CHAPTER FOUR

_PRECEDENT STUDY SUMMARY

4.1 _FARADAY STATION - JOHANNESBURG 2003

ALBONICO + SACK ARCHITECTS AND URBAN DESIGNERS IN ASSOCIATION WITH MMA ARCHITECTS

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This precinct was selected as a precedent study for its approach toward a South African identity in Architecture and use of materials. The functions of the precinct are also analysed in terms of being a catalyst for local development around an inter-modal orientated facility, where trade of the informal and formal sectors are able to combine in an element foreseen as a gateway to the city. Historical significance also plays a role in terms of buildings and movement patterns, with a strong focus on the encouragement of pedestrian movements.

4.2 _LE FRESNOY - National Studio for Contemporry Arts- tourcoing, france 1997

BERNARD TSCHUMI

An interesting approach to this redevelopment project results in a successful combination of old and new architectures, whilst maintaining the authenticity of the styles. Here an over-arching roofing element brings the building together as a whole, expressing the theme of “in-between”. The design approach is further expressed through an interesting conceptual philosophy that combines cinema and architecture, resulting in Tschumi’s hypothesis that architecture can be defined, and therefore associated through three elements, namely “space”, “movement”, and “use”.

4.3 _BRE LOW ENERGY BUILDING - GARSTON, UNITED KINGDOM 1997

FEILDEN CLEGG ARCHITECTS

This experimental project is appropriate for the investigation of low-energy, comfortable and healthy workplaces. In terms of passive heating and cooling strategies, this building adopts systems that rely on the environment as the primary source of energy, while reducing the needs for mechanically operated and high-energy use systems. The systems employed to the architecture assist in ventilation and cooling, solar control and daylight, and the use of photovoltaic cells as an energy source.

4.4 _KANSAI INTERNATIONAL AIRPORT - OSAKA BAY, JAPAN 1994

RENZO PIANO

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As a modern public building, this airport expresses its functions through its form and the use of high-tech materials and appropriate construction detail techniques . The structural roofing system, comprising of a number of elements that hold space frames in an appropriate form and order, ultimately produce the elegance of this building. Furthermore, the form of this structure assists in the natural movement of air (airflows), minimising the needs for additional HVAC vents.

4.5 _CAPE TOWN INTERNATIONAL CONVENTION CENTRE - CAPE TOWN 2003

FORESHORE ARCHITECTS

This building plays an important role as a national an international symbol to the city of Cape Town and South Africa as a whole. Its status strives toward first-world standards, as a congregator of social and political affairs, maintaining its presence to be that of a gateway, a catalyst, and a connector. The program and positioning of functions as a response to the dominant characteristics of the site and of the building is studied, as well as the approaches toward environmentally conscious design techniques.

4.1 _FARADAY STATION - JOHANNESBURG 2003

ALBONICO + SACK ARCHITECTS AND URBAN DESIGNERS IN ASSOCIATION WITH MMA ARCHITECTS

"...to provide public amenities and to maximise interpersonal encounters and socialbility" (SAIA 2003; pg20)

The search for a South African identity becomes evident in the appropriate application of materials, structure and form within a particular context. Local materials and craftsmenship can be applied to give unique characteristics to a building, such as in the case of the Faraday Station, where the celebration of the transient commuter culture and capturing of the memory through historical significance reinforce the "genius loci" - the spirit of the place.

The development of this precinct is to act as a catalyst to further development in the area, whilst satisfying the local council's requirements of providing facilities for holding and ranking taxis, as well as informal traders. It has been placed in such a way as to allow for easy vehicular access to adjacent highways, whilst maimising the number of 'opportunity sites' that can be created between the rank, the CBD, and other modes of transport such as trains and buses.

The architectural character aims to maintain the character of buildings that have contextual or historical relevance to the city, promote the maintenance of a close building-street relationship and the concept of containment, promote the use of appropriate technology and incorporate the principles of sustainability.

FIG. 4.1.1 Taxi holding area and rank

FIG. 4.1.2 Taxi management facility

FIG. 4.1.3 Taxi holding area

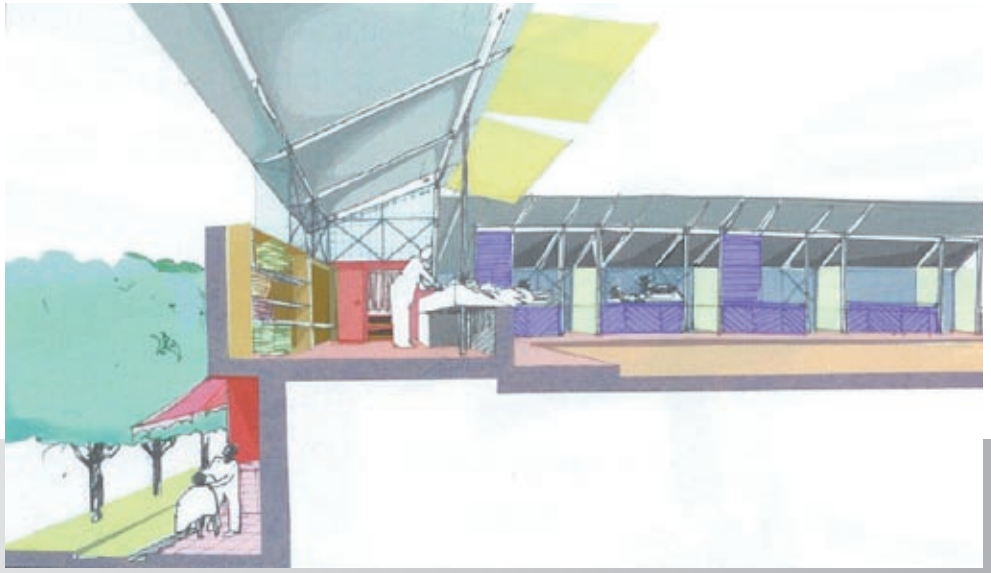


FIG. 4.1.4 Concept drawing for the general trading market

FIG. 4.1.5 - 7 Structural system for roofing elements

FIG. 4.1.8 Building addresses street edge

The main public-space functions as a threshold between various transport destinations, creating the opportunity for a focal point and gateway to the city - a space freed for social and cultural interaction. A further design intention is to reveal the history and significance of Faraday asone of the first black urban footholds through a programme of pulic art, allowing for community participation and inclusion of the precinct.

The facility allows for the activation of the street edges by placing retail facilities along these routes, providing for maximum legibility and accessibility. One of the main aims of this project is "to provide public amenities and to maximise interpersonal encounters and socialbility" (SAIA 2003; pg20) through the creation of systems that interlock spaces of different scale and purpose structured into a linear system, which is designed to accomodate a range of conditions.

The precinct has also been designed to encourage pedestrian movement into and through the facility and nearby amienities. This would include an extention to an existing pedestrian system and allow for linear markets, encouraging the freeing of pedestrian sidewalks that are safer and more pleasant to walk on.

FIG. 4.1.9 Appropriate use of local materials

4.2 _LE FRESNOY - NATIONAL STUDIO FOR CONTEMPORRY ARTS- TOURCOING, FRANCE 1997

BERNARD TSCHUMI

FIG. 4.2.1 Model of LeFresnoy

FIG. 4.2.2 - 3 Exterior views on the building complex

Conceived for the new art forms of the twenty first centuary, Bernard Tschumi's Le Fresnoy, the National Studio for Contemporary Arts in Tourcoing, France, is part experimental art laboratory, part multi-media production centre, part cinema and exhibition and performance space. This highly celebrated building defies categorization, encouraging cross-overs between architectural programs and art forms. A huge, technologically advanced roof covers both existing and recent construction, housing the renovated spaces of a former entertainment complex built in The 1920's. In Tschumi's remarkable building, the "in between" or residual spaces located bewteen the existing tiled roofs and the new, hovering steel structure punctuated by glass "clouds" become a place where artists can take over.

Tschumi turns toward an artistic explosion of varied polemics of literature, philosophy and cinema. He was fascinated by certain modes of montage found in cinema. In excercises called screenplays, he took excerpts from films, image by image, and tried to find an architectural relation by substituting the principle of montage for the compositional principle generally used by architects.

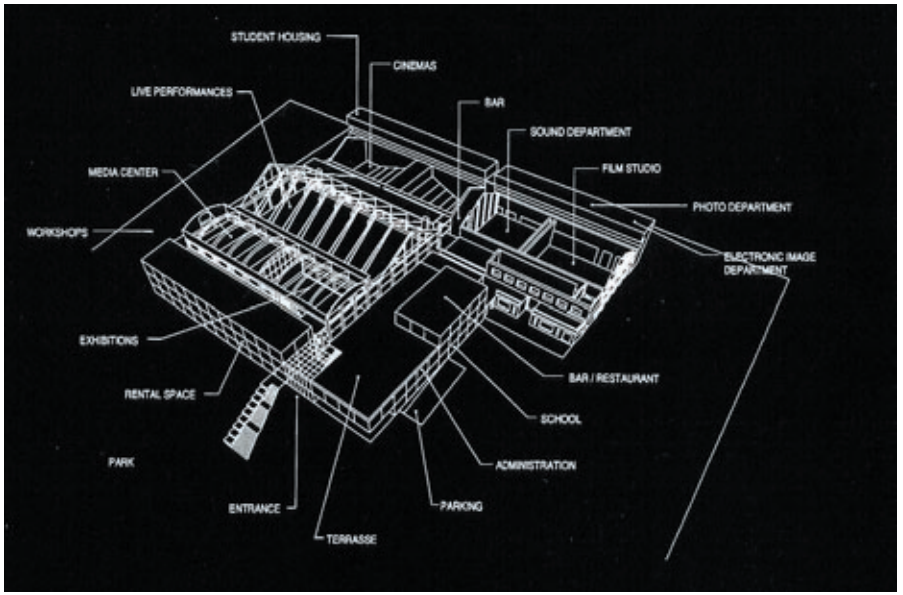
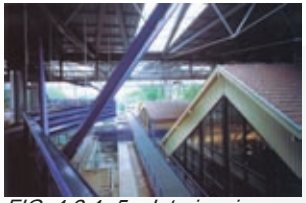


FIG. 4.2.6 Descriptive axonometric drawing of Le Fresnoy



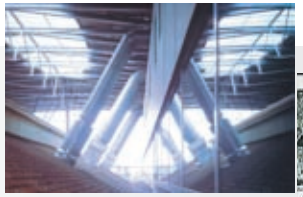


FIG. 4.2.4 -5 Interior views on the building complex

FIG. 4.2.7 Graphic by Tschumi used in his presentation

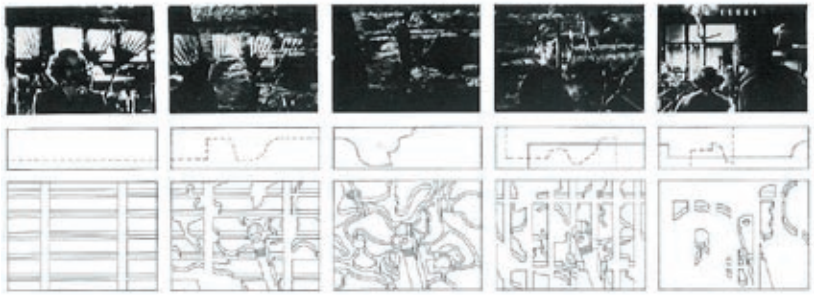


FIG. 4.2.8 Excerpt from screenplays: Alfred Hitchcock's Phyco

FIG. 4.2.9 Excerpt from screenplays: Palladio - Rietveld

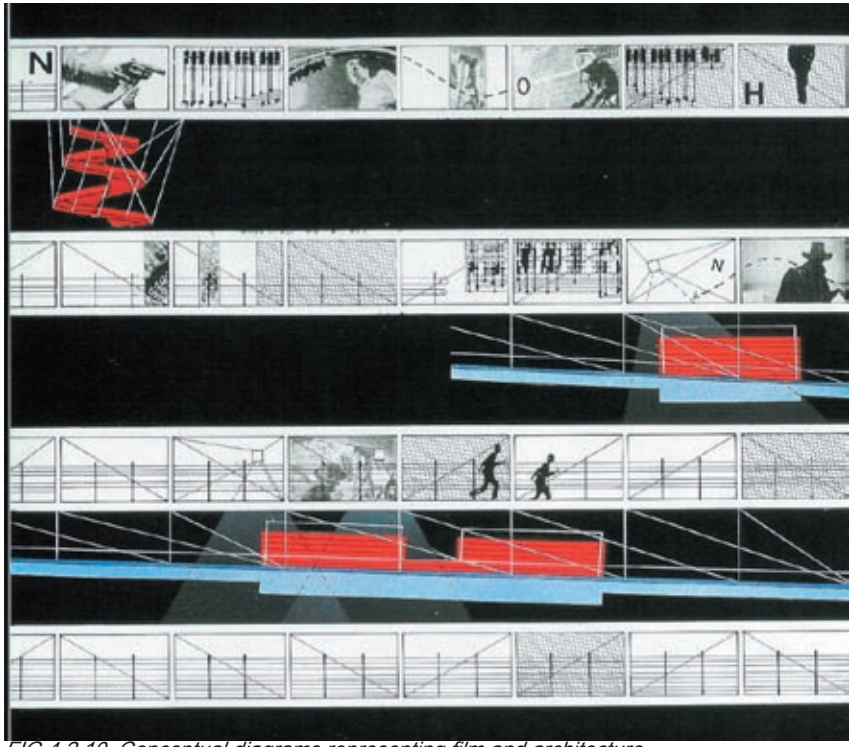


FIG 4.2.10 Conceptual diagrams representing film and architecture

The first of these Screenplays begins with a Hitchcock sequence drawn from *Psyco,* a conventional filmic technique, the fade-over, is transported into another mode, that of architecure. In this example, the geometrical and rectangular blocks of the Manhattan grid begin to interpenetrate, to super impose themselves on the organic contours of Central Park, before transforming into something radically different.

The same principle is in operation in another image, which takes Palladio's Villa Rotanda and places it over the famous Rietveld-Schroeder House in Utrecht in an act of superimposition/ transformation. But in this sequence thereis no longer any corrolation between the upper and lower images. In the Psyco screenplay, there was still a cause-and-effect relationship between the cinema system and the architecture system. In the Palladio-
Rietveld screenplay, this relation no longer needs to exist: the architectural fade-over is now paralleled by a fixed image. We thus find there are two systems functioning independently of one another.

Excerpts from The Manhattan Transcripts such as "The Block" demonstrate a tripartite relationship among the spaces of the architecture, the vectors of movement, and the event
or action. Tschumi's hypothesis was that architecture could be defined, and therefore dissociated, through three elements, SPACE (the fabrication of physical or material spcaes),
MOVEMENT (the movement of bodies in space), and finally, the event or USE.

FIG. 4.2.11 - 12 Interior views on the building complex

4.3 _BRE LOW ENERGY BUILDING - GARSTON, UNITED KINGDOM 1997

FEILDEN CLEGG ARCHITECTS

The new Environmental Building at BRE's (Building Research Establishment) Garston site provides a large-scale experimental facility for evaluating environmentally advanced technologies and operations. The design brief for the 2,000 square-meter, three-story office building included a demanding low-energy performance specification drafted by the Energy Efficient Office of the Future (EOF) project. The EOF project is a partnership between BRE and manufacturers, designers, utilities, and other building professionals to investigate low-energy, comfortable, and healthy workplaces for the 21st century. BRE expects its £2.5 million Environmental Building to use 30 percent less energy than the best current buildings.

One of the building's innovative passive design features is its concrete floor-ceiling assembly with a sinusoidal-shaped ceiling. Tension in the troughs of the wave structure and compression in its crests make a stiff floor using minimal concrete. Still, the assembly's mass helps limit peak summer temperature of the ground and first-floor offices. Hollow sections of the wave troughs provide space for fresh air delivery to the room below. Raised access flooring for the floor above tops the troughs and alternates with underfloor heating and cooling slabs riding the crests. The building is the first in the UK to use recycled aggregate in ready-mixed concrete. Recyclers crushed, screened, and graded demolished concrete from a London building to supply 20-5 mm coarse aggregate for 1,500 cubic meters of concrete (Bunn 1997; 28).

FIG. 4.3.1 View of southern facade of building

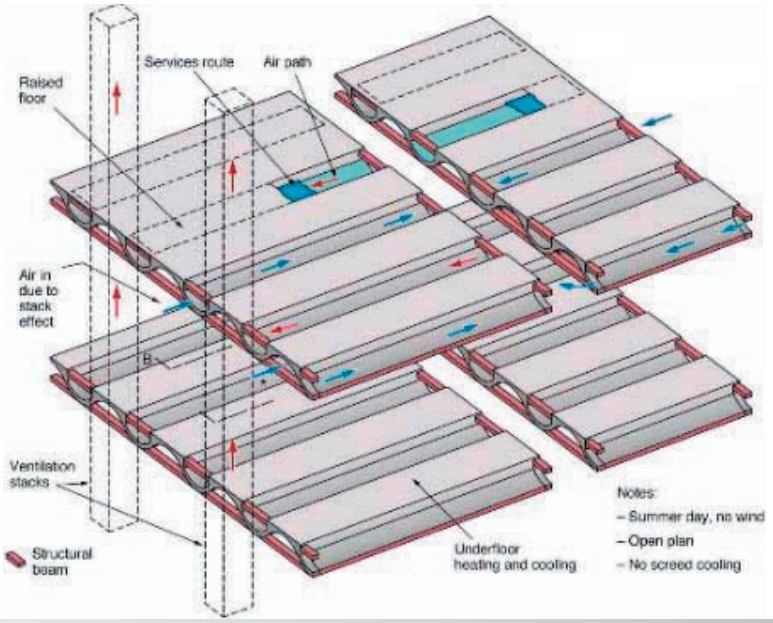


FIG. 4.3.2 Structural system showing its adaption as a ventilator and provider of thermal energy

FIG. 4.3.3 Glass-fronted ventilation shafts to warm the air inside and create stack-effect

FIG. 4.3.4 Interior view of office space with shaped ceilings that aid in the thermal control systems of the building.

FIG. 4.3.5 Photovoltaic array on Southern facade of building (northen hemisphere)

FIG. 4.3.6 External louvres prevent excessive heating and act as light-shelves

Ventilation and cooling

Ventilation shafts running up the façade form a key part of the energy-saving natural ventilation and cooling system. Warmed air naturally rises out of the stainless steel 'chimneys' and causes air from inside the building to be drawn through to replace it. The movement of air across the tops of these chimneys increases this 'stack' effect, while low-energy fans in the tops of the stacks can be turned on to give greater airflow. Cooler fresh air is then drawn through ventilation openings by this movement of air.

On warmer or windy days (when its windy the air on the north side is not as cool), air is drawn in through passages in the curved hollow concrete floor slabs. Because of its bulk - or thermal mass - the concrete cools the incoming air by absorbing heat from it. Additional cooling can be achieved by circulating cold water through the slab.

Overnight, the control systems can open ventilation paths right through the concrete slab to cool it further, storing this 'coolness' for the following day. During the winter months the water circulating through the concrete slab is heated to give gentle underfloor heating.

The ventilation and heating systems are controlled a building management system (BMS), but, as with most other systems in the building, a degree of user override is provided to suit individual needs.

Solar control and daylighting

To prevent excessive heating and glare from the sun shining in the building has a system of motorised louvres on the south façade to control the daylighting levels.

During the day the angle of the louvres changes according to the position of the sun. At times when direct sunshine is not a problem the louvres are angled to act as 'light shelves' - reflecting light off their smooth upper surface onto the ceilings of the offices. This reduces the amount of artificial lighting needed in the parts of the offices furthest from the windows.

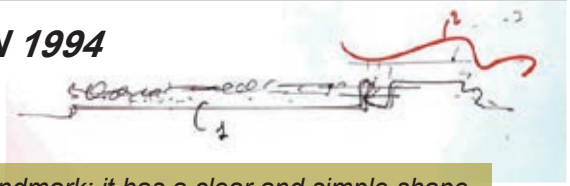
Photovoltaics

A building-integrated photovoltaic array (BIPV) was installed as a demonstration experiment and report the findings back to industry.

The array uses thin film amorphous silicon cells incorporated into a glazed cladding. The output from the cells (as direct current) is fed into the building's main supply panel via an inverter, providing additional power to the building from a non-polluting source. Inside the building a status panel shows the amount of electricity being generated, the percentage contribution to the building's lighting load, and the cumulative total since May 97 - the date of first occupation.

4.4 _KANSAI INTERNATIONAL AIRPORT - OSAKA BAY, JAPAN 1994

RENZO PIANO



"Kansai is a precision instrument, a child of mathematics and technology. It forms a strong and recognisable landmark; it has a clear and simple shape that declares itself without hesitation. But it is also an extraordinary spatial experience" (Renzo Piano 1994)

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FIG. 4.4.1 Satelite image of Osaka Bay

FIG. 4.4.2 Aerial view of Kansai Airport

FIG. 4.4.3 western facade

FIG. 4.4.4 Internal image of airport building

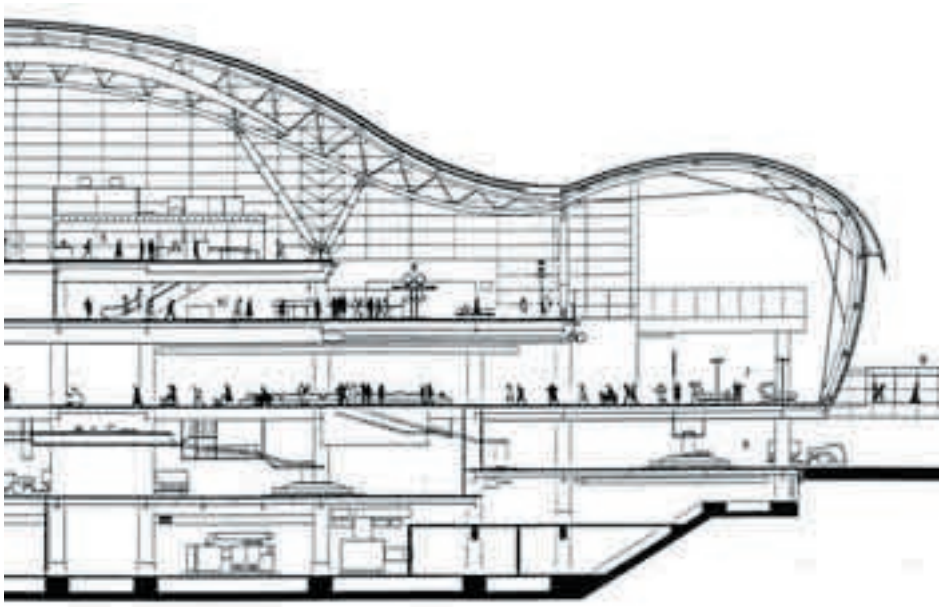

FIG. 4.4.5 Partial section through building

From the very first sketch of the Kansai structure, it can be seen that Rezno Piano wanted to create a structure full of smooth contours. His final design is a structure that is free of obstructions, by placing a glass front wall, as well as using baffles that reflect light. It is evident that the architect wanted the building to seem very open and communicative. His ideals are to have an interior and exterior that is not hindered by walls of other obstructions, so the traveller is able to navigate him or herself fairly easily from anywhere, as virtually every area is visible from anywhere in the structure.

The building represents everything that modern architecture is about. Use of modern materials, detailed construction techniques, and an innovative construction paradigm were all in place when thinking about the design. Rezno Paino's work has always been fascinating and this is no exception. The airport, apart from being an aesthetic marvel, is also an engineering marvel, with clever ideas such as allowing the contours of the roof to guide the flow of air in the building, thus eliminating the needs for extra HVAC vents inside the building.

FIG. 4.4.6 one of the two great glazed gable walls

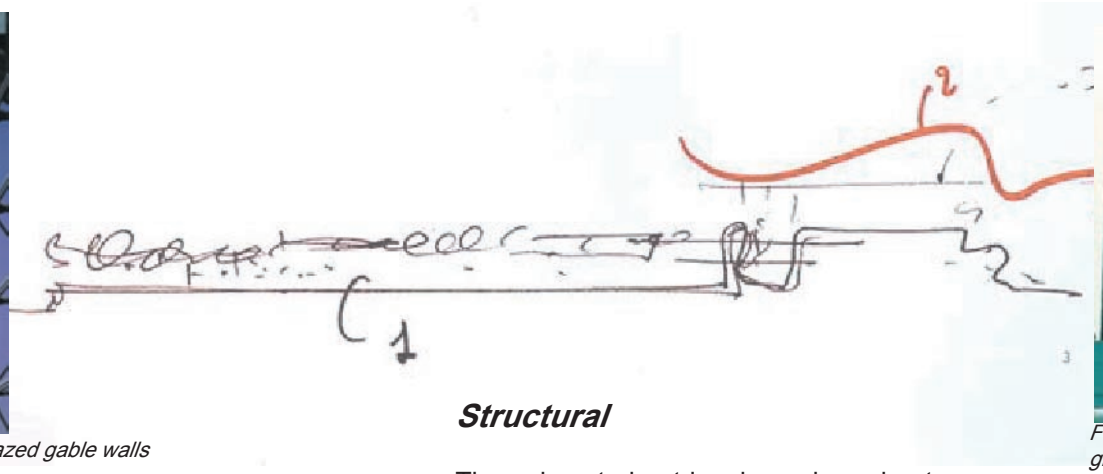

FIG. 4.4.10 one of the two great glazed gable walls

Structural

The inverted triangle shaped trusses are referred to as the 'A' truss type, and constitutes 18 trusses of the structure. Each of these is supported by inclining columns, and on the street-side, by vertical columns. The height gradually decreases towards the airside, giving it the wing-shell structure.

The transitional section has been designed to produce a sense of visual unity, and connects the lower chord of the truss to the wings. The gable end trusses ('B' trusses), sandwich the glazing of the end walls between 2 trusses. This gives the structure and glazing it independent orders by allowing the glazing to pass between trusses, as well as avoids complexities when joining trusses and glazing. The divided truss with the same form inside and out serves to strengthen the sense of continuity in the roof as it extends over the interior and outdoor space.

FIG. 4.4.7 computer generated drawing of primary structural element

FIG. 4.4.11 "B" truss with sandwiched glazing

FIG. 4.4.8 relationship of primary structral space frames

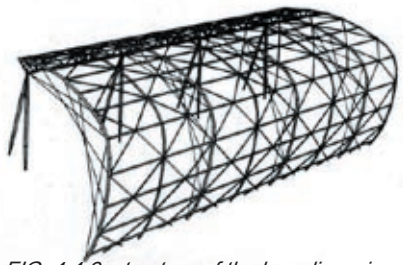

FIG. 4.4.9 structure of the boarding wing

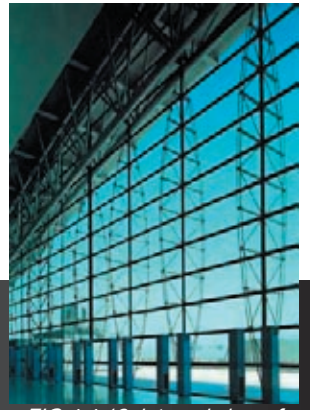

FIG.4.4.12 internal view of glazed gable wall

4.5 _CAPE TOWN INTERNATIONAL CONVENTION CENTRE - CAPE TOWN 2003

FORESHORE ARCHITECTS an association comprising: Revel Fox and Partners cc Architects and Planners, Van der Merwe Miszewski Architects, Lucien le Grange Architects and Urban Planners, Stauch Vorster Architects, ACG Architects and Development Planners, dhk Architects, Magqwaka Associates, Architects

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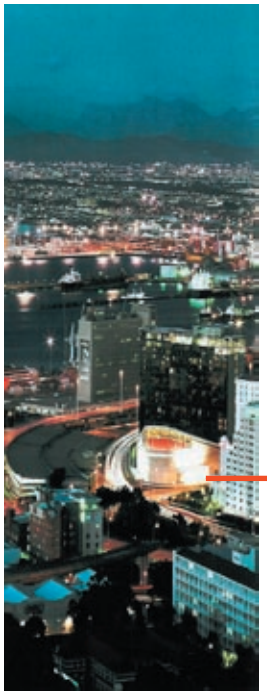

FIG. 4.5.1 night image over Cape Town and the harbour

FIG. 4.5.2 entrance foyer from the exterior

FIG. 4.5.3 view from highway, with bridge to hotel

FIG. 4.5.4 interior atrium for climate control

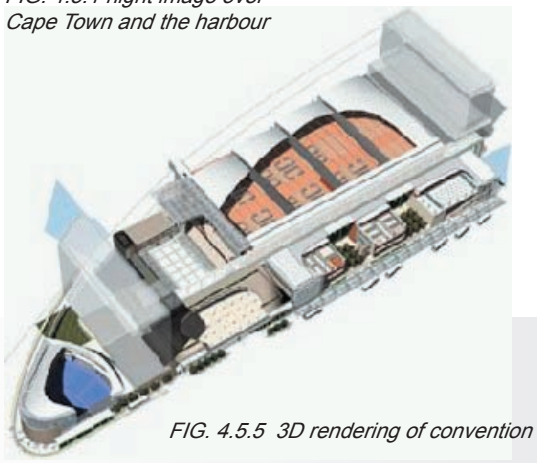

FIG. 4.5.5 3D rendering of convention centre

The CTICC (Cape Town International Convention Centre) is situated on an old landfill site previously used as a parking lot that is comparatively isolated at the edge of the CBD. The site is exposed to unfavorable climatic conditions, overlooked by a highway, and not easily accessible. However, the architectural concept is a direct and rational response to the dominant characteristics of the site, where the building was anticipated to become a major catalyst and connector between the port and the city itself.

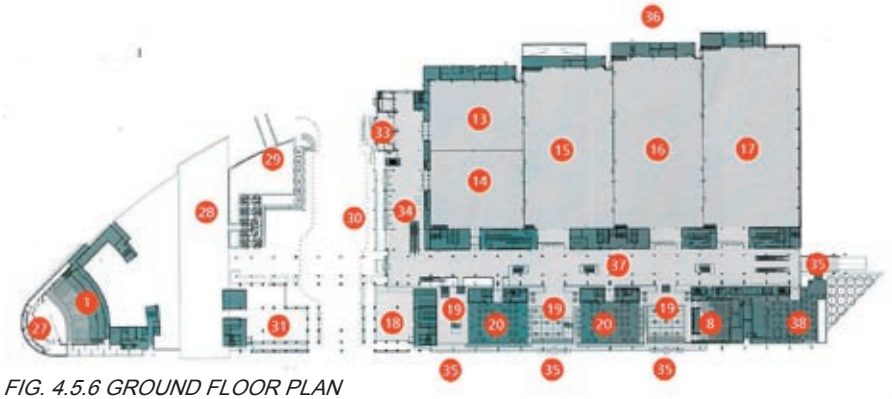

FIG. 4.5.6 GROUND FLOOR PLAN

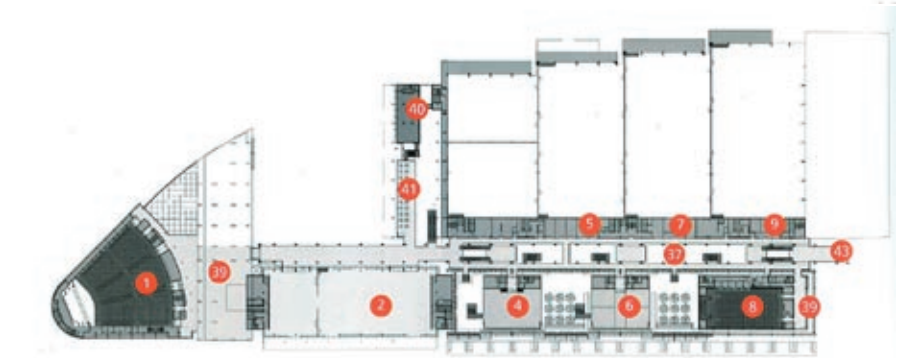

FIG. 4.5.7 FIRST FLOOR PLAN

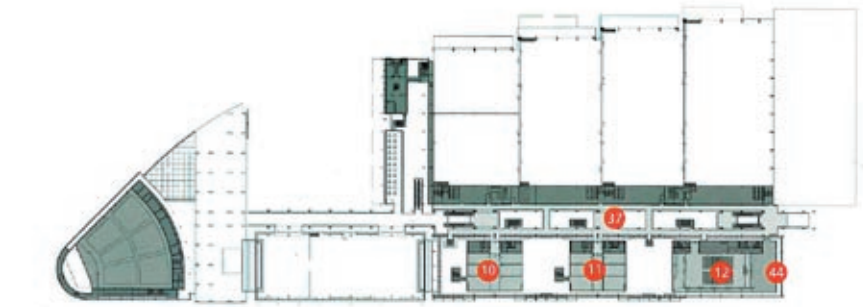

FIG. 4.5.8 SECOND FLOOR PLAN

The program for the building consists of windowless exhibition halls located along the freeway boundary, with meeting rooms, restaurants and arrival points extending along the line of bus and taxi drop-off zones. The administration, main entrance foyer and minor concessions face onto a square, with the auditorium finding its place at a noisy intersection, having already required special acoustical treatment. Ballroom bridges and a hotel are also located off the square. Critical to the cohesion of the plan is the three-level gallery or spine extending the full length of the site, and linking all the elements in an easily understood movement system.

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Environmentally conscious design was implemented, resulting in the provision of screens, canopies and planting in and around the building for protection from the sun and wind. Attention has also been given to energy- and water-saving devices. A carefully controlled interior climate has been created for the exclusion of direct sunlight during the heat of the day despite the extensive use of glass.

The interior also features a display of some important art works, as well as the provision of opportunities for formally unknown artists to exhibit their works without compromising the high standards set for all aspects of the CTICC.

1 AUDITORIUM 1
8 AUDITORIUM 2
13 + 14 EXHIBITION HALLS 1A & 1B
15 EXHIBITION HALL 2
16 EXHIBITION HALL 3
17 EXHIBITION HALL 4
18 REGISTRATION FOYER
19 CONSERVATORIES
20 RESTAURANTS
27 STAGE
28 HOTEL
29 FERRY TERMINAL
30 SQUARE AND MAIN ENTRANCE
31 HOTEL FOYER
33 BUSINESS CENTRE AND COFFEE SHOP
34 MAIN FOYER
35 ENTRANCES
36 MARSHALLING YARD
37 GALLERY WALKWAY
38 RESTAURANT

2 BALLROOM
4-6 MEETING ROOMS
5.7.9 MEETING SUITES
37 GALLERY WALKWAY
29 AUDITORIUM FOYER
40 MANAGEMENT OFFICES
41 LOUNGE
43 VIEWING GALLERY

10-11 MEETING ROOMS
12 ROOF TERRACE ROOM
37 GALLERY WALKWAY
44 OUTSIDE TERRACE

FIG. 4.5.9 facade of convention centre