

technical investigation

design resolution and technical detailing of the proposal

technical investigation

$$\begin{aligned} \text{Column width} &= H/SR \\ &= 3000/15 \\ &= 200\text{mm minimum dimension} \end{aligned}$$

Type column size used 520mm by 400mm with 80mm recesses.

Concrete slab thickness sizing (type1)

$$\begin{aligned} \text{Column width} &= L/SR \\ &= 8000/30 \\ &= 270\text{mm minimum thickness} \end{aligned}$$

Slab to be over design with additional loads due to additional book loads ([personal communication with structural engineer], von Geiso, 2011).

Floor thickness used 255mm with 255mm downstand beam, total thickness is 510mm.

The infill is face brick masonry units, Firelight Satin from Corobrik. All brick work to be built with wall hangers according to the drawings, as per engineer specification .

$$\begin{aligned} \text{Brick wall slenderness ratio} &= H/t \\ &= 3000/230 \\ &= 13 \end{aligned}$$

Brick wall is adequate, and will have additional support due to wall hangers.

8.1 Introduction

This chapter documents the technical resolution of the design.

8.2 Structure and masonry infill

The structure system used is in situ cast reinforced concrete.

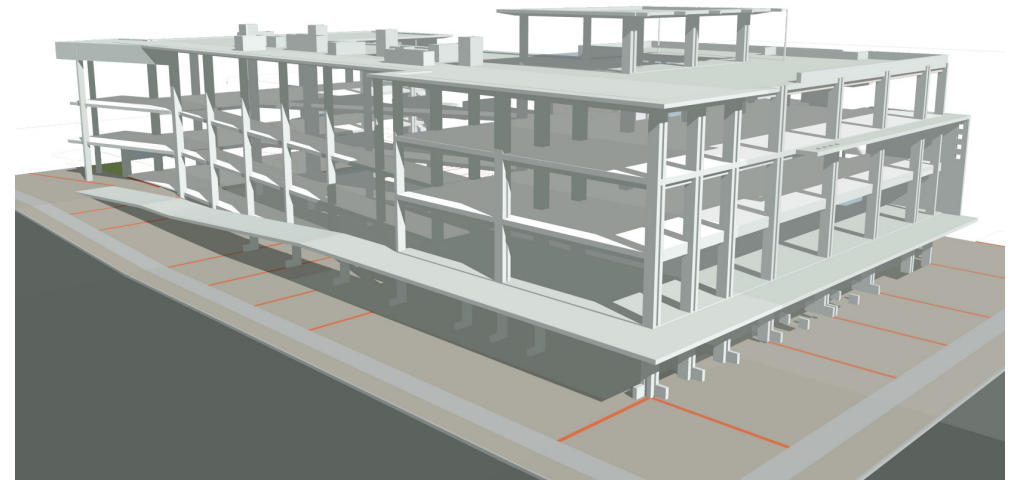
Concrete floor and beam sizing:

Concrete column width sizing (type1)

$$\begin{aligned} \text{Column width} &= H/SR \\ &= 3000/15 \\ &= 200\text{mm minimum dimension} \end{aligned}$$

Type 1 column size used 520mm by 200mm

Concrete column width sizing (type2)

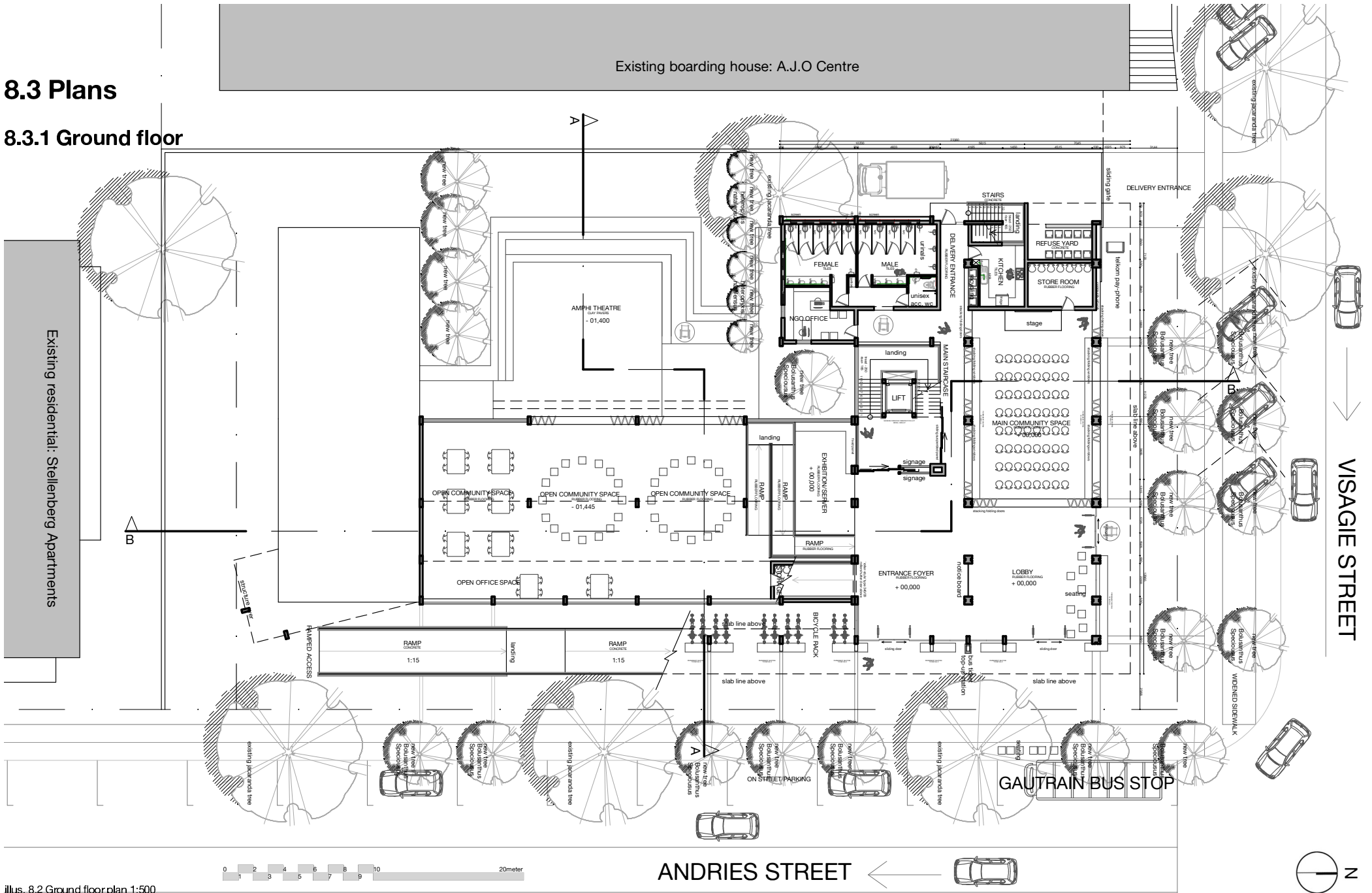


illus. 8.1 Reinforced concrete structure

Existing boarding house: A.J.O Centre

8.3 Plans

8.3.1 Ground floor



Existing residential: Stellenberg Apartments

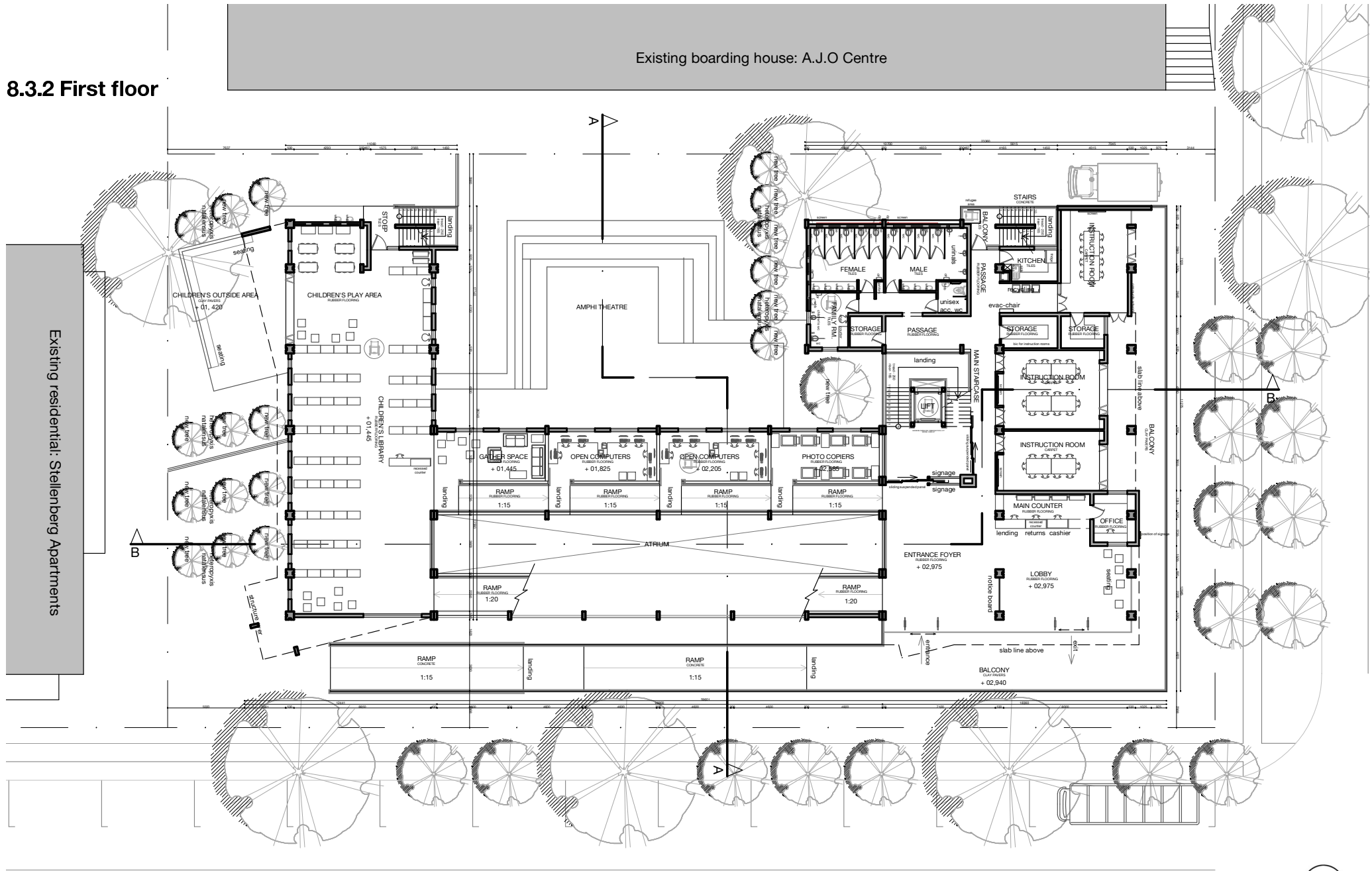
VISAGIE STREET

ANDRIES STREET

illus. 8.2 Ground floor plan 1:500

Existing boarding house: A.J.O Centre

8.3.2 First floor



Existing residential: Stellenberg Apartments

illus. 8.3 First floor plan 1:500

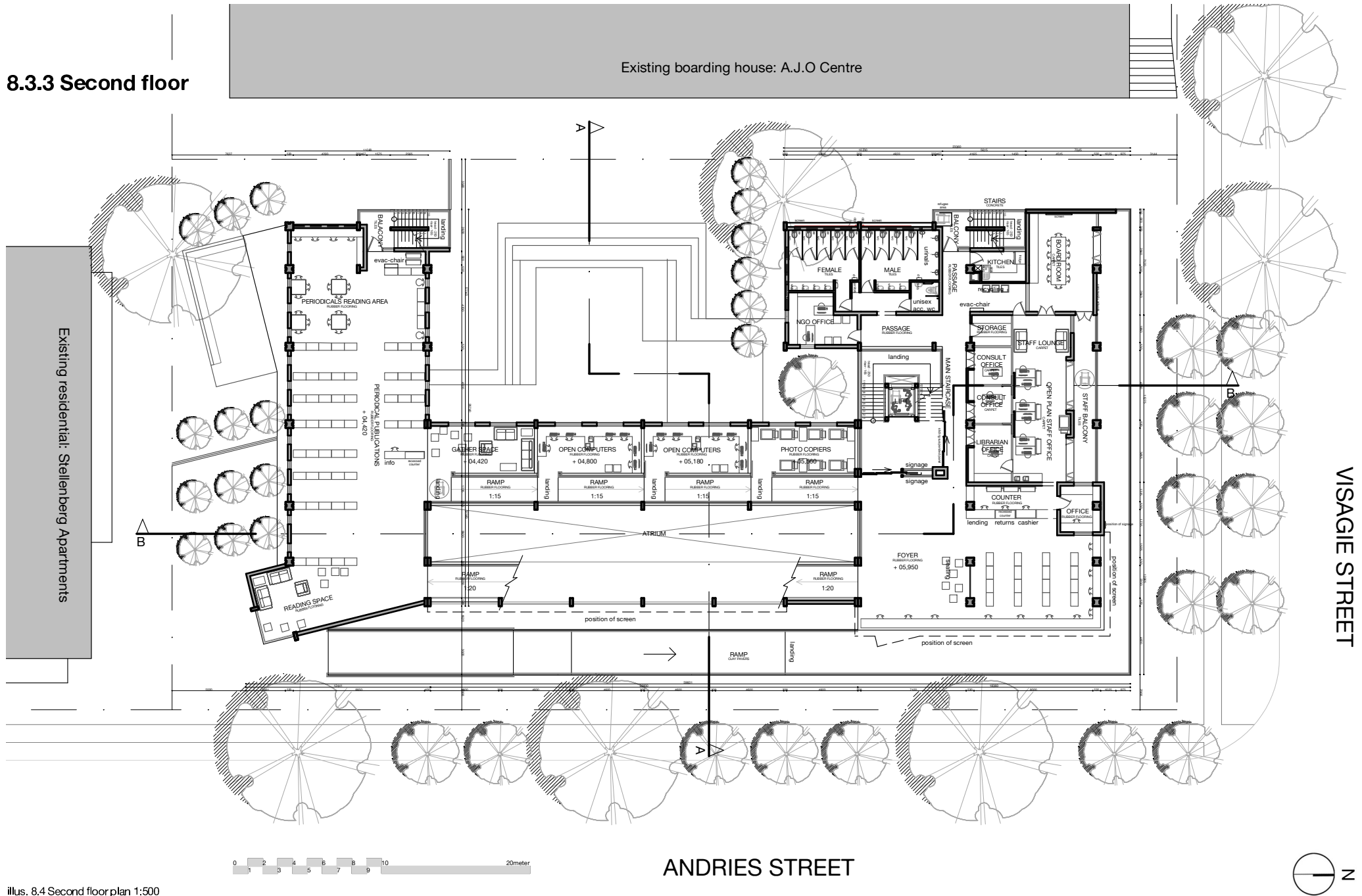


ANDRIES STREET



8.3.3 Second floor

Existing boarding house: A.J.O Centre



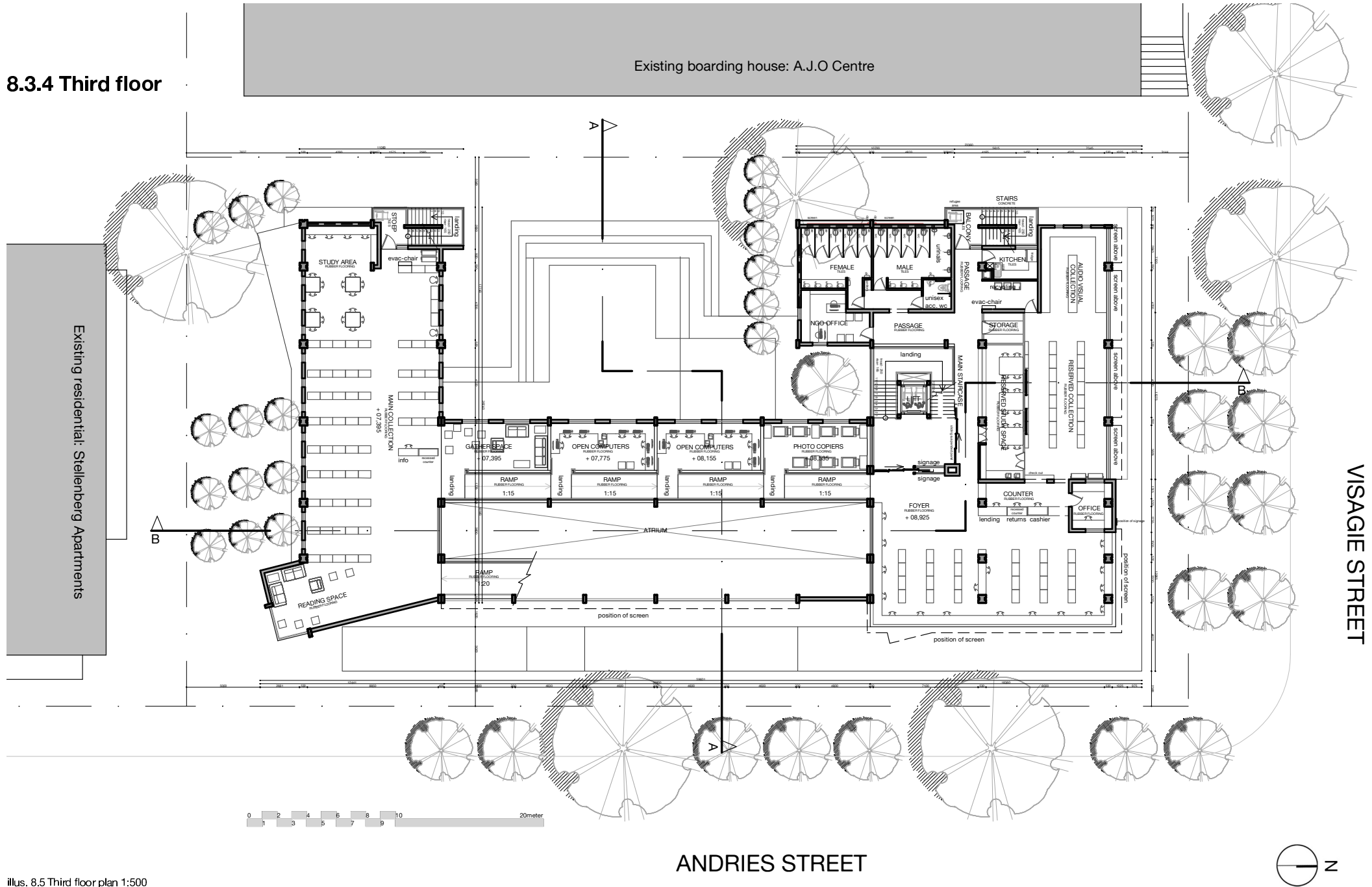
ANDRIES STREET



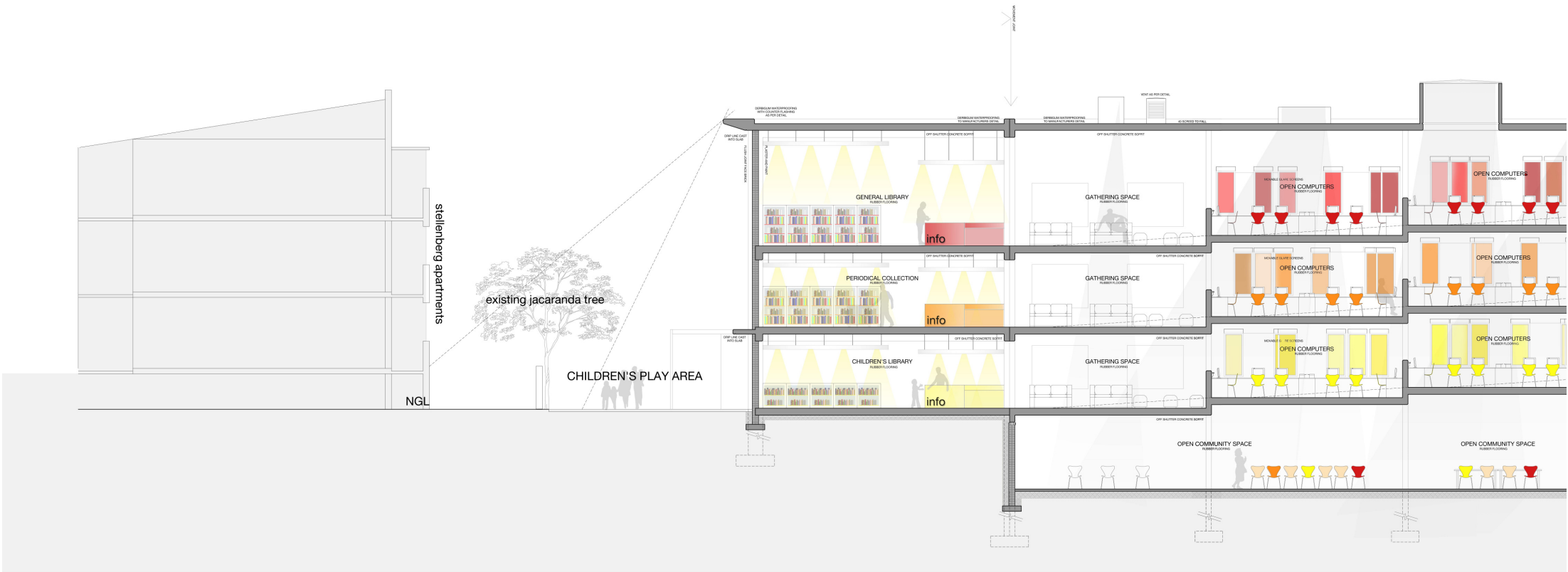
illus. 8.4 Second floor plan 1:500

8.3.4 Third floor

Existing boarding house: A.J.O Centre



illus. 8.5 Third floor plan 1:500



pantone 3945C



pantone 7404C



pantone 106C



pantone 130C



pantone 137C



pantone 021C



pantone 172C



pantone 173C

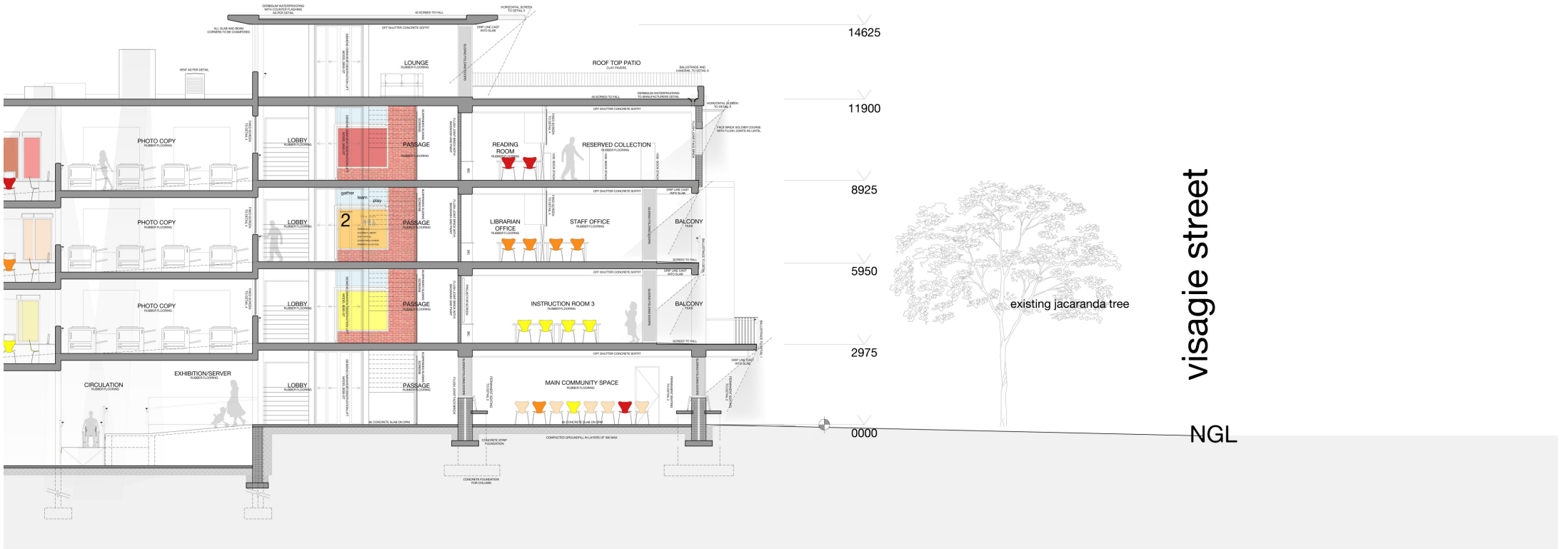


pantone 1797C



pantone 1915C

illus. 8.6 Longitudinal section (not to scale)



pantone 187C



pantone 438C



pantone 4725C



pantone 702C



pantone 4665C



pantone 4685C

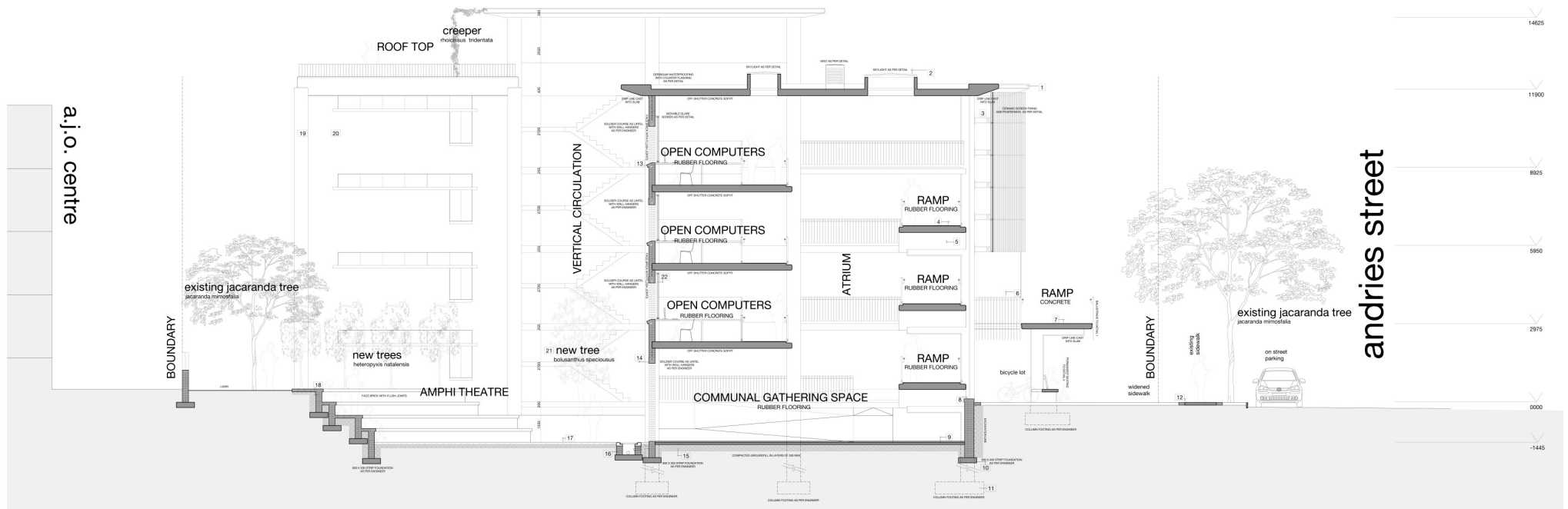


pantone 7499C



pantone 458C

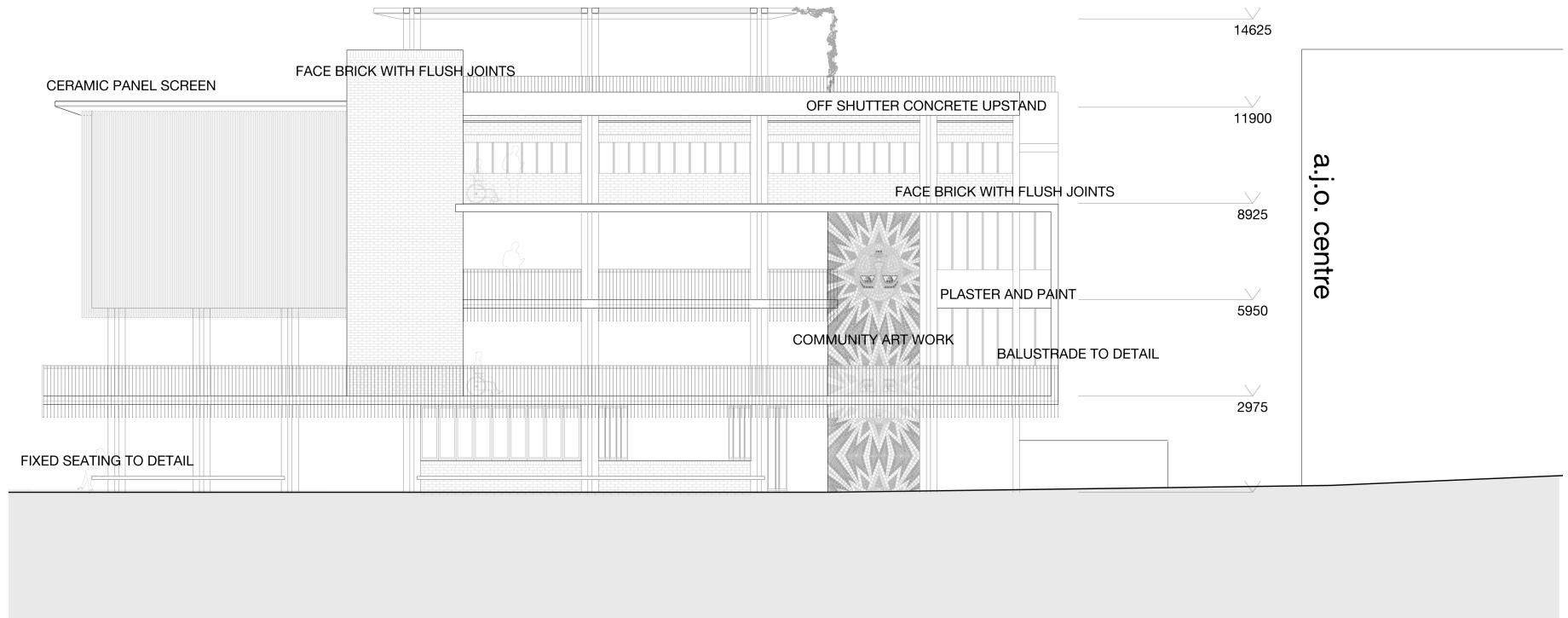
8.4.2 Cross section



illus. 8.7. Cross section 1:200

8.5 North Elevation

- 1 SLAB OVERHANG
OFF SHUTTER CONCRETE FINISH BRUSHED WITH STEEL BRUSH WHEN FORM WORK IS REMOVED. SLAB OVERHANG EXTENSION TO DIMENSION SHOWN IN DETAIL 3 WITH WATER PROOFING AS SHOWN.
- 2 SKY LIGHT
SKY LIGHT INSTALLED BY SPECIALIST AND INTERNAL PAINTED WITH WHITE PAINT UP TO DAY JOINT.
- 3 CERAMIC SCREEN AND FINING
CERAMIC TUBES PURPOSE MADE BY MARLEY WITH FULL GLAZING. COLOUR AS PER COLOUR CHART (SEE DRAWING). FINING FINING OF TUBES TO PANELS AS INDICATED. PANELS FIXED TO 200 x 100 x 25 SECTIONS. CUT AS INDICATED.
- 4 RUBBER FLOORING
450mm x 450mm x 8mm THICK RUBBERLAY RUBBER FLOOR TILES. TO BE INSTALLED TO MANUFACTURER'S SPECIFICATIONS. COLOURS AS INDICATED, VARYING PER FLOOR.
- 5 SOFFIT UNDER RAMPS
OFF SHUTTER CONCRETE FINISH BRUSHED WITH STEEL BRUSH WHEN FORM WORK IS REMOVED.
- 6 EXTERNAL BALUSTRADE
50mm x 50mm STEEL FLAT BAR AS VERTICAL MEMBERS AND 20mm x 10mm AS TOP MEMBER AND BALUSTRADE AS SHOWN IN DETAIL 1.
- 7 EXTERIOR RAMP FLOOR FINISH
40 MAGNESIUM FROVELED SCORED BY EXPERT FOR GRIP IN WET WEATHER.
- 8 WINDOW SILL
BRICK-ON-EDGE WITH FLUSH JOINTS ON DPC AS INDICATED. ALL BRICKWORK MUST BE CONTINUOUSLY CLEANED WITH SUGAR SOAP DURING CONSTRUCTION AND AFTER WORK IS COMPLETED.
- 9 LOWER LEVEL FLOOR SLAB
COMPACTED FILL IN LAYERS OF 150mm TO 55% MOCAASH TO STABILISE FINAL LAYER WITH 5% CEMENT. 50mm THICK REINFORCED 20MPa CONCRETE SURFACE BED (SLUMP 75) TO ENGINEER'S DETAIL AND SPECIFICATION WITH A SMOOTH AND EVEN STEEL TROWEL FINISH.
- 10 STRIP FOOTING
800 x 250 STRIP FOOTING AS PER ENGINEER'S SPECIFICATION.
- 11 COLUMN FOOTING
IN SITU CAST REINFORCED CONCRETE COLUMN FOOTING AS PER ENGINEER SPECIFICATION AND DRAWINGS.
- 12 EDGING TO PAVING
BRICK-ON-EDGE FACE BRICK WITH FLUSH JOINTS AS EDGING TO CLAY PAVERS. BRICKWORK MUST BE CONTINUOUSLY CLEANED WITH SUGAR SOAP DURING CONSTRUCTION AND AFTER WORK IS COMPLETED.
- 13 WINDOW SILL
BRICK-ON-EDGE FACE BRICKS WITH FLUSH JOINTS AS WINDOW SILL IN POSITION SHOWN.
- 14 SOLDER COURSE LINTEL
25mm PHOSPHORUS DEFLOR COURSE AS LINTEL WITH WALL HANGERS AS PER ENGINEER WITH REINFORCING AS INDICATED.
- 15 DAMP PROOF COURSE
GLAZED GUM-PLAST (GIB GREEN 250 MICRON) SABS 552-196 TYPE C LAMINATED POLYETHYLENE DAMP PROOFING MEMBRANE UNDER SURFACE BED.
- 16 THRESHOLD GRID AND DRAIN
550 MEDIUM DUTY CAST IRON SINGLE SEAL GRID TYPE C (SEALING) LESSER PRODUCT No. 420 ON BRICK. BRICK DRAIN WITH APPROPRIATE WATER PROOFING AS ENGINEER'S SPEC WITH SLOPE AS REQUIRED.
- 17 PAVING
CLAY PAVING BRICKS (PPE LIGHT SATIN) IN HERRINGBONE PATTERNS AS PER SITE PLAN WITH BRICK-ON-EDGE STRIP AS KERB ALL ON SUB-BASE AS PER ENGINEER'S SPECIFICATION AND DETAIL.
- 18 AMPHI THEATRE SEATING
FACE BRICK WITH FLUSH JOINTS WALLS ON STRIP FOOTINGS AS PER ENGINEER. FLEED WITH GROUND FILL WITH BRICK-ON-EDGE WITH FLUSH JOINTS AS SETTING SURFACE. SLOPED TOWARDS FRONT FOR WATER RUN OFF.
- 19 CONCRETE COLUMN AND UPSTAND OFF SHUTTER CONCRETE FINISH BRUSHED WITH STEEL BRUSH WHEN FORM WORK IS ALL CORNERS TO BE CHAMFERED AS INDICATED.
- 20 FACE BRICKS WITH FLUSH JOINTS
ALL EXTERIOR WALL FINISH TO BE FACE BRICK (FREIGHT SATIN) WITH FLUSH JOINTS. ALL BRICKWORK MUST BE CONTINUOUSLY CLEANED WITH SUGAR SOAP DURING CONSTRUCTION AND AFTER WORK IS COMPLETED.
- 21 NEW TREE
NEW *Podocarpus fenzliana* tree 1000mm, 1000mm OR NEW *Podocarpus fenzliana* 1000mm tree PLANTED ACCORDING TO LANDSCAPE ARCHITECTS GUIDELINES.
- 22 GLARE SCREENS
GLARE SCREENS FOR OPEN COMPUTER AREAS. FRAME WITH 25x25mm SHET FROD IN PARAMETER FRAME TO MANUFACTURERS SPECIFICATION. SUSPENDED ON 1 TRACK HANGER SUPPLIED. COLOURS AS INDICATED ON SECTION B-B.



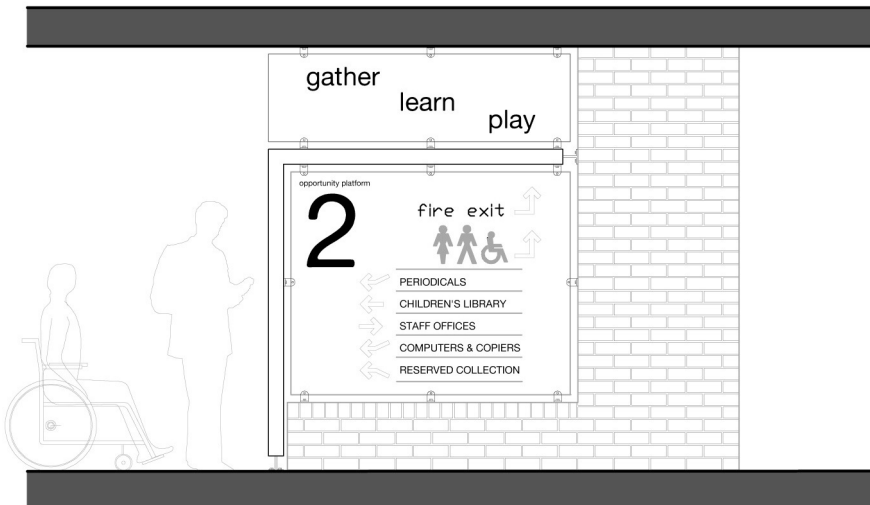
illus. 8.8. North Elevation 1:200

8.6 Signage

The main signage in the lobby and entrance foyer was designed in order to ensure accessible and legible wayfinding in the building. Signage panel has large font with arrows and is colour coded to match each floor, for additional clarity. The signage is duplicated to both sides in order to ensure a unified design approach, by making it visible to the lift and stair as well as the ramp (illus 8.9 and 8.10).



illus. 8.9. Lobby signage render



illus. 8.10. Lobby signage elevation (not to scale)

8.7 Fire Design

The Burger's Park Opportunity Platform is a open public building and therefore fire strategies need to be implemented to ensure safety of the occupants during an emergency situation. The National Building Regulations (NBR, Part-T) were followed and implemented in the design. These decisions made will have to be confirmed by a fire design specialist.

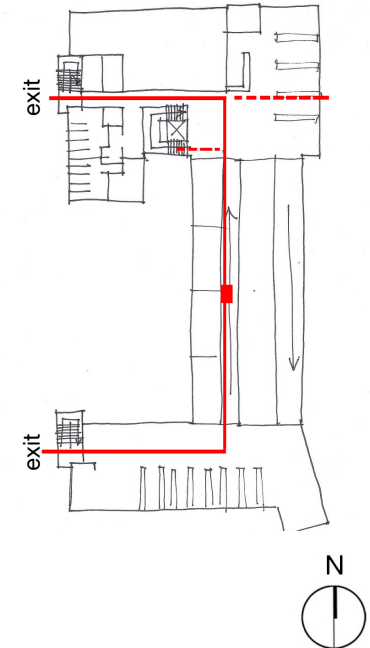
8.7.1 General design

Basic implementations such as distances to fire exits are 45m and the doors open outward. The building is three storeys and therefore requires only one fire escapes per allowable floor area. Refer to floor plans (illus. 8.11).

The fire extinguishing system used will be a sprinkler system combined with the placement of fire hose reels and fire extinguishers. Fire extinguisher placement according part Part T of the NBR, states one fire extinguisher per 500 sqm or part there of. This results in a placement of one fire extinguisher in the north wing, one in the south wing, per floor and an additional one in the lower community level. The requirement for fire hose reels results in one reel per wing, per floor. Additionally the ventilation stacks over the atrium will act as natural smoke extractors.

8.7.2 Evac-chair

According to the Occupational Health and Safety Act, employers are obligated to provide and maintain a working environment that is safe for all employees, including those with disabilities.



illus. 8.11 Fire design: 45m to exits, fire exits indicated



illus. 8.12 Evac-Chair model 300H

This is also true then for escape methods during emergency situations (Evac-Chair, 2011) Within buildings that are higher than two storeys the Evac-chair offers a means of (assisted) escape during an emergency situation. The Evac-chair has to be specified and place be provided for it in order to allow its use. Secondly staff needs to be trained in the use of it, and the user manual should accompany the Evac-chair. The Evac-chair must also be labelled with appropriate and legible signage (Evac-Chair, 2011).



illus. 8.13 Evac-Chair Stand

An Evac-chair (model 300H) is provided, as indicated on the plans, on each floor at the staircases that serve as fire/service stairs. The chair is fitted into the powder coated stand (illus. 8.13), and covered in the labelled yellow Evac-chair cover (illus 8.13). Refer to illus 8.12 for size and model. With the accompanying notification, see illus 8.15.



illus. 8.14 Evac-Chair in place with cover

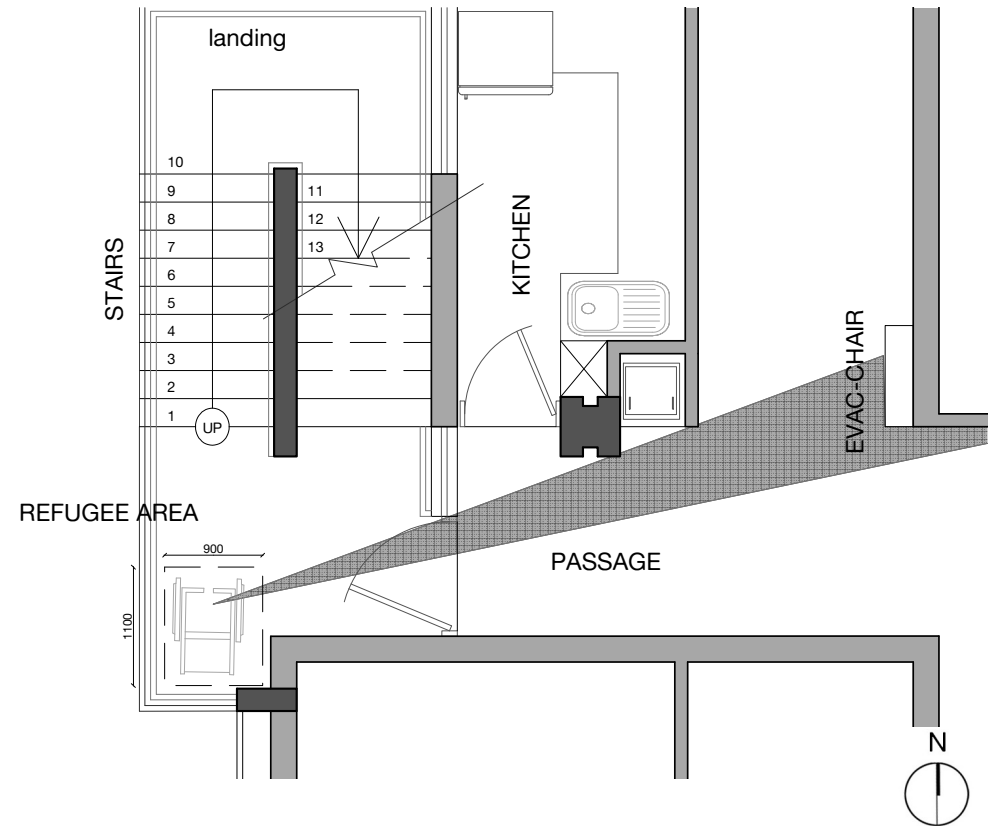
8.7.3 Refugee area

Fire safety for persons with mobility disabilities is imperative and therefore refugee areas have been provided as part of the fire escape staircase. Refugee areas act as a safe area where the person with the disability can remain until assistance can be obtained. Illustration 8.16 indicates the position and sizing of this area. (Holmes-Siedle: 1996: 65).



illus. 8.15 Evac-Chair signage and notification

From the refugee area the Evac-chair must be visible in order for the wheelchair user to point it out to the assisting person. Sizing of the refugee area are shown in illustration 8.16.

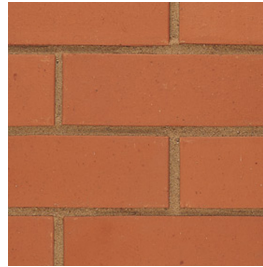


illus. 8.16 Refugee area for a wheelchair user during an emergency, with evac-chair in viewing range

8.8 Materiality

8.8.1 Brick

Brick work in the whole complex is Corobrik Firelight Satin. The brick work is executed with flush joints. Lintels and amphitheatre steps are either in brick-on-edge formation or soldier course as indicated on sections. Brick is one of the most used building materials in South Africa as it requires less high skilled labour. Brick is low maintenance and has a long life-span (Corobrik, 2011). Brick work also assist in providing thermal mass, which is needed in Pretoria. Certain interior walls will be plastered and painted



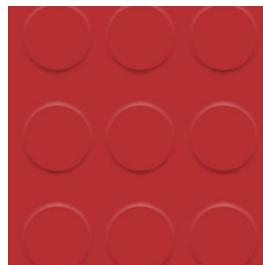
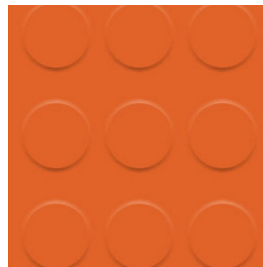
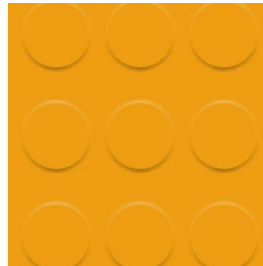
illus. 8.17 Fire light Satin with flush joints

8.8.2 Interior floors

The importance of the material choice for the floors is crucial given the hazards that inappropriate finishes can present. The choice of flooring material for interior spaces is Rubber floor tiles.

The proposed layout of flooring colour and pattern is carefully considered. The main circulation spaces are done in black and each floor is edged in it's colour coding colour; either light yellow, yellow, orange or deep red. This floor material is hard wearing and offers grip when walking on it. This is especially important on the ramped floor surfaces. Skirting components of the Rubaloy range must accompany the flooring installation where applicable, unless other wise stated. The rubber tiles are also durable and classified as industrial quality. The tiles can be replaced relatively easy.

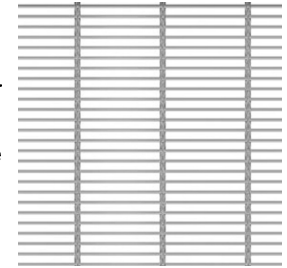
Rubaloy Mk1 recycled rubber floor tiles comes in standard sizes, 465mm by 465mm by 8mm thick tiles. Application is as per the manufacturer details. Expansion joints are to be at least 5mm and must be filled with black silicon, and movement joints must be finished with an aluminium strip (Rubaloy, 2011). The rubber tiles also offers absorption of sound, and will reduce excessive noise attenuation.



illus. 8.18 Rubber floor colours

8.8.3 Mesh components

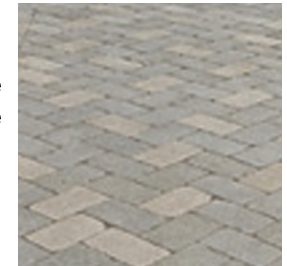
Mesh panels are used as separating device in the foyer and lobby spaces. Also the use of this mesh is applied to horizontal shade screens on the northern facade. The choice of material is GKD Mesh, 'Lamelle' and fixed as indicated on sections and in details.



illus. 8.19 'Lamelle' mesh

8.8.4 Outdoor floor finish

The external paved surfaces are to be concrete brick pavers as indicated on the plans. Firelight Satin brick on edge patterns are also indicated on the plan, and aligns with the columns of the main structure.



illus. 8.20 Concrete pavers

8.8.5 Ceramic facade

The ceramic tubes used as the screen element on the east and north facades are 50mm by 50mm, and in lengths as indicated on sections and details. The ceramic tubes require little to no maintenance and is durable. The tubes can be individually replaced. Colours and fixing is indicated on the sections and details.



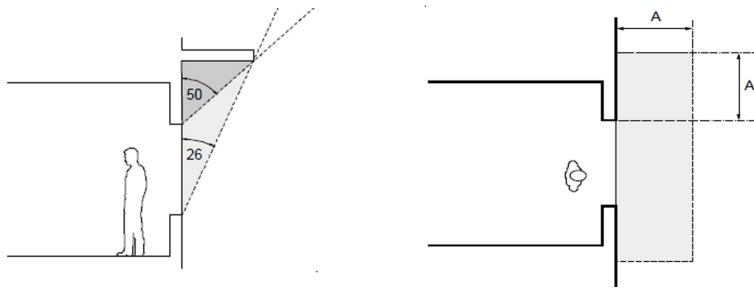
illus. 8.21 Ceramic finish and typical colours

8.9 Security

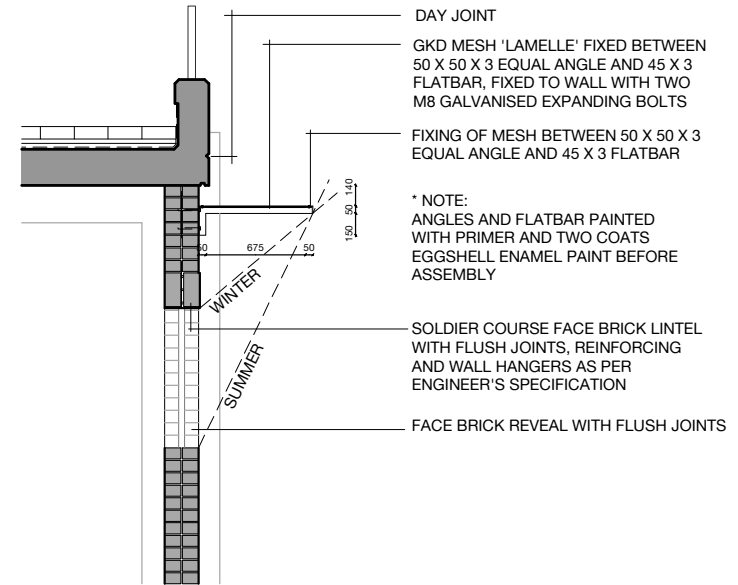
Security is a big concern in any public building. The design of the floors allows for surveillance between floors and from staffing stations. Mesh sliding and fixed panels are used to separate the lobby space from the library component after hours. These panels allow for access to the roof top during these times. It also makes the lift usable during this period, without access to the intermediate floors. Sliding gate for deliveries and sliding panels on the south periphery of the site also provide controlled access to restricted areas. Placement of children's play area was carefully considered, and was placed at south west corner, as it is the most protected area on the site.

8.10 Solar shading panels

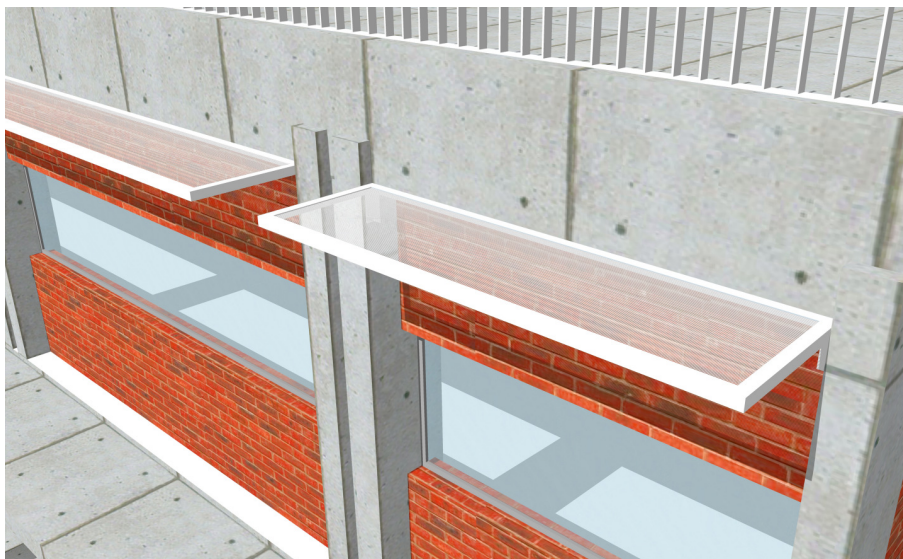
Solar shading panels on the northern facade keep harsh sun out during the summer, but allows winter sun to penetrate. The sizing (depth) of the panel was determined according to principles as prescribed in Sustainable buildings in Gauteng (CSIR, 2008: 36). The principle is shown in illustration 8.22a and the application in 8.22b & 8.22c.



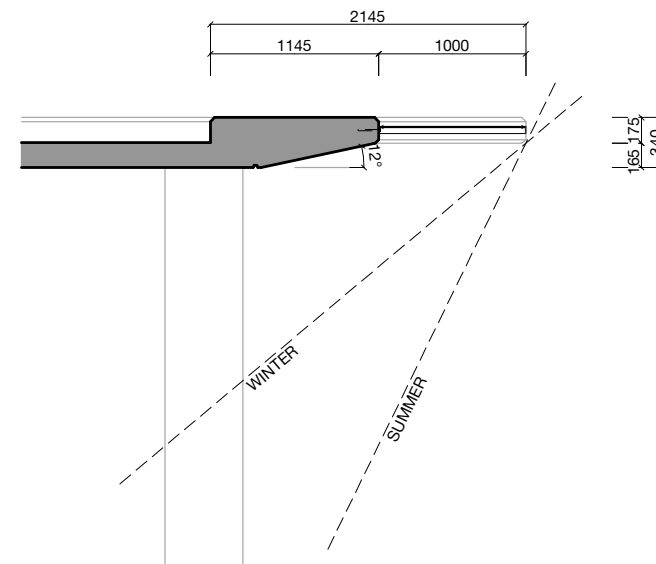
illus. 8.22a Principle of sizing horizontal shade panels



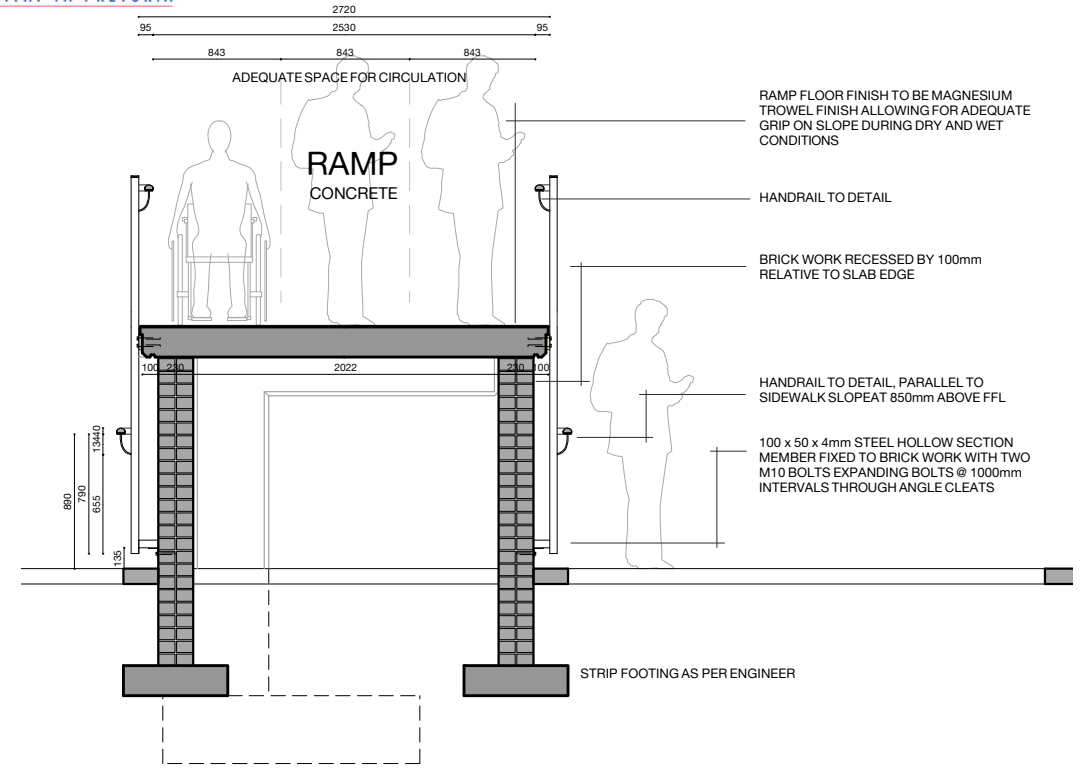
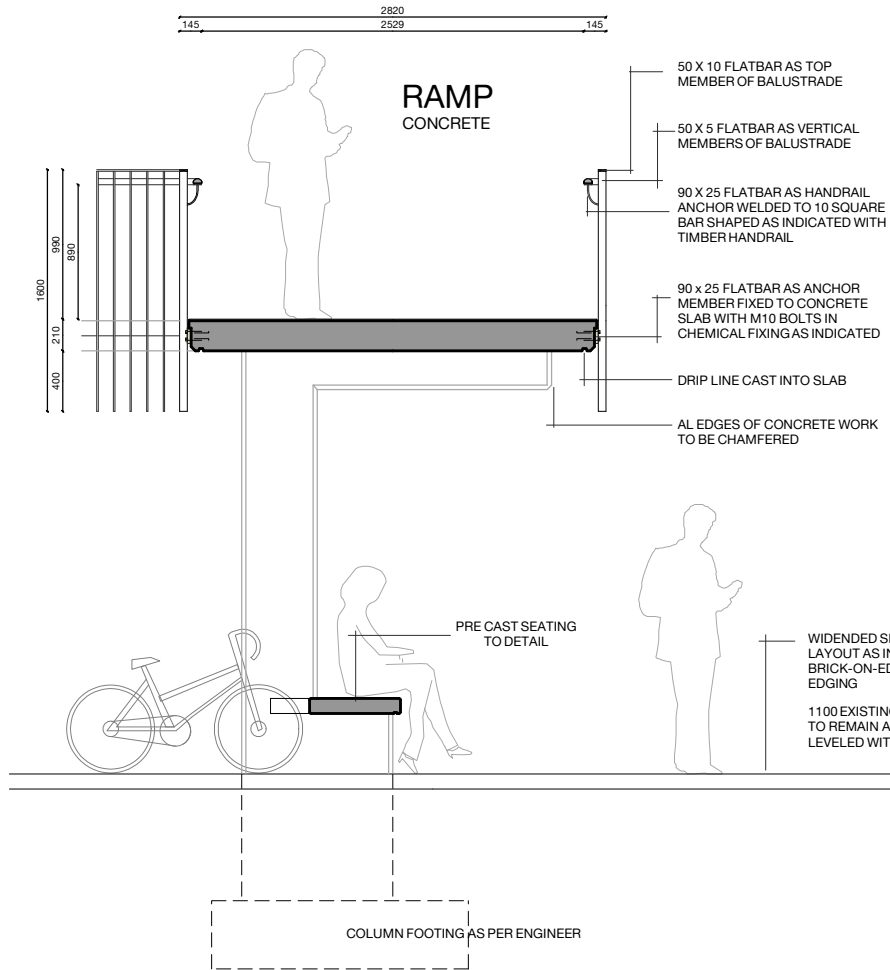
illus. 8.22b Upstand beam and balustrade with horizontal solar shade screen on 3rd floor



illus. 8.22d Render of panels in winter: allowing sun to enter space

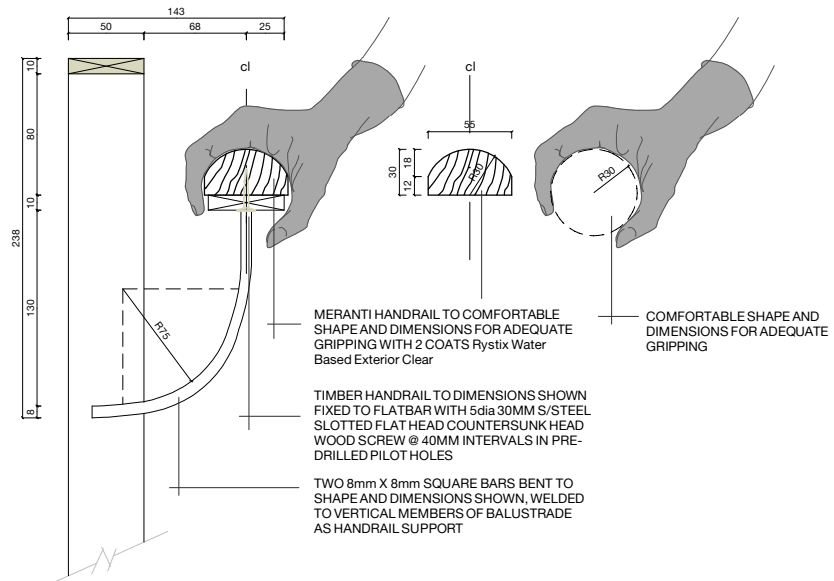


illus. 8.22c Slab edge detail, with horizontal solar shading screen on roof top level



illus. 8.23a Balustrade, ramp and seating detail

illus. 8.23b Balustrade, ramp and seating detail (alternative)



illus. 8.23c handrail detail and decision