technical investigation

design resolution and technical detailing of the proposal
technical investigation

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)
Column width  = H/SR
=3000/15
= 200mm minimum dimension
Type 1 column size used 520mm by 200mm

Concrete column width sizing (type2)

Column width  = H/SR
=3000/15
= 200mm minimum dimension
Type  column size used 520mm by 400mm with 80mm recesses.

Concrete slab thickness sizing (type1)
Column width  = L/SR
=8000/30
= 270mm minimum thickness
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.

Brick wall slenderness ratio  = H/t
= 3000/230
= 13

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

8.3.1 Ground floor

Existing boarding house: A.J.O Centre

Existing residential: Steenberg Apartments

ANDRIES STREET

VISAGIE STREET

Gautilain Bus Stop
8.3.2 First floor

Existing boarding house: A.J.O Centre

Existing residential: Stellenberg Apartments
Illus. 8.6 Longitudinal section (not to scale)
8.4.2 Cross section
8.5 North Elevation
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).

8.7 Fire Design

The Burger’s Park Opportunity Platform is an 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 escape 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 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.
This is also true 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).

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.

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).

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.
8.8 Materiality

8.8.1 Brick

Brickwork in the whole complex is Corobrik Firelight Satin. The brickwork 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.

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.

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.

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.

8.8.5 Ceramic facade

The ceramic tiles 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 tiles require
little to no maintenance and is durable. The tiles can be
individually replaced. Colours and fixing is indicated on the
sections and details.

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 façade 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.
RAMP FLOOR FINISH TO BE MAGNESIUM TROWEL FINISH ALLOWING FOR ADEQUATE GRIP ON SLOPE DURING DRY AND WET CONDITIONS

HANDRAIL TO DETAIL

BRICK WORK RECESSED BY 100mm RELATIVE TO SLAB EDGES

HANDRAIL TO DETAIL, PARALLEL TO SIDEWALK SLOPE AT 850mm ABOVE FFL.

100 x 50 x 4mm STEEL HOLLOW SECTION MEMBER fixed to brick work with two M10 bolts expanding bolts Ø 1000mm intervals through angle cleats.

STRIP FOOTING AS PER ENGINEER

PRE CAST SEATING TO DETAIL

WIDENED SIDEWALK IN CLAY PAVERS LAYOUT AS INDICATED ON PLAN WITH BRICK-ON-EDGE WITH FLUSH JOINTS AS EDGING.

1 L 0 0 EXISTING CONCRETE SIDEWALK TO REMAIN AND NEW PAVING TO BE LEVELLED WITH IT

COLUMN FOOTING AS PER ENGINEER

GRIP LINE CAST INTO SLAB

ALL EDGES OF CONCRETE WORK TO BE CHAMFERED

50 X 10 FLAT BAR AS TOP MEMBER OF BALUSTRADE

50 X 5 FLAT BAR AS VERTICAL MEMBERS OF BALUSTRADE

90 X 25 FLAT BAR AS HANDRAIL ANCHOR WELDED TO 10 SQUARE BAR SHAPED AS INDICATED WITH TIMBER HANDRAIL

90 X 25 FLAT BAR AS ANCHOR MEMBER FIXED TO CONCRETE SLAB WITH M10 BOLTS IN CHEMICAL FIXING AS INDICATED
MERANTI HANDRAIL TO COMFORTABLE SHAPE AND DIMENSIONS FOR ADEQUATE GRIPPING WITH 2 COATS Ryals Water Based Exterior Clear

Timber Handrail to dimensions shown fixed to flat bar with 5x3.0x6mm S/Steel slotted flat head countersunk head wood screw @ 40mm intervals in pre-drilled pilot holes

Two 8mm x 8mm square bars bent to shape and dimensions shown, welded to vertical members of balustrade as handrail support

Illus. 8.23c: handrail detail and decision