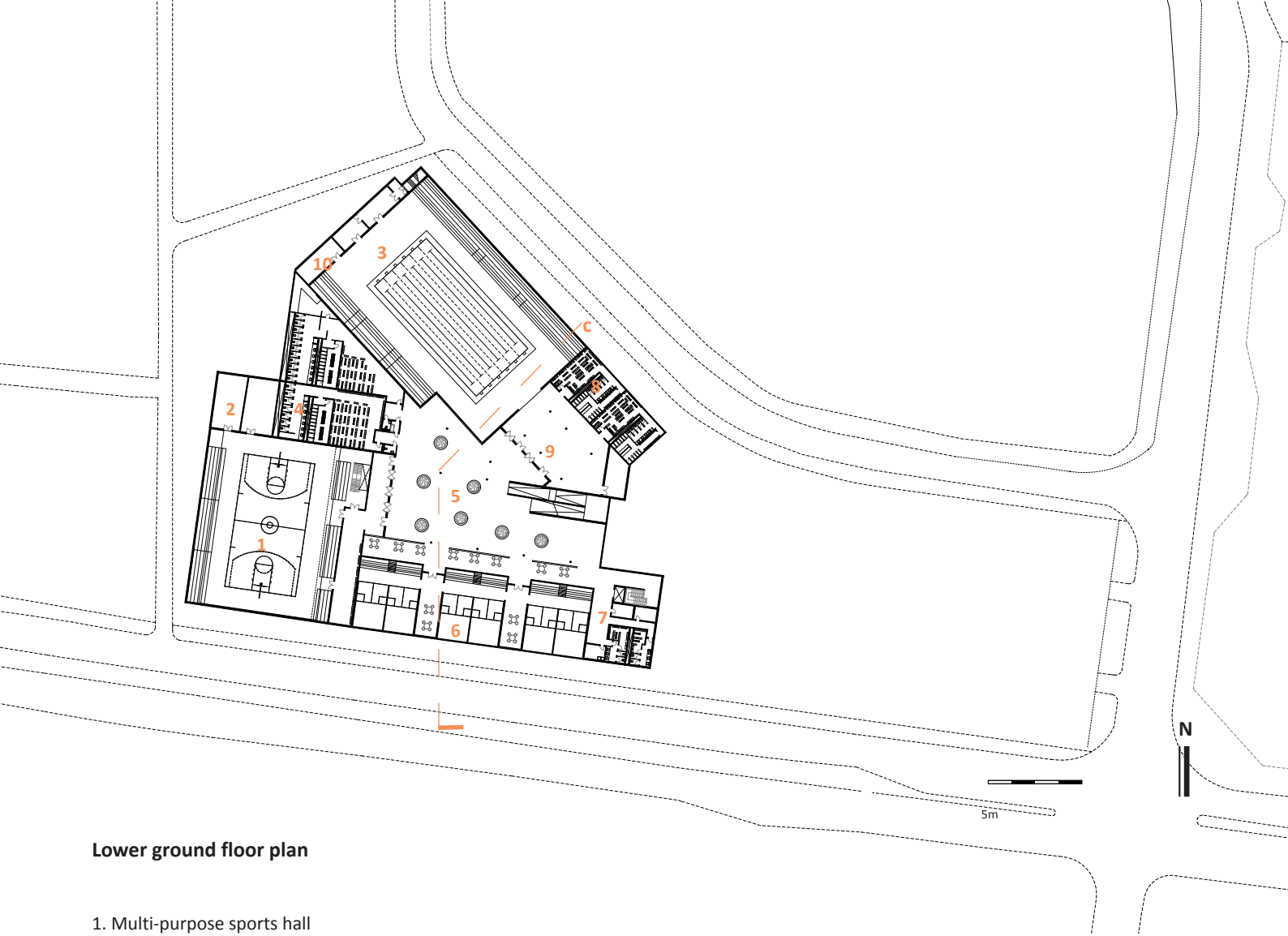
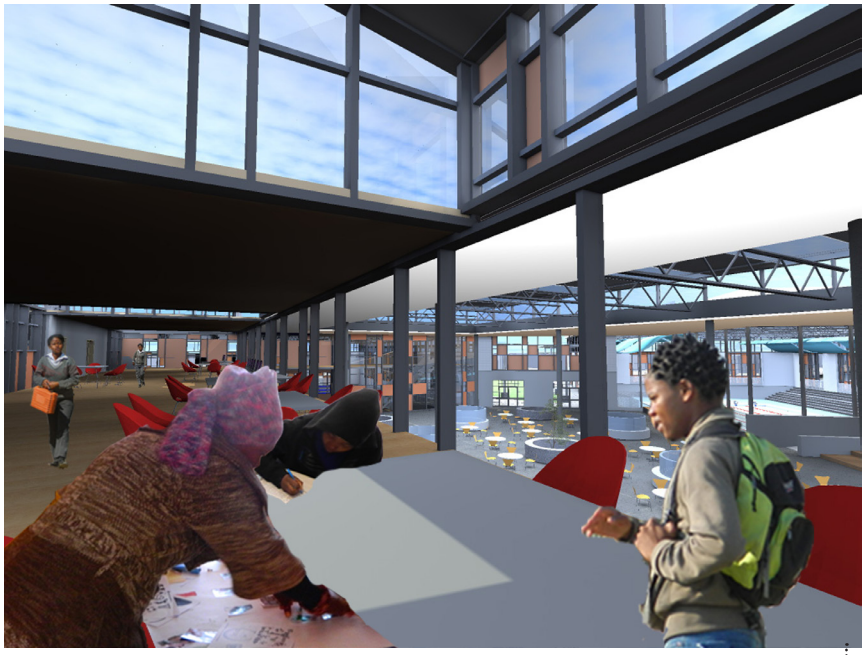


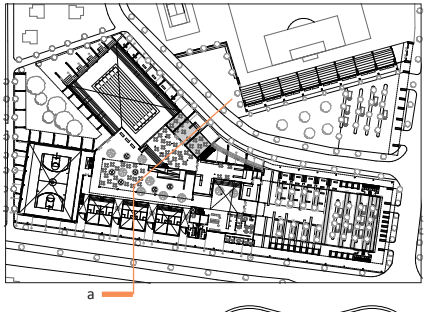
Lower ground floor plan

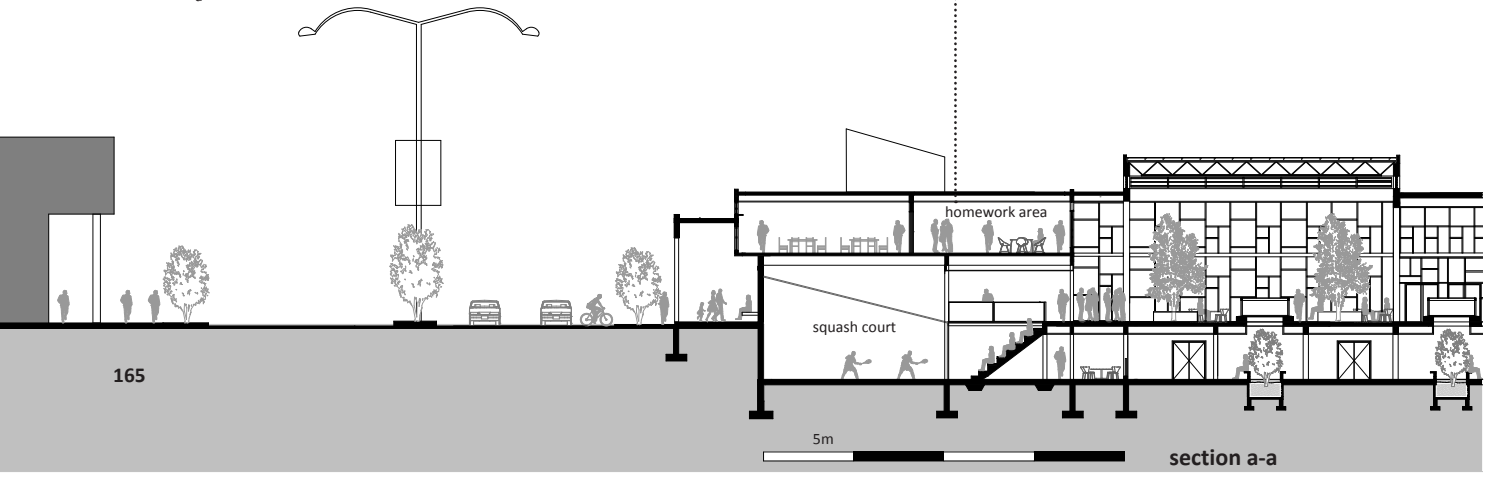
1. Multi-purpose sports hall
2.Store room
3.Swimming pool
4.Sports hall Ablutions and change rooms
5.Foyer
6.Squash Court
7.Cleaning Staff facility
8.Pool Ablutions and change rooms
9.Pool foyer
10.Pool plant room



The homework area is a flexible open plan space that is located on the first floor above the squash courts. The space looks out into the main foyer, allowing for visual connection and overlapping of activity in the foyer space. The homework area is used by students after school who need a place to do their homework or have study groups. The workshop rooms are used by the NGO for workshops or homework clubs. And when they are not being used by the NGO, the rooms are then used for community meetings, student dance and drama practice or study room.

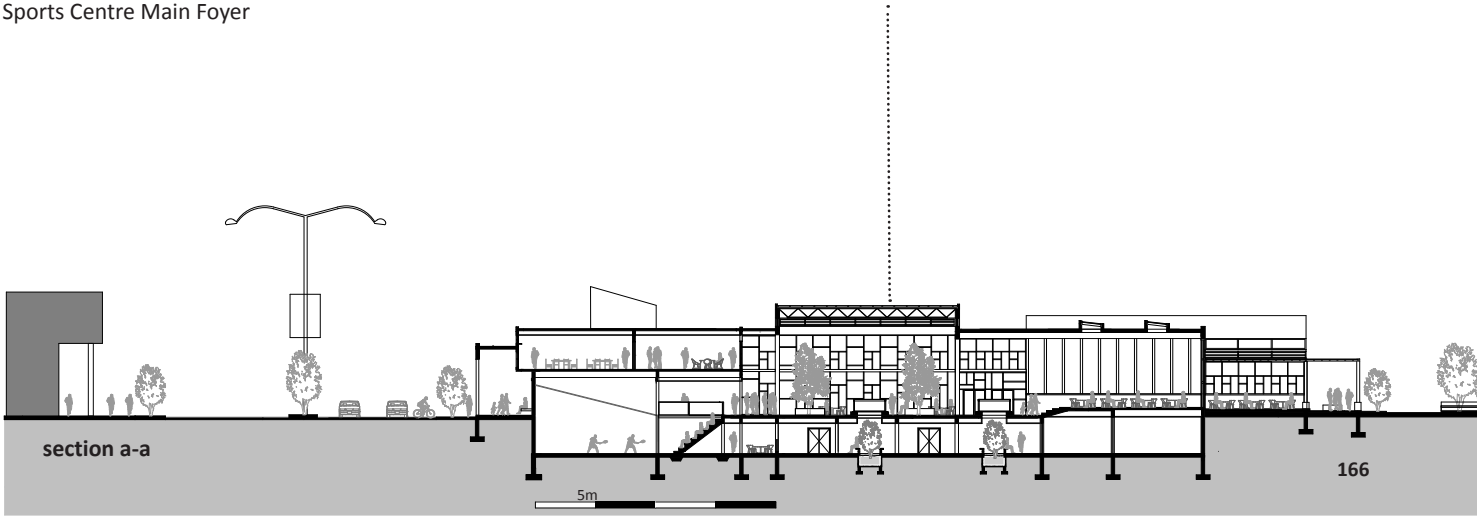
Homework area on the first floor

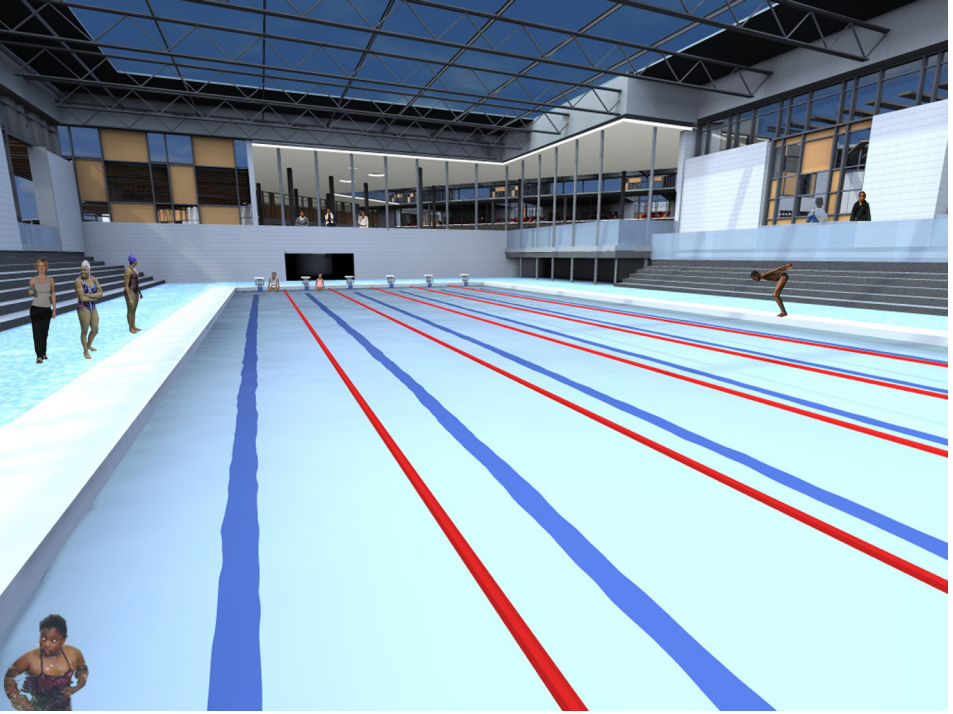




section a-a

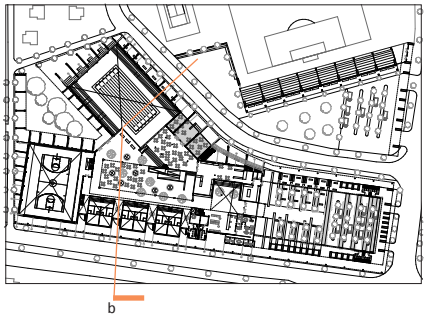
Sports Centre Main Foyer

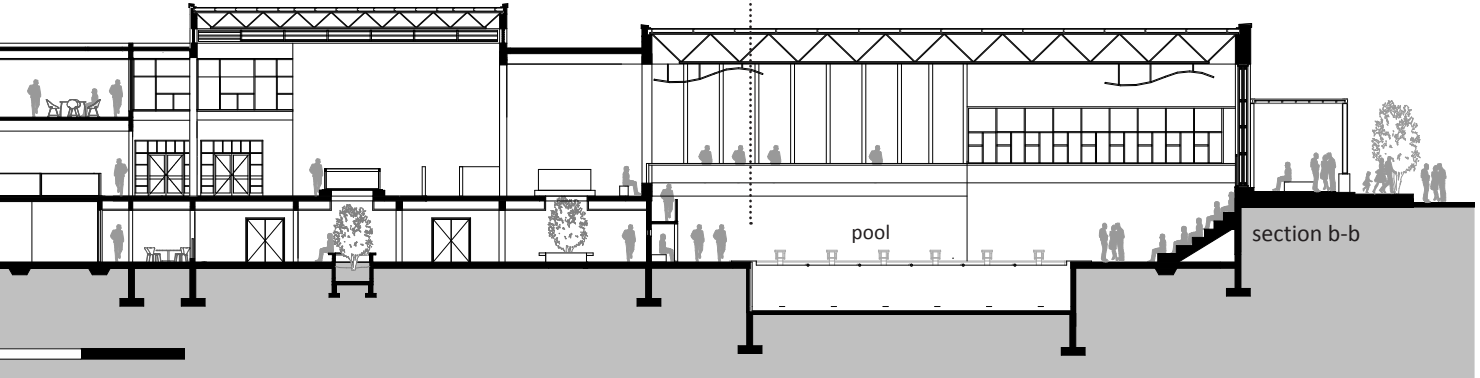




Swimming pool area

The pool area is located along the northern edge of the site, allowing people to engage with the activity that is occurring inside the space. The pool area in addition sits below street level, allowing people to view into to space without obstructing any activity and creates space for seating on the edge.







Northern edge of the sports centre



section b-b



The northern edge of the building responds to the residential context by being lower in scale and more flexible in form. The materiality of the northern edge is lighter and transparent. The northern edge becomes a habitable space for trading, gathering, socialising and watching activity inside the sport scentre.

Northern edge of the sports centre

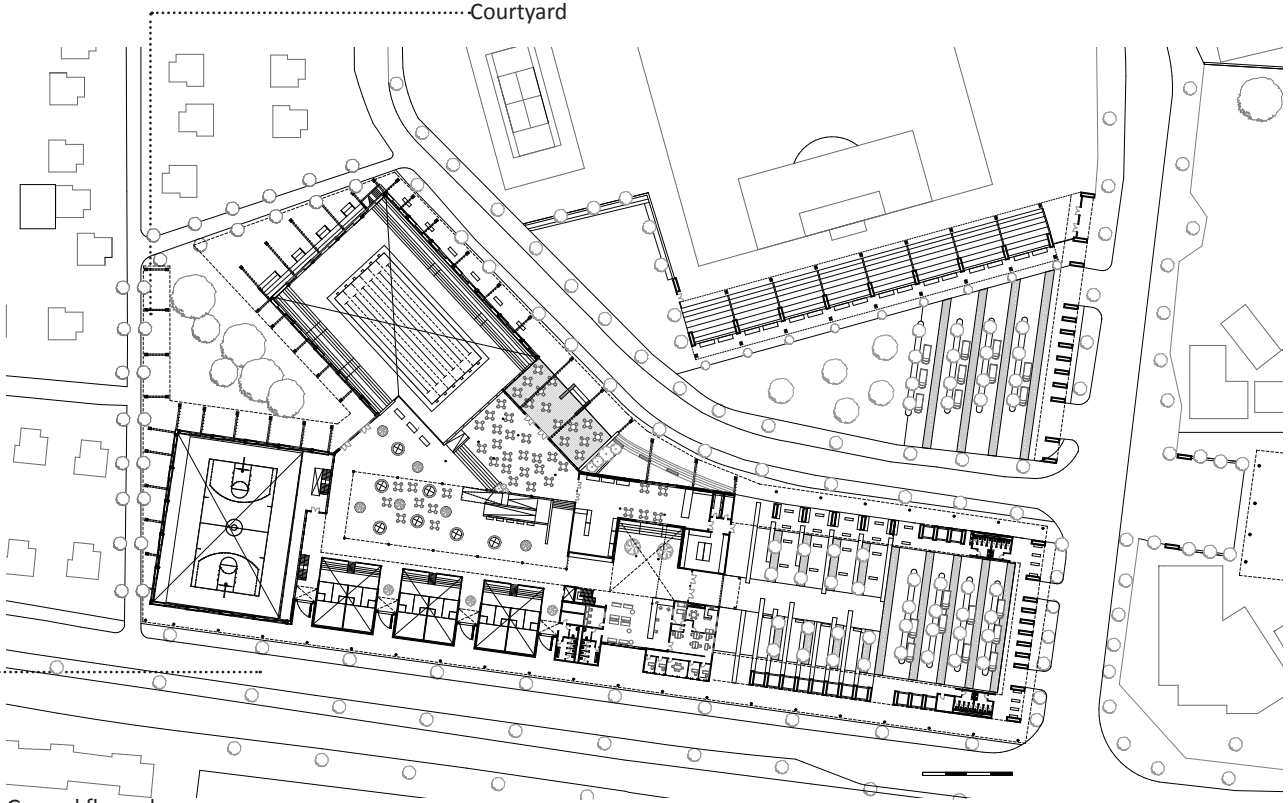


The southern edge of the building is designed to respond to the main road which lies on the harder edge of the site. The southern edge has an urban scale, that begins to define the edge .The use of concrete creates a robust colonnade that allows residents to inhabit the space and trade along the colonnade.

Southern edge of the sports centre



The courtyard is designed as a public space, that allows people to use the space for social gatherings and activities that are not necessarily related to the sports centre. The outdoor courtyard can be used by children as a play area after school or by the Zionist church in the afternoon. Sporting activity in the pool and sports hall can be observed from the courtyard space. The covered walkways have the potential to become trading spaces along the edge of the courtyard.



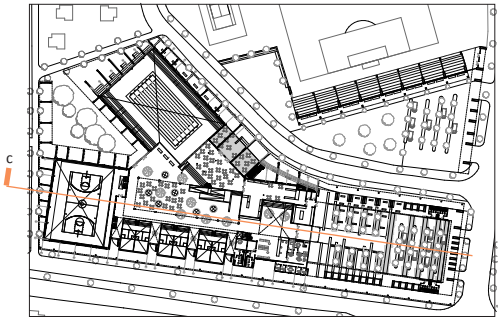
Ground floor plan

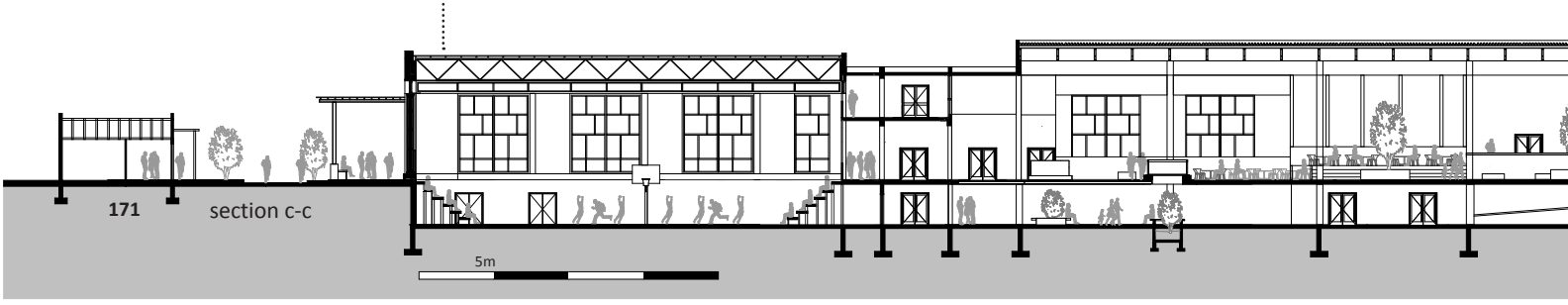


Multi purpose sports hall

The multipurpose sports hall is designed to accommodate both indoor sport activity such as badminton, basket ball and gymnastic, while also allowing the space to be used for social gatherings such as community meetings and church functions. The sports hall sits below street level, allowing people to view easily into the space without obstructing any activity. The sunken sports hall also allows for circulation to occur around the space at all levels.





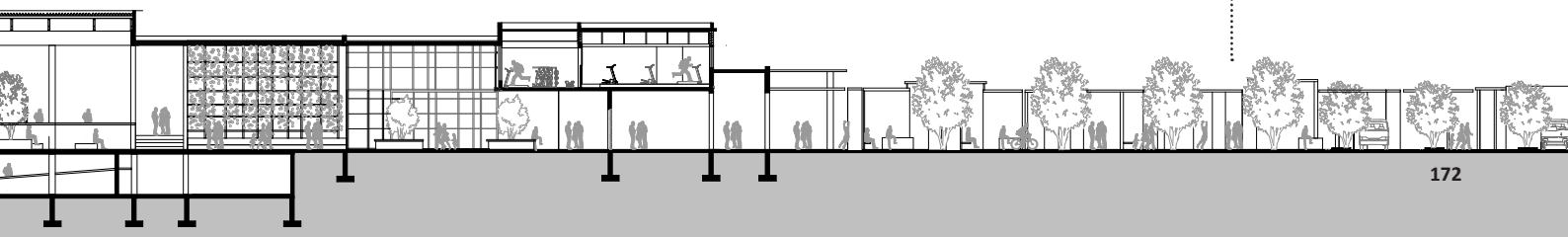


section c-c



Public square and market stalls

The public square is designed as a multi-use space that allows for social activity and trading to occur within the same space. The spaces aim to provide an urban environment that promotes freedom of use of the space for individuals and groups of people. The space is designed as a backdrop that allows for formal and informal activities to occur spontaneously in the space. The market stalls are located on the edge, which defines the eastern edge of the site and activates the edges.



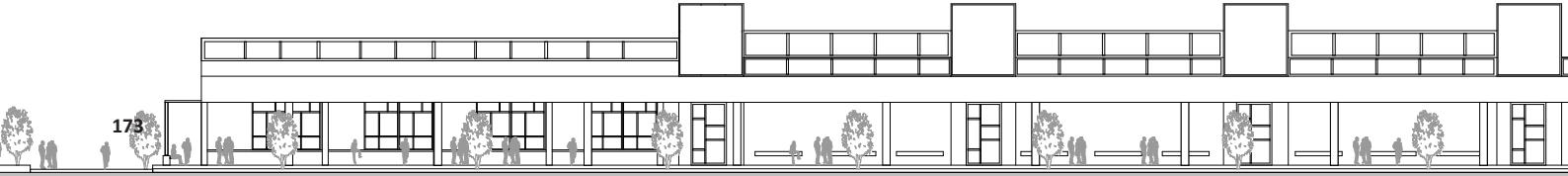


South Elevation

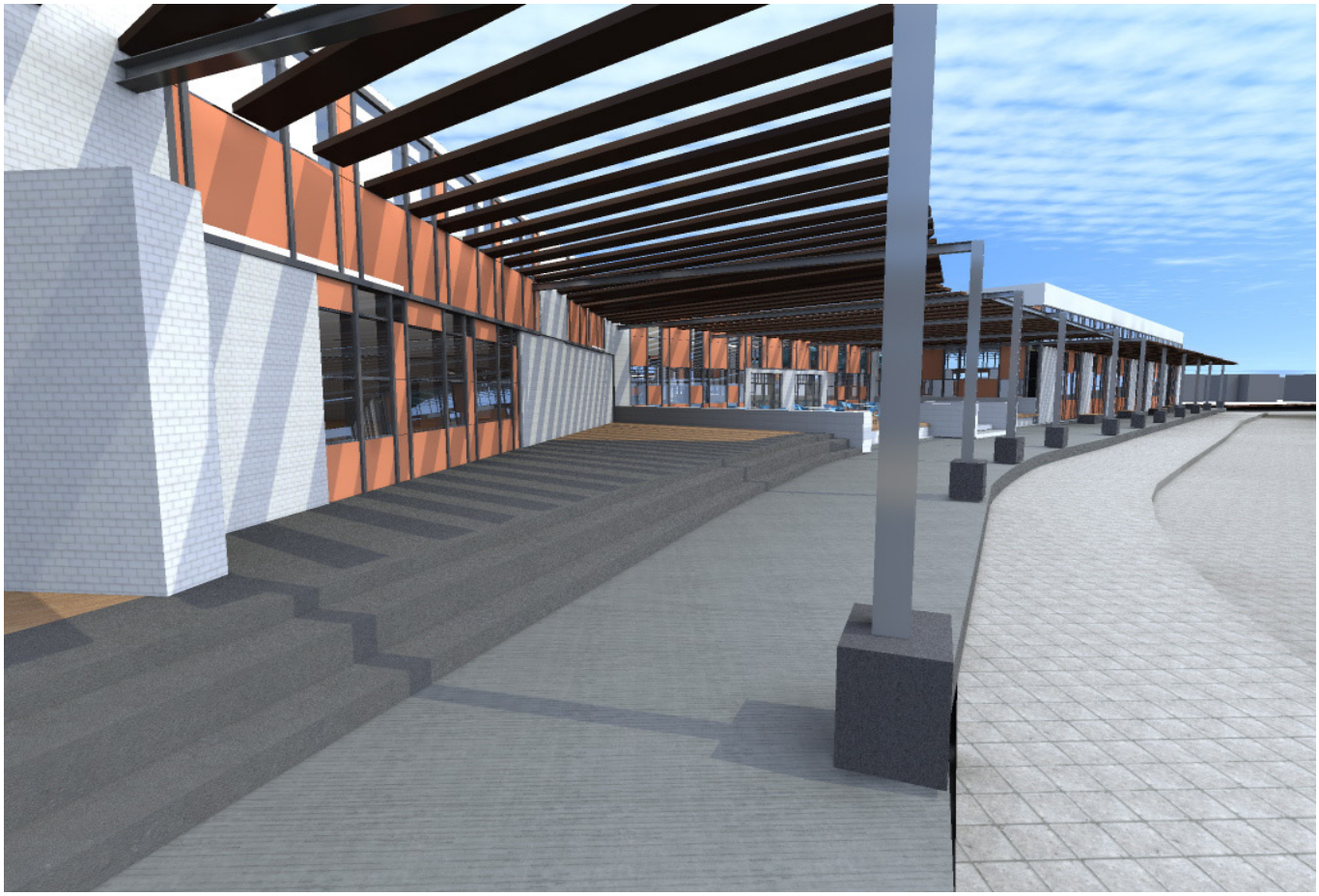


Sliding facade panels

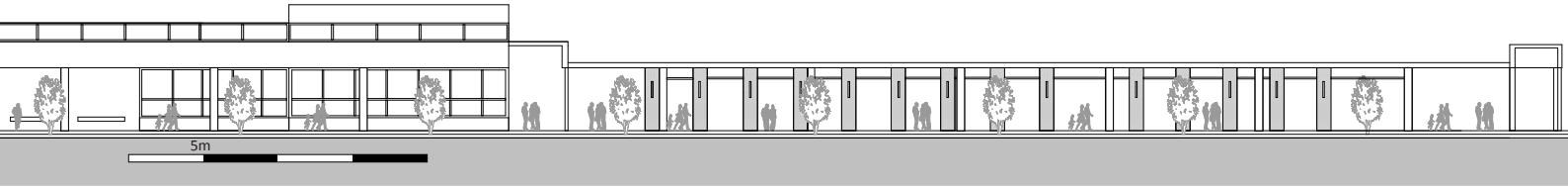
The facade panels of the sports hall and swimming pool area are designed to slide open with a controlled automated system. This allows the spaces to become more permeable and open, allowing people outside who walk past to observe activity inside the spaces. The sliding facade panels in addition allow for the spaces to receive sufficient cross ventilation.



North Elevation



North Elevation



5.3 Construction and Technology

Precedent

Exploring details

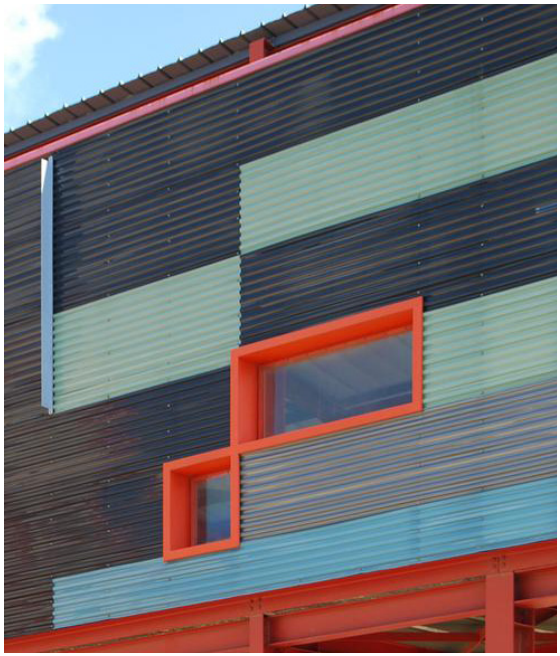
Lighting

Ventilation

Facade

Alexandra Heritage Centre. 2008. Alexandra. Johannesburg. Peter Rich Architects

Despite its simplistic, robust construction, the Alexandra Heritage Centre is a complex development. It shows how architecture can help support social processes and how the residents and local artisans could participate in the construction of this building (Detail 2011:344). This specific example was chosen to understand, how the steel portal frame structure, brick work and polycarbonate sheeting is put together to construct the building. Similar materials will be used in the in the Cosmo City sports centre. The sheet-metal apex covering is painted black so that the air immediately below is heated. The hot air can escape at the upper edge of the roof. In this way, a current is set in motion that draws cool air from the polycarbonate cavity on the facade (Detail 2011:348).

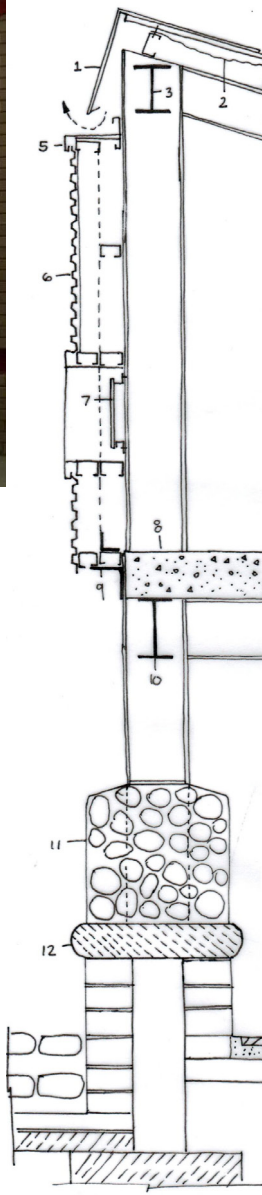


Polycarbonate Facade panels (Image by Rob Rich)



Steel portal frame structure (Image by Tom Madlener)

1.Sheet-metal apex covering painted black
2.Insulation in flexible strips fixed with wire to underside of roof
3.146/203mm steel I-Beam
4.100/50/20/2 mm cold-rolled steel channel section
5.240/65/73/20/2mm cold-rolled-steel section
6. 1.2 mm corrugated translucent polycarbonate cladding laid horizontally
7.Perspex sheeting with concealed fixings
8.Exposed reinforced concrete slab
9.150/150/15 steel angle
10.146/254mm steel I-beam column
11.Reinforced concrete column base clad externally with black-pointed stonework
12.150mm reinforced concrete bench



Section through facade after (Detail 2011:348)

Lighting

The overall concept, in terms of technology for the building is based on the design approach ,which allows for natural ventilation and natural light. The sports centre requires a lot of constant ventilation and lighting especially is the sports hall and foyer area. Mechanical systems on its own will be able to provide lighting and ventilation, however will be a costly to run the building on only mechanical systems. Therefore interventions such as open facade panels for natural ventilation were used and clearstory light and translucent roof covering were used to allow sufficient light into the space.

1.Light shelves

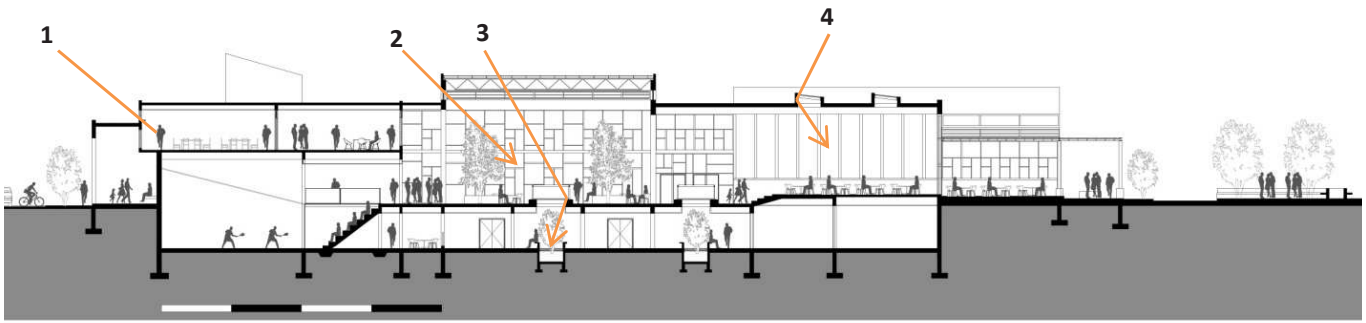
The workshop and homework rooms are located on the southern edge of the building, the space receives harsh south light in the afternoon. The use of light shelves assist to direct the incoming light upwards towards the ceiling, which then reflects down deeper into the interior of the room. The use of light shelves in addition prevents the light from glaring onto the work surfaces. The light shelves aid in reducing heat gain because the room does not receive direct sun light. Internal light shelves are mounted at 2.1 metres high, to eliminate the possibility of glare being reflected into ones eyes.
(Queens University 2010)

2.Clearstorey Window

Clearstory windows have been used in the larger volumes such as the main foyer, sports hall and pool area. The reason for utilising clearstory windows is that it provides a more uniform light for a large space. By positioning the windows on all four sides of the space, it allows the area to be lit equally from all sides. Therefore bringing in more natural light into the space.

3.Circular Light Wells

The lower ground level does not receive any natural light, because its located below street level. The aim of the circular light wells was to allow for natural light from the main foyer atrium to puncture through into the lower level ,which would bring slits of natural light into the lower foyer space. The inner slab and balustrade of the light wells is lined with a reflective panels that allows it to reflect the light further down into the lower level.



4. Light Wells

Light wells have been used on the first floor, where the homework room are located. The homework area is an internal space, and therefore it does not receive much natural sunlight. The use of light wells allows indirect light into the homework area, which will reduce the use of artificial lighting.

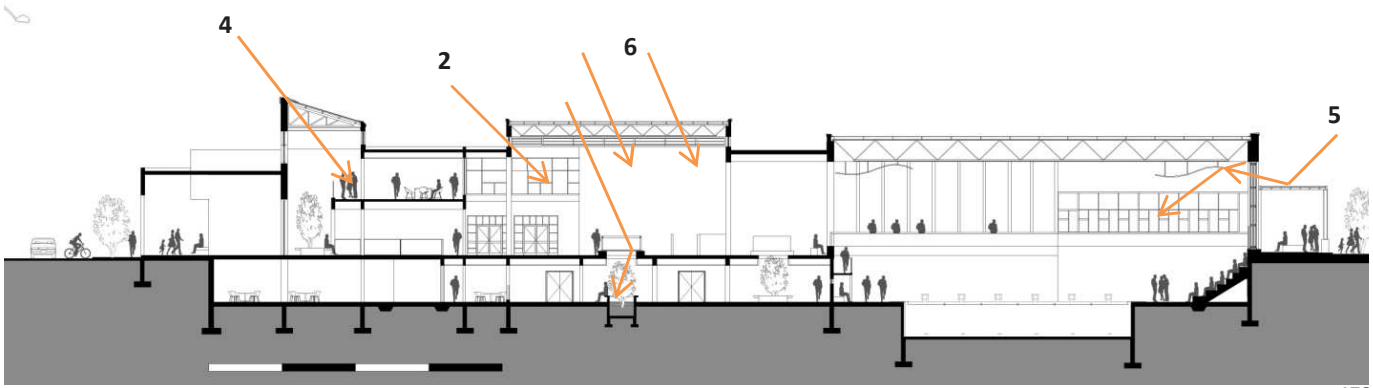
5.Covered Walkway

The covered pergola walkway functions as a flexible public space on the northern edge. However at the same time the covered walkway and pergolas allow the direct north light to be dappled, therefore preventing direct solar radiation from entering the covered walkway. The wide walkway also functions as horizontal louvers and a large overhang that diffuses the light and reduces heat gain in the pool area.

6.Atrium Transparent Roof Covering

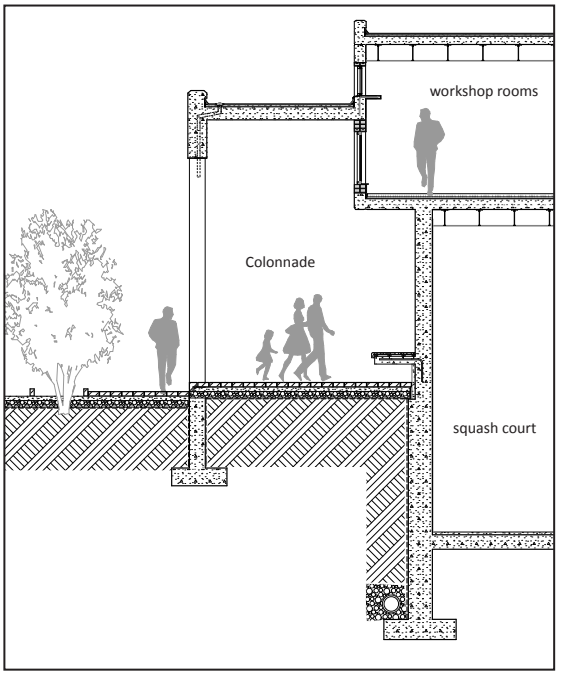
The larger atrium foyer design required a light roof structure that would allow sufficient natural light into the foyer space. A transparent silver polycarbonate sheeting was selected as a suitable and cost effective option versus glazing for the roof covering. Recent innovation in the industry has allowed for polycarbonate to transmit light and at the same time prevent 60% of radiated heat from entering through the use of 'heat stop'.

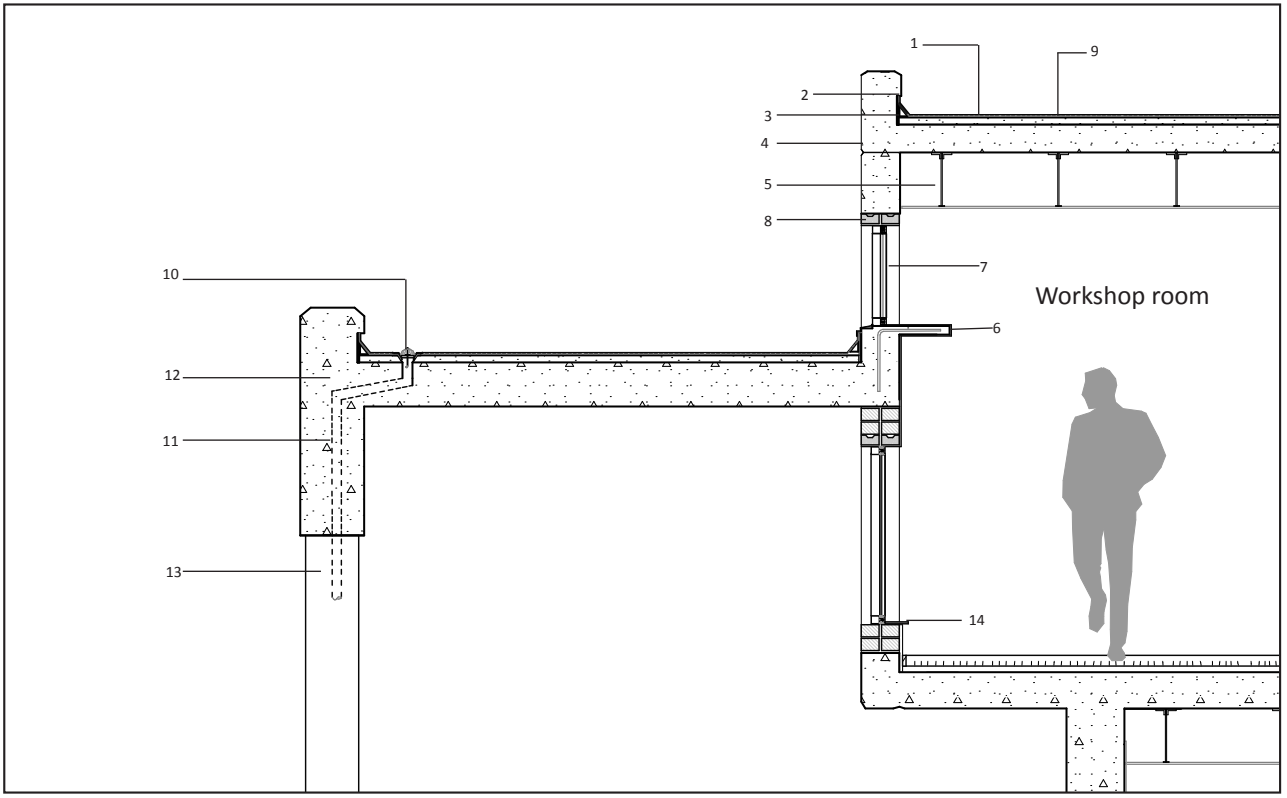
Heat Stop is a polycarbonate profiled extrusion, manufactured in South Africa, which has a co-extruded layer of UV stabilised surface protection on the weather side. Microscopic reflective particles are incorporated in the core material which create the silver colour and the reflective qualities of the product. This then, aids the direct sunlight to be diffused. This UV layer will not crack or delaminate, and ensures years of trouble-free performance in the harsh South African weather conditions (Hough Group 2010).



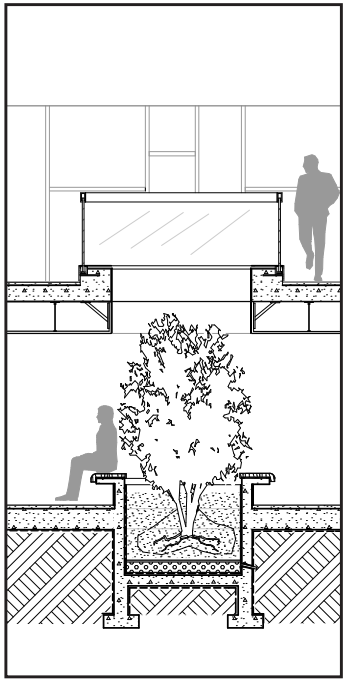
Detail 01

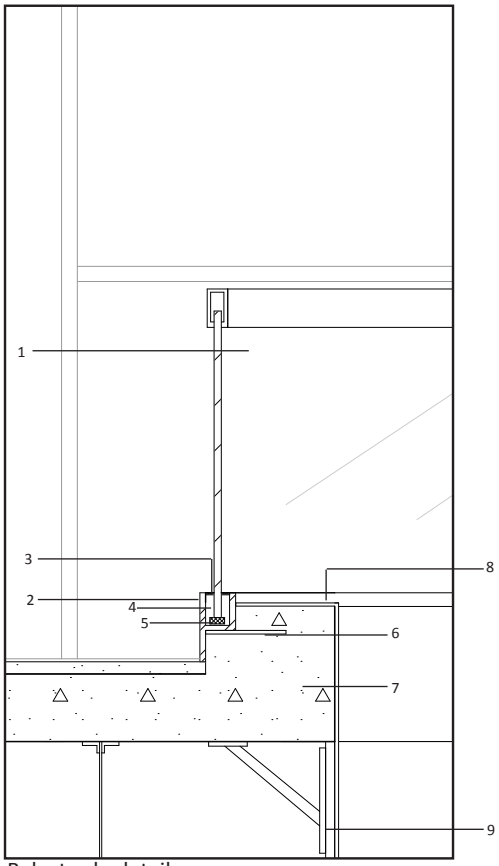
1. waterproofing membrane laid fully bonded to screed to the manufactures instructions
2. 20mm overhang
3. 75x75 concrete fillet
4. Fair face concrete
5. ceiling T s to be fixed to understand of slab with 600x600mm gypsum ceiling board panels
6. light shelve cast institu with reinforing rod to upstand beam.To engineers detail
7.Powdercoated aluminium window frame with glass pane
8.Reinforced concrete lintol
9. 1:5 cement screed laid to 1:50 fall with steel float finish with a min thickness of 35mm
10. 100 mm diameter vertical type fullbore outlet set in min 20mm below finished slab level
11. 80mm diameter plastic RWDP cast into column centres
12. Reinforced concrete slab to engineers detail
13. Reinforced concrete column to engineers detail
14.Superwood window cill to be painted black





Detail 02





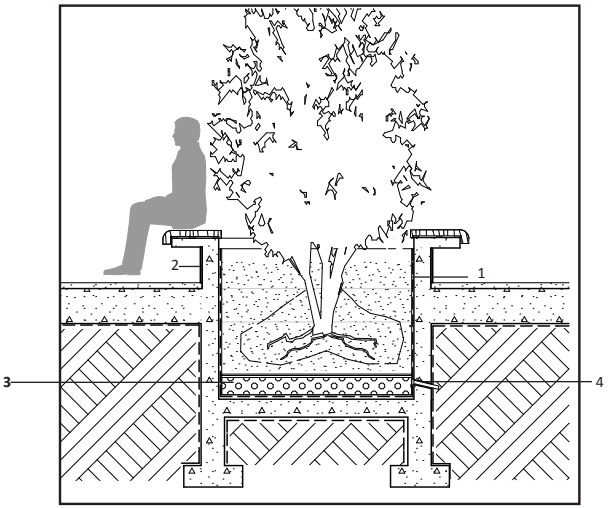
Balustrade detail

Balustrade detail on circular lightwell

1.Toughened safety glass balustrade
2.45x115 steel channel
3.5-10mm silicone filling
4.Non shrinkable grout
5.Neoprene setting blocks
6.10mm diameter steel round anchor
7.Reinforced concrete slab to engineers detail
8.Upstand bean and slab to receive 10mm plaster finish and paint.
9.Reflective panel to be fixed to steel brack

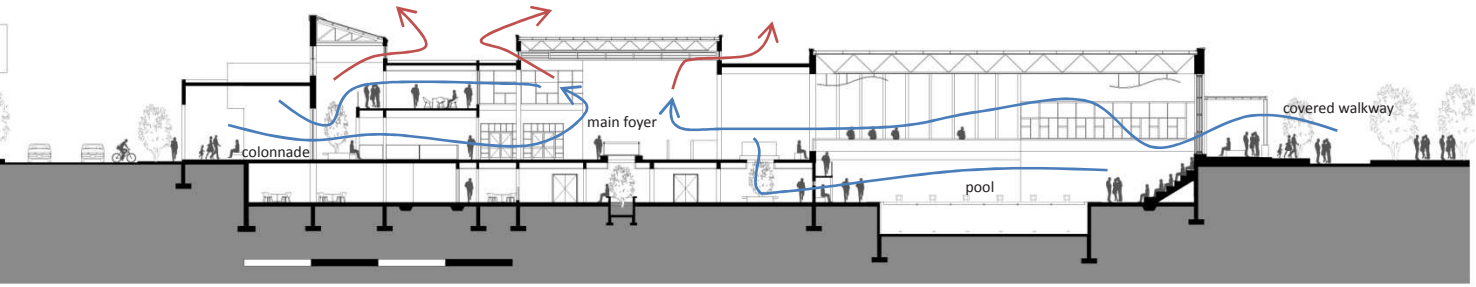
Planter Detail

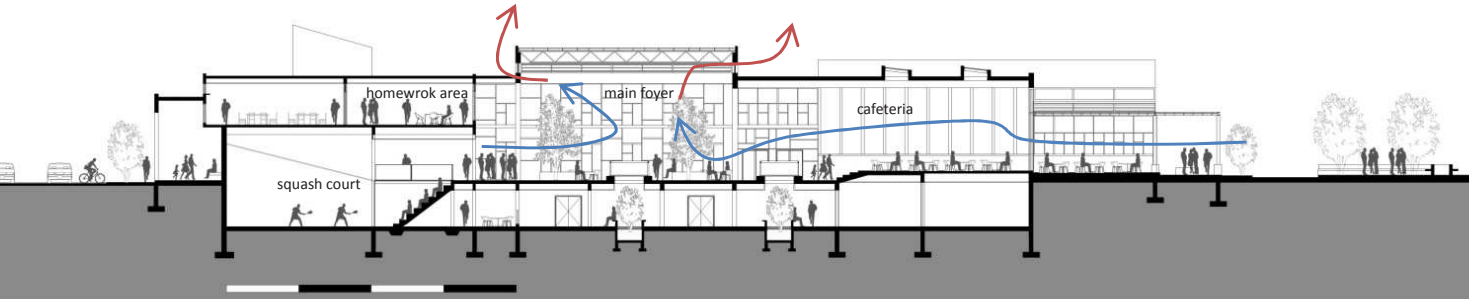
1.Waterproofing membrane laid and fully bonded to concrete planter
2.Cast institu concrete box cast with a slight slight slope
3.Geo fabric
4. 20mm diameter plastic water drainage outlet

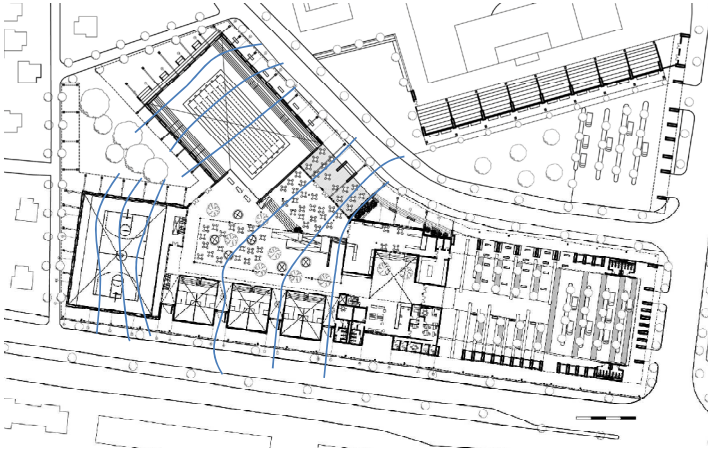


Planter Detail

Ventilation



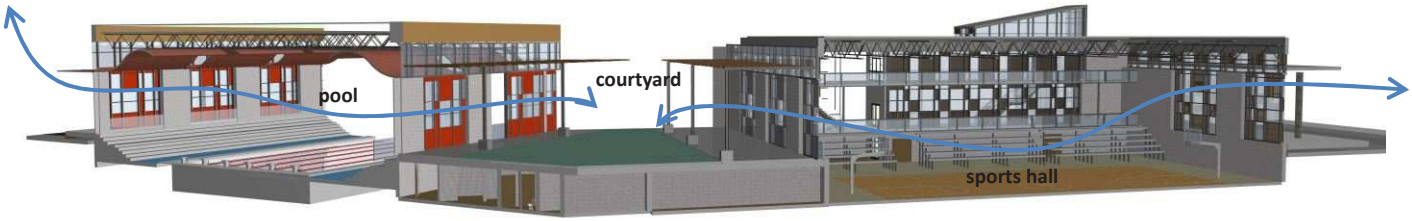




Generous openings in the facade allow for cross ventilation

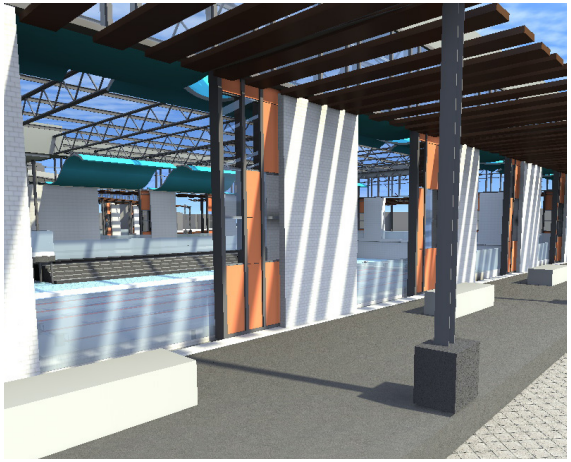
Natural Ventilation systems rely on natural driving forces, such as wind and temperature difference between a building and its environment, to drive the flow of fresh air through a building. Both work on the principle of air moving from a high pressure to a low pressure zone. Natural ventilation systems are usually integrated into building systems where there is some mechanical support (Resource smart 2010).

Being a space that generates sufficient heat through sport activities, the scheme uses both mechanical and natural ventilation ,however aims to rely more on natural ventilation. The two most prominent methods that are used for ventilation are cross ventilation and stack ventilation.Openings in the facade and no obstructing walls on the floor plate allow for cross ventilation in the sports centre.



The two main sport spaces are located on the western edge of the site where the existing trees can provide shade to the building. The main sports hall and pool are designed so that they lie on either side of the courtyard that allows for the spaces to receive natural ventilation.The sliding facade panels in the sports hall and pool area in addition also allow for the spaces to receive sufficient cross ventilation.

Facade



North facade.Looking into the pool area

Sports centre facade system

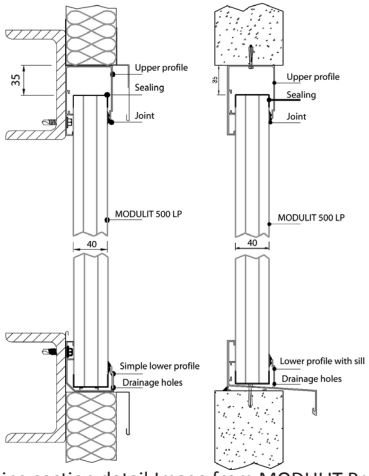
The sports centre uses the MODULIT polycarbonate as the facade system. This product is used on the sports hall, swimming pool and north facade of the building. The sports hall and swimming pool use the MODULIT panels in the sliding facade panels, that work on an automated system, allowing one to have control of when the panels can be opened and the size of the opening. The panels sit in a steel frame, which is the fixed onto a track. The facade panel when opened then sits in a brick cavity



Building that used Politec Modulit.
Image from http://www.archiexpo.com

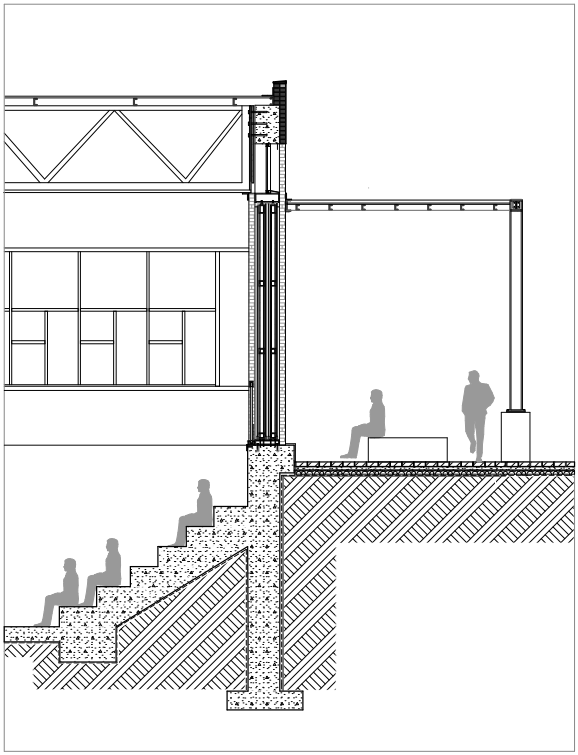
POLITEC MODULIT 500 LP.
Modular panel system in polocrbonate

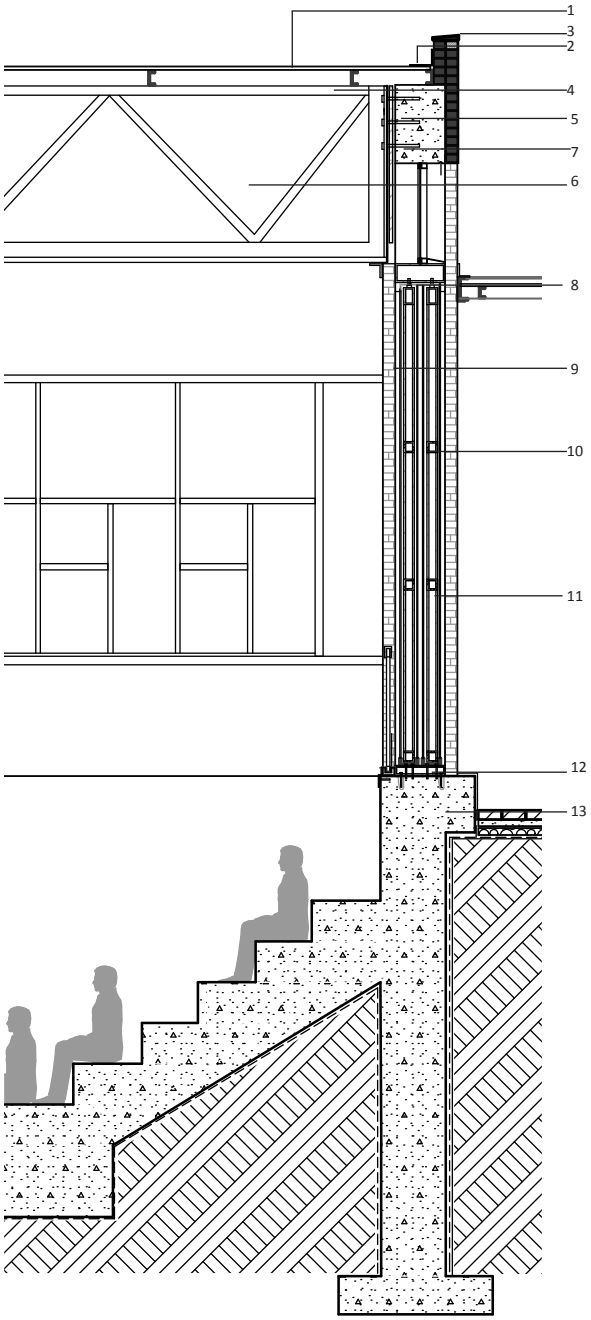
MODULIT is a polycarbonate modular panel system with a co-extruded UV protection. MODULIT system is mainly used for vertical or sloped glazing applications. The high thickness of 40mm and internal structure with diagonal ribs combine excellent mechanical properties and thermal insulation (Archiexpo 2010).



Fixing section detail.Image from MODULIT Product PDF

Detail 03



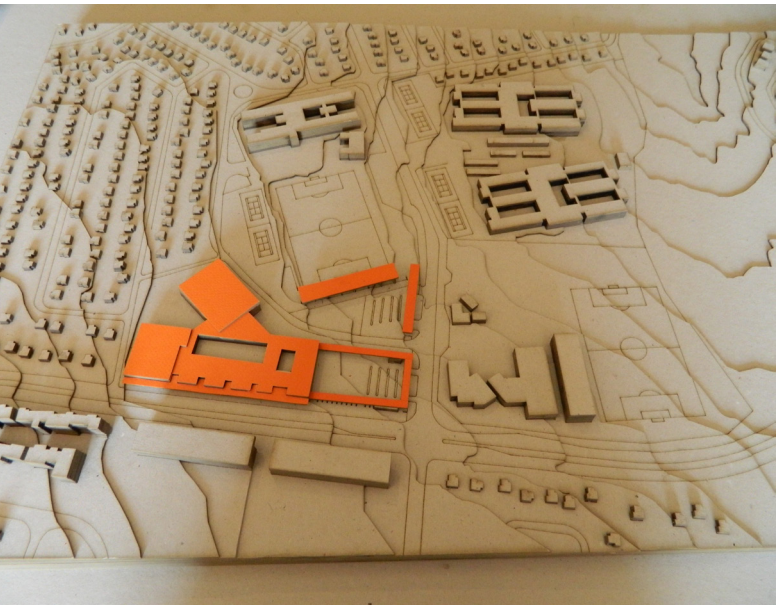


Facade detail

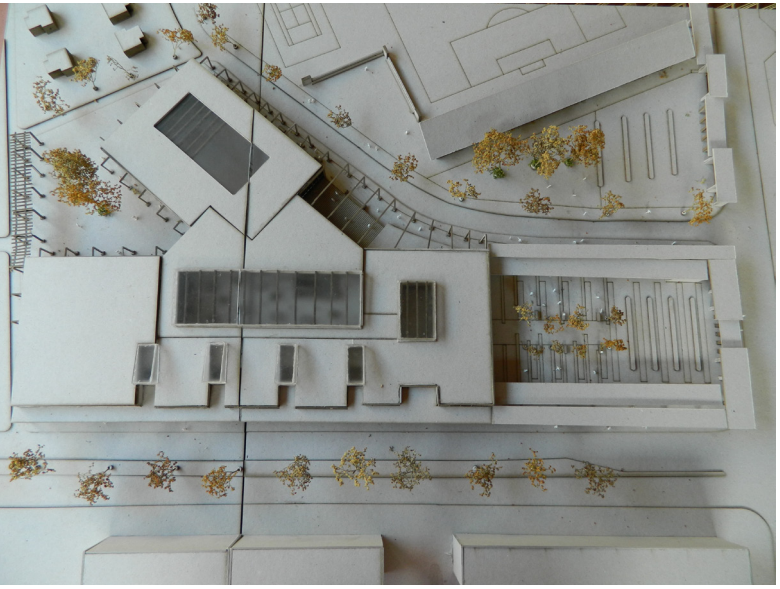
1.IBR Polocarbonate roof sheeting
2.Flashing to be fixed to sheeting and beam
3. Precast concrete copin
4.Insulation strip
5.Open web joist to be secured to steel bearing plate anchored in beam
6.Steel open wen joist
7.Reinforced concrete beam to engineers detail
8.Steel channel to be fixed to lug in concrete
9.Single skin Corobrick silver gray travertine
10.MODULIT panels in steel frame to be secured to track
11.Toughned glass balustrade
12.Steel channel
13.Concrete upstand beam to engineers detail

5.4 Design summary





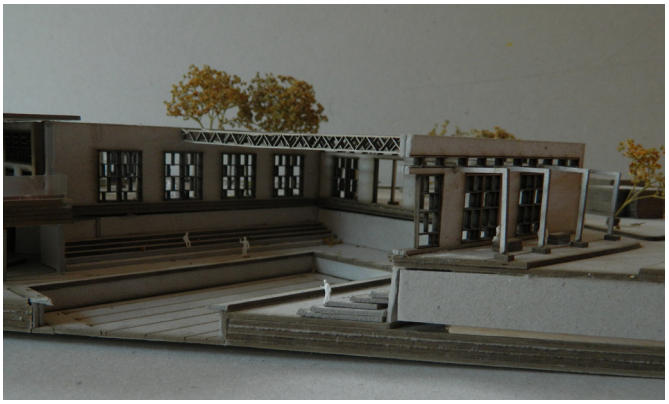
Context Model



Roof plan



Model showing interior view of squash courts,foyer and swimming pool

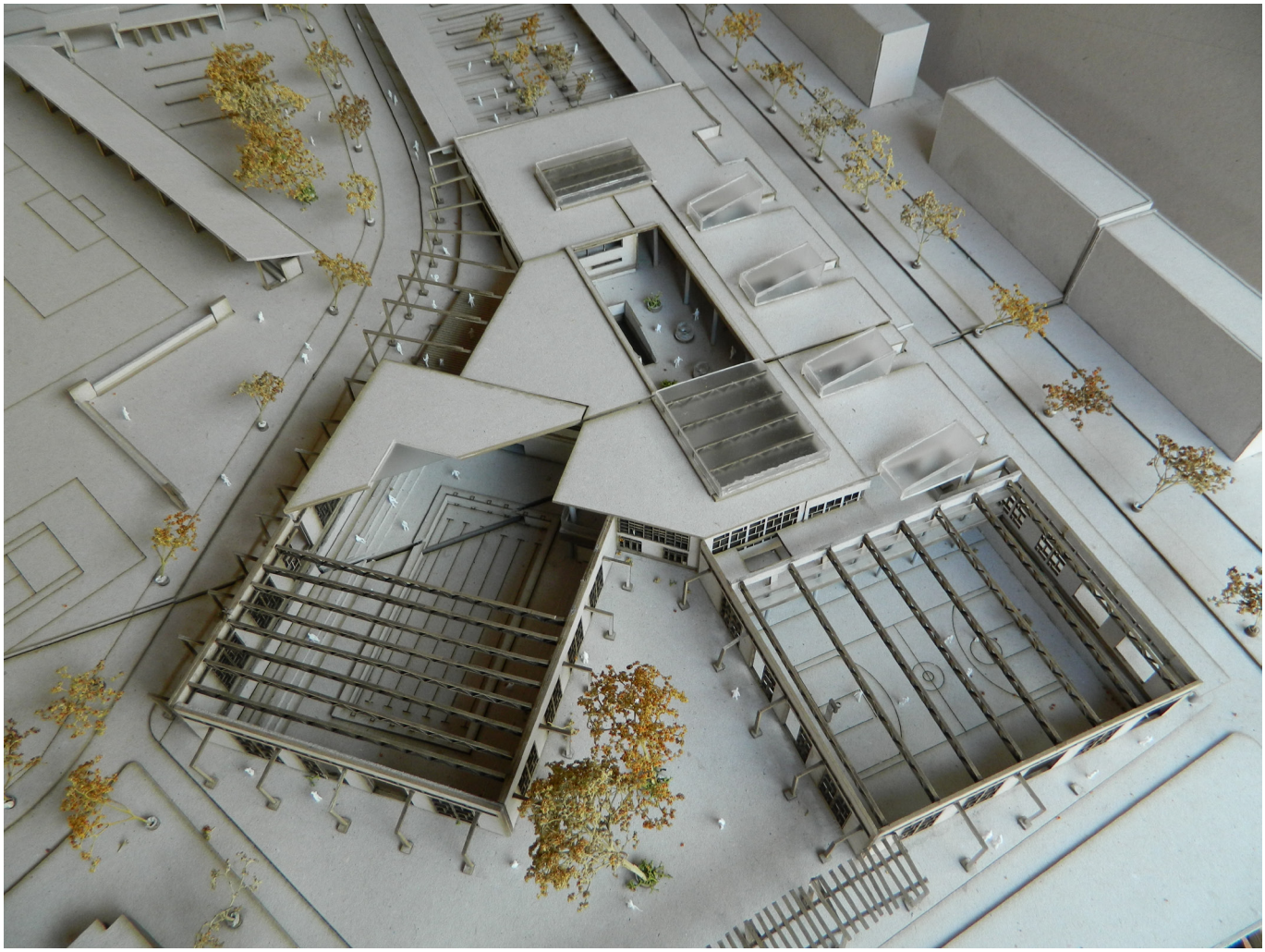


Swimming pool



Courtyard

Cosmo City Sports Centre-Models

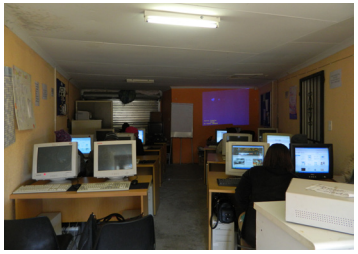


How this building works












Getting it built

The Cosmo City sports centre can be built by proposing the scheme to various departments in government. Or funding could be generated from the private and public sector. Many companies need to invest in social development programs and community outreach projects and this could be an ideal way to get involved by funding such a project. The other alternative is that the NGO could get a loan from a bank to fund the project.

Operation of the building

The existing Oasis NGO in Cosmo City are in desperate need of more space with better facilities. The building could be managed or owned by the NGO. The NGO will be responsible for co-ordinating all the activities and functions in the sports centre. Certain spaces such as the gym, cafeteria and market stalls could become rentable spaces to generate monthly income to maintain the running cost and up keep of the sports centre. In addition the sports hall could be rented out for functions to generate additional income.

Who are the users ?

The Cosmo City sports centre is designed to function as a public facility that is open to all residents of Cosmo City and those living in the surrounding areas and informal settlement. The building is designed to allow for easy access and to facilitate with a level of control and administration for security reasons.

The building is located closely to three schools that in total have over three thousand students. The current schools have limited facilities for the students to utilise. Therefore the Cosmo City sports centre becomes an extension to the school facilities. The Sports centre can be used during school hours for physical education classes.



The centre in addition will be able to provide a variety of after school extracurricular activities for the students. The centre in addition also provides flexible space to study and do homework and in addition provides internet access to facilitate research or learning basic computer skills.

The centre will cater for adult sport clubs, workshops and activities, which will promote development and healthy living in the community. The multi-use spaces of the sports centre such as the sports hall could be used for community gatherings. The various public spaces,cafeteria and market space in the design provide a backdrop for local residents to use the space for formal or informal activity. The design creates an urban environment for people to participate and engage in social and economic activity.

Conclusion

The aim of the design is to create a space that accommodates all users and various types of activity that can bring people together, ranging from social activity such as,social gatherings in the public square to sport activities such as playing basketball in the sports hall. The design intervention allows for access to facilities and resources while providing a framework for informal and formal activity to occur freely. The design ultimately sets the pre-conditions to allow for inclusive activity, development and integration to take place in Cosmo City.

This is achieved by creating a form and space that is open, accessible and transparent. The architecture creates an urban environment that encourages social interaction while providing multi-use space for existing informal activity to take place without any restraint on the site. The design allows spaces to overlap and intersect which creates an inclusive environment in a context that is fragmented by division of class. The design has flexible spaces that will evolve over time to suit the community of Cosmo City in their transition to becoming a more integrated community**.**

5.5 References

Banerjee,T. et al.(1990).City sense and city design. Cambridge London .The MIT press.

Beavon,K. (2004). Johannesburg: The making and shaping of the City. Pretoria ,University of South Africa Press

Borden,I and Ruedi,K. (2000).The Dissertation-An Architecture Students Handbook. Oxford: Architectural Press

Branch,M,C. (1985). Comprehensive City Planning: Introduction and explanation. American Planning association

Carmona,M.,et al. (2003).Public places,Urban spaces:The dimension of urban design. Oxford, Architectural Press

Ching.D.K.F.(2008).Building construction illustrated. 4th edition.John Wiley & Sons inc.

Detail Magazine.Alexandra heritage centre.vol 4/2011 p342-349

Dewar.D and Uytenbogaadt.R.S. (1995).Places to live: A guide.City Planning, University Of Cape Town,South Africa.

Dewar,D. and R.S,Uytenbogogaardt. (1991).South Africa Cities: A Manifesto for Change. University of Cape Town. Urban Problems Research Unit.

Gehl.J. (1987). Life between buildings: Using public space. New York ,Von Nostrand Reinhold Company

Gerneke,G. (2009).Red Location Museum of Stuggle 2006 In: Chapter 83 of 10 years+100 buildings.Architecture in Democartic South Africa. Cape Town,Bell Roberts publishing.

Hall,P.and Ward,C.(1998).Sociable Cities: The legacy of Ebenezer Howard. Wiley and Sons Ltd

Harrison,P.Todes,A.and Watson,V. (2008).Planning and Transformation: Learning from the post-apartheid experience. Routeledge

Itman.I. (1989).Public places and spaces. New York ,Plenum Press.

Kihato.C.W et al. (2010).Urban Diversity: Space, Culture, and Inclusive Pluralism in Cities Worldwide. Johns Hopkins University Press

Knipe,A.(2008).Museum of struggle,Red Location Cultural Precint,Port Elizabeth.Digest of South African Achitecture, vol 13,p12-p17.

Kostof,S.(1991).The City Shaped: Urban patterns and Meanings through history. Thames and Hudson Ltd

Lemon,A.(1991).Homes Apart: South Africa's Segregated Cities. Indiana University Press

Low,I. (2008).Baragwanath Transport Facility & Trader Market.Digest of South African Architecture,vol 13,p22-p25.

Lozano,E.(1990).Community design and the culture of cities. Cambridge University Press

Lynch,K.(1992).Good City Form. Cambridge The MIT press

Mathews.P.(2007).Detail Housed.Visual Books

Moughtin,C. (1992).Urban Design: Street and Square. Oxford, Architectural Press.

Read,S.Rosemann,J.& Eldijk,V,J.(2005).Future City. Spon Press

Spies,A. (2009).The New Ahmed Baba Institute. Digest of South African Architecture, vol 14 ,p92-p93.

Maps

Google Earth and Joburg GIS were used for the aerial maps of Cosmo City. The Cosmo City figure ground was generated from using a Google earth image that was drawn up in archicad.

University of Wiwatersrand.Graduate school of Enginnering and the Built Enviroment sytle guide for theses and dissertations was used as a guideline for referencing

Internet References

archiexpo.(2010).Modulit.INTERNET. http://www.archiexpo.com.modulit. Cited 12 October 2011

BasilReaddevelopments.(2009).CosmoCity.INTERNET. www. brdevelopments.co.za.Cited 2 March 2011

Cosmo Community centre.(2010).Tshepega.INTERNET.http://www. tshepega.co.za.Cited 15 October 2011

Cowden,B.(2006).Cosmo City Review.INTERNET. http://shift.org.za. Cited 10 March 2011

Hlanganani Garden Flats.(2010).ASA Architects.INTERNET.http://www. asaarchitects.co.za.Cited 14 October 2011

Hough Group.(2011).Poloycarbonate sheeting.INTERNET.http://www. roof-sheeting.co.za.Cited 25 October 2011

Informal settlement List (2010).Joburg IMS. INTERNET. http://ims.joburg. org.za.Cited 26 April 2011

Joburg City.Region C population.(2010)INTERNET. http://www.joburg.org. za.Cited 4 October 2011

Landman.K.(2004). Gated communities in South Africa: A review of the relevant policies and their implications. INTERNET. www.csir.co.za.Cited 4 October 2011.

Low,S,M .(2003).The Anthropology of Space and Place-Locating Culture. INTERNET. http://books.google.co.za/books.Cited 1st September 2010

Ndaba,D.(2008).South Africa's affordable housing programme is maturing but the delivery pressures are mounting. INTERNET. http://www. engineeringnews.co.za .Cited 28 March 2011

Resourcesmart.(2010).Cross ventilation.INTERNET.http://www. resourcesmart.vic.gov.au.Cited 24 October 2011

Statistics SA(2010).mid year population estimates.INTERNET. http://www. statssa.gov.za.Cited 4 October 2011

Urban Think tank .(2011).Vertical Gymnasium.INTERNET.http://www.u-tt. com.Cited 4 October 2011

Queens University.(2010).Integrated Learning Centre.INTERNET.http:// livebuilding.queensu.ca.Cited 25 October 2011

Reports

Building sustainable human developments in Johannesburg. End of term report 2006-2011.City of Johannesburg metropolitan municipality. Available at Johannesburg City Council

Cornell University.(2010).Cornell University Sustainable Design Research in Cosmo City.[Unpublished]

CUSD.(2010).Cornell Univiersity Sustainable Design Research.[unpublished report]

Landman.k,(2004).Gated communities in South Africa:A review of the relevant policies and their implication.INTERNET.http://www.csir.co.za. Cited 15 October 2011

Urban Dynamics.(2002).Cosmo City Framework report. Urban Dynamics Johannesburg.[Unpublished]

Vestro,D,U. and Teresa,A.(1999).How should the post- apartheid city be planned. Report from field work in Port Elizabeth, South Africa, carried out between 15 March-3 June 1999.Stockholm School of Architecture.

Interviews

Interview with Mrs Lynette Groenawald of Urban Dynamics. Took place on the 14.04.2011 at Urban Dynamics Office .Johannesburg.

Images

Cosmo house.(2008).Private property. INTENET. http://property.co.za. Cited 7 October 2011

Coca cola Dome.(2011).National boat show.INTERNET. www. nationalboatshow.co.za.Cited 7 October 2011

Itsoseng settlement.(2010).INTERNET. http://www.globalexchange.org. Cited 7 October 2011

Jackal Creek Estate. GolfingSA.INTERNET. http://www.golfinsouthafrica. com.Cited 7 October 2011

Alexandra Hertitage centre (2011).Detail Magazine.INTERNET.http://www. detail.de.Cited 14 October 2011

Alexandra Hertitage centre (2011) .Arch daily.INTERNET.http://www. archdaily.com.Cited 21 October 2011

All unreferenced images were taken by the author













Social Inclusion

a platform for social integration in Cosmo City

Chayneeka Jayawardena 2011

Programs used for the drawings,perspective and document layout:

Archicad 14

Photoshop CS3

Indesign CS5

Artlantis studio render 3