SECTION 7

7. TECHNICAL INVESTIGATION

7.1 Building Material

The selection of materials may reflect the architectural approach in the Tshwane city and the present time. The materials should reflect the historical tradition and cultural values of Tshwane city as a whole, thus materials are a means of celebrating our culture and social heritage. The Jazz centre will grant opportunities to explore and integrate building techniques and materials both urban and rural building practices, therefore incorporating materials that are associated with the diversified cultural population (Refer to fig. 151-164).

7.1.1 ❖ Timber

- Cladding
- Sun Screening
- Flooring
- Windows
- Doors

7.1.2 ❖ Concrete

- Structure
- Paving
- Trading Stands
- Cladding
- Roofing

7.1.3 ❖ Corrugated Sheeting

- Cladding
- Roof Covering

7.1.4 ❖ Aluminium

- Windows
- Doors

7.1.5 ❖ Steel

- Structure
- Roof
- Bracing

7.1.5 ❖ Rocks

- Paving
- Cladding

7.1.6 ❖ Glass

- Glazing
- Doors

Fig.151 Wall Finish (Grobbelaar, 1993:12)

Fig.152 Wall Finish (Grobbelaar, 1993:14)

Fig.153 Wall Finish (Architecture SA 2007:3)

Fig.154 Wall Finish (Architecture SA 2007:3)

Fig.155 Floor Finish (Architecture SA 2007:3)

Fig.156 Floor Finish (Architecture SA 2007:3)

Fig.157 Sun Screen(Leading Architecture 2003:20)

Fig.163 Floor Finish (Anon, 1995:53-55)

Fig.158 Floor Finish (Architecture SA, 2007:3)

Fig.164 Floor Finish (Anon, 1995:1)

Fig.159 Floor Finish (Architecture SA, 2007:9)

Fig.160 Floor Finish (Anon, 1995:1)

Fig.161 Floor Finish (Anon, 1995:53-54)

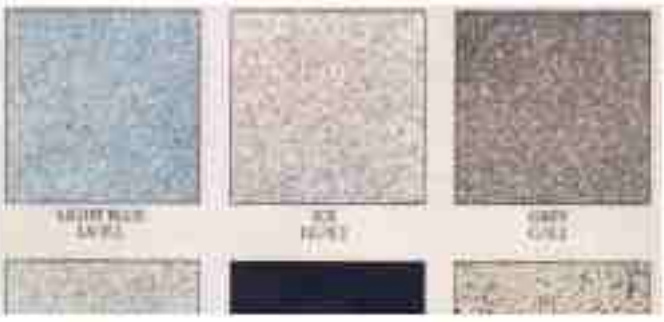

Fig.162 Floor Finish (Anon, 1995:53-55)

7.2 Finishes Schedule

GROUND FLOOR

7.2.1 Main Entrance

- Finishes Columns and Beams
  - In-Situ Concrete.
  - Indiscriminate Scratch and paint with different colours (representing a rainbow nation).
- Finishes Walls
  - Traditional Scratch and Paint.
  - Flush jointed Face Brick.
  - Stock Brick plastered inside and Stone Cladding outside.
  - Crafted Steel representing music elements on walls openings.
- Finishes Floors
  - Ivory I/E.J. Floor Tile Manufactured by Union Flooring Tile.
  - Craz "E" Classic Cobble paving Blocks.
- Finishes Soffit
  - In-Situ Concrete.
  - Traditional Scratch and Paint.
- Finishes Ceiling
  - Mineral Fiber Panels natural finish.
  - Rough-cast and paint.
- Finishes Doors and Windows
  - Clear Varnish on doors exposing the timber.
  - Aluminium Windows-factory finish with a timber coating.
- Balustrades
  - One coat primer two coats sealer (colours to be approved).

7.2.2 Main Entrance Foyer/Hair and Cosmetics

- Finishes Columns and Beams
  - In-Situ Concrete.
  - Indiscriminate Scratch and Paint.
- Finishes Walls
  - Traditional Scratch and Paint.
  - Flush jointed Face Brick.
- Finishes Floors
  - Suntan Weave Floor Tile Manufactured by Union Flooring Tile.
- Finishes Soffit
  - In-Situ Concrete.
  - Traditional Scratch and Paint.
- Finishes Ceiling
  - Mineral Fiber Panels natural finish.
  - Rough Casted and painted.
- Finishes Doors and Windows
  - Clear Varnish on doors exposing the timber.
  - Aluminium Windows-factory finish with a timber coating.

7.2.3 Jazz Club

- Finishes Columns and Beams
  - In-Situ Concrete.
  - Plaster and Paint.
  - 10mm thick Tongue and Groove Hardwood Timber Board with Clear Varnish.
- Finishes Walls
  - Traditional Scratch and Paint.
  - Rough-cast and Paint.
- Finishes Floors
  - Burnt Brown Floor Tiles Manufactured by Union Flooring Tile.
  - Timber Floor Decking by Specialist.
- Finishes Soffit
  - In-Situ Concrete.
  - Traditional Scratch and Paint.
- Finishes Ceiling
  - Mineral Fiber Panels natural finish.
- Finishes Doors and Windows
  - Clear Varnish on doors exposing the timber.
  - Aluminium Windows-factory finish with a timber coating.

7.2.4 Restaurant/Anat Fast Food

- Finishes Columns and Beams
  - In-Situ Concrete.
  - Plaster and Paint.
  - 10mm thick Tongue and Groove Hardwood Timber Board with Clear Varnish.
- Finishes Walls
  - Traditional Scratch and Paint.
  - Stone Cladding exposed on inside.
- Finishes Floors
  - Terracotta Rustic Floor Tiles Manufactured by Union Flooring Tile.
  - Freezer Room Floor by Specialist.
- Finishes Soffit
  - In-Situ Concrete.
  - Traditional Scratch and Paint.
- Finishes Ceiling
  - Mineral Fiber Panels natural finish.
- Finishes Doors and Windows
  - Clear Varnish on doors exposing the timber.
  - Aluminium Windows-factory finish with a timber coating.

GROUND FLOOR

7.2.5 Administration Wing

- Finishes Columns and Beams
  - In-Situ Concrete.
    - Indiscriminate Scratch and Paint.
- Finishes Walls
  - Traditional Scratch and Paint.
    - Flush Jointed Face Brick.
- Finishes Floors
  - Olive M14 E.J. Floor Tiles Manufactured by Union Flooring Tile.
    - Carpet Manufactured by Belgotex Carpet.
    - Timber Floor by Specialist.
- Finishes Soffit
  - In-Situ Concrete.
    - Traditional Scratch and Paint.
- Finishes Ceiling
  - Mineral Fiber Panels natural finish.
- Finishes Doors and Windows
  - Clear Varnish on doors exposing the timber.
    - Aluminium Windows-factory finish with a timber coating.

7.2.6 Classrooms/Shops/Information Centre

- Finishes Columns and Beams
  - In-Situ Concrete.
    - Indiscriminate Scratch and Paint.
- Finishes Walls
  - Traditional Scratch and Paint.
- Finishes Floors
  - Olive M14 E.J. Floor Tiles Manufactured by Union Flooring Tile.
- Finishes Soffit
  - In-Situ Concrete.
    - Traditional Scratch and Paint.
- Finishes Ceiling
  - Mineral Fiber Panels natural finish.
- Finishes Doors and Windows
  - Clear Varnish on doors exposing the timber.
    - Aluminium Windows-factory finish with a timber coating.

7.2.7 Coffee Shop

- Finishes Columns and Beams
  - In-Situ Concrete.
    - Indiscriminate Scratch and paint.
- Finishes Walls
  - Traditional Scratch and no paint.
    - Flush jointed Face Brick.
- Finishes Floors
  - Olive M14 E.J. Floor Tiles Manufactured by Union Flooring Tile.
- Finishes Soffit
  - In-Situ Concrete.
    - Traditional Scratch and no paint.
- Finishes Ceiling
  - Rough-cast and paint.
- Finishes Doors and Windows
  - Clear Varnish on doors exposing the timber.
    - Aluminium Windows-factory finish with a timber coating.

FIRST FLOOR

7.2.8 Performance Theatre

- Finishes Walls
  - Scratchtex.
    - Carpet Manufactured by Belgotex Carpet.
    - Impact Barrier Plus underlayment (Sound absorption material).
- Finishes Floors
  - Carpet Manufactured by Belgotex Carpet.
    - Impact Barrier Plus underlayment (Sound absorption material).
- Finishes Ceiling
  - Mineral Fiber Panels natural finish.
- Finishes Doors
  - Clear Varnish on doors exposing the timber.

7.2.9 Recording Studios

- Finishes Walls
  - Carpet Manufactured by Belgotex Carpet.
    - Impact Barrier Plus underlayment (Sound absorption material).
    - Soft Sound Class 'A' Pyramid Studio Form by Specialist.
    - Plaster Board Panels fixed to wall by timber frame.
- Finishes Floors
  - Carpet Manufactured by Belgotex Carpet.
    - Impact Barrier Plus underlayment (Sound absorption material).
- Finishes Soffit
  - Scratchtex.
    - Carpet Manufactured by Belgotex Carpet.
    - Impact Barrier Plus underlayment (Sound Absorption material).

FIRST FLOOR

- Finishes Ceiling
  - Mineral Fiber Panels natural finish.
- Finishes Doors and Windows
  - Heavy-duty noise blocking barrier laminated to 1 in. thick sound absorbing foam.
  - The noise blocking door cover, sound stopping perimeter seal and door sweep.
  - Door frame Sound Barrier tape & acoustical sealant to fill in gaps, holes and cracks in the door and frame
  - Clear Varnish on doors exposing the timber.
  - Aluminium Windows-factory finish with a timber coating.

7.2.10 Braai Area/Social Area

- Finishes Walls
  - Traditional Scratch and Paint.
  - Flush Jointed Face Brick.
- Finishes Floors
  - Olive Sand Mazista Floor Tile.
- Finishes Doors
  - Clear Varnish on doors exposing the timber.

7.2.11 Exhibition Area

- Finishes Columns and Beams
  - In-Situ Concrete.
  - Indiscriminate Scratch and paint with different colours (representing a rainbow nation).
- Finishes Walls
  - Traditional Scratch and Paint.
  - Flush jointed Face Brick.
  - Stock Brick plastered inside and Stone Cladding outside.
  - Crafted Steel representing music elements on walls openings.
- Finishes Floors
  - Suntan Weave Floor Tile Manufactured by Union Flooring Tile.
- Finishes Soffit
  - In-Situ Concrete.
  - Traditional Scratch and Paint.
- Finishes Ceiling
  - Mineral Fiber Panels natural finish.
  - Rough-cast and paint.
- Finishes Doors and Windows
  - Clear Varnish on doors exposing the Timber.
  - Aluminium doors-factory finish with a timber coating.
  - Aluminium Windows-factory finish with a timber coating.

7.2.12 Board Room

- Finishes Columns and Beams
  - In-Situ Concrete.
  - Indiscriminate Scratch and Paint.
- Finishes Walls
  - Traditional Scratch.
  - Carpet Manufactured by Belgotex Carpet.
- Finishes Floors
  - Carpet Manufactured by Belgotex Carpet.
  - Impact Barrier Plus underlayment (Sound absorption material).
- Finishes Soffit
  - Traditional Scratch.
  - Carpet Manufactured by Belgotex Carpet.
- Finishes Ceiling
  - Mineral Fiber Panels natural finish.
- Finishes Doors and Windows
  - Clear Varnish on doors exposing the timber.
  - Aluminium Windows-factory finish with a timber coating.

7.2.13 Lecture Theatre

- Finishes Walls
  - Traditional Scratch and Paint.
  - Carpet Manufactured by Belgotex Carpet.
  - Impact Barrier Plus underlayment (Sound absorption material).
- Finishes Floors
  - Timber Floor Slates by Specialist.
- Finishes Ceiling
  - Mineral Fiber Panels natural finish.
- Finishes Doors
  - Clear Varnish on doors exposing the timber.

7.3 Acoustics (Materials)

The investigation of sound within specific rooms plays a critical role in a music related building. The proposed centre for Jazz requires fine-tuning of sound quality inside of certain rooms: Recording Studios, Performance Theatres and Lecture Theatres (refer to fig 165-170).

Standing waves results to a destruction, and this may cause enhancement of certain frequencies in the music that are undesirable. Standing waves are controlled by non-parallel walls, and the energy is not trapped between the parallel surfaces, but actually disperses throughout the room. Reverberation Time can also causes destruction to sound quality in a room that is poorly designed, therefore contents of a room affect the amount of absorption and in turn the reverberation time.

They are different types of acoustic materials which can assist in the fine-tuning of sound quality: fiber base (fiberglass, Cotton /Polyester), foams and a variety of alternative resin-based products. Selection of the proper materials is dependent on room size, composition, building codes and desired finished appearance.

Fig.165 Quiet Barrier
(http://soundprooffoam.com/)

Fig.166 Impact Barrier-plus-temp (ibid)

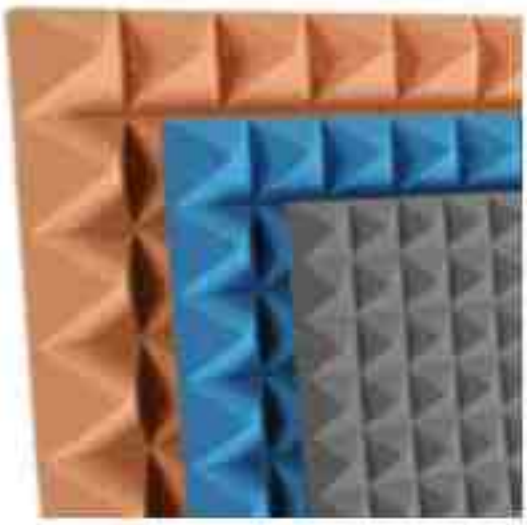

Fig.167 Pyramid-Family
(http://soundprooffoam.com/)

Fig.168 Quiet Batt Fibercraft (ibid)

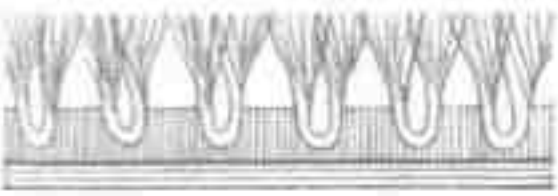

Fig.169 Belgotex carpet (Ching, 2001:7)

Fig.170 Tufcore Ceiling Tiles
(http://soundprooffoam.com/)

7.4 Properties of Materials

7.4.1 Quiet Barrier

A flexible, 2lb per sq./ft. 1/4 in. thick, high density material with a smooth surface designed to reduce noise transmission between two spaces. Applications include reducing airborne noise transmission through walls, ceilings and floors.

- ☐ High performance soundproofing material for reducing airborne noise.
- ☐ May be used behind drywall in wall and ceiling assemblies or sandwiched between existing and new drywall.
- ☐ Use in flooring systems to increase sound transmission class.
- ☐ Only 1/4 in. thick yet weighs 2lb./sq. ft. for maximum noise blocking.
- ☐ Used for both residential and commercial soundproofing applications.

(http://soundprooffoam.com/)

7.4.2 Impact Barrier-plus-temp

Premium grade carpet underlayment designed to reduce the transfer of sound from impact.

- ☐ Extremely effective in reducing impact sound.
- ☐ Very effective in reducing airborne sound transmission.
- ☐ Extra padding for additional acoustic performance and comfort.
- ☐ Extends the life of your carpet.
- ☐ Reusable under normal conditions & traditional installation methods.
- ☐ Engineered for plush carpets.
- ☐ Made with approximately 60% recycled materials.
- ☐ 1/2 in. thick easy to cut and install.

(ibid)

7.4.3 Pyramid-Family

High performance, sound absorbing foam panel designed to reduce echo within an environment. Enhances sound quality and aesthetics of a recording or listening environment.

- ☐ Excellent echo reduction.
- ☐ 3D pyramid pattern adds architectural interest.
- ☐ Variety of colors, see color options.
- ☐ Light weight, open cell polyurethane foam.
- ☐ Easy to cut and install, see installation method.
- ☐ UL94 HF-1 flammability rating.

(ibid)

7.4.4 Quiet Batt Fibercraft

A premium high-performance acoustical / thermal insulation manufactured from 80% recycled cotton fibers. Quiet batt offers superior noise reduction versus typical fiberglass, cellulose and foam insulations.

- ☐ No itch, easy to handle friction-fit: easy to install.
- ☐ Superior sound absorbing performance.
- ☐ 80% + recycled cotton fiber content.
- ☐ Available in 3-1/2 in. & 5-1/2 in. thickness.
- ☐ No harmful chemicals or worker discomfort.
- ☐ Meets "Green" building requirements.

(http://soundprooffoam.com/)

7.4.5 Carpet

- ☐ Highly durable construction.
- ☐ Attractive finished appearance.
- ☐ perfect for increasing speech privacy.
- ☐ Outstanding sound absorption performance.

(Ibid)

7.4.6 Tufcore Ceiling Tiles

High-performance composite ceiling panel. Especially well-suited to minimize sound transmission between adjacent spaces sharing a common plenum or attic space.

- ☐ Dual function performance absorbs and blocks sound transmission.
- ☐ Available in a variety of finish options and edge details
- ☐ Minimize sound transmission between adjacent spaces sharing a common plenum or attic space.
- ☐ Gypsum improves sound blocking.
- ☐ Fiberglass cores improves sound absorbing.

(Ibid)

7.5 Performance Theatre

To achieve a good listening environment for music in the Theatres, certain precaution have been adhered to for good results. The walls have been designed to be at divergent angles to prevent standing waves and to help reflect sound to the audience. (refer to fig. 171-172) The side walls are finished with strips of sounding board (reflectors) at certain intervals to help reflect sound to the audience where it is desired. Skimmed plaster board ceiling is fixed at a curving profile to prevent parallel surfaces. The back of the wall is made absorbent by applying Carpet as an absorptive material to decrease the possibilities of echo. Carpet in conjunction with the Impact Barrier Plus underlayment have been applied on the floor for absorptive purposes.

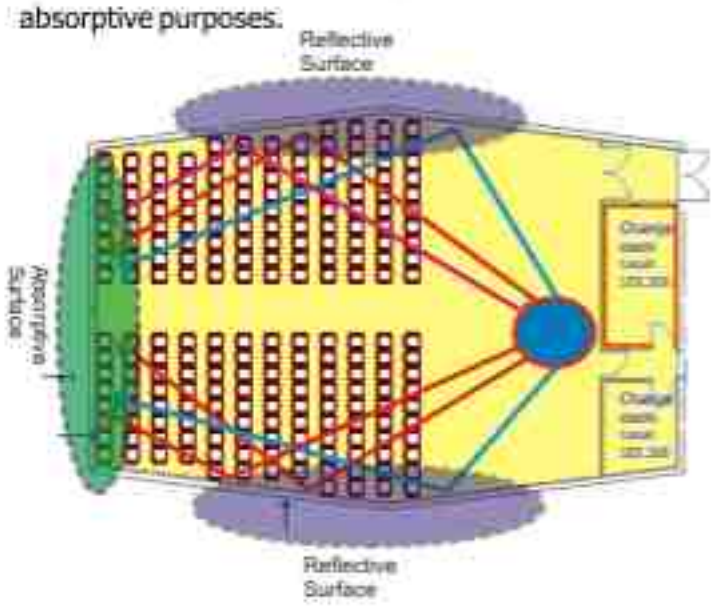

Fig.171 First Floor sketch Plan Theatre Layout

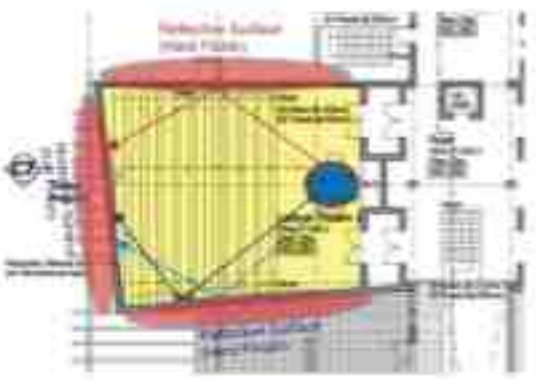

Fig.172 Sketch Section C-C

Fig.173 First Floor sketch Plan Theatre layout

7.6 Lecture Theatres

The principles of sound absorption and reflection adhered to in Lecture Theatres applies the same way as the Performance Theatres. Non-parallel reflective walls have been designed with a reflective ceiling secured at a curving profile (refer to fig. 173). Timber Floor Slates by specialist are applied to the floor and the concept of absorption will be catered by the people occupying the seats.

7.7 Recording Studios

Studio setting requires strategic placement of sound absorption surfaces to control standing waves and reverb-time. The concept of absorbing sound is exploited the same way as the Performance Theatres, but in the Recording Studios flutter echoes are discouraged by not permitting sound to reflect from the walls. The sound source is usually from the middle of the room and disperses throughout the room perimeter, therefore a Soft Sound Class 'A' Pyramid Studio Form by specialist is applied to the three sides of the Studio. Plaster board panels are fixed at an angle on one side of the walls to avoid parallel sides thus discouraging standing waves. Mineral Fibre ceiling panels are secured at a curving profile to avoid parallel surfaces (refer to fig. 174-176). The floors are constructed the same way as the Performance Theatres.

Fig.176 Section C-C sketch

The maximization of good quality sound in sensitive Recording Studio rooms and Theatres environment is of great necessity from a musical related Jazz centre perspective.

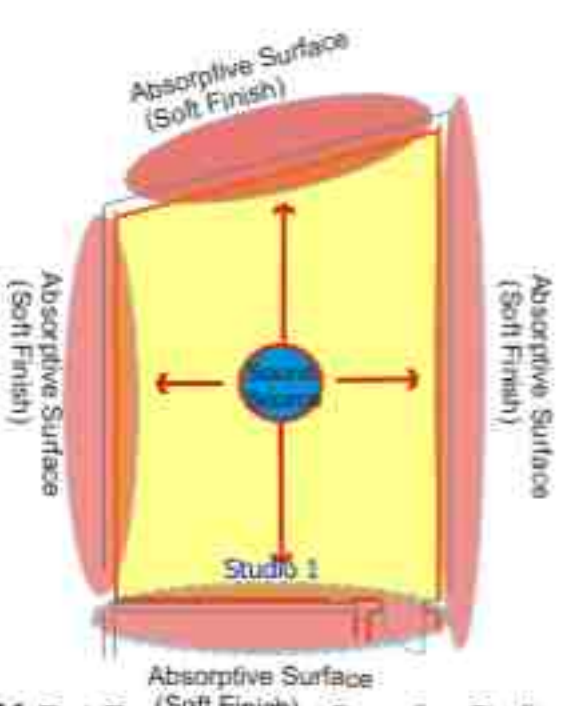

Fig.174 First Floor sketch Plan Recording Studio Layout

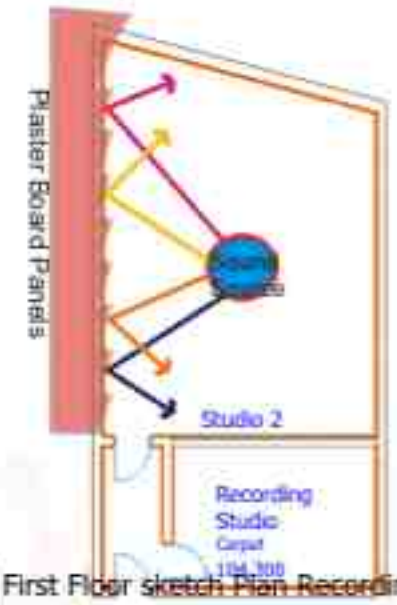

Fig.175 First Floor sketch Plan Recording Studio layout

7.8 Sound Absorption Details

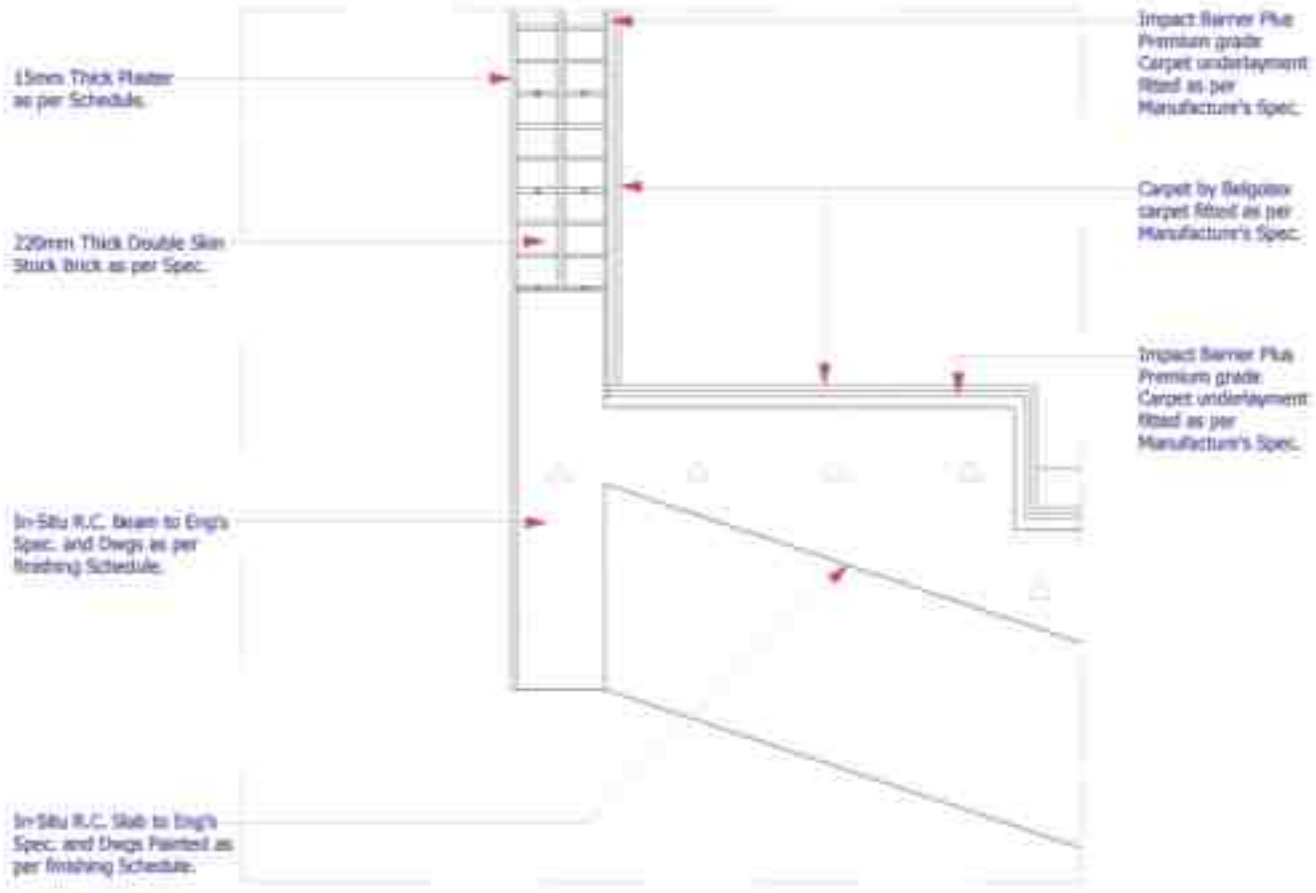

Fig.177 Detail-4a

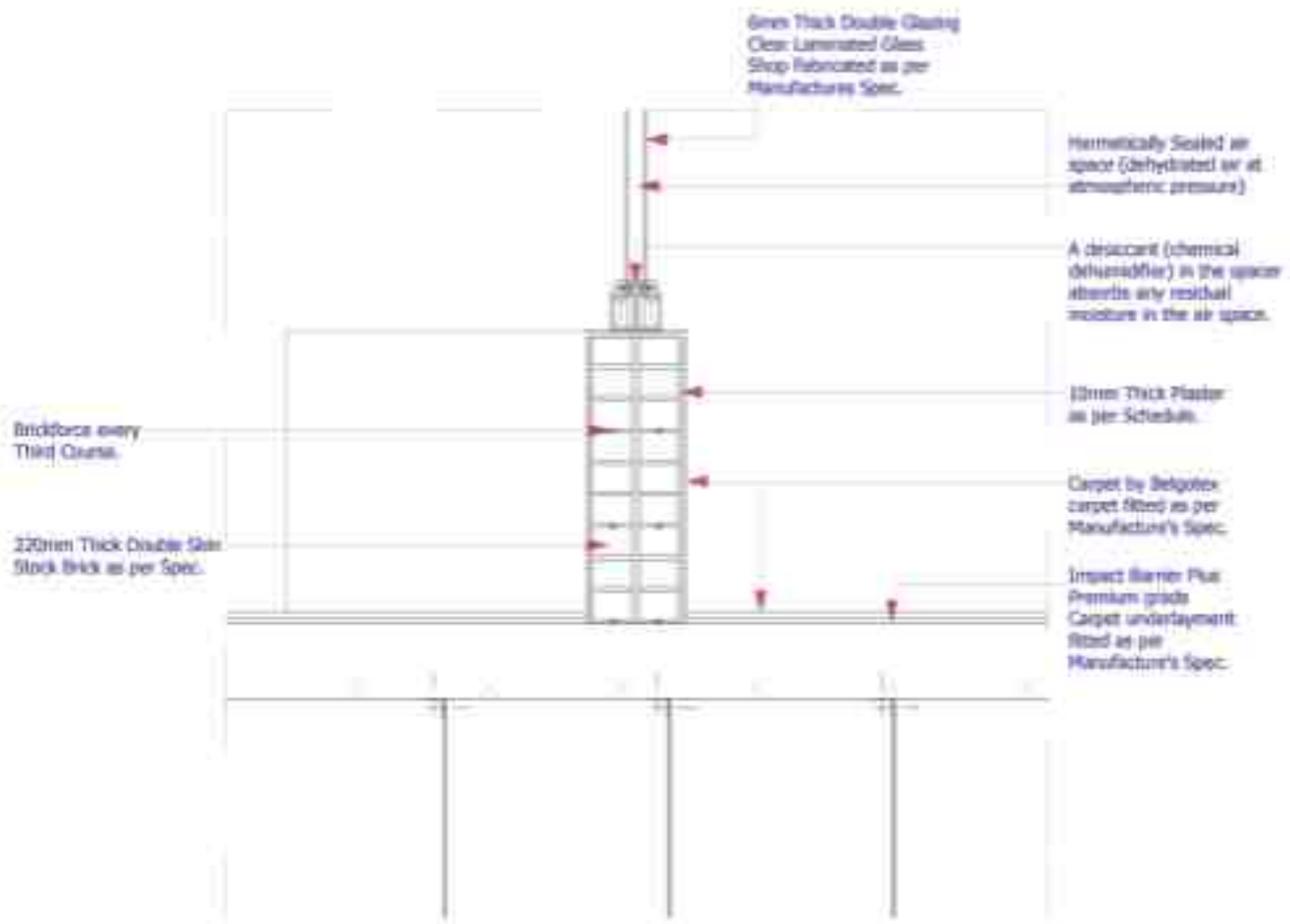

Fig.178 Detail-6c

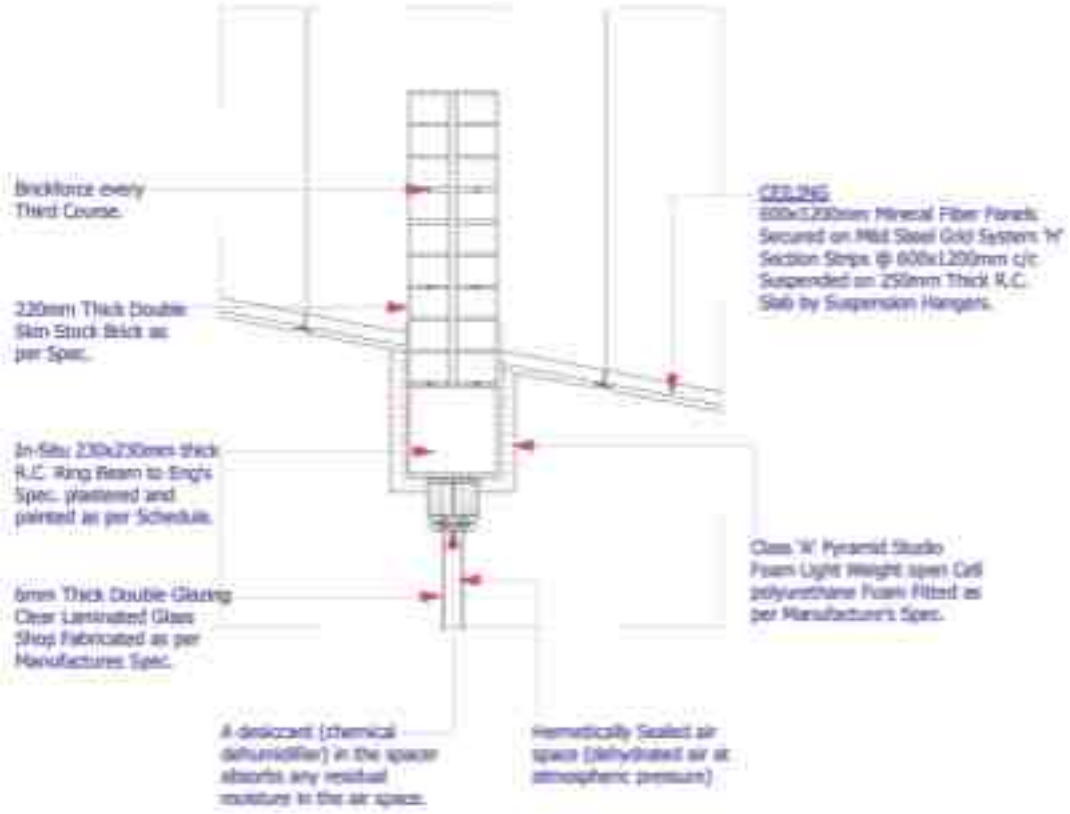

Fig.179 Detail-6b

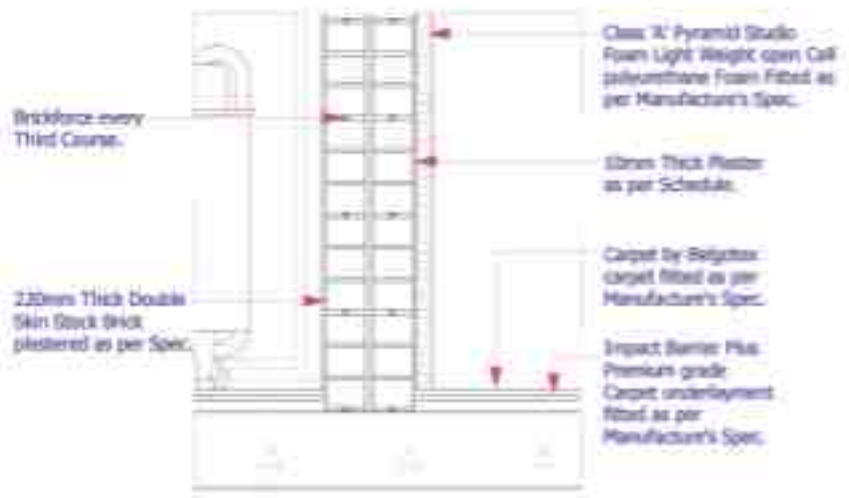

Fig.180 Detail-6a

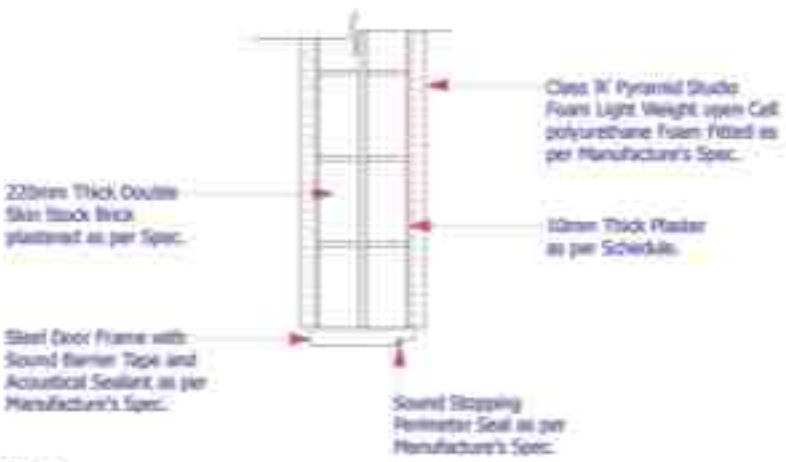

Fig.181 Detail of Door Plan

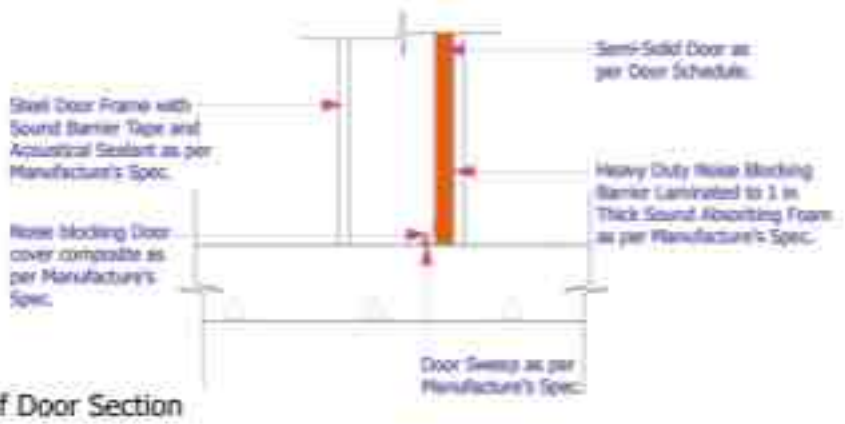

Fig.182 Detail of Door Section

7.9 Building Organization

The heart of the building is at the Exhibition area where the main entrance into the building is located. The Exhibition space is a triple volume and is elevated from the ground by means of columns for easy of pedestrian access into and through the public space (Courtyard) (refer to fig. 183). Vertical circulation by means of stairs and lift from the main entrance foyer takes one to the vibrant inter-related functions, the Recording Studios, Performance Theatres, Braai area and the Exhibition space which takes one back to the roots of Jazz. A linear movement corridor from east to west which opens out to the braai area connects these spaces already mentioned above.

Fig.183 Ground Floor Plan main entrance & perspective.

On the ground floor still on the west wing a Jazz Club reside where one gets to listen to the drums, piano, trumpet, alto and tenor sax, clarinet and bass float and weave and dive over and under each other, bending and twisting a simple chord structure or time signature in surprising ways without breaking it or crashing into each other, or if they do crash creating something out of the dissonance. The Jazz Club has two inviting entrances, the first one is from the southern side along Proes Street and the second entrance opens out to the public space linking the indoor to the outdoor area (refer to fig. 184).

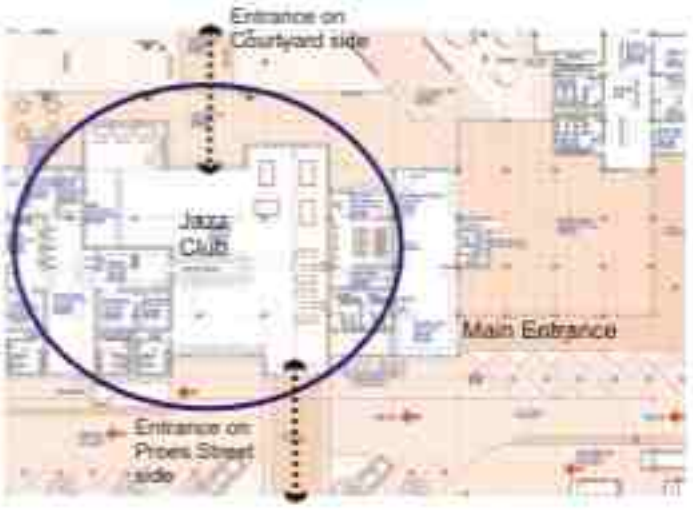

Fig.184 West wing Floor layout & perspective

A restaurant and a fast-food area are on the far western side. The setup of the indoor and outdoor tables forms continuity from the public space into the interiors of the fast-food and the restaurant. Outdoor games such as Chess, Mrabaraba, and Draft will draw a large no of people from the Jazz Club, fast-food shop and restaurant which are positioned within close range in the public space (refer to fig. 185).

Fig.185 Restaurant Floor layout & perspective

.... TECTONIC INVESTIGATION

A secondary entrance into and through the building is on the eastern side. The Administration wing, Classrooms and the Information Centre are easily accessed through this entrance. Adjacent to the Classrooms are Shops which opens out to the public space. The Jazz Instrument shop display demos of Jazz Instruments which are open to the public usage within the public space, the Record and C.D. shop sells and store Jazz music. The public is not allowed to purchase old Jazz music but only to listen to it. A coffee shop is attached to the Information Centre where students and the public can enjoy a cup of coffee while gathering information about Jazz (refer to fig. 186-187).

The Centre for Jazz activities are grouped in terms of their relationship to one another and the activities which require less noise are elevated from the ground and positioned away from the traffic noise (Proes and Struben Street).

Fig.186 East wing Ground Floor layout & perspective.

Fig.187 East wing First Floor layout & perspective.

7.10 Climatic Concept

Passive and Mechanical climatic control is applied to the building for comfortable working and socializing environment. Cross ventilation is incorporated in the design by creating double and triple volumes along corridors and spaces such as the Information Centre and the Exhibition area. Openings are sited strategically opposite each other to allow for ease of air circulation from one end to the other (refer to fig. 188).

The assistance of mechanical ventilation will play a major role in the case of high humidity in the rooms such as boardrooms, lecture Theatres, Performance Theatres, Recording Studios, offices, Classrooms and Information Centre (refer to fig. 188). Hot air contained in the building will also be expelled through openings in form of glass louvers positioned at high levels, which will also allow light into the building. The idea of double and triple volume spaces is to have open circulation working as a cooling stack effect, by drawing hot air out of the building and cooling the spaces within the courtyard (Refer to fig. 189).

Screening of the western sun by deciduous trees will be advantageous to the ground floor activities. Timber laths will be used on the western façade to screen the harsh afternoon sun (refer to fig. 189). Adjustable glass louvers on the northern façade will be controlled according to the summer and winter solstice angles, allowing sufficient heat during winter into the building to radiate at night through the entire building. Different floor and wall textured finishes will play a major role in absorbing and reflecting the sun in summer and winter period.

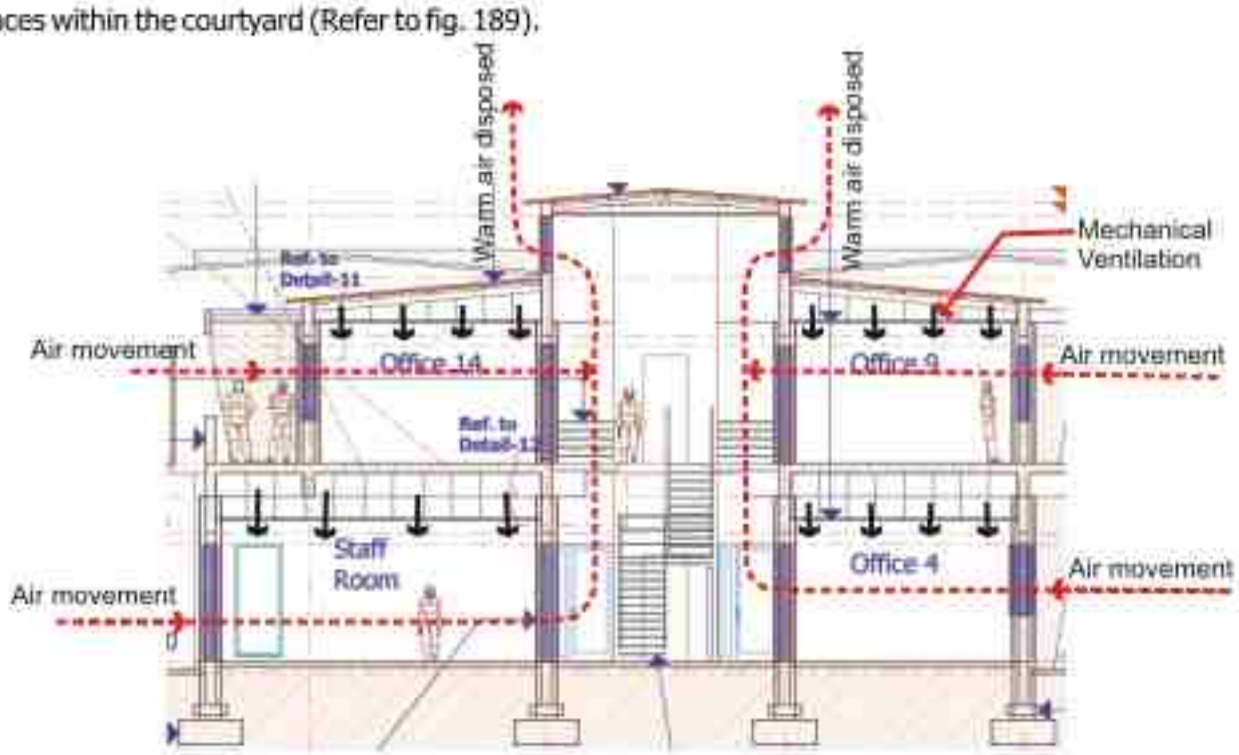

Fig.188 Cross & Mechanical ventilation

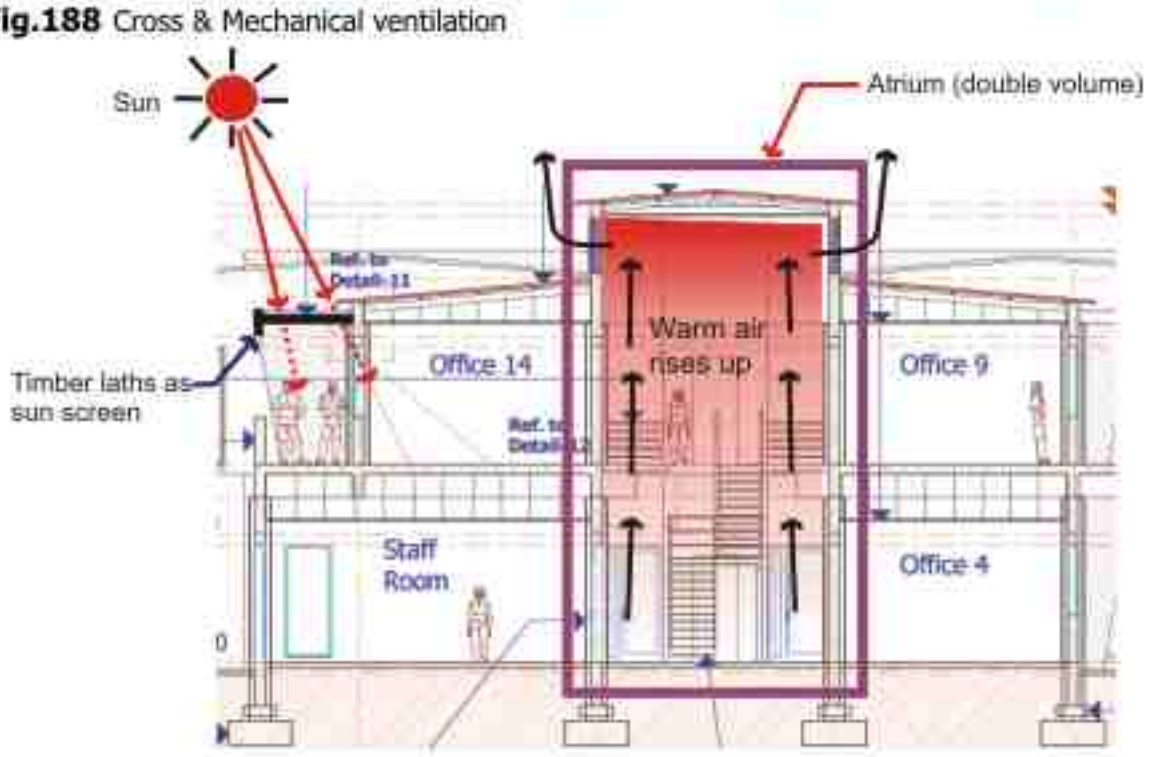

Fig.189 Cooling Stack effect & sun screen