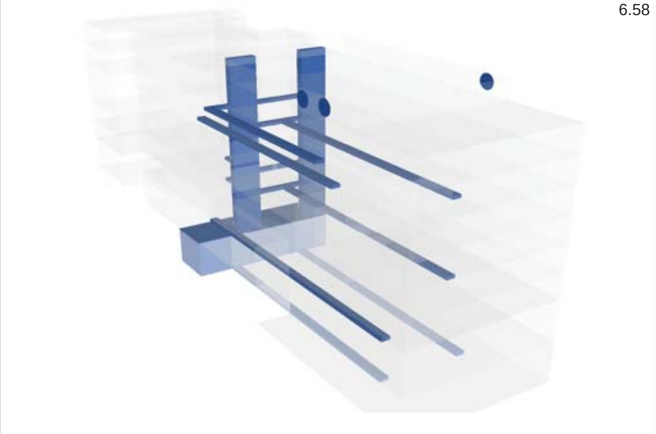

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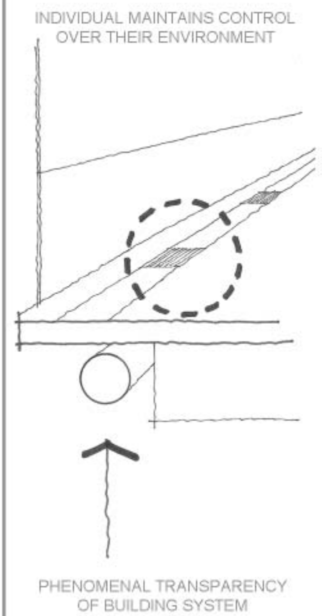

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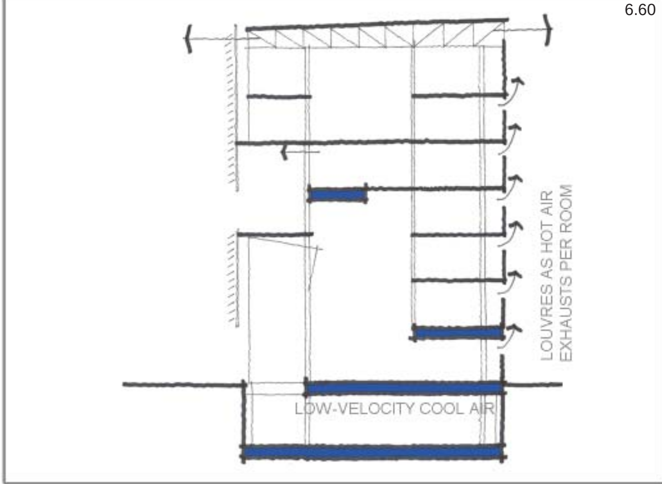


6.56 LOCATION OF DISPLACEMENT VENTILATION WITHIN INTERVENTION
6.57 SYSTEM IMPLEMENTATION PRINCIPLE
6.58 VENTILATION DUCTING
6.59 LEGIBILITY OF THE SYSTEM
6.60 CROSS SECTION VENTILATION

radiant cooling, heating and natural ventilation

As the low floor to soffit height remains within the office and upper storeys of the college environment, displacement ventilation is not a viable option here. Therefore a combination of radiant ventilation panels and cross ventilation is proposed to reduce the heat gains supplied by electrical equipment and people per space occupancy.

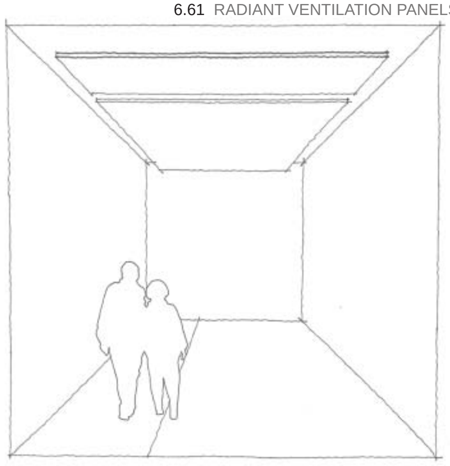
Radiant cooling works on the principle of distributing chilled water through a series of copper pipes which cool the large aluminium ceiling panels and accordingly the air around it. The process of convection then allows the cool air to be distributed throughout the space. In combination will cross ventilation, the system becomes more efficient as the cool air is more successfully circulated within the space and allows individuals greater control of their immediate climate. The intervention proposes that the temperature be maintained at approximately 22°, to reduce the energy consumption required to chill the water. As the hot air naturally rises in the space, the radiant ceiling panels absorb the heat. Larger ceiling panels are more effective as they reduce the risk of condensation occurring.

Similarly the heating of the office spaces and smaller college facilities demonstrate the distribution of hot water through the copper pipes, thus heating the air around the panel. Once the panel has reached the desired temperature, the water temperature is lowered and stabilised to again reduce energy requirements. The Thermasail© Radiant Conditioning Sail is this flexible ceiling panel system which can be adapted to suit the design aesthetics of the space. Colour, size, thickness, edge conditions and perforation are all adaptable features of the sails.

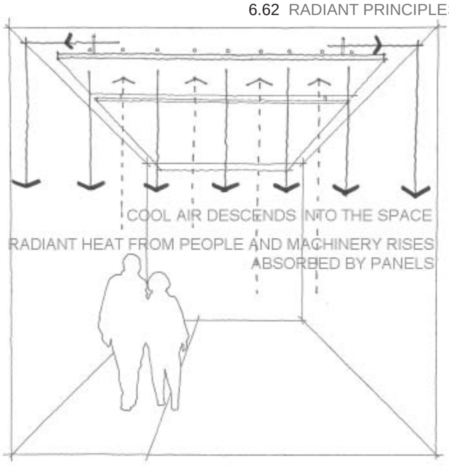
A chiller plant is required for this system and would be housed in the existing basement. Stormwater off the exposed concrete aggregate surfacing of the southern portion of the site would be collected, filtered and stored in tanks in the basement. The copper pipes would then be fed through the tanks and the water heated or cooled per demand.

Servicing and installation of equipment for the mechanical plant room in the displacement and radiant ventilation systems is available by a 1700mm wide pedestrian ramp as well as a new service elevator which has access to the basement. A cavity wall system with acoustic insulation within allows for noise reduction from the plant room into the public volumes.

6.61 RADIANT VENTILATION PANELS



6.62 RADIANT PRINCIPLES



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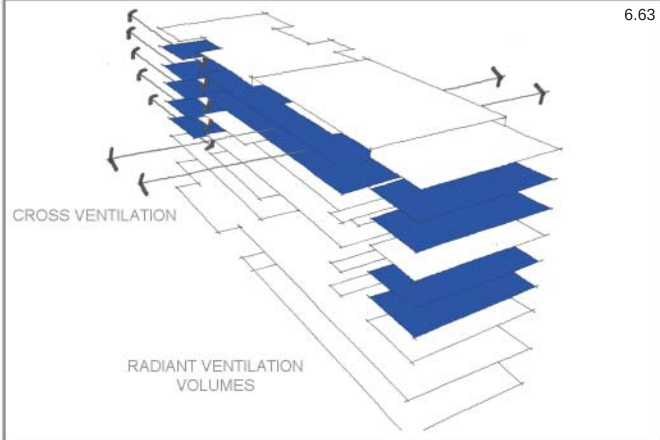

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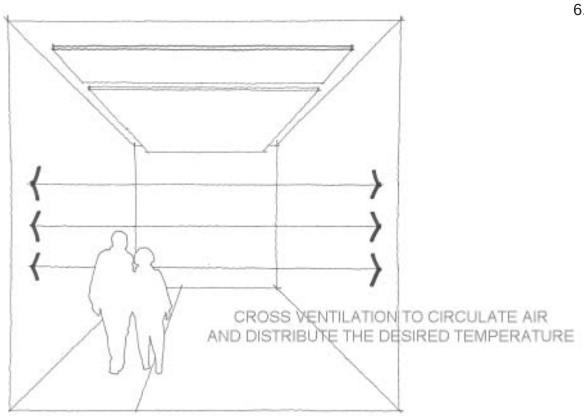
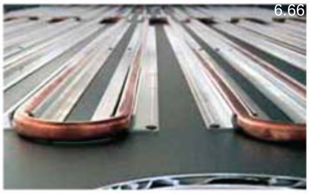


6.63 LOCATION OF RADIANT VENTILATION WITHIN INTERVENTION
6.64 INSTALLATION PROCESS
6.65 RADIANT AND CROSS VENTILATION
6.66 COPPER PIPES ON PANELS
6.67 HUGO BOSS APPLICATION
6.68 HUGO BOSS OFFICE SPACE

6.66



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6.68

SERVICES

energy

To address the energy footprint that the new intervention adds to the building in terms of larger scaled venues, new movement systems, motorised openings and the construction process itself a system of photo-voltaic panels is proposed. Located on the roof at the southern edge of the building to maximise direct sunlight hours, a series of 1000 x 2200mm photo-voltaic panels are fixed at 27° for optimum solar harnessing potential and set with an aluminium frame. The battery storage is located on the third floor of the building directly in line with the photo-voltaics on the roof. This is for energy efficiency in the transfer between receptor and storage and for ease of installation. The battery store is accessible and manageable via stairs and the service lift for movement of equipment if necessary. A vertical duct the full height of the building is dedicated to electrical services in combination with the 300mm ceiling voids.

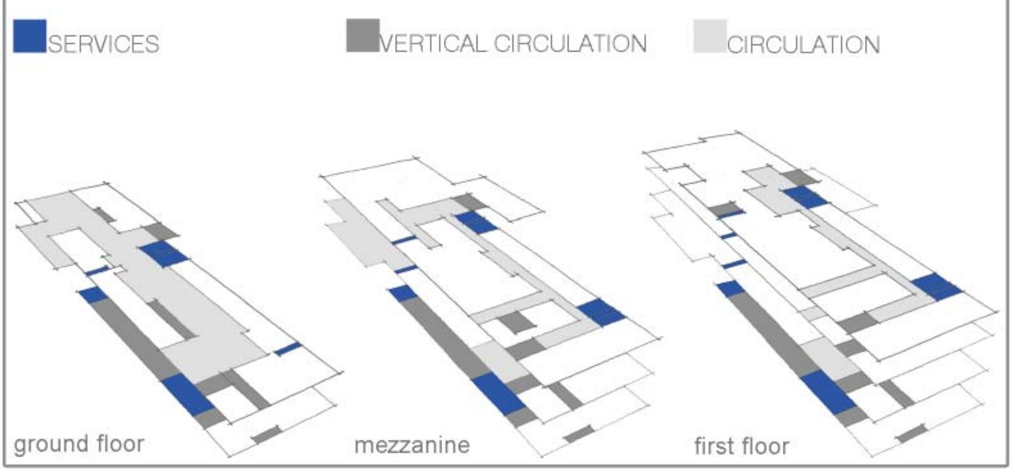
The existing provision of telecommunications will be expanded upon in order to update and service the shared facilities network for the start-up office spaces. This includes internet connections and a minimum of three telephone lines per network.

water

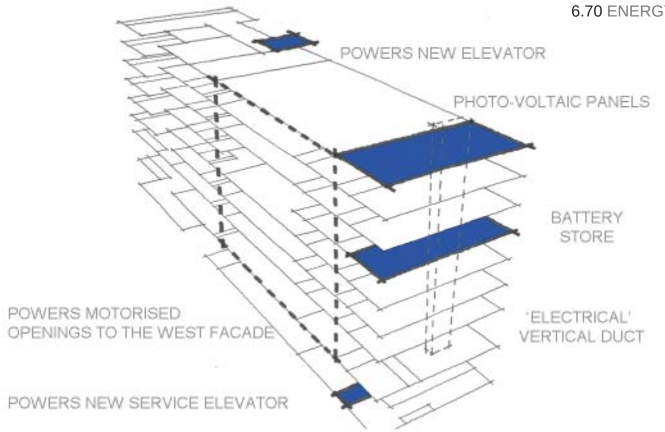
The formalisation of the open spaces responds to existing conditions. As a result the drainage is co-ordinated with existing storm water drains and connections determined by topography to Pretorius Street. A bypass system which services the requirements of the chiller plant used in the radiant ventilation process is proposed, such that on a bi-monthly schedule (during the rainy season of October to March) the tanks which store water for the ventilation process are emptied into the municipal system and the tanks re-filled with storm water off the open site.

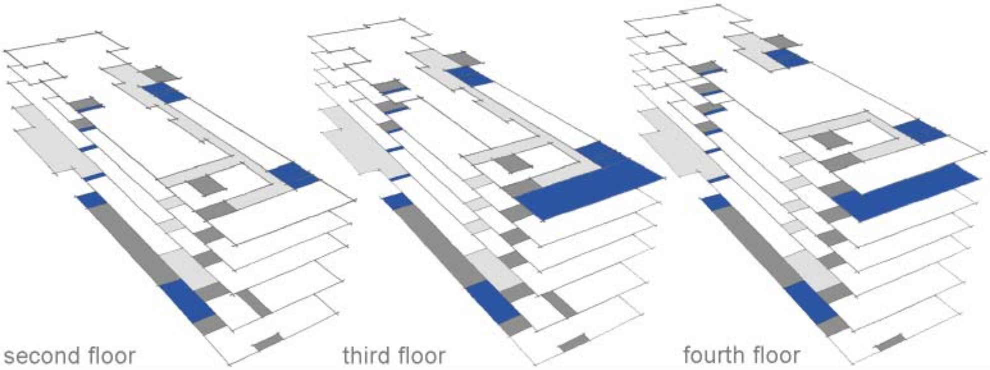
The existing water reticulation system of the building is maintained in addition to the consolidation of the wet cores. New plumbing work will be required within the existing wet services vertical duct as the principal gents bathrooms move to the same core. A refreshment counter at the edge of this core which is part of the shared network facilities for the start-up office spaces will also require a water connection.

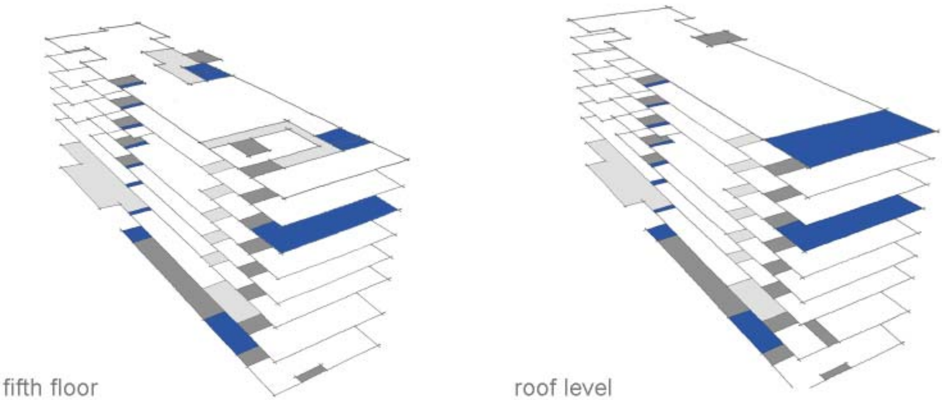
6.69 SERVICES AND CIRCULATION GUIDE PER FLOOR



6.70 ENERGY SYSTEM LOCALITY







refuse

The existing retail outlets on the ground floor of the arcade do not have dedicated external refuse yards and remove their refuse on a daily basis at the close of business. This is a uniform condition for the length of Pretorius Street in the central business district, rendering the sidewalk experience unpleasant. The intervention proposes that the retail outlets in the college atrium utilise the remaining portion of the site on the eastern edge of the building. New yards will be constructed, such that refuse can be stored outside and on the designated removal day be wheeled by building management staff to the collection point on Schoeman Street.

The retail outlets on the mezzanine level will be provided with a ventilated refuse room, where all outlets can store their refuse until the designated removal day. This strategy is determined by allowing for small independent trade. All food sold within 239 Pretorius Street will be pre-packaged and therefore there is no required for kitchens and ventilated exhaust spaces.

movement systems

The existing movement system within the building is a 1350 x 1400mm elevator, set within a 2700 x 2400mm shaft and has a mechanical room on top of the building. The intervention proposes that this elevator is removed and replaced with a new 'Elenessa' 2590 x 2160mm Mitsubishi Electric system which compounds the mechanisms within the shaft to produce a 'machine-room-less elevator'. In terms of increasing the legibility of the intervention and exposing movement routes and opportunities, the elevator should follow the 'observation car' model which is fully glazed car, allowing readability to its mechanisms. The existing mechanical room will be removed and the shaft continued for new access to the roof.

For servicing and fire requirements within this nine level building, a service lift is proposed with access off the college atrium. The new service shaft is 3520 x 2300mm and economised within the existing concrete structure and thus able to provide ventilation and mechanism space for the service lift. The intervention proposes the new elevator is a 'Nexiez' 2500 x 3000mm Mitsubishi Electric standard machine room system.


6.71


6.72

6.71 ING HOUSE ELEVATOR
6.72 OBSERVATION CAR
6.73 GLAZING SCENARIO

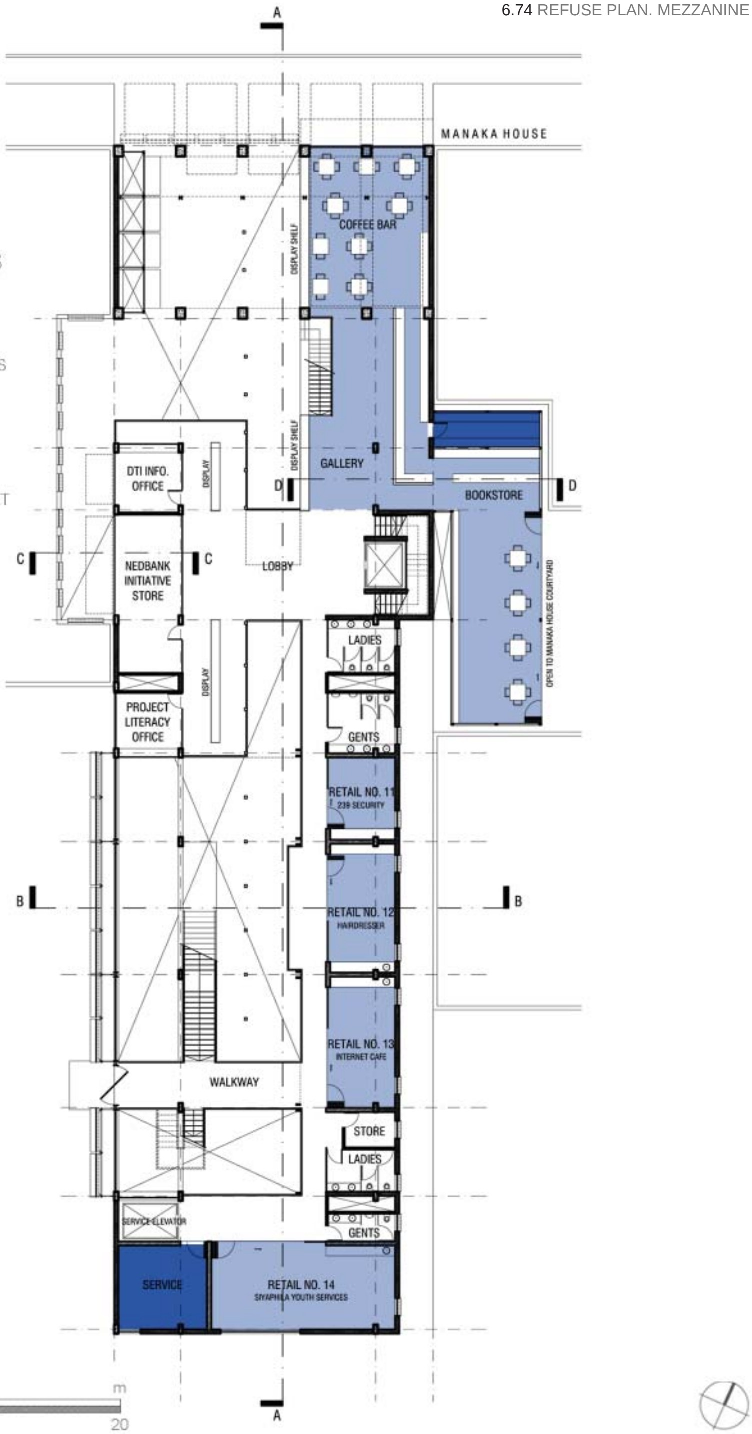
6.73


6.74 REFUSE PLAN. MEZZANINE

REFUSE ROOM

RETAIL OUTLETS

RUBBISH PRODUCED IN THE RETAIL OUTLETS CAN BE STORED WITHIN THE OUTLETS OR IN THE REFUSE ROOMS PROVIDED ON MEZZANINE LEVEL. THE BUILDING MANAGEMENT WILL THEN WHEEL THE REFUSE TO THE DESIGNATED COLLECTION POINT ON SCHOEMAN STREET ON THE MUNICIPALLY ALLOCATED DAY.



fire

The arcade through the building is a public thorough-fare and thus provides immediate access to either Pretorius Street or the open southern section of the site. Two staircases run the full height of the building and in accordance with Part TT 16.4 of SABS 0400 no point in the building is more than 45m away from the circulation points. Within the information centre an intermediary circulation core connects all five levels of the volume, all of which feed towards the principal staircase. Circulation routes throughout the upper levels of the building allow for two options of escape and fire extinguishers and fire hose reels are provided in accordance with SABS 0400. The fire plan will be clearly mounted for public information in several key points throughout the building.

The exposed steel structure is painted with a fire retardant intumescent coating and all adjoining spaces are fitted with sprinkler systems which will be co-ordinated with the water reticulation of the radiant ventilation strategy.

The college atrium has mechanised opening sections which open in the event of fire and is connected to smoke alarm sensors. The information centre also responds to the requirements of a large volume, where the clerestory louvres are automatically opened as per the detection of smoke.

6.75 FIRE PLAN. SECOND FLOOR