Submitted by Adèle Brand,
University of Pretoria

Mentor
Alta Steenkamp

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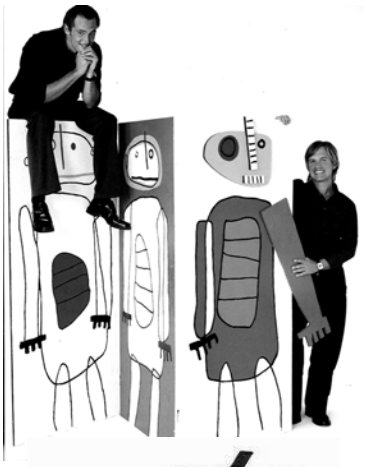
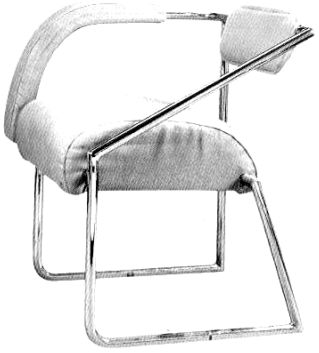
University of Pretoria
Department of Architecture

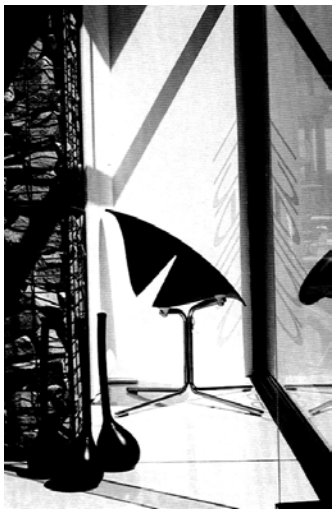
November 2003

DiD Warehouse

Décor, Interior, Designer Furniture Warehouse







Inspired by [Kalman, 1997:003]

People spent their days upright

PEOPLE SPENT THEIR DAYS UPRIGHT….

And their nights lying down

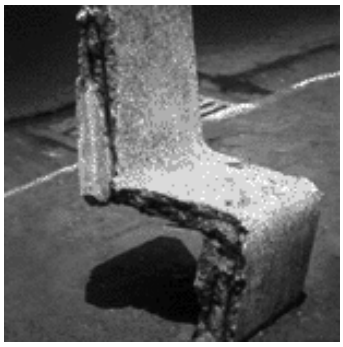
AND THEIR NIGHTS LYING DOWN…

Eventually someone invented sitting

EVENTUALLY SOMEONE INVENTED SITTING….

And Chairs.

AND CHAIRS.

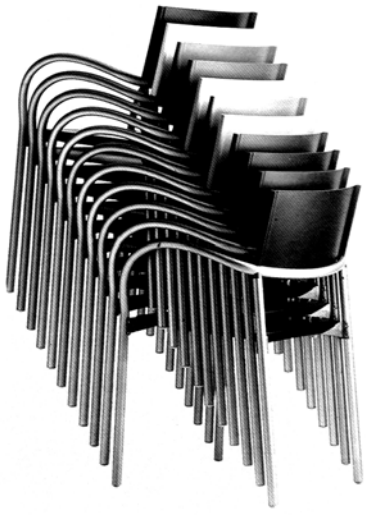


Chairs evolved

CHAIRS EVOLVED

And multiplied.

AND MULTIPLIED.



Now there are so many that we need to make a building to house them.

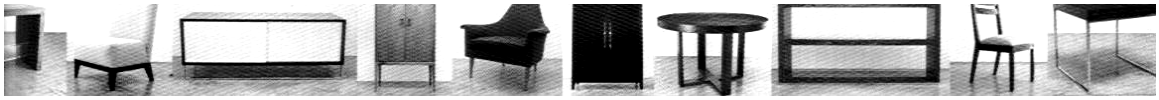
NOW THERE ARE SO MANY THAT WE NEED TO MAKE A BUILDING TO HOUSE THEM.

DiD WAREHOUSE

oorsig

DiD warehouse

"Design is a reflection of the ongoing development of our society. As such, it is part of our culture. In addition, however, it has become a factor in the competitive process. To integrate this realization more strongly into the mindset of companies and of the public at large are extremely important." [Kalman, 1997:586]



Die ondersoek wat in hierdie tesis onderneem word handel oor die verhouding tussen ontwerpersmeubels, dekorelemente, binne-ontwerp en argitektuur.

Elke menslike wese het nodig om sy omgewing te verbeter – om sy onmiddellike milieu te versier. Mode en behoefte het in meeste gevalle 'n direkte invloed op mekaar. Daar sal altyd 'n behoefte aan dekorelemente en meubels in elke huis bestaan. Ontwerpers ervaar 'n sterk begeerte om volgens hul eie persoonlike smaak te ontwerp, en die mens wil in verband tot sekere elemente staan om sodoende 'n onmiddellike persoonlike behoefte te bevredig.

Argitekte, binne-ontwerpers en die tuisteskepper sal voordeel uit die voorgestelde DiD Warehouse trek. Hier het hulle 'n wye verskeidenheid om van te kies, en sal aan die jongste ontwerpe en neigings in die bedryf blootgestel word. Tegnologie en die moderne lewe in die 21ste eeu het groot veranderings in leefwyse teweeggebring – alles is makiliker, vinniger, beter. Die voorstel sal daarna streef om 'n pakhuis te ontwerp wat elke persoon se poging om meubels en dekor te bekom, sal vergemaklik. Ikea, 'n bekende internasionale dekorverskaffer, is 'n voorbeeld hiervan. Meeste van hulle meubels kan plat verpak word, en so word hulle bergings- en vervoerkostes drasties verlaag.

Die pakhuis sal as 'n afsetgebied van dekorelemente en ontwerpersmeubels, asook vir Suid-Afrikaanse en internasionale dekorwinkels en -ontwerpe, beskou word. 'n Toonlokaal vir ontwerpersmeubels (van bekende ontwerpers soos Rietveld, Graves, Gehry, ens) wat op die publiek en ander belangstellende en betrokke partye gemik is, sal voorsien word. Hierdie verskillende funksies moet geïntegreer word, en die geleenthede vir interaksie wat tussen verskeie ontwerpers en dekorelemente moontlik gemaak word sal 'n belangrike eienskap van die pakhuis wees.

DiD Warehouse moet vernuwing fasiliteer. Nuwe talent onder medewerkers, asook die ontwerpverbruiker wie, deur 'n koopprojek van sy/haar eie aan die gang te sit, die verspreidingsproses transformeer, moet deur DiD Warehouse verwelkom word. Selfs handelaars sal hulle houding moet verander, en van die "museumwinkel"-konsep, dit wil sê 'n ruimte waar die voorwerpe wat ten toon gestel word nie aangeraak mag word nie, ontslae moet raak. Die pakhuis behoort as 'n gebeurtenis-ruimte beskou te word, wat in 'n verhouding met die lewe en kultuur van die stad staan, en wat die besoeker aanlok en hom met emosies en goeie diens bombardeer, bo en behalwe die eenvoudige uitruil van handelsware en geld wat oor 'n toonbank plaasvind. Groei van enige aard bring daarmee saam die vermoë om aan te hou verander, en om van verouderde vooroordele ontslae te raak en plek te maak vir die nuwe. Vervorming, beweging en ligtheid is uiteindelik die woorde wat die karakter van dit wat die ontwerperspakhuis in die toekoms moet wees, die beste opsom.

Tyd, skaal, en verskille ten opsigte van funksie moet deur middel van die ontwerp en beplanning van ruimtes opgelos word. Die gebou sal as 'n "houer" optree. Suid-Afrikaanse en internasionale invloede, asook die ruimtelike waarneming van die Post-Moderne era, moet ingelyf word om 'n presedent vir die pakhuis daar te stel. 'n Egte Suid-Afrikaanse invloed en moderne styl sal deur die argitektuur weerspieël word. Die meubels en dekorelemente gaan deel van die gebou en argitektuur vorm, en moet mekaar beklemtoon / komplementeer. DiD Warehouse sal geskiedkundige sowel as hedendaagse ontwerpermeubels en dekorelemente huisves, om vooruitsigte, moontlikhede en geleenthede vir die ontwerpers van die toekoms te verseker. Plaaslike ontwerpers sal aan die internasionale ontwerpbedryf blootgestel word, en 'n standaard vir elke ontwerp en ontwerper sal bepaal word.

Verskille teenoor ooreenkomste moet die verskeidenheid van Suid-Afrikaanse en internasionale ontwerpe uitbeeld. Invoer en uitvoer van ontwerpersmeubels en dekor gaan 'n baie belangrike onderdeel van die administrasie en ekonomiese bestuur van die pakhuis uitmaak.

Die argitektuur en binne-ontwerp van die pakhuis sal mekaar komplementeer en dieselfde atmosfeer skep – een van inspirasie, kreatiwiteit, moderne ontwerp, verbeelding, realiteit, en eksklusiwiteit.

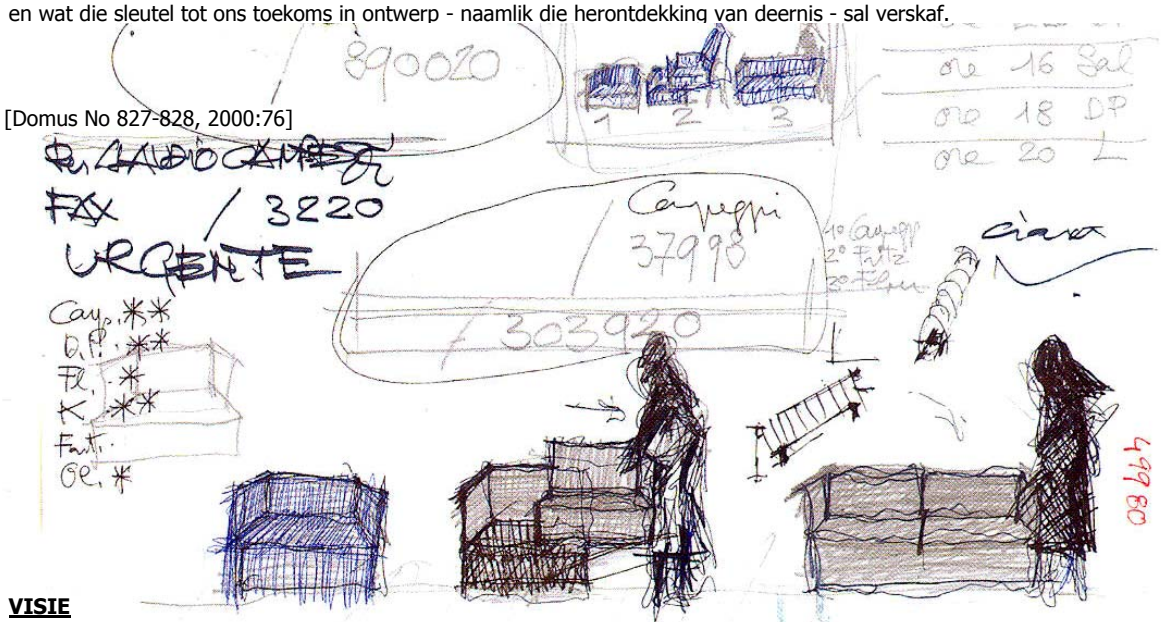
Die funksie van en aktiwiteite binne die gebou sal deur die fasade en argitektuur weerspieël word. Die ontwerp sal poog om ook 'n meesterstuk te wees. Elke bekende argitek het in sy of haar leeftyd 'n meubelstuk ontwerp, en die verhouding tussen argitektuur en ontwerpersmeubels is belangrik en dinamies. Een van die belangrikste funksies van die pakhuis sal wees om loopbane van stapel te stuur en idees te toets. Die eksterieur (argitektuur en fasade) sal 'n standaard neerlê vir wat binne die gebou gehuisves word, en die pakhuis sal poog om 'n presedent vir die toekomstige ontwikkeling van meubels in Suid-Afrika te word. Die gebou sal daarna streef om 'n belangrike katalisator vir die ontwikkeling van ontwerpersdekor en -meubels te wees.

Daar bestaan 'n behoefte aan kleinhandel wat die nywerheids- en uitvoersektor sal laat herleef. Suid-Afrika is steeds die kragsentrale van die kontinent, en medium- tot lantermyn vooruitsigte is goed. Dit beteken dat ooreenkomste wat vandag suksesvol is, in die toekoms nog aantrekliker gaan word. Die pakhuis moet ontwerpers aanmoedig om bewustelik van ontwerp as 'n faktor in die mededingende proses gebruik te maak. Presedente sal die platform vir die finale produk wees. Die gebou moet aanpasbaar en buigsaam wees om die aaneenlopende veranderings in tegnologie, mode en die veranderende omgewing en leefwyse van elke persoon, te akkommodeer. Hierdie buigsaamheid sal moontlikhede, beter vooruitsigte en voordelige beleggings meebring.

Jong entrepeneurs moet die geleentheid gebied word om hulle ontwerpe ten toon te stel. Die pakhuis sal op 'n teoretiese, praktiese en visuele manier 'n opvoedende rol speel. Meubelontwerpkursusse sal van tyd tot tyd aangebied word, en uitstallings van werk deur entrepeneurs en jong vooruitstrewende ontwerpers sal gehou word. Hierdeur sal kontraste in prys en ervaring uitgebeeld word.

Die doel van die tesis is om 'n pakhuis (wat in 'n besigheidspark met sekuriteit geleë is) vir moderne ontwerpersmeubels en dekor te ontwerp, om in die behoeftes van die gemeenskap en die bedryf te voorsien; om die teoretiese benaderings en filosofieë van bekende argitekte en meubelontwerpers te ondersoek; om te verseker dat DiD Warehouse enkel in sy soort in Suid-Afrika sal wees; om'n mark vir plaaslike talent daar te stel en om die verskeidenheid van hedendaagse moderne meubels en dekor te weerspieël; om plaaslike en internasionale ontwerp aan die publiek te vertoon; en om almal maklike toegang na en van die gebou te bied. En uiteindelik, om 'n ruimte vanuit 'n ander eeu (nie van die verlede nie, maar van die toekoms) te skep, wat op menslike verhoudings, meesterintelligensie, respek en lojaliteit gebaseer is, en wat die sleutel tot ons toekoms in ontwerp - naamlik die herontdekking van deernis - sal verskaf.

[Domus No 827-828, 2000:76]



VISIE

Om 'n inspirerende plek te skep vir sosiale, ekonomiese en fisiese interaksie en stimulasie, wat gebruikersvriendelik is, en in die behoeftes van die gemeenskap en die bedryf voorsien.

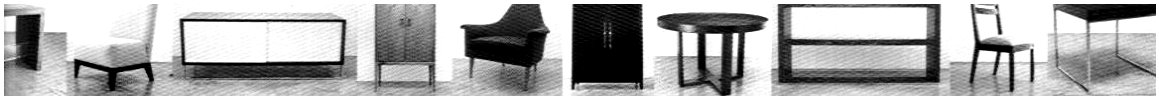
"Throughout the development of our projects, nervousness and inexperience have always been countered by a friendly and visionary approach. Mistakes and naiveté in furniture design immediately become necessary experimentation and serious discussion." (Kalman, 1997:260)

"Paradoxically, in an era of global communication, our world is suffering from an increasingly aggressive universalisation of concepts. Slogans rule, labels are readily at hand, and so we have become increasingly used to speaking in terms about design, industry and entrepreneurs. This creates problems, because a single design, a single industry, or a single entrepreneur simply does not exist. It is precisely in cases where a good example is being set that individuality manifests itself and blazes it's own trail. Such examples are instructive not so much because of the specific forms they take, but the processes they reveal, how they come to be, the perspectives opened by the message, and of course, for the fundamental goals they set themselves." (Kalman, 1997:582)

overview

DiD warehouse

"Design is a reflection of the ongoing development of our society. As such, it is part of our culture. In addition, however, it has become a factor in the competitive process. To integrate this realization more strongly into the mindset of companies and of the public at large are extremely important." [Kalman, 1997:586]



The investigation undertaken in this thesis concerns the relationship between designer furniture, décor elements, interior design and architecture. Scale differences and relations between them are an important consideration in the proposal.

Every human being has a need to change his environment into a better place – to decorate his immediate surroundings. Fashion and need have a direct influence on each other in most cases. Décor elements and furniture will always be required in every home. Designers have a very strong need to design according to their personal taste and preferences and the human being has a need to relate to a certain element to satisfy an immediate personal need.

Architects, interior designers and the ordinary home-creator will benefit form the proposed warehouse. Here they can choose from a very wide variety and will be exposed to the latest designs and trends in the industry. Technology and the modern way of living in the 21st century, have brought a different way of living - easier, faster, better. The proposal will strive to design a warehouse that will ease each person's attempt to obtain furniture and décor. Ikea, a very well-know international décor warehouse, is an example of a company that achieves this. Most of their furniture can be flat-packed, which means that their storage and transportation costs are much lower.

The warehouse will be seen as an outlet of décor elements and designer furniture as well as of South African and international décor shops and designs. A showroom of designer furniture (of well-known designers like Rietveld, Graves, Gehry, etc.) for the public and interested and affected parties will be provided. All the different functions must be integrated and the interaction between various designers and different décor elements will form an important aspect of the warehouse.

DiD Warehouse must facilitate innovation and welcome new talents among collaborators along with the "design consumer", an informed and sensitive buyer who, by setting in motion a buying project of his own, is transforming distribution. Even retailers will have to change their attitude, and get rid of the "museum store" concept, that is, a space where the objects on display cannot be touched. The warehouse should be seen as an event place, which has a give-and-take relationship with the life and culture of the city and which attracts the visitor, plying him with emotions and services over and above a simple exchange of merchandise and money over a counter. Growth of any kind brings with it an ability to keep changing, doing away with moldy prejudices to make room for the new. Transformation, movement and lightness are, in the end, the words that best sum up the character of what the designer warehouse must be in the future.

Time, scale and functional differences must be solved through the design and planning of spaces. The building will be seen as a "container". South African and international influences, as well as space perceptions of the Post-Modernist era, must be incorporated to set a precedent for the warehouse. A true South African influence and modern style will be reflected through the architecture. The furniture and décor elements will form part of the building and architecture, and must complement each other. DiD Warehouse will house historical and current designer furniture and décor elements, to ensure prospects, possibilities and opportunities for designers of the future. Local designers will get exposure to the international design industry, and a standard for each design and designer will be set.

Differences versus similarities must positively reflect the diversity of South African and international design. Import and export of designer furniture and décor are going to be very important aspects in the administration and economical management of the warehouse.

The architecture and interior design of the warehouse will complement each other and create the same feeling, that of inspiration, creativity, modern design, imagination, reality and exclusivity.

The building will reflect its function and the activities within the façade and architecture, and will aim to be

a designer masterpiece as well. Every well-known architect has designed a piece of furniture in his/her lifetime and the relationship between architecture and designer furniture is very important and dynamic. One of the most important functions of the building will be to launch careers and test ideas. The exterior (architecture and façade) will set a standard for what is inside the building and the warehouse will aim to set a precedent for future furniture development in South Africa. The building will strive to be a very important catalyst in generating designer décor and furniture.

There is a demand for steady retail, which will revive the industrial and export sector. South Africa remains the powerhouse of the continent and medium to long-term prospects are good. This means that deals that can be successful today will become that much more attractive in the future. The warehouse must encourage other designers to make conscious use of design as a factor in the competitive process. Precedents will be the platform of the final product. The building must be adaptable and flexible to accommodate continuous changes in technology, fashion and the changing environment and way of living of each person. It must be flexible in terms of more possibilities, greater prospects and better investments.

Young entrepreneurs must have the opportunity to show their designs. The warehouse will be educational in a theoretical, practical and visual way. Furniture design courses will be held from time to time as well as exhibitions held by entrepreneurs and "young–up-and-coming" designers. That will create contrasts in price and experience.

The aim of the thesis is to design a modern designer furniture and décor warehouse (situated in a security business park) to fulfill the needs of the community and industry; to investigate well-known architects and furniture designers theoretical approaches and philosophy towards design; to ensure that DiD Warehouse will be one of its kind in South Africa; to set a market for our local talent and to reflect diversity in today's modern designer furniture and décor; to showcase local and international design for the public and to give everyone easy access to and from the building; and finally, to create a place (warehouse) from another century, not of the past but of the future – based on human relationships, master intelligence, respect and loyalty; which will hold the key to our future in design – the rediscovery of compassion.

[Domus No 827-828, 2000:76]

VISION

An inspiring place for social, economical and physical interaction and stimulation which is user-friendly and fulfills the needs of the community and industry.

"Throughout the development of our projects, nervousness and inexperience have always been countered by a friendly and visionary approach. Mistakes and naiveté in furniture design immediately become necessary experimentation and serious discussion." (Kalman, 1997:260)

"Paradoxically, in an era of global communication, our world is suffering from an increasingly aggressive universalization of concepts. Slogans rule, labels are readily at hand, and so we have become increasingly used to speaking in terms about design, industry and entrepreneurs. This creates problems, because a single design, a single industry, or a single entrepreneur simply does not exist. It is precisely in cases where a good example is being set that individuality manifests itself and blazes it's own trail. Such examples are instructive not so much because of the specific forms they take, but the processes they reveal, how they come to be, the perspectives opened by the message, and of course, for the fundamental goals they set themselves." (Kalman, 1997:582)

Did warehouse user profile

owner (dev.)

manager

ground floor manager

first floor manager

second floor manager

third floor manager

furniture

local entrepreneur

décor

south africa

international

restaurants

vanilla house interiors

seven

ikea

smoke

economics /finances

human relationships

marketing

social

public

shops

shows

security

showrooms

import/ export

skills learning/ training

dini

stock/ orders

administration

services

galleries

publications

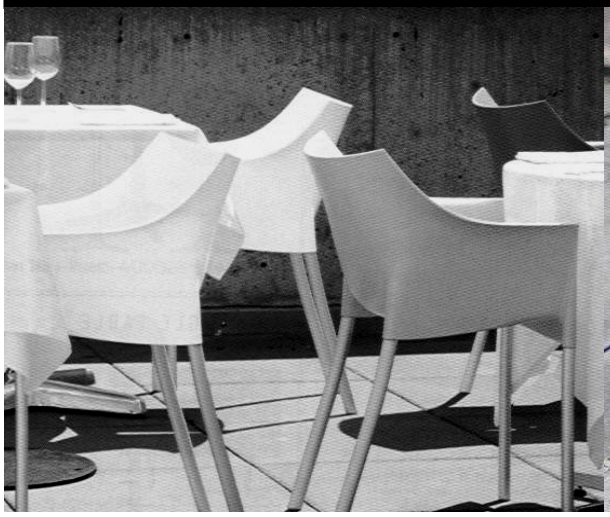
consultants

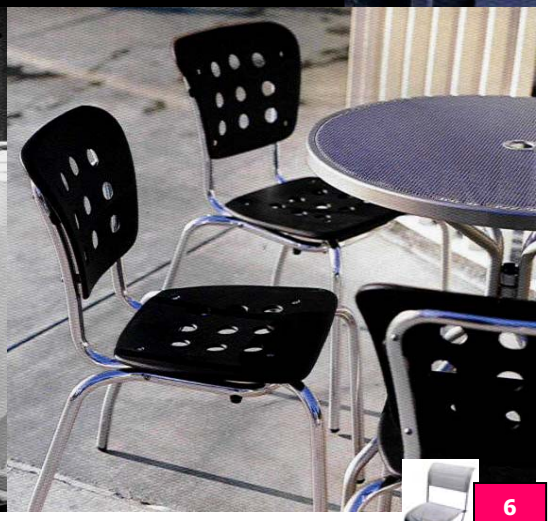
information boards/ info. to public

etc.

each group will be subdivided with workers working in that apartment

The Coffee Shops and Restaurants will have designer tables and chairs as seen in this pictures.





[www.dwr.com]

FUNCTION	USAGE	DESCRIPTION	SPACE REQ.	ARCHITECTURE
Administration	**Reception, info. boards**	Striking, bold entr.	**100m2**	Designer furniture and décor.
Info boards must be cle	ar and people must have easy access to building/spaces. Entrance must welcome people.			
Security	**Offices - security cameras**	Highest level of sec.	**25m2**	Sec. check up points.
Security throughout th	e building must be very strict because of valuable/expensive objects. Accesses areas - fully secure.			
Sitting area	**Gathering/relaxing/waiting**	Individual/groups	**60m2**	Designer sofas/coffee tables etc.
Provide informal sitting	space for the public - self service coffee machine and magazines etc. to read from.			
Offices	**Main offices + diff.companies**	Offices for staff	**365m2**	Modern, open plan offices.
1 manager, 4 floor man	agers, 6 sub-managers, 18 offices - open plan 8m2 p.p = total of 29 offices (see user profile).			
Showrooms	**Showcase facilities**	Showcase designs	**500m2**	Ceilings, floors, lights etc.
Should be designed for	general purposes and not around a particular show. Large spaces (flexible layouts/temporary partition).			
Shops	**Available to public - designs**	Ikea, Sevens, etc.	**850m2**	Open layouts, glass, shopfronts.
Most economical way o	f gaining volume for storage is to use height. Flexible - accommodate change. > useable spaces.			
Restaurants	**For public + people in building**	Exclusive/variety	**750m2**	Feature - Gehry's restaurant.
Furnished with designe	r chairs and tables. Views are important - towards the interior of building and to outside as well.			
Gallery	**Temporary exhibitions etc.**	More private display	**500m2**	Display, freestanding walls.
Random circulation -	more private space. Suitable design for satisfactory viewing, distance and lighting.			
Skills learning area	**Entrepreneurs/learn skills**	Workshops/classes	**280m2**	Noise control, thermal comfort.
Workshops and short 1	week training courses in furniture and décor design - to public (all ages) - given by well-known designers.			
Library/Internet	**Gather info. on designs/designers/history etc.**		**250m2**	More private space.
Provide internet faciliti	es, reading material, buyers' guides, brochures, future exhibition and workshop planners.			
Circulation area	**Passages etc.**		**250m2**	Excluding open spaces - atrium.
Adequate space should	be provided for people to view the objects, exhibits etc. and also to pass between viewers.			
Services	**2 Lifts, piping, ducts, staircase**	Loadbearing lifts	**45m2**	Lifts/staircase - feature.
Lifts must carry the loa	d of the furniture and objects. Provide sufficient ramps and staircases - open - view towards designs.			
Gallery/atrium	**Moveable partitions**	Focus on designs	**450m2**	An impressive interplay of light.
Ensure maximum vision	for attendants. Showcase, freestanding, on walls/cables (temporary/flexible).			
Sanitation	**Wcs, urinals, basins etc.**	Sufficient layouts	**250m2**	Privacy are important.
Proper calculations of	numbers required for building. Correct appliance, activity space. Simplifies circulation/reduces walked.			

NORMS	STANDARDS
A rough guide, allow 10 - 15% of production floor area or	[Tutt, Adler, 1998:91]
5m2 per person	
Most thefts are carried out during working hours	[Tutt, Adler, 1998:487]
Attendants/wardens/electronic detection/max visual coverage	
3,7m2 minim. floor area per person	[Tutt, Adler, 1998:114]
0,5m2 - 1,4m2 depending on number of seated people	
Absolute minim. area p.p. 3,7m2 - 4,2m2 (incl. aisles, cabinet)	
4,2 - 6,0m2 - reasonable conditions. 11,3m2 room capac.p.p.	[Tutt, Adler, 1998:114]
Allow 1/3 depth of showcase to light surface of object	
Reading/object - 1100 from viewer, 15 - 20 degree angle	[Tutt, Adler, 1998:114]
Note especially access, display requirements, position in	
regard to main circulation, delivery of goods and storage	[Tutt, Adler, 1998:286]
Dining rooms (luxury) 1,7m2 - 1,9m2 p. seat	[Tutt, Adler, 1998:321]
Coffee shops and restaurants 1,3m2 p. seat	Rectangular tables (4 seating) 1,3 - 1,5 m2 area p.diner
Normal limit of vision without moving head is a cone of 40 deg.	[Tutt, Adler, 1998:286]
Provide extra viewing space (not placed too near to another)	
Minim. space between equipment to allow for working/circ.	[Tutt, Adler, 1998:275]
Work top height 865mm, crafts (machines etc.) 8,40m2/space	
General reader 2,3m2 p.p., research worker 3,25m2 p.p.	
1 reader space - 6 people 0,4m2 p.p./ 3,8m shelving admin.	[Tutt, Adler, 1998:293]
1200 - 1400 minim. passageway (depends on size of object)	[Tutt, Adler, 1998:286]
1400 - 1600 viewing distance	
Single staircase serving gross floor area of less than 230m2 -	[SABS 0400, 1990:91]
765mm wide.	[Tutt, Adler, 1998:481]
Minim. 1000 away from corners - avoid congestion in corners	[Tutt, Adler, 1998:286]
1200 - 1400 minim. passageway (depends on size of object)	
1 wc minim. For 1 - 15 women, 1 wc + 1 urinal for 1 - 15 men	
1 wb to be provided for 1 - 15 persons for regularly employed	[Tutt, Adler, 1998:337]

Function	Norms	Standards
Fire	The dead end of any escape should not exceed 7,6m.	
	Use fire extinguishers, escape routes, fire seperation walls.	[SABS 0400, 1990:157]
	Buildings over 18,3m high - fire staircases with smoke outlets	[SABS 0400, 1990:217]
Noise	Human ear- sensitive for f 1-3kHz. Barrier against traffic	
	noise on western façade of building. Noise - disturbing when	
	sound exceeds ambient level in dBA by 7 dB or more.	[Tutt, Adler, 1998:435]
Acoustic	Acoustical data on materials and products are important.	[Tutt, Adler, 1998:438]
	Thermal insulation material can give a measure of acoustic	
	control, particularly in providing absorption.	
Light	Warehouse - daylight factor 2% (say 10 - 15 % FA) 300 -	[SABS 0400, 1990:101]
	500 lux. Design level should not be below a daylightfactor of	[Tutt, Adler, 1998:428]
	5%. Overhead light fittings are less likely to cause glare.	[Tutt, Adler, 1998:428]
Disabled	Wc compartment - support rails - 35mm diameter with 50mm	[Tutt, Adler, 1998:151]
	clearance between rail and wall. Wc cubicles - 1500 x 2000.	[Tutt, Adler, 1998:341]
	Horizontal rails should carry a static load of 150kg.	
Temperature	Refer to Psychrometric chart, New Metric Handbook, p. 394.	[Tutt, Adler, 1998:394]
	Protects exhibits from heat produced by lighting.	
Thermal comfort	Laws of thermodynamics: energy cannot be created or	[Tutt, Adler, 1998:381]
	destroyed/heat will only flow from a higher temp. to a lower.	
	Minim. Fresh air supply is 4,72l/s/p. Factories/offices - minim.	
	vol. p.p. is 11,5m3 (natural/forced). Art Galleries/museums -	
	20 deg./infiltration rate (1 h-1) vent. Allow 0,33 (W/m2deg.)	
Lifts/staircases	Passanger lift + goods lift. Standard lift car size 1,1 x 1,4 x	[Tutt, Adler, 1998:481]
	2,2m, door width of 0,8m - will accommodate a wheelchair	[SABS 0400, 1990:91]
	and most items of furniture except largest.	
Security	Fence better than wall (can see through). Fence not less	[Tutt, Adler, 1998:487]
	than 2,5m high. Window panels less than 0,5m2 cannot be	
	climbed through. Last door - stout (mortice lock)	

Fig. 2 - Accommodation list for DiD Warehouse

Expected community response to an increase in the ambient dBA level
As a result of intrusive noise
In accordance with SABS 0103 criteria

	Excess noise (Increase in dBA level)	**Expected community reaction**
	L ambient - L residual	
	0	No observed reaction
	>0< or equal 5	Sporadic complaints
	>5< or equal 10	Widespread complaints
	>10< or equal 15	Threats of community action
	>15	Vigorous community action

Fig. 3 - Community response to an increase in the ambient dBA level	

user profile

owner

- RPP Developments (they will fund the building)

manager

- A recognized academic qualification
- Architect, Interior Architect, Previous Manager of Designer Company etc.

floor manager

- A recognized academic qualification
- Requisite practical experience
- Unblemished record of good conduct and high standards of craft workmanship in business and Architect, Interior Architect, Designer,
- practices
- B.Com Financial Management, Marketing, Accounting etc

furniture. decor etc.

- Managers of designer companies with more than 6 years experience
- Human relationship
- Language skills
- Staff from designer companies

manager

- People with qualifications and knowledge in that specific department
- Workers – students, exchange students, entrepreneurs, post-graduates, people with experience in design/décor/furniture etc., and shop owners/relatives/family etc.
- Designers themselves
- Each shop/department can appoint their own staff or workers (form a panel of staff of the warehouse)

Job creation will be a main factor when considering/appointing staff for the warehouse. (Opportunities for thousands of local qualified/experienced, entrepreneurs and people in South Africa).

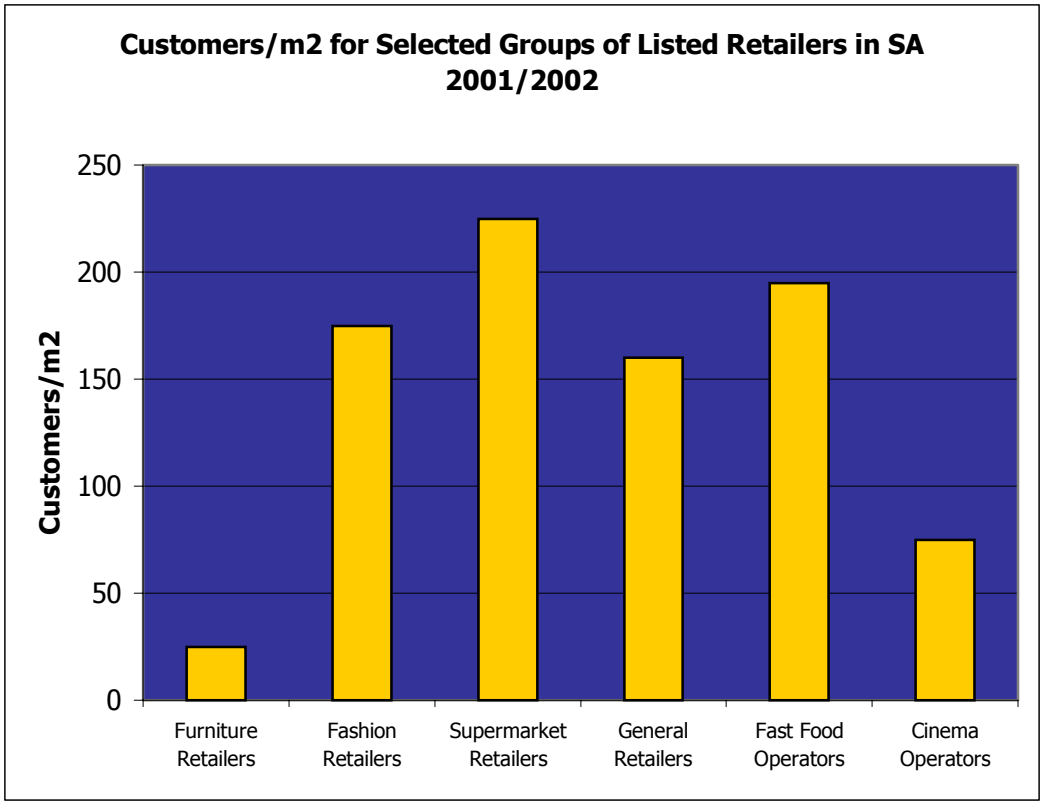
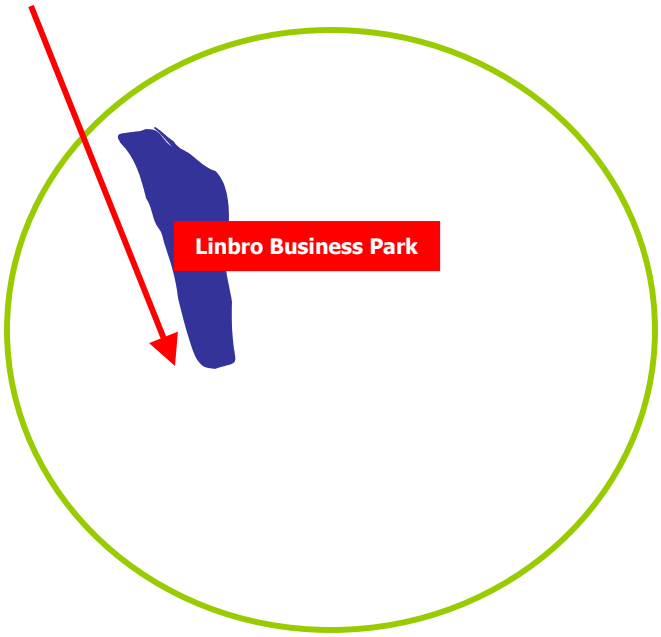


Fig.4 – Customers per square meter for selected groups of listed retailers in South Africa

Continue:
02contextStudy-2
pages 11-20

SITE MAP OF AREA



Modderfontein

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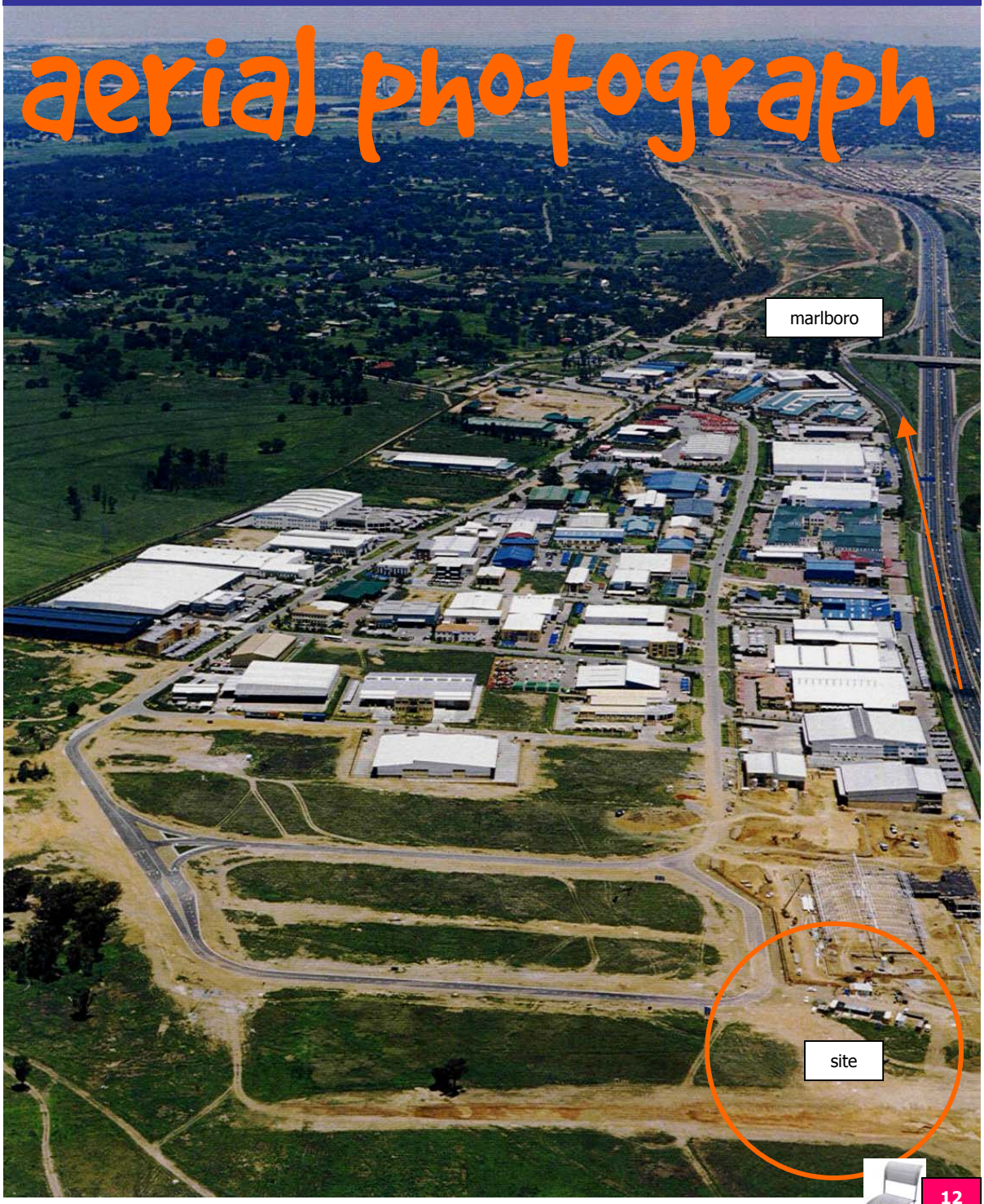
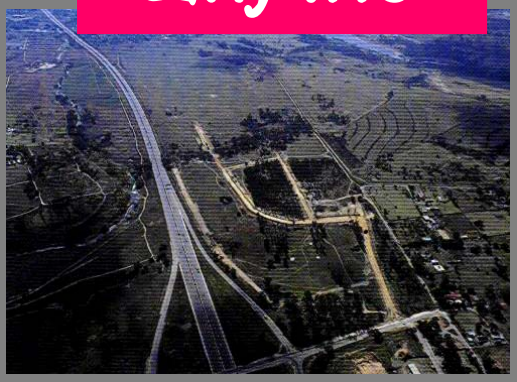
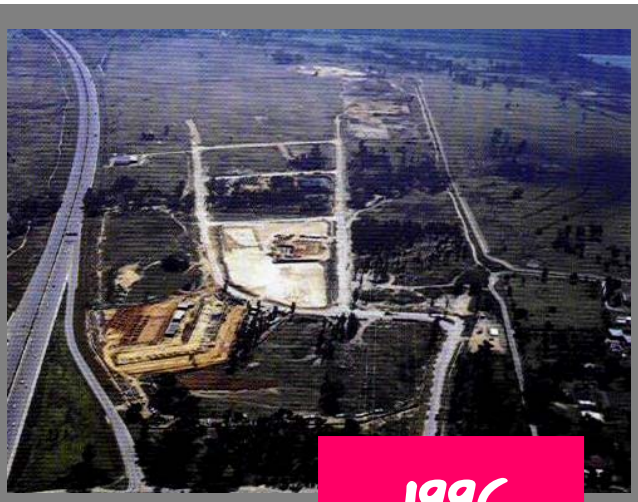


[Brian Rose, RPP Developments, 2003]

early 1996





1996

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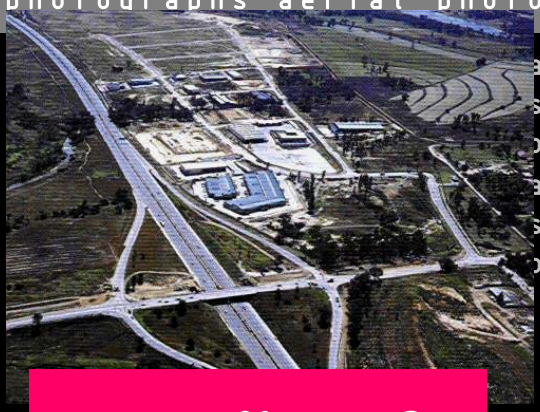

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March 1997

1999

1993 to 1995. Land purchase, rezoning and town-ship planning took place to create a major new 110 hectare development node in the Sandton area. During 1996 phase 1 of 40 hectares was proclaimed and serviced, and the first buildings were completed. In March 1997, Phase II of 20 hectares was proclaimed. Major upgrading of Marlboro Drive, linking Linbro Business Park to Sandton CBD, was in progress, together with the upgrading of the highway interchange. 1998 – 1999 saw the major growth phase of the Park with a large number of buildings completed or under construction. During 2000 a major upgrade of the Park entrance created new stands and improved the access with a one way system (Phase III). Work also commenced on the roads and services for Phase IV, adding a further 20 hectares.

2001

[Brian Rose, RPP Developments, 2003]

SITE:

Frankenwald Extension 19 Township, comprising of 2 erven numbered 58 and 59 situated on portion 59 of the farm Bergvallei No. 37 – IR. Vide diagram S.G. No.10280/2000, Deed of transfer no., Province of Gauteng. (See site map).

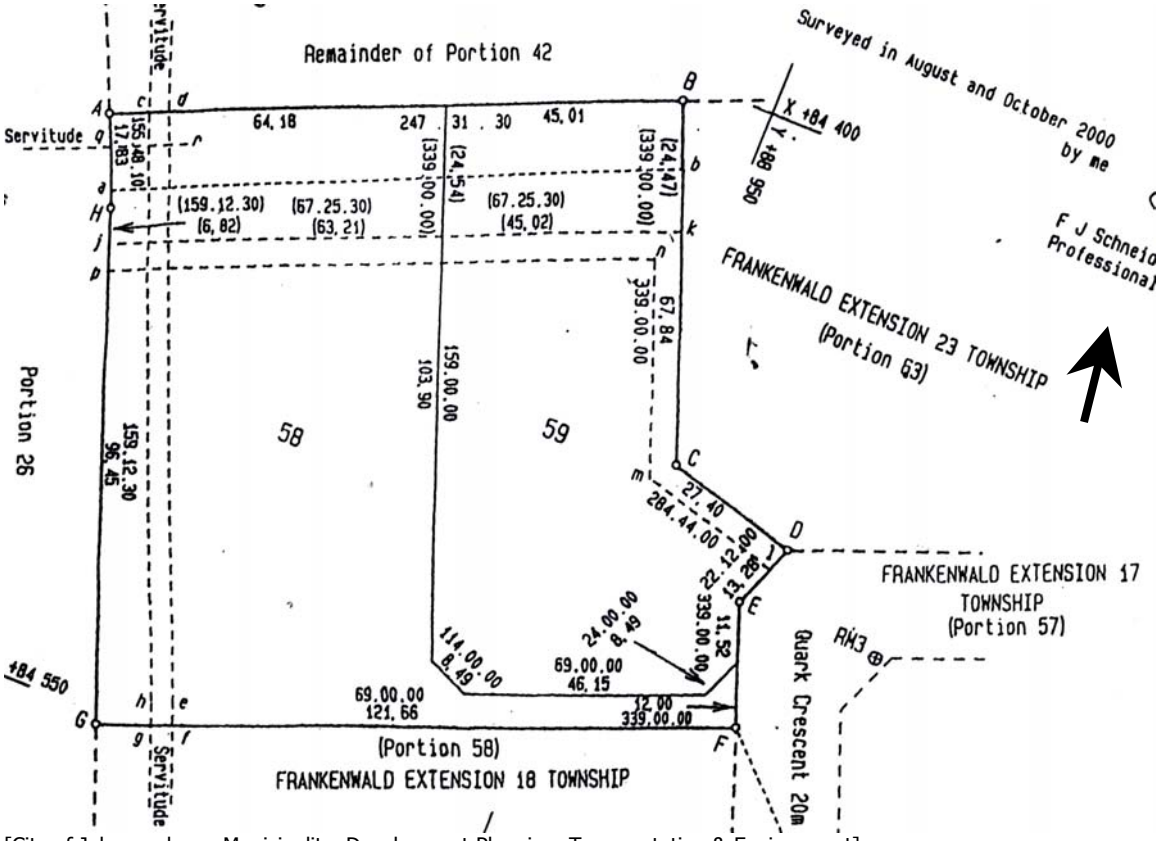
ZONING:

The site is zoned "Special" and "Industrial 1" – permitting industries, businesses and public garages: Provided that the retail trade in goods wholly or partly manufactured or assembled on the property or any other goods that, although they are not manufactured, prepared or assembled on the erf, form part or are ancillary to the scale of manufactured, prepared or assembled on the erf may be allowed with the written approval of the local authority. Other uses including offices may be permitted subject to the consent of the local authority.

FAR	0,5
PARKING	4 bays per 100m2 for offices, 1 bay per 100m2 for warehousing
HEIGHT	Except with the written approval of the local authority, the height of all buildings shall not exceed 12 metres from natural ground level.
BUILDING LINES	6 metres to street frontage and 5 metres to side boundaries (may be relaxed subject to approval of local authority).
BUILDING TIME FRAME	As soon as possible after transfer.
PLAN APPROVAL	Subject to approval of Design Review Committee.
RATES AND TAXES	0,0831c in R (exclusive of VAT) on municipal valuation per annum.
PARK OWNERS LEVY	R2,12 psm (exclusive of VAT) per annum on land area. (0,1683c per month on land area exclusive of VAT)

Fig.5 – Site and building requirements for Portion 58, Frankenwald Extension 18 Township.

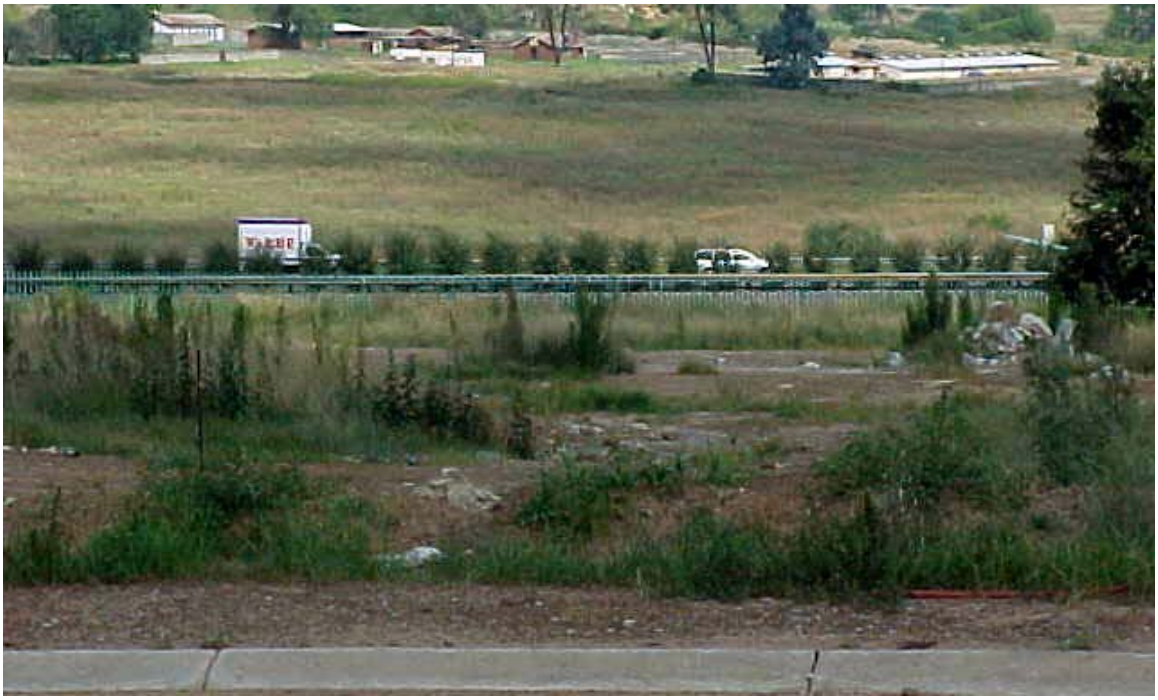
SERVITUDE:



[City of Johannesburg, Municipality, Development Planning, Transportation & Environment]

Servitude Notes:

1. The figure c d e f g h represents a Servitude Vide Diagram S.G. No. A 5695/1990: Deed of Servitude No. K 1001/1996s and affects Erf 58
2. The figure A B k j H represents a Servitude and affects Erven 58 and 59 as indicated
3. The figure j k C D l m n p represents a Servitude Vide Diagram S.G. No. 10279/2000: Deed of Servitude No. and affects Erven 58 and 59
4. The line q r represents the Centre Line of a Servitude 4,00 metres wide Vide Diagram S.G. No. 553/2000: Deed of Servitude No. and affects Erf 58



Site – Erf 58, Linbro Business Park [author]

LINBRO BUSINESS PARK: [Prince, 2003:1]

Linbro Business Park is located in Sandton adjoining the N3 highway with excellent access to the freeway system and to the fast growing Sandton CBD.

The first phases of Linbro Business Park was proclaimed in March 1996. Consistent and controlled growth has resulted in the final phases V and VI being scheduled for release in the fourth quarter of 2002, bringing the park to a total area of 110 hectares and on target for a development value in excess of R1 billion.

More than 200 000sqm of buildings have been built in Linbro Business Park to date with a value in excess of R500 million. The Park has attracted a healthy balance of institutional investment, private investment and owner occupied buildings and has enjoyed a high occupancy rate since its inception. Occasional vacancies are generally of short duration and are a result of companies making internal structural changes. These vacancies add to the dynamic nature of the Park. A number of buildings have high office ratios and accommodate head office situations.

Major developments last year included the upgrading of the entrance with a one way system to improve traffic flow, the establishment of an Engen Service Station and extensive development of newly released stands at the entrance of the Park.

This development will include Linbro Village – a new Freehold Title development, the continued marketing of Phase IV land for sale or development and the upgrading of the security access control area.

The popularity of Linbro Business Park continues to increase as a result of the access and security controls, the effective management of the Park, strict controls on the approval of building plans and the quality profile of the companies located in the Park. All owners automatically become members of the Park Owners Association.

The Park has strong representation from major companies, both as owner-occupiers and as tenants. Vacancy levels remain low and strict controls, administered by the township developers and the Linbro Business Park Owners Association, continue to ensure high standards of security and common area maintenance as well as unusually high architectural standards. Owners are also proud to maintain attractive landscaping within their own areas.

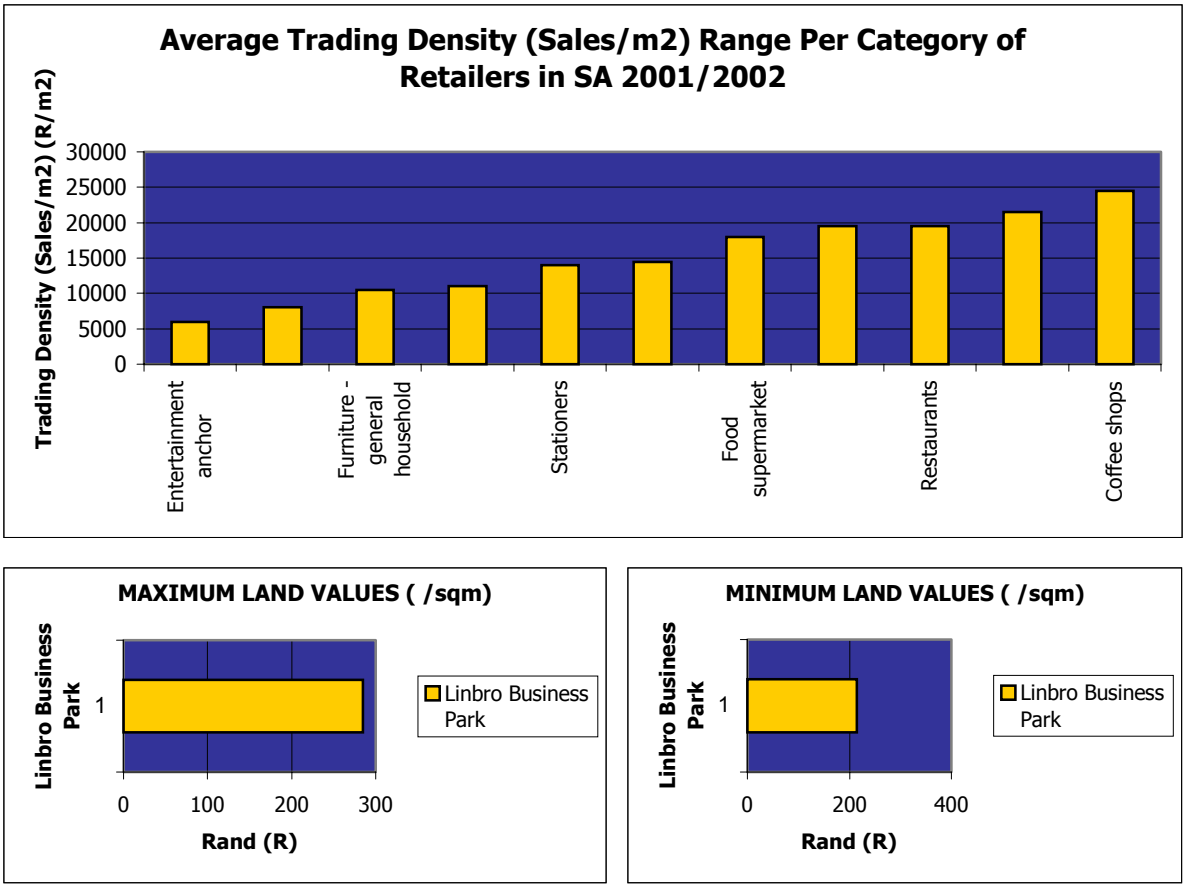
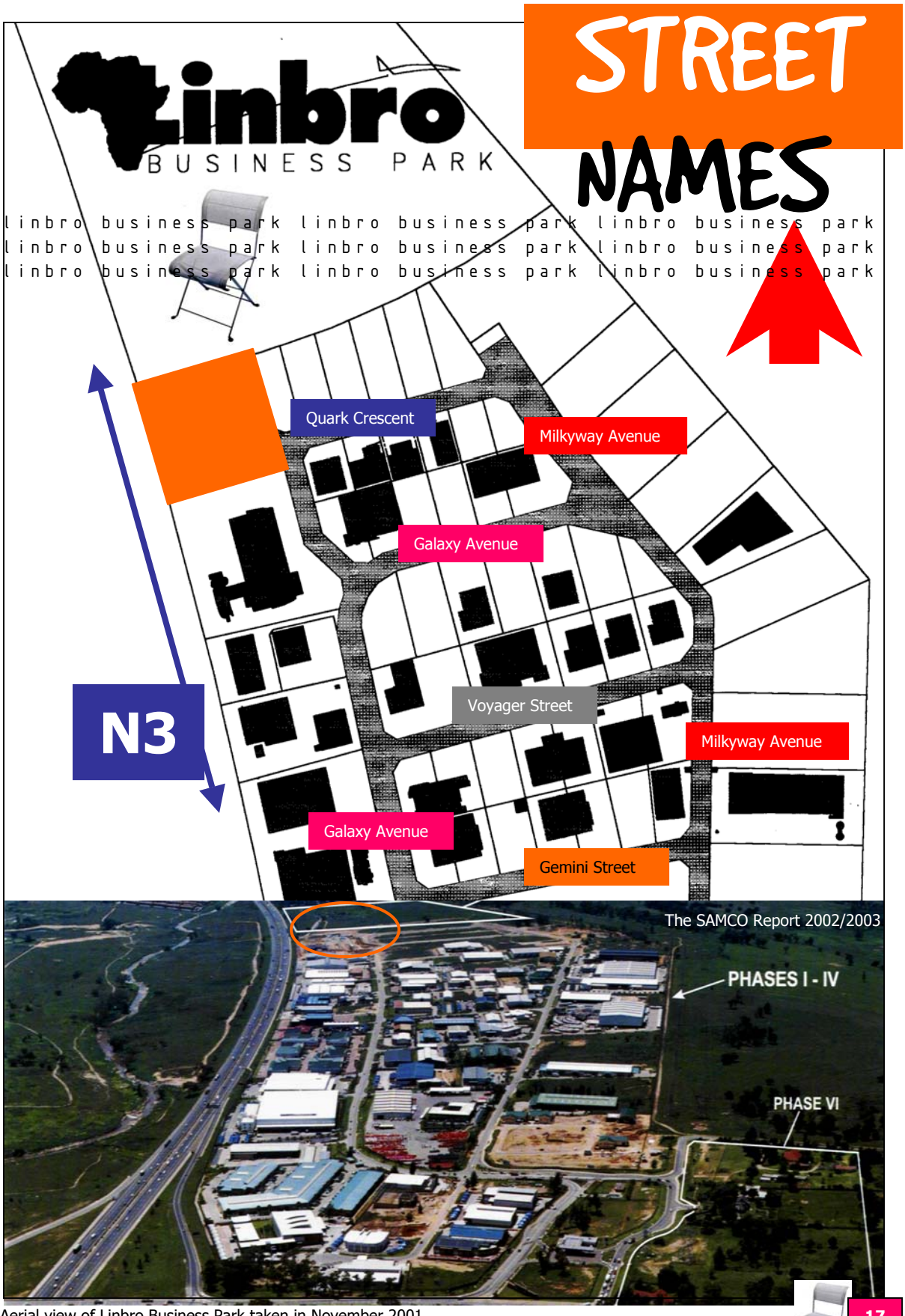


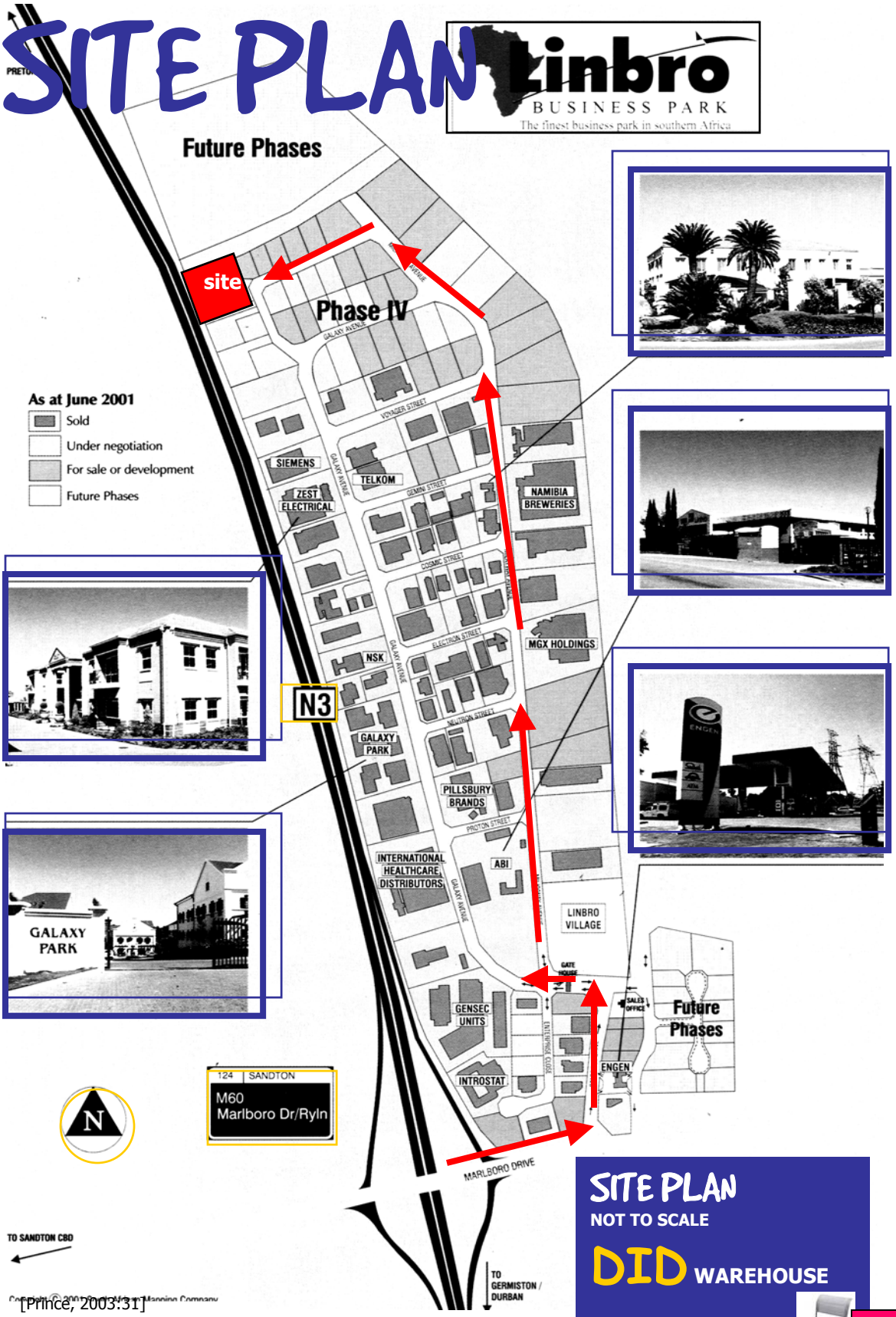
Fig.6 – Average Trading Densities in South Africa and Minimum Land Values of Linbro Business Park.



Aerial view of Linbro Business Park taken in November 2001.
[Prince, 2003:29]

SITE PLAN

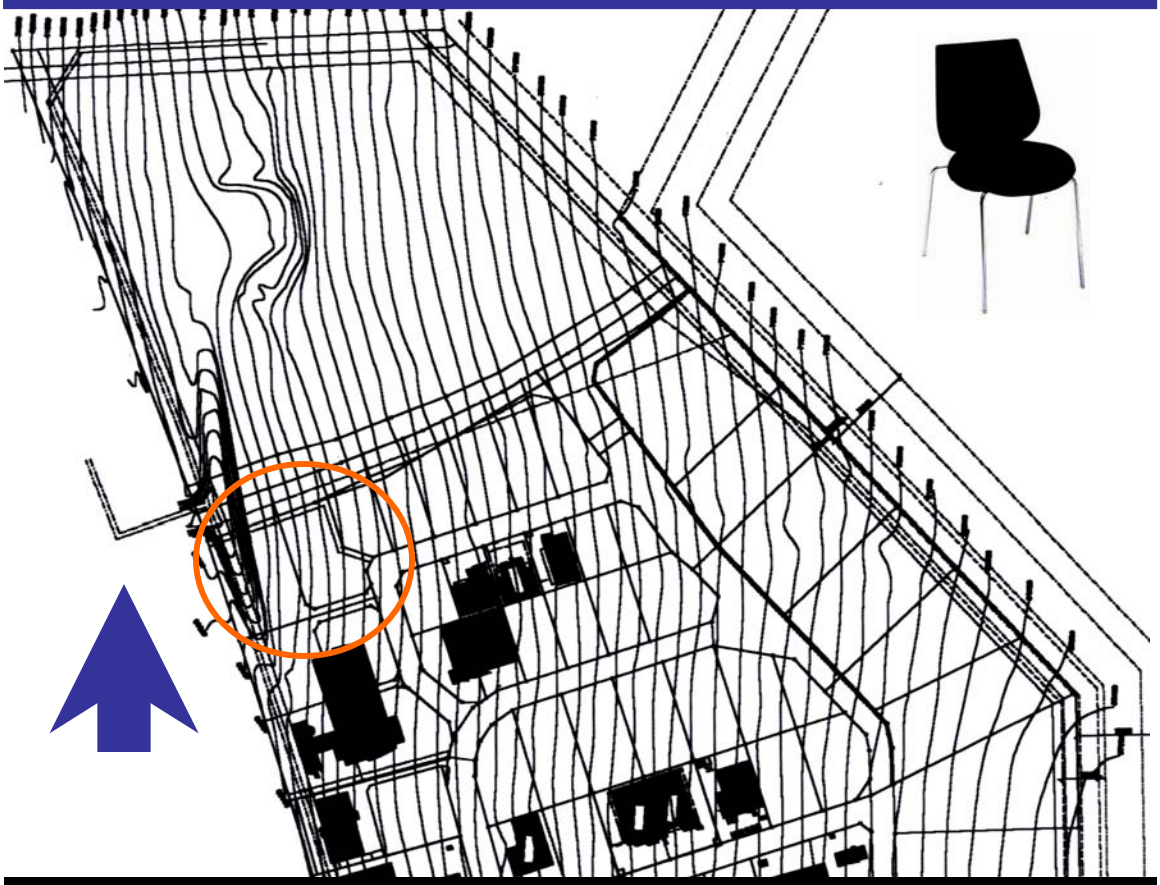
Linbro BUSINESS PARK
The finest business park in southern Africa



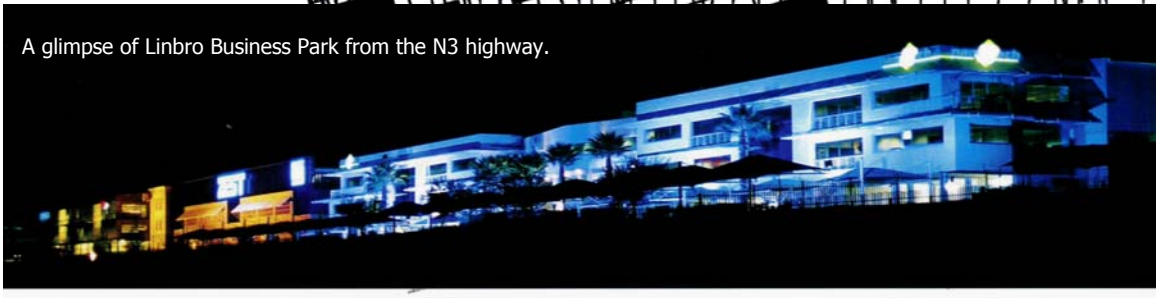
SITE PLAN
NOT TO SCALE
DID WAREHOUSE

[Prince, 2003:31]

CONTOURS



A glimpse of Linbro Business Park from the N3 highway.

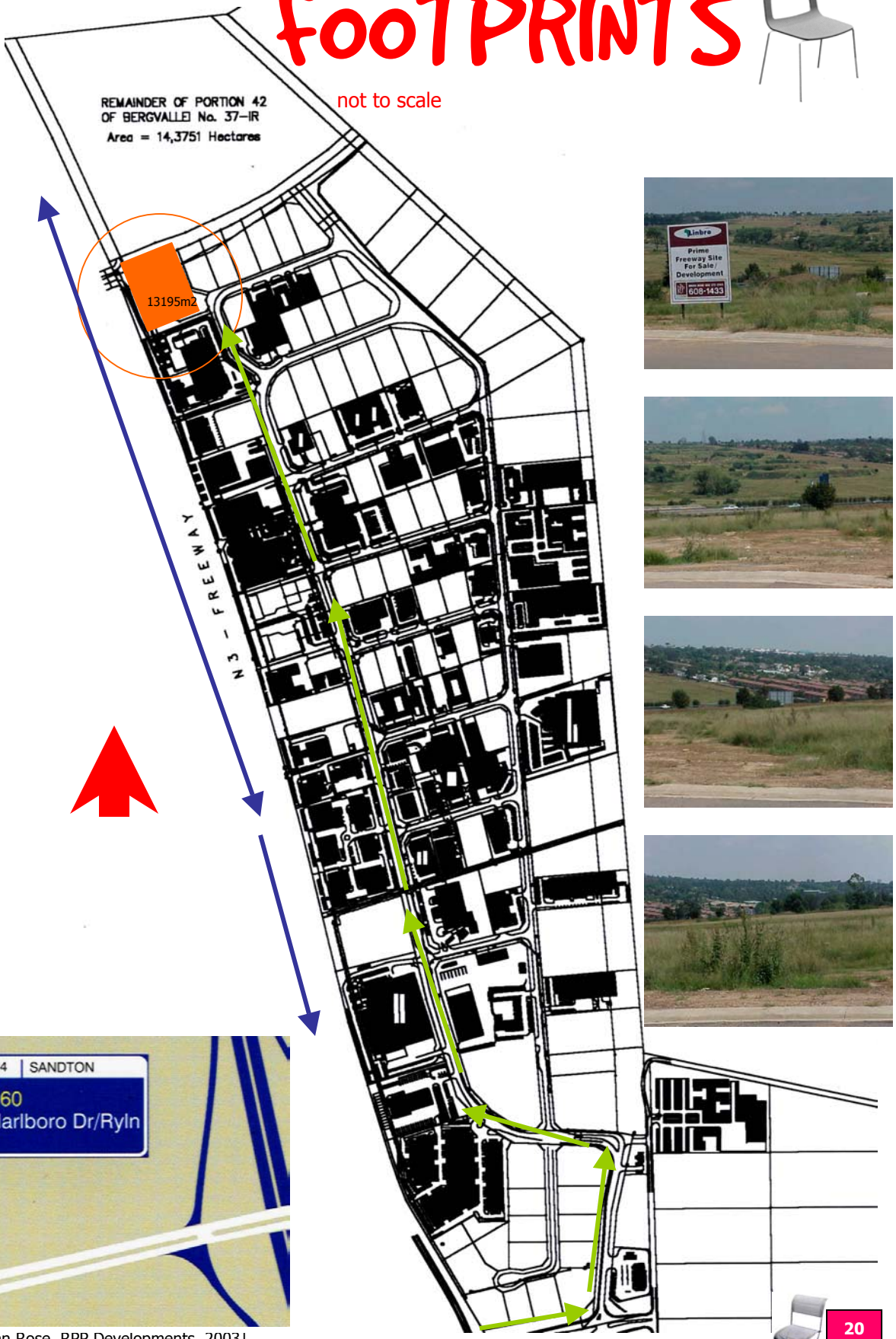


Siemens – designed by Leon Krige.

[Prince, 2003:28]

FOOTPRINTS

not to scale



[Brian Rose, RPP Developments, 2003]

Continue:
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pages 21-30

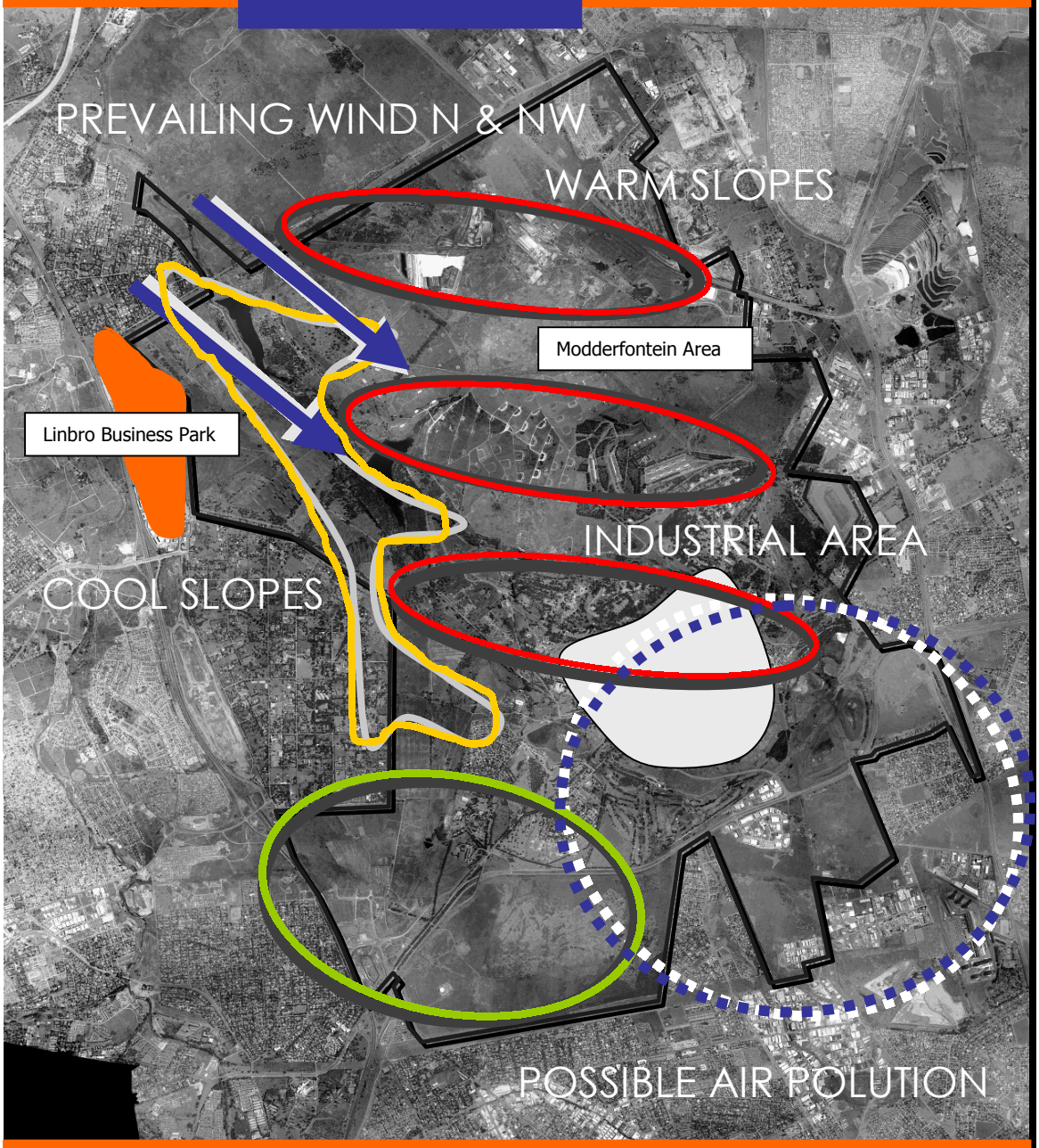
user profile

of linbro business park – not to scale

[Brian Rose, RPP Developments, 2003]

MACRO CLIMATE ANALYSIS

[MArch(Prof) I, 2003]



URBAN DESIGN PROPOSALS FOR LINBRO BUSINESS PARK:

- Focus on a secure environment
- Maintain the aesthetic and environmental tone of the business park to the benefit of all participants
- Develop various zones to create a broad range of industrial participants
- Provide mini-factories, small stand developments as well as sites for larger scale developments
- Improve circulation patterns for vehicles as well as pedestrians
- Provide urban design features and focal points through the main entrance
- Enhance street scapes by the provision of closely spaced street lighting and trees

[MArch(Prof) I, 2003]

Fig. 7 - Linbro Business Park and (above) site for DiD Warehouse

BUILDING COSTS AND ESCALATION FORECASTING
Second quarter 2002
Gauteng region (Overall rates per sqm incl preliminaries but excl VAT)

Retail Developments

Value centre type retail	R 1450-1700
Convenience strip shopping centre	R 1650-2100
Regional shopping centre with enclosed malls	R 1950-2750

Residential Developments

GASH housing by Contractor/Developer	R 1500-1850
Duplex houses/apartments	R 1750-2150
Luxury (cluster) houses	R 2750-4000

Leisure Developments

Thatched game lodge accommodation	per sqm	R 2050-2750
Budget type hostels	per room	R 175,000
Luxury hostels	per room	R 850,000

Industrial Developments

Warehousing with 6 m height (over 2000 sqm) including ablutions	R 800-1000
Medium duty factory building with 8 m height (over 2000 sqm)	R 1000-1250
Attached office buildings (no AC)	R 1600-1850
HiTech workshop and storage	R 1100-1300

Office Developments

Underground parking basements including foundations	R 900-1050
Commercial office park development on basement (with AC)	R 1900-2200
Prestigious office development on basements	R 2950-3750

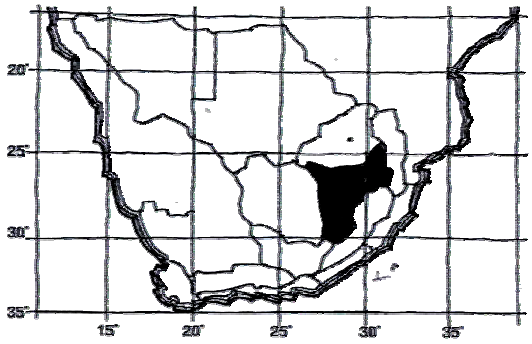
Fig. 8 – Building costs and escalation forecasting.

JOHANNESBURG INDUSTRIAL RENTALS AND LANDVALUES
Selected Industrial Areas

AREA	RENTAL LEVELS MINI UNITS R/m2 Gross*	RENTAL LEVELS MIDI UNITS R/m2 Gross*	RENTAL LEVELS LARGE UNITS R/m2 Gross*	LAND VALUES R/m2*
Honeydew, Laser Park	20.00	15.00	18.00	130.00
Industria North	11.50	9.50	7.50	80.00
Kramerville, Eastgate Extensions	24.00	21.00	18.00	180.00
Linbro Business Park	**29.00**	**29.00**	**29.00**	**240.00**
Meadowdale, Route 24	24.50	20.00	18.00	160.00
Midrand, Kyalami Business Park	22.00	20.00	18.00	220.00
Wadeville	12.00	8.50	6.00	40.00
Wilbart, Sunnyrock	24.50	18.00	16.00	120.00
Wynberg, Kew	12.50	10.00	8.00	120.00

Fig. 9 – Johannesburg Industrial Rentals and Landvalues.

CLIMATIC ZONE – HIGHVELD
[Holm, 1996:64]



LOCATION:
26,1 degrees to 31,2 degrees east and 30,8 degrees south.

ZONE CLIMATE DESCRIPTION:
Distinct rainy and dry seasons exist with a large daily temperature variation and strong solar radiation. Humidity levels are moderate.

TEMPERATURE:
The maximum temperature diurnal variation occurs in September. The average monthly diurnal variation is 11K.

HUMIDITY:
The average monthly relative humidity is 56%.

WIND:
Summer winds are predominantly north-easterly, and winter winds are predominantly north-westerly, but there is also a fair amount of south-westerly wind.

COMFORT ZONE:
The summer temperatures which exceed the comfort zone are insignificant. Winter temperatures are approximately 15K below the comfort zone. Humidity levels are low in the winter.
[Holm, 1996:64]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ave
Max ave monthly temp (degrees)	25,6	25,1	14,7	21,2	18,9	16	16,6	19,3	22,8	23,7	24,1	25,2	21,10
Minim ave monthly temp (degrees)	14,7	14,2	13,2	10,4	7,3	4,2	4,3	6,3	9,5	11,3	12,7	13,9	10,17
Ave monthly amplitude (K)	10,9	10,9	1,5	10,8	11,6	11,8	12,3	13,0	13,3	12,4	11,4	11,3	10,93
Ave monthly relative Humidity (%)	64,0	65,0	64,0	61,5	53,3	51,5	48,5	46,0	46,0	52,5	59,5	60,5	56,04
Ave monthly rainfall (mm)	126	90	91	52	13	8	4	6	28	73	118	105	59,50
Rham	78	80	80	78	71	70	67	64	63	67	73	74	72,1
Rhpm	50	50	48	45	36	33	30	28	29	38	46	47	57,60

Fig. 10 – Climatic data for Johannesburg.

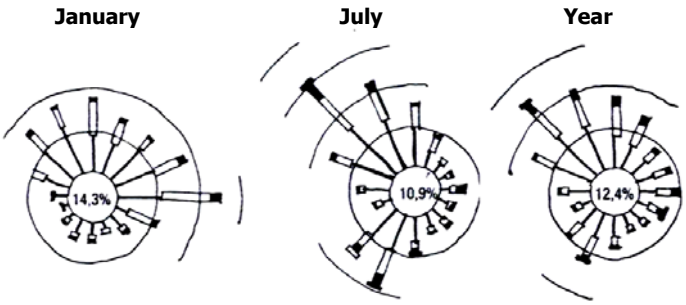
BUILDING ENVELOPE:
[Holm, 1996:64]
MASS:
Thermal mass is also advisable especially in inland areas when the daily temperature swing is larger than 13K. It can be provided by massive floors and internal partitions. It is effective for approximately half of the under heated period and for the entire overheated period.

INSULATION:
Lightweight insulated roofs are feasible in this region.

PROPERTIES OF MATERIALS:

All external surfaces should be light coloured or reflective (but not shiny metal) to minimize solar heat gain in the overheated period.

WIND ROSE FOR JOHANNESBURG



SOLAR CONTROL:
[Holm, 1996:66]
SUN ANGLES:
It is recommended that summer sun be screened and winter sun be allowed to penetrate.

EQUATORIAL WINDOW:
An equatorial window with an area equal to 19,2% of the floor area is effective for the entire overheated period. Openings for solar gain should be orientated towards the winter sun and screened in summer when solar control is necessary to prevent overheating.

VENTILATION:
Ventilation is effective for alleviating overheating, but may be unnecessary if thermal mass is exploited. Night ventilation can be implemented to compensate for insufficient mass.

SYSTEMS:
[Holm, 1996:67]
EVAPORATIVE COOLING:
Direct evaporative cooling is effective for controlling the entire overheated period, but is unnecessary if thermal mass is exploited.

ACTIVE:
Airconditioning is not necessary unless the building function demands it.

MECHANICAL:
Mechanical ventilation is not necessary unless the building function requires higher ventilation rates.

VERTICAL SUN ANGLE AT 12:00 SOLAR TIME

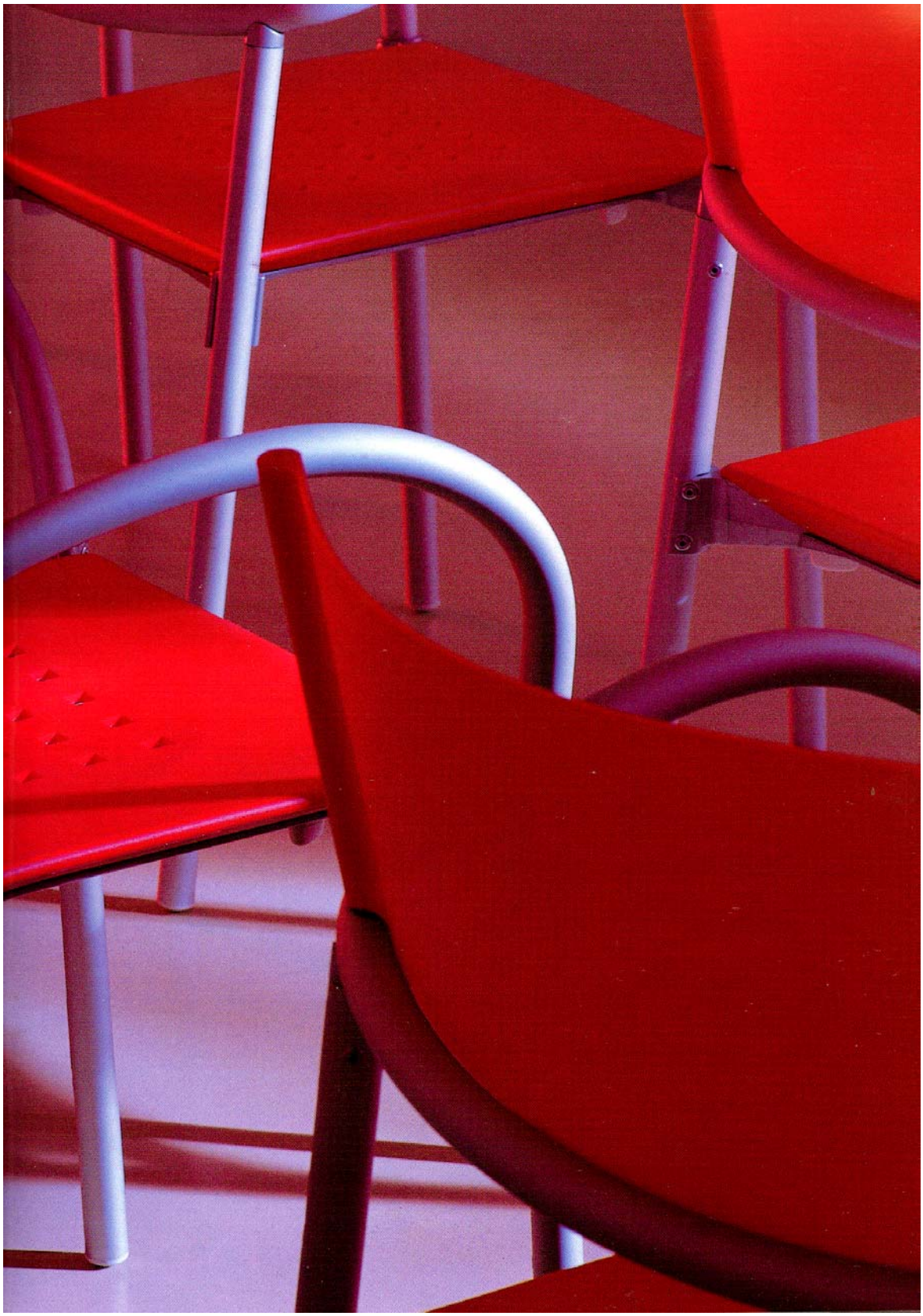
	Latitude (South)	Solstice (21 Mar/23 Sept)	Winter (22 June)
Johannesburg	26,13 degrees	63,87 degrees	40,37 degrees

Fig. 11 – Vertical sun angle at 12:00 solar time.

CLIMATE:
[Schulz, 1986:320]
The average annual precipitation in the highveld region varies from about 900mm on its eastern border to about 650mm in the west. The rainfall is almost exolusively due to showers and thunderstorms and falls mainly in summer, from October to March, the maximum fall occurring in January. The winter months are normally dry and about 85% of the annual rainfall falls in the summer months; heavy falls of 125 to 150mm occasionally fall in a single day.

The annual average number of thunderstorms varies from about 75 in Gauteng to 100 in the southern highlands. These storms are often violent with severe lightning and strong gusty south-westerly winds and are sometimes accompanied by hail.

This region has about the highest hail frequency in South Africa; about 4 to 7 occurrences (depending mainly on altitude) may be expected annually at any one spot, whilst occasionally hailstones grow to the size of hen's eggs or tennis balls and can cause tremendous damage. Snow may occur about once or twice a year. Very exceptionally, snow will fall further northwards and has been observed as far north as the Soutpansberg.



[Domus No 847, June 2002:]

Average daily maximum temperature is roughly 27 degrees in January and 17 degrees in July but in extreme cases these may rise to 38 degrees and 26 degrees respectively. Average daily minima range from about 13 degrees in January to 0 degrees in July, whereas extremes can sink to 1 degree and –13 degrees respectively.

The period during which frost is likely to form lasts on the average for about 120 days from May to September, though this period is longer in the southern highlands. On the whole winds are light except for short periods during thunderstorms. Very occasionally tornadoes do occur and cause tremendous damage if they happen to strike a populated area. Sunshine duration in summer is about 60% and in winter about 80% of the possible.

[Schulz, 1986:320]

Geology:
[March(Prof) I, 2003]
The underlying rock structure of Modderfontein comprises of two main rock types. Granite and Amphibolite.

Granite:

Granite is a very well known igneous rock, which forms some of the oldest rocks on Earth (3.5 billion years). Granite forms when magma intrudes into the Earth's crust to crystallize in an isolated environment, which causes the rock to be coarse-grained. This rock consists of minerals like quartz, plagioclase and alkali feldspar.

Soil Profile:

In humid areas silty sand or clayey silt forms, which is mica rich with quartz grains. These soils are dispersive (highly erodible) and have a high permeability. Core stone development and an uneven bedrock topography may occur. In some areas, e.g. Halfway House, a collapsible grain structure may develop.

Engineering Qualities:

Slope instability is frequent when it is saturated– which means that the ground can flow easily downhill. It is a high erodable soil. The core stones can cause problems in the placing of foundations such as piles. A collapsible grain structure may cause damage to structures if proper foundation measures are not implemented. Both the soils and the rock is widely used as aggregates for roads and concrete.

Unique Qualities:

Granite is regarded as a solid rock and is therefore widely used as construction material.

Aesthetic and Scenic Value:

The wide range of geomorphological features formed on granites make this a much written about and researched rock type. Some of the most scenic landscapes are associated with granite areas. Examples are the Klipkoppies in and around Nelspruit, south of Lebowakgomo, along the eastern Bushveld and the isolated tors in the northern and western parts of the Northern Province. In Swaziland and some parts of Kwazulu-Natal typical granitic landforms also occur.

Amphibolite:

A faintly foliated metamorphic rock developed during regional metamorphism of simatic rocks, composed mainly of hornblende and feldspars. The engineering qualities and uses of this rock are very similar to that of Granite as they are both igneous rocks.

An interesting characteristic of these two rock types, is that of the soil profiles formed by them and thus the agricultural potential of the area. The depicted view of the geology layers is identical to that of the agricultural potential – and therefore indicates those areas with the greatest potential(high, medium or low) for agricultural potential.

Ironically, the area's whose profiles have the highest potential are those which are most densely built and developed.

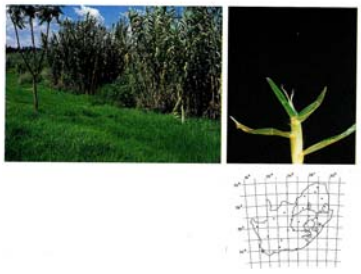
Habitat:

There are a number of elements other than say agricultural potential which determine the Ecological importance of the site, one of which is the Habitat and Habitat diversity – which includes both plant and animal life.

To briefly describe the fauna quality of the site(over and above the study conducted by Ryan Astrup) the area has patterns of indigenous trees, mostly Acacia and Rhus, as well as large clusters of Eucalyptus and Wattle.
[MArch(Prof) I, 2003]

Vegetation

IDENTIFIED INDIGENOUS GRASS SPECIES AT MODDERFONTEIN



- *Digitaria Erianthia*
- *Pennistetum Clandestinum* (left)
- *Eragrotis Curvula*

Dominant species to the Natural Environment:

- *Digitaria Erianthia* (Finger Grass)
- *Hyparrhenia Anamesa* (Bundle Thatching Grass)

Problem species to Natural Environment:

- *Hyparrhenia Hirta* (Common Thatching Grass)
- *Pennisetum Clandestinum* (Kikuyu)
- *Eragrotis Curvula* (Weeping Love Grass)

INDIGENOUS TREE SPECIES IDENTIFIED AT MODDERFONTEIN

ACACIA KAROO – Sweet Thorn
Shrub to medium sized deciduous tree; crown rounded, dark green. Spines paired, straight, white, usually more prominent on young plants. The inner bark can be used for rope. Excellent shade tree.

ALOE SPP.
Found throughout the Highveld. Thorny leaves used to thin animal skin for clothing. Important contemporary and traditional medicines.

CELTIS AFRICANA – White Stinkwood
Leaves eaten by cattle and other domestic animals. The wood has been used as a protective charm. Timber is tough and strong, used for furniture etc.

GREWIA SPP. – Velvet rasin/cross-berry
Root extracts used to help in childbirth. Important contemporary and traditional medicine. Pounded bark – soap.

PORTULACARIA AFRA – Porkbush
Fresh leaves eaten raw. Valuable fodder plant in dry regions, but often unpalatable to livestock. Used as thatch.

RHUS LANCEA – Karree
Wood is hard/tough.

[MProf(Arch) 1, 2003]

SOCIO-ECONOMIC

COMMUNITY: MODDERFONTEIN AREA

[MArch(Prof) I, 2003]
THORNHILL ESTATES

The demand for housing establishments of this kind is in excessive demand in the Modderfontein area. Thornhill itself is constantly growing and people are willing to pay extreme prices to live in the Estate.

SPORT FACILITIES
Modderfontein has two sport clubs as well as a golf club. Other sport facilities are squash, tennis, soccer, rugby, cricket and bowls.

MODDERFONTEIN CENTENARY GOLF COURSE
Modderfontein Centenary is the only golf course in the area.

MODDERFONTEIN CONSERVATION SOCIETY
Environmental talks, walks through the park and many other activities are constantly organised and the public are encouraged to take part.

CHURCHES
The only church in Modderfontein is St. Francis In The Wood, an old Anglican chapel that served the community before the extensive expansion of Modderfontein. The chapel can only accommodate a community of around 50 people.

NOBEL PRIMARY SCHOOL
Nobel Primary currently has 735 pupils, of which 35 are pre-primary children. The school is totally full and no more additional pupils can be accommodated. This is due to the limits of the septic tank that they have.

The school attracts children not only from Modderfontein (Thornhill Estate and Lake Side) but also from all the surrounding areas including Eastleigh, Edenvale, Eden Glen, Illiandale, Kempton Park West, Estherpark, Rembrandpark and Tembisa.

HOSPITALS/MEDICAL CENTRE
There is a public hospital in Modderfontein although at present it is not in total functioning condition. The Modderfontein Medical Centre next door functions as a clinic for outpatients and sees most of the people in search of medical attention. The facility encompasses only two on-staff doctors and a pharmacy. It also runs a training facility. There are no private hospitals or private practices located in Modderfontein. The closest public hospital is Edenvale Hospital and is 15km away.

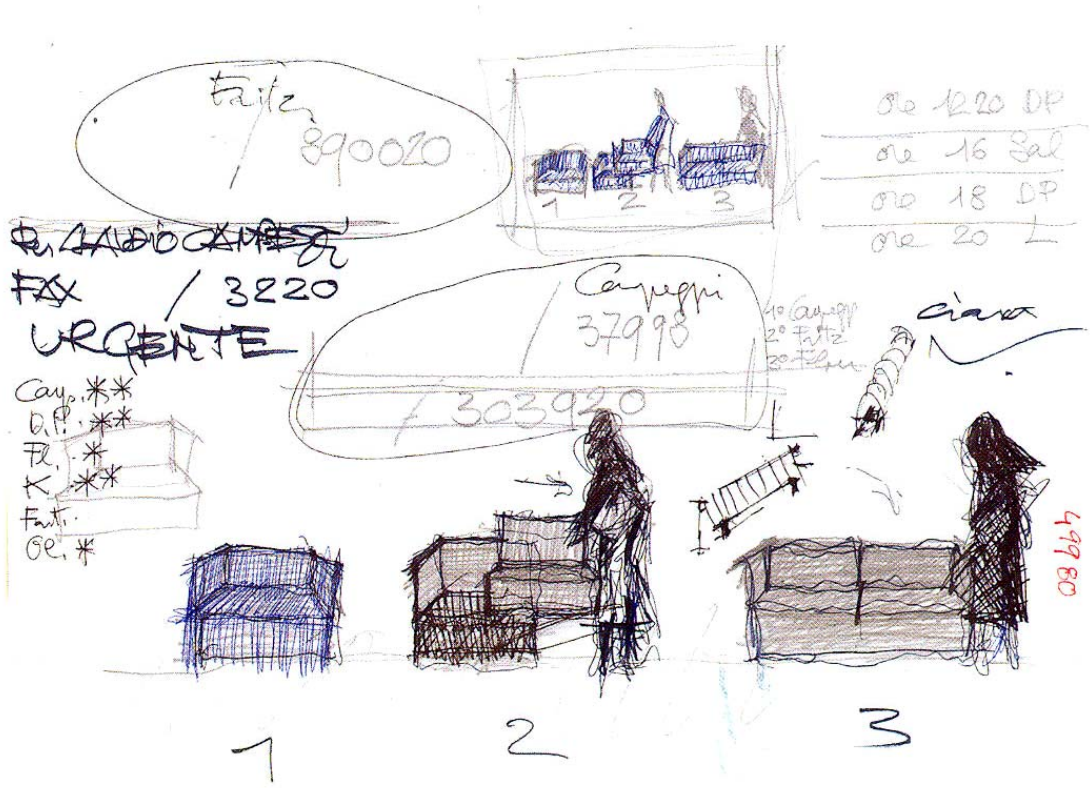
POLICE STATION
Modderfontein no longer has a police station of its own but falls under Sebenza Police Station.

FIRE DEPARTMENT
Modderfontein boast its own fire department. The Modderfontein Fire Department falls under Johannesburg jurisdiction and can be dispatched through contacting the Johannesburg Fire Department.

INDUSTRIAL AREAS – SASOL POLYMERS
The industrial area of Modderfontein consists of mostly corporate and retail businesses. Most of the Sasol Polymers employees come from Kempton Park, Edenvale, Pretoria, Boksburg and Tembisa.

[MArch(Prof) I, 2003]

Continue:
04contextStudy-4
pages 31-41



[Domus No 827-828, 2000:76]

ECONOMIC ENVIRONMENT:

Economic issues addressed will concentrate on the expansion of economic opportunities through the release of land for development and support of the industrial corridor east of the N3. A vision is formulated for the region:

To maximize the economic opportunities and
to provide and maintain an acceptable living environment [LIDP, 2002:I]

The City-wide principles that guide development in Administrative Region are as follows:

- Protect public and private investment – commercial, economic and residential.
- Stimulate and promote appropriate and focused localized economic activity in residential neighbourhood areas.
- Manage and contain urban development through: the promotion of nodal development, balancing mobility and activity roles of the arterial roads system, and supporting residential densification and infill, taking due cognizance of infrastructure capacities.
- Upliftment, renewal and integration of declining urban areas, promoting diverse land uses in support of social and economic development.
- Sustainable development – responsible use of natural resources.
- **Provide the necessary support to ensure investment and Economic growth.**

LOCATION:

The Linbro Park area (Frankenwald) are part of Region 7, which is one of the 11 Administrative Regions of the City of Johannesburg, is located north of the Johannesburg CBD, partially in the former Eastern Metropolitan Local Council, and partially in the former Northern Metropolitan Local Council.

Administrative Region 7 measures approximately 139,862km2. It has a mix of land uses. The prominent land uses are residential, industrial and the AECI National keypoint. This land is a national key point and a sensitive area, which has been sterilized due to the manufacturing of explosives and legislation governing explosives. Past pockets have been identified for release and urban development.

The industrial areas include all concerns of a commercial and manufacturing nature, including warehousing and distribution-related activities. This is prevalent in the Marlboro South area to the west of the region, as well as to the east of the region, in the Linbro Park area.

The industrial areas surrounding Alexandra are experiencing negative influence from Alexandra in terms of security and safety, which is causing an exodus. The AECI Modderfontein land is sterilized due to the explosives factory and legislation governing explosives. [LIDP, 2002:1]

OPEN SPACES:

This comprises a few significant parks and nature reserves, and forms an integral part of the overall spatial development framework. Parks and open spaces in Region 7 are mainly found in the Southern residential areas of this region. The only designated conservation area in this Administrative Region is found to the north, namely the Modderfontein Conservation Area. [LIDP, 2002:2]

SIGNIFICANCE IN THE METROPOLITAN AREA:

Region 7 can be considered as a region of transition between the affluent Administrative Region 3 and the western areas of Lethabong MLC. It is also a significant employment node (Wynberg) in its own right. On the other hand, it is an area that has a severe negative influence on surrounding and adjacent areas, due to the present state of one of its key residential suburbs – Alexandra.

It is the home of AECI, a national security key point in the manufacturing of explosives. It has also a diverse quality of residential areas catering for the wealthy to the poorest of the poor. It contains major employment nodes i.e. Wynberg, Bruma and Linbro Park Industrial Area.

The area is well served in terms of infrastructure and services, however, severe problems in terms of reticulation and over consumption are encountered in certain areas (Alexandra). It is and important contributor to the fiscal and GDP of the Metropolitan area. [LIDP, 2002:2]

CURRENT SITUATION AND PROJECTED POPULATION GROWTH:

There are certain problems as far as reliable, updated information about the demographics of this Administrative Region is concerned. According to Census 96 and iGoli 2010, Region 7 houses a population of

188 000. For the purpose of the LIDP, an estimated number of 394 000 (including the estimated 350 000 inhabitants of Alexandra, derived from the overall business plan for the Reconstruction and Urban Renewal of Greater Alexandra (2000) has been used as basis for calculations and the formulation of interventions.

The population in Administrative Region 7 is 14% of the population of the GJMC area (estimated to be 2,8 million according to iGoli 2010 reports). It is composed of 87% Blacks, 11% Whites, 1% Coloureds and 1% Indians. The population composition of Alexandra is biased to the age group 17 – 35 years, with an extremely low percentage of children and senior citizens (less than 5%).

This is not a normal population curve, and highlights the transient nature of the inhabitants of Alexandra. [LIDP, 2002:4]

TRENDS:

An industrial corridor is emerging along the eastern side of the N3 due to the locality and accessibility. The N3 is serving as a buffer from the negative effects of Alexandra. [LIDP, 2002:4]

ENVIRONMENT:

Administrative Region 7 is situated to the north of the catchment divide and therefore falls within the Jukskei River catchment area, which forms part of the Crocodile River system. Both the Jukskei River and the Modderfonteinspruit, which drains to the north, traverse the region. A tributary of the Jukskei River, the Sandringhamspruit drains the southern part of this region. [LIDP, 2002:10]

DAMS:

Dams in the area include Modderfontein Dams 1, 2, 3 and 4, which are fed by the Modderfonteinspruit and its tributaries. As these dams are on the property of AECI, the management of these dams falls under the scope of their Environmental Management Plan. These dams are currently not being utilized for any other purpose than water attenuation.

RIDGES:

The Linksfield Ridge is found to the south of this Administrative Region, but continues to the west into Administrative Region 8. The northern slope of the ridges is regarded as an ecologically sensitive area with a high bio-diversity. The ridge serves as habitat for varied trees, bushes, flowers (including the rare Transvaal Rothmania) and bird life. The ridge is also of historical importance in Johannesburg.

The Linksfield Ridge and the Linksfield Ratepayers Association are actively involved in the management and conservation of this ridge. [LIDP, 2002:10]

PARKS AND OPEN SPACES:

Open spaces in Greater Johannesburg are generally divided into two categories, namely un-maintained land (in the form of disused mining land, buffer zones, open veld etc.) and maintained land (in the form of recreational open space, parks, golf courses etc.) These categories can be divided into further sub-groups related to activities, which take place on the open spaces. [LIDP, 2002:11]

Parks of regional active nature include:

- Observatory Golf Course
- Royal Johannesburg Golf Club
- Huddle Park Golf Course
- Modderfontein Golf Course

Remaining open spaces in the area are mainly of a local active nature and include:

- Bezuidenhout Park
- Old Royal Park
- Dixon Park
- Rhodes Park
- Alexander Park
- Hofland Park
- Orange Grove Park

FLORA:

The property of the Sizwe (Rietfontein) Hospital contains pristine Bankenveld grasslands. This may be one

of the few remaining areas representative of this vegetation type, in pristine condition, and should be preserved.

CEMETERIES:

About 5 000 graves are situated on the property of the Rietfontein Hospital. Concerns have been raised that the disturbance of these graves may result in the spread of diseases (Marian P Laserson, March 1999). [LIDP, 2002:12]

POLLUTION:

Sources of pollution can be found throughout Region 7, but the most heavily degraded areas are found in Alexandra and adjacent areas. Pollution sources consist of: [LIDP, 2002:12]

- air pollution (from vehicle emissions, coal fires and industries in adjacent areas)
- water pollution (from urban runoff, blocked sewers and litter)
- land pollution (from poor waste management and litter) and
- noise pollution (particularly along arterial roads and industries)

AIR POLLUTION:

The burning of fossil fuels, such as wood and coal, is the main contributor to air pollution in Alexandra. A large number of residences do not have access to electricity.

WATER POLLUTION:

Run-off from urban areas, blocked and leaking sewers, litter and illegal discharges from industry all contribute to poor quality water in these watercourses. This pollution detrimentally affects recreational activities in the dams located in watercourses.

WASTE:

People in informal settlements have varied levels of access to services, including regular refuse removal and sanitation services. It is evident that external operators dump waste within Greater Alexandra to avoid paying fees for dumping at the Linbro Park disposal site. This compounds the problems experienced with insufficient waste removal in the area.

OPEN SPACES:

Most open spaces are found in the areas to the north of Broadway, south of Sandringham and to the west of the N3 freeway, except for the Modderfontein Conservation Area. These open spaces are mostly combined with formalized outdoor recreational facilities, mainly in the form of golf courses.

Limited open space accessible to the general public, exists in areas of Kensington, Jeppestown, Kew, Marlboro Gardens and Kelvin.

The lack of open spaces in these areas also limits the recreational opportunities for people.

WASTE REMOVAL:

The lack of waste removal and management in Alexandra has a definite negative effect on public health. The non-removal of waste also increases the likelihood of contamination of groundwater and soil. The provision of proper waste services will have a positive impact on the curbing of the spread of certain diseases, the aesthetic quality of the area and an improvement in living conditions for people.

AIR POLLUTION:

Industrial activities in the Wynberg/Kew area, as well as moderate to excessive coal burning taking place in Alexandra, are the main causes of air pollution. Through electrification of Alexandra, this problem can be successfully addressed. However, many people have very little income and cannot afford the luxury of electricity.

WATER POLLUTION:

Water quantity levels are low due to the industrial effluent and inadequate sanitation services in the densely populated informal settlements. By supplying adequate services, this will decrease levels of bacteriological contamination in the Jukskei River, as well as improve the health of local communities.

OPEN SPACES AND PARKS:

The creation of a Metropolitan Open Space System (MOSS) is one of the key areas that have been mentioned that necessitates attention. The open spaces and parks in this Administrative Region could form an integral part of a possible MOSS for the Greater Johannesburg. [LIDP, 2002:12]

CURRENT ECONOMIC SITUATION:

At present some 6,000 jobs (plus another 3,000 or so indirect jobs) in Marlboro South just north of Wynberg are being lost through factory invasions and occupancy as rental accommodation, much of it to first time migrants with the least education and marketable skills. Industrial infrastructure does not support high-density living.

It may be that these factories can be restored to their wealth creation function, but only after the region gains a new sense of purpose and hope. A settled and stable Alexandra would pick up the whole area.

Until then the strategy should be to encourage industries to move into new regional sites across the N3, such as Linbro Park and areas further south.

A very important project is the proposed Gautrain Rapid rail link project. This project is one of the ten Spatial Development Initiatives (SDI's) of the Gauteng Government, also known as the Blue IQ programme. This is a R1,7 billion initiative to invest in economic infrastructure development.

This proposed rail development is consistent with the Government's stated policy to promote and priorities public transport as an alternative to private transport. [LIDP, 2002:17]

ROADS AND STORMWATER:

The present major road arterial infrastructure is well developed, all of which are tarred and in good condition, although many of the routes have limited capacity. [LIDP, 2002:26]

This region is well provided in terms of road infrastructure:

- the M1 in the west
- the N1 in the east
- the N12 in the south

Fig. 12 - The road network within the region consists of the following:

RESPONSIBILITY	ROAD HIERARCHY	LENGTH (km)
National		16,3
Provincial		24,0
Local	Unknown	142,2
	Primary	52,7
	Secondary	13,3
	Tertiary	324,7
	Total	533,1

STORMWATER DRAINAGE:

In the fully developed part of the region the main stormwater conduits appear generally to be of ample capacity to handle presently recurring flows.

The topography of the area is such that all stormwater runoff disperses quickly into established watercourses, which have sufficient capacity to handle the run-off water, i.e. the entire region is well drained and offers good drainage for any potential development. Thus bulk stormwater poses no major restraint to development, other than in or in close proximity to such water courses (normally determined by 1:50 year return storm floodplain) such as informal settlements in Alexandra. [LIDP, 2002:27]

WATER:

The area is fully serviced with water and sanitation. However, certain low-density areas could be redeveloped at higher densities – this could result in the need to upgrade services at the intermediate level (i.e. sub-outfall sewers and/or water reservoirs. The existing water networks in the Johannesburg and Sandton portions of the former Eastern Metropolitan Local Council are comprehensive and in general in a good condition.

Due to the age of certain portions of the networks, it is necessary that upgrading and refurbishing of the networks be carried out on a regular basis. [LIDP, 2002:28]

Fig. 13 - The reservoir supply zones serving the region and estimated spare capacity are shown in the schedule below:

SUPPLY ZONE	RESERVOIR	CAPCITY (ml)	SPARE CAPACITY	EQUIVALENT DWELLINGS	
				Low income	Upper income
Klipfontein	Linksfield	33	62,9	59 860	16 760
Alexandra					
Linbro Park	Linbro Park	12	5,8	5 570	4 920
Marlboro	Marlboro	38,7	0	0	0

SANITATION:

This region falls within the northern drainage basin and is generally well served with bulk sanitation infrastructure. Changes in the nature of development such as densification will have an impact on existing infrastructure.

WASTE:

The developed parts of the region have an adequate standard of service. The service level is mostly weekly and the street cleaning is kept to a recognized standard. In general there is a good performance record for the number of tons of refuse collected per member of cleaning staff. [LIDP, 2002:29-30]

Fig. 14 - The landfill sites serving the area and their estimated year of closure is as follows:

LANDFILL SITE	EXPECTED CLOSURE DATE	AVAILABLE AIR SPACE (m3)
Linbro Park	2008	1 800 000
Robinson Deep	2020	7 800 000

ELECTRICITY:

There are currently two electricity distribution supply authorities in this region: [LIDP, 2002:31]

- Johannesburg Metro Electricity
- Eskom

Fig. 15 - Substation supply zones in the region and spare capacity are shown in the figure and schedule:

SUPPLY ZONE	INSTALLED CAPACITY	FIRM CAPACITY	1999 MAX. DEMAND	SPARE CAPACITY
Megawatt	40	20	25,7	
Buccleuch	40	20	26,3	
Marlboro	70	50	35,2	
Alexandra	90	45	13,6	31,4
Gressworld	180	135	93,3	41,7

TRANSPORT:

The road network serving this region is composed of: [LIDP, 2002:33]

- Two north-south freeways; namely the N3 which goes through the region and the M1 which lies to the west of the region.
- Three east-west freeways that lie just outside of the region; namely the N1 which completes the ring road westwards, R24 that goes eastwards past the Johannesburg International Airport and the M2 which passes just south of the region.
- The east-west arterials; which include Marlboro Drive; (Katherine Drive) – London Road; Glenhove – Pretoria – Atholl – Johannesburg – Modderfontein – Louise Botha – 8th – Club – Linksfield Road, Bezuidenhout/Kitchener – Broadway leading to the R24 and the east, and Main Reef Road that runs parallel to the M2.

The proposed Gautrain link will have a positive impact within the region. This include: [LIDP, 2002:33]

- Stimulation of economic growth and job creation
- Increased public transport usage
- A more efficient use of space compared with road design

- Lower vehicle emission rates per passenger
- Improved safety levels.

BUS SERVICES:

Bus services in the area are provided by Metropolitan Bus Service, Putco Soweto and Putco Commuta. The bus routes are very pervasive in the southern parts of the region but less so in the northern parts. [LIDP, 2002:33]

ECONOMIC KEY ISSUE:

The critical thrusts are: [LIDP, 2002:38]

- To grow the size of the Regions's economy by maximizing exchange between people, goods, services, information and cultural activities so as to further economies of scale and the diversity of goods and services.
- To lower all transaction costs – to buy, sell, meet, find information, access services – so as to underwrite the competitiveness of the area.
- To build confidence and future investment by paying attention to joint public, private and community planning, investment and urban and resource management, the protection of existing property investment and the improvement of the area's human capital and support to entrepreneurs. The Gautrain and its station will provide a significant boost to the economy of the area.

GOALS:

- Increase access and movement [LIDP, 2002:42]

Balancing the mobility and activity roles of the arterial road system to enhance accessibility and mobility.

- To integrating movement and activity
- Support public transport and mobility on major nodes and arterials
- Support an urban structure that will support public transport
- To ensure adequate access to urban opportunities for all
- Upgrading of major intersections
- Widening/re-alignment of a number of prominent arterials
- Establish Local Economic Growth and Development

To provide the necessary support to ensure investment and Economic growth.

- To promote a unique entrepreneurial
- To provide training centers
- To establish SMME's

The criteria that follow provide comprehensive guidelines for good site-responsive design that is based on information gathered through the site analysis and surroundings.

The design elements include the following as the minimum assessment criteria:

- Infrastructure capacity
- Neighbourhood character
- Parking and vehicle access
- Site layout and landscaping
- Building form

ELEMENT	CRITERIA
Infrastructure	• The development should not overload the capacity of existing public infrastructure • Public infrastructure includes reticulated services, streets, open spaces and social and community services • The design should allow sufficient space for services to be installed and maintained efficiently and economically • The design should indicate stormwater management measures
Neighbourhood character	• The development should take into consideration and accommodate the built form, vegetation, topography and street scape of the surrounding neighbourhood in its design • Development should be sited and designed to acknowledge the privacy of

	abutting developments • Significant height difference between existing developments and a new development should be graduated
Parking and vehicle access	• Proof of adequate parking provision must be provided • Parking must be provided on site • Parking for residents and visitors must be provided • The number of bays in residential developments should be in line with the car ownership trends in the particular area • The accessway must allow for the passing of vehicles and must be sited so that cars entering the development will not hinder the vehicle movement in the public street • Paved areas must not hamper the efficient management of stormwater • A minimum of one tree for three parking bays must be planted • Car parking facilities should not dominate the development or street frontage • Access to the development must be in line with the mobility policy
Site layout and landscaping	• Developments should integrate well with the surrounding neighbourhood, enhance existing character of streets and maintain the predominant character of the site • Layouts should respond positively to site features e.g. topography, drainage, vegetation etc. • Common property on the site should be functional and be capable of efficient management • Developments next to existing public open spaces should be laid out to complement the open space • Provide good lighting, visibility and surveillance with perimeter lighting on the street frontage
Building form	• Street frontage should suit the efficient use of the site, the residential amenity and the character of the neighbourhood • Building height and location must not have a negative impact on surrounding developments • Private open spaces and habitable rooms of adjacent existing dwellings should be reasonably protected from direct overlooking

Fig. 16 – Criteria for good site responsive design.

INTERVENTIONS AND GUIDELINES:

1. To strengthen and expand the emerging Industrial Corridor along the N3 and the development of a local Neighbourhood node
2. Area east of the "new road" and West of Modderfontein Conservation Area to be developed in a sustainable residential environment [LIDP, 2002:66]

INTERVENTIONS	GUIDELINES
1.1 Improve accessibility by: • Extending Marlboro Drive southwards to link with London Road and Modderfontein Road; • Set-up a mass transport system to link Alexandra and other residential neighbourhoods with new industrial corridor	In accordance with Alexandra Renewal Project Alexandra Transportation Plan Gautrain Project
1.2 By means of detail Design and Development Framework support and promote industrial and commercial development of land west of the new road and east of the N3 from Linbro Park Industrial down to Westfield, in accordance with a detail precinct development plan	Linbro Framework to be revised in consultation with existing community structures and forums Guided by Infrastructure capacities
1.3 By means of a detail Design and Development Framework support the development of a local neighbourhood node specializing in daily consumables on the eastern side of the new road and London Road intersection	Market demand Guided by Infrastructure capacities
1.4 Revise infrastructure master plans and provide infrastructure to support new development initiatives	
2.1 Prepare a detailed Precinct Plan to convert from agricultural holdings to appropriate residential development	Linbro Framework to be revised in consultation with existing community structures and forums
2.2 Revise infrastructure master plans and provide infrastructure to support new development initiatives and revise existing temporary uses	

Fig. 17 – Interventions and guidelines for Administrative Region 7.

Most South Africans are unaware of the role décor and design plays in our country. As a cultural industry, design allows people to express their creative ideas, while at the same time it **provides them with the opportunity to generate income and stimulate related industries.**

Décor and design also provide a perfect example of the new role which the Ministry of Arts, Culture, Science and Technology sees the arts as playing in the development of our country**. It is an industry that has enormous potential to contribute to employment creation and income generation, both so urgently needed.**

All over South Africa, exciting new developments are happening in the field of arts and culture. There is an explosion of exhibitions, exciting new galleries are opening all the time, and there is constant flow of ideas between different art forms and practices. We are at last expressing our rich artistic heritage.

Lionel P/H M Mtshali
Minister of Arts, Culture, Science and Technology

[Margolius, 1999:I]

INSTITUTES AND ASSOCIATIONS:

Institutes and associations are organizations or societies set up by committed people who, in their particular area of research and/or industry, wish to uphold, promote and systematically improve mores and standards. In the field of décor and design, there are various solid, well-established organizations that build upon the current strengths of the industry. They aim to improve the industry by implementing new ideas and methods.

The selection of institutes and association members is strict and careful. The professional code of ethics is precise and meticulous, and the integrity and expert knowledge of board members in their specific field is essential. Within the ambit of décor and design, institutes and associations include architects, designers, builders, plumbers, hardware manufacturers and suppliers, decorators, art and antique dealers and garden landscapers.

The Association of South African Quantity Surveyors which offers tremendous space for resources and skills development, and The Institute of South African Architects which is committed to maintaining professional standards. These organizations represent architect, quantity surveyors, consulting engineers, and town and regional planners who belong to the development professions.

The Society of Designers in South Africa (SDSA) represents professionals in the key disciplines of graphic design; interior architecture and design; product design; and industrial, textile and ceramic design in South Africa. It aims to promote awareness and the benefits of good design, to improve standards, to protect the interests of clients, and to adhere to an international code of professional conduct.

The South African Guild of Interior Designers (SAGID) endeavours to uphold standards of professional behaviour within the décor and design industry, and to promote the benefits of consulting interior designers about the numerous facets involved in décor and design. It also encourages good relations with suppliers, craftspeople and associated tradespeople.

[Margolius, 1999:15]

MEANING OF FURNITURE:

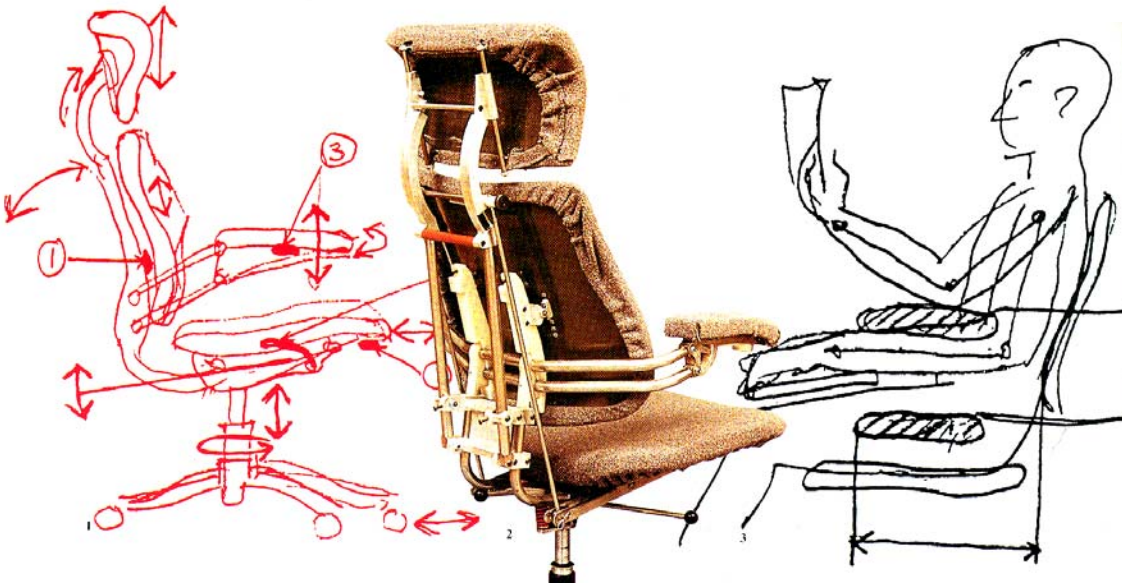
Furniture occupies a curiously ambiguous place among human artifacts. Strictly speaking, it is not necessary to human existence; and some cultures, more especially nomadic ones, seem to get on well enough without it. Because of its bulk, most furniture implies a reasonably settled existence.

Indeed, at one end of the scale, it is almost inseparable from architecture. Built-in-furniture, often thought of in this century as typically "modern", is in fact the earliest we know – a Neolithic house at Skara Brae in the Orkneys incorporates built-in seats and sleeping-places.

Furniture, from the middle ages onwards, has constantly been influenced by architecture. Ornament on furniture is, more often than not, borrowed from this source. Architects, certainly from the eighteenth century onwards, have exercised an enormous influence over the way in which furniture has developed**, insisting that there ought to be unity between interior architecture and the object placed within a given space.**

One of the things the Modern Movement has done is to teach us to look at forms more attentively, in isolation from their function, and also from what they may or may not represent.

[Smith, 2002:7,14]



[Domus No 824, March 2000:82]

design philosophy of

DID WAREHOUSE

Inspired by Fritz Hansen
[Wallpaper, November 2000:2]

1. timelessness

furniture has to be born a classic

2. simplicity

has to dominate line, execution and design

3. functionality

optimum functionality and uncompromising choice of furniture

4. innovation

focus is on ground-breaking and visionary product development

did warehouse SERVICES: Services

HELP LINE:

Trained staff can help with everything from individual workstations to planning a complete living room. Opening up an DID-account can give a company up to 30 days interest-free credit.

DÉCOR-RESEARCH AND INFO. CENTRE:

Provide a computer lab and material in the form of a research library inside the warehouse. Everyone (architects, designers, clients, people and children) must have free access to it and be able to search/find information on any décor/designer/interior related topic.

HOME DELIVERY:

Delivery charges will be calculated in zones based on postcode and the value of goods to be delivered. Use the flat-packed idea of IKEA. It fits neatly into the boot of a car.

AFRICAN SHOP:

This shop will offer lots of traditional African food items etc.

RESTAURANTS:

The restaurants inside the building will have a wide variety of food – to suit everyone's personal taste. The emphasis will be on the interior as well. Interest views and open sitting space will be created. Designer tables, chairs and décor inside the restaurants will give character to the space and create a place within each restaurant.

HOME FURNISHING ADVISORS:

If a client is about to embark on a major re-furnishing project, he can make an appointment with one of DID's furnishing advisors. Their experience will walk them through DID's extensive range. They'll offer suggestions and advice to help them decide on the combination of furniture and décor. This service will be free and anyone can make an appointment by calling the store.

PRICE GUARANTEE:

Furniture and décor prices on the (did.sa) web site are for furniture/décor that one collect from DID. All requested delivery, assembly and installation services will be charged separately.

DID INFO-LINE:

Speak in person to one of DID's customer service advisors during store opening hours.

SHOP BY PHONE:

By using the DID catalogue, one can ordered by phone. Just call 0800 333 9999.

DID CREDIT CARD:

For shopping convenience, use the DID credit card. Fill out an DID credit card application at the store.

OVERNIGHT FACILITIES FOR CUSTOMERS:

Guesthouses just outside Linbro Business Park have bed and breakfast accommodation for those who want to spend a night in one of South Africa's top class designer-furnished-guesthouses. The designer furniture will reflect the style of the warehouse. Shuttles will transport the people to and from the warehouse. Traveling exhibitions will form part of the program.

[Inspired by IKEA]
[www.ikea.co.uk]

A timeline furniture

[Habegger, Osman, 1989:1-20]

Furniture design and production have undergone more dramatic progress in the twentieth century than any other time in history. In the last 120 years, a truly modern idea of furniture has evolved. The acceptance of the machine as a positive and creative aesthetic force marked the beginning of the modern era. Resulting new techniques enabled creative designers to go beyond the imitation of historical forms.

During the first part of the twentieth century, innovative design experimentation had its roots in the concepts of mass production and adaptive reuse of existing materials. It is thus fundamentally ironic that many significant designs from this period were hand crafted.

Following World War II, new production techniques and industrial materials, such as aluminum alloys, curved plywood, and plastics, were adapted to domestic uses and became the standards. The principle of these materials were mobility / lightness.

1870

"CORBUSIER" DINING CHAIR
Oldest modern chair in production. Consists of only 5 elements of Carpathian beechwood, overlapped and joined with screws. 6,8 kilos.

1904

LARKIN SWIVEL-BASE DESK CHAIR
Frank Lloyd Wright's central-pedestal –base metal desk chair. Prototype for the task chair in office furniture industry.

1927

MR DINING CHAIR
Ludwig Mies van der Rohe's design represents the first resilient cantilevered steel-tube chair. Knoll introduced stainless steel versions of Rohe's furniture in 1947.

1932

PAIMIO (41) LOUNGE CHAIR
The arms and base of Alvar Aalto's chair are of laminated birchwood bent into a closed curved. This chair was designed for the Paimio Sanatorium in Finland.

1940

80 D DESK
Franco Albini achieved a lightness and simplicity for the desk function in his metal truss structure, which supports the glass top and the drawer unit.

1954

SOFA COMPACT
Charles and Ray Eames's application of human engineering is evident in the profile of this thin, high-back sofa. This design established the standard for the "modern" sofa.

1969

BOCCA (MARILYN) SOFA
This sofa design by Studio 65 is upholstered in the form of a pair of voluptuous lips (Marilyn Monroe's) and covered in red knitted textile. Injects a sense of humor.

1974

EKC 13 DINING CHAIR
Paul Kjaerholm's daring version of Ludwig Mies van der Rohe's Brno chair, in which the back and cantilevered seat structure form a rigid connecting element.

1986

TEA-FOR-TWO SIDE TABLE
A small table design by Francois Scali and Alain Domingo consists of a circular glass top laid in compression against thick and thin steel rods.

[Hagegger, Osman, 1989:15]

Furniture design

AN INTRODUCTION - history

The twentieth century will undoubtedly go down in history as the century of design. It will not be forgotten that it was during these hundred turbulent years that this discipline took shape as a concept and became a reality crowned with success. It is a phenomenon that has gone through various phases over the course of its short but intense life, to the point that it now permeates our everyday life, as any man-made object has inevitably also been designed by somebody.

Design forms part of our culture and embraces all types of items. Designer goods cannot be understood if they are divorced from their economic, political, social, cultural or technological contexts. The roots of this discipline lie in the crafts industry and over time it has evolved into its present state.

In the early days pride of place went to the skill and dexterity of the first cabinetmakers, who gave form to wood, the noble material par excellence. With the passing of time, the work of these professionals has given way to that of designers seeking to find a balance between esthetics, functionality, creativity and the demands of the market, on the basis of technology advances and the latest revolutionary treatments of materials.

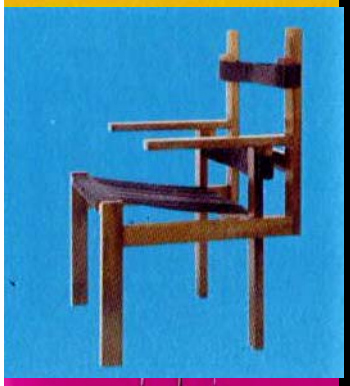
While it is true that furniture has been part of human life in many civilizations since time immemorial, it is not, however, vital to the human race, as proven by the fact that some cultures have dispensed with it altogether. The presence of pieces of furniture implies the abandonment of certain animal habits and postures and so represents a consolidation of cultural changes. The appearance of furniture is predetermined by a sedentary lifestyle, as opposed to a nomadic one, and an environment which taught how to use it.

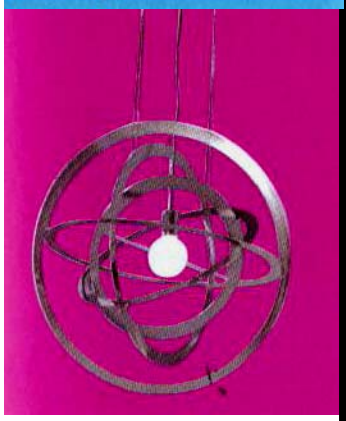
The history of furniture can be said to begin in Egypt, the home of one of the most inspired of all ancient civilizations. The Egyptians found new possibilities for creation with stone and they will go down in the history not only for their well-known contribution to politics and philosophy but also for their legacy of thousands of objects, some of them functional but others solely made for the sake of their beauty. Egypt breath art, and this environment made it possible to unobtrusively come up with new formulas.
[Asensio, Montes, 2002:18]

[Asensio, Montes, 2002:18]

The world of furniture can be approached from several angles – according to its functional or technical aspects, for example – making it possible to record the evolution and progress of a specific era and find out how and why certain materials were used at that particular time. The examination of furniture can give rise to a partial reconstruction of a particular period in order to discover the social class of the owner of a specific piece; just as in the cases of clothes, architecture and literature, the study of furniture can help to draw a fairly full picture of an entire historical age.

The history of furniture is undoubtedly distinguished by the changes is has undergone and by the fact it has been highly influenced, especially in the Middle Ages, by architecture: the two disciplines overlap and these days it is very unusual for them to be considered in total isolation from each other.
[Asensio, Montes, 2002:18]





[Asensio, Montes, 2002:26]

Wood was the ideal material for making furniture as it was so easy to handle. The problem was that Egypt lacked this material, as it could only boast palm trees, tamarinds, sycamores, willows and other species that were largely unsuitable for furniture. So, ebony had to be imported from Sudan and olive, fig, cedar and pine trees came from Syria and Phoenicia.

Modern furniture has inherited may features from Egyptian design, which was highly developed due to the richness of their civilization. The most common pieces in ancient Egypt were the chair and its various derivations; the table; the night-time and day-time beds – they distinguished between sleeping and resting; burial furniture and chests and their variants.

The Middle Ages used basically the same types of furniture as those of the latter years of Antiquity. Medieval kings and nobles were nomads and so their furniture frequently had to be transported from one place to another. So, two types of furniture emerged: large and heavy pieces that stayed in the castle and houses, and other lighter pieces that could be easily transported. An analysis of the furniture of the seventeenth century reveals more differences than affinities with respect to previous periods, even though at first sight there seems to be little change. This century is defined by its variety, the result of the conflict between exuberance and austerity. Another novelty of this period was the importation of furniture to India and neighboring countries. It also saw France emerge as the doyen of high-quality furniture: the Louise XIV style was dominated by Classical influences, with sideboards and console tables being the most outstanding pieces. In contrast, the Louise XV style, headed by the designers Meissonnier and Oppenordt, is remarkable for its Baroque and Rococo features, which gave way to Classicism once more in the Louise XVI style. English furniture made all the running in the eighteenth century. The outstanding designer was the Neoclassical architect Adam, who drew on Roman models to create simple and functional forms.

New approaches were pioneered by William Morris, who stripped away decorative features in favor of greater functionality and experimented with new materials like metal and plastics. It is undoubtedly true to say that, in may ways, furniture underwent a more radical transformation in the first half of the nineteenth century than in the previous three hundred years – a period of innovation only comparable to the one that has been experienced from 1945 to the present day.

Today's furniture is passing through a phase marked by a diversity of influences, by eclecticism and plurality. Everything, or almost everything, is permissible, although the designer, despite enjoying absolute freedom at the drawing board, is in reality often overruled by the norms established by the market, by practical considerations and by prevailing trends.

DESIGN MODERN DESIGN DESIGN DESIGN

Design came into being to take advantage of technological developments – a role it still performs, although it is far from the only one – and it grew into the esthetic revelation of the twentieth century by becoming a part of everyday life. Design is here to stay, whether we like it or not. It is indispensable for most of us, as we have to deal with it day after day. We are surrounded by "designs"; they are the mirror of our age and are constantly on show. From the ballpoint pen with which we fill in a crossword to our toothbrush, the bed we sleep in, the clothes we wear or the shelter where we wait for our bus – everything has been passed through the filter of design and its influence is widespread and varied, embracing all types of objects and products. It enshrouds everything; it enshrouds us. Design has often been defined as the

[Asensio, Montes, 2002:10]

Conception and elaboration of all the objects created by human beings, as a tool to improve our quality of life. It could be said that design is what makes it possible to create "something" that covers a need nobody had thought of before. In fact, most design is based on common sense and the remainder – a very small part – is devoted to esthetics and appearance, although for many people these factors undoubtedly become the main and most interesting features. Although it may seem otherwise, design is not a new discipline; design permeates everyday in live, it is within reach of everybody and it has accompanied human beings since time immemorial. However, it is true that the origins of design, as we understand it today, lie in the Industrial Revolution and the appearance of mechanized production. Whereas objects and furniture were once totally handmade and the responsibility of a single creator, the emergence of new industrial processes and the ensuing division of labor gave design a whole new dimension. At fist design was considered just one of the many interrelated aspects of mechanical production. It had no industrial, theoretical or philosophical basis and had little impact on either the industrial process or on society as a whole. Modern design emerged thanks to the reforming designers of the nineteenth century, particularly William Morris, who tried to unite theory and practice. His ideas did not immediately bear fruit as he continued using craft techniques; despite this, the reforming ideas were fundamental to the development of this modern movement. "Modern" design did not take root until the early twentieth century, as a result of the efforts of men like Walter Grophius – the founder of the Bauhaus in 1919 – who used the latest means of production to integrate theory and practice in design. Modern design had to unite intellectual, commercial, esthetic and practical interests through artistic adeavor and the exploitation of technology.

[Asensio, Montes, 2002:10]

DESIGNERS

MODELS FOR SUBSEQUENT GENERATIONS

[Asensio, Montes, 2002:50]

From Alvar Aalto to Philippe Starck, there are many designers who have presented their own personal vision of reality through their creations. The main purpose of this book is not to cover the work of all these artists – a titanic task doomed to failure – but we would nevertheless like to remember some of the figures who have earned their place in the history of design and have helped to make today's design scene so distinctive by influencing and inspiring contemporary designers. The pieces that these artists created can be considered "modern classics", as years after they were first produced they remain unsurpassed and serve as models for subsequent generations.

The contribution of **William Morris** (1934 – 1896) is crucial. His reforming ideas, in both the social and artistic spheres, were based on those of Ruskin. One of his aims was to bring "good design" to the masses, but his rejection of mass production meant that this pieces were expensive and only accessible to a wealthy elite. Morris was one of the main champions of the Arts and Crafts movement; he advocated the primacy of utility, simplicity and suitability over luxury. Producing high-quality pieces and the idea of design as a democratic tool were concepts that were fundamental to the emergence of the modern movement.

Meanwhile, in Barcelona, **Antoni Gaudi** (1852-1926) was introducing his revolutionary ideas. This unclassifiable Catalan architect espoused a distinctive view of reality that bore fruit in work that has survived until today. His deep respect for nature and his boundless imagination still inspire artists in every field and he is widely admired. Gaudi was a prolific artist who did not confine himself to architecture: his projects were all-embracing and his designs for furniture, which were never mass-produced, are worthy of mention, being not only singularly expressive and beautiful but also comfortable and ergonomic.

Modigliani "Tete" by Vakais

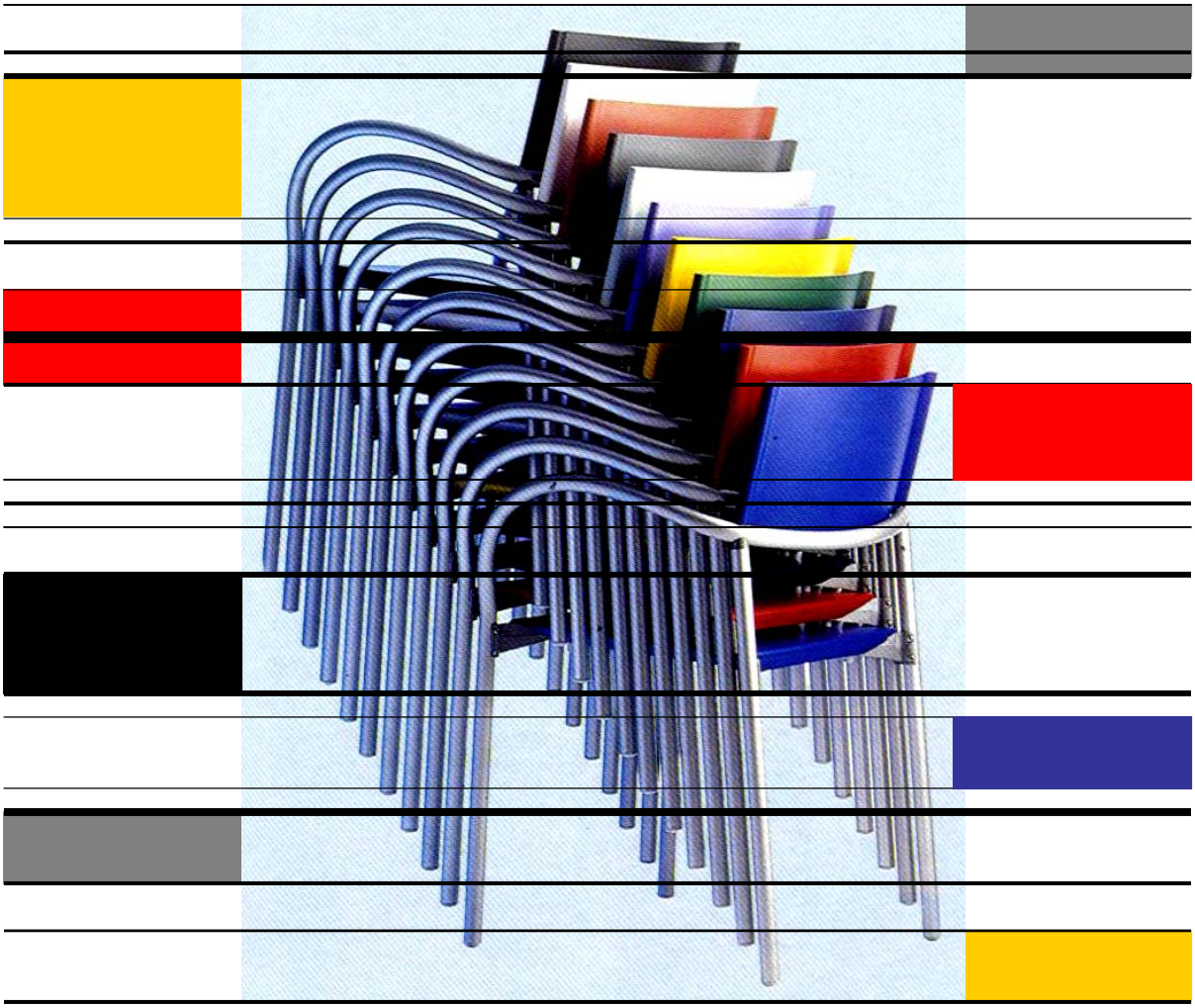
Frank Lloyd Wright (1867-1959) is an outstanding figure. His roots also lie in the Arts and Crafts movement but he later broke away to explore other styles. A deep respect for nature and a belief in human values are the distinguishing features of this precursor of organic design, who tried to symbolize the essence of Nature and Man. This humanist's work still exerts a strong influence.

Walter Gropius (1883-1969) preached the unity of the arts and was the director of the Bauhaus from its creation in 1919 until 1928. His designs reflect the move towards industrial

modernity. His work is a clear expression of the modern movement, in that it accepted the need for standardization in design.

Another of the most important exponents of modern design is undoubtedly **Ludwig Mies van der Rohe** (1886-1969). His work, inspired by Neo-classical architecture, presaged rationalist and functional design and remained influential throughout the twentieth century.

The same is true of **Le Corbusier** (1887-1965), who will go down in history as both one of the most outstanding architects and one of the most innovative designers. His early projects were marked by the premises of the



international style - a term applied to the work of artists in the modern movement who combined functionality and technology with a formal geometric language to create a modern esthetic - but over time he renounced the formalism of this style to take on a freer, more expressive language.

Gerrit Thomas Rietveld (1888-1964) was a standard bearer for Neoplasticism and a formal geometric language, which he applied to his highly personal designs and, over the course of time, turned into his trademark. Many of his objects manifest a return to elemental wooden structures, in response to the economic recession of the 1930's. He was an innovative pioneer and his designs are still highly relevant today.

Alvar Aalto (1898-1976) is another of Scandinavia's most important designers. His concepts are characterized by his use of organic forms. He was profoundly convinced that design should not only acknowledge functional demands but should also open up other needs on the part of the user; the best way to do this being through the use of natural materials like wood, which Aalto learnt how to mold at will and with consummate mastery.

The husband-and-wife team of **Charles Eames** (1907-1978) and **Ray Eames** (1912-1988) was celebrated for its excellent innovations and exquisite designs. Their contribution in this field is beyond dispute, and their pieces are still as attractive, functional and efficient as when they were first created. They are the outstanding exponents of organic design and two of the most important designers of the twentieth century; they proved that design not only endows objects with formal beauty but also helps improve the quality of life of the people who use them.

Eero Saarinen (1910-1961) introduced daring and revolutionary creations into the world of design. A rationalist convinced in the concept of progress, this pioneer of organic design created some of the twentieth century's most important pieces and heralded a new direction in furniture design. If he achieved the total organic unity of materials, function and structure, this was due to technological limitations of his day.

Another outstanding Italian is **Alessandro Mendini** (1931). Unlike may of his Compatriots, he set out to promote "banal" design, in order to fill the intellectual and cultural vacuum he found in industriatized society. His pieces transmit a sophisticated sense of humor, as well as the idea that innovative design could not continue in the same it has until then. Mendini's creations are permeated with exuberance, an explosion of colour and daring forms, reflecting his emphasis on design for design's sake. Nobody has contributed more to the anti-design debate; he is highly provocative and one of the propagators of Postmodernism.

Philippe Starck (1949) is one of today's most prolific designers. He made his name in the 1980's; his early work was sumptuous, extravagant, audacious, witty, innovative and bursting with imagination. The so-called enfant terrible of French design is responsible for some of the pieces with the greatest character and personality to have emerged in the last few years. Whereas in the 1980's he reveled in exaggeration, he has now toned down to concentrate on more long-lasting products that will pass the test of time.

It is clear that design was born with the twentieth century, and that it has brought new challenges into our day-to-day existence. The idea of "less is more" that governed minimalism is still relevant, but it is losing ground against new ways of understanding design.

[Asensio, Montes, 2002:50]

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[Rowlands – Eileen Gray, 2002]

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Transat Chair [Rowlands, 2002, p. 60]

She was someone who had a gift. She had this incredibly free, very playful way of using materials, of mixing the poorest, the most modernist ones, but using them in masterpieces.

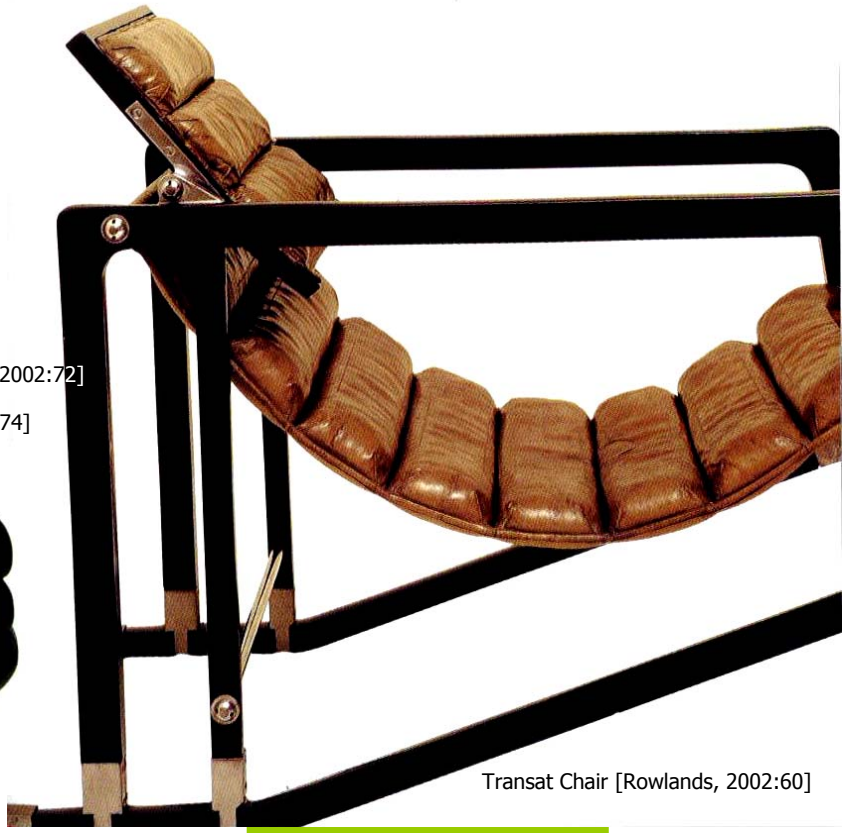
Gray undertook her first architectural project – her own shop, on the rue du Faubourg Saint-Honorè. As a woman in interior design, which was then much a man's world, she shrewdly named it Jean Dèsert. The store was drop-dead elegant,from its stark, clean-lined, black and white façade to its contents of furniture, lacquerwork, screens, and carpets. Whoever turned up,there's no evidence that the remarkably unsnobbish Gray was impressed. Indeed, it seems safe to say Gray had a ..... [Rowlands, 2002:7]

love/hate relationship with her clients.

She was never interested in doing one-offs for rich people, yet custom pieces were exactly what her clientele was after.

Nonconformist Chair [Rowlands, 2002:72]

Bibedum Chair [Rowlands, 2002:74]



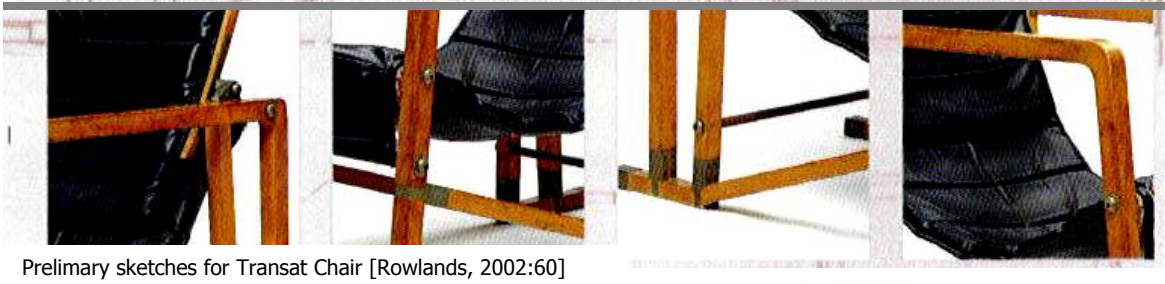
Transat Chair [Rowlands, 2002:60]

Collapsing S Chair [Rowlands, 2002:89]

An itinerary of its almost shockingly imaginative furniture – much of it made from industrial materials – might run for pages. Almost every piece did something. Things folded, fanned out, collapsed. A dining banquette on metal U-shaped supports could fold up for storage or transform into an occasional table. A smaller, metal-framed table had a reversible surface; on one side, it was made of zinc, on the other, of cork, a material Gray favored. [Rowlands, 2002:20]

Although Gray hugely admired Le Corbusier, their philosophies had fundamental differences, ones what would become more apparent as Gray continued her architectural work. Ultimately, she rejected his famous dictum that a house should be a "machine for living". Instead, she seemed to call for a less coldly intellectual approach, writing that a house should be "a man's shell, his extension, his growth, his spiritual glow…."

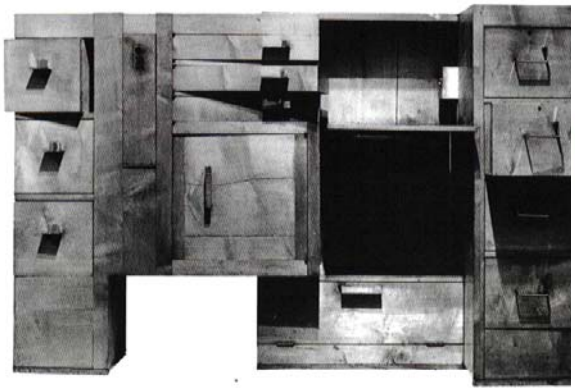
[Rowlands, 2002:15]



Prelimary sketches for Transat Chair [Rowlands, 2002:60]

The well-known design – Gray's S-shaped chaise longue – could be collapsed backward to half its size. Metal chairs metamorphosed into stepladders.

Architect's cabinet [Rowlands, 2002:58]



Abstract rug [Rowlands, 2002:52]

Nonconformist Chair prototype, 1926 [Rowlands, 2002:70]

Chair prototype 1930 [Rowlands, 2002:70]

Chair prototype, 1930 [Rowlands, 2002:71]

Chair prototype 1925 [Rowlands, 2002:71]

In his artistic evolution Rietveld always envinced a special quality: at every moment of his career he was an I N N O V A T O R [Baroni, 1978]

Gerrit Thomas

RIETVELD FURNITURE

R

Unlike many other architects of his generation who thought of architecture as a cubic box, Rietveld employed the method of starting his constructions from the interior and working outward, as if to exemplify a Freudian complex. [Baroni, 1978]

jean prouvè
jean prouvè
jean prouvè

[Rowlands – Jean Prouvè, 2002]

jean prouvè
jean prouvè
jean prouvè

"He combines the soul of an engineer with that of an architect", Le Corbusier once said of Jean Prouvè.

Reclining Metal Armchair [Rowlands, 2002:7]

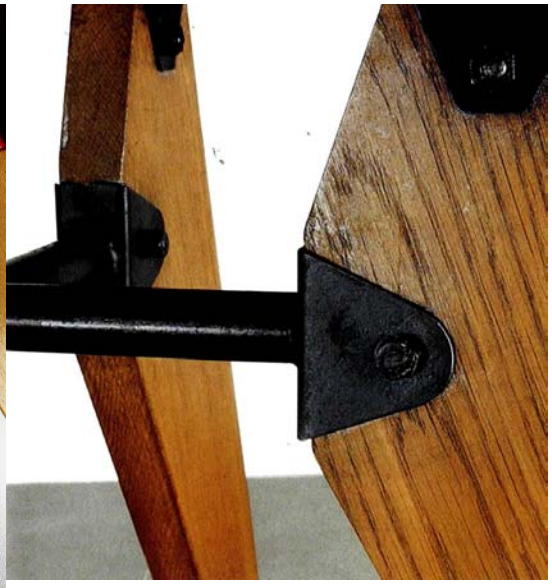
Prouvè was a "constructeur" – quite simply, a builder – one who happened to work with some of the most forward-thinking architects of his day, creating them with miraculous structures of sheet steel and other then-daring materials. In his parallel work as a furniture designer he was equally audacious, turning out pieces that still look crisply modern sixty or seventy years after he first brought them to life. We can, and do, learn from them still.

"Prouvè sort of burst forward with a fresh vision," he adds. "I think of him as the **central French designer in the immediate post-World War II period"**, says R. Craig Miller, curator of architecture, design, and graphics at the Denver Art Museum.

Sometimes his furniture took on tasks that no other pieces had done before. [Rowlands, 2002:11-13]

By 1924, he was developing his first prototypes of furniture, including adjustable armchairs and folding chairs. "I couldn't be satisfied with arched steel tubing," Prouvè stated, referring to the preferred material of such Modernists as Le Corbursier, Mies van der Rohe, and Marcel Breuer. "It was sheet steel that inspired me – folded, pressed, ribbed, then soldered." Phillip Jousse, a longtime dealer in Prouvè's furniture, believes he also liked folded steel because of its greater strength. If style wasn't Prouvè's first concern, it was certainly a by-product. "There's a Prouvè style, even if he didn't want one," Jousse contends.

Left: Antony Chair [Rowlands, 2002:45] Middle: Collapsible Chair [Rowlands, 2002:37]



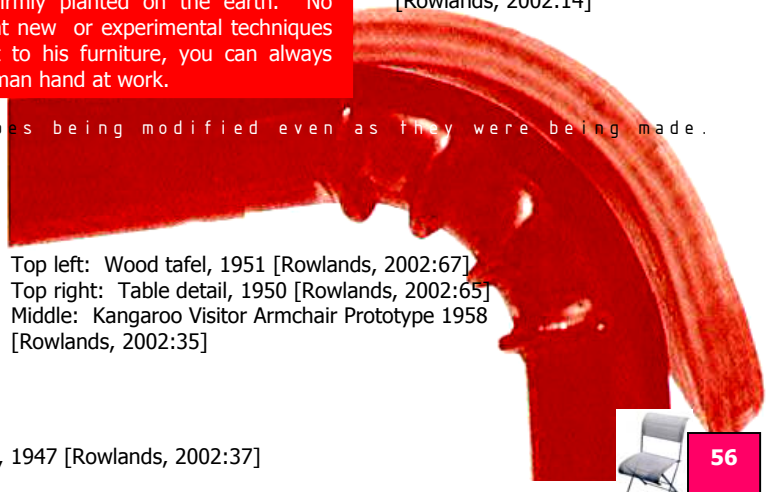
Even his grander furniture, such as the regal, angular 1950 Prèsidence desk, is deeply utilitarian.

The goal of most of these pieces is mass manufacture, easy living, ingenious practically.

Even when designing prefabricated buildings, Prouvè followed the protocol he used for furniture: he'd sketch, make prototypes, then modify his designs – all before drawing actual plans. Sometimes this process was abbreviated, with prototypes being modified even as they were being made.

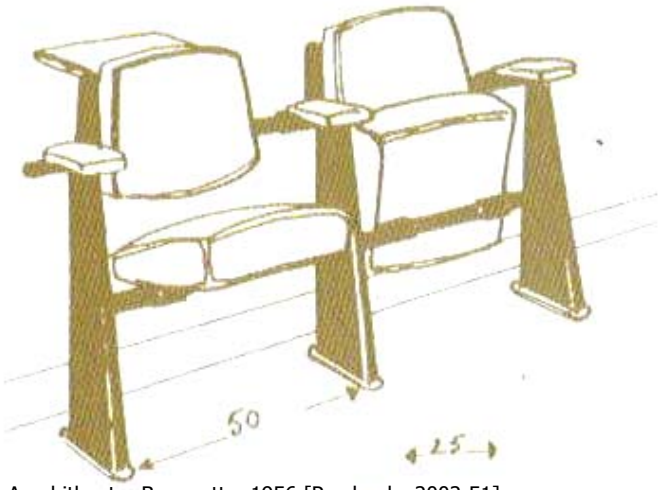
Prouvè distinguished himself from fellow designers such as Le Corbusier by wanting even insisting, on keeping the craftsmanlike quality of his work apparent. His furniture, while factory made, often had visible hesitations and reworkings. It reminds you that, in a sense, Prouvè was making it up as he went along. Although both he and Le Corbusier thought that mass manufacturing was the ideal, Prouvè's work – intentionally, you sense – never entirely looked the part. While Le Corbursier was enamored of his vision, contemplating the beauty of skyscrapers and futuristic cityscapes, Prouvè remained firmly planted on the earth. No matter what new or experimental techniques he brought to his furniture, you can always see the human hand at work.

[Rowlands, 2002:14]



Top left: Wood tafel, 1951 [Rowlands, 2002:67]
Top right: Table detail, 1950 [Rowlands, 2002:65]
Middle: Kangaroo Visitor Armchair Prototype 1958 [Rowlands, 2002:35]

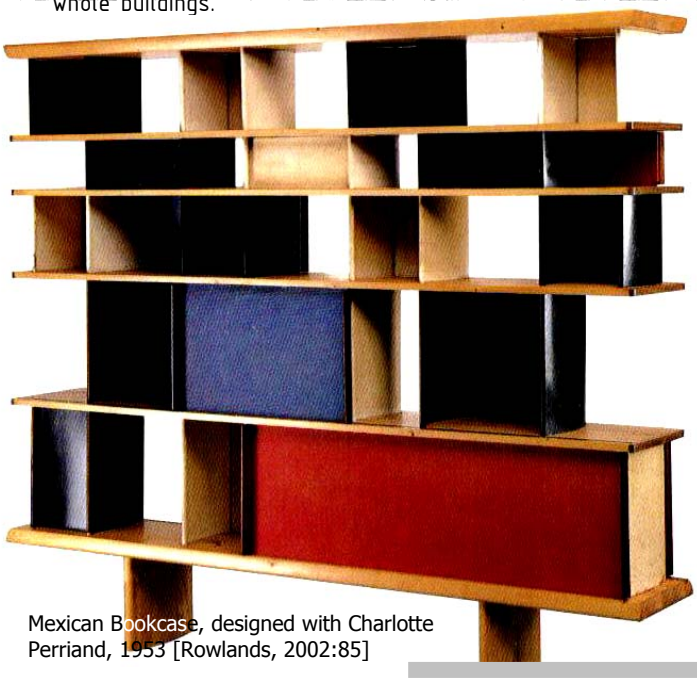
Collapsible Chair, 1947 [Rowlands, 2002:37]



Amphitheatre Banquette, 1956 [Rowlands, 2002:51]

Granipoli Table, 1939 [Rowlands, 2002:77]

Some of Prouvè's earliest architectural projects were revolutionary, including a bus station designed in 1933 to be built in the La Villette section of Paris. Althou this project was never built, it was nonetheless historic: it was the first building designed entirely of folded sheet metal. According to Prouvè's daughter, Catherine, Prouvè came to designing buildings in increments, beginning with the fanciful elevator cages he'd come up with in the 1920's. "He started little by little. He never did anything until he had mastered things. He made lots of construction elements; then, little by little, he came to whole buildings."



Mexican Bookcase, designed with Charlotte Perriand, 1953 [Rowlands, 2002:85]

"The problems to be solved (in the making of furniture) are just as complex as those to be solved in large construction projects," Prouvè observed. Both his buildings and furniture evidenced brilliant solutions.

A man who loved the ingenuity of the modern age, Prouvè adored both planes and cars. Conference tables, balanced on what he called "airplane wing" bases, look poised for take off.

"I couldn't be satisfied with arched steel tubing, it was sheet steel that inspired me – folded, pressed, ribbed, then soldered." Prouvè stated.

Shifting façade of the Mozart Square Apartment House, 1953. p. 84.

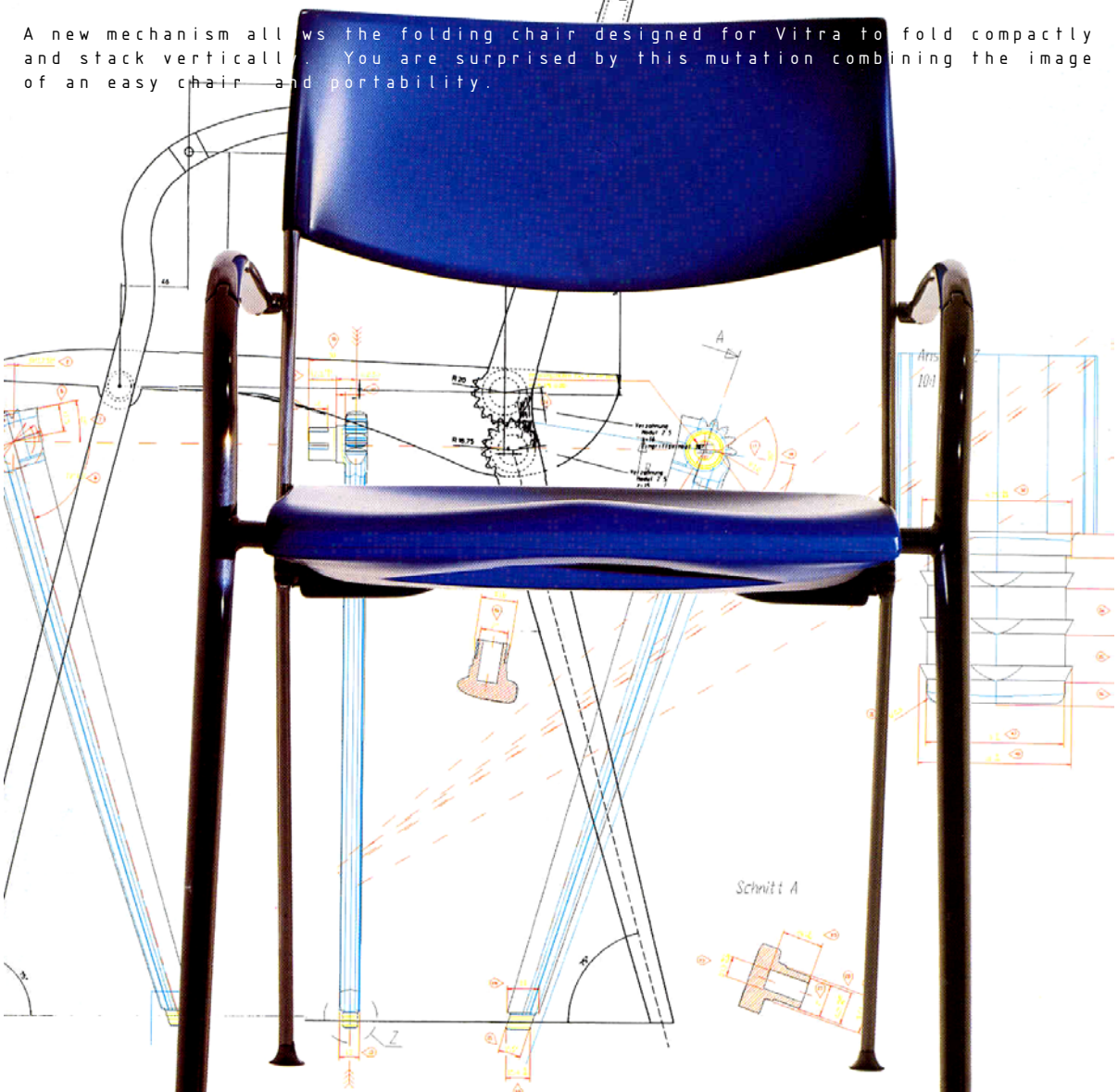
"What is material thinking?" Prouvè would ask himself as he sat down to design. He encourage his workers in a similar approach. **"He taught me to feel materials,"** Antti Lovag, a Hungarian born architect and former employee has written. **"One day he gave me an awning to design and I tried (but unsuccessfully).** Then he appeared with a piece of sheet metal and said to me, 'Touch that. See how it reacts to different maneuvers. Then draw it.'" [Rowlands, 2002:15]

VITRA

[Domus No 813-814:60]

Santachair – a folding chair for Vitra

A new mechanism allows the folding chair designed for Vitra to fold compactly and stack vertically. You are surprised by this mutation combining the image of an easy chair and portability.

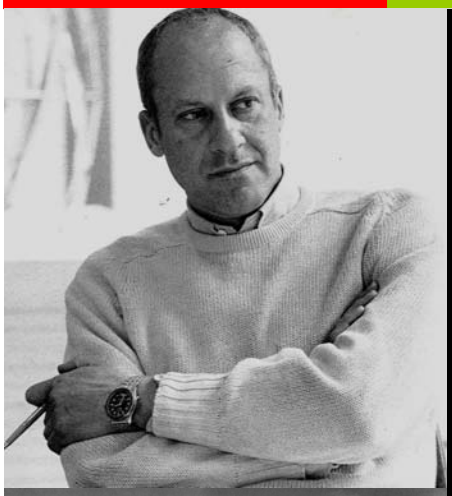


One morning Denis Santachiara set off for Basle, after carefully slipping his prototype chair into a leather portfolio. Awaiting him there in Switzerland were the assembled staff for Vitra for a practical and concise demonstration of his latest invention: a folding chair that can be closed no larger than a shopping bag. From the deck-chair to the Modern chair. Modernity has always been married to transformation and movement; in a marriage that prompted Loos to say: "the only modern furniture is furniture that can be moved". One finds oneself wondering why the idea of convertible and portable furniture should be so appealing. The focus would need to be shifted to the space around the object rather than to the object itself, and to the human use to which it is put, in accordance with the laws of proxemics. An object can be situated at the center of the possible transformations of space and of its social use formed by reciprocal positions. Therefore, Santachiara takes up the most classic tradition of design to develop a new mechanism for a folding seat. [Domus 813-814:60]

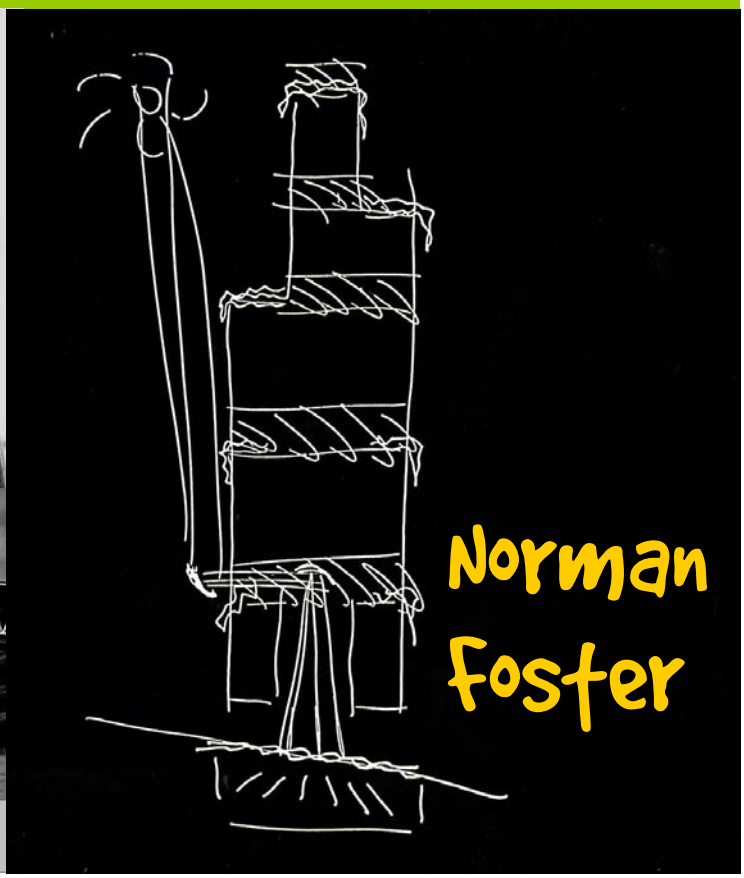
NORMAN FOSTER
SERVICED SHED

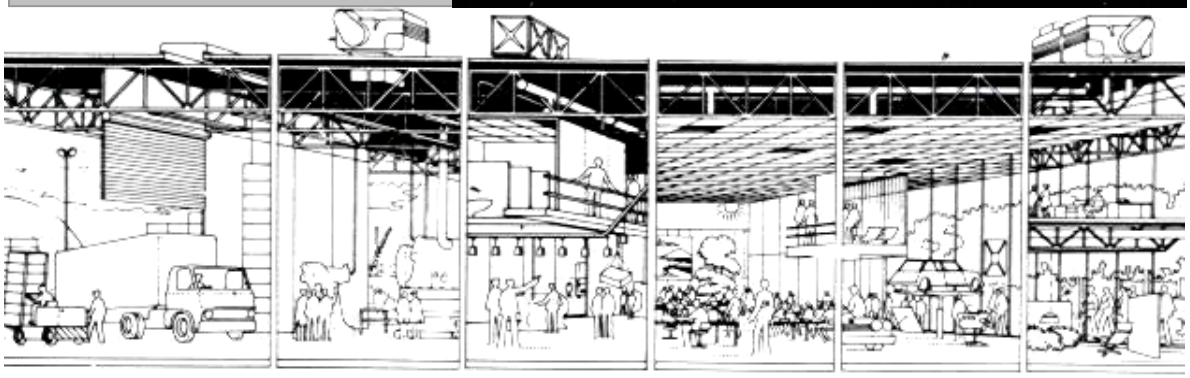
"A bicycle shed is a building, Lincoln Cathedral is a work of architecture." The idea of a serviced shed – a lightweight kit of parts turned to respond to growth and change. The systems approach is based on the **integration of structure and services and the swift assembly of prefabricated components.** It offered clear attractions to hard-pressed industrial clients. Far from being one of the client's imperatives, **"aesthetic considerations"** emerge as a delightfully unexpected bonus. The Olsen Centre, Computer Technology building, IBM's Advance Head Office, are all examples of 'serviced sheds' which have **acquired the status of architecture.**

The significance lies as much in **their flexibility in use as in the beauty of their materials or the speed and economy of their construction.** [Foster, 1984:]



Sainsbury Centre from the south showing top lighting from strips of glazed panels.





5 000-square-metre space houses the brand's six different labels, plus eyeware and timepiece collections. Miyake chose architect Frank O Gehry because "he is someone whose work creates movement, light and energy." This emporium housing offices, a showroom and retail spaces showing all Miyake's innovative collections. This three-storey interior has been designed to function as a "laboratory and atelier – a place to showcase creativity and art." All fixtures are easily moveable, allowing spaces to evolve and constantly been injected. [Sorrel, 2002:36-37]

[Sorrell, 2002:36-37]

a yen for design

issey miyake's retail space was sculpted by none other than frank o gehry

On the ground floor, a glass-floor "island" allows shoppers glimpses of the showroom in the basement. Double-height stainless-steel "stair walls" direct and streamline the flow of visitors.

The beige and burgundy paint that covered the original metalwork inside was stripped, "revealing the original, hyper-industrial silvery blue-grey", which has been sealed with a clear coating.

[Sorrell, 2002:36-37]

F R A N K G E H R Y
VITRA DESIGN MUSEUM

"Balancing Tools" [Boissière, Filler, 1990:57]

The idea of the **Vitra Design Museum** grew out of a furniture producer's wish to find and document the roots and history of his craft. Rolf Fehlbaum, director of the Vitra Furniture business, embarked upon his search in the early eighties.

The collector's passion was linked to the insight **that examining the past could give new impetus to the furniture of tomorrow.**

The Vitra Museum first opened its doors in November 1989. It includes now almost **all important periods and styles of international furniture design.**

In contrast to other museums, in which furniture design is only one subject among many, the Vitra Design Museum focuses principally upon **its historical and future development.**

The main aim for the museum is to make it an "antièlite" institution which appeals to the layman and awareness of a designed environment.

Vitra Design Museum exhibitions concentrate on presenting objects occupying keys positions in the development of **industrial** furniture design because of their material, construction, function, and form.

[Boissière, Filler, 1990:6]

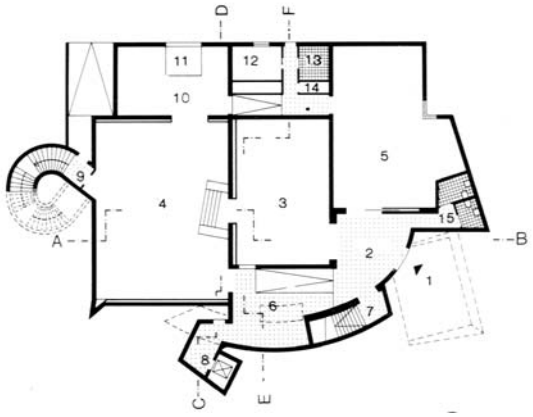
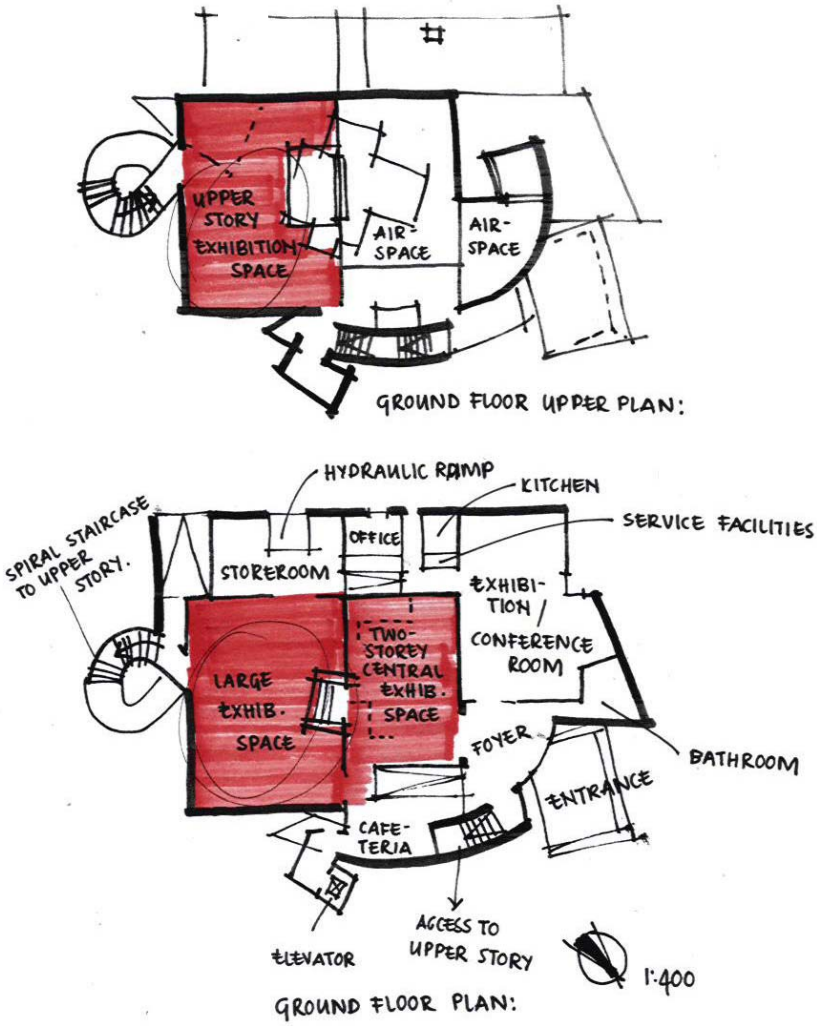


Fig. 18 - Ground floor plan of Vitra Museum.

"Well-tempered Chair" on foreground – Arad [Boissière, Filler, 1990:85]

Interplay of vertical and horizontal openings, formed contrapuntally of spatial and light volumes. Upper space gives an **unrestricted view** into rooms below. Cross of light is an integral part of interplay of forms – concludes the building made up of **space and light.**



Ground floor and upper floor plan of Vitra Design Museum and Furniture Production Unit.

michael graves
michael graves
michael graves

[Iovine, 2002]

michael graves
michael graves
michael graves

Michael Graves, architect, artist, product designer, and enigma. Though he may have been dismissed as a Postmodern has-been by the architectural elite, he is a household name. Indeed, he is the first modern architect to get the full celebrity treatment (Frank Lloyd Wright behaved like a rock star, but Graves was voted GQ Man of the Year in 1999). This broad appeal has rendered him something of a curiosity within the architectural profession.

[Iovine, 2002:7]

designer as a populist

Tea kettle for Allessi, 1985 [Iovine, 2002:46]

Left: Denver Central Library, Colorado, 1990-91. Below: Ikon fruit bowl for wachtersbacher keramick, 1991 [Iovine, 2002:31]

The man himself is a bit a mystery as well. Few architects pay closer attention to domestic issues, whether designing objects for the home or collecting with meticulous connoisseurship for his own. He has achieved the dream of every architect **– the chance to place his stamp on just about everything in sight.**

"I guess I just don't take life that seriously."

The sterling silver tea service – a squat fluted body with blue Bakelite balls for feet – that he designed in 1982 is most often cited as the fork in the road for Graves. After that, he would never again be known as primarily an architect. By 1994, there were six people in his office working exclusively on products.

"I grew up in architecture school in the 1950's, when our heroes were Saarinen, who did a lot of furniture, and Charles Eames, who was making movies, furniture, everything. He was really King of the Hill."

After receiving his master's, Graves spent a year in the office of George Nelson, the furniture designer and creative director for Herman Miller who was also a photographer, graphic designer, and editor. Graves didn't hesitate when he was approached by Alberto Alessi. **Even Alessi was surprised when Graves's $25,000 tea service began to sell.** [Iovine, 2002:15]

Pepper mill, salt shaker for Allessi, 1987 [Iovine, 2002:49]

Alessi quickly commissioned Graves to do more. **"All my designers have at least a few failures, but not Michael."** [Iovine, 2002:16]

Finestra Chair for Vecta Al, 1989 [Iovine, 2002:28]

Graves's love of colour sets him apart from other architects of his generation, who tend to treat timidly beyond a spectrum ranging from silver to white and black. He applies colour with bold conviction. The combination of rust-toned terra-cottas, mustardy ochres, and cerulean blues have become part of the architect's signature.

In his buildings, colour allows the architecture to emerge from the landscape as if it were actually part of it. [Iovine, 2002:19]

Armchairs for the Dorsey Collection, 1990 [Iovine, 2002:38]

TOP 5 PURCHASING COUNTRIES	
China	15%
Sweden	12%
Poland	10%
Germany	6%
Italy	6%

TOP 5 SALES COUNTRIES	
Germany	20%
United Kingdom	13%
USA	12%
France	9%
Sweden	8%

Fig. 19 – Top five purchasing and sales countries in the world (IKEA).

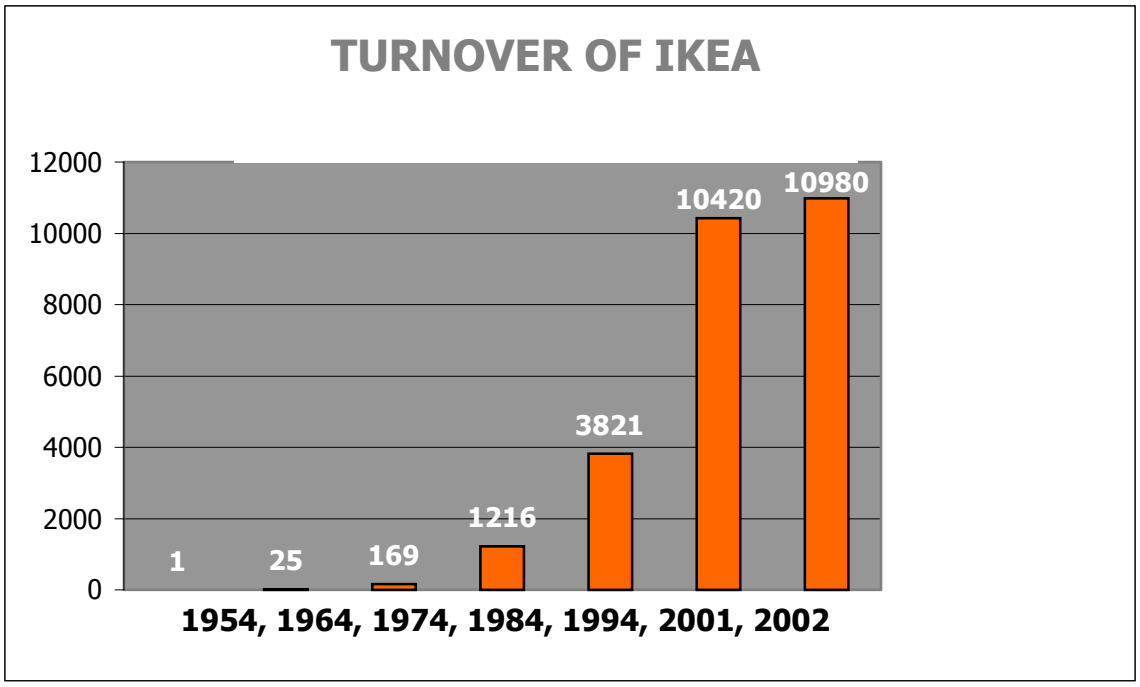


Fig. 20 – The turnover for the financial year 2002 was 11 billion Euro.

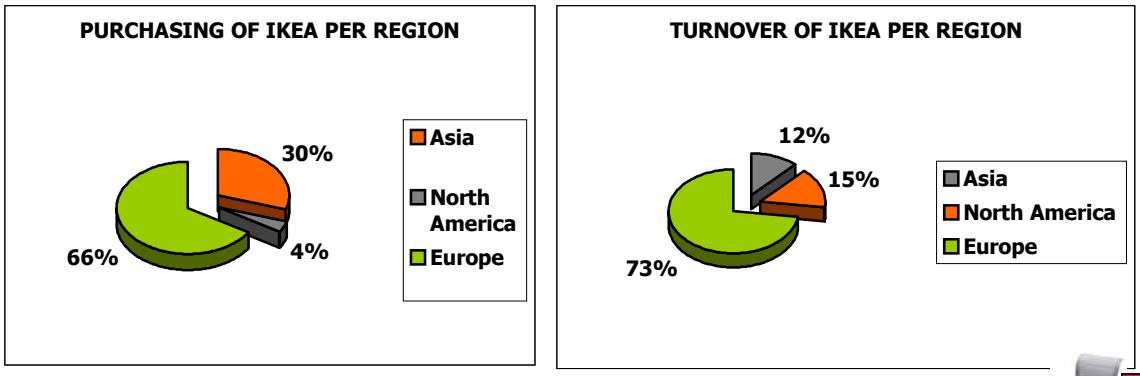


Fig. 21 – Top five purchasing and sales countries in the world (IKEA).

how the ikea group works

how the IKEA Group works

Work at IKEA is organised in order to match the needs of the customers to the potential of the suppliers in the best possible way.

IKEA co-workers all over the world contribute to this collective effort by their individual involvement in the process from development and production to sales.

[www.ikea.co.uk]

Group Support Functions
Work within the IKEA Group is supported by a total of nine units in Holland (IKEA Services B. V.) and Sweden (IKEA Services AB)

Finance & Treasury	**PR & Communications**	**Social & Environmental Affairs**	**Property**	**Risk Management**
Legal Affairs	**Human Resources**	**Retail Development**	**Logistics**	
IKEA IT Development, maintenance and support of IT solutions	**IKEA Food Services** Strategy and purchasing for IKEA restaurants, Swedish Food Markets and bistros	**IKEA Retail Equipment** Supplies fittings and working materials for stores and warehouses	**IKEA Raw Material** Purchases and sells raw material to IKEA suppliers	
IKEA Catalogue Services Produces art work for all versions of the IKEA catalogue	**Modul Services** Wholesaler for components such as screws and nuts	**IKEA Rail** Develops cost-effective, envi-ronmentally adapted transport solutions	**Travel** Policies, contracts and methods development for cost- efffective business travel	

Experts and economies of scale
Decentralisation is the maxim at IKEA, but to fully exploit economies of scale, experts in central positions deal with certain key areas – from the food in the store restaurants to the production of IKEA catalogues. In this way these experts too can play their part in keeping IKEA prices low.

[www.ikea.co.uk]

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[Domus No 819-820,1999:75]

100 CLASSICAL SEATS

[www.design-museum.de]

Dimensions of Design - 100 Classical Seats

An exhibition of miniatures by the

Vitra Design Museum

No piece of furniture has attracted the attention of designers, architects and artists alike as has the chair. The chair is closely related to the shape of the human body, it is the depiction of our body and has arms, legs, feet and a back. The chair has assumed a key role in the history of design – as an experimental object, as the motor driving new developments forwards and as an icon. It has long since advanced from being an everyday utilitarian object to attain the status of an artistic event.

In the exhibition Dimensions of Design, 100 miniatures of classical seats convey the significance of design and the role it plays in the industrial production process. These classical chairs, exact 1:6 replicas of the originals, are presented on plinths in an elegant installation. The exhibition is accompanied by 40 wall-mounted panels comprising photographs, original drawings and time-lines. An integral component of the exhibition is a booklet which guides the observer through the world of chairs and provides detailed descriptions of each exhibit.

The transport and installation costs of the exhibition Dimensions of Design have been kept comparatively low, to enable smaller museums, galleries and design centers to afford it. We are particularly pleased that, in cooperation with the Goethe Institute, the exhibition will tour Latin America, Asia and Africa.

Dimensions of Design - Chairs that have taken their place in history
Since 1992, the chair miniatures produced by the Vitra Design Museum have earned a deserved reputation as high-quality, true-to-scale collectors' items. The Miniatures Collection, which is meant for sales purposes, meanwhile comprises more than 80 models; by contrast, 100 prototypes of classical seats dating from between approx. 1800 and 1990 have been developed for the exhibition.

In the exhibition, viewers attention is directed towards the perfectly crafted true-to-scale character of the miniatures. It is visually easy to grasp a chair as a miniature, its proportions stand out even more distinctly than in the original object. The concentrated, clearly-defined world of the miniatures helps viewers find their bearings in the manifold styles of contemporary design. Chairs provide us with information on social connections, on the age in which they were created as well as on those manners of sitting which are considered exemplary. In our exhibition, the chairs are considered not as isolated phenomena but are placed firmly in their cultural and historical context. Reproduced documents from the archive of the Vitra Design Museum illustrate the path of development of the seats from the first draft via production to their actual use.

Dimensions of Design - 100 Classical Seats
Exhibition objects

100 miniature chairs - exact 1:6 scale replicas of the originals.

Installation
Each object has been positioned on a pyramid-shaped plinth and positioned inside a Plexiglas cube using a magnet. The size of the cube is 25 x 25 x 25 cm. Each plinth is made of white varnished fiberglass, is 127 cm high and has a base of 40 x 40 cm.

Educational aspects
The history of furniture design from 1800 to 1990 is presented in terms of nine groups. Each group is described in an introductory text. Furthermore, faithful reproductions of drawings, photographs and catalogues are exhibited. A time-line provides background information on social, political, economic and artistic developments during each epoch.
A color-coding system ensures easy orientation in the exhibition.

Exhibition area
Depending on the layout, the exhibition takes up an area of 140 to 400sq. m. Various layouts are possible, ensuring the exhibition can be adapted to the size and dimensions of the respective venue. The exhibition can be laid out as a square (e.g. consisting of 10 x 10 units) or as a room divider in one long row or according to groups.

Wall area
Wall panels, reproductions of original documents, and time-lines are all presented in flat aluminum frames. For the documentation, which can be subdivided into nine groups, approx. 35 running meters of wall space are required.

Transport
The exhibition has been specially designed to ensure a low transport volume and easy handling. The exhibition is packed into thirteen crates: eight for the plinths, four crates for the Plexiglas cubes including the exhibits, and one crate for the framed documentation. The transport volume amounts to approx. 20 cubic meters.

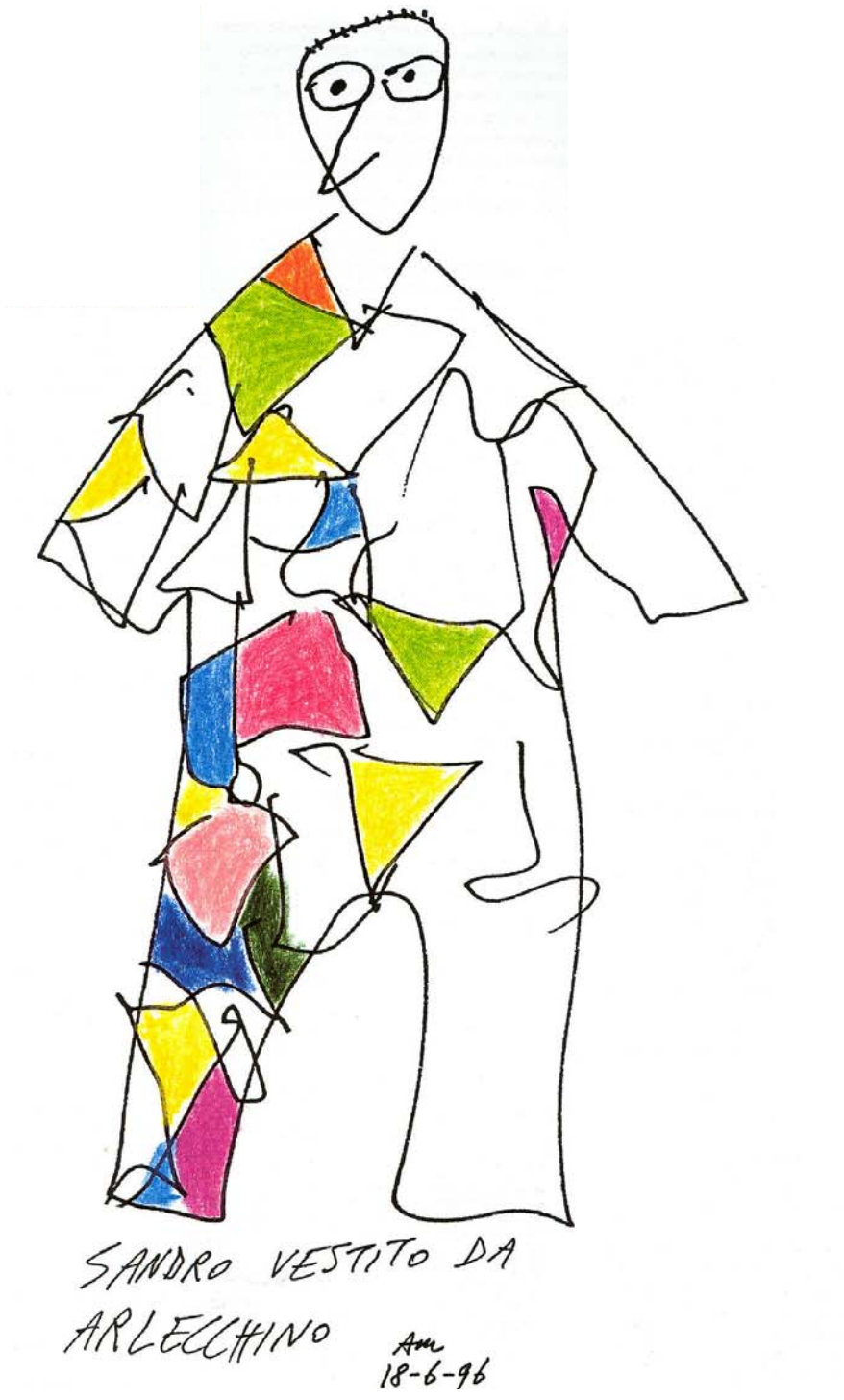
Insurance
The exhibition is insured by the Vitra Design Museum wall to wall. Insurance costs are included in the acceptance fee.

Mounting and dismounting
The complete installation is delivered together with the exhibition. If lighting, wall and spatial conditions have been well prepared, the exhibition can be assembled in as little as one and a half days.

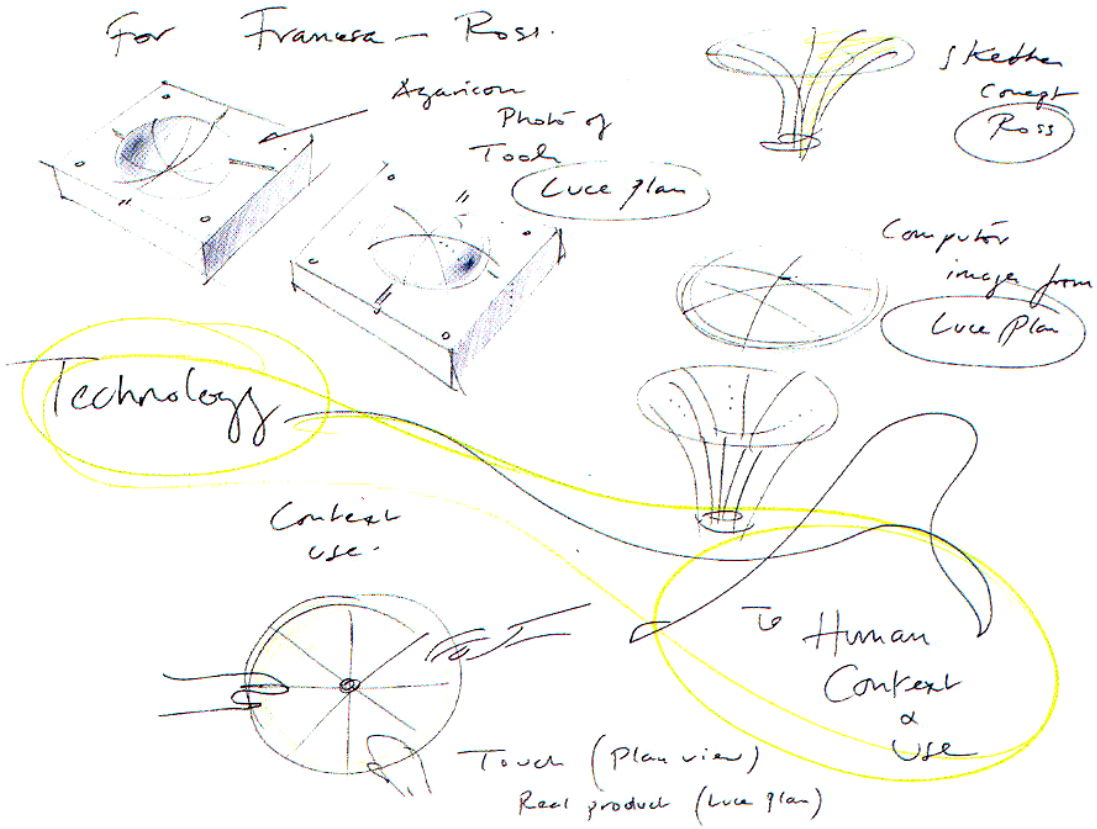
Exhibition catalogue
The booklet Dimensions of Design - 100 classical Seats, 250 pages, 12 x 17 cm. contains detailed descriptions of each individual miniature. The catalogue includes descriptions of the history of the design and reception of the chairs, the production process and details of each particular construction. The booklet is available at present in German, English and Spanish.

Accompanying products
The Miniatures Collection as well as publications and other articles for your museum shop can be acquired at reasonable conditions. We should be pleased to provide you with a separate offer.
[www.design-museum.de]

"What we need today is to replace the aesthetic objects with the semantic objects, this will result in replacing the simply beautiful with the good. We must start again from scratch so that these objects and machines serve us, in order for us to live better"
Philippe Starck (An-Ray Designs)
[www.anray-designs.com]



[Domus No 813-814, 1999:57]



[Domus No 827-828, 2000:72]

A hundred years – A hundred chairs
[www.design-museum.de]
The Vitra Design Museum has one of the biggest and most important collections of modern furniture design, with a catalogue of over 3,000 works. The exhibition A hundred years - A hundred chairs provides us with the opportunity to contemplate the museum's most beautiful pieces. The aim of this exhibition is to offer a view of the different periods of industrial furniture design in this century. It all began in the latter half of the 19 th century with curved wooden furniture which lent itself to mass-production. Design played a significant role in cultural at development at the beginning of the century. Gerrit Rietveld designed furniture with simple lines, while Marcel Breuer created the first tubular steel chairs. This lightness in shape was subsequently a source of inspiration for Alvar Aalto, who was the first to use plywood, and for Jean Prouvé, who started to use techniques and materials which had previously only been used by the aeronautical industry.

Following the Second World War, American designers began to collaborate closely with industry. Designers like Charles Eames, Eero Saarinen and Harry Bertoia came up with designs which would be used for the mass production of furniture for American homes. Design became a key element of daily life. At that time in Europe, furniture design was developing mainly in Italy and Scandinavia. Nonetheless, the objective was still the same as that in America, namely to make designer goods more accessible to the general public.

Hans Wegner and Arne Jacobsen were forerunners in Scandinavian countries in creating wooden furniture, while the Italians turned their attention to more novel materials like plastic. The considerable malleability of these materials, together with the development of new types of foam, gave rise to a wealth of creative fantasy in the sixties. At that time, Pop Art provided a source of inspiration and designers played on form and colour. The main representatives of this trend were Verner Panton and Joe Colombo. Later, in the seventies, designs became even more radical, leading to the emergence of opposition to the rules of Modernism. Groups of designers like Memphis or Archizoom emphasised the amusing and playful nature of forms rather than functionality.

The eighties were marked by a search for both, individualism and pluralism, giving rise to a variety of previously unheard of styles. Philippe Starck, Ron Arad and Gaetano Pesce are leading representatives of this trend. A search for simple but innovative shapes and materials has characterised the present decade, the last of this century. Frank Gehry and Jasper Morrison are two key figures of this period. Nevertheless, fantasy remains an indispensable criterion in the conception of forms. The work of Ron Arad and Marc Newson, both concerned with functionality and mass-production, bears witness to this fact. Drawings, sketches and documents belonging to the Vitra Design Museum accompany the chairs on display. Visitors are given precise details of the pieces on show, which are exhibited in specially designed interiors evoking the historical context in which they were created. Six films reveal the manufacturing process of some of the chairs, giving the spectator general insight into different production techniques.

A hundred years – A hundred chairs
An exhibition by the Vitra Design Museum

Exhibition design
Dieter Thiel

Number of works
- 100 chairs dating from 1899 to 1999
- 48 explanatory panels (70cm x 100cm)
- one model of the Vitra Design Museum
- one photograph of the Vitra Design Museum (70cm x 100cm)

Media
7 film installations including A/V hard- and software

Installation:
All plinth for TV and presentation platforms provided.

Space requirements
600-800 m²

Transport Volume
Approx. 4 containers

Contact for scheduling information:
Reiner Packeiser
Head of the Exhibition Department
Vitra Design Museum
phone: +49 (0)7621 702 37 29
fax: +49 (0)7621 702 47 29
reiner.packeiser@design-museum.de

[www.design-museum.de]

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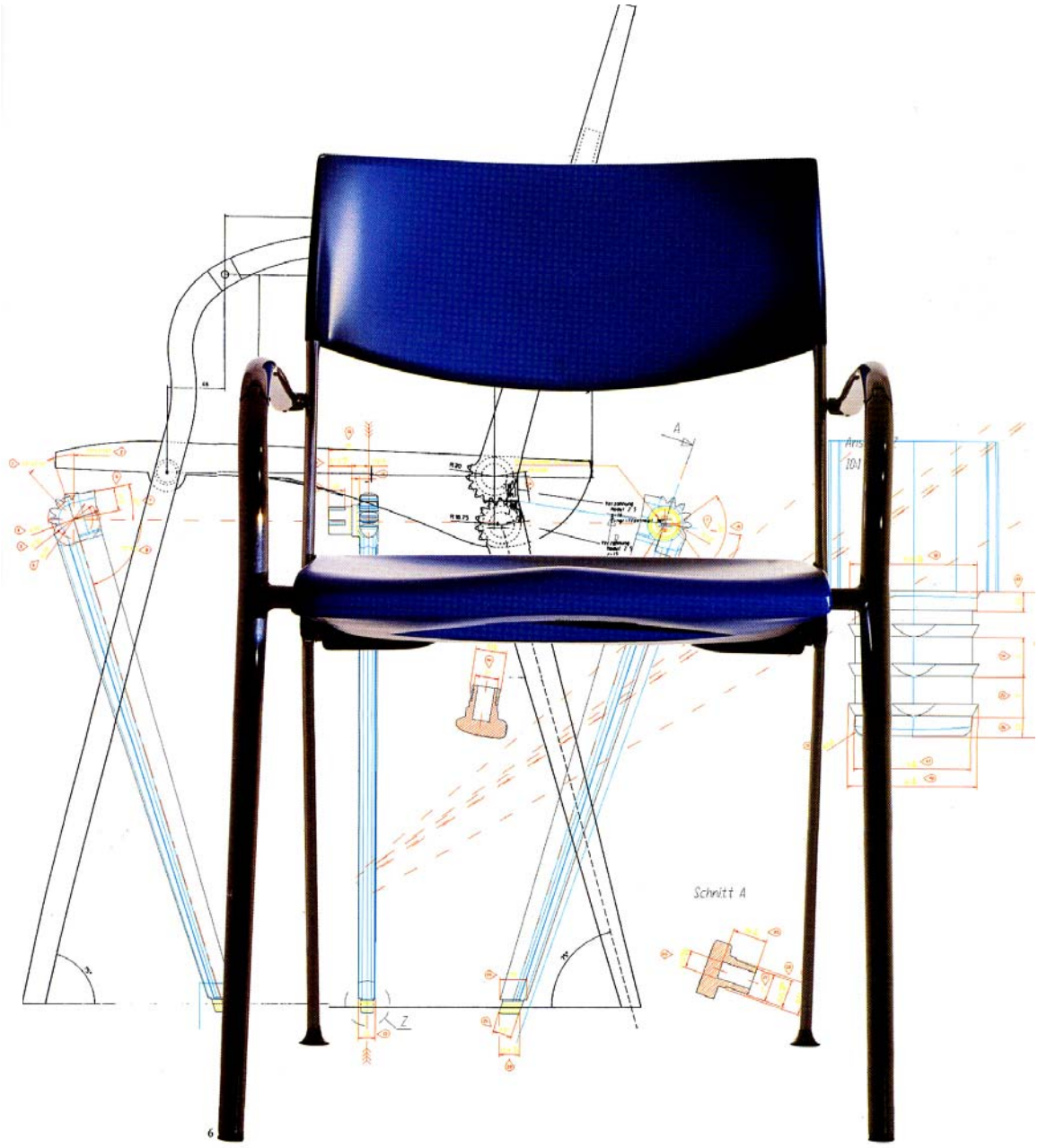

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A legacy OF INVENTION

The Work of Charles and Ray Eames – A Legacy of Invention

[www.design-museum.de]
A legacy of invention has been organised by the Library of Congress, Washington, D.C., in partnership with the Vitra Design Museum, Weil am Rhein, Germany. The European tour is organised by the Vitra Design Museum. The U.S. tour is organised by the Library of Congress.

The Work of Charles and Ray Eames – A Legacy of Invention Charles Eames (1907-78) and Ray Eames (1912-88)
gave shape to America's twentieth century. Their lives and work represented the nation's defining movements: the West Coast's coming-of-age, the economy's shift from making goods to producing information, and the global expression of American culture. The Eameses embraced the era's visionary concept of modern design as an agent of social change, elevating it to a national agenda. Their evolution, from furniture designers to cultural ambassadors demonstrated their boundless talents and the overlap of their interests with those of their country. In a rare era
of shared objectives, the Eameses partnered with the federal government and the country's top business to lead the charge to modernize postwar America.

Charles and Ray Eames practiced design at its most expansive. From the 1940s to the 1970s, their furniture, toys, buildings, films, exhibitions, and books aimed to improve society – not only functionally, but culturally and intellectually as well. The Eameses' wholehearted belief that design could improve people's lives remains their greatest legacy. Even more remarkable is how they achieved their seriousness of purpose with elegance, wit, and beauty. This exhibition brings together the sources of the Eameses' inspiration, the personal documents of their lives, and the finished products of their talent. In order to understand the processes that led to the Eameses' achievements, this exhibition is organized around challenges posed to them by clients or – as with most creative geniuses – posed by themselves:

- How to build economical, yet well-designed, space for living and working?
- How to produce affordable, yet high-quality, furniture?
- How to help people see beauty in the everyday?
- How to make fundamental principles accessible to lay people?
- How to help Americans and other cultures understand each other?

The Eameses' vast body of work illustrates their solutions to these challenges. It also demonstrates the ambition and scope of their agenda – from the utilitarian chair to complex issues of human perception, understanding, and knowledge.

Structure of the exhibition

Space

From their own house in Los Angeles to their proposal for the "Do-it-yourself" Kwikset House, the Eameses sought to bring "the good life" to the general public by integrating high and low art forms, modern materials and construction technologies, craft and design. Their architecture promised good design for minimal cost through the use of prefabricated standardized parts. Although ultimately the Eameses designed few buildings, they popularized basic tenets of their architecture through their toys, furniture, films, and slide shows.

Culture

Charles and Ray Eames' careers in the 1950's mirrored America's postwar shift from an industrial economy of goods to a post-industrial society of information. Rather than furnishings and buildings, the Eames Office focused its efforts on communication systems – exhibitions, publications, and films. In these endeavors the Eameses used imagery of daily rituals and entertainments, vernacular landscapes, and ordinary objects to promote popular culture as the currency of exchange between nations and people.

Beauty

Charles and Ray Eames' philosophy of the educational role of everyday things led them to develop projects that would spur people to find beauty in the commonplace. Charles heard the music of Bach in the splash of soapy

water on an asphalt schoolyard – and made the film Blacktop. Ray saw beauty in the shape of utilitarian leg splints – and transformed them into elegant sculptures. The Eameses' ability to transform the ordinary into the extraordinary is one of their greatest legacies. Their films and slide shows gave the spectator, in Charles' words, a "new depth of vision."

Sciences

To help people understand new technologies and their potential, Charles and Ray Eames produced approximately 60 films, exhibitions, and books for such corporations as IBM, Boeing, Polaroid, and Westinghouse. A major theme in all the Eameses' scientific endeavors was the beauty and elegance of scientific principles and the tools used to study them. Revealing science's complex integration of art, philosophy, and nature, their films and exhibitions successfully related the unfamiliar aspects of science with familiar and comfortable facets of everyday life.

Furniture

For forty years Charles and Ray Eames experimented with ways to meet the need for affordable, yet high quality furniture for the average consumer. They designed flexibility into their compact storage units and collapsible sofas for the home; seating for stadiums, airports, and schools; and chairs for virtually anywhere. An ethos of functionalism informed all their furniture designs: "What works is better than what looks good," Ray Eames said, "the looks good" can change, but what works, works." The Work of Charles and Ray Eames.

The Work of Charles and Ray Eames – A Legacy of Invention
Initial idea

Alexander von Vegesack

Development Team:

The exhibition was directed by Donald Albrecht, who also edited the catalog, and was designed by Craig Hodgetts and Hsin-Ming Fung. Responsibility for concept development was shared by Donald Albrecht and Hodgetts + Fung Design Associates, in collaboration with the organizing institutions. The exhibition's media was designed by Eames Demetrios.

Venue Requirements:

Shipping: Venues pay prorated shipping.
Space: 6,000 square feet/ 600 m²
Security and environmental: Exhibition requires high security. Venues must maintain temperatures at 70 degrees F. (+/5) and humidity at 50% (+/- 5%).

Insurance is included
Exhibition displays are included

General Checklist

- Approximately 88 objects (furnishings, furniture prototypes, molds, jigs)
- Eames designed toys
- KAZAM machine
- Rotating chair testing machine
- Original art works from Ray & Charles
- Correspondence from Ray and Charles
- Graphic works from the Eames Office
- More than 100 pieces of professional and personal ephemera, including correspondence, promotional material, graphic designs, and decorative objects collected by the Eames incl. a selection of Mexican and Indian objects from the Eames.
- Model of the Eames House
- Architectural plans and drawings from the Eames House, originals and reproductions
- "Powers of Ten" – Production panels (32 reproductions in original size)
- Light tables with aprox. 300 slides made by Charles Eames.
- Approx. 20 Films
- Multi-Media installation " Glimpses of the USA "

Contact
Reiner Packeiser
Head of the Exhibition Department
Vitra Design Museum
Tel.(+49) 7621 702 3729
Fax. (+49) 7621 702 4729
reiner.packeiser@design-museum.de

[www.design-museum.de]

[Domus No 829-830, 2000:1]

Mies van der Rohe
Architecture and Design in Stuttgart, Barcelona, Brno
[www.design-museum.de]
An exhibition of the Vitra Design Museum in collaboration with the Weißenhof-Institut at the Staatliche Akademie der Bildenden Künste, Stuttgart **Mies van der Rohe** was first and foremost an architect. Only Le Corbusier and Frank Lloyd Wright had the same impact on modern architecture as Mies. His impressive legacy of ground-breaking buildings and his activity as organiser and teacher confirm this status. His most significant European building projects, the German pavilion at the Barcelona World Fair (1929) and the Villa Tugendhat in Brno (1930) enabled modern architecture to emerge from experimental infancy.

In 1932, Philip Johnson coined the term "International Style" when he staged an exhibition at the Museum of Modern Art in New York; it was an attempt to summarise the various currents and ambitions of the European avant garde in the field of architecture. Since then, the term has predominantly been used to describe the elegant steel-and-glass buildings in the style of Mies van der Rohe, a style that continued to dominate architecture and construction until well into the 1960s. Siegfried Giedion made a poignant remark about the difference between Mies's buildings and the bulk of those that looked similar: "Along with Le Corbusier, Mies van der Rohe is one of the few architects who have made a conscious decision to base their buildings on proportions, but not simply in the sense that a number is just a number but in the sense that a number possesses characteristics of quantity as well as quality." This statement emphasizes the principle characteristics of Mies van der Rohe's **furniture designs**.

Although he designed furniture only for a relatively short time (1927 to 1932), his designs are among the most influential of the modernist movement. He designed the first-ever cantilever chair for the Weißenhof estate in 1927, establishing tubular steel as a standard material for furniture production. Then, in 1929–30, when a wave of tubular steel furniture – already derivative and lacking innovation – swept the market, Mies designed three entirely new models.

The chair for the German Pavilion in Barcelona as well as the chair and armchair for the Villa Tugendhat used flat rather than tubular steel; the Barcelona chair, in particular, became symbolic of the elegance of Mies's furniture designs. As in his buildings, this elegance did not, however, simply rely on the use of exclusive materials, but on careful proportioning and detailing.

Architecture

Between 1907 and 1919, Mies van der Rohe built several private homes, his style still influenced by Karl Friedrich Schinkel, Hendrik Petrus Berlage and Peter Behrens. In the period from 1919 to 1923, however, he surprised everyone with a series of five private homes and high-rise buildings, which constituted an important step for modern architecture.

When modern architecture became established during the following years, and most architects failed to recognize anything but rational and technical problems, Mies referred to architecture as "the will of an epoch translated into space", showing that he was still very much aware of questions of style and artistic content in relation to his own work. His rigorous marketing efforts for his own tubular steel furniture range were also considered highly unusual at the time; indeed, many people thought he had sold out on the social ideals of modern architecture in accepting commissions to design two exclusive buildings, the pavilion in Barcelona and the villa in Brno.

His directorship at the Bauhaus from 1930 to 1933 proved yet another controversial period in his life: he introduced sweeping changes to the left-wing programme of the Bauhaus school, streamlining this educational institution into a school for architecture.

After the war, Mies's reputation continued to grow, in contrast with the fate of many pioneers of modern architecture, who found it difficult to resume the work they had abandoned in the late 1930s. None of the German architects who emigrated to the US adapted so thoroughly to American standards as Mies did; his Seagram building in New York is testimony to this transformation.

The Exhibition

A wealth of outstanding exhibits testify to the quality of this exhibition. Most of exhibits come from the

Vitra Design Museum collection and the archive, including important documents from the estate of Anton Lorenz, a key figure in he development and spread of tubular steel furniture, which will go on public display for the first time as part of the exhibition. However it has to be said that true highlights of the show are bound to be the rare items of original furniture on display, which will include not only a large number of items from the initial phases of production but also prototypes and unique pieces from Mies van der Rohe's private estate.

Complemented by reproductions of drawings, patents and sales catalogs, these items serve as documents of the process of furniture design. Architectural models – some including furniture miniatures – sketches, and a large number of photographs come together to create a multilayered.

Curator

Mateo Kries

Exhibition Objects

30 objects incl. six architectural models
Three architectural models (complete) on a 1:100 scale.
Three architectural models (sections of rooms) on a 1:6 scale.

2 video documentation, 1 audio documentation
1 interactive computer station: walk through the Villa Tugendhat.

Educational Material

Comprehensive texts on the objects and the architectural projects.
Approximately 120 original patent licenses, historical photographs, drawings, catalogues and architectural plans.
A biography of Ludwig Mies van der Rohe.

Exhibition Installation

The exhibits will be displayed on wooden plinths (height 30 cm) with an inset Plexiglas panel lit from below. (14 items measuring 130 x 130 cm, two items measuring 300 x 150 cm, one item measuring 300 x 300 cm). The documents ill be displayed in six identical lit vitrines. (95 x 300 x 60 cm).

The architectural models will be displayed on stands (height 95 cm) The photographs will be displayed in six wall-mounted frames. (30 x 300 cm).10 format prints (approximately 3.00 x 4.00 m) showing plans and photos from the objects and buildings.

Space requirement

Approx. 500 – 800 sq.m.

Shipping volume

Transport volume is four containers.

Insurance

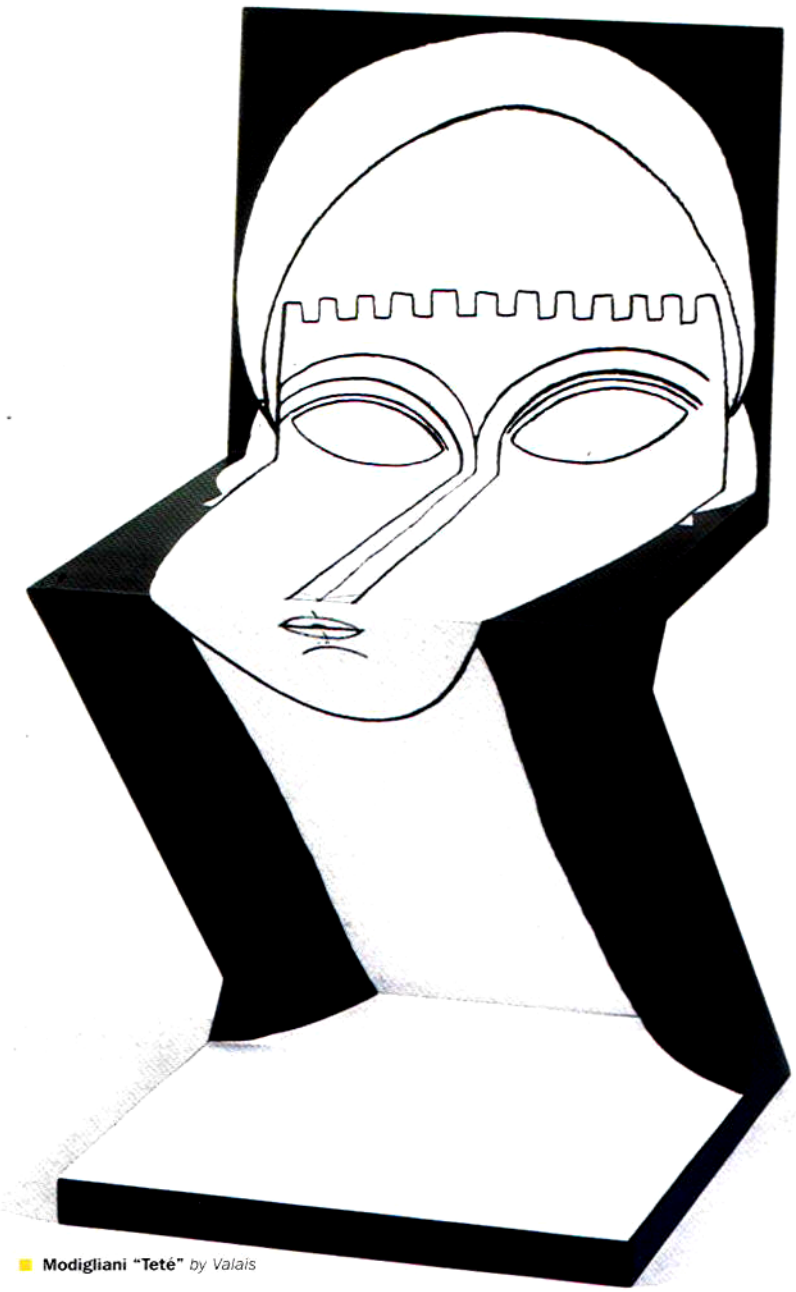
The exhibition is insured by Vitra Design Museum's "nail to nail".

Exhibition Catalogue

260 pages, format: 29 x 24 cm, approx. 250 illustrations, including approx. 50 colour.
Includes contributions by Dr. Otakar Macel, Werner Blaser, Dr. Wolf Tegethoff,
Lenka Kudelkova, Karin Schulte, Mateo Kries.
Publication date: Oct. 1998.

Contact

Reiner Packeiser
Head of the exhibition Department
Vitra Design Museum
Tel.(+49) 7621 702 3729
Fax. (+49) 7621 702 4729
reiner.packeiser@design-museum.de
[www.design-museum.de]



Modigliani "Teté" *by Valais*

[Asensio, 2002:133]

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The material world of childhood
The exhibition has been curated by independent curator and writer Lucy Bullivant, London and Jutta Oldiges, Vitra Design Museum. The current curator of the exhibition is Dr. Barbara Fehlbaum, Basel, Switzerland. This exhibition aims to explore and critically illuminate the changing relationships between children and adults as expressed by their immediate, everyday material environments in societies in and beyond the Western world.

Cross-cultural patterns of adult provision for children are traced through a geographically far-reaching selection of furniture and other daily artefacts. Contextual images showing activities and objects in use, and a video about children's play with footage from the 1920s to the present day, are woven into the layout. These offer glimpses of the material world of childhood that build up a wider, global perspective of the developing child's response to its environment and its closest relationships.

From a Biedermeier nursery to work-orientated Shaker communities in New England, a Iatmul house in Papua New Guinea to the collective space of a Chinese kindergarten, the material worlds of childhood are made up of furniture and artefacts that are potent carriers of meaning. Irrespective of culture or period, and conspicuous by their presence (or relative absence), they communicate messages about adult attitudes towards learning, the child's physical and psychological development, intimacy and order in the family, control, autonomy and personal territory, and above all the role of play.

The child's own improvised intervention in the adult world encourages us to consider the meaning of play, and above all, the play between the two worlds of adult and child.

The exhibition
The exhibits are grouped into five themes defined by contrasting functions, featuring typologies that illuminate patterns of sleeping, basic functions, mobility, play forms, institutions of formal and informal learning. The selection of exhibits cuts a broad swathe through many cultures and periods in order to illuminate links between them.

Patterns of sleeping
Contrasts in patterns of infant and child care mark out specific cultures, periods and stages in the child's development, and nothing is more central to perceiving this than the place of sleep. Whether elaborate or simple, fixed or mobile, through its design, materials, symbolism and methods of manufacture we can unravel adult attitudes towards the child's social context and family aspirations.

Only in the Western world, for example, are children expected to sleep alone. Cots, cradles, hammocks, mats and cradleboards embody themes of intimacy and distance, security, mobility, adaptability and multi-purpose use as play objects.

Basic functions
The "invention" of the nursery in the seventeenth century, and of furniture designed specifically for it, brought highchairs and a proliferation of other designs relating to the daily care of children - supporting feeding, toilet training, bathing, grooming, nappy changing and storage. As children began to be seen to have rights alongside adults, furniture for their daily care gradually broadened from being miniaturised versions of adult furniture, developing in adaptability while maintaining scope to control.

Enabling participation in the adult world, which babycare designs can curtail by estrangement, starts at birth. The vast inventory of childcare products of the industrialised nations, which can turn homes into hospital wards, is not prevalent in non-Western cultures like the Iatmul of Papua New Guinea, where the encouragement of personal initiative, through food gathering and preparation, and autonomous activities, are traditional features of everyday life.

Play
Children the world over play as a matter of necessity, stimulating their imagination and shaping their psychic identity. Without the tangible, commercial objects of play, they draw on their own resources, using indigenous raw materials and found objects from the external environment. In industrialised cultures, arrays of play furniture are provided within interior settings often geared to adult use.

[www.design-museum.de]

Their hybrid nature erases the boundaries between practicality and play, between furniture and toy, and ideally encourages spontaneity of use. Assemblages, or rocking or constructional forms, which sometimes double up as practical items such as highchairs or cots, assist motor skills, logic, role-play, eye-hand co-ordination and creativity. Improvisational play, with its lack of reliance on a pre-defined programme, reinvents the adult order.

Mobility
The pram, the sling and buggy, like the idiosyncratic forms of the baby walker known since medieval times, are all vehicles facilitating the mobility of the child with their own history and culture. The classic coach-built pram, well upholstered and elegantly gleaming, often bought as a family investment, has been overtaken by the lightness and convenience of carrycots and transporters which separate and fold down for storage and for traveling, and also by the slings and baby carriers originating in many non-Western cultures where the younger child is kept physically close to its mobile parents.

The sling attunes children to rhythms of the adult world; the pram positioned them at arm's length from their carriers: in the Western world, both are social statements.

Formal learning
The kindergarten or day nursery might best be described as an extension of the home, not a substitute for it. This context for the child's first social relationships outside the home has produced various communally used designs. Desks for formal learning are not universal; nor are schoolrooms. In fact, a long period of compulsory schooling is a recent Western invention. In previous centuries not all children went to school, nor do they now in some cultures.

The organization of space for learning, whether at school or in the home, reflects widely varying definitions of "education". Conforming patterns of provision have been increasingly broken by the initiatives of designers keen to explore design solutions supporting learning that is informal, personal and, as a result, usually fun.

Concept and Curator
Lucy Bullivant, London (indepenent curator), Jutta Oldiges, Vitra Design Museum; The current curator of the exhibition is Dr. Barbara Fehlbaum, Basel, Switzerland.

Exhibition Design
Dieter Thiel

Exhibits
approximately 140 objects
6 large format prints (382cm x 256cm)
Photos (in frames)
7 frames with didactic material (122cm x 92cm)
4 frames with didactic material (62cm x 92cm)
1 video documentation, to be played on 6 stations

Space requirement
600 – 800 sqm

Shipping volume
three 40 ft containers

Min. ceiling height
3.0 m

Catalogue
Editors: Alexander von Vegesack, Jutta Oldiges and Lucy Bullivant.

Size
320 pages, 24 x 28 cm, German and English version.

Contact
Reiner Packeiser
Head of the Exhibition Department
Vitra Design Museum
Tel.(+49) 7621 702 3729
Fax. (+49) 7621 702 4729
reiner.packeiser@design-museum.de
Vitra Design Museum
[www.design-museum.de]

Continue:
08designInfluences-4
pages 85-94

The Miniatures Collection is currently on display at Twiice International's showroom in Parktown, where these perfect replicas of the original masterpieces of design can be viewed, and ordered in the beautiful surroundings of another design masterpiece – the Cologne House which Twiice International calls home.

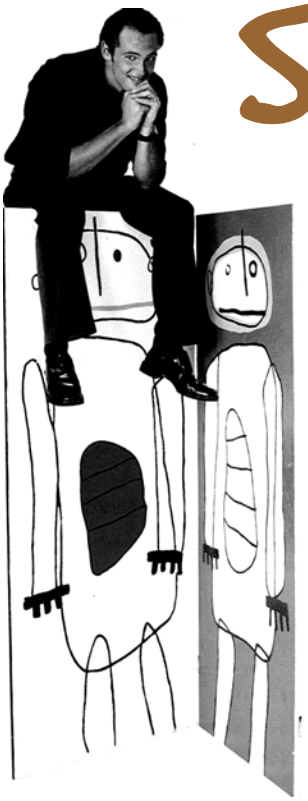
[www.twiice.com]

TwIIce international

Environmental issues are no longer just the concern of the world's green groups but are critical to any company intent on moving forward and upward. One such company is Twiice International, exclusive supplier of Ahrend, VITRA and Mauser ranges of office furniture, who has carefully selected partners and suppliers that share its dedication to ensuring that the environment is not harmed. Names such as Ahrend, VITRA and Mauser, while synonymous with superior quality furniture, are also benchmarks to which companies around the world look to in trying to formulate their own environmental policies.

Twiice International prides itself on being vastly different, particularly when it comes to service. We are a versatile, fast growing and dynamic company, specialising in providing furniture solutions on any scale. Our comprehensive product range and our ability to meet any furniture requirement, has earned us a unique reputation in the southern African market. I believe that our success in the market can be attributed not only to the quality of the products we offer, but also to our high level of service and on-time delivery. On price versus quality, the Twiice International products are hard to beat although the ranges are fully imported. Together with my team of experts and with the backing of our international suppliers, I believe we will succeed in our mission to become the most unique service orientated furniture and service supplier in Southern Africa. *Tin Korver - Managing Director* [www.twiice.com]

SOUTH AFRICAN DESIGNERS



CHRISTIAAN BARNARD
[VISI WINTER 2002:49]

BOYD FERGUSON
[VISI WINTER 2002:49]

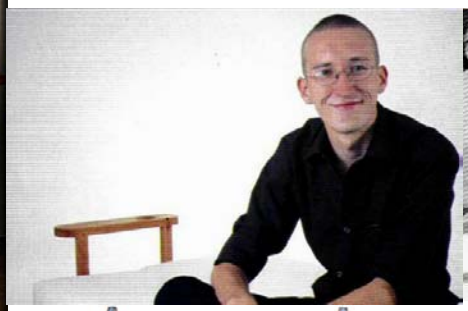
MERWE
[VISI WINTER 2003:115]

ANTON SMIT
[HOUSE & LEISURE JULY 2001:25]

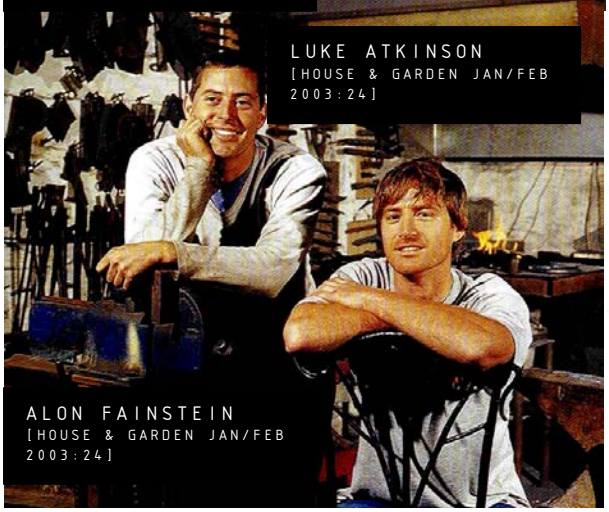
Right: [Visi Winter 2003:27]

TERENCE BACON
[VISI LENTE 2002:200]

[ELLE AUTUMN 2003:45]



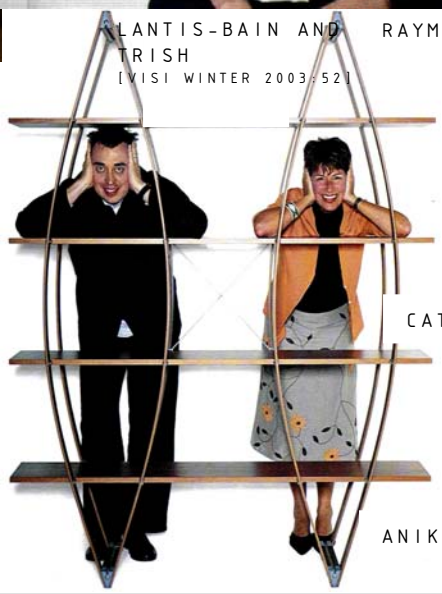
ANNEKE



LUKE ATKINSON
[HOUSE & GARDEN JAN/FEB 2003:24]

ALON FAINSTEIN
[HOUSE & GARDEN JAN/FEB 2003:24]

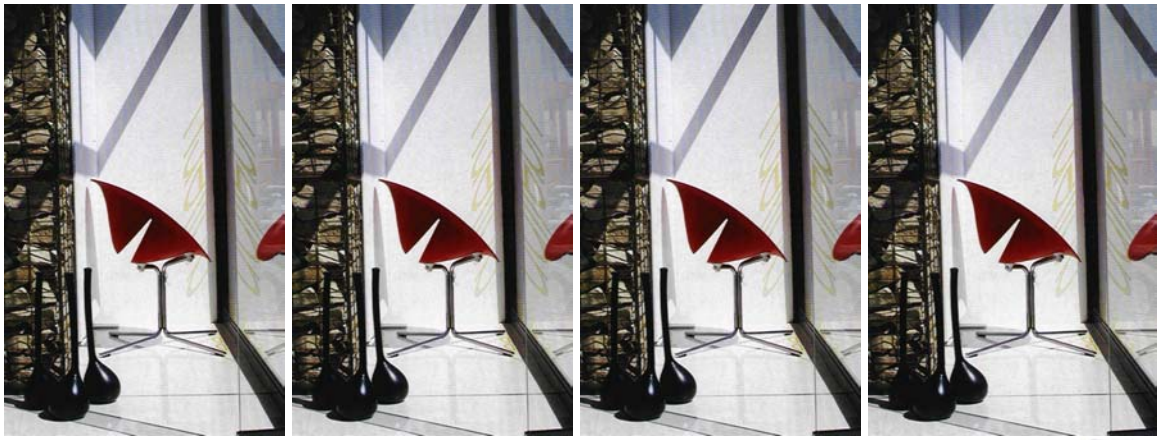
LANTIS-BAIN AND TRISH
[VISI WINTER 2003:52]



RAYMUND

CATHERINE

ANIKA



(Top) European Concepts - local furniture, and (above) Ink – modular couches, Design District, Rosebank .

[Sorrell, June 2003:133]

DESIGN SHOPS

in south Africa

[p.88-92 pictures - taken by author]

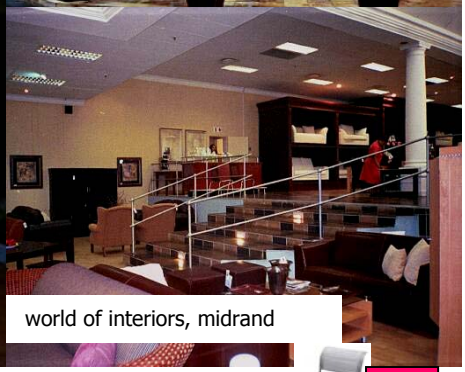
p. maldini, kramerville, sandton

sevens, fourways

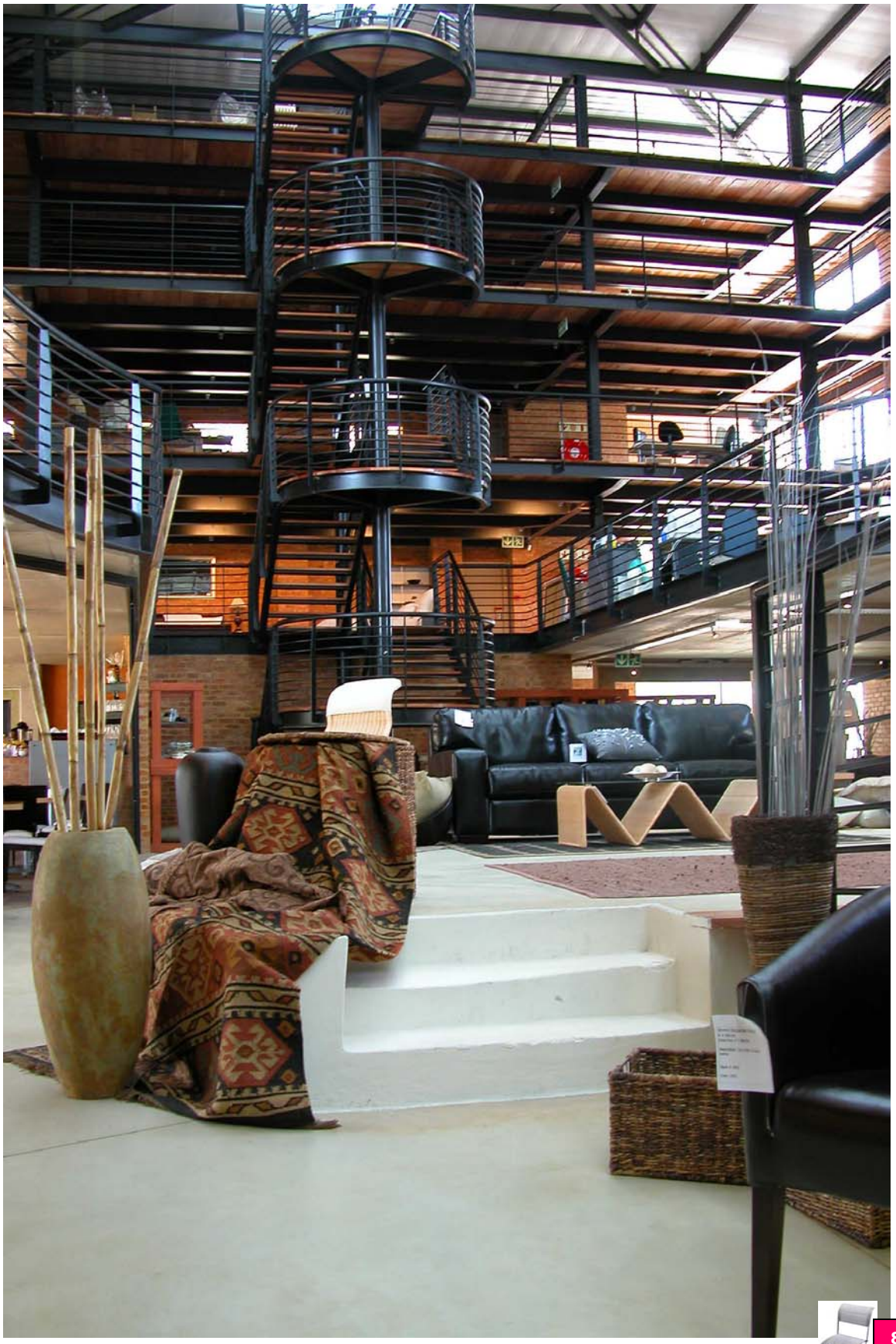
designers on the square, sandton

designers on the square, sandton

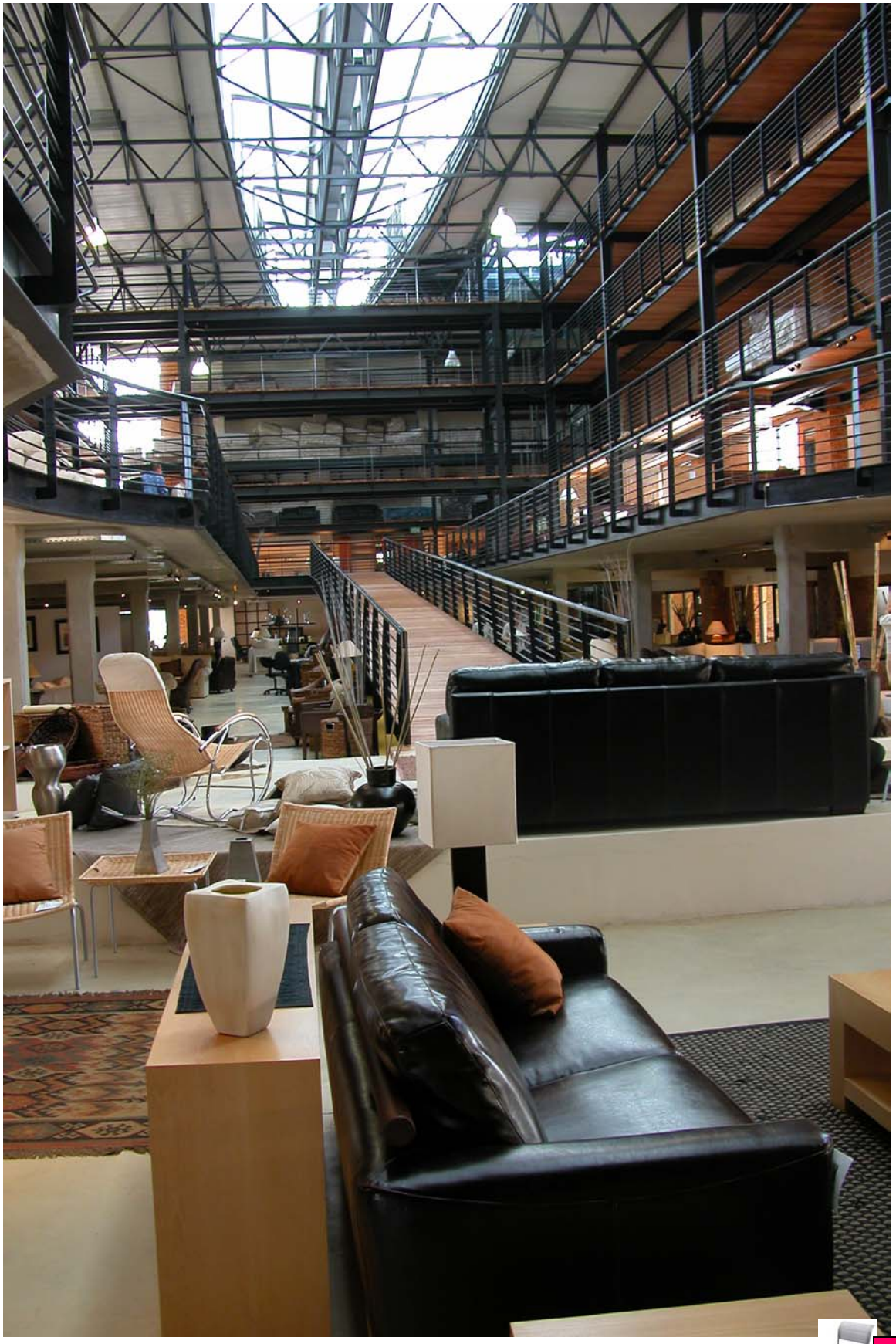
bakos brothers, dunkel west, sandton



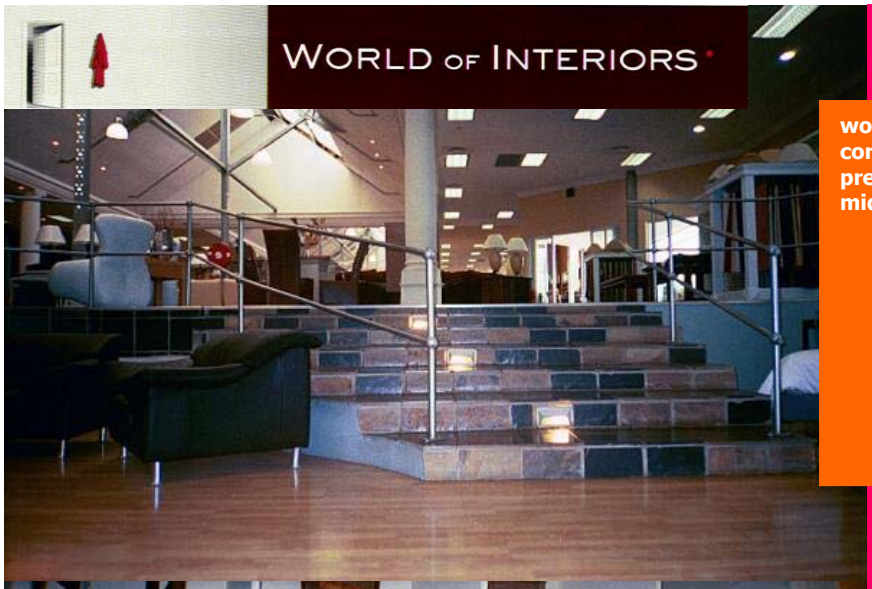
world of interiors, midrand



sevens, fourways



sevens, fourways



world of interiors,
corner allandale & old
pretoria road
midrand, gauteng

wetherleys, kramerville,
sandton

designers on the
square, hyde square,
hyde park
designers on the
square is a natural
progression of the
full service practice,
design cc, who have
for the past nine
years been planning
and designing.

designers on the square, sandton

world of interiors, midrand

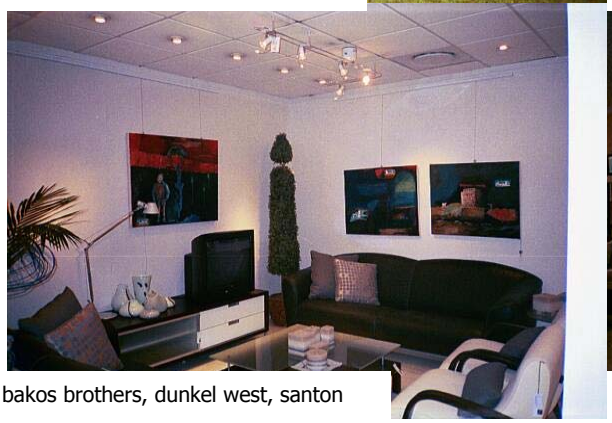
world of interiors, midrand

world of interiors, midrand

java plantation, marlboro road

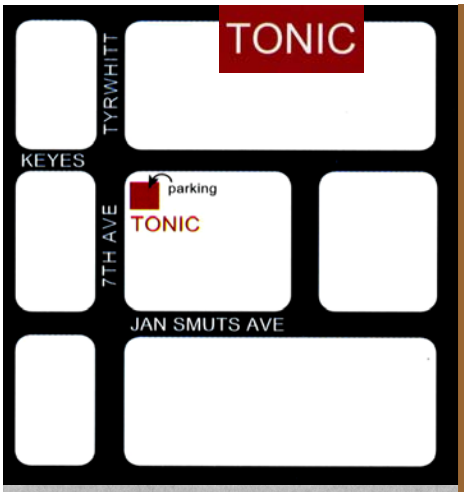
italian furniture, kramerville

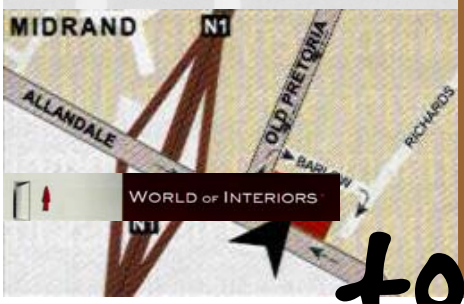
bakos brothers, dunkel west, santton



world of interiors, midrand

The layouts of all the interior shops are flexible and can easily be changed. The furniture inside the large open spaces define the interior of the building and maximum eyesight is obtain. Light, thermal comfort and ventilation are very important qualities of the spaces.





A P S

maps
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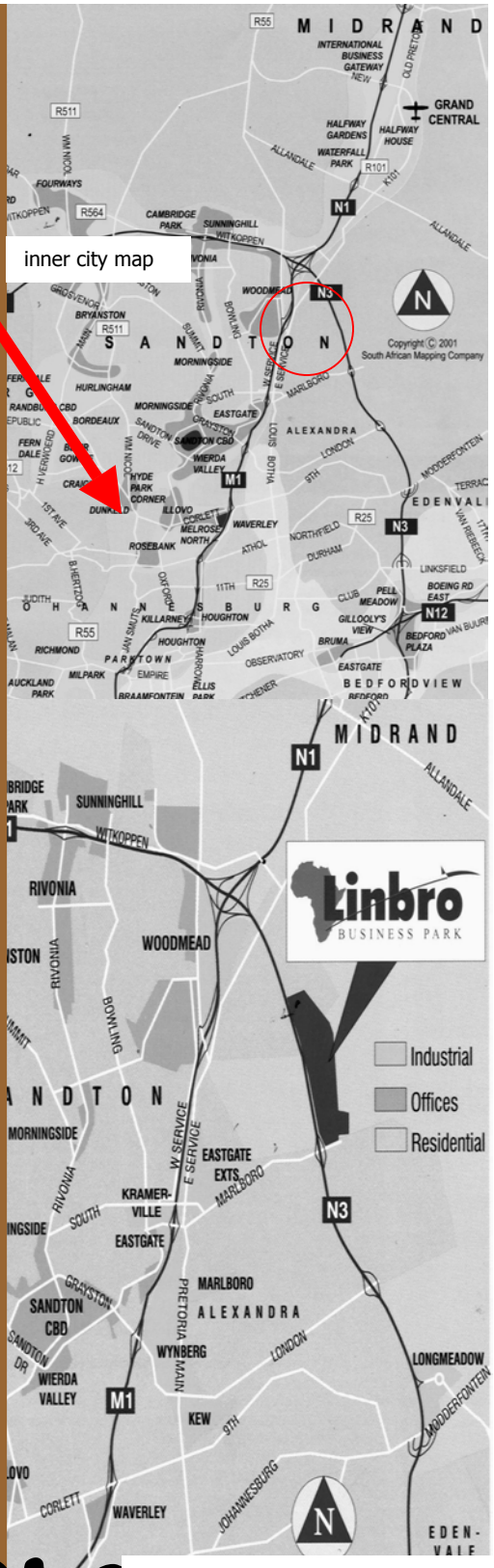
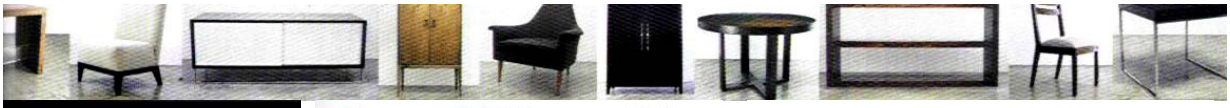
inner city map



to shops

n Rose, RPP Develpments, 2003]



KnollStudio
ORIGINAL CONTEMPORARY CLASSICS

eclipse
Furniture Hardware Supplies

WORLD OF INTERIORS

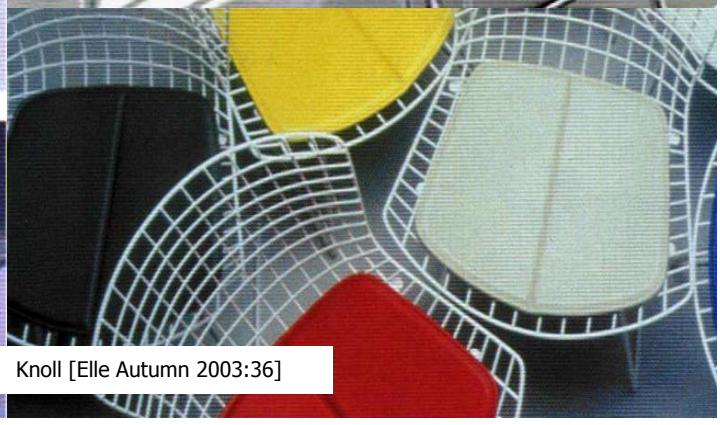
Magis yogi low chair [Elle Autumn 2003:15]

TONIC

sevens
SETTING THE TRENDS IN HOME & OFFICE DECOR

COMFORT CREATIONS

Knoll [Elle Autumn 2003:36]



Knoll [Elle Autumn 2003:36]

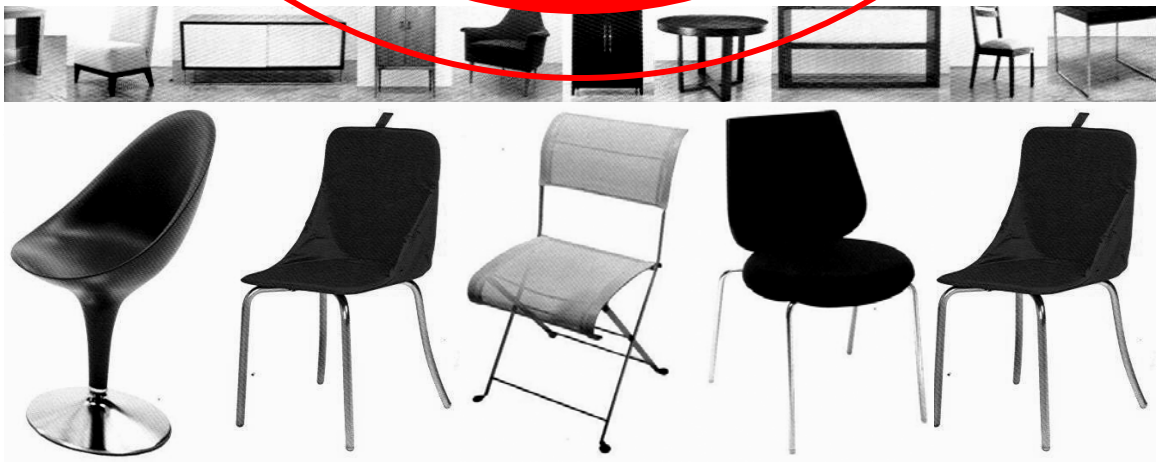
SETTING IN MOTION A BUYING
PROJECT OWN IS
TRANSFO RIBUTION

DiD

WAREHOUSE

BASELINE
DOCUMENT

A S ECTS ON
DISPL OUCHED SEE
THE W AS AN EVENT
PLACE IN A GIVE-AND-TAKE



INTRODUCTION:

In the developing of a "target-setting baseline document" for DiD Warehouse, the Sustainable Building Assessment Tool (SBAT 2000: Jeremy Gibberd) was used as basis. The SBAT has been designed to assess the sustainability of buildings. This is done by determining the performance of the building in relation to a number of economic, social and environmental criteria. The tool also enables the building to be rated in terms of sustainability.

Much information was gathered to provide sufficient guidelines in terms of economical, environmental and social issues. This sets a target for the design-process of DiD Warehouse and the issues addressed here must be reflected in the building as far as possible. Some issues are more important than others, but an essential and interesting challenge would be to integrate the three main categories: social, environmental and economic.

The report gives guidelines in terms of size, percentages, angles, factors and properties, just to mention a few. Some of the information will be implemented when detail issues such as properties of lamps, glare indices, etc., are considered. The target-setting report must maximize the design alternatives and provide a solution for every problem that may occur during the design process. Many possibilities/values are compared with each other to ascertain what option will be the most obvious one to choose.

Well-known trade names are included in the report for elements such as glass walls, internal partitions, extractor fans etc. It is important to use local contractors and companies to support the local economy.

The success of the baseline document will be reflected in the reporting tool which will indicate after the completion of the design process, which targets that have been set, have been achieved, and to what degree.

Thus, the main purpose of the document is to set a target for DiD Warehouse – a target that will address all important issues related to economical, social and environmental aspects.

The document provides information on these three topics that is selected and proven to be the best option and consideration for the purpose, position and function of DiD Warehouse.

Target setting

1. Lighting
- allow maximum natural light to penetrate the building
- avoid glare at any cost
- block direct rays of sun
- use special sun control devices
- daylight – the coolest colour (coffee shops, sitting spaces etc.)
- white – intermediate (atriums)
- warm white – the warmest (restaurants)
- compacted fluorescent lights (CFL) – energy saving

2. Ventilation
- cross-ventilation
- atriums – create a stack-effect
- ventilation system (rock bin-system)
- flexibility, adaptability and choice – main features of ventilation-system
- night ventilation
- openable windows with louvers on north, west facades
- 4 extractor fans above atrium – remove hot air, dust and fumes
- (require no maintenance and can be closed during winter)
- corresponding minimum fresh air supply is 4,72 litre/s/person

3. Noise
- city center noise (highway) – 80dBA
- minimize the amount of windows on western façade
- cavity wall and insulation material – mineral wool
- 82dBA on highway 100m way from building – 68dBA at DiD warehouse
- 68dBA – noisy category
- bigger cavity – maximum results (better isolation capacity)
- 220 – 120 – 220 (101dBA)
- double glazing windows 6 – 100 – 4mm (39dBA)
- 6mm laminated glass (30dBA)

4. Disabled
- wc compartments for the disabled
- requirements for handrails and support
- ramps and access to and from the building
- ramps 1:12 fall or lift
- edges – between walls and floors – clearly distinguished
-

5. Social spaces
- design for easy informal/formal social interaction
- sitting spaces, coffee shops, restaurants, social gathering spaces
- available to community and neighbouring buildings
- easy accessible ablutions

6. Security
- highest possible level of security
- wardens on site and inside the building
- entrances and exits checked by electronic detection
- external doors and windows protected from illegal entry
- "camera-eyes" 24 hours activated
- 2,5m high fence around site
- vehicle control – booms and security guards on duty in parking area/basement
- manned guard point – adjacent to main entrance
- sufficient lighting must be provided

7. Fire regulations
- no smoking inside the building
- fire escape staircases according to SABS 0400
- sufficient outside space
- escape routes in case of fire will not exceed the maximum of 45m
- 6 exits for DiD warehouse
- SABS 0400: TT16.12

- 2 escape routes minim. not less than 800mm
- rise max. 200mm, tread minim. 250mm, 900mm high handrails
- fire-extinguishers provided on each level
- control facility (security room) – monitor on a 24 hour, 7 days a week basis
- smoke exhaust fans provided in atriums

8. Occupancy
- non-useable space – not more than 20% of total area
- occupied for and average equivalent of 30 hours per week
- DiD warehouse – 62 hours occupation per week

9. Vertical dimension
- minimum structural dimension of 3m
- 170 slab, 300 access floor, 3270 height (floor to ceiling) for DiD warehouse
- high floor to ceiling will ensure flexibility in future (long and short term)
- grills in access floors (ventilation)
- 600 x 600mm panels

10. Internal partitions
- knocked-out easily
- temporary partitions for exhibition purposes
- flexibility in terms of change
- glass partitions (shopfronts) and inside the building – views (Movitec)
- thick gypsum board (painted) in the atrium spaces
- non-load bearing so that you can remove partitions
- double glazing system – aluminium profile (sound proof)

11. Water
- rainwater from 80% of roof surface is harvested, stored and used
- 92,6m3 water per month harvest (1900 x 0,65 x 0,9)
- 9 000 litre tanks will be used (10 tanks)
- consumption indoors (248,6m3 per month)
- consumption outdoors (54m2 per month)
- total consumption more or less 300m3
- one third of the required amount of water will be used from tanks
- use efficient taps (below 0,03 – 17 litre p/s) and toilets (below 6 litre)

12. Landscape
- recycled concrete slabs
- clay tiles, concrete blocks
- restrict extent of paving – aiming for water to penetrate (soft landscape)
- grass concrete blocks – will absorb water
- deciduous trees (indigenous) – leaves in summer and sun in winter
- ekebergia capensis
- celtis africana

13. Recycling and reuse
- bins provided on site
- specify the use very clearly
- glass and organic bins
- adequate space are essential (share with neighbours)
- collection of waste to be specified
- contractors to be specified
- restaurants – biodigester in service yard (need ventilation)
- (shoot out of kitchen to organic containers)

14. Materials
- materials with low embodied energy
- steel 20 GJ/TON
- brick 2,5 GJ/TON
- concrete 1,7 GJ/TON
- aluminium (by hydro electricity) 75 GJ/TON
- plasterwork (clay coloured pigmented plaster) – Coprox
- tiles – natural clay tiles (very low embodied energy)
- natural stone cladding – entrances
- louvers – enamel double coated steel (lower embodied energy than aluminium)








RECENT EXPERIENCE IN ENERGY-EFFICIENT DESIGN

With technological advances in the 1950s and 1960s when compact heating and air-conditioning equipment was developed, a high degree of comfort in buildings was achievable even in adverse climates. But as a result, the wisdom of designing with climate was too often ignored. If in a hot climate, one would use more air conditioning. If a cold climate, one would just call for an oversized heating system. The design of the building itself could be the same, it seemed, whether placed in the arid desert or the snow-bound mountain. With the energy emergencies and shortages of the 1970's, the liabilities and hidden costs of our over reliance upon high energy use to create comfort in buildings became apparent, thus making climatic design and energy efficiency important once again.

[Watson, Labs, 1983:3]

[Gibberd, 2000:SBAT]

LeCorbusier – 20th century

1.1 OCCUPANT COMFORT:

The quality of environments in and around buildings has been shown to have a direct impact on health, happiness and productivity of people. Healthier, happier, more effective people contribute to sustainability by being more efficient and therefore reducing resource consumption and waste. However, the quality of this environment needs to be achieved with minimal cost to the environment. [Gibberd, 2000:SBAT]

1.1.1 LIGHTING AND SOLAR QUALITIES:

Definition: Light is an electromagnetic energy radiation within the spectrum between ultraviolet and infrared radiations. Light causes a sensation perceived by the eye which is interpreted by the brain as vision. (The eye sees best in natural sunlight). [Holm, 1996:6]

One must be bathed in light on entering the building. The sun's presence will be most pronounced in the atrium spaces, where skylights and louvers will harness the sun. Innovations in the use of natural light and playful presentations of it will be a main feature of and consideration in the building. Sunlight will almost bounce around the interior.

The northern glass façade of the building will be protected from the sun's rays by means of computer controlled louvers, while the western and eastern facades will be fitted with angled fabric sails and fixed louvers. West façade louvers will allow natural light into the building.

Light will filter into the atrium spaces through at the north, south and east ends, and gaps between the roof and northern walls will allow the sun to play across interior surfaces.

By passing through different layers and types of materials, (opaque, transparent or semi-reflective, double-glazed, simple metal screens punctured with holes, and spaces alternating between light and shadow) light will be transformed in numerous ways. The use of different materials and textures will be reflected throughout the façade and interior of the building. Energy-efficient fluorescent strips provide good artificial lighting for in the interior. Natural light will enter the building in different ways and not only through the atrium spaces.

The challenge concerning natural lighting will be to design a building that will invite natural light and fill spaces with daylight, but at the same time, withstand the hot summer climate. Despite north and south walls that will be nearly 100% glazed, and roofs filled with skylights, systems should be provided that will bring the building within a lighting budget half that of other buildings.

The most important purpose of the atrium, however, is to bring daylight down to all levels, using a daylight system at its top. Skylights will house computer-controlled mirrors that will track the angle of the sun; their tilt angles will then adjust to reflect light in a vertical direction.

The two main glass entrances will form a transparent and friendly focal point that will offer natural light and aid circulation and orientation. An equatorial window with an area equal to 19,2% of the floor area is effective for the entire period when overheating occurs. Openings for solar gain should be orientated towards the winter sun and screened in summer when solar control is necessary, to prevent overheating. [Holm, 1996:66]

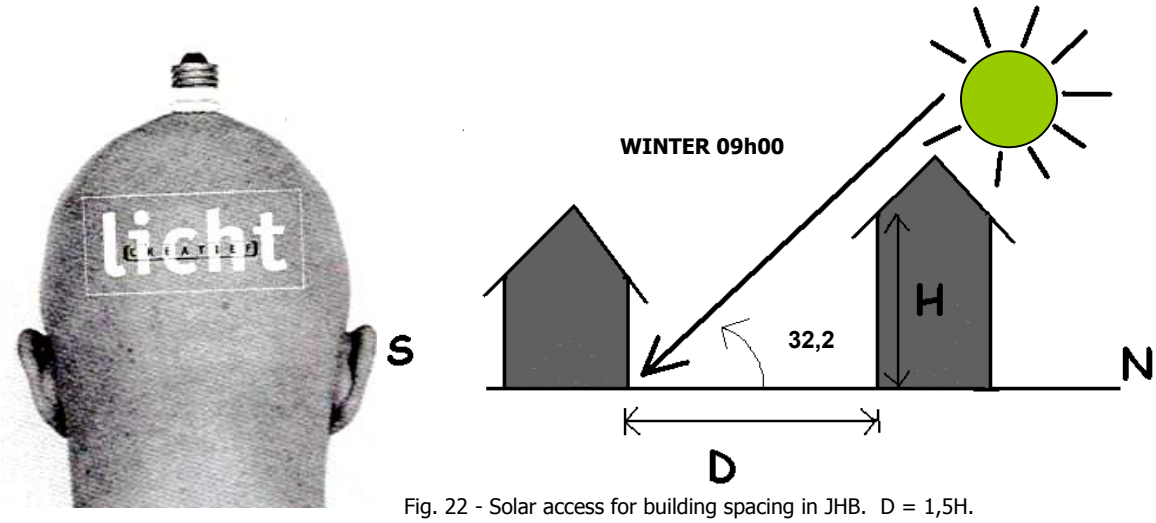


Fig. 22 - Solar access for building spacing in JHB. D = 1,5H.

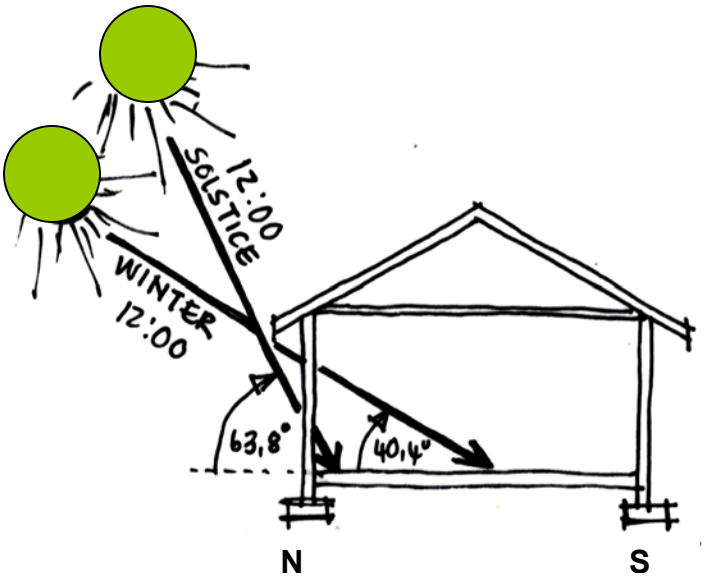


Fig. 23 - Roof overhang, window height and positioning for Johannesburg.

The following variables affect human comfort: [Holm, 1996:64]

- Temperature – the comfort range is defined from 16 – 23 grade Celsius with the optimum temperature being 21 to 22 for seated persons exposed to air movement of 1m/s.
- Humidity - the desirable relative humidity range lies between 30 – 65%. Johannesburg's average monthly relative humidity level is 56,05%. The humidity level is moderate and not considered problematic. Humidity levels are low in the winter,
- Air movement
- Radiation – for ex. a person seated at a window may sit in the sun and will hotter than colleagues in the shade.

- Type of clothing worn – encourage clothing to be comfortable for eg. no ties in winter and big jackets in winter (save 20% of energy bills)
- Acclimatisation
- Age
- Body type
- State of health
- Metabolic rate

[Holm, 1996:5]

Thermal efficient buildings provide the desired comfort zone and promote productivity, health and mental/physical energy.

- Allow maximum natural light to penetrate the building.
- Establish type of lighting after deciding which activities are going to take place.
- The light source will influence the overall effect.
- Compact Fluorescent Lights (CFL) – (tiny tubes folded into a compact shape).
  - energy saving
  - operate at lower temperatures
  - last a long time
  - can be used indoors/out
- Avoid glare.
- Contrast of light and shade are a special effect.
- Revealing textures.
- Large glass areas will provide:
  - healthy psychological reaction associated with the sense of openness and freedom.

- Control penetration
- Block the direct rays of the sun before they can pass through glazed areas.
- Use special sun control devices (fixed or movable).

Entrance/atrium:

- Fully illuminated by the natural light that pours flashes of colour and the combination of textures present come out as one moves into the building.
- The large glass wall will link the elements, textured materials, light and textured walls.
- The light, air and breathing space of the building must overwhelm you when entering.
- Form a transparent and friendly focal point by using glass that offers natural light and aids circulation and orientation.

Design the building to make optimal use of day lighting:

- Orientation, space organization and geometry of spaces to be lit.
- Location, form and dimensions of openings.
- Location and surface properties of internal partitions which reflect daylight.
- Location and form of devices controlling light quantities and solar control.
- Light and thermal characteristics of glazing materials.

[Holm, 1996:6]

Glazing in windows, doors and skylights is the source of the greatest heat loss in winter and at night and the greatest solar heat gain. Glazed areas need to be designed to eliminate solar radiation in summer and capture it in winter to ensure superior thermal performance of a building. Direct and diffuse solar radiation is transmitted through glass. Shading of windows only stops direct sun- rays. Heat gain is possible during daylight whereas heat is loss at night. [Holm, 1996:12]

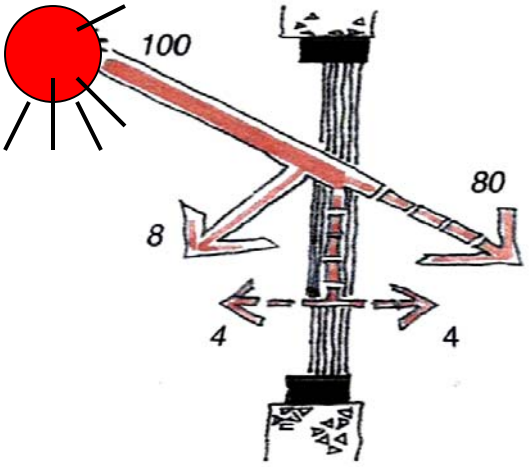


Fig. 24 – **Transmission of heat through clear glass.** 4mm clear float glass with 0,02% Fe2O3 admits 84% of solar energy.

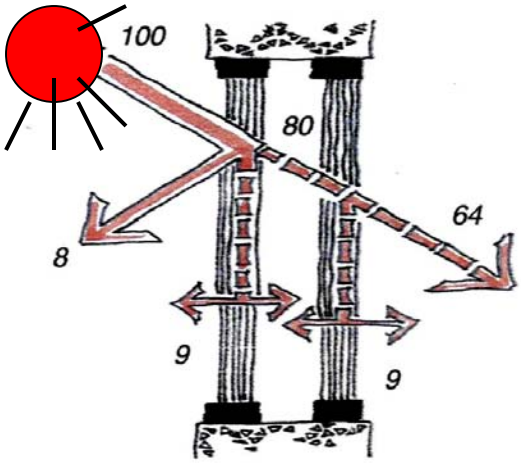


Fig. 25 – **Transmission of heat through double glazing.** Double glazing is not a strategy to stop penetration of sunlight.

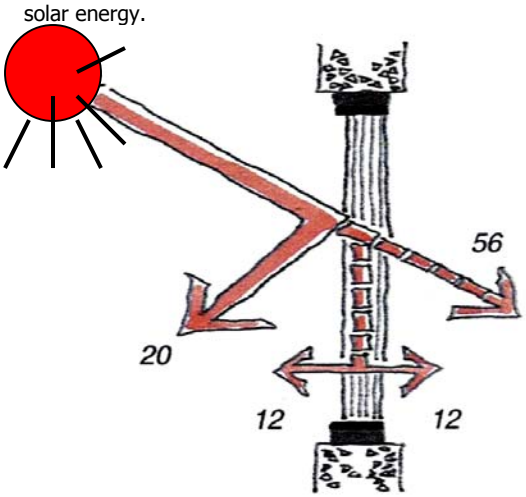


Fig. 26 – **Transmission of heat through reflective glass.** Note the increased temperature of the glass panes.

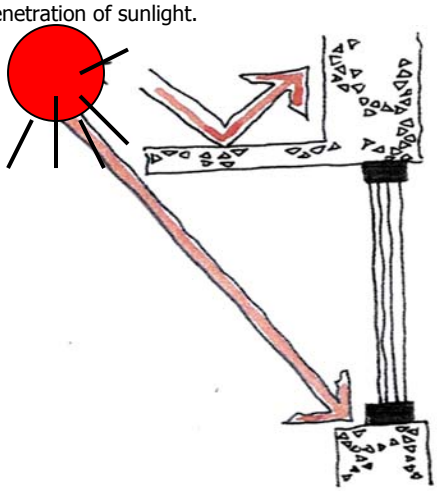


Fig. 27 – **Design of external solar control devices according to vertical sun angles.** Watch sight lines.

Since glass is transparent, solar radiation is transmitted through it. Glass also reflects and absorbs radiation which it reradiates to both inside and outside. Glazed areas create a greenhouse effect by allowing direct radiation (short wave) to be transmitted through it, but not to return. The direct radiation converts to heat when it strikes objects and is reradiated as heat (long wave radiation), this heat is captured. [Holm, Viljoen, 1996:12]

External shading, generally in the form of overhangs, fins or external louvers, is the most effective means of reducing radiant heat gains through glass. This is because solar heat is prevented from reaching the glass and entering the building. [Holm, Viljoen, 1996:12]

The benefits of external shading are maximized if these few guidelines are observed:

- east and west facades should be as small as possible
- the use of glass on east and west facades should be minimized

- glass heights should be kept to a reasonable minimum to enable maximum protection from overhangs; and
- building layout and orientation should be arranged such that the major facades are north or south facing.

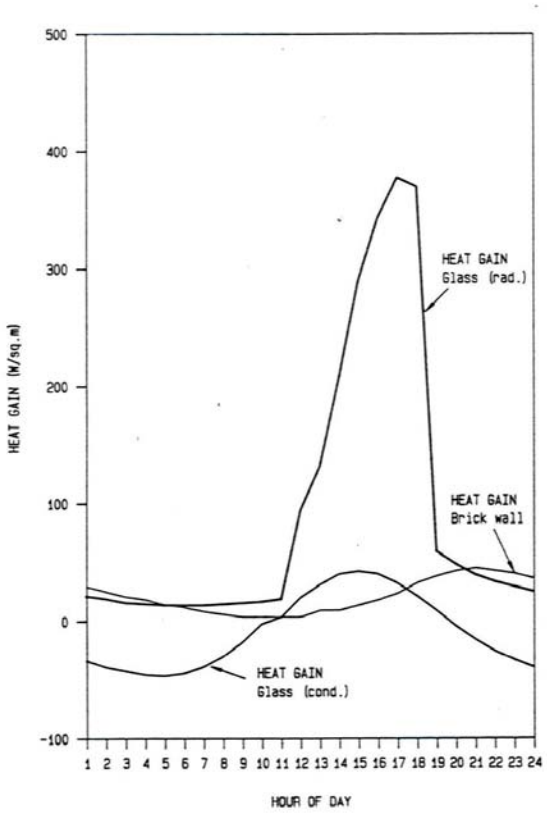
[Holm, Viljoen, 1996:12-13]

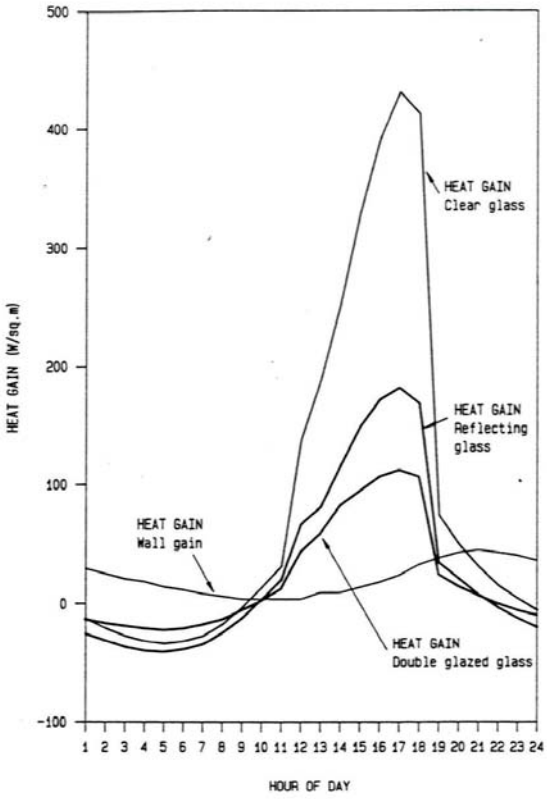
The parameters pertaining to the incorporation of overhangs or fins in façade design which might be considered important architecturally are identified as follows:

- minimum overhang or fin length;
- corresponding vertical or horizontal shadow angle.

CONCLUSION:

Large glass areas mean large heat gains or losses to or from any building. Solar controlling glass, while effective in reducing direct and diffuse radiant heat gains, allows large conductive heat gains in summer and large conductive heat losses in winter. Double glazing systems are effective in substantially reducing both radiant and conductive heat gains, but they are expensive. External shading is a simple and effective means of reducing solar heat gains and can be a cost effective means of controlling heat gains if it is handled appropriately. Façade design is the crux of energy efficient building design. [Raats, 2002:38]





A rough guide, for continuous lighting during exhibition (museum) hours do not exceed:

- 50 lux on sensitive items (textiles etc.)
- 150 – 250 lux on most other classes of items.

Exhibition lighting is crucial to the success of the exhibition spaces. Visitors expect to be able to see exhibits clearly and study them in detail, the atmosphere of the exhibition to feel "right", to enjoy their visit, and to feel that they are seeing the "real thing". Staff have equally high expectations – that the lighting dosage for exhibits will be within safe limits, maintenance and running costs will be kept to a minimum, and that equipment and controls will be adaptable/flexible, reliable and easy to use.

Ascertain whether natural light is required to feature in the design of exhibit areas and determine a basic lighting strategy:

- Full natural lighting of exhibits, supplemented by artificial light below specified level of illumination.
- Background natural lighting of space and exhibits, plus highlighting of exhibits with artificial light.

- Ambient natural light, plus artificial lighting of exhibits.
- Top-lit or side-lit spaces.
- Artificial lighting – diffuse, directional or combination – of space and exhibits.
- Electronic mechanical or manual controls of natural and artificial lighting, independently or interactively.

The quality of light is very important: level, dynamics, colour rendering and absolute colour, direct and indirect glare, and shadows must all be considered and controlled. Great care must be taken in devising natural lighting systems, in choosing luminaries and lenses, and in deciding their position. Methods of eliminating UV light include:

- Absorbent paints for light wells (indirect natural lighting).
- Absorbent film applied to the interior of the glazing.
- Plastic film sandwiched in the glazing and on glazed display case tops.
- Glazing with 6mm VE Perspex of equivalent rigid filter.
- Plastic sleeve on fluorescent tubes.
- Glass filter on tungsten – halogen lamps.
- Use of non-UV-radiating lamps and fittings – stand bulbs and spots, fibre-optics, etc.

Surface heating effects on exhibits and the raising of air temperature inside display cases/exhibit areas caused by lighting must also be avoided. Method of reducing infra-red radiation and air heating include:

- Use of cool sources – fluorescent lamps, fibre-optics.
- Use of reflectors on tungsten-halogen lamps.
- Removal of heat-generating gear (transformers, fibre-optic lamp box, etc.) from danger areas.
- Extraction of lamp-heated air via luminaries.

By establishing of lighting requirements, consider:

- What visual tasks must be provided for.
- The shape of each space in relation to sizes and positions of windows, light wells, etc.
- Lighting levels required for general and task/exhibit illumination.
- Natural lighting – orientation, and shape and sizes of glazed areas to avoid glare, uneven light, direct sunlight in exhibit, storage and sensitive work areas, reflections, and unwanted solar gain and heat loss.
- Artificial lighting – appropriate system, e.g. general (luminous ceiling, indirect, direct diffused), localized, task or combination; intensity, quality of light (glare, excessive contrasts, colour), efficiency, length of life, initial and on-going costs.
- Type of lamps and luminaries; also location and arrangement.
- Elimination of ultraviolet light in all exhibit, storage and sensitive work areas.
- Flexibility, e.g. individually controlled task lighting versus general lighting; alternatively, track with movable fittings of modular luminaries in suspended ceiling.
- Veiling reflections (bright reflections in the task area) – particular care must be taken with visual display unit screens; lighting for these will require special consideration (an indirect lighting system).
- Emergency lighting requirements – generator or batteries; automatic change-over device; separate circuit to light strategic routes and exits.
- Access to luminaries for maintenance and cleaning.
- Controls and switching patterns – control from central point, time control, etc.; also individual switches for rows of light in storage areas; special switch for groups of lights for cleaners or other users.

[Matthews, 1991:80-81]

Natural day lighting-design should include:

- window size
- room depth
- internal colours
- orientation
- solar control

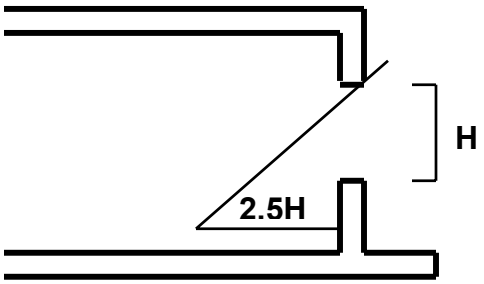


Fig. 30 – Rule of thumb.

For all normal environments, adequate light should fall not merely on the horizontal working plane, but also on walls and ceiling; or the room will look gloomy. Light-coloured room surfaces make it very much easier to achieve good light distribution than dark-coloured surfaces.

Rule of thumb:
[Tutt, Adler, 1998:412]

Light-coloured room surfaces (including the floor); side windows, rooflights and electric light fittings of high B2 number (downward light distribution tends to be dispersed) will aid the achievement of good scalar illumination in most ordinary rooms.

Overhead light fittings are less likely to cause glare to occupants than more distant fittings; glare is therefore more likely in long rooms. There should be a dominant direction of lighting inside the building (windows/rooflights/electrical fittings etc.) rather than completely diffused light. A generally well-liked angle of lighting is downward and from the side, at an angle of 15 – 45 degrees to the horizontal plane.
[Tutt, Adler, 1998:416-417]

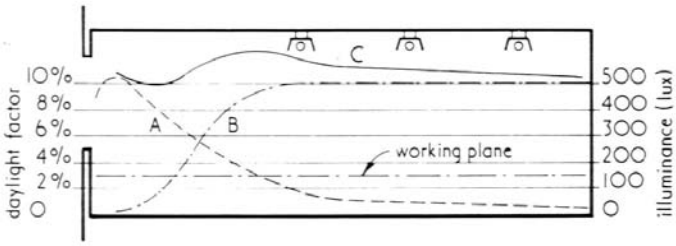


Fig. 31 – The PSALI principle. Daylight near the window, and artificial light deeper in the room, combine during daylight hours.

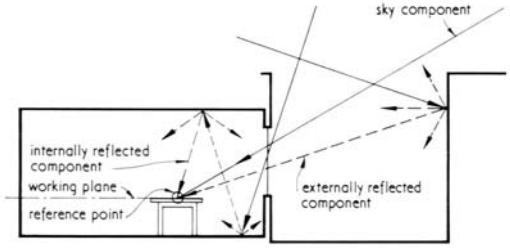


Fig. 32 – Daylight reaches indoor working plane in three ways: 'daylight factor' calculation takes account of all three.

RULE OF THUMB:
Risk of glare is increased with:

- Long rooms
- Low ceilings in large rooms
- Dark decorations
- Lack of diffusers or louvers on light sources
- Electric light fittings with high B2 values. [Tutt, Adler, 1998:418]

Large rooflights can cause great problems of solar heat gain summer and of heat loss in winter. In proposed buildings, sides facing due south, or in any direction east or west of south, should have all points 2m above ground level accessible to sunlight for 3 hours on March 1. Sunlight is only counted if the sun is 10 degrees or more above the horizon, but sunlight at a bearing of less than 22,5 degrees to the side of the building is not excluded. [Tutt, Adler, 1998:421]

AREA OF GLAZING REQUIRED TO GIVE A CERTAIN MINIMUM DAYLIGHT FACTOR:

Estimated by the following formula:
P = 10 x D
P = area of glazing as % of floor area
D = minimum daylight factor

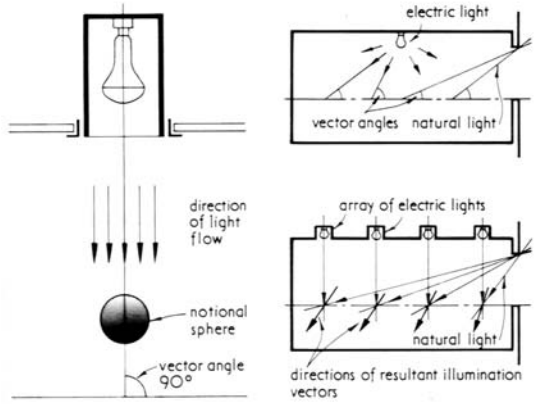


Fig. 33 – Direction of illumination vector under a downlighter will be virtually vertical; most people will find this unpleasant. A single overhead light fitting, in the middle of the room, gives good modeling (provided it emits light sideways as well as downwards). Daylight through side window also gives a satisfactory vector angle of about 45 degrees; and the combination of overhead electric lights plus side windows gives excellent modeling qualities to light.

Sufficient escape lighting should also be provided:

- to indicate escape routes in the building
- to allow safe movement towards the exits
- to illuminate fire alarm call points and firefighting equipment.

All exits and escape routes in places of public assembly must be clearly identified by signs reading "EXIT" (see BS 5266 and BS 2560). In a darkened auditorium, an illuminance of 0,02 lux is accepted, provided another 0,18 lux is added from a non-maintained system when the mains fail, to bring the illuminance up to 0,2 lux.

Fluorescent tubes consist of a glass tube filled with mercury vapour at low pressure, through which an electric arc is struck. Maximum efficacy produces the "high-efficacy" class of fluorescent lamps, giving 50 to 80 lumens of light output per watt of electricity, but providing less than ideal colour rendering. Good colour produces the "de luxe" class of fluorescent lamps, giving only 30 – 55 lumens per watt.

[Tutt, Adler, 1998:430]

The three kinds of "high-efficacy" tubes can be used to create different atmospheres: [Tutt, Adler, 1998:430]

- Daylight (the coolest colour) – reading rooms
- White (intermediate) – combined, atriums
- Warm white (the warmest) – restaurants

Situation	Standard service illuminance (lux)		are index	appearance of lamps	letters of suitable lamps (See table 2)	es
Corridors, passageways	100 scalar	1,2m above floor	22	Intermediate or warm	CDEFHIJLMQ	Solar illuminance not less than 120 lux if there is no daylight
Lifts (passenger)	150	Floor	-	Ditto	CDEFHIJ	
Stairs	150	Treads	-	Ditto	CDEFHIJLMQ	Limit glare
External covered	30	Ground	-	Ditto	CHIKLMNPQ	Illuminance should be compatible with adjacent lit areas
Entrances and exits	30	Ground	-	Intermediate or warm	CHIKLMNPQ	
Restaurants	200	Tables	22	Ditto	DEFHIJQ	Arrange switching to allow variation of all illuminance
Stores and stock rooms	150	Vertical plane	-	Intermediate or warm	CHIKLQ	
Car park - underground	30	Floor	22	Intermediate or warm	CHILMN	Vertical obstructions should be lit to a higher illuminance than floor
Libraries – reading rooms	300	Desks	19	Intermediate or warm	CDEFHIKL	Low noise level required
Offices - general	500	Desks	19	Ditto	CDEFHIKL	Minimise desktop reflections by suitable luminaire location
Conference rooms - office	750	Tables	16	Ditto	DEFJQ	Consider variation of illuminance to suit different functions
Computer rooms	500	Working plane	19	Intermediate or warm	DEFHIKL	Avoid specular reflections in consoles
Shops	500	Display – vertical and horizontal	19	Cool, intermediate or warm	ADEFGHIKLPQ	Local or localized lighting needed to emphasise displays

Fig. 34 – Recommended illuminances, limiting glare indexes, and lamp colours for specific situations.

Glass is one of the most versatile materials in extensive use throughout the building industry. Perhaps the most visible glass developments have been featured on security, and the importance of solar and acoustic control. Tremendous advances have been made in glass technology to meet the requirements needed to overcome the specific difficulties that these aspects provide.

Laminated glass can be designed to withstand bullets and bomb blasts by using multiple laminates of glass and thicker interlayers. Glass has long surpassed other materials in the role of solar control.

The thermal zoning of the building is a very important energy conservation strategy to take into account. The utilization of solar gain to heat areas in winter (when placing offices etc. relative to the path of the winter sun), will minimize the need for active heating. Thus, the offices and meeting rooms should take first preference.

The storeroom, toilets, equipment room, delivery lifts and passages will be placed on the west side of the building. Spaces like these will serve as buffer zones between hot summer afternoon sun, and the occupied zones. During winter, these zones will act as buffers for outward heat conduction.

The optimum orientation will be the façade that receives a combination of the most radiation during winter and the least during summer. The building is orientated so that openings are predominantly facing north and south. Openings in the west walls are minimized. The optimum orientation for solar windows and solar collectors is north.

The direct component of solar radiation is best controlled by the use of external shading devices. The general principle of the design of the shading devices will be to intercept the solar radiation before it enters the building during summer periods. In winter, the devices must allow the winter sun into the building.

NORTH-FACING WINDOWS:

- horizontal overhangs extending beyond the window width will be sufficient or vertical fins should be employed

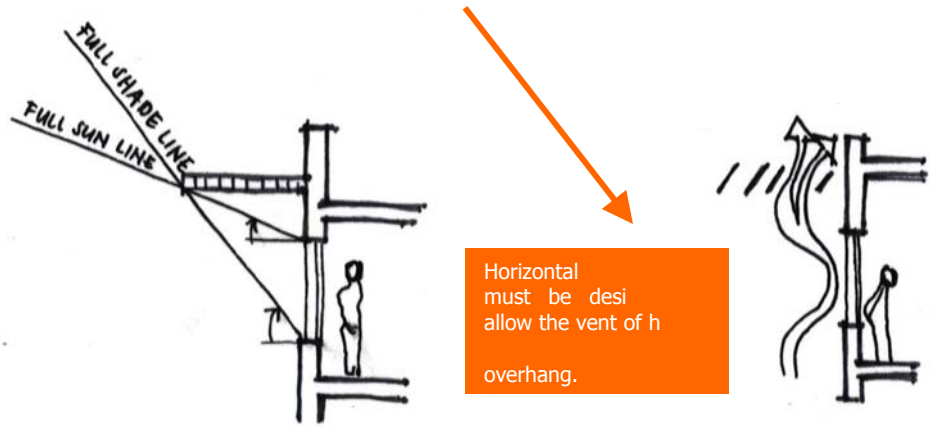


Fig. 35 – Horizontal overhangs and louvers – northern façade.

It is proposed that the lighting for the offices be ceiling mounted low brightness luminaries and allowance for indirect lighting systems in the more social areas. For parking bays a level of 80 lux will be sufficient, elevator lobbies 200 lux and entrances 100 lux. The lighting of the entrances/exits will provide a transition zone to avoid sudden changes in illuminance between inside and outside the building and basement.

Luminaires will be open tube twin fluorescent of 1200 and 1500mm length. For general areas, the luminaries will be evenly spaced, ceiling mounted on a grid pattern. Sensors that control room lighting according to occupancy should be provided.

Lighting will be controlled from a distribution board on each floor, with the facility to switch off all the lights on the floor. A central control panel in the security control room will allow the various floor lighting to be switched off in zones. Entrance/exit lighting will stay on continuously for security reasons. Dimming of incandescent lighting in meeting/conference rooms and restaurants will be allowed.

Productivity is adversely affected by discomfort. It has been established that work efficiency can drop up to 40% with an increase in dry bulb temperature from 28 - 34 degrees Celsius. However, optimum performance conditions do not coincide with those for optimum comfort. Cooler than optimum promotes mental activity and warmer, physical activity. Optimum conditions promote sleep and relaxation.

Light provides visual comfort or causes discomfort. Glare and high contrast in lighting levels promote

discomfort and cause a blinding effect. This can be alleviated by more even distribution of light (use of diffused light).

Light is an electromagnetic energy radiation within the spectrum between ultraviolet and infrared radiations. Light causes a sensation perceived by the eye which is interpreted by the brain as vision. The eye sees best in natural sunlight.

Critical measurements related to dimension of openings are the area (e.g. 20% of the floor area), the height of the opening and the position of the opening in the wall. Roof overhang plays an important role in window positioning.

- location and surface properties of internal partitions which reflect daylight –
  - dark interior surfaces absorb light and do not reflect it deeper into the spaces
  - reflective roof surfaces adjacent to roof monitors will aid light distribution
- location and form of devices controlling light quantities and solar control –
  - solar control devices are designed according to sun angles and usually allow winter sun to penetrate the building, but screen summer sun to prevent overheating
  - solar control devices reduces the amount of natural daylight entering the building
  - they may absorb light depending on the materials used
  - solar control devices can be designed to reflect light into the building, for example, light shelves
- light and thermal characteristics of glazing materials
  - different glazing types exhibit different light transmission and thermal characteristics
  - clear glass transmits about 80% of light while some heat resistant glass transmits 50% and reflects approximately 40%
  - glass that transmits much daylight also admits much heat, so solar gain is high
  - reflective glass reduces heat gain and day lighting levels [Holm, 1996:6-7]

MINIMUM STANDARDS:
The National Building Regulations (SABS 0400) specifies minimum requirements for the areas of openings that provide natural day lighting.

The minimum area of openings should be 10% of the floor area of a room served by the opening or 0,2m2 whichever is the larger. The regulation also gives minimum standards for distances between openings and outdoor obstructions.

DESIGN FOR SUPERIOR/SATISFACTORY DAY LIGHTING:
One of the greatest problems with natural day lighting is the prevention of glare. Glare can be prevented by devices which diffuse light. This can be achieved in the following manners:

- light shelves allow reflected light to enter, but reduce the area where daylight can enter
- reflective indoor colours reflect light into darker interiors
- skylights, roof monitors and atriums allow light to enter from above; this can be exploited where rooms are deep or where they don not border on a façade; in atriums the glare may need to be controlled by shading because direct light reflected off walls of atrium may cause glare
- reflective blinds or solar control devices (shading) reduce glare
- glare is also avoided by creating an artificial sky; this simulates overcast sky conditions, i.e. diffused light; it can be created by using direct daylight or artificial lighting
- mirrored walls give multiple reflections which create the illusion of an infinite horizon

[Holm, 1996:7]

"The sun, usually man's friend, becomes his implacable enemy in certain latitudes at the height of the summer. Therefore some device enabling the sun to have its full effect in winter and checking it in the dog-days of summer was indispensable."

Le Corbusier in the 20th century

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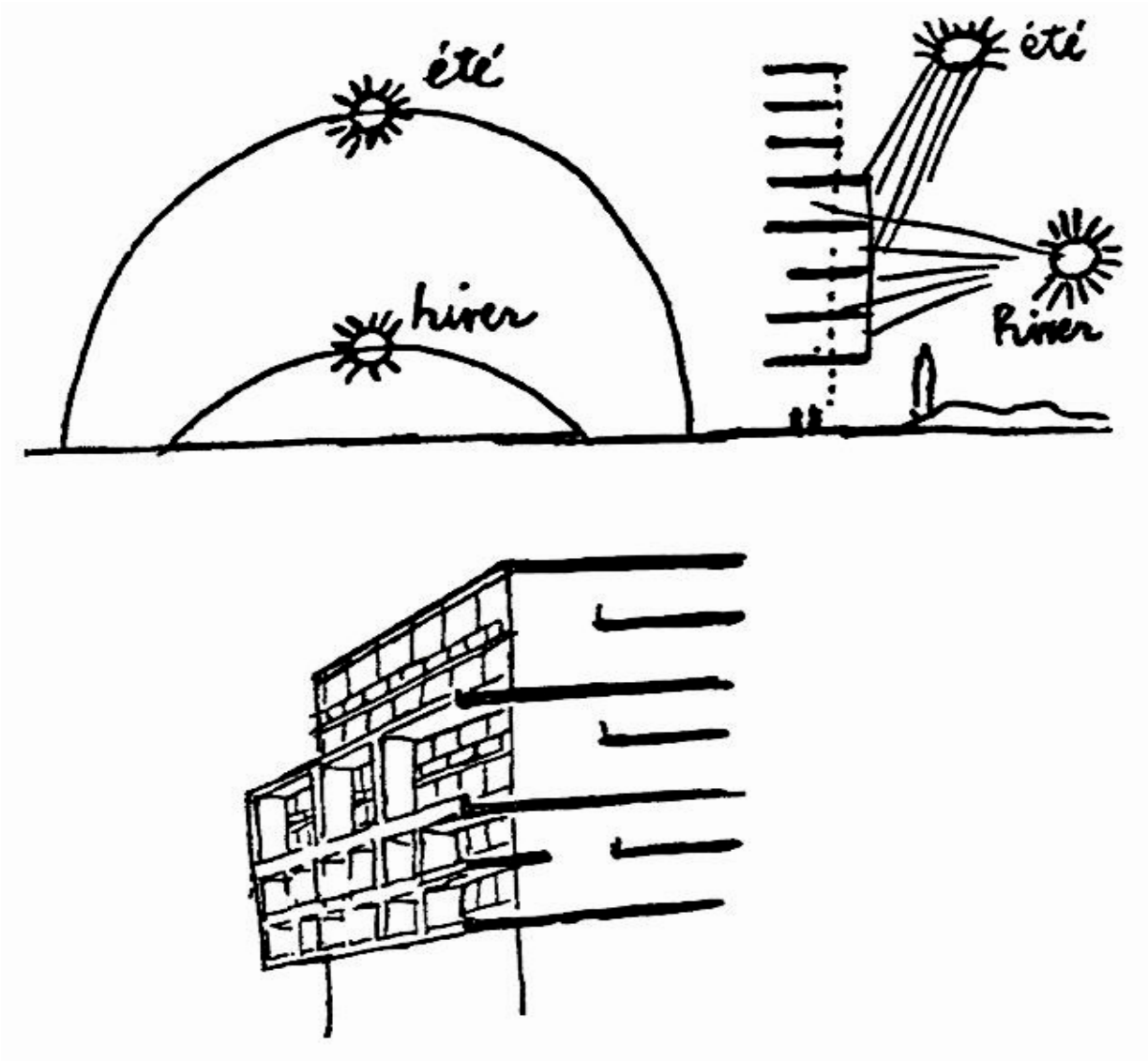


LeCorbusier – 20th century

ADEQUATE CLEAN AIR SUPPLY TO 'BREATHING ZONE' OF EACH INHABITANT. SUPPLY TAKEN FROM UNPOLLUTED SOURCE. ADEQUATE CLEAN AIR SUPPLY TO 'BREATHING ZONE' OF EACH INHABITANT. SUPPLY TAKEN FROM UNPOLLUTED SOURCE. ADEQUATE CLEAN AIR SUPPLY TO 'BR ZONE' OF EACH INHABITANT. AKEN FROM UNPOLLUTE CLEAN AIR SUPPLY TA SOURCE. ADEQUATE BREATHING ZONE' OF E PLY TAKEN FROM UNP ADEQUATE CLEAN AIR SU ING ZONE' OF EACH INHABITAN PLY TAKEN FROM NPOLLUTED SOURCE. ADEQUATE CLEAN AIR SUPPLY TO 'BREATHING ZONE' OF EACH INHABITANT. SUPPLY TAKEN FROM UNPOLLUTED SOURCE. ADEQUATE CLEAN AIR SUPPLY TO 'BREATHING ZONE' OF EACH INHABITANT. SUPPLY TAKEN FROM UNPOLLUTED SOURCE. ADEQUATE CLEAN AIR SUPPLY TO 'BREATHING ZONE' OF EACH INHABITANT. SUPPLY TAKEN FROM UNPOLLUTED SOURCE. ADEQUATE CLEAN AIR SUPPLY TO 'BREATHING ZONE' OF EACH

Ventilation

[Gibberd, 2000:SBAT]

1.1.2 VENTILATION:

Ventilation comes from the Latin word, ventus, and means the movement of air.

Ventilation serves three ends in the environmental control of buildings: it is used

- to satisfy the fresh air requirements of the occupants ("health ventilation")
- to increase the rate of evaporative and sensible heat loss from the body ("comfort ventilation")
- to cool the building interior by exchanging warm indoor air to cooler outdoor air ("structural ventilation")

Air is made to move by differences in density and differences in pressure. When a mass of air is heated, as in a fireplace, it expands and, becoming less dense, rises. Conversely, a cold mass of air, as in a draft falling along a cold window, seeks it lowest level, thereby displacing surrounding warmer air upward. Under such conditions, we say that the air is driven by thermal force, thermal buoyancy, or buoyant draft. Then thermal force discharges air form a building, the action is referred to as the chimney effect, or stack effect. [Watson, Labs, 1983:53]

The building envelope separates the indoor and outdoor environment. In winter, ventilation and infiltration should be limited to prevent heat loss. Infiltration often occurs at construction joints. In summer, the building will be cooled by the removal of heat by convection. The air movement will be especially desirable for occupant comfort. Air movement through the building depends on the differences in air pressure. Cross ventilation will be induced by placing the openings on opposite sides of the spaces. The velocity of wind distribution is uneven. The required changes in air will be achieved through passive systems as:

- **cross ventilation**
- **stack effect (atriums)**

Cool air will enter the spaces through operable windows. Warm air will rise and enter the atrium. The warm air will escape through the openings at the top. It is very important to provide openable windows otherwise the building will be stuck with unwanted warm air. Controllable louvers will minimize solar gain during summer temperatures. The openings can be closed during winter temperatures to keep warm air inside the building.

Six extractor fans on top of the roof, above columns, will remove hot air, dust and fumes. It is waterproof and will make the interior space of the building a healthier and more productive environment. They require no maintenance and are adjustable to the pitch of the roof and will be closed during winter, by means of a damper which will be operated form floor level, so that there is no heat loss during winter time. It is a wind driven ventilator and will improve ventilation in the building. A small (standard 350mm) model extractor fan will work over an area of 50m. Internal air temperatures may be reduced by 3 – 5 degrees Celsius.

A stack effect will be achieved by artificial air movement. Air velocity of 1m/s and 1,5m/s give a cooling effect of 5K and 6,5K respectively. [Holm, 1996:12]

In Johannesburg, the night time dry bulb temperature will be below 20 degrees Celsius for a maximum of 11 hours and a minimum of 5 hours during summer months. During these periods the building will be structurally cooled by using ventilation fans to cool the high mass walls and floors that heat up during the day. During this period will mechanical fans and extractor fans be operating. The sufficient temperature will have been reached when entering the building the next morning. The cooling fans will be switched off during the day to save cost and to minimize energy use. Night ventilation will be implemented to compensate for insufficient mass.

Air for ventilation will enter the spaces (offices, shops etc.) through grills in the floor. Each grill can be individually opened or closed to suit specific needs. Separate fresh air, which will be introduced through the access floor, will provide a high degree of air quality to the building.

A large "gabion wall" in the atrium will have a cooling effect on the building as well. (To be further discussed).

The main features of the ventilation-system-policy are:

- flexibility
- adaptability
- choice

The whole ventilation/heating system will make provision for tenants to select from different systems/options. To minimize the loss of floor space in the basement for ventilation/heating equipment, and to create an open environment free of visual and structural obstacle will be achieved by integrating the ventilation rooms with the roof structure of the basement.

Natural ventilation will be combined with direct evaporative cooling where air will be drawn over a gabion wall inside the atrium. It is important to notice that the openings orientated directly towards the ruling wind direction will receive greater air speed than openings oblique to the direction of the wind. No air will flow into the building through openings situated parallel to the direction of the wind.

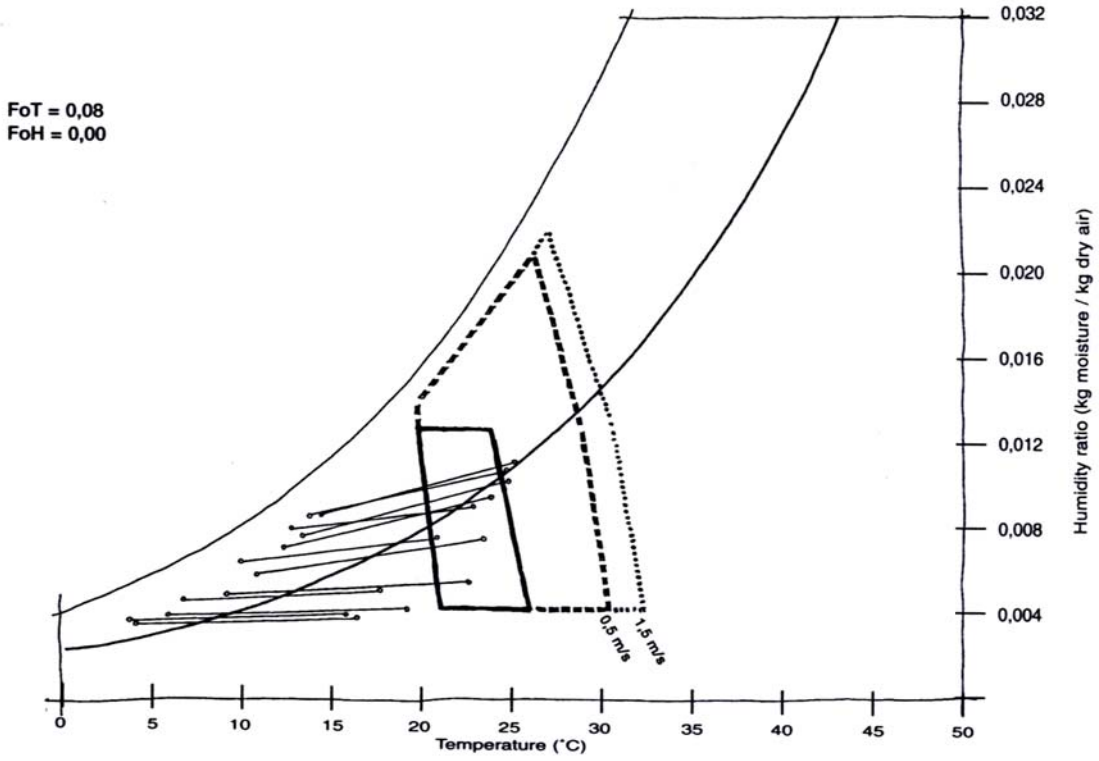


Fig. 36 – Psychrometric chart with ventilation. A minimum requirement is 28,6% of the effect of 1m/s required to deal with the worst case in summer condition.

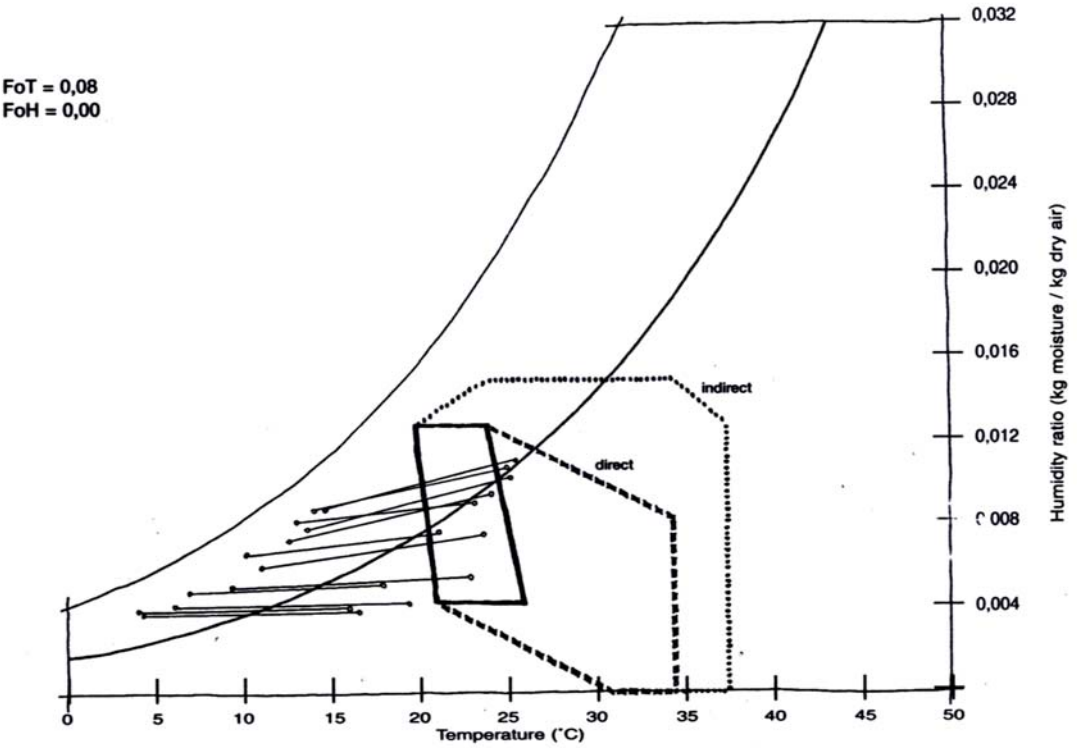
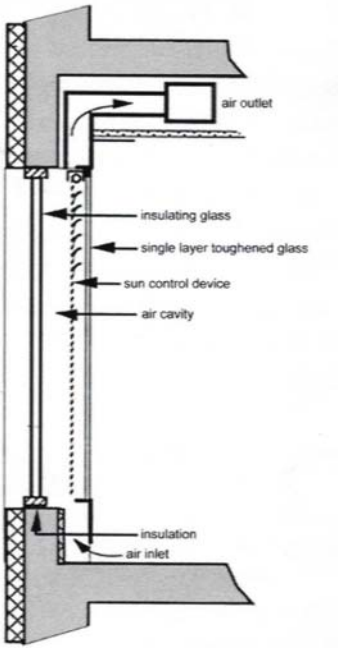


Fig. 37– Psychrometric chart with evaporative cooling. 12,0% of direct evaporative cooling is effective.

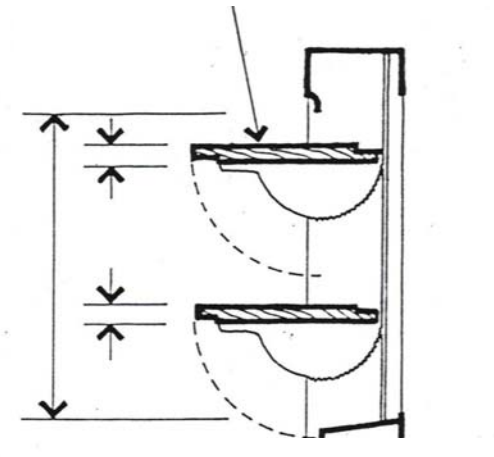


The air cavity is ventilated mechanically. Lower pressure inside the cavity draws part of the exhaust air from the room into this cavity. This is where the air warms up, taking most of the heat from the solar control device, and is then drawn off by means of mechanical ventilation. Although it is possible in principle to choose the direction of the flow either up or downwards, it is better and more 'natural' to create an upward flow. The advantages of these ventilated cavity walls are multiple:

- the main advantages lies in the minimalisation of the temperature differences between the air in the room and the surface of the glass wall
- this improves the thermal comfort conditions in the office space nearer to the wall, and thus reduces energy costs for heating in the winter and cooling in the summer
- it also improves the efficiency of floor use, because working close to the wall is more comfortable
- the heat insulation properties are much better than that of a normal, double-glazing façade, because of the extra insulating properties of the ventilated cavity
- the noise reduction is also better than normal
- a heat exchanger can be used to reclaim energy from the exhaust air
- the ventilated cavity is one of the few feasible possibilities of using a fully-glazed wall [Hope, 2001:23]

Fig. 38 – Air cavity method – a system to enhance the properties of glass.

Any barrier or partition located in the internal air flow path between ventilating inlets and outlets will impede air circulation and the ventilation of the interior. In order to promote unrestricted air movement, therefore, partitioning should be adjustable and located so as to offer least resistance to airflow when it is desired for natural ventilation cooling. The open partitionless interior is the surest way of achieving good air movement.



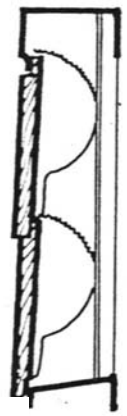
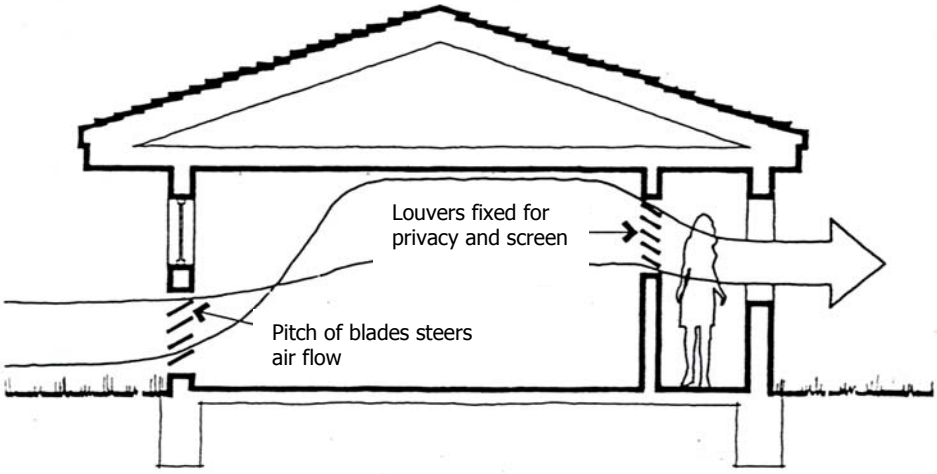
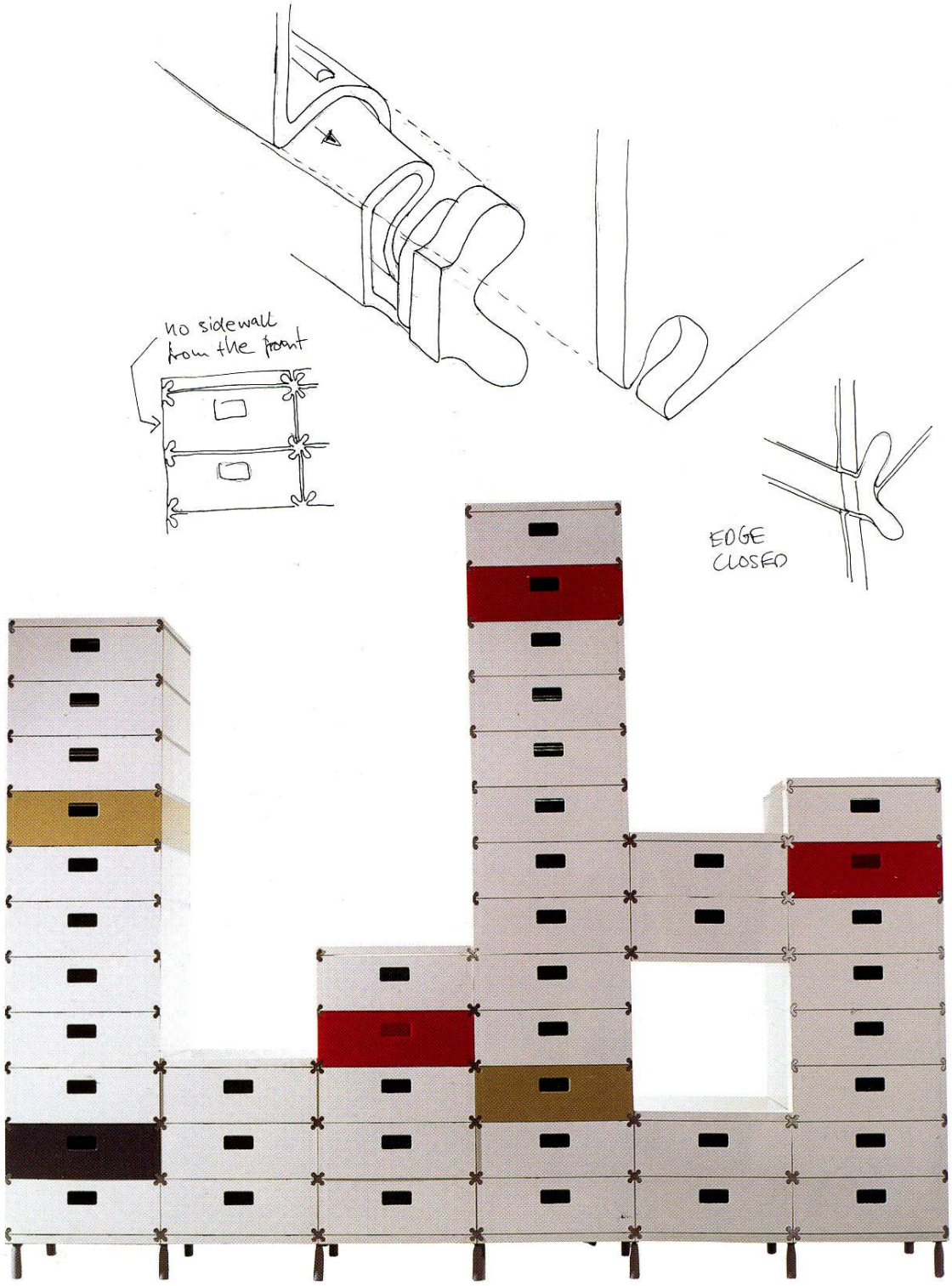


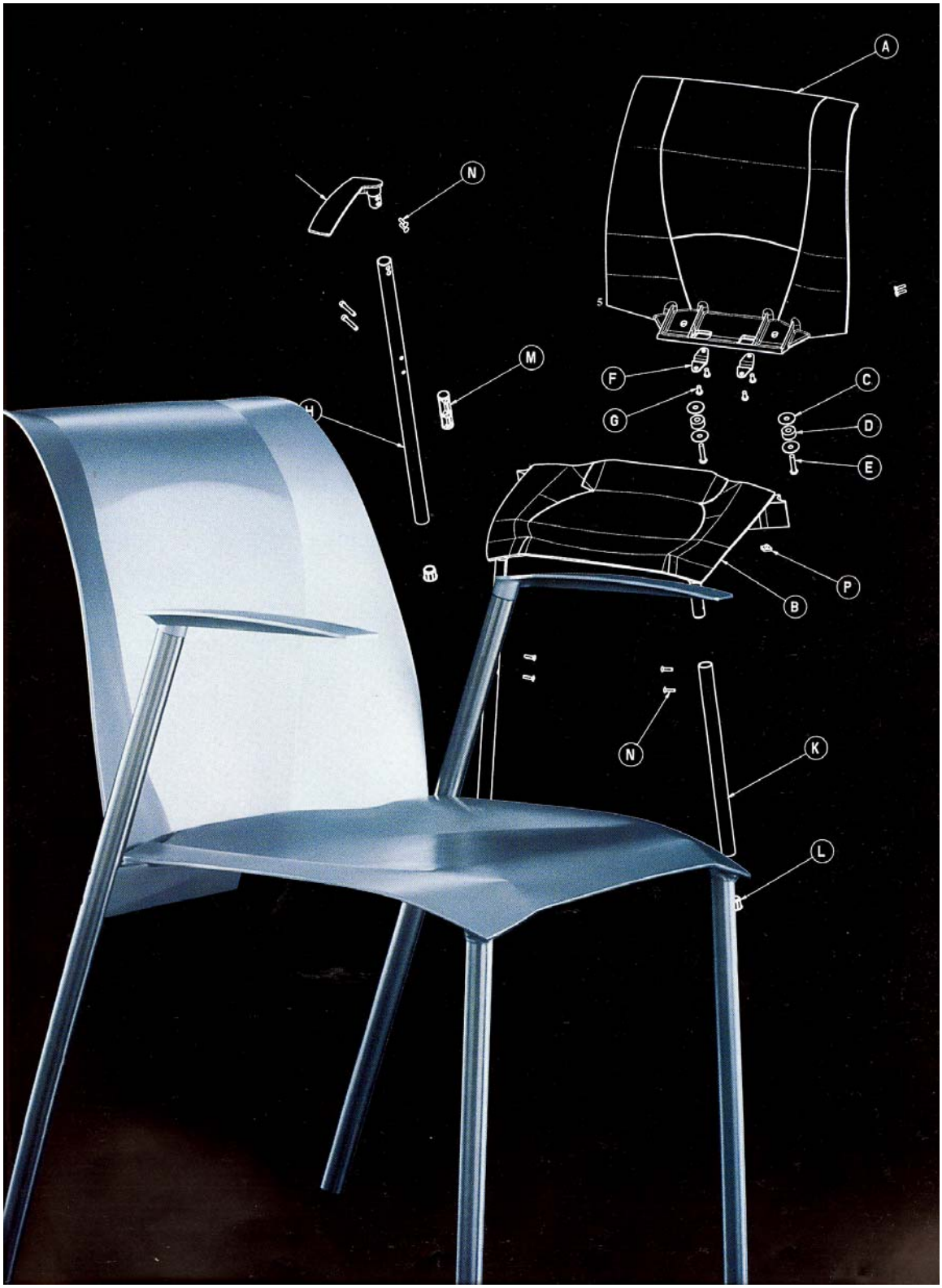
Fig. 39 – A major advantage of the louvred window is the almost unrestricted free area in the open position. For glass louvers, a free area of up to 86% is obtainable in the open position, 46% at 30 degrees, 22,5% at 15 degrees.

Fig. 40 – Another major benefit of louvred windows is rain control, and with opaque or heat absorbing glass louvers, sun screening is also achieved.

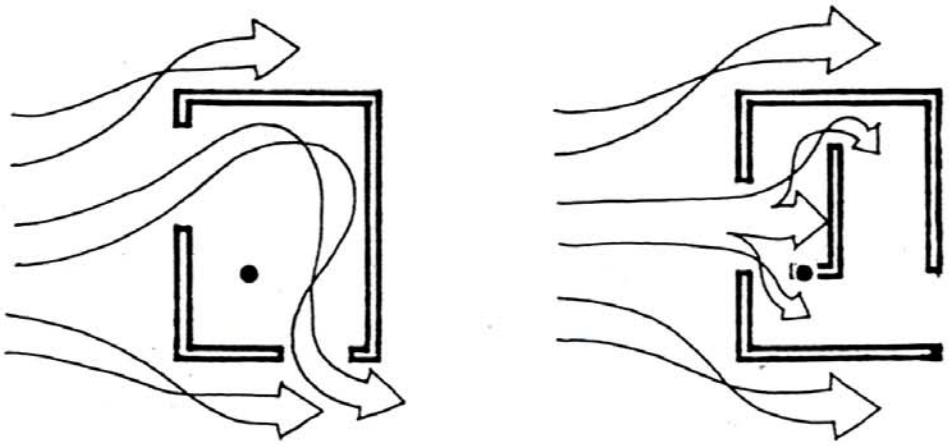




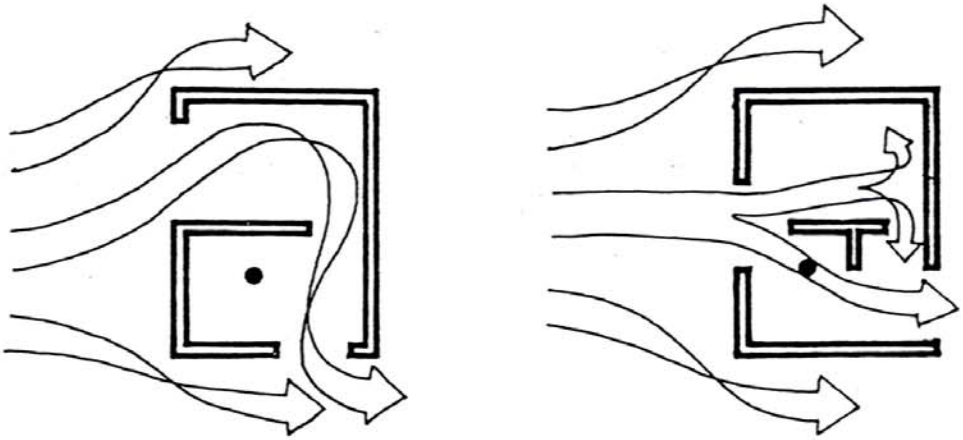
[Domus No 827-828, 2000:74]



[Domus No 819-820,1999:59]



Unobstructed air flow path will be determined by location of intake vent in façade. (Note static area).



Placing partition in static area will have little effect on air flow pattern.

Partition placed in flow zone absorbs dynamic force. Neither room receives adequate ventilation.

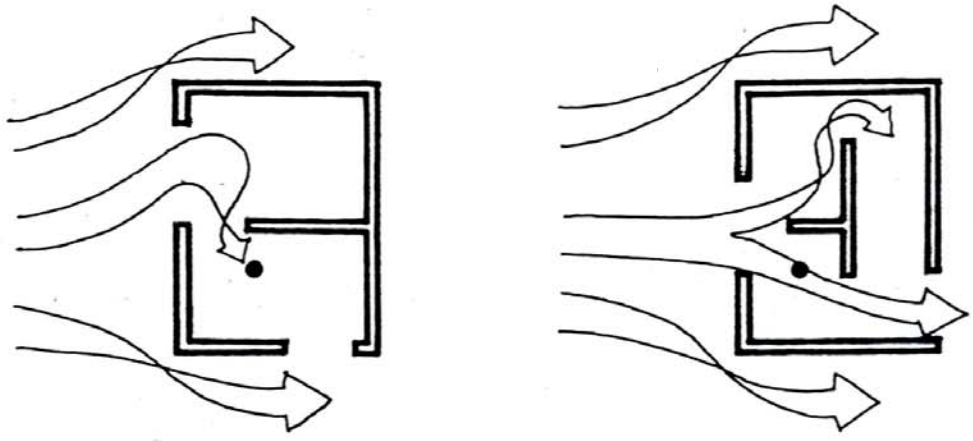


Fig. 41 – Open plan interior, to promote air- flow.

Ventilation is used to exchange the air inside the building with fresh air form outside. That will ensure sufficient oxygen supply and the removal of carbon dioxide, which is unsatisfactory beyond a concentration of 0,5%. Adequate ventilation will also ensure that unwanted heat, moisture, smells etc. will be removed. [Tutt, Adler, 1998:384]

The furniture warehouse, with a area of 2 361m2 (without basement), and an average of 650 people, will require a minimum amount of ventilation of:

2361m2 x 12m high = 28 332m2
= 33,3m3/p.
= 8.0 liter/s x 650
= 5 200 liter/s
= 5,2m3/s
= 18 720 m3/hour
= 7,93 air change/hour

The corresponding minimum fresh air supply is 4,72 liter/s/person.

Type of building	Tei (degrees Celsius)	Air infiltration rate	Ventilation allowance (W/m2 degrees Celsius)
Art galleries and museums	20	1	0,33
Exhibition halls:			
Large (height >4m)	18	0,25	0,08
Small (height<4m)	18	0,5	0,17
Service rooms	16	0,5	0,17
Staircase and corridors	16	1,5	0,50
Entrance halls and foyers	16	1,5	0,50
Public rooms	21	1	0,33
Libraries:			
Reading rooms (height >4m)	20	0,5	0,17
(height<4m)	20	0,5	0,25
Store rooms	15	0,25	0,08
Offices:			
General	20	1	0,33
Private	20	1	0,33
Restaurants and tea shops	18	1	0,33
Shops and showrooms:			
Small	18	1	0,33
Large	18	0,5	0,17
Store rooms	15	0,5	0,17
Warehouses:			
Working and packing spaces	16	0,5	0,17
Storage space	13	0,25	0,08

Fig. 42 – Recommended design values for internal environmental temperatures and empirical values for air infiltration and ventilation allowances (for normal site and winter heating).

Range of speeds m/min	Effect
0-15	Not noticeable, less than 1 degree Celsius of apparent cooling as air passes over skin
15-30	Just noticeable cooling effect equivalent to 1-2 degrees Celsius
30-60	Effective and pleasant cooling effect
60-100	Maximum wind speed for cooling without undesirable side effects
100-200	Too fast for desk word; paper start to blow around
Over 200	Too fast and uncomfortable for internal conditions

Fig. 43 – Effect of internal wind speeds in warm humid climates.

Many plants, climbers and trees will provide shade during the summer months and drop their leaves during the cool winter allowing the sun to provide heating.

COMFORT CRITERIA:
The room temperatures for load calculations will be based on 24 degrees Celsius in summer, 20 degrees Celsius in winter with a maximum humidity of 57% Rh.

The parking basement will be mechanically ventilated by means of a supply and extract system to comply with the Building Regulations.

Mechanical ventilation will be used in all the ablution facilities. Air speed will be increased to 2 m/s to facilitate adequate comfort ventilation.

CLIMATE CONDITIONS:
It is not economical to design for the actual extremes and the proposal is to design within parameters which occur 97,5% of the time. The climatic data can be summerised as follows:

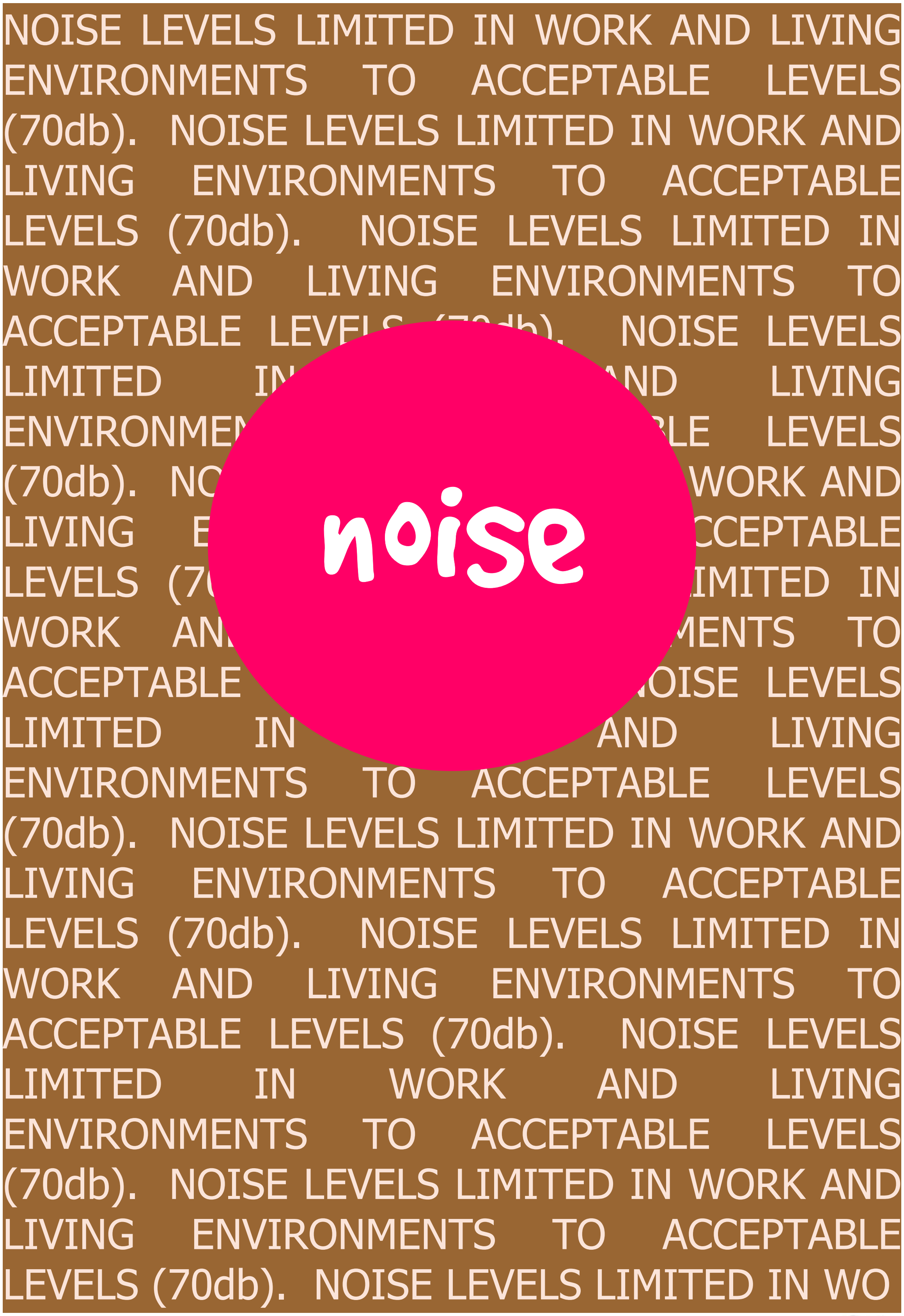
Location	Johannesburg
Classification	Composite
Altitude	1 692m
Max. Solar Radiation	1 007W/m2
Max. Summer Dry Bulb	30 degrees Celsius
Max. Summer Absolute Humidity	0,012kg/kg
Max. Energy Content	61KJ/kg
Min. Winter Dry Bulb	0 degrees Celsius
Min. Winter Absolute Humidity	0,0042kg/kg

Fig. 44 – Climatic data of Johannesburg.

OPERATING HOURS
Occupancy hours have an impact on the energy consumption of the building and the following schedule is proposed:

Item	Time Schedule
General floor lighting	07:00 – 21:00
Entrance lighting	24 h/day
Cooling/Heating fans	07:00 – 19:00 weekdays 07:00 – 14:00 Saturdays and Sundays Automatically controlled
Extractor fans	Automatically controlled as required Summer: 16:00 – 05:00 Winter: 03:00 – 06:00
Lifts, ramps, staircases	06:00 – 21:00 weekdays 06:00 – 15:00 Saturdays and Sundays After hours minimum with occupancy control
Basement ventilation	Programmed for morning and afternoon traffic rush hours Minimum fans for balance of time
Basement lighting	06:00 – 21:00 normal lighting After hours minimum with occupancy control to activate balance

Fig. 45 – Operating hours of lighting in building – A time schedule.



[Gibberd, 2000:SBAT]

1.1.3 NOISE:

NOISE IMPACT:
Noise is unwanted sound. The annoyance or noise impact caused by a specific noise depends on the amount by which that noise causes the noise level (dBA) to rise above the ambient noise level (dBA). [Van Zyl, 2001:4-1]

NOISE LEVEL:
In accordance with National Noise Regulations, the Noise level is the total sound level in dBA, including the effect of any specific source under investigation. [Van Zyl, 2001:4-1]

Because the building is situated next to the N3-highway, traffic noise will be a problem and have to be taken into consideration. There isn't exact traffic statistics available on the amount of vehicles per day, but by looking at the following table, one can see that the freeways carry thousands of traffic per day.

	To Johannesburg CBD				From Johannesburg CBD			
	Car	Minibus	Bus	Total	Car	Minibus	Bus	Total
M1 North of CBD	23795	6661	977	91433	25737	13196	3555	42488
M1 at Buccleach	48756	3493	826	53075	19830	4750	1399	25979
Louis Botha Ave	2368	10418	407	13193	4816	5680	2777	13273
Gordon	8694	316	517	9527				
Jules	4008	1911	1831	7750				
M2 at Benrose	21353	11595	2778	35726	4838	5849	291	10978
M2 at Heriotdale	19313	15419	3120	37852	10818	4515	1423	16759
Lombardy Link at Kelvin	9857	831	405	11093				

Fig. 46 - Existing peak period (05:00 to 08:00) passenger volumes.

The first major precaution against the traffic noise will be to minimize glazing on the western façade of the building because glass provides no attention to sound.

The noise spectrum of road traffic noise will be influenced by factors such as the percentage of heavy vehicles, speed, road surface, road gradient etc., but the overall typical spectrum will always exhibit the strongest component at low frequencies. City center noise is typical at around 80 dBA, as well as in the case, close to highways.

Rooms are not necessarily designed to have the lowest possible background noise level, since this could lead to unsatisfactory environments and would be costly. The glazing should attenuate the outside noise to a level which does not annoy, but is still efficient to mask the ambient, internally generated noises.

Acceptable maximum levels of background noise are roughly:
- Quiet areas 30 – 35 dB
- Low-noise areas (staff areas, enquiries desks etc.) 45 – 50 dB
- Noisy areas (lobbies, stairs etc.) 50 – 60 dB.

[Matthews, 1991:81]

The computer room in the building will have greater noise level than the reading room (library). Say for example there are three computers with noise levels of (52,5 dBA), (46,8 dBA), (56,2 dBA), the average noise level will be:

LP_Average = 10 log (1/3)(10(52,5/10) + 10(46,8/10) + 10(57,2/10)
= 54,0 dBA

The total noise level of all 3 computers running:
LP_Total = 10 log (10(52,5/10) + 10(46,8/10) + 10(57,2/10)
= 58,8 dBA

The total noise level that will be produced by 15 of type 1 computers:
LP_15 = 52,5 + 10 log (15)
= 64,3 dBA

[Van Zyl, 2001:4-3]

It will be very important to make the computer room more sound proof than for example the library. (Especially because the computer room will be situated near offices and exhibition spaces). Walls and screens must be designed to act as acoustic barriers attenuating the sound level.

A noise screen located between the source and the receiver reduces the sound pressure level by an amount which is a function of the difference in path length traversed by the sound wave with and without the presence of the screen.

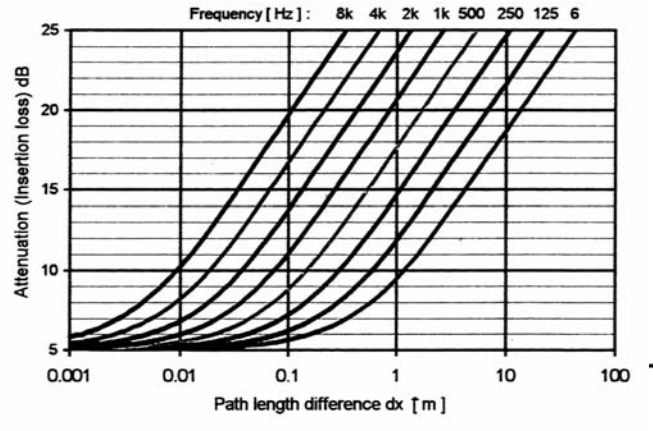


Fig. 47 – Attenuation by screen.

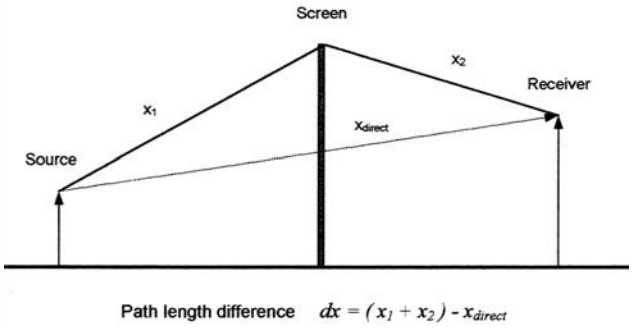


Fig. 48 – Attenuation by screen – the principle.

Say the average peak-hour traffic noise level measured at a distance 5m from the highway is 82,0 dBA, what will the noise level be in the building, 100m from the highway?

LPx2 = LPx1 – 10 log (kx) [dBA]
LP100m = LP5 – 10 log (100/5) [dBA]
LP100m = LP5 – 13,01
= 82,0 – 13
= 69 [dBA]

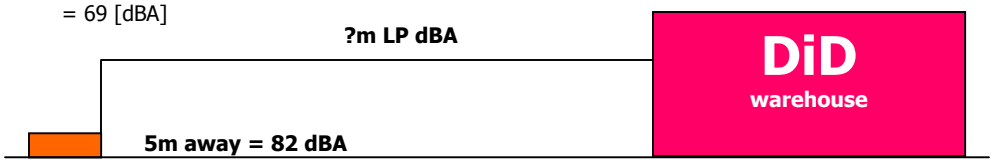
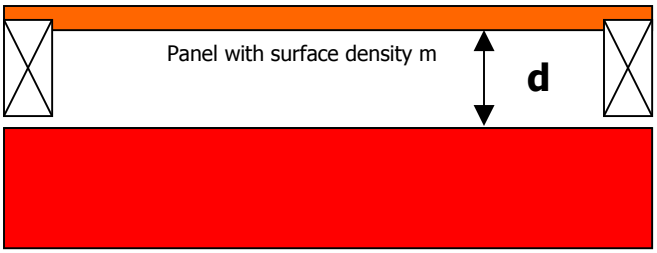


Fig. 49 – The influence of the N3-highway on DiD-warehouse.

INSULATION:
Glass wool, mineral wool, open-cell polyurethane foam or underfelt – that must be employed in acoustic design for the control of reverberation time and control. Used in conjunction with insulating materials to construct walls and panels. Examples of acoustically translucent protective cover are: [Van Zyl, 2001:6-2]

- perforated vinyl
- perforated steel
- woven cloth
- shade netting
- wooden slats with openings
- expanded materials

PANEL ABSORBER:
A sound wave incident on a panel will set it into vibration. A panel over an air gap constitutes a resonating system with resonance frequency determined by panel mass and air stiffness. If the sound wave contains energy at the resonance frequency, the panel will resonate and extract (absorb) energy from the sound wave. [Van Zyl, 2001:6-3]



d = air gap [mm]
m = panel surface density [kg/m2]

- provides narrow band absorption
- not suitable for wide-band applications
- particularly effective at low frequencies

Fig. 50 – Panel absorber.
(plywood panel, gypsum ceiling)

Description	125	250	500	1k	2k	4k
Brick unplastered	0,02	0,03	0,03	0,04	0,05	0,07
Brick plastered	0,01	0,02	0,02	0,02	0,03	0,03
Concrete smooth painted	0,01	0,01	0,01	0,02	0,02	0,02
Plastered wall unpainted	0,03	0,03	0,02	0,03	0,04	0,05
4mm glazing	0,35	0,25	0,18	0,12	0,07	0,04
6mm glazing	0,18	0,06	0,04	0,03	0,02	0,02
12,7mm gypsum on brandering under pitched roof	0,33	0,15	0,08	0,04	0,07	0,09
12,7mm gypsum on 38mm brandering against concrete roof	0,29	0,10	0,05	0,04	0,07	0,09
50mm 48kg/m3 glass wool against solid backing	0,23	0,47	1,09	1,05	1,02	1,08
100mm 48kg/m3 glass wool against solid backing	0,83	0,78	1,20	1,09	1,07	1,15
50mm 60kg/m3 mineral wool against solid backing	0,28	0,60	0,99	1,06	1,02	1,02
100mm 60 kg/m3 mineral wool against solid backing	0,69	1,13	1,08	1,04	1,05	1,02

Table 51 – Sound Absorption of different materials.

Use a material that is thin and high in density for insulation.

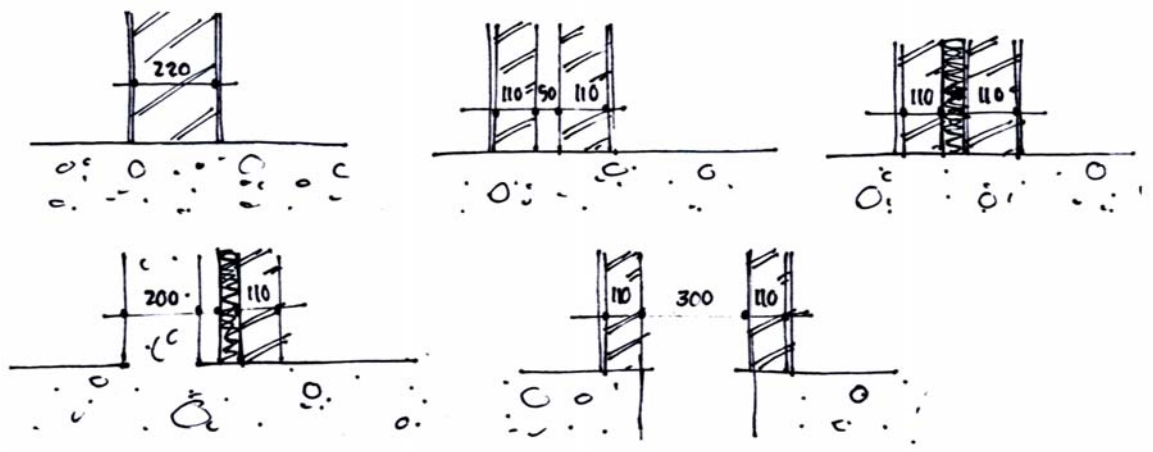


Fig. 52 – Cavity Walls.

The bigger the cavity, the better the isolation capability. The cavity must be filled with isolation material (glass wool) to gain maximum results.

Provide the entrance on the west façade with a mechanical glass entrance door to limit the amount of traffic noise that will enter the building in the case of an open standing door. The door will open when entering and will close

immediately. Use double-glazing to limit the amount of noise outside the building. All the windows on the west façade should be 6mm or 10mm with a cavity >40. (A smaller cavity won't be effective).

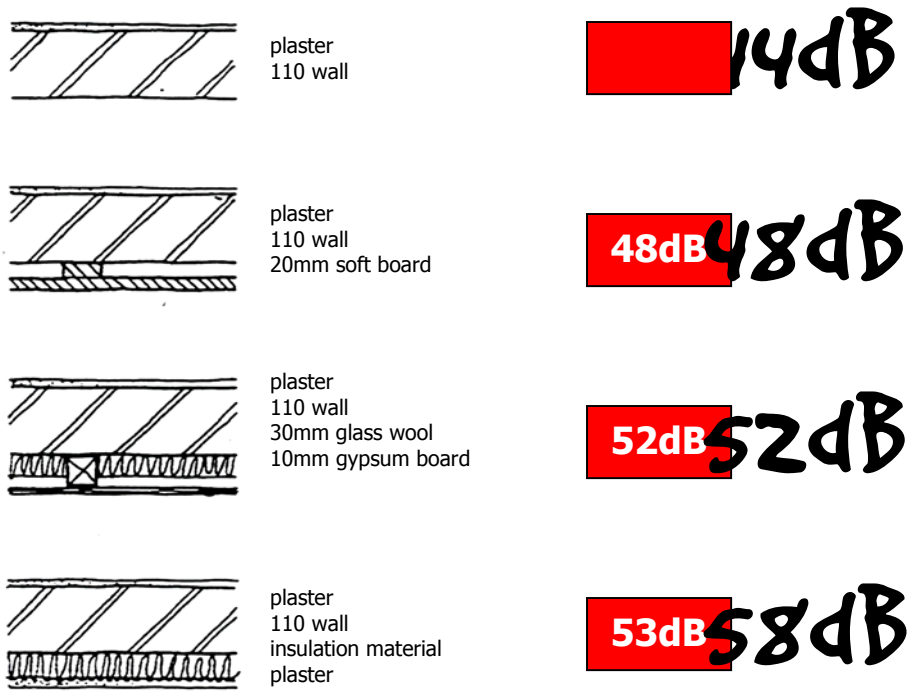


Fig. 53 – Improvement of the average isolation value of a 110mm wall.

Single walls:	**Average 100 – 3150Hz.**
110 wall (unplastered)	43
110 wall (plastered – both sides)	48
220 wall (plastered)	54
330 wall	55
Cavity walls:	
110 – 50 – 110 (plastered)	55
110 – 80 – 110 (plastered)	52
220 – 120 – 220 (plastered, glass wool)	101
Windows: (closed)	
Single 3mm glass	23
Single 4mm glass	24
Single 6mm glass	26
Single 10mm glass	28
Single 6mm laminated glass	30
Double 10 – 50 – 10mm	35
Double 3 – 100 – 3 mm	35
Double 6 – 100 – 4mm	39
Double 6 – 100 – 6mm	38
Windows: (openable)	
4mm glass in steelframe	18
6mm glass louvers	17
4mm – 30 degrees	8
Doors:	
Hollow core	16
60mm solid core	34

Table 54 – Isolation values against noise.

Heat transfer through insulation material occurs by means of conduction, while heat loss or heat gain from the atmosphere occurs by means of convection and radiation.

In the case of solvent based vapour barriers the manufacturer's application procedures must be carefully followed, as the danger of solvent entrapment exists due to premature over-coating resulting in surface "bubbles". Condensation occurs when water vapour in the atmosphere comes in contact with a surface at a temperature of less than or equal to the dew point. Therefor, it the surface temperature is less than the dew point, condensation will occur. The presence of condensation on the warm side of the vapour barrier has no detrimental effect on the insulation but must, nevertheless, be avoided. To prevent condensation, the insulation thickness should be so designed that temperature on the warm side of the vapour is above the dew point.

Aerolite will be used for the acoustical and thermal insulation of the cavity wall on west façade as well as on the ceilings. Aerolite and factorylite are the ideal products for temperature control of ceilings and roofs, with Aerolite being the preferred product to use for acoustics (in dry walling as well). The heavier density mineral wool insulation can be used in walls, and under plinths supporting fans, etc. for noise control.

required, the insulation system is only as good as its vapour barrier and the care with which it is installed.

[African Heating and Cooling – March-April 2002:44-46]

BIDIM USED AS AN ACOUSTIC CURTAIN:
A geotextile, Kaytech's bidim A4, has been successfully used as an acoustic curtain. The structure comprised 137m long steel arches which, at the time, were believed to be the longest spans of their type in Africa. The fabric can be attached to masts manufactured specially by a yacht sail-maker and then be hung form the roof. The specified geotextile – made from 100% polyester – will be the perfect choice for acoustical and fire purposes. It has a melting point of between 250 and 260 degrees Celsius. It can be implemented when considering factors such as privacy, acoustic, flexibility spaces etc. in the atrium or exhibition spaces. [www.smartglass.co.za]

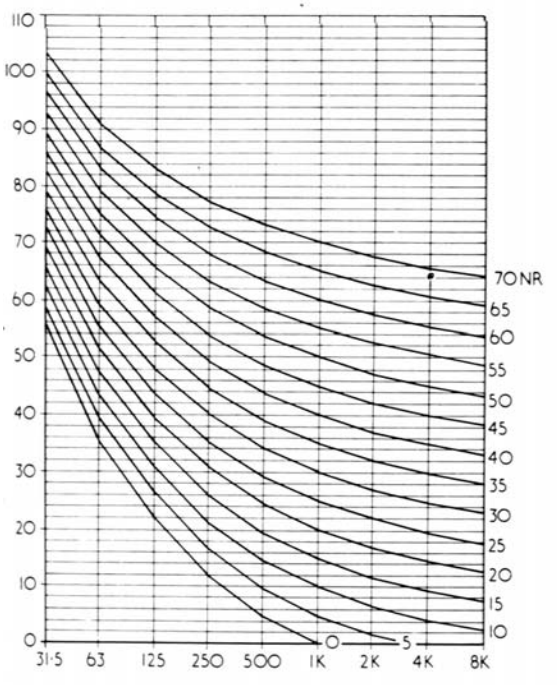


Fig. 55 – Noise rating curves.

Any kind of opening in a partition will seriously impair the sound insulation. Two single walls of 30 dB sound insulation combined would not produce 60 dB but only about 35 dB; the doubling of the mass per unit area adding 5 dB by the mass law. By separating the two walls several meters apart will provide insulation of nearly 60 dB. The suspended floors will act as insulation against sound caused by footsteps on hard-surfaced floors.

As mentioned, windows are the weakest part of the envelope where sound insulation is concerned. The mass per unit area of the glazing is small compared with the rest of the envelope. All openable windows on the west façade must be sealed with rubber or silicone strips.

Suitable wall constructions for sound insulation to Building Regulations 1976, G2(2):
[Tutt, Adler, 1998:439]

1. A solid wall consisting off -
   - bricks or blocks with plaster not less than 12,5mm thick on at least one face; or
   - dense concrete cast in situ or panels of dense concrete having all joints solidly grouted in mortar; or
   - lightweight concrete with plaster not less than 12,5mm thick on both faces of the wall,

in each case the average mass of the wall (calculated over any portion of the wall measuring 1 metre square and including the mass of any plaster) being not less than 415kg/m2.

2. A wall having a cavity not less than 50mm wide constructed of two leaves each consisting of bricks, blocks or dense concrete with plaster not less than 12,5mm thick on both faces of the wall, and having any wall ties of the butterfly wire type, the average mass of the wall (calculated over any portion measuring 1 metre square and including the mass of the plaster) being not less than 415kg/m3.

3. A wall having a cavity not less than 75mm wide constructed of two leaves each consisting of lightweight concrete with plaster not less than 12,5mm thick on both faces of the wall and having any wall ties of the butterfly wire type, the average mass of the wall (calculated over any portion of the wall measuring 1 metre square and including the mass of the plaster) being not less than 250kg/m2.
[Tutt, Adler, 1998:439]

1.1.4 VIEWS AND ACCESS TO GREEN OUTSIDE:

ALL LIVING AND WORK AREAS HAVE ACCESS TO A VIEW OUT. ALL USERS LOCATED IN 6M OR LESS FROM A WINDOW. EASY ACCESS PROVIDED TO EACH USER TO GREEN OUTSIDE SPACES.

A view to the outside, have a calming effect on people sitting inside a building. The restaurant and coffee shops in the building have outside spaces and balconies that will provide great views from different angles around the building. Although slightly separated, will there be a view from the coffee shop towards the atrium.

Because of the large amount of glass in the façade and glass partitions that will be between the shops (to separate them), will different objects and horizontal and vertical openings interplay each other.

The views inside the building are equally important and occupants will see different objects intersect each other through their viewports.

The upper exhibition spaces and ramps will give unrestricted views into the rooms and spaces below. Views into the central exhibition spaces will show impressive interplays of light falling from different directions. Another important view will be the one from the N3-highway towards the building. It is very important to get a glamorous glimpse that will reflect the character of the building (interior and function) and force people to notice it.

By providing a pleasant, easily accessible space, one can increase productivity by enabling people to be refreshed by spending a short time in a different environment. (temperature, light, humidity, air movement). Provide adequate sitting space on balconies and around the building on ground floor level. Use deciduous trees to provide shade in summer and allow sun the penetrate through during winter. (umbrellas, spray pipes etc. to make it a pleasant and comfortable environment). "Sunwalls" for example during the winter will give people the opportunity to go out for 5 min.
to get warm and relax.

Continue:
11baseline-3
pages 125-139

thermal comfort

PRODUCTIVITY WILL BE ADVERSELY AFFECTED
BY DISCOMFORT. IT HAS BEEN ESTABLISHED
THAT WORK EFFICIENCY CAN DROP UP TO
40% WITH AN INCREASE IN DRY BULB
TEMPERATURE FROM 28 TO 34 DEGREES
CELSIUS. PRODUCTIVITY WILL BE ADVERSELY
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BULB TEMPERATURE FROM 28 TO 34 DEGREES
CELSIUS. PRODUCTIVITY WILL BE ADVERSELY

[Gibberd, 2000:SBAT]

1.1.5 THERMAL COMFORT:

= A personal issue.

Thermal comfort in a building depend on a range of factors including: [Holm, 1996:5]

- radiant temperature of surrounding surfaces
- air movement
- solar radiation
- activities
- clothing
- acclimatization
- age etc.

Working policy must encourage occupants to wear for example no ties in summer and thick coats during winter temperatures. That will ensure comfort and will minimize costs of heaters and air conditioners.

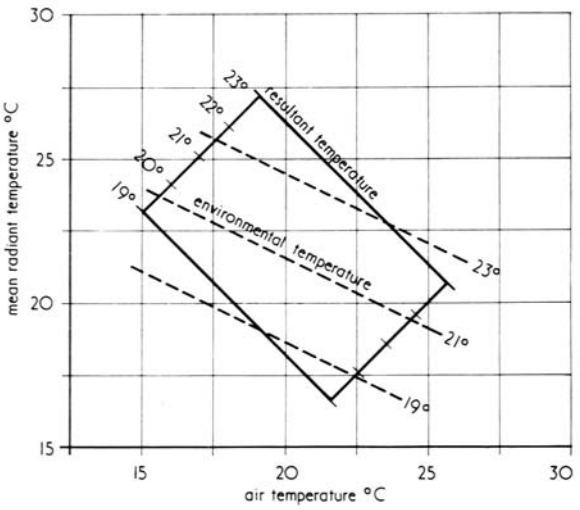


Fig. 56 – Comfort zone for sedentary occupation with air velocity 0,1m/s.

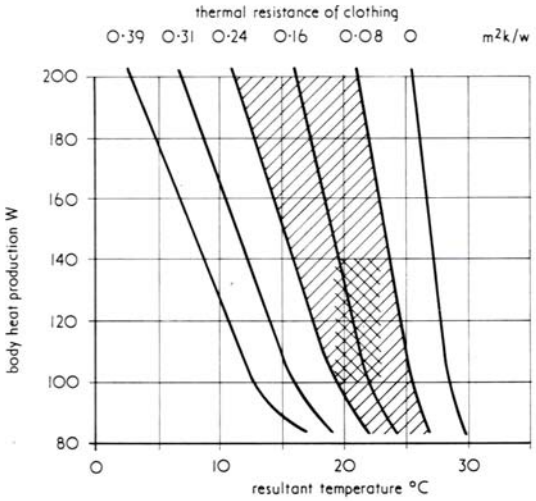


Fig. 57 – Room temperature in relation to activity and clothing: normal range of clothing shown single hatched comfort zone shown cross hatched.

HUMIDITY AND COMFORT:
It will be the humidity or lack of it that will cause the discomfort rather than the temperature. The range of acceptable relative humidities is quite large: for secondary occupations between 40 and 70%. Very high and very low humidities both have a deleterious effect on the building fabric and furniture. The build-up of static energy is encourage by low humidity. [Tutt, Adler, 1998:396]

Thus, a fan will not be effective for cooling the building in Johannesburg because it will only dry the air. Use a system that will moisten the air by passing it through water.

(A suitable system that will be consider is the rock-bin system – the air will be coolened by cold water passing through a rock bin situated near constant ground temperature).

Example: An internal environment with relative humidity of 60% and temperature of 25 degrees Celsius is required where the outside RH is 90% and temperature is 30 degrees Celsius. How could this be achieved?

The point on the psychrometric chart (next page), corresponding to RH 90% and 30 degrees Celsius, corresponds to a mixing ration of 24,6g/kg. If the air is cooled to 28,2 degrees, it can be seen that the air will become saturated. Further cooling will cause water to condense out of it, and the saturation line on the chart will be followed down. At a temperature of 17 degrees, the mixing ratio will be 12,2g/kg, which is the same as for the required combination of RH 60% and temperature 25 degrees Celsius.

The air, now conditioned, can be allowed to reach the required temperature by passing it over the ducts carrying the inlet air at 30 degrees Celsius, without allowing it to mix with it. This it the basic principle by which effect an air conditioner will have on the building. [Tutt, Adler, 1998:396]

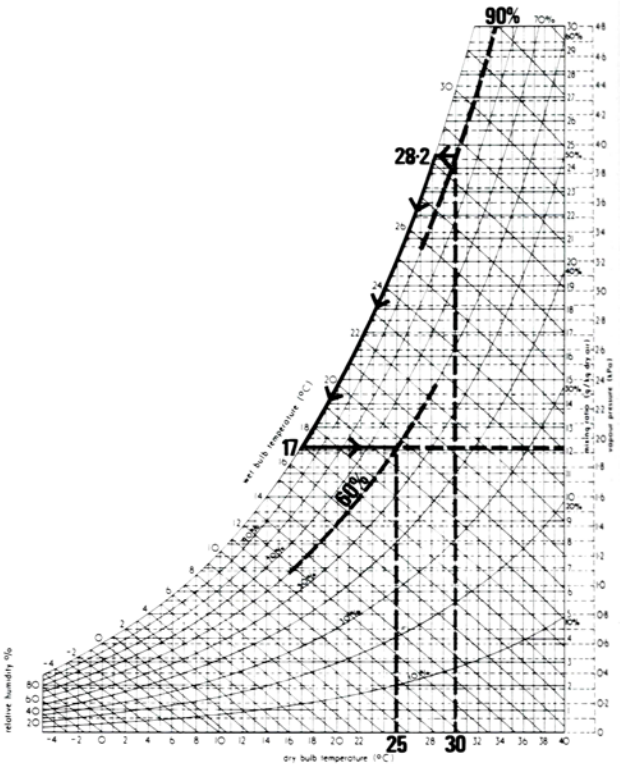


Fig. 58 – Psychrometric chart for reduction of humidity by cooling.

Definition: Thermal comfort involves the human response to climatic factors. Comfort is usually described as a range. The human body responds to thermal stresses (whether hot or cold) to reach equilibrium. [Holm, 1996:5]

The following variables will have an effect on human comfort and must be considered throughout the design:

- Temperature – the comfort range is defined from 16 – 32 degrees Celsius with the optimum temperature being 21 – 22 degrees Celsius for seated persons exposed to air movement of 1 m/s.
- Humidity – the desirable relative humidity range lies between 30 and 65% with the optimum being approximately 50%. The combination of high humidity and temperature promotes discomfort as does the combination of low temperature and low humidity.
- Air movement – the mean radiant temperature may increase with increased ventilation, but the air movement will still create a cooling effect especially in hot humid climates provided that the air temperature is lower than the body temperature.
- Radiation – it is absorbed by objects without heating the air, for example, a person seated at a window may sit in the sun and will feel hotter than colleagues in the shade. [Holm, 1996:5]

The furniture warehouse must provide the desired comfort zone and promote productivity, health and mental and physical energy.

Productivity will be adversely affected by discomfort. It has been established that work efficiency can drop up to 40% with an increase in dry bulb temperature from 28 – 34 degrees Celsius. However, optimum performance conditions do not coincide those for optimum comfort. Cooler than optimum promotes mental activity and warmer, physical activity. Optimum conditions will promote sleep and relaxation.

The design must take all the variables mentioned above in consideration to provide the sufficient thermal comfort zone for all occupants.

[Gibberd, 2000:SBAT]

1.2 INCLUSIVE ENVIRONMENTS:

Buildings can be designed to accommodate everyone, or specially designed buildings need to be provided. Ensuring that buildings are inclusive supports sustainability as replication is avoided and change of use supported.
[Gibberd, 2000:SBAT]

1.2.1 THE DISABLED:

Disabled people are remarkably adaptable and often of necessity extremely determined to manage for themselves, albeit with considerable discomfort, in buildings designed primarily for able-bodied people. For many ambulant disabled people, the difficulties are surmountable, but for wheelchair users the problems are more serious for if an area is not negotiable by a wheelchair, then the user is forbidden entry and this is intolerable in new buildings.

It is therefore vital that proper consideration should be given to the provision of wc and access to and from the building.

Wc compartments for the disabled can often usefully be unisex; this has several advantages:

- husbands and wives can assist each other which is not possible in single sex compartments
- they avoid the need for and cost of duplicated facilities for each sex; one decent unisex facility can be considerably more economic than two inadequate single sex facilities
- they simplify signposting and access to disabled facilities

A wc compartment for general use by disabled people should allow for frontal or lateral transfer from the wheelchair, with space for an attendant to assist.

In wcs for wheelchair users in public buildings or special buildings for disabled people a hand rinse basin should be installed where it can be conveniently reached by a person seated on the wc. However it is desirable that the basin is also usable from the wheelchair. These opposing criteria together with the requirements for handrails and supports present a difficult problem usually resulting in a poor or even unworkable compromise.

The preferred diameter for support rails is 35mm diameter with 50mm clearance between the rail and the wall. Most proprietary rails are incorrectly sized. Rails must be securely fixed to the structural surface, and horizontal or inclined rails should be capable of carrying a static load of 150kg.
[Tutt, Adler, 1998:341-342]
Ramps and access to and from the building will accommodate the disabled. They will have equally access to all the spaces and exhibitions as the other people.

Where the display routes involves changes in level by steps, or other difficulties for wheelchair users, lifts or ramps should be provided. Ensure that these will be adequately signposted, they need not exactly parallel the ambulant route. (All changes in level catered for with appropriate ramps of 1:12 fall, or lifts).

All edges i.e. between walls and floors and stair nosings will be clearly distinguished through the use of contrasting colour.

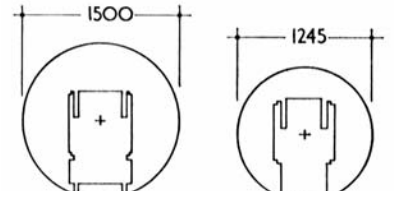


Fig. 29 – Small wheelchairs: comparative turning space requirements (front propelling wheels).

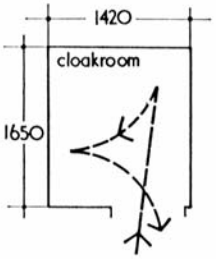


Fig. 30 – Three-point turn in cloakroom.

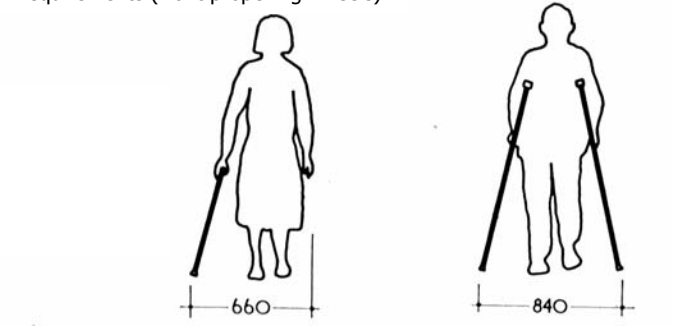


Fig. 59 – Stick user (left) and crutch user (right).

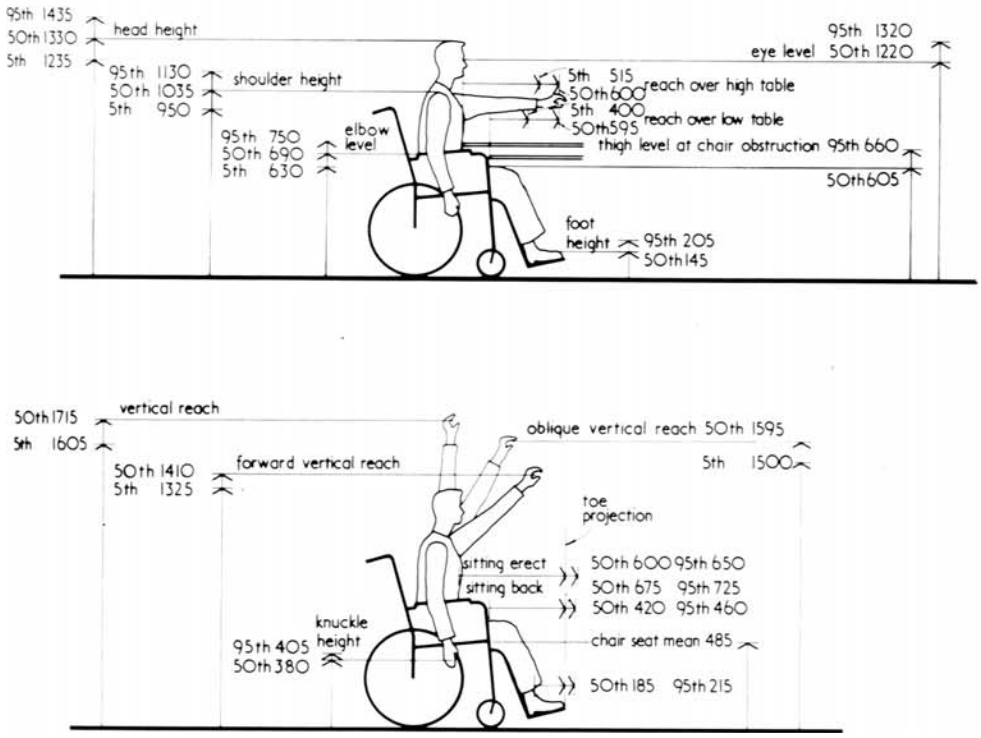
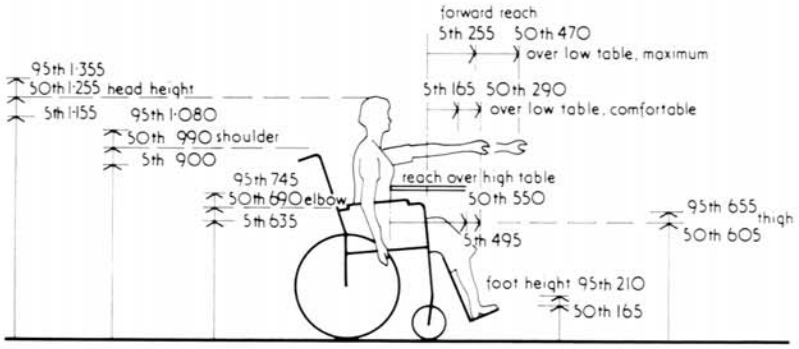


Fig.60 – Dimensions of different percentiles of adult male wheelchair users. These dimensions relate to people who use standard wheelchairs and who have no major impairment of upper limbs.



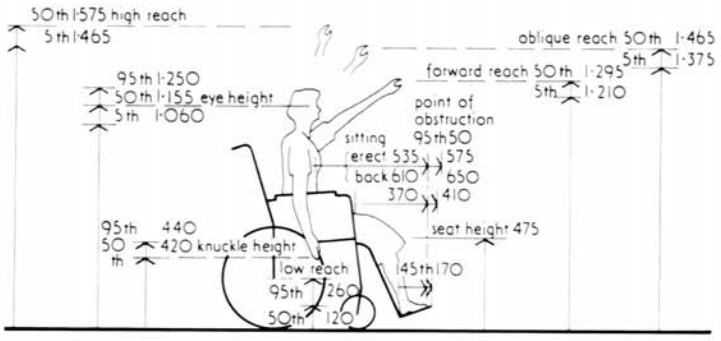


Fig. 61 – Dimensions of adult female wheelchair users.

ENSURING THAT USERS PARTICIPATE IN DECISIONS ABOUT THEIR ENVIRONMENT HELPS ENSURE THAT THEY CARE FOR AND MANAGE THIS PROPERTY. CONTROL OVER ASPECTS OF THEIR LOCAL ENVIRONMENT ENABLES PERSONAL SATISFACTION AND COMFORT. BOTH OF THESE SUPPORT SUSTAINABILITY BY PROMOTING PROPER MANAGEMENT OF BUILDINGS AND INCREASING PRODUCTIVITY. ENSURING THAT USERS PARTICIPATE IN DECISIONS ABOUT THEIR ENVIRONMENT HELPS ENSURE THAT THEY CARE FOR AND MANAGE THIS PROPERTY. CONTROL OVER ASPECTS OF THEIR LOCAL ENVIRONMENT ENABLES PERSONAL SATISFACTION AND COMFORT. BOTH OF THESE SUPPORT SUSTAI

participation & control

[Gibberd, 2000:SBAT]

1.3 PARTICIPATION & CONTROL:

Ensuring that users participate in decisions about their environment helps ensure that they care for and manage this properly. Control over aspects of their local environment enables personal satisfaction and comfort. Both of these support sustainability by promoting proper management of buildings and increasing productivity. [Gibberd, 2000:SBAT]

1.3.1 ENVIRONMENTAL CONTROL:

Users in the building have reasonable control over their environmental conditions; this should include opening windows and adjustable blinds.

The occupants in the building will have control over the following aspects in the building (to suit their individual preferences):

- louver panels
- grills in floor that can open/close (warm/cold air)
- openable windows
- moveable partitions and showcases for exhibitions
- lights
- ramps
- staircases
- more than one entrance
- different parking bays

The ramps and staircases will allow an open interactive viewing, inspiring the occupant of DiD furniture warehouse to choose his/her own route through the spaces – provokes moments of pause, reflection and discovery.

The ramps will drive movement through a series of spatial sequences. It will provide curved elements of both mystery and surprise.

1.3.2 SOCIAL SPACES, AMENITY AND COMMUNITY INVOLVEMENT:

Design for easy informal/formal social interaction. This could involve a tearoom with comfortable seating. Seating provided along regularly used routes. Spaces shared between occupants/users that are large enough to allow for comfortable social interaction. Easy access to refreshment facilities and wcs for all user of the building.

The building will have sufficient social spaces. There will be sitting spaces, coffee shops, restaurants, reading rooms, exhibitions with social gatherings related to it and by creating lots of different spaces in different parts of the building will there definitely be sufficient social interaction and gatherings. Tables and chairs will be outside as well to create a social atmosphere outside and inside the building.

Ablution facilities will be easily accessible and there will be two separate blocks on a level (west and east side of the building).

Spaces, activities, shops, exhibitions, restaurants etc. will be available to the community and their involvement will be valuable in terms of future innovation.

BUILDINGS NEED TO CATER FOR THE WELL-BEING, DEVELOPMENT AND SAFETY OF THE PEOPLE THAT USE THEM. AWARENESS, AND ENVIRONMENTS THAT PROMOTE HEALTH CAN HELP REDUCE THE INCIDENCE OF DISEASES SUCH AS AIDS. SAFE ENVIRONMENTS AND FIRST AID CAN HELP LIMIT THE INCIDENCE OF ACCIDENTS AND WHERE THESE OCCUR, REDUCE THE EFFECT. L AND ACCESS TO INFORMATION IS INCREASINGLY SEEN AS A REQUIREMENT OF A COMPETITIVE WORK FORCE. AL NTRIBUTE TO SUSTAINABILITY BY HELPING ENSURE THAT PEOPLE REMAIN HEALTHY AND ECONOMICALLY ACTIVE, THUS REDUCING THE 'COSTS' (TO SOCI IRONMENT AND THE ECONOMY) OF UNEMPLOYMENT AND ILL HEALTH. BUILDINGS NEED TO CATER FOR THE WELL-BEING, DEVELOPMENT AND SAFETY OF THE PEOPLE THAT USE THEM. AWARENESS, AND ENVIRONMENTS THAT PROMOTE HEALTH CAN HELP REDUCE THE INCIDENCE OF DISEASES SUCH AS AIDS. SAFE ENVIRONMENTS AND FIRST AID CAN HELP LIMIT THE INCIDENCE OF ACCIDENTS AND WHERE THESE OCCUR, REDUCE THE EFFECT. L

[Gibberd, 2000:SBAT]

1.4 EDUCATION, HEALTH AND SAFETY:

Buildings need to cater for the well-being, development and safety of the people that use them. Awareness, and environments that promote health can help reduce the incidence of diseases such as aids. Safe environments and first aid can help limit the incidence of accidents and where these occur, reduce the effect. Learning and access to information is increasingly seen as a requirement of a competitive work force. All of these factors contribute to sustainability by helping ensure that people remain healthy and economically active, thus reducing the 'costs' (to society, the environment and the economy) of unemployment and ill health. [Gibberd, 2000:SBAT]

1.4.1 EDUCATION:

Access to support for learning must be provided. This can be in the form of internet access, structured courses, or the provision of learning material such as books and newspapers.

There will be a lot of educational facilities provided in DiD furniture warehouse, such as:

- bookshop with books such as furniture design, furniture history, furniture designers and the latest trends (locally/internasionally)
- internet access
- computer rooms
- newspapers available in coffee shops
- skills learning courses
- exhibitions
- info boards (all over the building) – info. cable structure electric board – every 10 sec. new info.

1.4.2 SAFETY AND SECURTIY:

Measures taken to ensure that areas of the building and routes to and from the building are safe, and feel safe. Measures taken could include well lit routes, routes and spaces overlooked by occupied areas, clear visual links between spaces. Building must comply with all the health and safety requirements. Policy/regular checks in place to ensure that these are complied with.

DiD furniture warehouse will contain objects and furniture of high value. The highest possible level of security must be maintained. Although the building is situated in a security business park with access control at the main entrance, it is still an open environment and a risk in terms of security.

Reliance will be mainly on wardens on site (near entrances) and inside the building. The human element is to be considered important, but technology allow good mechanical and electronic measures and detection of removal by alarms will be used as well.

Entrances and exits will be checked by electronic detection. The amount of hiding places, such as cupboards, opening directly off the public areas, should be limited.

All external doors and windows will be protected from illegal entry. The security room on the ground floor level will act as a control room in terms of security. There will be cameras installed on each floor to control the entire building.

There must be very strict control when delivering. "Camera-eyes" must be activated 24 hours in the delivery room to check furniture coming in and out of the building. It will also monitor staff and visitors' entries and exits. There are only two main entrances – for safety purposes mainly.

At night, when the building is more or less empty, security will be very strict because during that time will the crime be high.

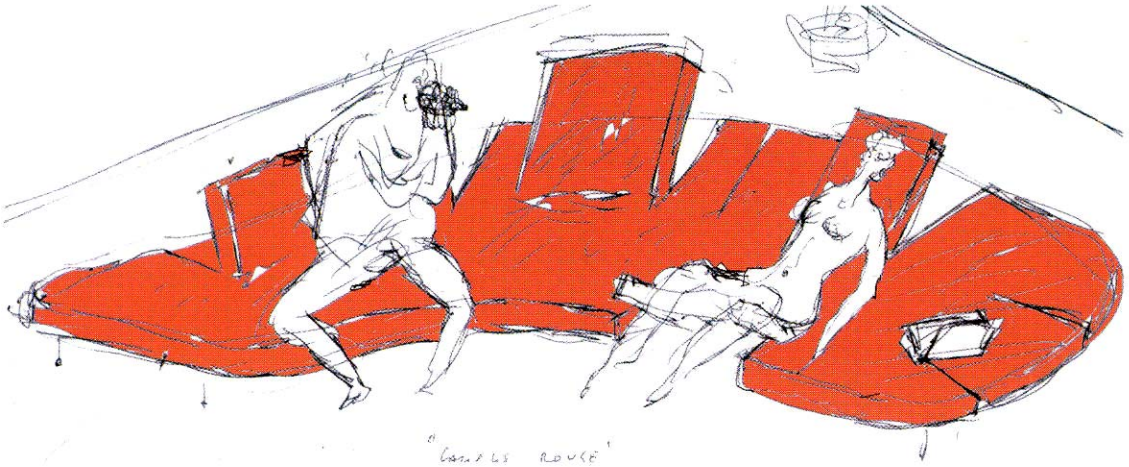
The types of crime to be considered are: [Tutt, Adler, 1998:487]

1. pilferage by staff or other insiders
2. pilferage by public (shoplifting)
3. vandalism without gain to the perpetrator
4. casual break-ins
5. planned break-ins

On site, fences will be used rather than a wall, because of the view towards the building and one will see through it for security purposes. It will be more or less 2,5m high (not less) and topped with two strands of barbed wire.

Window panes less than 0,05m2 in area can not be climbed through (consider it on ground level).

Vertical bars will be more effective than horizontal bars. The bars will be of square cross-section minimum 20mm at a maximum spacing of 125mm and built in 75mm. Transverse tie-bars will be provided at 600mm centers.
[Tutt, Adler, 1998:487]



[Domus No 827-828, 2000:66]

Type of building	Principal risks	Vulnerable points	Design solutions
Shops	1,2,4,5	Ground floor doors and windows, stores and rear corridors, unfrequented areas of sales.	Security locks and easy observation, constant casual observation.
Offices	1,4,5	Ground floor doors and windows, particularly rear fire escapes.	Panic-type locks on rear escape doors. All areas under constant casual observation. Supply all staff with lockable furniture for personal valuables.
Factories and storage buildings	1,4,5	Ground floor doors and windows, loading banks.	Doors barred with heavy duty locks – in many cases machinery for cutting through such devices will be to hand.
Restaurants	1	Kitchens, stores, cash desk	Constant casual observation will be necessary.
Car parks	1,2,3,4		Observation at all times, including the use of lighting and closed circuit television. In this case public acceptance is universal.

Fig. 62 – Relationship between crime and building type.

The delivery store, internet café and computer room's door (and other valuable rooms) should be as stout as possible. It will be solid, and the hinge will be internal. The lock must be a mortice lock. No lock will be fitted that can opened from inside without the key – it will hinder an intruder's escape.

Safety and security measures must be strict in the interest of the occupants of the building. Lifts must be serviced on a monthly basis to ensure that people will be safe and feel secure. It will be the best way of security control to appoint a security firm to handle all aspects of security and safety on site and in the building. They will be held responsible for the security.

The LIDP's report on safety and security in the larger area (Region 7):

Police stations are situated in Alexandra, Buccleuch, Bramley, Edenvale, Sandringham and Sebenza.

Safety and security are a problem in certain areas of Administrative Region 7, especially in the Greater Alexandra Region, due to amongst others, the lack of recreational facilities, unemployment and low educational levels. The police station where the highest number of serious crimes relative to overall GJMC crime situation are reported, is within the Alexandra area. More than 50% of incidents reported at the Alexandra Police Station were classified as serious crime.

The top five crimes are other thefts, burglary from residential premises, thefts of motor vehicles and motorcycles, thefts out of or from motor vehicles and robbery with aggravating circumstances (with a firearm).

Safety and security is a serious problem which must be addressed in the industrial areas, as well as the residential areas, to provide a safe and friendly environment in which to work and play.

An unsafe environment is not conducive to the well-being of society, because of the social impacts of criminal activities for example higher death rates and increased anti-social and criminal behavior.
[LIDP, 2002:23]

Vehicle control will be secure by booms and security guards on duty in parking area and basement. (During working hours and after hours). When entering, each vehicle will receive a passing ticket to control passback.

A manned guard point will be provided adjacent to the main entrance of the site. The vehicle exit will be clearly visible from the guard point.

Sufficient lighting must be provided, especially besides walkways and pavement entrance points and landscape areas. Specific lighting in front of retail shopfront glass façade must be provided.

1.4.3 HEALTH:

First aid kit provided in a central location. Policy to ensure that this can be used effectively. Information readily available on health, education and career development issues. This could be in the form of a well serviced notice board located in a central position.

To prevent a "sick-building-syndrome", ensure that the building was sufficient: [Gibberd, 2000:SBAT]

- sunlight
- ventilation (natural)
- clean ablutions
- access to green outside
- views to the outside
- enough space per person
- sufficient lighting
- routes (either by stairs, lifts, ramps)
- information boards
- emergency exits and plans (first aid kits)
- clean water supply
- a clean and hygienic building (appoint a cleaning team)

1.4.4 SMOKING AND FIRE CONTROL:

No smoking in public spaces. Space allocated for smoking where it will not affect other users, i.e. away from air intakes etc.

NO SMOKING WILL BE ALLOWED INSIDE DID FURNITURE WAREHOUSE. There will be sufficient outside space, balconies etc. provided to smoke outside.

According to the new smoking law, restaurants must have separate outside, closed smoking areas. That will be provided.

There are a lot of products that meet the standards of fire on the market today: [Raubenheimer, 2002,(1):48]

- **Factorylite** (glass wool) – an improved industrial roofing product designed to insulate commercial buildings speedily and cost-effectively. Non-combustible, and meeting all the requirements of the fire and smoke index (ASTM E84), Factorylite assists in reducing the fire hazard in any commercial building. This material also creates a saving on energy bills by reducing heat loss during the roof and walls, and it also insulates against noise, thus improving interior acoustics for a quieter working environment. Maintenance-free, Factorylite is a non-corrosive material, and is supplied with the option of a foil, lacquered foil or black cloth facing.

- **Factoryboard** (wall cladding, roof insulation) – a multi-purpose wall cladding and/or roof insulation designed to insulate walls and new or existing roofs. In addition to the thermal and acoustical properties shared by both new products, Factoryboard is visually attractive, with a finish that can be adapted to complement a sophisticated or utility environment. This adaptable product can be installed in areas subjected to a high humidity level where there is no risk of sagging or distortion of the boards.

- **Solaris** (glass bricks) – they are aesthetically pleasing, admit light, save energy and discourage burglaries. They also have a high fire resistance. Ideally suited for feature walls in any type of building – or for use as room dividers, entrances, etc. Solaris glass bricks have been tested in accordance with the German DIN 4102 to determine the range of their application as fire-resistant glazing. It was found that glass bricks provided a rating of G60 (fire-resistance up to 60 minutes) for a single wall and G120 for a double glass brick wall.

- **Variflex** (partition wall system) – a mobile acoustic partition wall system. It has passed stringent fire testing by the SABS with flying colours. Marketed, manufactured and installed in South Africa by Aluglass, Variflex has been used with great success at major venues. The Variflex mobile partition walls provide excellent acoustic properties and allow flexible use of large areas. Rooms may be subdivided for privacy, and after the partitions can be moved away on an overhead track and positioned neatly on one side or in a cupboard. No floor track is required, and the mobile walls stand firm once locked in position. Available in three basic types, Variflex can accommodate heights from 2000 to 10 000mm. The test conducted by the SABS were to determine the fire resistance of the partition wall in accordance with WABS 0177-1981 Fire resistance test for building elements, and since the partition was symmetrical in construction in respect of both faces, it was tested from one side only – a special panel finish was applied. The 80 minute furnace test, where the furnace temperature eventually reached 990 degrees Celsius, showed that the exposed face on the non-fire side of the panel reached an average temperature of 79 degrees Celsius, with no failure being observed.

Fire-extinguishers (CO_2) must be provided on each level according to basis fire requirements codes such as SABS 0139, BS 6266, BS 7273 and BS 5839.

A control facility (in security room) will integrate and monitor all fire safety installations on a 24 hour, 7 days a week basis.

Should a fire break out, a signal to the control room will be immediate, enabling the fire to be investigated by trained security personnel, and tenants of the building alerted quickly.

Simultaneously, the alarm will be transmitted via radio telemetry to the Fire Department's control center, to respond to the incident.

Fire escape staircases and routes will be designed according to SABS.

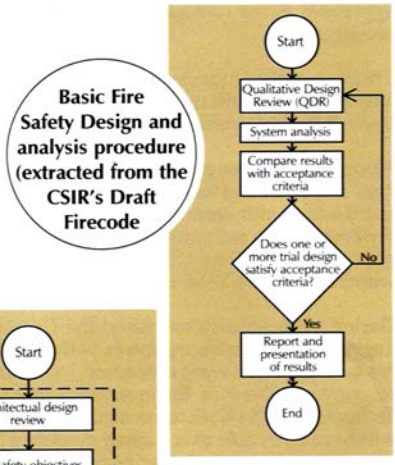
Smoke exhaust fans will be provided in the two atriums in terms of the rational fire design.

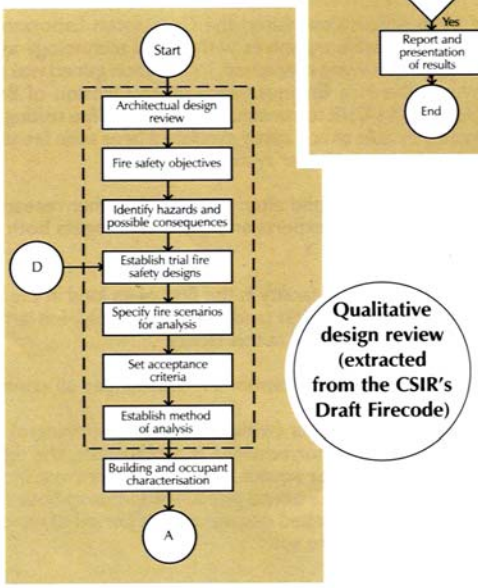
Escape routes in case of fire will not exceed the maximum of 45m.
[SABS, 1990:T1/W1]

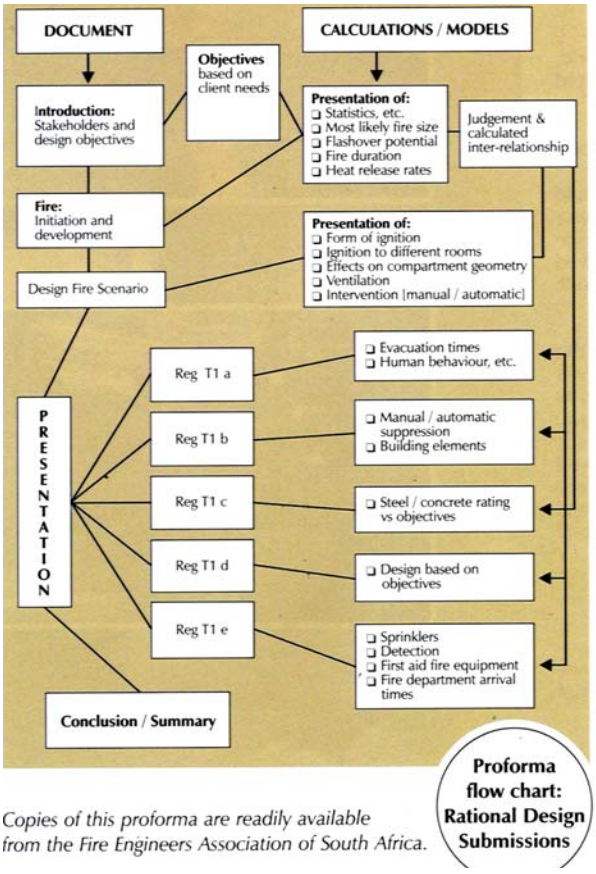
There will be six alternative fire exits in the furniture warehouse.

They will be well spread to provide exits from all angles; north, south, east and west.

FIRE FIRE FIRE FIRE







Copies of this proforma are readily available from the Fire Engineers Association of South Africa.

THE BASIC REQUIREMENTS OF SABS 0400:1990, PART T1 FIRE PROTECTION

This Code states that any building shall be so designed, constructed and equipped that in case of fire:

T1(a) the protection of occupants or users therein is ensured and that provision is made for the safe evacuation of such occupants or users;

T1(b) the spread and intensity of such fire within such building and the spread of fire to any other building will be minimised;

T1(c) sufficient stability will be retained to ensure that such building will not endanger any other building: Provided that in the case of any multi-storey building no major failure of the structural system shall occur;

T1(d) the generation and spread of smoke will be minimised or controlled to the greatest extent reasonably practicable, and

T1(e) adequate means of access, and equipment for detecting, fighting, controlling and extinguishing such fire, is provided.

Fig. 63 – Proforma flow chart – recommended by the Fire Engineers Association of South Africa – specific reference to the Part T1 of SABS 0400:1990.

Continue: 12baseline-4 pages140-155

[Gibberd, 2000:SBAT]

2.1 LOCAL ECONOMY:

The construction and management of buildings can have a major impact on the economy of an area. The economy of an area can be stimulated and sustained by buildings that make use and develop local skills and resources.

Use local contractors, building materials and supply, components and fittings to ensure efficiency of use, adaptability and flexibility, outsource opportunities and quick repairing and maintenance. It will also help to boost our local economy and training skills of contractors.

Local contractors are cheaper and if necessary can training be carried out to develop a local skill base that can be drawn of for maintenance of the building.

Maximum use of local materials will minimize cost and environmental impact of transport. Specify local technology, materials and components that can be serviced by local contractors. That will develop a local capacity to service technology. By using local people, small businesses will be supported through the design (cleaning, valet services, computer technicians, lift services, fan-services, catering etc.).

2.2 EFFICIENCY OF USE:

Buildings cost money and make use of resources whether they are used or not. Effective and efficient use of buildings supports sustainability by reducing waste and the need for additional buildings.

2.2.1 USEABLE SPACE:

Non useable space such as plant, wcs and circulation does not make up more than 20% of total area.

DEFINITION: This is the area of a floor capable of occupation. On multi-tenants floors it excludes common areas such as toilets and corridors.

Major vertical penetrations of the floor such as lift shafts and stairs are always excluded. It is of prime concern to a tenant in evaluating the size of the area offered by a landlord an in allocating the area required to accommodate personnel and furniture.

On multi-tenant floors it can vary over the life of a building as corridors expand and contract and as floors are modified.

As seen in the plan on the right, most of the area will be useable space. There will not be a lot of corridors and service occupation in the interior. The atrium space will be useable and staircases and ramps will transport the people to the next level. Most of the interior space will be flexible in terms of moveable partitions and temporary screens. The useable spaces will thus differ from time to time according to the layout of the interior atrium spaces (exhibitions).

Fig. 64 – Useable space on ground floor level of DiD Warehouse.

Building and all working/living spaces are occupied for an average equivalent of 30 hours per week.

To meet the requirements of a sustainable building and environment, there must be a high number of people/m2 floor area.

Business hours: Monday – Friday 08h00 – 18h00 (without exceptions – after hour exhibitions/functions/meetings/courses etc.)
Saturday – Sunday 08h00 – 14h00
= (10 x 5) + (2 x 6)
= 50 + 12
= 62 hours per week occupation minimum.

2.2.3 SPACE USE:

Use of space intensified through space management approach and policy such as shared workspaces i.e. 'hot-desking'.

The layouts of the partitions inside the building will be very flexible. Even the shops can subdivide or enlarge their space to suit a specific need. The atriums can be subdivided into a lot of smaller parts or can be use as one big atrium. All of the temporary spaces will have shared possibilities and flexible qualities to adapt change and provide innovation for the future.

A proportion figure of spaces inside the building will look more or less like this:

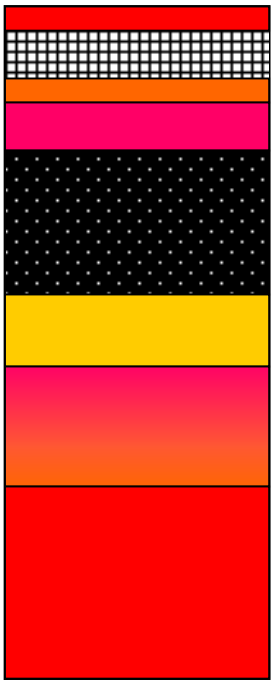


Fig. 65 – A proportion figure of the space occupation in DiD furniture warehouse.

Provide maximum productive space and limit space occupied by services, technology and other equipment. Use more compact technology and ensure that valuables take up large amounts of space.

2.2.4 USE OF TECHNOLOGY:

Communications and information technologies used to reduce space requirements i.e. videoconference, teleworking etc.

The following technology will be used:

- computers - internet, security, ventilation/heating, fire
- video facilities – for meetings, courses etc.
- cameras – security
- e-mail – allow people to shop from home
- computer controlled louver panels

MOST BUILDINGS CAN HAVE A LIFE SPAN OF AT LEAST 50 YEARS. IT IS LIKELY THAT WITHIN THIS TIME THE USE OF THE BUILDING WILL CHANGE, OR THAT THE FEASABILITY OF THIS WILL BE INVESTIGATED. BUILDINGS, WHICH CAN ACCOMMODATE CHANGE EASILY SUPPORT SUSTAINABILITY BY REDUCING THE REQUIREMENT FOR CHANGE (ENERGY, COSTS ETC.) AND THE NEED FOR NEW BUILDINGS. MOST BUILDINGS CAN HAVE A LIFE SPAN OF AT LEAST 50 YEARS. IT IS LIKELY THAT WITHIN THIS TIME THE USE OF THE BUILDING WILL CHANGE, OR THAT THE FEASABILITY OF THIS WILL BE INVESTIGATED. BUILDINGS, WHICH CAN ACCOMMODATE CHANGE EASILY SUPPORT SUSTAINABILITY BY REDUCING THE REQUIREMENT FOR CHANGE (ENERGY, COSTS ETC.) AND THE NEED FOR NEW BUILDINGS. MOST BUILDINGS CAN HAVE A LIFE SPAN OF AT LEAST 50 YEARS. IT IS LIKELY THAT WITHIN THIS TIME THE USE OF THE BUILDING WILL CHANGE, OR THAT THE FEASABILITY OF THIS WILL BE INVESTIGATED. BUILDINGS, WHICH CAN ACCOMMODATE CHANGE EASILY SUPPORT SUSTAINABILITY BY REDUCING THE REQUIREMENT FOR CHANGE (ENERGY, COSTS

[Gibberd, 2000:SBAT]

2.3 ADAPTABILITY AND FLEXIBILTY:

Most buildings can have a life span of at least 50 years. It is likely that within this time the use of the building will change, or that the feasibility of this will be investigated. Buildings, which can accommodate change easily support sustainability by reducing the requirement for change (energy, costs etc.) and the need for new buildings.

2.3.1 VERTICAL DIMENSION:

Structural dimension (floor to underside of roof, or slab of the floor above) minimum of 3m.

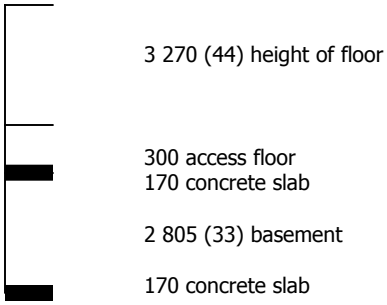


Fig. 66 - The floor to ceiling heights of DiD furniture warehouse – in section.

Floor to ceiling heights are most of the time too low. A higher floor to ceiling height will ensure flexibility in future and will enable the building to accommodate change

- short term (daily)
- long term (life of the building)

Access flooring have a lot of advantages and computer cables, heating/cooling systems etc. will be installed in the raised floor.

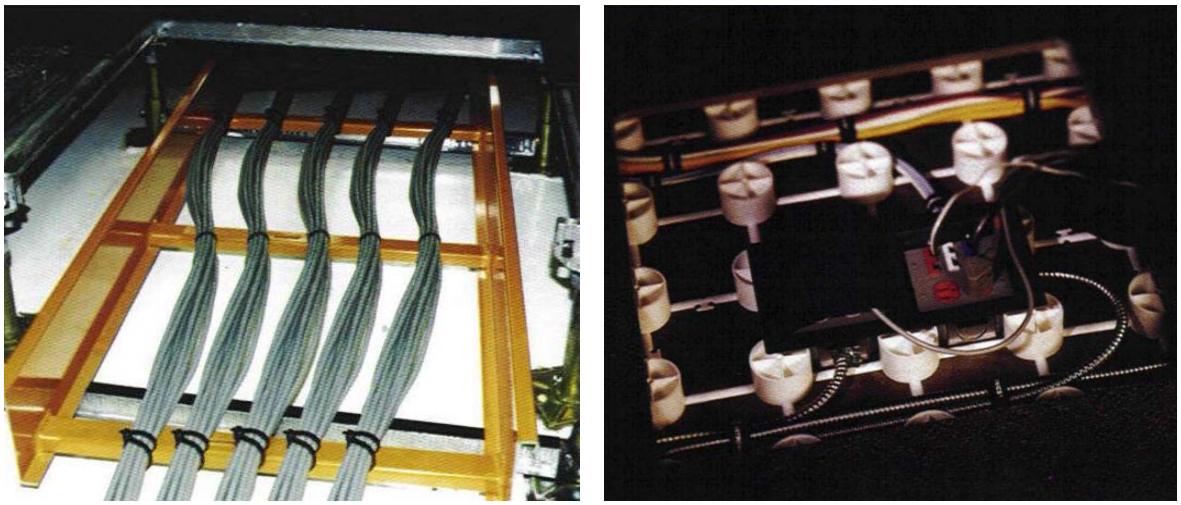


Fig. 67 – Cablefloor has a much lower height requirement (68mm). There are many different cabling systems available in South Africa.

DEFINITION OF AN ACCESS FLOOR:
A raised access floor is a floor consisting of loadbearing, removable floor and that provides panels supported by pedestals and, where installed on a structural subfloor, and underfloor space for the accommodation and distribution of services and provides access to facilitate the relocation. [Hope, 2002:17]

- panel size – 600 x 600mm (18mm thick)
- panel connections – stringerless panels (decrease panel reveberation)
- outlets – flush, concealed or surface-mounted
- accessories – panel lifters, cut-outs and perforated panels
- installation – panels must be precise and dimensionally exact
- fire protection – insure that values for smoke development, heat transfer, and flame spread are sufficient
- electrical performers – static control accomplished by maintaining high relative humidity and using finish materials
- panel finish – carpet, resilient tile, or high pressure plastic laminate

2.3.2 INTERNAL PARTITIONS:

Internal partitions between living/work spaces are non-load bearing (i.e. non-load bearing brick/block or plasterboard partitions) and can be 'knocked-out' relative easily.

As previously mentioned, exhibition spaces and shop spaces will be constructed of temporary internal partitions to accommodate change. A flexible layout is essential to ensure flexibility of spaces. Each exhibition will require different requirements and sizes. The walls will be non-load bearing so that you can the partitions. The internal partitions will be of glass (shopfronts – views towards exhibitions and other spaces) and of thick gypsum board (painted) in the atrium spaces (for exhibition purposes).

A typical gypsum internal drywall construction will look like this:

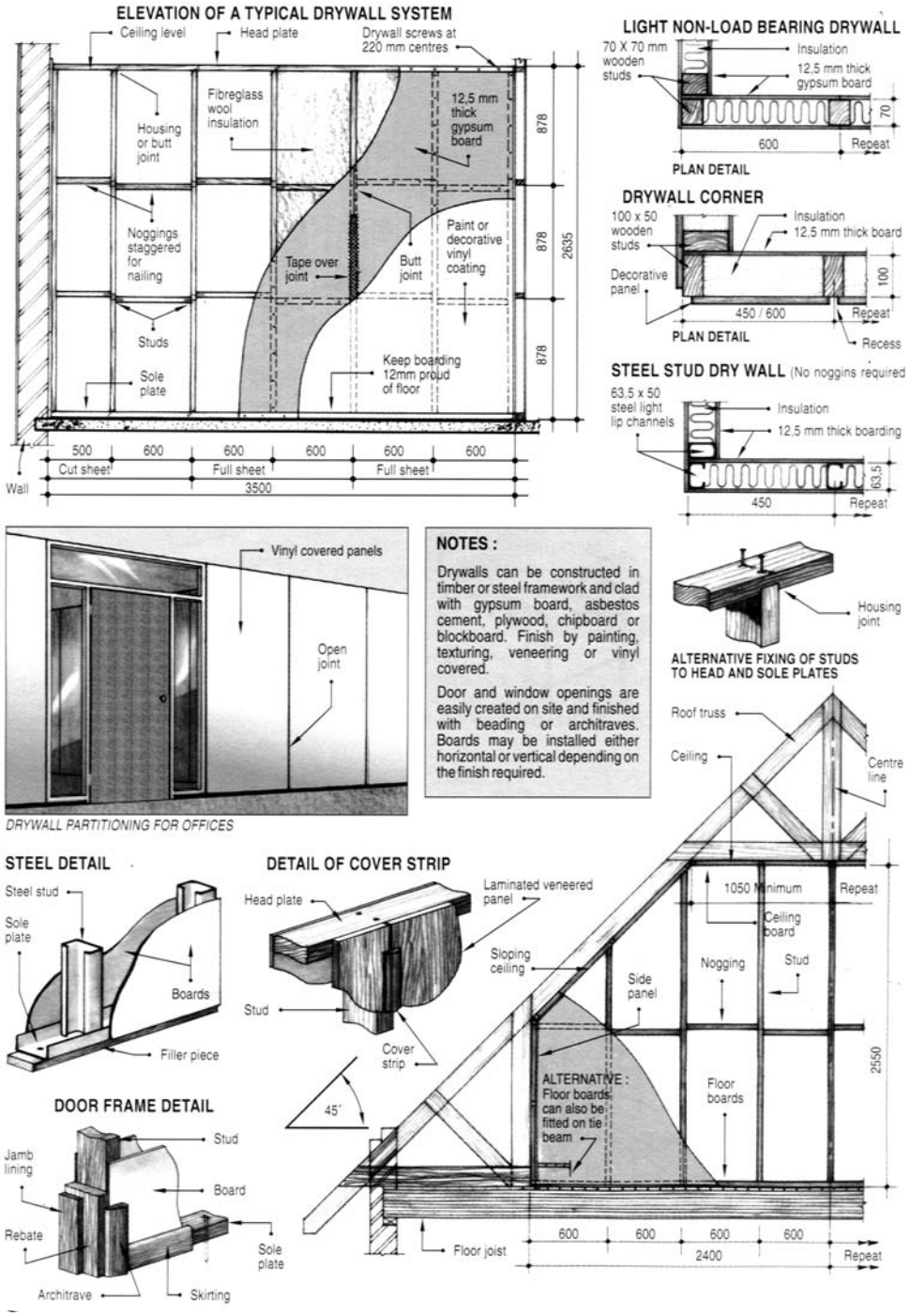
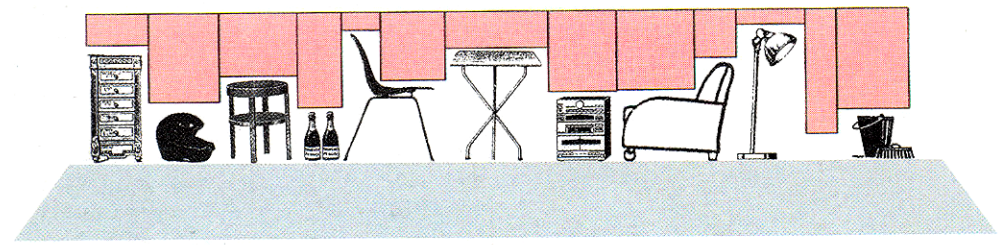
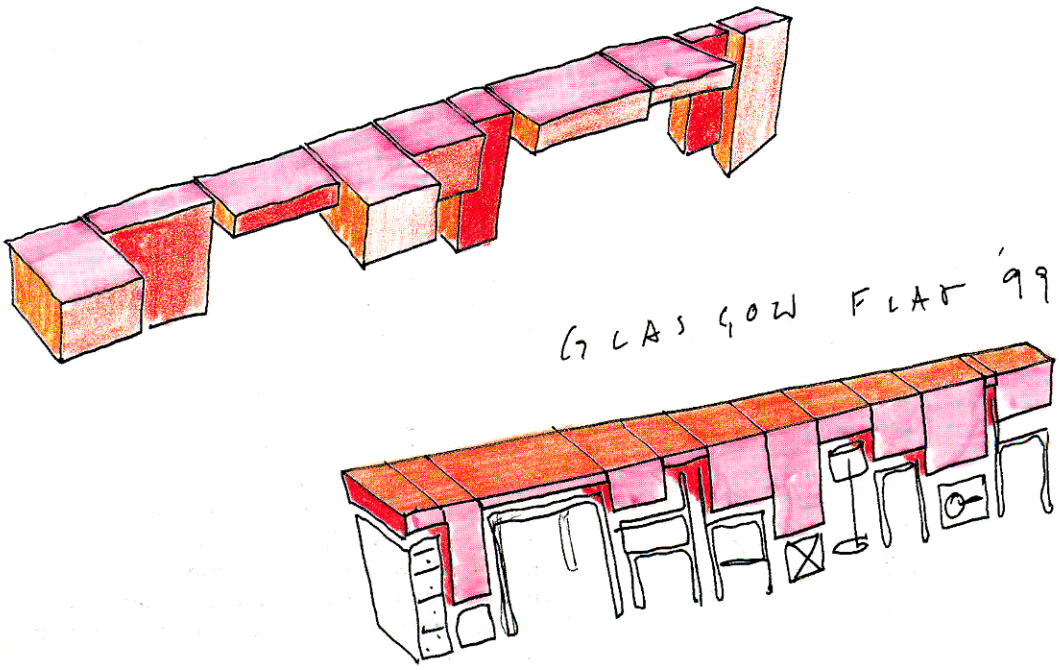


Fig. 68 – A typical drywall construction.





[Domus No 819-820, 1999:44]

Fig. 69 : Not included

Fig. 69 – Movitec Design PTY (Ltd), a local company, will manufacture and install the glass partitions that needs to be provided. The partition range is fully sound proof and fire rated Class 1.

SPECIFICATION AND MATERIAL SPEC. FOR LOW MAINTENANCE AND OR LOW COST MAINTENANCE. ALL PLANT AND FABRIC HAVE A MAINTENANCE CYCLE OF AT LEAST TWO YEARS. LOW OR NO MAINTENANCE COMPONENTS (I.E. WINDOWS, DOORS, PLANT, IRONMONGERY ETC.) TO BE SELECTED. MAINTENANCE CA RIED OUT COST EFFECTIVELY ITEMS SUCH AS LIGHT BU EACHED AND REPLACED EXPENSIVE EQUIPMEN MATERIAL SPECIFICAT NANCE AND OR LOW CO PLANT AND FABRIC HAVE CYCLE OF AT LEAST TWO YEA LOW OR NO MAINTENANCE COMPONENTS (I.E. WINDOWS, DOORS, PLANT, IRONMONGERY ETC.) SELECTED. MAINTENANCE CAN BE CARRIED OUT COST EFFECTIVELY (I.E. REPLACEABLE ITEMS SUCH AS LIGHT BULBS CAN BE EASILY REACHED AND REPLACED WITHOUT USE OF EXPENSIVE EQUIPMENT). SPECIFICATION AND MATERIAL SPECIFICATION FOR LOW MAINTENANCE AND OR LOW COST MAINTENANCE CYCLE OF AT LEAST TWO YEAR

ongoing Costs

[Gibberd, 2000:SBAT]

2.4 ONGOING COSTS:

2.4.1 MAINTENANCE:

Specification and material specification for low maintenance and or low cost maintenance. All plant and fabric have a maintenance cycle of at least two years. Low or no maintenance components (i.e. windows, doors, plant, ironmongery etc.) selected. Maintenance can be carried out cost effectively (i.e. replaceable items such as light bulbs can be easily reached and replaced without use of expensive equipment).

Maintenance will be minimized by good detailed design in terms of roof overhangs and exposed material specifications. Weather will play a tremendous role in hard wearing of materials and it is important to design to minimize the direct impact of the weather elements on materials.

The annual maintenance of buildings may cost 1 – 4% of its original erection cost, depending on design. Assuming a conservation average life cycle of 50 years for a building, the maintenance cost spend during the life of the building will be twice the original cost. It is for this reason, very important to choose materials that require low maintenance and have a relative long life span (see materials section).

Solar passive design will minimize maintenance cost since there will be no moving parts and there will be direct financial benefits for energy saving. The building will save energy cost for not using airconditioners and water consumption will benefit from the watertanks and roof catchment system.

[Holm, 1996:84,85]

The basic strategy for choice of sustainable building materials will consist of:

- prevention of unnecessary use and efficient use of materials
- use of renewable and recycled sources
- selection of materials with the least environmental impact

The environmental impact of materials is caused during the complete lifetime. Typical environmental issues are:

[Anink, Boonstra, Mak, 1995:10]

- raw materials, embodied energy, emissions, hindrance, waste, recycling, repair and lifetime. It is important to select those building products which have the lowest environmental impact and long lifespan.

Stainless steel balustrades and fittings are durable and will not need much maintenance. Make use of natural materials, for example brick and stone (without paint) – it will ensure much longer lifespans.

An energy audit can be executed with various levels of accuracy:

- a visual inspection and estimation of approximate maintenance and operation costs
- quantified energy uses and losses by tests and measurements
- complete analysis for each energy function within a building with modeling and pattern predictions

[Holm, 1996:892]

FROM AN ENERGY EFFICIENCY POINT OF VIEW IT PAYS TO INVEST INITIALLY IN ORDER TO SAVE IN THE LONG RUN.

2.4.2 CLEANING:

Measures taken to limit requirement for cleaning. Hard wearing solid flooring (limited or no carpeting) specified. Windows easily accessible for cleaning.

2.4.3 SECURITY/CARE TAKING:

Measures taken to limit requirement and costs of security. This should include mixed-use development (area is always occupied), buildings and spaces overlooked by occupied neighbouring buildings.

2.4.4 INSURANCE/WATER/ENERGY/SEWERAGE:

Costs of insurance, water, energy and sewerage monitored. Consumption and costs regularly reported to management and users. Policy and management to reduce consumption (i.e. switching off lights on leaving building spaces implemented.

2.4.5 DISRUPTION AND 'DOWNTIME':

Electrical and communication services, HVAC and plant located where they can be easily accessed with a minimum of disruption to occupants of building. This should maximizing access to this from circulation areas and lift off panels at regular intervals to vertical and horizontal ducting.

Provide visible meters in the building so that people can monitor their consumption (1 meter per floor).

- the meter must be highly visible (daily/monthly)
- reports for building users each month – encourage them to save
- linking to computer – to build up a long term picture

Lifetime maintenance-plan for the building components:

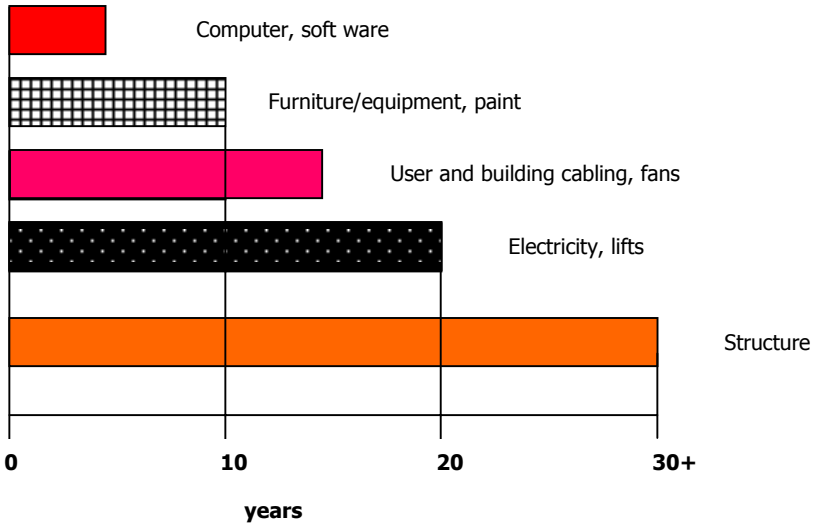


Fig. 70 – Lifetime maintenance-plan for the building components.

2.5 CAPITAL COSTS:

Buildings are generally one of the most valuable assets that people, and often organizations and governments own. Money spent on buildings is not available for other uses such as health and education. Often in addition, the high cost of buildings results in the services (i.e. health and education) and the accommodation (for work and living) is beyond the reach of people with the lowest incomes. Buildings that are cost effective support sustainability by helping provide access to accommodation and services for low-income areas and by enabling money to be spent on other areas that support sustainability.

PROPORTIONS OF COST SPEND:
Capital cost of buildings can be categorized under the following headings:

- services
- HVAC
- electrical
- plumbing

PLATE RATIO:
Ratio of floor space to external wall surface area. Should not exceed 0,4 for an cost efficient building. The ease of construction (shape of building as well) will have an influence on the capital cost. Use prefabricated structures where possible to reduce energy consumption and labour-hours on site. [Gibberd, 2000:SBAT]

WATER IS REQUIRED FOR MANY ACTIVITIES. HOWEVER THE LARGE-SCALE PROVISION OF CONVENTIONAL WATER SUPPLY HAS MANY ENVIRONMENTAL IMPLICATIONS. WATER NEEDS TO BE STORED (SOMETIMES TAKING UP LARGE AREAS OF VALUABLE LAND AND DISTURBING NATURAL DRAINAGE PATTERNS WITH ASSOCIATED PROBLEMS FROM EROSION ETC.); IT ALSO NEEDS TO BE PUMPED (USING ENERGY) THROUGH A NETWORK OF PIPES (THAT NEED TO BE MAINTAINED AND REPAIRED) TO THE USER. THE WATER, A PARALLEL NETWORK IS REQUIRED TO DISPOSE OF THE WATER ONCE USED, I.E. SEWERAGE SYSTEMS. REDUCING WATER CONSUMPTION SUPPORTS SUSTAINABILITY BY REDUCING THE ENVIRONMENTAL IMPACT REQUIRED TO DELIVER WATER, AND DISPOSE OF THIS AFTER USE IN A CONVENTIONAL SYSTEM. WATER IS REQUIRED FOR MANY ACTIVITIES. HOWEVER THE LARGE SCALE PROVISION OF CONVENTIONAL WATER SUPPLY HAS MANY ENVIRONMENTAL IMPLICATIONS. WATER NEEDS TO BE STORED (SOMETIMES TAKING UP LARGE AREAS OF VALUABLE LAND AND DISTURBING NATURAL DRAINAGE PATTER

[Gibberd, 2000:SBAT]

3.1 WATER:

Water is required for many activities. However the large-scale provision of conventional water supply has many environmental implications. Water needs to be stored; it also needs to be pumped through a large network of pipes. Having delivered the water, a parallel efforts is then required to dispose of this after it is used, i.e. sewerage systems. Reducing water consumption supports sustainability by reducing the environmental impact required to delivered water, and disposing of this after use in a conventional system. [Gibberd, 2000:SBAT]

Johannesburg have an average monthly rainfall of 59,50mm.

The highveld-climatic region (Johannesburg) have a rainfall of 650 – 900mm per year.
[Holm, 1996:64]

Building type	Cold water storage (24 hours supply) litre/person	Hot water storage (at 65 degrees Celsius) litre/person
Restaurants	7	3*
Offices: With canteen Without canteen	 45 35	 5 5

* Restaurants vary between 450 litre storage for 50 meals per day, to 1 100 litres for 400 meals per day, and to 3 400 for 1500 meals per day.
Fig. 71 – Water storage in various building types.

Distribution	Minimum or temporary	Normal	With wastage allowance
Standpipe for up to 100 persons	20	40	60
Single tap connection	120	160	180
Multiple tap connection	160	200	240
Multiple tap connection in areas of water shortage	100	150	-

Fig. 72 – Daily domestic water supply standards (litres per capita).

STORMWATER DRAINAGE (For Administrative Region 7): [LIDP, 2002:27]
In the fully developed part of the region the main stormwater conduits appear generally to be of ample capacity to handle presently recurring flows. The topography of the area is such that all stormwater runoff disperses quickly into established watercourses, which have sufficient capacity to handle the run-off water, i.e. the entire region is well drained and offers good drainage for any potential development. Thus bulk stormwater poses no major restraint to development, other than in or in close proximity to such water courses (normally determined by 1:50 year return storm floodplain) such as informal settlements in Alexandra.

WATER (For Administrative Region 7): [LIDP, 2002:27]
The area is fully serviced with water and sanitation. However, certain low-density areas could be redeveloped at higher densities – this could result in the need to upgrade services at the intermediate level (i.e. sub-outfall sewers and/or water reservoirs).

The existing water networks in the Johannesburg and Sandton portions of the former Eastern Metropolitan Local Council are comprehensive and in general in a good condition. Due to the age of certain portions of the networks, it is necessary that upgrading and refurbishing of the networks be carried out on a regular basis.

Supply zone	Reservoir	Capacity Ml	Spare capacity	Equivalent dwellings Low income	Equivalent dwellings Upper income
District 1: Dunkeld	 Dunkeld	 13,6	 62,9	 59 860	 16 760
Parktown 1&2	Parktown 1	22,7	62,9	59 860	16 760
Klipfontein	Linksfield	33	62,9	59 860	16 760
Linbro Park	Linbro Park	12	5,8	5 570	4 920
Marlboro	Marlboro	38,7	0	0	0

Fig. 73 – Reservoir supply zones serving Region 7 and estimated spare capacity.

3.1.1 RAINWATER

Rainwater from 80% of roof surface is harvested, stored and used.

Area of the roof = 2 060m2
(Say 1 900m2 – provide for corners etc.)

Area 1 900m2 x 0,65m rainfall = 1 235m3
(0,9 effect.)
= 1 111,5m3 per year
= 92,6 m3 per month

9 000 litre tanks will be used
= 9 000 x 10
= 90 000 litres

Thus, 10 tanks (9 000 litres) will be necessary.

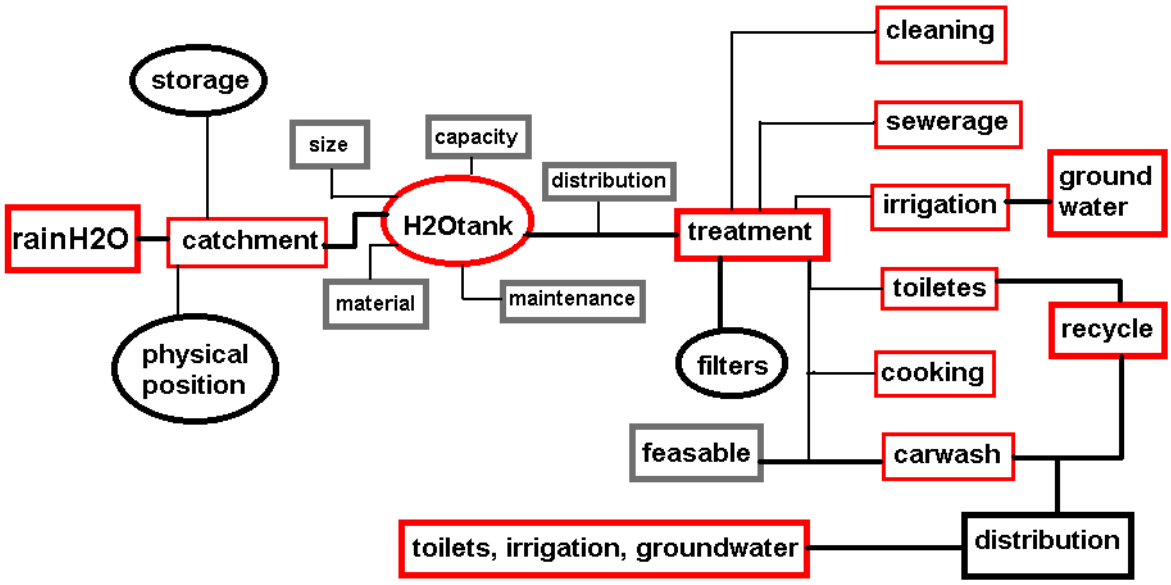


Fig. 74 – Diagrammatic representation of the rainwater catchment and distribution of Did warehouse.

AVERAGE HOT WATER CONSUMPTION:

- handbasin 5 litre
- kitchen sink (per wash-up) 6 litre
- dishwasher 14 litre

(Turning the geyser thermostat down to 65 degrees Celsius will instantly lower energy and costs).

WATER CONSUMPTION:
INDOOR:

- restaurant – drinking (4 persons = 1 litre per day)
  350 = 88 litre per day
  - cooking 1000 litre per day
  - dishes 800 litre per day

- toilets – wcs
  (1 toilet flush = 10 litre)
  60 times per hour
  60 x 8 = 480 times per day
  480 x 10 = 4 800 litre per day
  - whbs, urinals = 1 600 litre per day

- spray pipes

TOTAL:
= 88 litre + 1 000 litre + 800 litre + 4 800 litre + 1 600 litre
= 8 288 litre per day
= more or less 248 640 litre per month.

OUTDOOR:

- landscaping – irrigation (30 litre x 60 = 1 800 litre/hour) – once a day
- other (flower boxes etc.)
- hose pipe = 30 litre per minute
- a dripping tap = 6-12 kl per month

TOTAL:
= 1 800 litre per day

Thus, more or less, one third of the required amount of water will be used from the tanks per month.

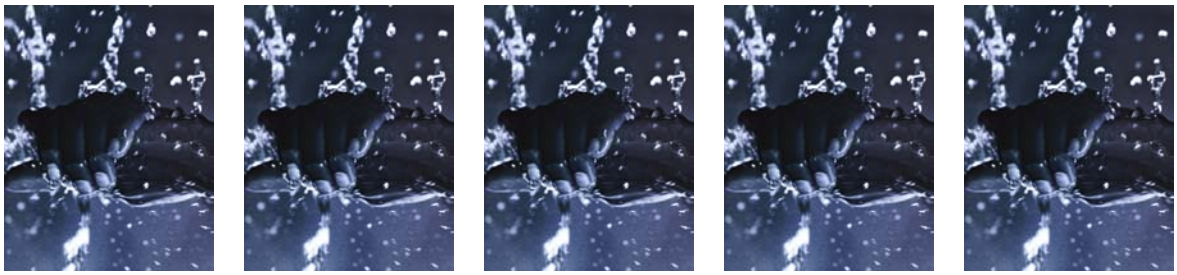
Fig. 75 : Not included

Fig. 75 – Diagrammatic layouts – boreholes, tanks and stands.

3.1.2 WATER USE:

All water devices specified minimize water consumption and encourage efficient use.

Use efficient:
- toilets – below 6 litre
- taps – below 0,03 – 0,17 litre per second (specify low flow taps)



3.1.3 PLANTING:

All planting specified has a low water requirement (indigenous species).

HARD PAVING:
- recycled concrete slabs
- concrete slabs, turf
- clay tiles, concrete blocks

Restricting the extent of paving, and aiming for water-permeable hardening is preferable because it enlarges the water collecting area, which favours the micro-climate. It reduces the burden on the water treatment plant, which helps to prevent annual overflows. Pilot studies already carried out, which have taken this into account, have proven that a reduction of the hardening, including roof surfaces, from about 50% down to 40% is feasible.

Recycled concrete slabs are preferable for paving as they consist, in part, of secondary raw materials. Slabs are generally preferable to clay tiles due to their lower energy content. Grass turf has a limited use because of its structure, but it has the advantage of a smaller amount of material and greater water permeability.
[Anink, Boonstra, Mak, 1995:36]

Run-off will be reduced when using soft landscaping. Trees and lawn (soft landscape) will filter/absorb water. Soft clay bricks will absorb water as well.

Sand surfaces for parking will be better than tar surface roads. A steep site will cause erosion – (water gets up to a certain speed). Large areas of exotic plants must also be avoided because they will consume more water. For that reason, indigenous planting will be used.

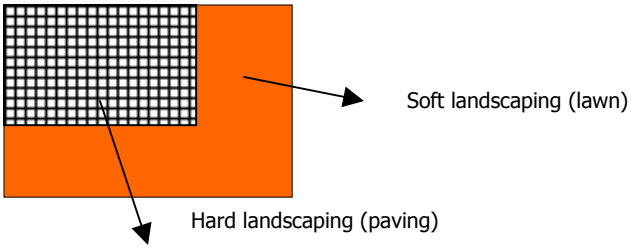


Fig. 76 – A strategy called 'Hydrozone Planting' – to prevent water run-off.

Soft landscaping will absorb the water coming from the hard surface to prevent run-off on site. Use grass-concrete blocks instead of paving. The grass inside the concrete block will absorb the water. Locate species with different requirements (soft edges). Continuous trees must be provided on north-west and north-east edges as well as evergreen trees on the south side (windbreak trees).

Indigenous planting: (deciduous trees) – plant on northern side of the building for sun (winter) and shade (summer).
- EKEBERGIA CAPENSIS
- CELTIS AFRICANA

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BUILDINGS CONSUME ABOUT 50% OF ALL ENERGY PRODUCED. CONVENTIONAL ENERGY PRODUCTION IS RESPONSIBLE FOR MAKING A LARGE CONTRIBUTION TO ENVIRONMENTAL DAMAGE AN NON-RENEWABLE RESOURCES DEPLETION. USING LESS ENERGY OR USING RENEWABLE ENERGY IN BUILDINGS THEREFORE CAN A SUBSTANTIAL CONTRIBUTIO STAINABILITY. BUILDINGS 0% OF ALL ENERGY PR AL ENERGY PRODUCTI MAKING A LARGE CO ONMENTAL DAMAGE A RESOURCE DEPLETION. GY OR USING RENEWABLE E IN BUILDINGS THEREFORE CAN MAKE A SUBSTANTIAL CONTRIBUTION TO SUSTAINABILITY. BUILDINGS CONSUME ABOUT 50% OF ALL ENERGY PRODUCED. CONVENTIONAL ENERGY PRODUCTION IS RESPONSIBLE FOR MAKING A LARGE CONTRIBUTION TO ENVIRONMENTAL DAMAGE AND NON-RENEWABLE RESOURCE DEPLETION. USING LESS ENERGY OF USING RENEWABLE ENERGY IN BUILDINGS THEREFORE CAN MAKE A SUBSTANTIAL CONTR

energy

[Gibberd, 2000:SBAT]

3.2 ENERGY:

Buildings consume about 50% of all energy produced. Conventional energy production is responsible for making a large contribution to environmental damage and non-renewable resource depletion. Using less energy or using renewable energy in buildings therefore can make a substantial contribution to sustainability. [Gibberd, 2000:SBAT]

3.2.1 LOCATION:

Building located within 400m of public transport.

The road network serving in Administrative Region 7 is composed of: [LIDP, 2002:33-34]

- two north-south freeways; N3 and M1
- three east-west freeways; N1, R24 and M2
- East-west arterials; which include Marlboro Drive

BUS SERVICES:
Bus services in the area are provided by Metropolitan Bus Services, Putco Soweto and Putco Commuta. The bus routes are very pervasive in the southern parts of the region but less so in the northern parts.

Minibus routes are more evenly distributed in the region than the bus services.
(See plans – Transportation – Administrative Region 7).

Develop a pattern that will encourage:

- public transport
- pedestrians (15 min. to walk 1 km)

3.2.2 APPLIANCES AND FITTINGS:

Energy efficient fittings and devices specified. 80% of light fittings are fluorescent/low energy consumption.

- use ambient energy as much as possible (energy that is in the environment – natural daylighting)
- one drop of water per second can waste over 1000 litre per month – check for leaks
- by switching the geyser off at night/ times during day will save a lot of energy (not that much warm water will be used by the furniture warehouse)
- computers – most draw around 100 watts, unless using, switch on/off as required

3.2.3 VENTILATION SYSTEM:

80% of ventilation requirements met through passive ventilation.

Ventilation rate per person:
= 2 x volume of room (m3) / 3 600 seconds
= (m3/s)

3.2.4 HEATING AND COOLING SYSTEM:

All heating and cooling requirements met through passive environmental control system use.

RAW MATERIALS AND NEW COMPONENTS USED IN BUILDINGS CONSUME RESOURCES AND ENERGY IN THEIR MANUFACTUR AND PROCESSES. BUILDINGS ACCOMMODATE ACTIVITIES THAT CONSUME LARGE AMOUNTS OF RESOURCES AND PRODUCTS AND PRODUCE LARGE AMOUNTS OF WASTE. REDUCING THE USE OF NEW MATE[illegible]D COMPONENTS IN BUILDINGS [illegible] ACTIVITIES ACCOMMOD[illegible] WASTE BY RECYCLING [illegible] SUPPORTS SUSTAINAB[illegible]E ENERGY CONSUMPT[illegible]NSUMPTION RAW MATE[illegible]OMPONENTS USED IN BU[illegible]E RESOURCES AND ENERGY IN [illegible]ANUFACTUR AND PROCESSES. BUILDINGS ACCOMMODATE ACTIVITIES THAT CONSUME LARGE AMOUNTS OF RESOURCES AND PRODUCTS AND PRODUCE LARGE AMOUNTS OF WASTE. REDUCING THE USE OF NEW MATERIALS AND COMPONENTS IN BUILDINGS AND IN THE ACTIVITIES ACCOMMODATED AND REDUCING WASTE BY RECYCLING AND REUSE SUPPORTS SUSTAINABILITY BY REDUCING THE ENERGY CONSUMPTION AND RESOURCE CONSUMPTION

recycling & reuse

[Gibberd, 2000:SBAT]

3.3 RECYCLING AND REUSE:

Raw materials and new components used in buildings consume resources and energy in their manufacture and processes. Buildings accommodate activities that consume large amounts of resources and products and produce large amounts of waste. Reducing the use of new materials and components in buildings and in the activities accommodated and reducing waste by recycling and reuse supports sustainability by reducing the energy consumption and resource consumption. [Gibberd, 2000:SBAT]

3.3.1 TOXIC WASTE:

Arrangements made for the safe disposal/recycling of toxic/harmful substances i.e. batteries, printer toners, vehicles etc.

3.3.2 INORGANIC WASTE:

Arrangements for sorting, storage and pick up of recyclable waste.

3.3.3 ORANIC WASTE:

All organic waste recycled on site i.e. compost.

3.3.4 SEWERAGE:

Contribution to mains sewerage form toilet minimized through use of compost toilets, and other 'local' systems.

3.3.5 CONSTRUCTION WASTE:

Construction waste minimized through design and careful management of construction practices. Design limits wastage by designing to comply with modular dimensions of materials. Construction waste minimized by specifying this requirement in tender document and monitoring compliance.

- minimise the production of waste through working with suppliers etc. to avoid packaging
- look at linkages within site and with neighbours to enable recycling (composting, glass bins etc.)
- create linkages with neighbouring buildings

There are a huge waste disposal site in Linbro Park. Fees are to be paid for dumping at the Linbro Park disposal site. The non-removal of waste will increase the likelihood of contamination of groundwater and soil.

The provision of proper waste services will have a positive impact on the curbing of the spread of certain diseases, the aesthetic quality of the area and an improvement in living conditions for people.

The following types of waste are to be considered to be recycled/reuse: [Gibberd, 2000:SBAT]

- construction
- sewerage
- organic
- inorganic
- toxic

Important considerations:

- bins provided on site
- specify the use of the bins very clearly
- smaller bins can be in the building
- adequate space are essential
- collection of the waste to be specified
- contractors to be appointed

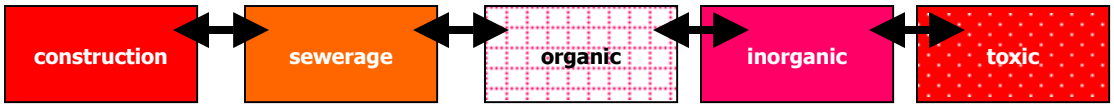


Fig. 77 – Waste to be recycle/reuse on building site.

THE CONSTRUCTION OF BUILDINGS USUALLY REQUIRES LARGE QUANTITIES OF MATERIALS AND COMPONENTS. THESE MAY REQUIRE LARGE AMOUNTS OF ENERGY TO PRODUCE. THEIR DEVELOPMENT MAY ALSO REQUIRE PROCESSES THAT ARE HARMFUL TO THE ENVIRONMENT AND CONSUME NON-RENEWABLE RESOURCES. THE CONSTRUCTION OF BUILDINGS USUALLY REQUIRES LARGE QUANTITIES OF MATERIALS AND COMPONENTS. THESE MAY REQUIRE LARGE AMOUNTS OF ENERGY TO PRODUCE. THEIR DEVELOPMENT MAY ALSO REQUIRE PROCESSES THAT ARE HARMFUL TO THE ENVIRONMENT AND CONSUME NON-RENEWABLE RESOURCES. THE CONSTRUCTION OF BUILDINGS USUALLY REQUIRES LARGE QUALITIES OF MATERIALS AND COMPONENTS. THESE MAY REQUIRE LARGE AMOUNTS OF ENERGY TO PRODUCE. THEIR DEVELOPMENT MAY ALSO REQUIRE PROCESSES THAT ARE HARMFUL TO THE ENVIRONMENT AND CONSUME NON-RENEWABLE RESOURCES. THE CONSTRUCTION OF BUILDINGS USUALLY REQUIRES LARGE QUANTITIES OF MATERIALS

materials & components

[Gibberd, 2000:SBAT]

Listen to LeCorbusier in 1927:
You employ stone, wood and concrete, and with these
Materials you build houses and palaces; that is construction.
Ingenuity is at work.
But suddenly you touch my hart,
You do me good, I am happy and I say: "This is beautiful".
That is architecture. Art enters in.

3.4 MATERIALS AND COMPONENTS:

The construction of buildings usually requires large quantities of materials and components. These may require large amounts of energy to produce. Their development may also require processes that are harmful to the environment and consume non-renewable resources. [Gibberd, 2000:SBAT]

3.4.1 EMBODIED ENERGY:

80% of the building materials and components made from materials and components with low embodied energy. Low embodied energy. Low embodied energy materials include locally (within country) made and sourced timber, concrete, concrete block timber, windows and doors.

3.4.2 MATERIAL/COMPONENT SOURCES:

90% of materials and resources from renewable resources.

3.4.3 MANUFACTURING PROCESSES:

Environmental damage limited during product component development. No green house gases released, no pollution caused.

3.4.4 RECYCLED/REUSED MATERIALS AND COMPONENTS:

10% of building materials and components are reused or from recycled sources.

3.4.5 CONSTRUCTION PROCESSES:

Building and construction process designed to minimally impact the environment. Requirement for large-scale vegetation clearing and earth movement minimized.

WATER CONSUMED IN BUILDING MATERIALS:
- 1 tonne bricks – 2 200 litre
- 1 tonne steel – 165,000 litre
- 1 tonne plastic – 1,32 million litre
- concrete: typical bag – 23 litre

[Gibberd, 2002]

- ensure that the manufacturing process will not be harmful to people/environment
- encourage suppliers to incorporate recycling material in their materials
- recycling of aluminium reduces the requirement of energy by 96%, steel by 53%
- the building must be designed to minimize the requirement for large-scale groundwork on-site
- energy conscious design attempts to reduce energy wasted of cutting and placing of building materials

The basic strategy for choice of sustainable building materials consists of the following steps:
- prevention of unnecessary use and efficient use of materials
- use of renewable and recycled sources
- selection of materials with the least environmental impact

[Anink, Boonstra, Mak, 1995:10]

- 50% of material resources taken from nature are building related
- >50% of national waste production comes from the building sector
- pollution per kg created by stone, concrete and brick-like material is, generally minimal
- stone, concrete and related products last the entire life-span of a building
- concrete has a low energy content per kg
- glass – large amount of energy needed to achieve high temperature require for processing the raw materials
- glass – successfully recycled – remelting
- glass waste – only recycled into low-grade glass

- sand-lime-brick – unsuitable for reuse (only for low-grade application)
- metals – reusability (economically attractive)
- aluminium – high-grade recycling
- steel – reuse (less than al.)

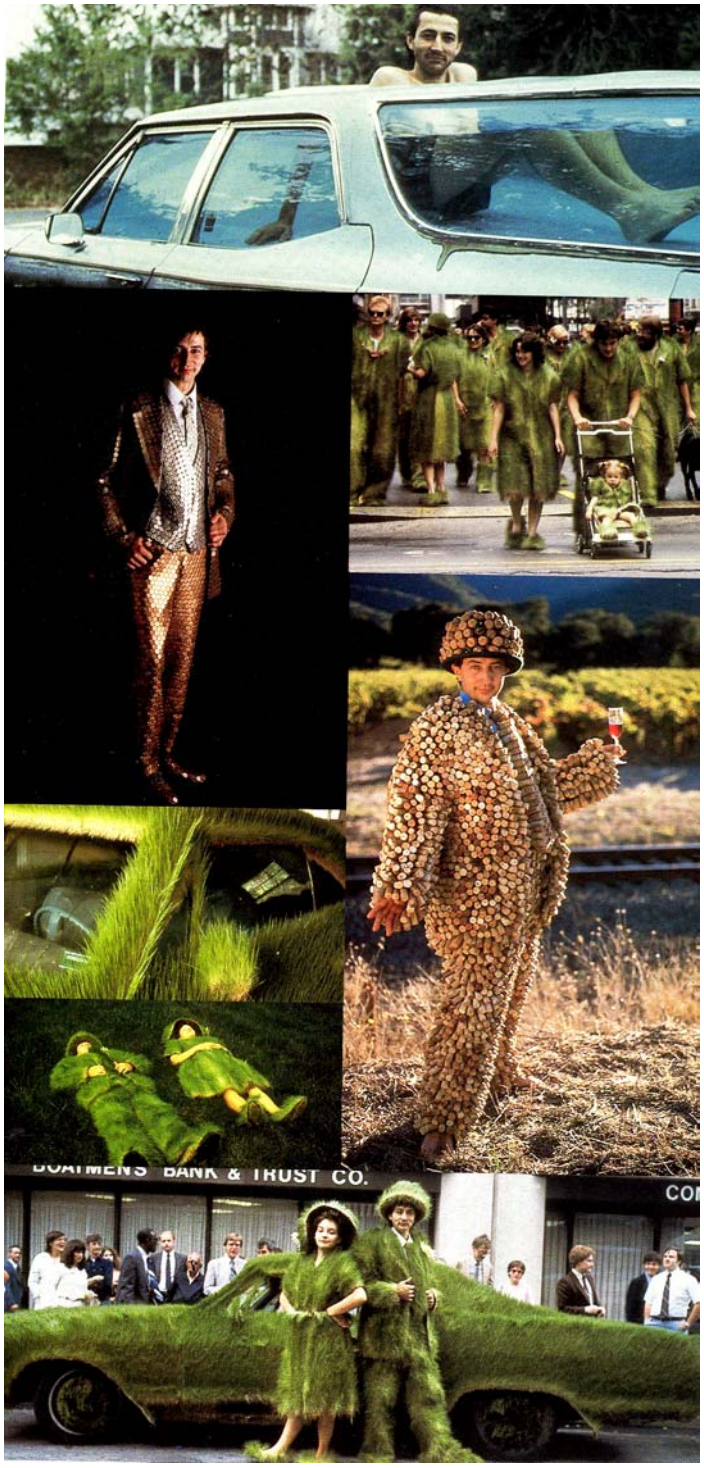
[Anink, Boonstra, Mak, 1995: 166-167]

Material	GJ/TON
Steel	20
Steel, recycled	3,6 – 5,6 (82% saving)
Aluminium (by hydro electricity)	75
Aluminium (by coal fired power)	167
Aluminium, recycled	4,7 (97,2% saving)
Lead	31
Copper	40
Zinc	46 – 52
Polythene	137,5
Cement	13,1
Glass, sheet bottles	14 – 18
Tiles	4
Clay bricks	1 – 6 (3,5)
Soft wood	3,4
Copper	40
Zinc	46 - 52

Table 78 – Energy content of building materials.

Material	GJ/TON
Brick	2,5
Concrete	1,7
Superstructure (roof structure)	
Plasterboard	4,4
Stabilized earth	0,7
Concrete tiles	12
Vinyl	70
Glass, technical ware	54

Table 79 – Energy content of building materials.



[Domus No 813-814, 1999:89]

SETTING IN MOTION A BUYING
PROJECT OWN IS
TRANSFO RIBUTION

DiD

WAREHOUSE

TECHNICAL
REPORT

A S ECTS ON
DISPL OUCHED SEE
THE WA AS AN EVENT
PLACE IN A GIVE-AND-TAKE

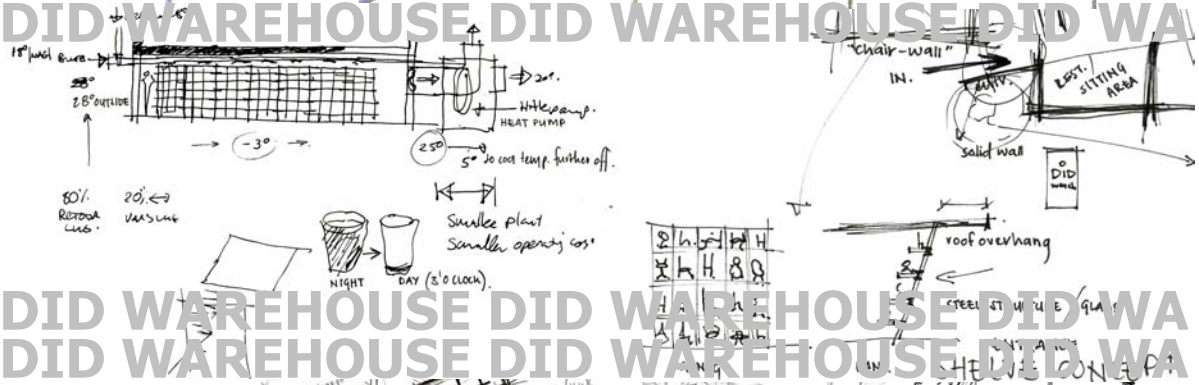
INTRODUCTION:

The technical report is a summary of the building performance according to the baseline document (target setting).

The report is a respond to the target that has been set in the baseline document. Thus, this report will act as a performance tool of the standards set for a sustainable building (SBAT Tool – Jeremy Gibberd).

The report is applicable to the building as a whole as well as to the baseline document, and must be viewed together.

Detailed descriptions of every economic, social and environmental target of the building is provided in the baseline document and the technical report is only a reporting tool for the baseline document.



1. LIGHTING:

Natural light penetrates the building through the north, east and south facades. The amount of glass is minimized on the west façade to minimize traffic noise from the N3-highway, as well as afternoon sun. A fair amount of sun and glare protection is provided by means of louver panels. The north façade has a glass curtain wall with a steel louver panel in front of the curtain wall to minimize the amount of direct rays of the sun, but to maximize the amount of natural light.

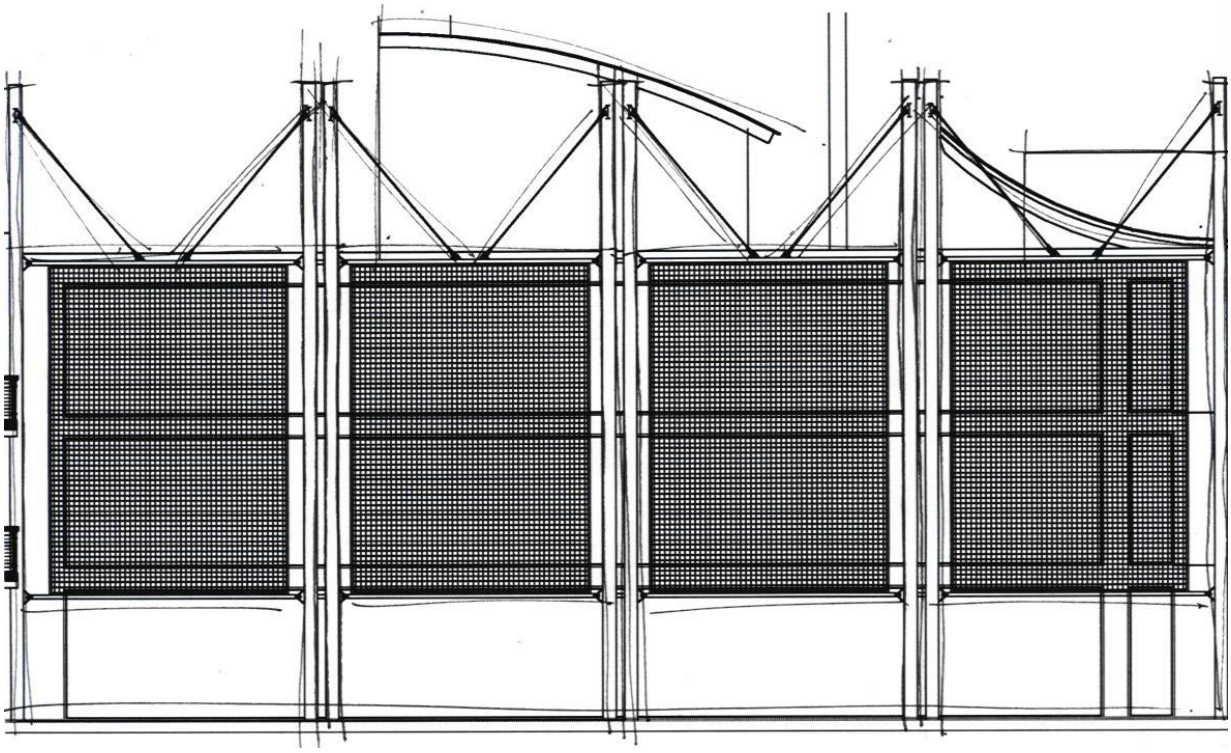


Fig. 80 - An advertising board – act as a louver panel.

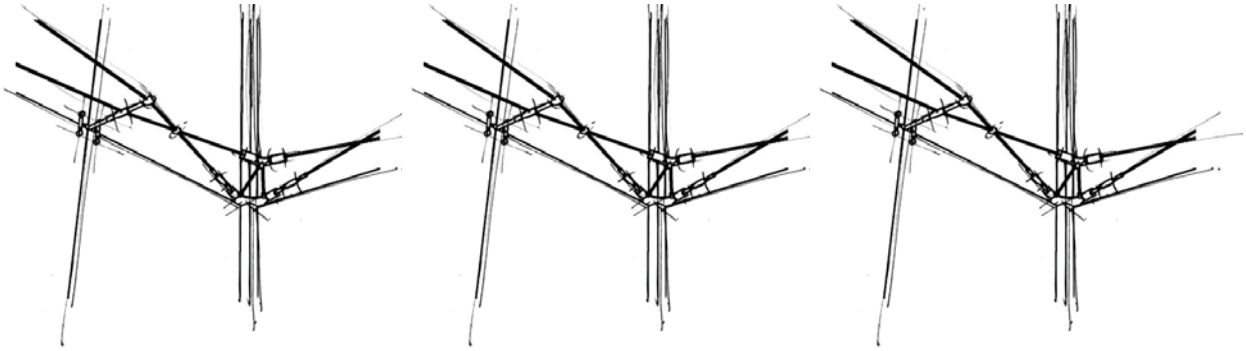


Fig. 81 - Glass curtain wall on the north façade.

An advertising board on the east façade is covered with a shadow net and acts as an advertising board as well as a sun device to block the direct rays of the sun.

Natural light enters the atrium spaces through unobstructed glass panels underneath the roof structure (see Section A-A).

Refer to baseline document (lighting) for detailed information on other lighting qualities and information on DiD Warehouse.

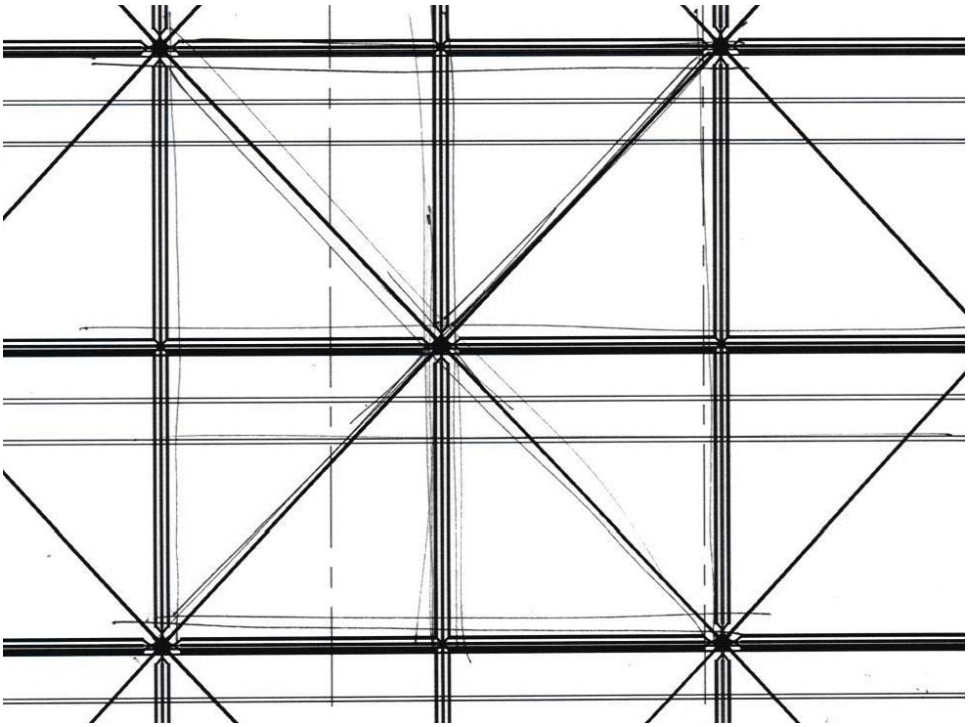


Fig. 82 – The typical louver panel on the north and west façades to protect the building against direct rays of the sun.

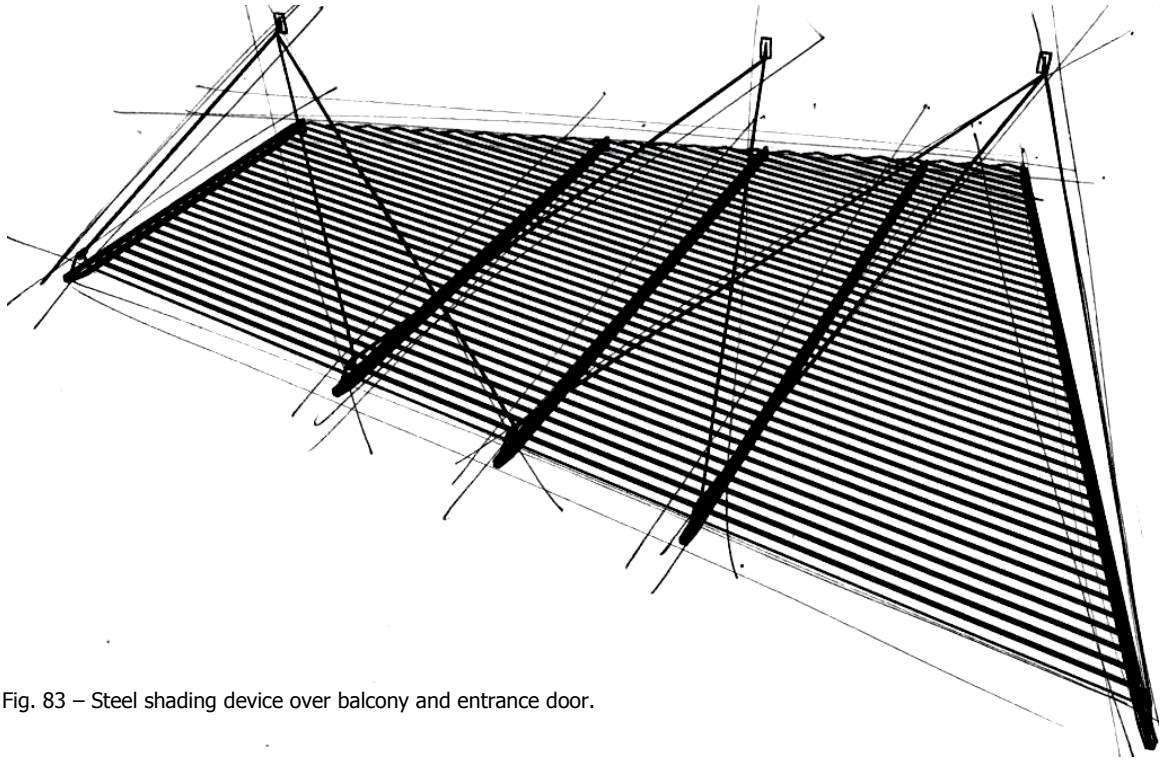


Fig. 83 – Steel shading device over balcony and entrance door.

2. VENTILATION:

The building will be ventilated through cross-ventilation and a rock bin system. Spaces are designed to allow maximum natural cross ventilation and the atrium spaces will act as stack systems to ensure that unwanted warm air during summer will escape through windows at the top.

(See basement plan – position of rock bin system)

2.1 VENTILATION SYSTEM: ROCK BIN [Mechanical engineer – Pieter Nel, 2003]
"A rock bin system" will be implemented to keep the building cool during the summer when hot daytime temperatures occur.

The rock bin is basically a bin filled with rocks. Air will be driven through the openings between the rocks. Because the ground surface has a constant temperature of 15 – 20 degrees Celsius, a suitable position for the rock bin will be underneath the building.

It can be assumed that an internal temperature of 20 degrees Celsius will be provided. A heat pump (air-conditioner) will cool the air a further 5 degrees Celsius. The rock bin will minimize the operating cost of the air-conditioning unit and a smaller plant will be required than usual. It is important to keep cool air inside the building because the cool air will tend to leave through every possible opening, (especially in the atrium spaces).

RULE OF THUMB:
- 1m3 rock bin for every 10m2 of floor area

RULE OF THUMB:
- Flow distance of rock bin 2m

- Airflow 3 – 8 m/s (more than 5 becomes noisy)
- Section area (m2)
- Flow rate (m3/s)
- Formula: Flow rate = speed x area
- Ventilation rate: 2 x volume of room m3/3 600s (energy: baseline document)

Rising warm air will be removed from the internal spaces of the building by means of extractor fans on top of the roof. The extractor fans can be closed during winter and require no maintenance. They will contribute to the removal of hot air, dust and fumes trapped inside the building. The fans will operate with a thermostat, which will activate a damper to open the fans at 3 o'clock in the afternoon, when a temperature of 28 degrees Celsius will probably be reached in the upper floors of the building.

Cold air will move through the atrium where no obstruction exists and floors through louver panels (grills) in the floors. An openable louver panel will be provided for every 10m2 floor area. Each panel can open separately – to suit individual needs.

The system will use convection to create air movement. Fans will assist the process and control the movement of air. Fresh air will be supplied to all the spaces and will be more than sufficient in terms of spaces with inadequate ventilation or windows. Note that no smoking will be allowed in DiD Warehouse.

The air requirement according to SABS 0400 (see baseline document) are:
- Educational buildings
  - libraries: 6,5 litre/s
- Food and eating facilities (public)
  - cafeterias: 5 litre/s
  - kitchens: 17,5 litre/s
- Shops
  - malls, arcades, warehouses: 7,5 litre/s
  - sale floors, showrooms: 7,5 litre/s
- Resorts and similar facilities
  - conference rooms: 5,0 litre/s
  - assembly rooms: 5,0 litre/s

The minimum air that needs to be supplied is 5 litre/s (500 litre/s = 0,5 m3/s).
5 x 650 persons = 3 250 litre/s fresh air requirement
= 3,25 m3/s
Thus, the corresponding minimum fresh air supply is 4,72 litre/s/person.

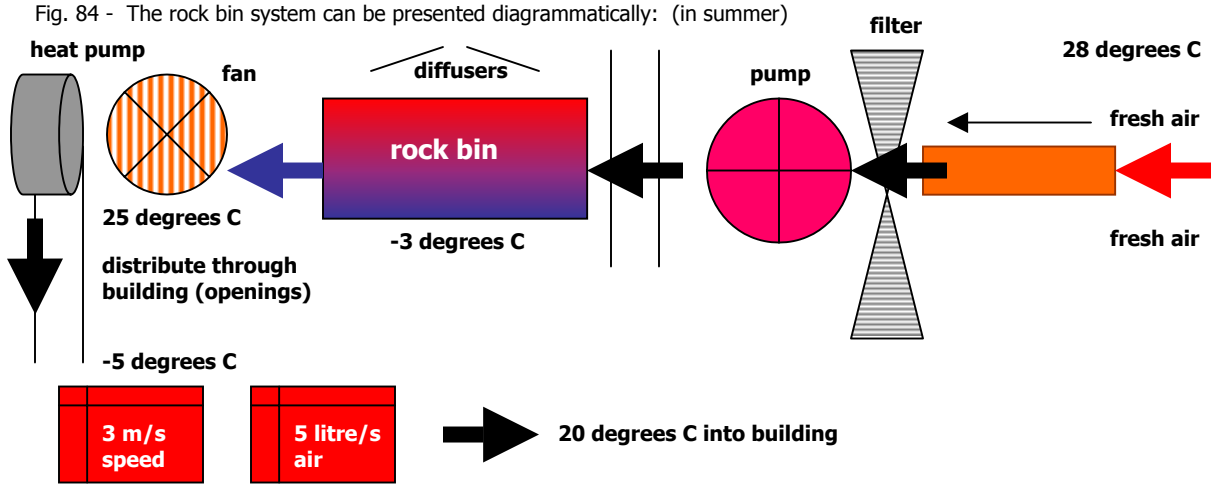
Calculations:
V = V x A x 0,7
V = flow rate
V = volume of flow rate
A = ventilation duct area
70% factor for max. speed x area

Sales floors, showrooms: (7,5 litre/s air requirement: SABS 0400)
7,5 x 200 persons = 1 500 litre/s
= 1,5 m3/s

Area of duct > 1,5m3/s
Size of ventilation ducts = 1 000 x 1 400 (area = l x b)
Size of rock bins:
1 m3 rock bin for every 10 m2 floor area
Flow distance: 2 000 (acc. to mechanical engineer Pieter Nel)
Provide 5 litre/s fresh air and speed of 3 m/s

Internal floor area = 1 963,7m2
= 196 m3 rock bin to be provided
= l x b x h
= 40 x 2 x 2,5
= 200 m3
(2 805 = height of basement)

Fig. 84 - The rock bin system can be presented diagrammatically: (in summer)



Air will not go through the system during the winter. The diffusers will be closed and air will only go through the heat pump and then be distributed through the building. The warm air must be kept inside the building and when necessary, be removed by the extractor fans.

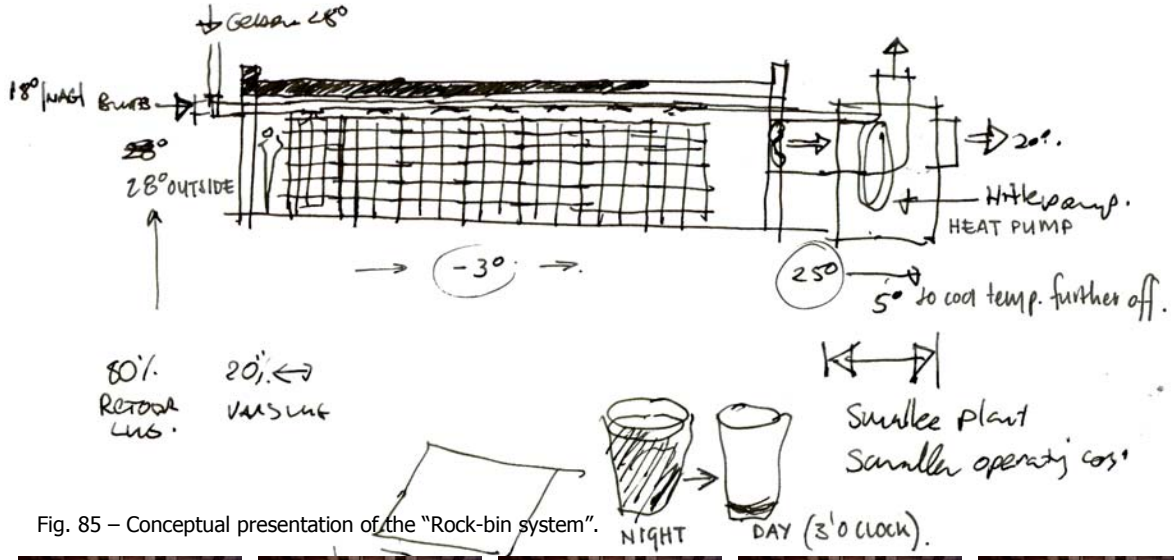
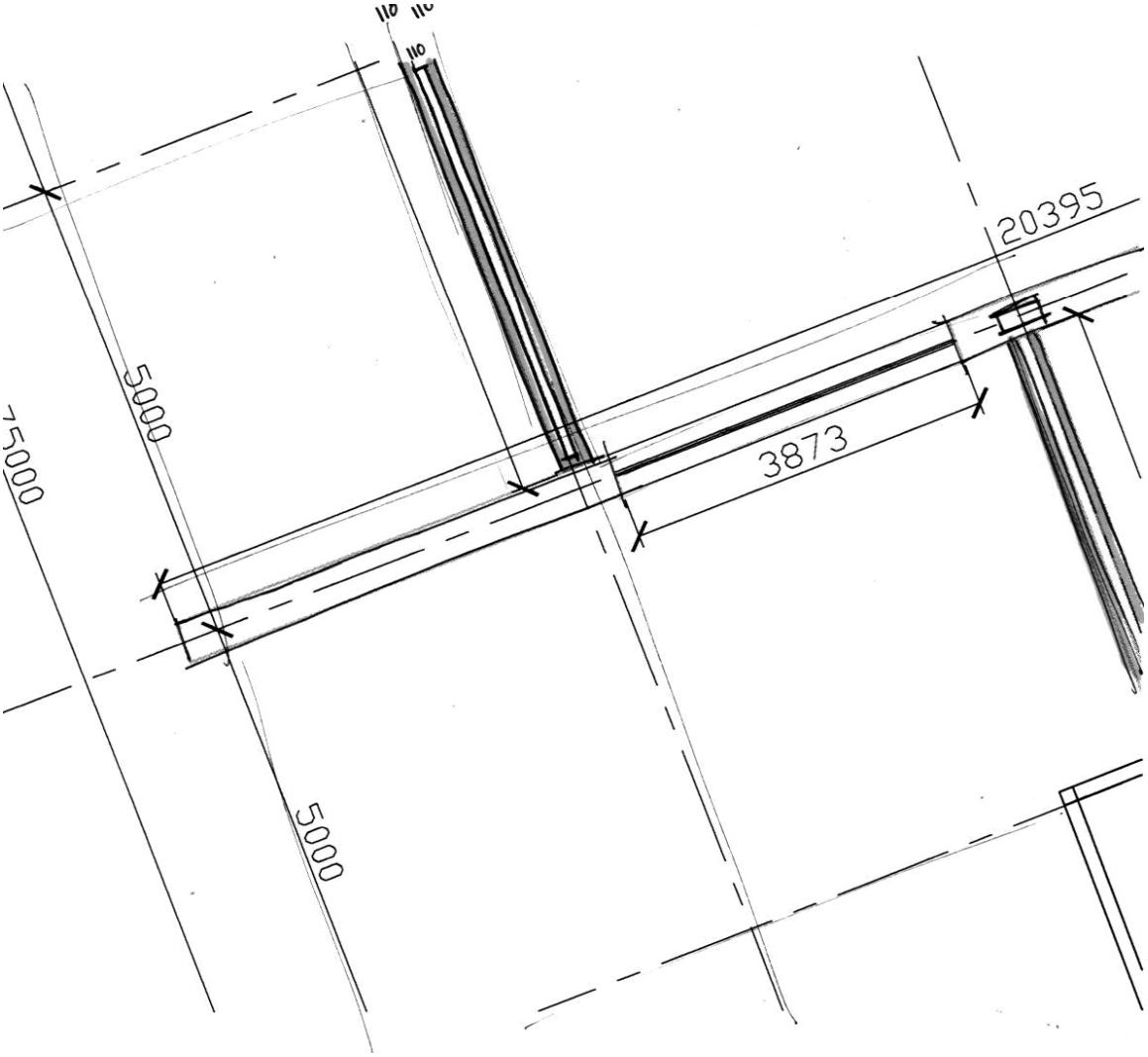


Fig. 85 – Conceptual presentation of the "Rock-bin system".

3. NOISE:

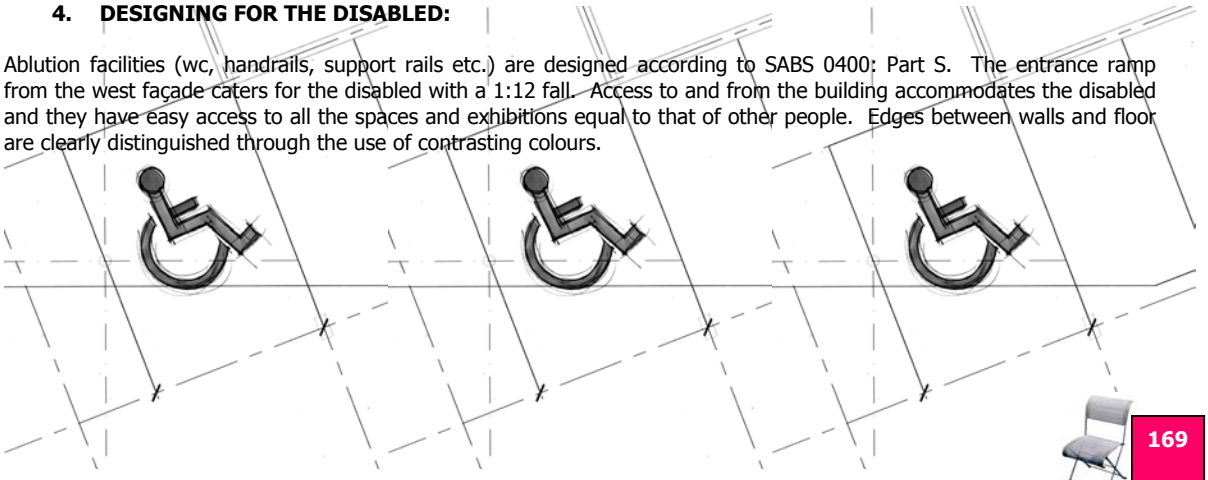
Traffic noise on the west side of the building is limited through a minimum amount of glass on the façade. Windows, doors and walls are fitted with glass wool, mineral wool and underfelt to ensure maximum insulation. Walls are constructed with a cavity (330mm walls with a 110mm cavity), to maximize the results (55dB).

(See baseline document for detailed calculations on the noise levels that will occur in DiD Warehouse).



4. DESIGNING FOR THE DISABLED:

Ablution facilities (wc, handrails, support rails etc.) are designed according to SABS 0400: Part S. The entrance ramp from the west façade caters for the disabled with a 1:12 fall. Access to and from the building accommodates the disabled and they have easy access to all the spaces and exhibitions equal to that of other people. Edges between walls and floor are clearly distinguished through the use of contrasting colours.

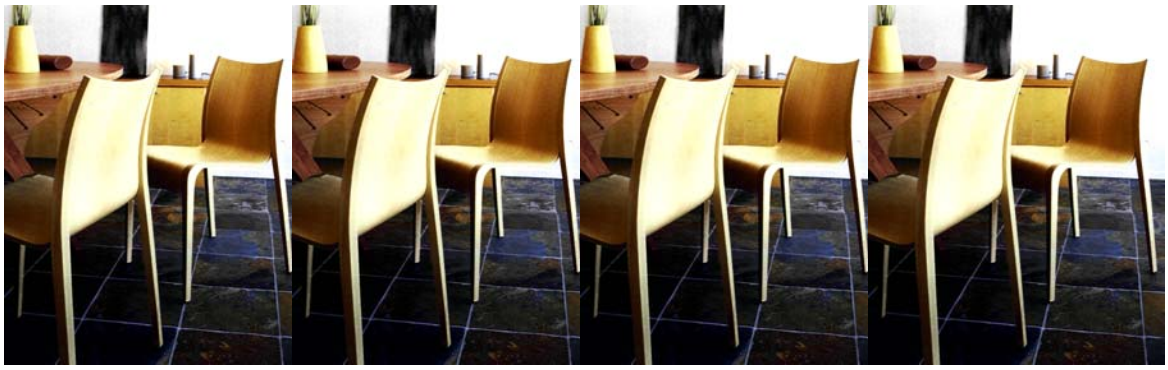


5. SOCIAL SPACES:

Social spaces such as

- gathering/relaxing/waiting area
- cafeteria
- outside sitting spaces
- lunch/juice bars
- informal reading room

are provided to ensure informal/formal social interaction for DiD Warehouse, as well as for the greater Linbro Business Park. Because of the lack of social facilities in the area, DiD Warehouse will provide a cafeteria and juice bar for breakfast and lunch hours in Linbro Business Park.



SOCIAL SOCIAL SOCIAL SOCIAL SOCIAL SOCIAL

6. SECURITY:

DiD Warehouse will comply with all the targets that have been set in the baseline document, by providing the highest possible level of security. (See baseline document – education, health and safety, section 1.4.2).

7. FIRE REGULATIONS:

The regulations of SABS 0400: Part T, are applicable to DiD Warehouse and escape routes, outside spaces, smoking areas, staircases, ramps etc., are designed according to those regulations. (Refer to baseline document).

8. OCCUPANCY:

DiD Warehouse will be occupied 64 hours per week. (See baseline document for detailed calculations). Usable space is calculated for the ground floor level as follows:

- Shops – 313,3m2
- Showrooms – 1 559,6m2
- Cafeteria – 137m2
- Sitting/relaxing/waiting area – 1 170m2
- Administration office – 58,3m2
- Security – 40,8m2
- Exhibition space – 627,8 m2

Total ground floor useable space – 3 906,8m2

Total area (including lifts, toilets, corridors, stores, etc.) – 4 395,3m2

Thus, the total useable space on ground floor level – 89%

9. VERTICAL DIMENSION:

To ensure maximum flexibility for DiD Warehouse, high floor to ceiling heights and access floors will be able to accommodate changes in the short term (daily) and long term (for the full lifetime of the building).

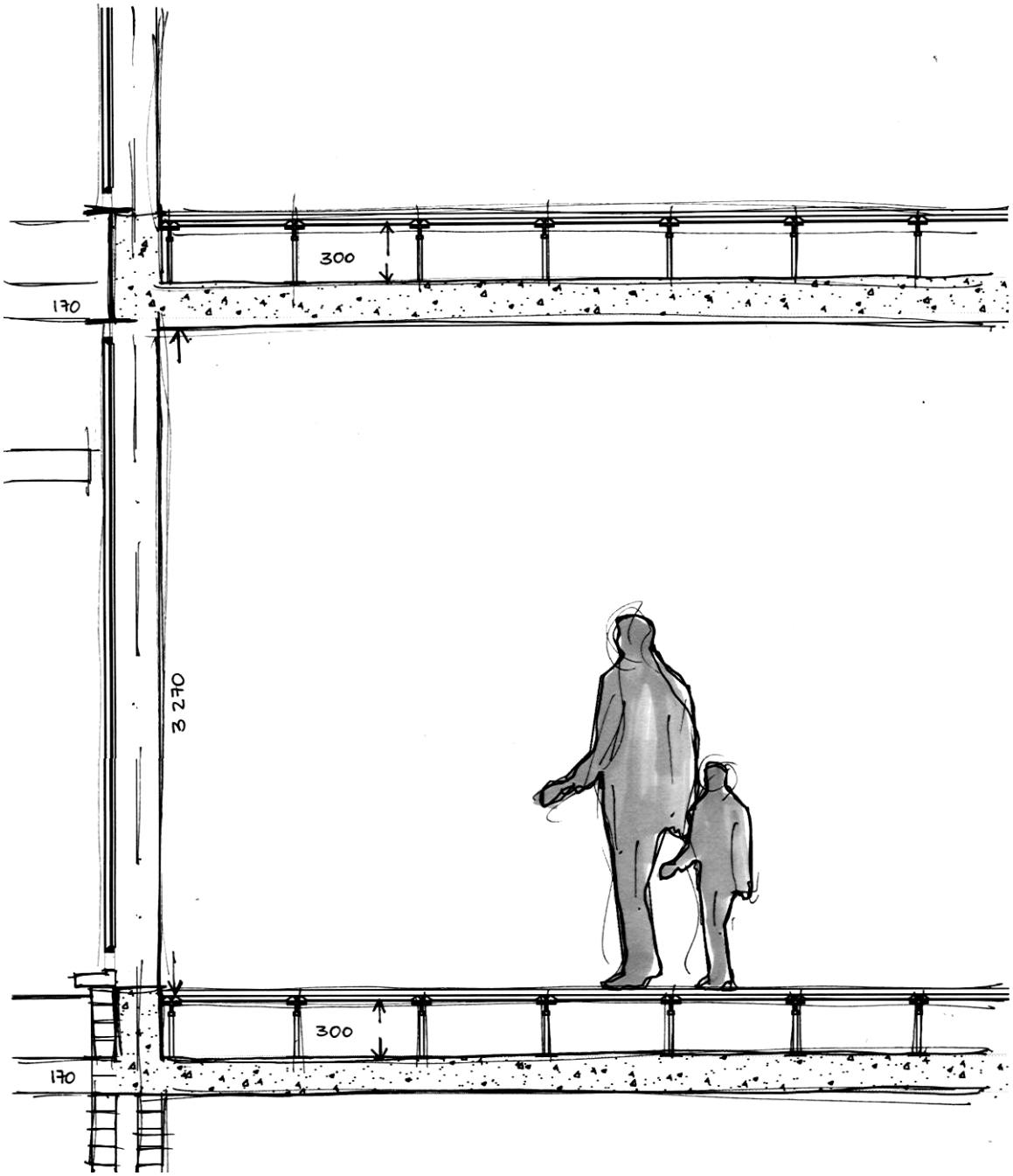


Fig. 86 – A concept section through DiD Warehouse to show floor to ceiling heights and access floors.

10. INTERNAL PARTITIONS:

See construction drawings (plans, section A-A, drywall details). Refer to baseline document for information on internal partitions used in DiD Warehouse. The "glass box" (containing the shops on the northern side) will mainly consist of glass partitions and drywalls. This will maximize flexibility in terms of future changes. Exhibitions will also be designed and constructed out of non-load-bearing drywall partitions.

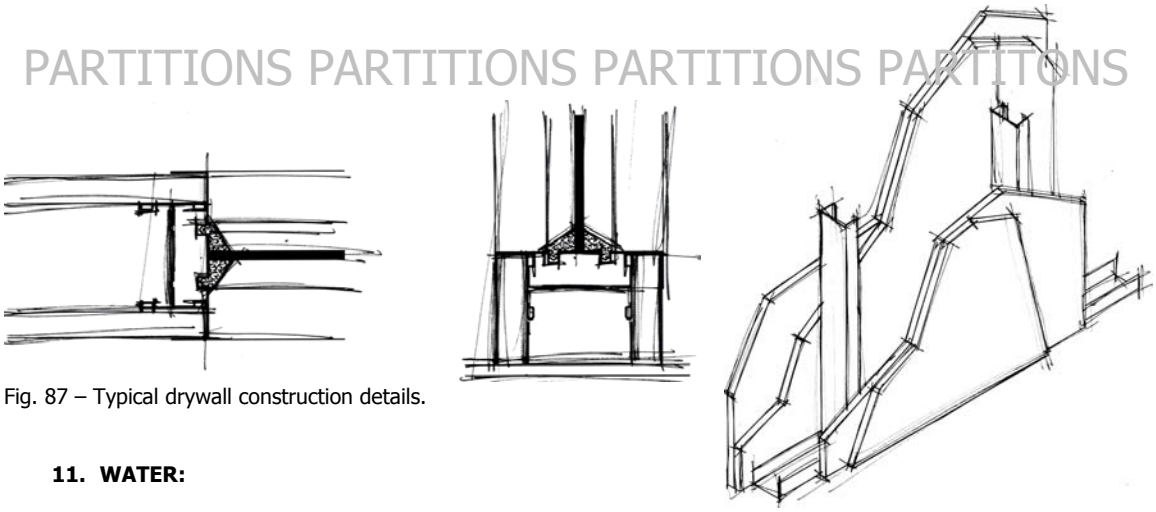


Fig. 87 – Typical drywall construction details.

11. WATER:

Rainwater will be harvested, stored and used for toilet flushing and irrigation purposes. According to the calculations made in the baseline document, a third of the required amount of water will be supplied by collection tanks.

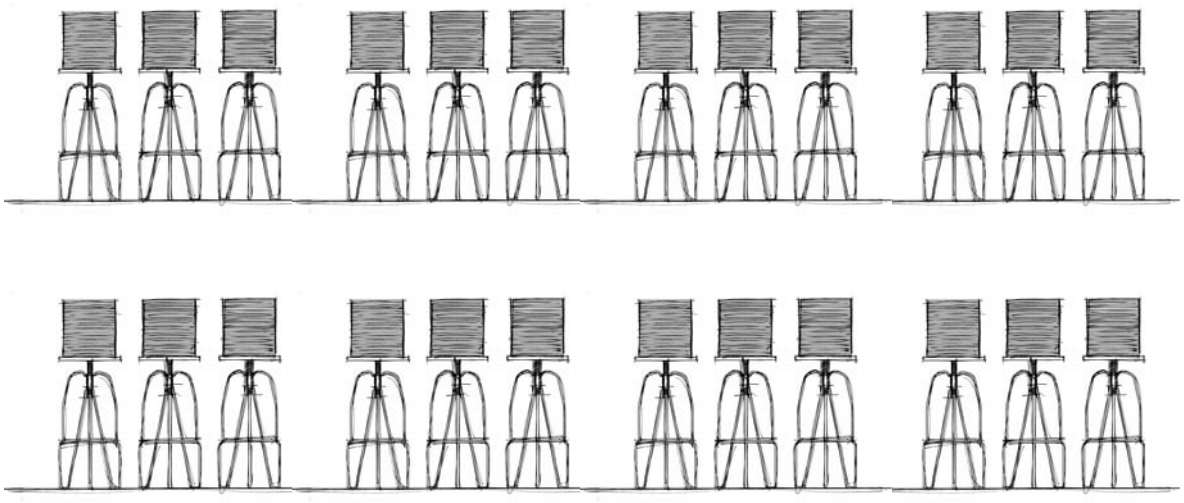


Fig. 88 – Model six stools – designed by Jeff Covey. Spun aluminum of formed maple plywood seat, cast aluminium hub, rolled steel base. The Covey stool collection of San Francisco became the concept for the water tank "chair-design".

12. SITE – PARKING REQUIREMENTS:

Type of building	Parking provision	Loading/unloading provision
Shops	Staff: one car space for each 100m2 gross floor area. Customers: one space for each 25m2 gross floor area.	General minima as follows: Gross floor space not exceeding: 500m2 (minim. space req. 50m2) 1000m2 (minim. space req. 100m2) 2000m2 (minim. space req. 150m2)
Offices	Staff: one space for each 25m2 of gross floor area, or one space for each managerial and executive staff, plus one space per four others. Visitors: 10% of staff parking provision.	General minima: Gross floor space not exceeding: 100m2 (minim. space req. 50m2) 500m2 (minim. space req. 100m2) 1000m2 (minim. space req. 150m2)
Storage buildings (warehouses)	Staff: one space per each 200m2 gross floor space.	General minima: Gross floor space not exceeding: 100m2 (minim. space req. 70m2) 250m2 (minim. space req. 140m2) 500m2 (minim. space req. 170m2) 1000m2 (minim. space req. 200m2)
Restaurants and cafés	Staff: one space per three members employed at peak period. Diners: one space for each two seats in dining area.	General minima as follows: Dining floor space not exceeding: 100m2 (minim. space req. 50m2) 250 m2 (minim. space req. 75m2) 500m2 (minim. space req. 100m2)
Museums and public art galleries	Staff: one space per two members on duty. Visitors: one space per 30m2 of public display space.	Minimum 50m2.

Fig. 89 - Parking and loading/unloading requirements.

PARKING REQUIREMENT FOR DID WAREHOUSE:

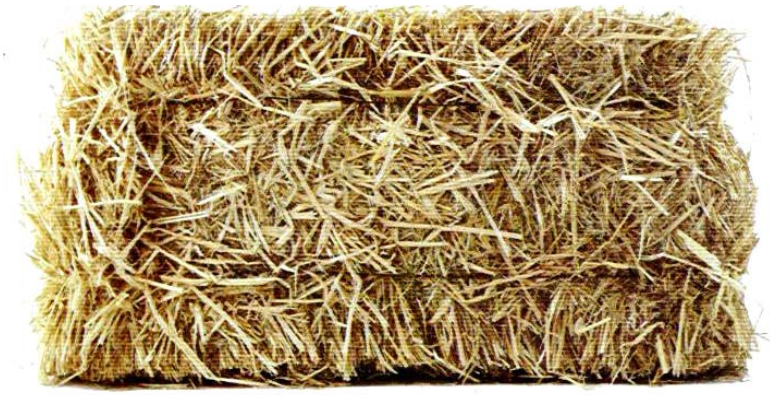
- **Shops**
  - Ground floor – 352,6m2
  - Total: 352,6m2 (3 for staff + 14 for customers)
- **Offices**
  - Ground floor – 33m2
  - First floor – 65,5m2
  - Second floor – 375m2
  - Total: 473,5m2 (provision for customers in the other spaces – 19 for staff)
- **Storage**
  - Ground floor – 72,5m2
  - First floor 65,5m2
  - Second floor 65,5m2
  - Total: 203,5m2 (1 per each 200m2 – 1 parking)
- **Restaurants/coffee shops**
  - Ground floor – 145,3m2
  - First floor – 135m2
  - Second floor – 104,3m2
  - Total: 384,6m2 (20 – they have been taken into account in other spaces)
- **Showrooms/galleries**
  - Ground floor – 1114,7m2
  - First floor – 883,2m2
  - Second floor – 318,2m2
  - Total: 2316,1m2 (1 for each 30m2 – 70 parkings)
- **Skills learning/lectures/workshops**
  - First floor – 98,5m2
  - Total: 98,5m2 (as offices, 1 for each 25m2 – 4 parkings)
- **Conference room**
  - Second floor – 122,5m2
  - Total: 122,5m2 (as offices, 1 for each 25m2 – 5 parkings)

TOTAL: **122 parking bays must be provided on site** (49 – basement / 73 – site).

13. RECYCLING AND REUSE:

Organic and glass recycled bins is provided on the neighbour site next to DiD warehouse. Other buildings will use the same bins and a collector will collect the waste once a week. Adequate space are essential and use of the bins will be clearly specified.

ORGANIC AND GLASS RECYCLED BINS ON SITE
ORGANIC AND GLASS RECYCLED BINS ON SITE
ORGANIC AND GLASS RECYCLED BINS ON SITE

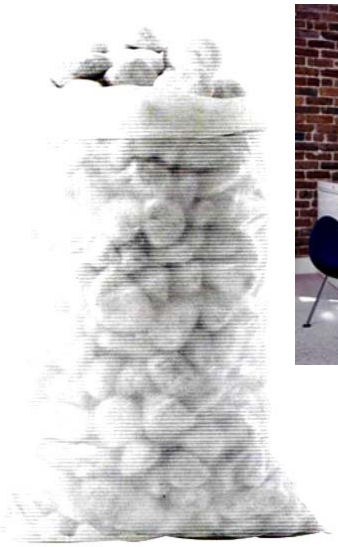


14. MATERIALS:

Materials with low embodied energy will be used.

- steel balustrade
- brick walls
- concrete slabs
- steel and concrete columns
- plasterwork (Coprox – clay coloured pigmented plaster)
- tiles – natural clay tiles
- natural stone wall (entrance walls)
- enamel double coated steel louvers
- sheet metal roofing

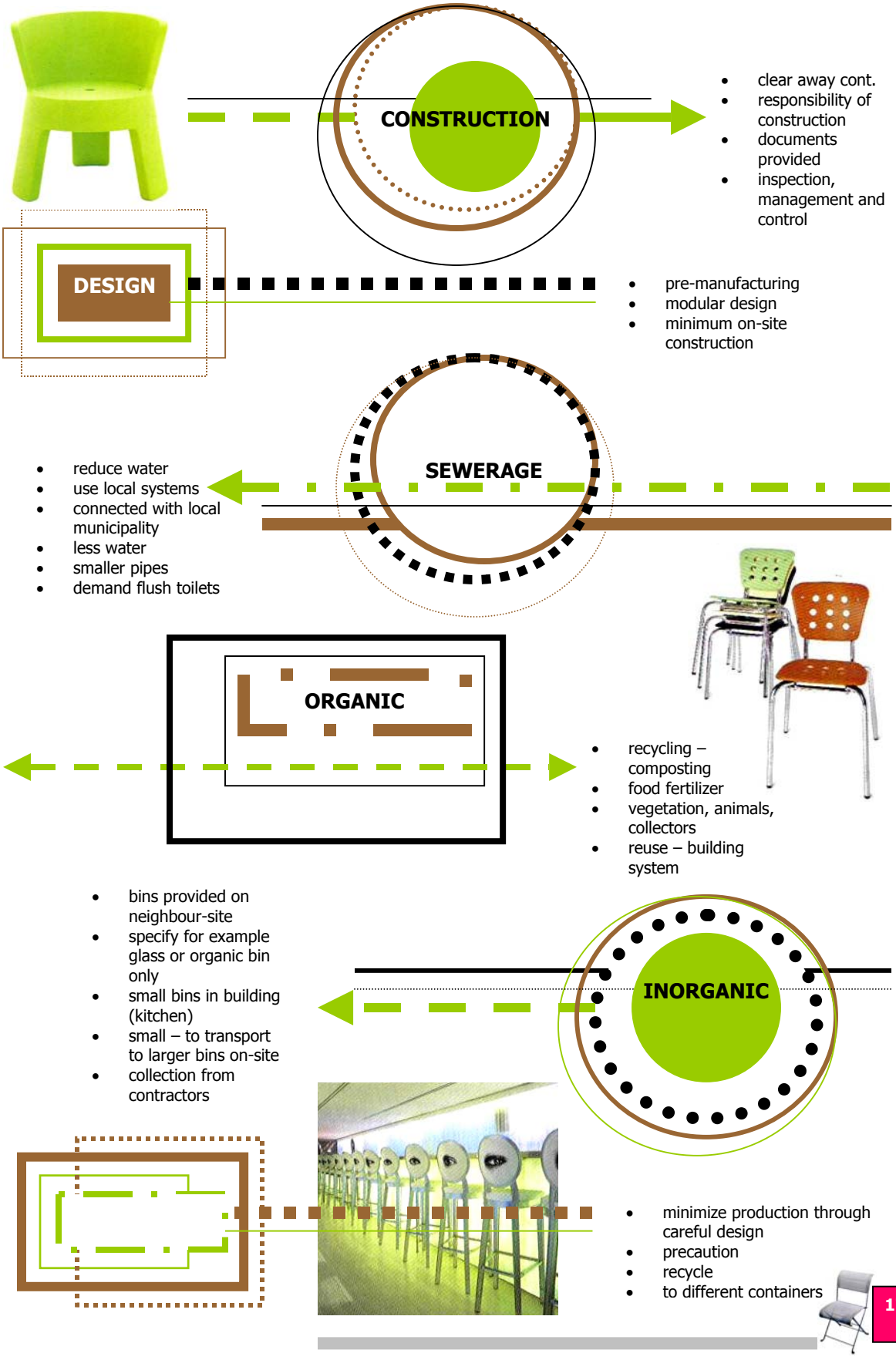
(See construction drawings for detail information on materials).



PURPOSE	MATERIAL	COMMENT
External sewers	Vitrified clay	Considerably cleaner than that of synthetic pipes
Hard paving	Recycled concrete slabs	Consist, in part, of secondary raw materials
Ground floors	Hollow ceramic elements	Demands less material and use less energy than a solid concrete floor
Ground floor insulation	Mineral wool, EPS	Production process requires less energy
Balconies	Sustainable durable wood elements	Class II does not need to be treated when used externally (renewable) Production of aluminum is harmful to the environment (high energy)
Flat roof construction	Softwood rafters and roof coverings	Do not contain environmentally harmful adhesives, in contrast to plywood
Internal window frames	Sustainable wood	Production of steel frame is more environmentally damaging than a softwood frame (>quantity material)
Internal doors	Honeycomb with hardboard skins	Plywood pollutes more than softwood (the amount of material <)
Internal stairs	Softwood	Direct reuse Steel has a high energy content
External stairs	Sustainable durable wood	Material is renewable Recycling no problem
External balustrades	Sustainable durable wood	Steel needs to be treated (corrosion)
Installing glazing	Dry glazing	Dry glazing with a rubber sealant – great durability
External wall rendering	Ceramic tiles	Considerably longer life-span than a layer of render
Plasterwork	Flue-gas gypsum	From electricity power plants – preferable to natural gypsum – less energy is required to manufacture
Exterior paintwork (wood)	Natural paint, boiled paint	Natural paint and high-solid alkyd paint – interior on wood and high solids alkyd paint for outside
Internal waste	Ceramic	Production process is considerably cleaner than synthetic pipes
Water supply	PE, PP	PP – suitable for hot and cold water pipes and PE – only cold water pipes
Taps and shower heads	Water saving	Flow-limiters – reduction in use of tap water and energy consumption without a loss of comfort

Table 90 – Sustainable building materials

Fig. 91 - WASTE RECYCLING AND REUSE – DID WAREHOUSE (useful input to another)**:**



[Du Preez, 2003:30]

TRIPLE BOTTOMLINE REPORT - PERFORMANCE PRIORITISATION

	Criteria	No requirement 1	Low requirement 2	Medium requirement 3	High requirement 4	Essential 5
SO	**Social**					
SO1	Occupant comfort					
SO2	Inclusive environments					
SO3	Participation and control					
SO4	Education, health and safety					
SO5	Labour practices & decent work					
SO6	Human rights					
SO7	Society					
SO8	Long-term responsibility					
SO9	Corporate citizenship					
	ECONOMIC					
EC1	Local economy					
EC2	Efficiency of use					
EC3	Adaptability & flexibility					
EC4	Ongoing costs					
EC5	Capital costs					
	ENVIRONMENTAL					
EN1	Water					
EN2	Energy					
EN3	Recycling & reuse					
EN4	Materials & components					

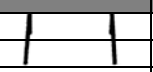
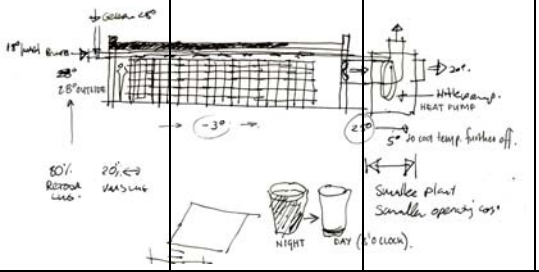




Fig. 92 – Building sustainability – DiD Warehouse.

	CRITERIA	TARGET SET	BUILDING PERFORMANCE	REFERENCED	ACHIEVED Y/N?	SCALE 1 - 5
SO1	**Occupant comfort**					
SO1.1	Lighting/solar quality	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	5 (excellent)
SO1.2	Ventilation	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	5
SO1.3	Noise	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	5
SO1.4	Views/access to green outside	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	5
SO1.5	Thermal comfort	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	5
SO2	**Inclusive environments**					
SO2.1	The disabled	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	5
SO3	**Participation and control**					
SO3.1	Environmental control	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4 (good)
SO3.2	Social spaces, amenity, community involvement 	(Target setting)	(Techn. report)		Yes	4
	Education, health and safety					
SO4.1	Education	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
SO4.2	Safety and security	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
SO4.3	Health	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
SO4.4	Smoking and fire control	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
SO5	**Labour practices and decent work**					
SO5.1	Employment					
SO5.2	Labour/management relations					
SO5.3	Diversity and opportunity					
SO6	**Human rights**					
SO6.1	Strategy and management					
SO6.2	Non-discrimination					
SO6.3	Freedom of Association and Collective Bargaining	(Will be able to scale achievement after completion of DiD warehouse)				
SO6.4	Child labour					
SO6.5	Forced and compulsory labour					
SO7	**Society**					
SO7.1	Community					
SO7.2	Bribery and corruption					
SO7.3	Political contributions					
SO8	**Long-term responsibility**					
SO8.1	User health and safety					
SO8.2	Services					
SO8.3	Advertising					
SO8.4	Respect for privacy					

Fig. 93 – Assessment table for DiD Warehouse in terms of Sustainability

	CRITERIA	TARGET SET	BUILDING PERFORMANCE	REFERENCED	ACHIEVED Y/N?	SCALE 1 - 5
SO9	**Corporate citizenship**					
SO9.1	Corporate values					
SO9.2	Corporate governance					
SO9.3	Stakeholders					
SO9.4	Investing for the long-term					
SO9.5	Accountability and responsibility					
SO9.6	Transparency					
SO9.7	Tackling corruption					
SO9.8	Employee relations					
SO9.9	Engaging with local communities					
SO9.10	Building capacity					
SO9.11	Engaging in dialogue with government					
EC1	**Local economy**					
EC2	**Efficiency of use**					
EC2.1	Useable space	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	5 (excellent)
EC2.2	Occupancy	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	5
EC2.3	Space use	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	5
EC2.4	Use of technology	(Target setting) 	(Techn. report) 	(Baseline doc.) 	Yes 	5 
EC2.5	Space management	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	5
EC3	**Adaptability and flexibility**					
EC3.1	Vertical dimension	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	5
EC3.2	Internal partitions 	(Target setting)		(Baseline doc.)	Yes	5
EC3.3	Services	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
	Ongoing costs					
EC4.1	Maintenance	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
EC4.2	Cleaning	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
EC4.3	Security/care taking	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
EC4.4	Insurance/water/ energy/sewerage	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
EC4.5	Disruption and downtime	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
EC5	**Capital costs**					

	CRITERIA	TARGET SET	BUILDING PERFORMANCE	REFERENCED	ACHIEVED Y/N?	SCALE 1 - 5
EN1	**Water**					
EN1.1	Rainwater	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	5
EN1.2	Water use	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	5
EN1.3	Planting	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	5
EN2	**Energy**					
EN2.1	Location	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
EN2.2	Appliances and fittings	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
EN2.3	Ventilation system				Yes	4
EN2.4	Heating and cooling system	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
EN3	**Recycling and reuse**					
EN3.1	Toxic waste	(Target setting)	(Techn. report)	(Baseline doc.)	No	0
EN3.2	Inorganic waste	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
EN3.3	Organic waste 	(Target setting)	(Techn. report)	(Baseline doc.) 	Yes	4
EN3.4	Sewerage	(Target setting)	(Techn. report)	(Baseline doc.)	No	0
EN3.5	Construction waste	(Target setting)	(Techn. report)	(Baseline doc.)	No	0
EN4	**Materials and components**					
EN4.1	Embodied energy	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
EN4.2	Material/component sources	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
EN4.3	Manufacturing processes	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
EN4.4	Recycled/reused materials and components 	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4
EN4.5	Construction processes	(Target setting)	(Techn. report)	(Baseline doc.)	Yes	4

TARGET & ASSESSMENT TOOL TARGET & ASSESSM

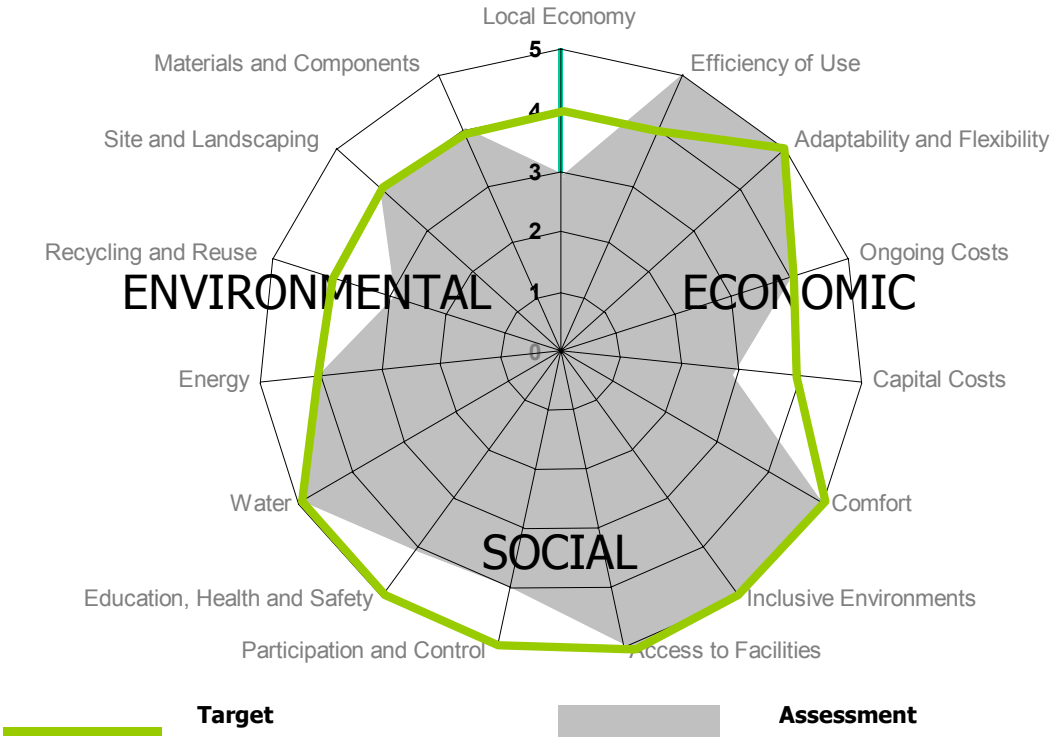
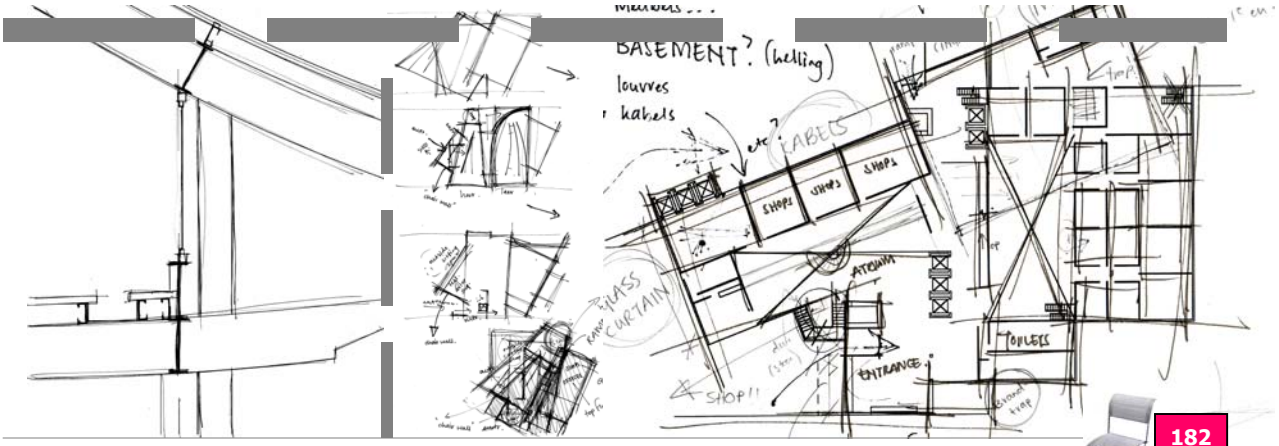


Fig. 94 – Target and assessment tool for DiD Warehouse.

TARGET & ASSESSMENT TOOL TARGET & ASSESSM



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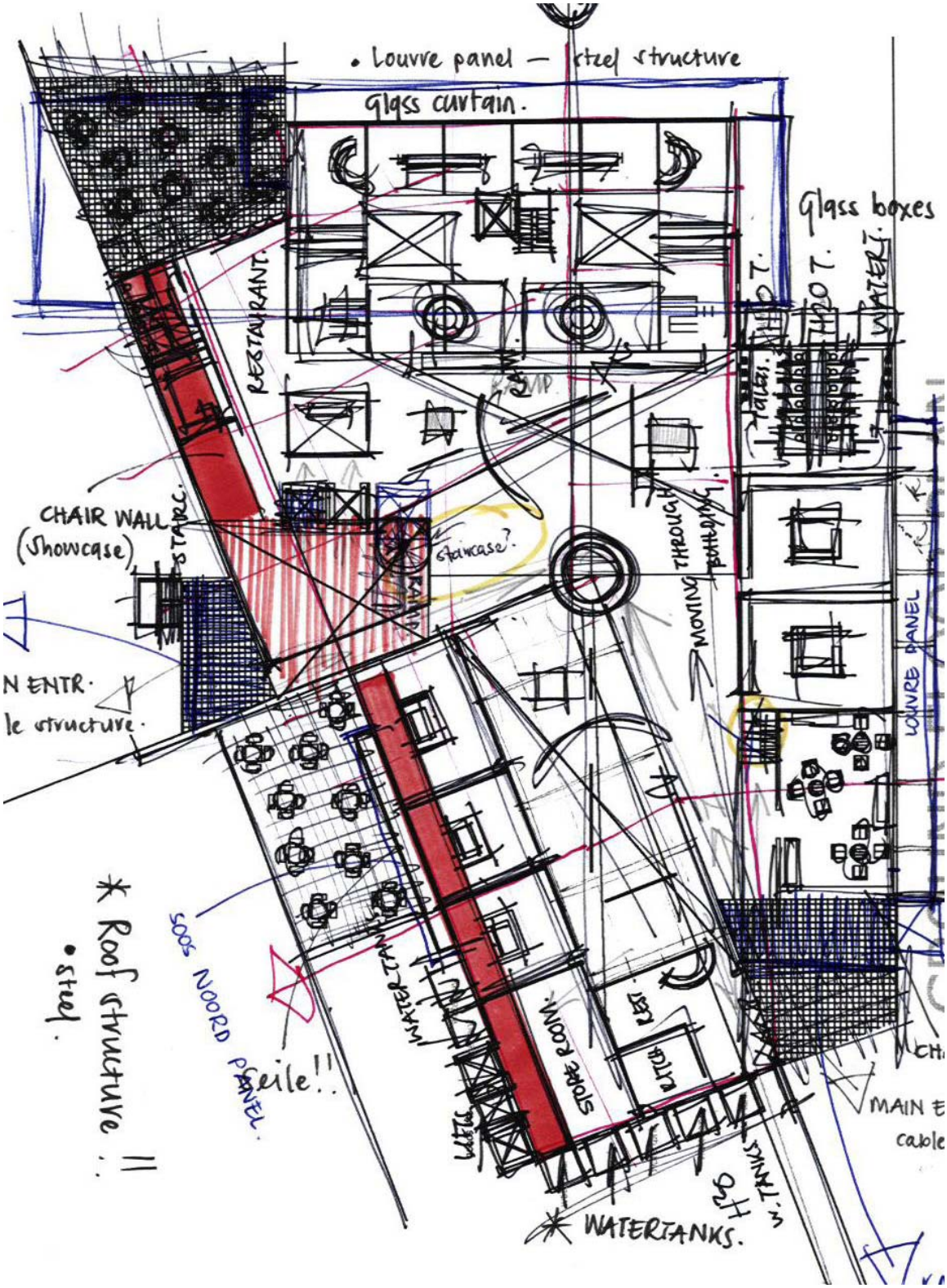


Fig. 95 - Conceptual design and space planning for DiD Warehouse.

DiD Warehouse – A décor, interior and designer furniture warehouse:

DiD Warehouse will meet the needs of every designer and décor/design lover. Architecture and design are two terms that cannot be separated from each other, and that are directly dependent on each other. For man to activate his brain creatively, an immediate attunement with design must be an element of the creative process. Décor, interior design and furniture design are the end products of the creative function of the human brain. Each individual designer item can thus be regarded as a unique and personal product that has been created by a human being.

When the term "design" is intensively analyzed, one realizes that a very definite similarity exists between architecture and design. Today, millions of designs by millions of designers are in existence, some more famous than others, but each unique in its own right. DiD Warehouse provide a container for décor, interior design, and designer furniture from across the world – internationally and locally known and unknown. It is seen as a building that displays and sells this diversity of designs. A very important similarity and contrast exists between the architecture and that which is on display. Functionality in terms of space planning and the design of the façade (i.e. including the architecture) has led to the final product. The main role of every space is to facilitate a maximum view of that which is being displayed or sold. An environment is created where the full potential of the design, rather than the finer details of the building, can be observed.

The impact that DiD Warehouse will have on designers (as well as on home-makers) will be immense, and it will provide opportunities for young up-and-coming designers to be exposed to international as well as local standards and trends. The competitive factor that will exist between décor houses and designers in DiD Warehouse can be utilized to the advantage of all those involved.

DiD Warehouse consists of two important components: that which is for sale, and that which is being displayed. Shops of different sizes will be occupied by interior and designer outlets like Twiice International, Knoll, IKEA, MG Design Box, Sevens, P. Maldini, World of Interiors, Designers on the square, Comfort Creations, Tonic, and many more. These outlets, of international and local origin, will be managed from within DiD Warehouse. South African designers are indubitably competitive on an international level and will benefit from the exposure that DiD Warehouse will provide for them.

The various outlets will make a huge contribution to the profitability of the building, through monthly leases and the renting of exhibition spaces and showrooms.

DiD Warehouse will provide the following services: a help-line, where trained staff can advise on everything from individual workstations to the planning of a complete space; a décor research and information center that will provide a computer laboratory and material in the form of a research library inside the warehouse; home delivery and restaurants; home furnishing advisors, who can receive clients by appointment; and, an info-line and shop-by-phone facility, a DiD credit card, as well as overnight facilities for customers in a luxury hotel/guesthouse just outside Linbro Business Park.

A favourable choice of site would be next to a freeway in the Johannesburg area. Linbro Business Park is located in Sandton adjoining the N3 highway, with excellent access to the freeway system and to the fast-growing Sandton CBD. More than 200 000 sqm of buildings have been built in Linbro Business Park and the popularity of the Park continues to increase as a result of the access and security controls. DiD Warehouse will be visible from the N3 highway, and a striking and enticing glimpse of it will be provided. Huge billboards on the west façade of the building will promote the building and its function.

As Linbro Park is mainly composed of warehouses and headquarters buildings, a need exists for restaurants and cafeterias where business people can go to have breakfast, lunch or a quick cup of coffee. DiD Warehouse will be an attraction due to facilities like its restaurant and juice bar. The copy shop, library and computer facilities will meet the needs of many businesses in Linbro Park. Together with the fact that DiD Warehouse will be the host of an international designer market, it will importantly focus on South African talent and local design trends and styles. This will boost and exhibit our own furniture- and décor designers and provide a platform for their talents and ideas.

During the formulation of a concept design for DiD Warehouse, several precedents were studied. Norman Foster's idea of a "serviced shed" influenced many design ideas during the concept phase of DiD Warehouse. He stated that: " a bicycle shed is a building, Lincoln Cathedral is a work of architecture". The systems approach is based on the integration of structure and services and the swift assembly of components. Their significance lies as much in their flexibility in use as in the beauty of their materials or the speed and economy of the construction. For him, aesthetic considerations emerge as a delightfully unexpected bonus.

Therefore, one of the most important terms used by Norman Foster in his formulation of a theory is flexibility – flexibility in terms of special change, aesthetic adaptability, and the size and functionality of spaces. It can be assumed that each exhibition will, and must, differ from the next in terms of size and appearance, how designs are displayed, colour, lighting, materials, etc. The place where Foster's theory will logically be most valid is in the display areas of DiD Warehouse. His theory is carried through where partitions are used to demarcate internal walls. Their flexibility will facilitate change, and will increase the usability of spaces. These partitions will for the greater part be made of glass to ensure maximum views to and from the spaces.

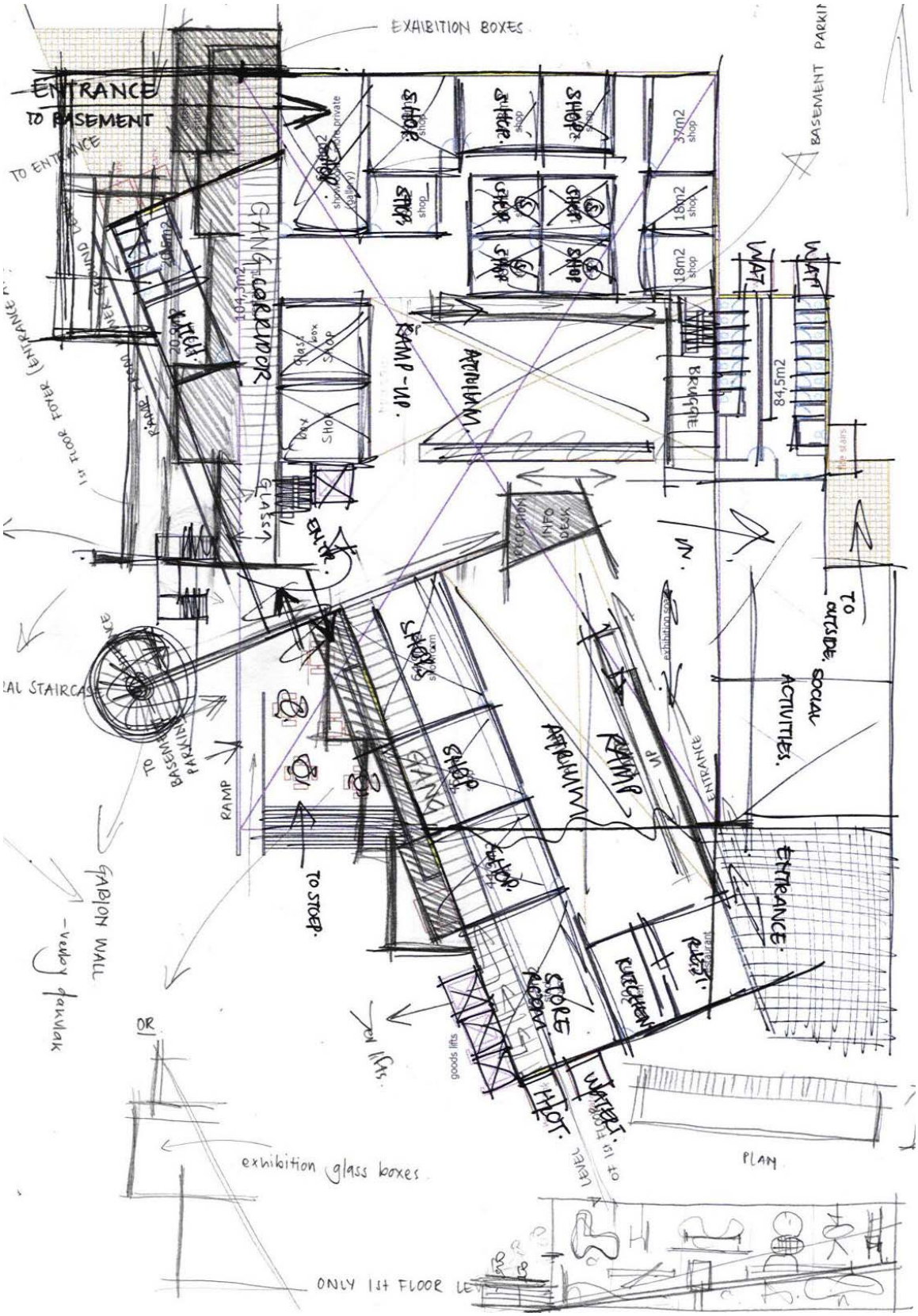


Fig. 96 - Sketch design and space-investigation.

A good South African precedent for DiD Warehouse is Sevens in Fourways. Privacy does not play a role in the spaces, and the view of the furniture on display is not obstructed. Simplicity in architecture and use of materials ensure that the emphasis falls on that which is being displayed. Viewers choose their own path through the furniture and each route will become an experience in its own way. Each exhibition will have a unique appearance which will bring about different modes of movement.

The Vitra Design Museum by Frank Gehry was studied and found to contrast strongly with Foster's idea of the "serviced shed". The Vitra Museum is not used as precedent for its complexity and architecture, but rather for how the objects inside the spaces are displayed. Unrestricted views and the cross of light concludes the building composed of space and light. The idea of the Vitra Design Museum grew out of a furniture producer Rolf Fehlbaum's wish to find and document the roots and history of his craft. The Vitra Design Museum exhibitions concentrate on presenting objects occupying key positions in the development of industrial furniture design because of their material use, construction, function, and form.

Another masterpiece by Gehry, the Issey Miyake retail space is well-known for its use of glass partitions. The interior fixtures are easily moveable and allow spaces to evolve and to be constantly been injected.

The atrium spaces in DiD Warehouse can be seen as sheds, because they are simple and flexible, and without any kind of obstruction (Foster). That which is displayed/sold/marketed makes the spaces more complex (Gehry).

To make future extension and change possible, the building was designed on maximum ground space. A lower ground floor (above the basement) has sufficient space for a future extension and can be used currently for future storage. The plan takes two different grids into consideration, i.e. the north-south grid, and the grid of the site (parallel to the N3 freeway). To strengthen the two axes from inside as well as outside, two dry-packed natural-stone walls are used. These walls are visible from practically every exterior angle. The two entrance ways – a south-east entrance and a western entrance – originated along these two axes. The stone-walls extend a bold invitation to approach the building. The use of texture is carried through from the entrance to the rest of the building, inviting exploration and touch. It conveys a feeling of natural simplicity and innocence right at stout. The two axes lead one to the focus point at the center of the building. It consists of the reception and information desk, from where circulation to the rest of the spaces in the building occurs.

The spaces sell themselves, due to the fact that, from the center, one gets an immediate view of each individual space and its function. The spaces are simple, and movement through them occurs practically without any obstruction or structures like columns, staircases, ramps or walls. The main circulation routes inside the building are located on either side of the two atria. In the absence of exhibitions, the atria can each be seen as sheds with circulation routes through the centers, and with boxes placed around the shed. The "glass box" located to the north consists only of shops, and functions independently as a more complex box next to the simple sheds (atria). The showrooms and offices to the west of the atria function in the same way. Informal seating areas and cafeterias form the sharp point of the plan to the north and south, and spill out onto a balcony. These spaces establish a connection with the landscape and the open air. Views from these open spaces become part of the building and play an important role in satisfying the statement made by Jeremy Gibberd (SBAT Tool 2000), that every building should have sufficient "access to green".

DiD Warehouse is a people-orientated building with many elements providing social spaces, entertainment and a comfortable environment inside and outside the building. One of the most important aspects of the design was to take the human element into consideration in terms of scale and dimension. People, and that which is being displayed/sold, should feel at home in DiD Warehouse, and proportions in terms of ceiling heights and space divisions were exceedingly important design considerations. Because the interior space of DiD Warehouse is simple and open, internal partitions and loose panels are used to define spaces and to create atmosphere. Each order of panels, boxes, showcases, etc., provides a different feel to the space. To develop this space to its full potential, sufficient ventilation (natural, as far as possible) and natural sunlight is provided. Cooling will be done by means of cross ventilation and the "rock-bin system" (as described in full in the baseline document). Natural sunlight penetrates the skin of the building through every possible window, and also through the rooflights above two atria.

The main features of these two ventilation-systems are flexibility, adaptability and choice. The two main glass entrances will form a transparent and friendly focal point that will offer natural light, and aid circulation and orientation. Exhibition lighting is crucial to the success of the exhibition spaces. A large glass curtain wall on the northern façade of the glass box is covered with a louver panel to admit sun in winter and block direct rays during summer. The advertising shading device in front of the glass wall at the eastern façade has two functions: to block direct rays of the sun and to serve as an advertising board. The louver panel on the western façade blocks late afternoon rays and is constructed in a similar ways to that of the north façade louver panel. The glazed façade is sensitive in terms of comfort control, designed to maximize daylight in the building whilst limiting solar heat gains in summer and heat losses in winter. An important characteristic of the louver façade is its ability to permit a low degree of solar energy ingress.

Philippe Starck couldn't help amazing us with technological record-beating chairs that displays maximum simplicity combined with maximum technological complexity. This theory can be applied to DiD Warehouse in terms of its simple structure and technological complexity where louvers, systems, computers, access floors systems, etc., are concerned.

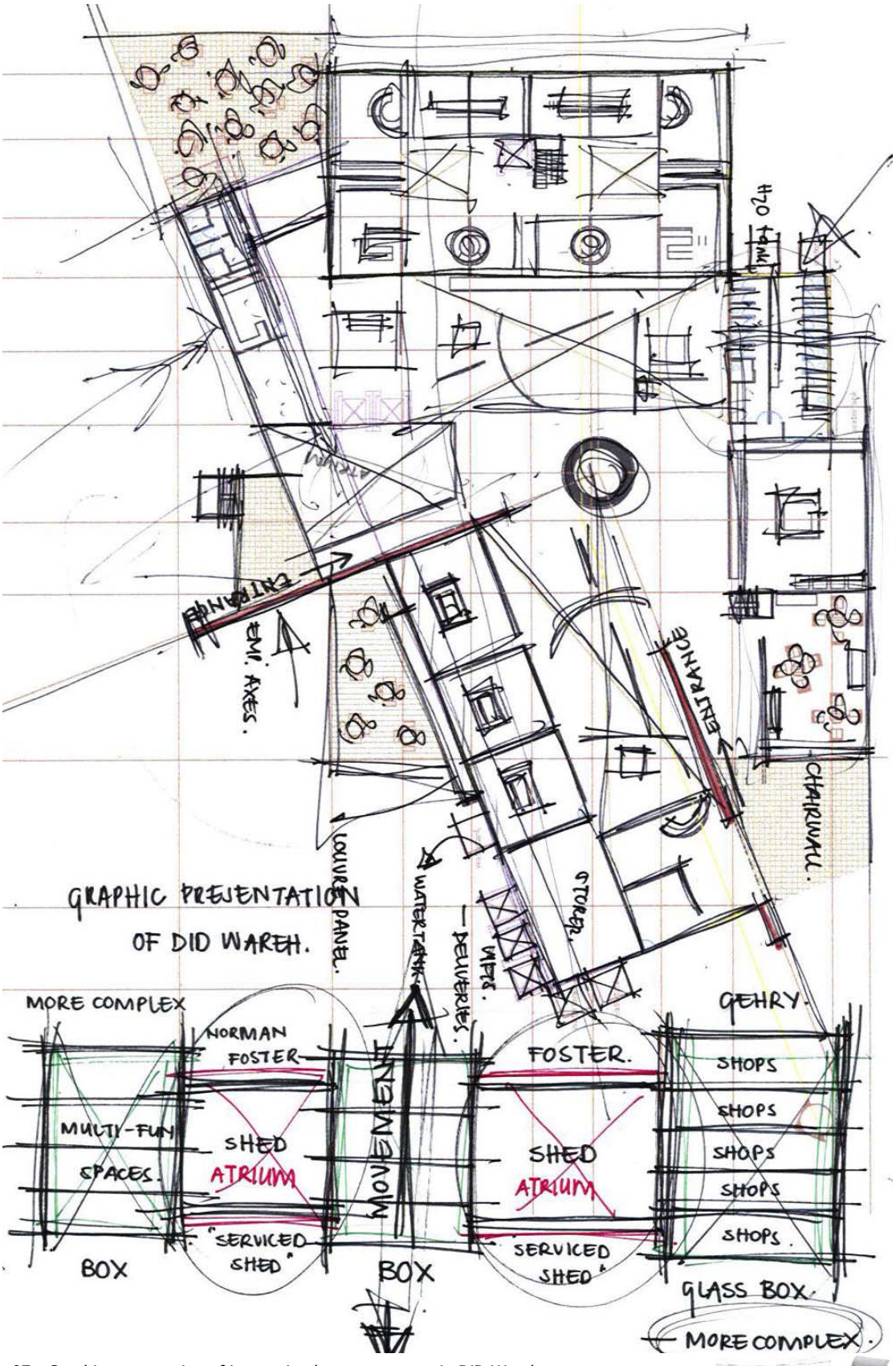


Fig. 97 - Graphic presentation of interaction between spaces in DiD Warehouse.

The building is orientated so that openings predominantly face north and south. Openings in the west walls are minimized. Thus, the optimum orientation for solar windows and solar collectors is north and the general principle of the design of the shading devices will be to intercept solar radiation before it enters the building during summer. In winter, the devices are designed to allow the winter sun into the building.

Occupants of DiD Warehouse will be able to control their space in terms of ventilation and sunlight. Simple access floor panels under every floor make it possible for every occupant to allow as much ventilation as desired. Each individual has his/her own preferences where ventilation and personal comfort zones are concerned. Thus it is simple to adjust the angle of the ventilation grill (open, half-open or closed). When the "rock bin system" is activated during the summer months, it is important to ensure that it remains a closed system and that no openings are present. Cold air will be inclined to escape through every possible opening. At night, openings can be used to expel warm air, and to prepare the system for the next morning. As a rule, the system will not be used for ventilation during the winter months. The building will rather rely on the natural stack effect which will be made possible by the atria and openings in the roof.

The fact that a minimum number of openings exist on the west side of the building, does not provide a final solution to the issue of noise. It merely mitigates the problem somewhat. As the site is situated right next to the N3 highway, noise is a much bigger problem than it would be under normal circumstances. According to calculations (see baseline document), the noise level in the building, 100 metres from the highway, will be 69dB during peak-hour traffic. Acceptable maximum noise levels are roughly around 40 –45 dB. It is obvious that a noise level of 69 dB can create a huge problem unless one designs for it.

All windows on the west side have double glazing, with a cavity of 100mm. A cavity smaller than 50mm will not be effective. Walls are also built with cavities of 110mm (110 – 110 – 110). Insulation such as mineral wool and polyurethane foam will be inserted into the wall cavities. According to calculations, a plastered wall with a 110mm cavity will offer a noise insulation value of more or less 55. The suspended floors will act as insulation against sound caused by footsteps. Windows are definitely the weakest part of the building envelope where sound insulation is concerned. All openable windows on the west façade are sealed with rubber.

The views to the outside will have a calming effect on people inside the building. Because of the large amount of glass in the façade and glass partitions between the shops, different objects and horizontal and vertical openings will interplay with each other. By providing pleasant, easily accessible space, one can increase productivity by enabling people to be refreshed by spending short amounts of time in a different environment (temperature, light, humidity or air movement). The views inside the building are equally important and occupants will see different objects intersect each other through different viewports. DiD Warehouse has a working policy that encourages occupants to wear, for example, no ties in summer, or to wear thick coats during the winter months, to ensure comfort and minimize the costs of cooling and other systems.

DiD Warehouse is designed to fully accommodate the disabled, and equal access to and from all spaces is provided. All changes in level cater for them with an appropriate entrance ramp with a fall of 1:12 from the western façade. Edges are clearly distinguished through the use of contrasting colour. Toilet facilities comply with SABS 0400 standards.

DiD Warehouse will contain objects and furniture of high value. The highest possible level of security must be maintained. Although the building is situated in a security business park with access control at the main entrance, it is still an open environment and a risk in terms of security exists. Surveillance will mainly be done by wardens on site (near entrances) and inside the building. The human element is to be considered important but technology allows good mechanical and electronic measures, and alarms will be used to detect removal of items. Entrances and exits will have electronic surveillance. All external doors and windows will be protected from illegal entry. The security room on ground floor level will act as a control room. Cameras will be installed on each floor to observe the entire building. On site, fences will be used rather than a wall, to allow unobstructed views of the buildings.

No smoking will be allowed inside DiD Warehouse. There will be sufficient outside space and balconies for the use of smokers. DiD Warehouse complies with all the Fire Regulations and requirements. (A complete report on the subject is inclined in the baseline document).

The interior spaces of DiD Warehouse are designed to ensure maximum flexibility, and due to the low number of interior walls and obstructions, the area contains a high percentage of useable space. The use of very few corridors, columns, stairs, lifts, etc., contribute to the fact that the interior consists of mainly open space defined by temporary partitions. The useable space will change from time to time according to the layout of the exhibition spaces. On ground floor level, useable space to the extent of 89% is provided. This is excellent and contributes to a highly efficient use of space of DiD Warehouse, which will generate a high income in terms of lettable area.

Structurally, DiD Warehouse should be flexible in terms of the adaptability that is required by the different functions of space. Because DiD Warehouse contains both shops and offices, a raised floor will be installed. Such an access floor has many advantages, which include the out-of-sight management of cabling systems. The floor-to-ceiling height of DiD Warehouse is relatively high to ensure maximum flexibility and to enhance the multi-functionality of each interior space.

Voyager – by Saporiti Italia. (Curved line – concept for curved roof).

Maya Cuoro Rosso Bulgaro – by Denis Santachiara. (Curved line – concept for curved roof).

Fig. 98 - Conceptual west elevation.

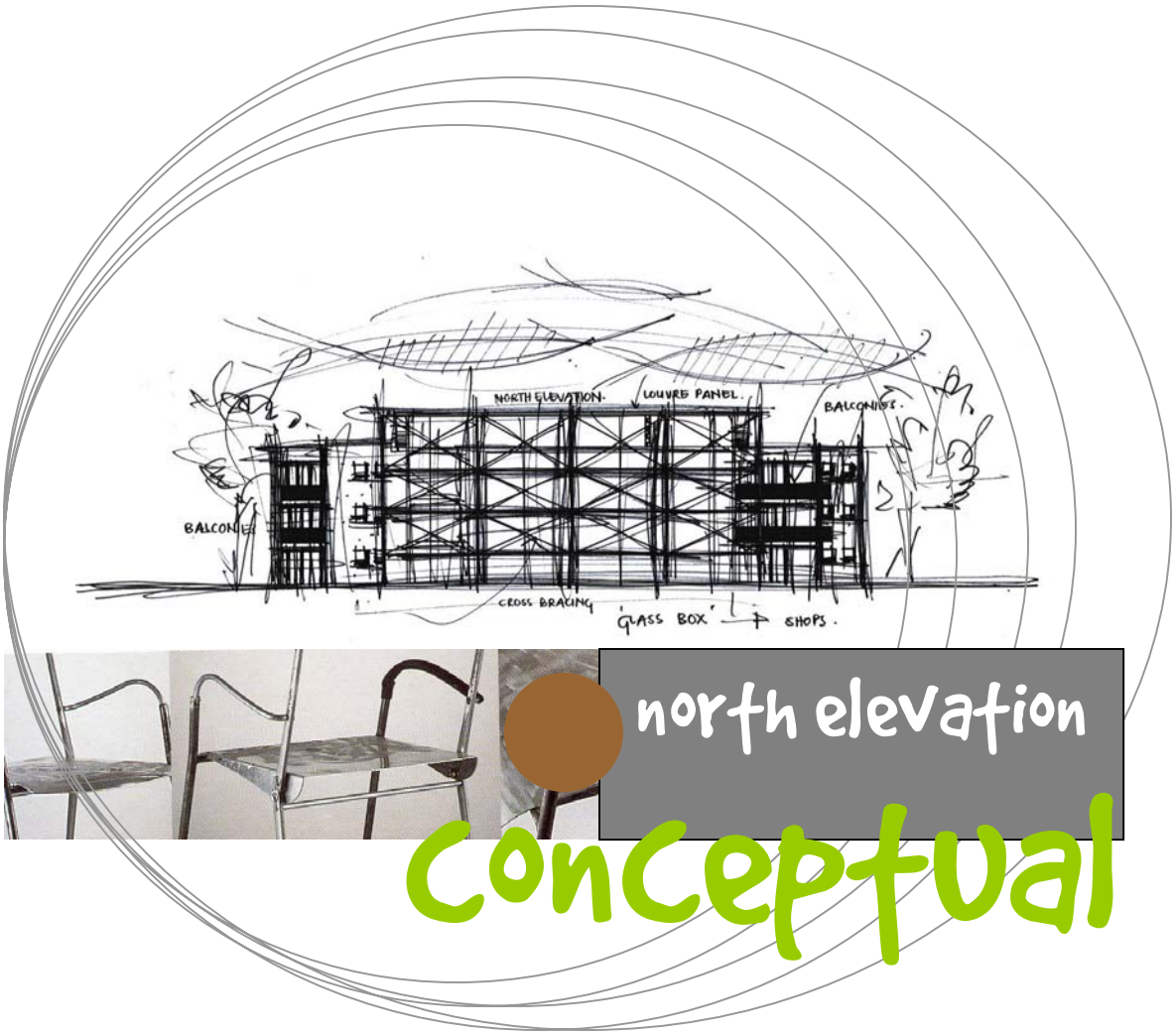


Fig. 99 - Conceptual north elevation.

Spaces can accommodate quick change, and adaptability is ensured without problems in terms of cabling or height restrictions. The access floor is installed throughout the top of a 170mm concrete slab. Installing the floor at a height of 300mm will be sufficient for the purpose of DiD Warehouse. (Panel sizes and further specifications are included in the baseline document). An appropriate floor-to-ceiling height for the ground floor, first and second floors, would be 3270mm. Thus the space becomes efficient and flexible independent of its function.

The roofs of DiD Warehouse are designed in such a way as to catch a huge amount of rainwater annually. The curve represents the line of a chaise-longue – an invitation without any inhibitions. Curved roofs collect water and enable it to run off onto the flat concrete roof area. From here, down-pipes channel the water to tanks, from where it will be utilized for the flushing of toilets and the irrigation of the landscape. Calculations, which can only provide an estimate, make provision for times of drought. If an assumption is made concerning water consumption, rainfall per month/year and roof surfaces, it can be calculated that DiD Warehouse can collect just under a third of the water it requires. Ten water tanks with a capacity of 9000 litres each are installed for this purpose. From here water is pumped to several locations. Because of the enormous size of these water tanks, it was impossible to hide them. In this way they became design features of DiD Warehouse.

The structure of the water tanks is based on the designs of Jeff Covey, i.e. his "Model six" stools. These consist of aluminium with a formed maple plywood seat, a cast aluminium hub, and rolled steel base. The Covey stool collection originated in San Francisco. (More comprehensive calculations are found in the baseline document). The framework of the water tanks consists of a steel base structure anchored by 500 x 500 x 700mm deep concrete bases, a standard reinforced fiberglass tank is encased by profiled steel plates.

Low-flush toilets which use less than 6 litres of water per flush, and low-flush taps, which will allow only 0,03 – 0,17 litres of water per second, are specified for use inside DiD Warehouse. The Warehouse also contributes towards recycling and waste management. A huge waste disposal site exists in Linbro Park. Fees are paid for dumping at this disposal site. The provision of proper waste services will have a positive impact on curbing the spread of certain diseases, the aesthetic quality of the area and the improvement of living conditions. The following two types of waste will be recycled/reused: organic and inorganic waste. Both inorganic waste, and organic waste generated by the restaurants, cafeterias and juice bars will be removed to small bins on site where it will be contained until it is removed to larger bins outside the building. Currently, the best location for these bins is on the site next door to DiD Warehouse. A canal and very unstable soil conditions make this site unsuitable for building purposes. Bins will be clearly differentiated from each other to avoid confusion. An appointed contractor from the area will be responsible for the weekly removal of waste. From here it will be distributed, processed (i.e. for soil fertilization of soil) or recycled (i.e. glass).

All specified planting is indigenous, and thus has low water requirements. The amount of paving on site is kept to a minimum; water-permeable hardening is preferred for its ability to absorb water. It also reduces the burden on the water treatment plant, preventing annual overflows. Pilot studies have proved that it is feasible to reduce hardening (including roof surfaces) from about 50% to 40%. Extensive soft landscaping, i.e. trees and lawns, will absorb water. The area that will carry the most traffic, from the entrance to the parking area and basement, will be surfaced with grass-concrete blocks instead of paving. The grass growing inside the cavity of the concrete block will absorb the water. Continuous trees are provided on the north-west, north and north-east edges of the site, and evergreen trees will be used as a wind break on the south side. Indigenous deciduous tree species, Ekebergia Capensis and Celtis Africana, are planted on the northern side of the building, to provide shade during the hot summer months, but to allow sun during the winter months.

Different types of pavers, ground covers, trees and grasses will be used to enhance contrast – rough vs. smooth, colour vs. non-colour, shadow vs. light, tall vs. small, straight edges vs. organic lines, etc. In this way the landscape will complement the building, enhance the view, and form and important link to those parts of the building, i.e. balconies, that open up to the landscape.

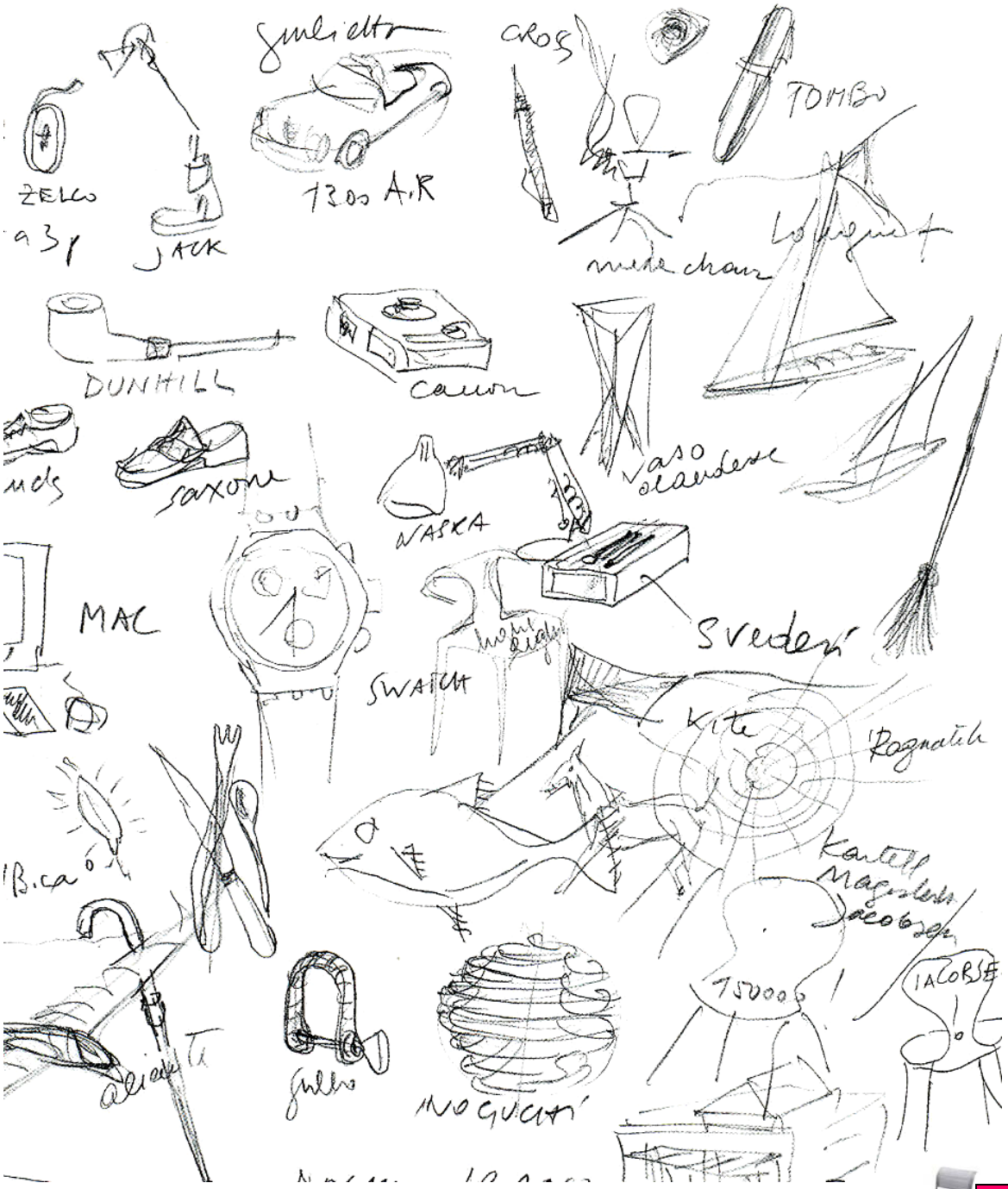
To summarize, the quality of spaces in the building is important in order to enhance the enjoyment of the activities within, and to instill confidence and a sense of permanence to the place – DiD Warehouse. (See Target Setting for Parking Requirements).

The structure consists mainly of steel columns, concrete slabs and brick walls. Columns are respectively built of steel and concrete, depending on the loadbearing function they have to fulfill. Interior spaces are subdivided by drywall partitions. These consist of a timber framework clad with gypsum board and covered with textured vinyl.

Two types of roofs will be employed, i.e. a flat concrete roof, and curved sheet-metal roofs. The curved roofs consist of a steel structure with steel columns, fixed to the brick wall of the flat roof construction. Steel gives the roofs a lighter appearance, and their curved lines, as mentioned, resemble those of a chaise-longue. The roof construction is exposed, and creates and industrial appearance on the inside. Choice of materials was based on energy values. The embodied energy of different materials were studied to determine their suitability. Steel (20 GJ/ton), aluminium (75), cement (13,1), tiles (4), clay bricks (3,5), brick (2,5), concrete (1,7) and concrete tiles (12), are just some of the materials with a relatively low embodied energy. Thus, steel balustrades, brick walls, concrete slabs, steel and concrete columns, plasterwork (Coprox – clay coloured pigmented plaster), tiles (natural clay tiles), natural dry-packed stone

walls (two entrance walls), enamel double-coated steel louvers and sheet metal roofing make up the choice of materials for DiD Warehouse. (See working drawings for more detailed information on structure and materials).

Quality is achieved through the integration of spaces, materials, a mixture of uses, and pedestrian access. DiD Warehouse offers a variety of spatial experiences. These experiences commence outside the building, i.e. in the landscape, after which the two stone walls emphasis the entrances to the building. As one approaches the building, the spatial experience intensifies and becomes more complex than the landscape. Contrasts in texture, light and size increase from the landscape towards the building. The spaces are meant to be silent, not static; they are differentiated through irregularity. Walkways outside the building steer movement through a series of spatial sequences and provide curved elements of both mystery and surprise, creating changing perspectives. On entering DiD Warehouse, the dynamic internal circulation allows open, interactive viewing, inspiring the visitor to choose his own route through the spaces – to evoke moments of pause, reflection, and discovery.



[Domus 824, March 2000:59]

Fig. 100 - Conceptual south elevation.

Fig. 101 - Conceptual east elevation.

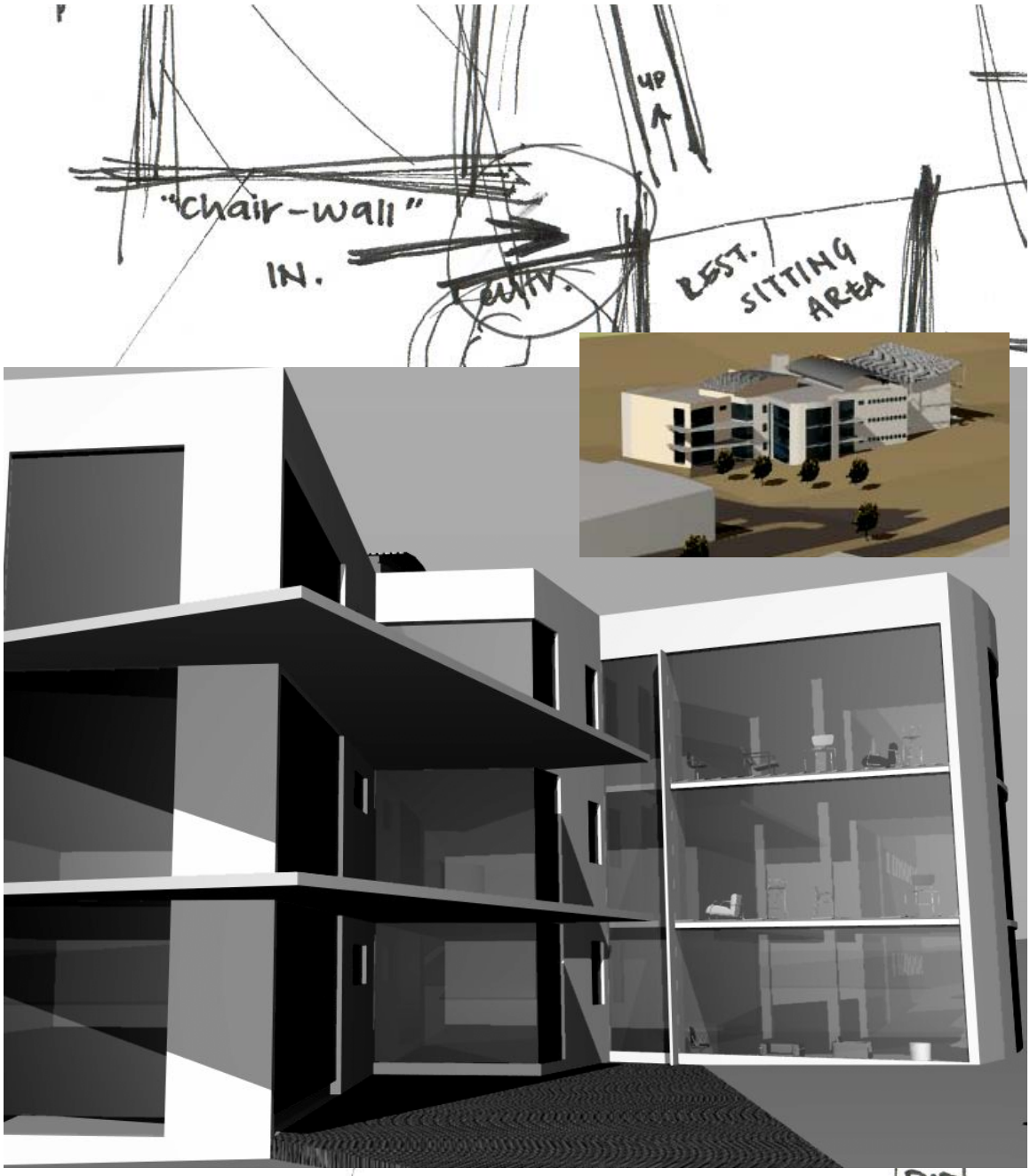


Fig. 102 - Three dimensional view of "chairwall" – design development phase 2.

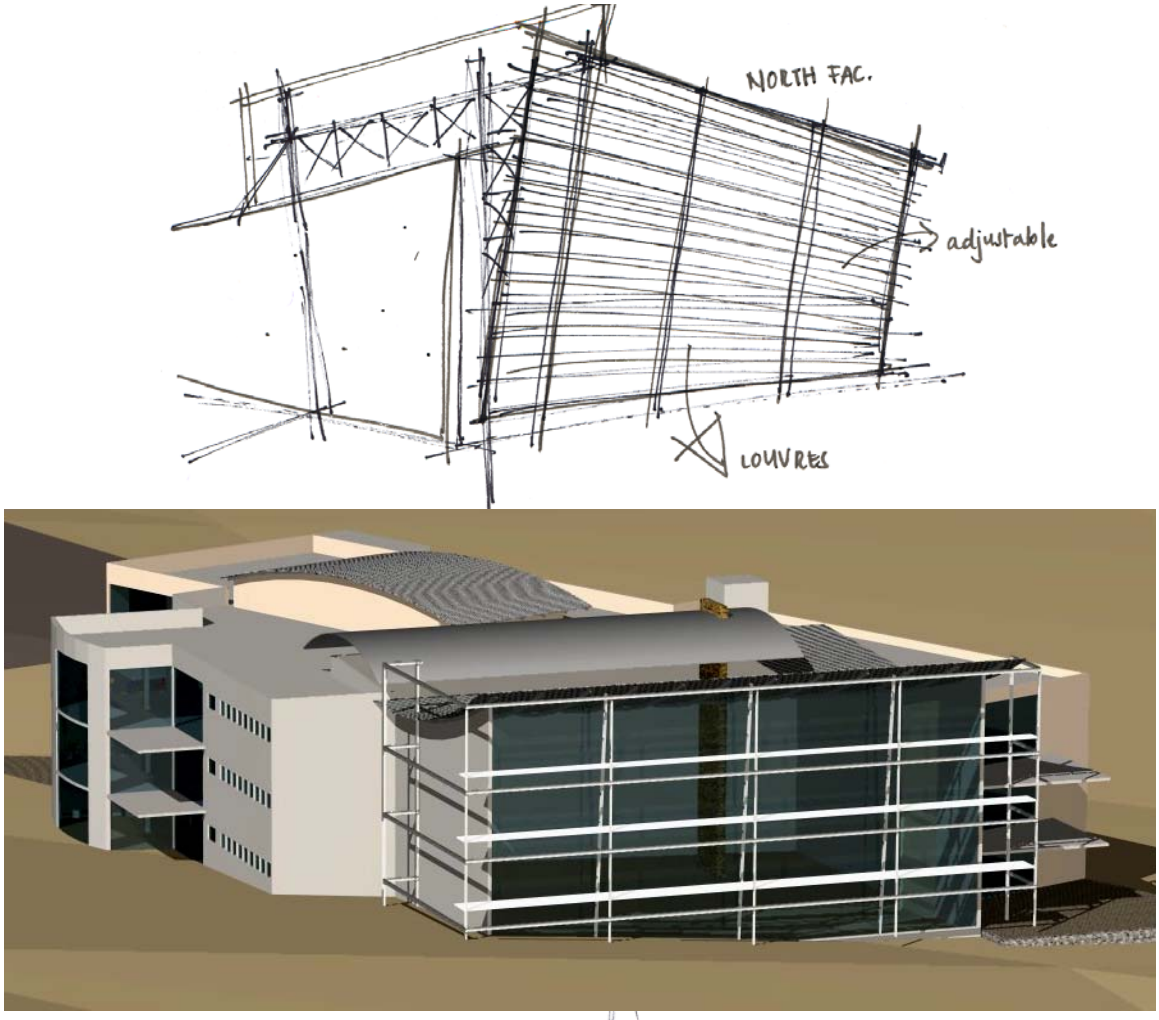
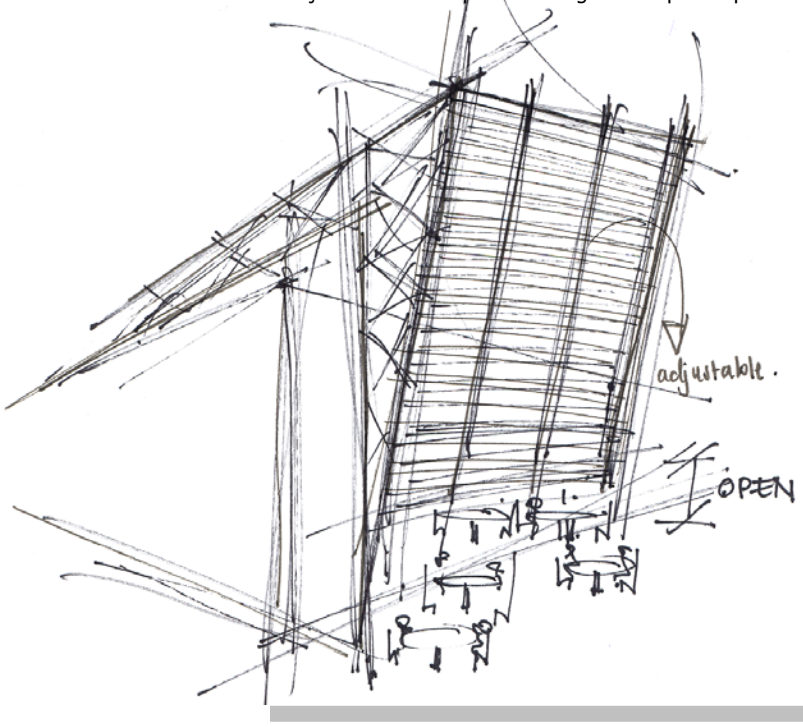


Fig. 103 - Three dimensional view of north façade and louver panel – design development phase 2.



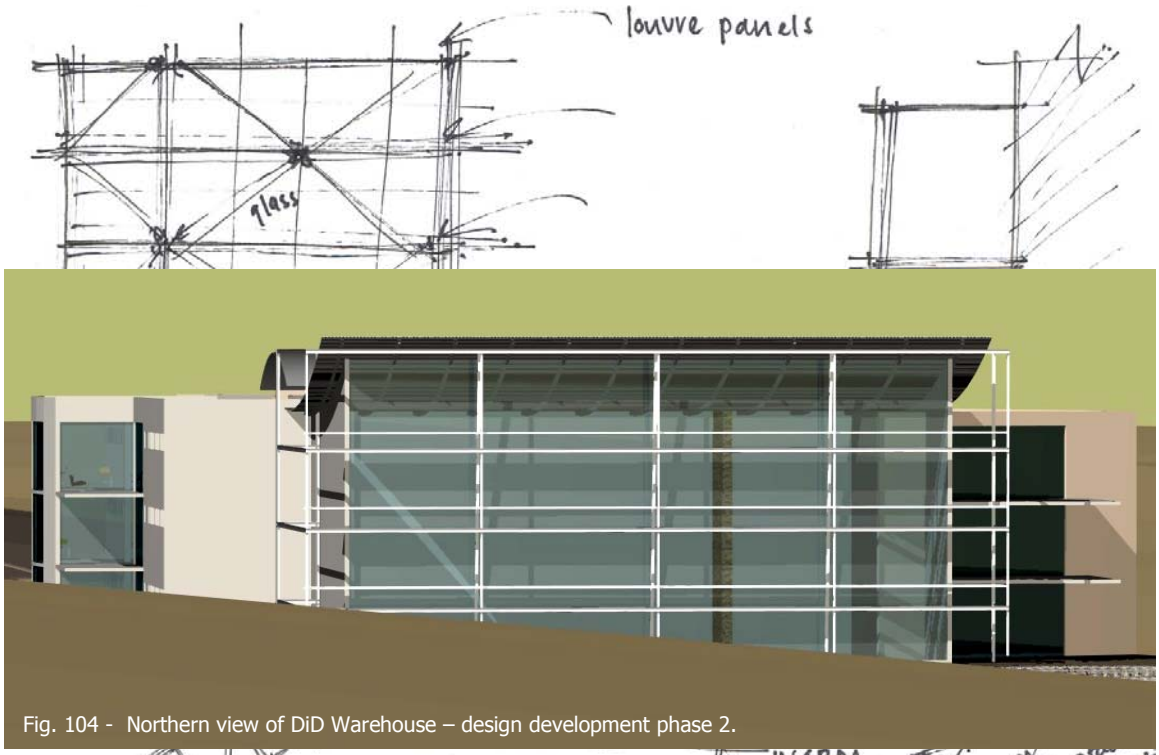


Fig. 104 - Northern view of DiD Warehouse – design development phase 2.

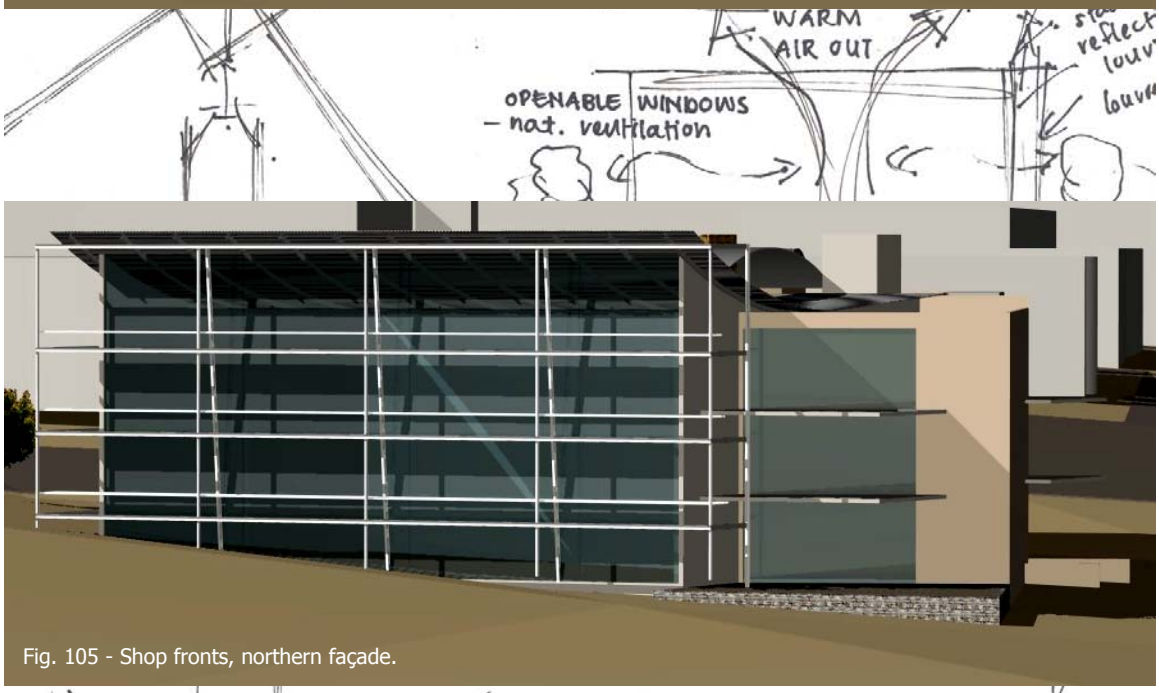


Fig. 105 - Shop fronts, northern façade.

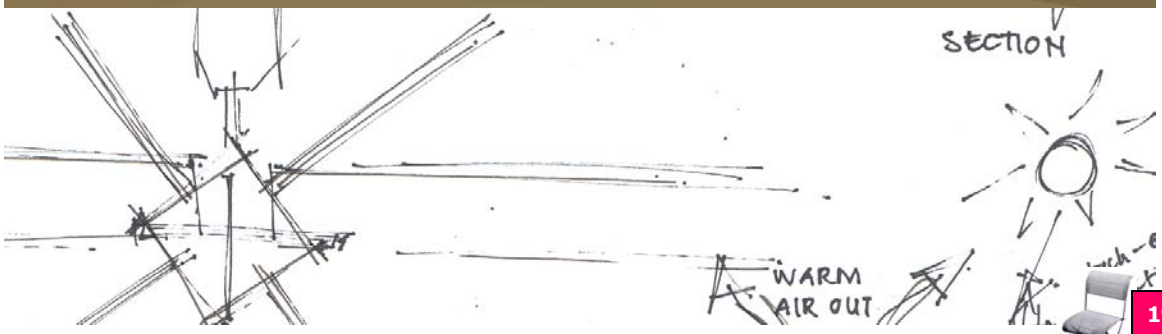
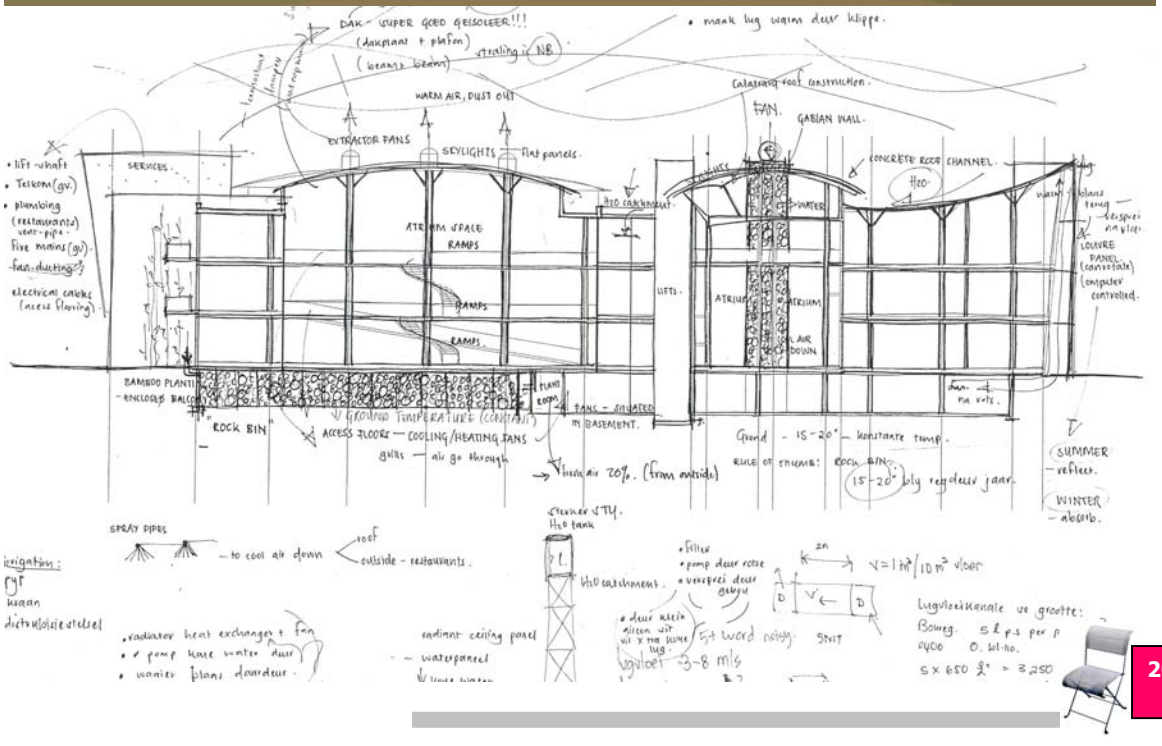


Fig. 106 - Three dimensional model of DiD Warehouse – design development phase.



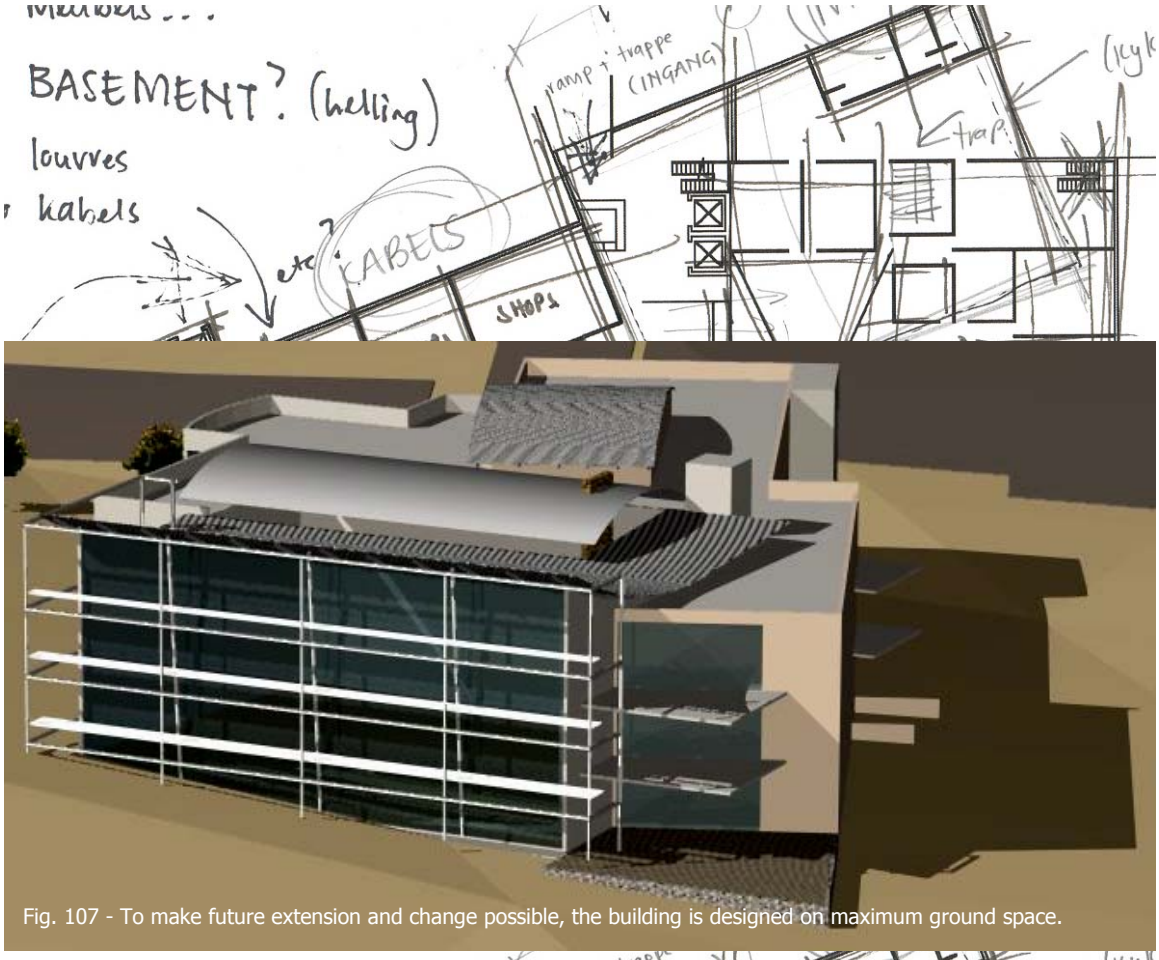


Fig. 107 - To make future extension and change possible, the building is designed on maximum ground space.

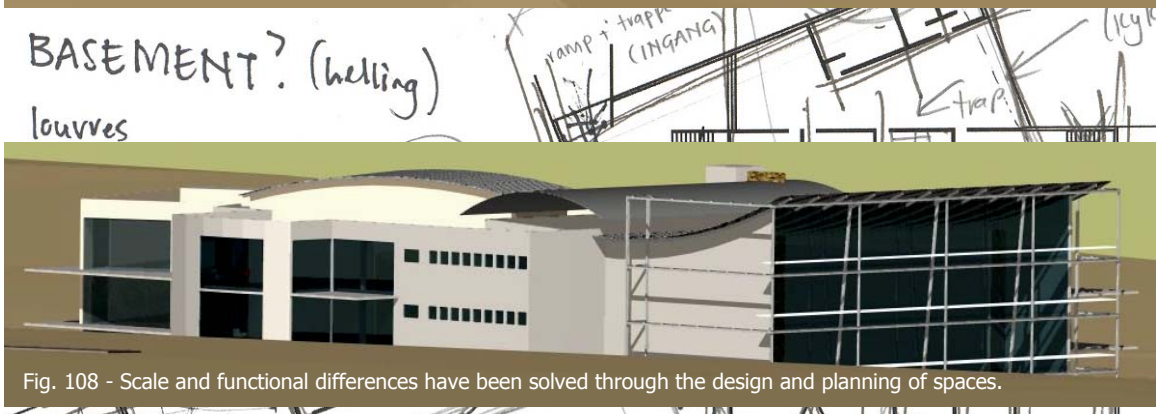
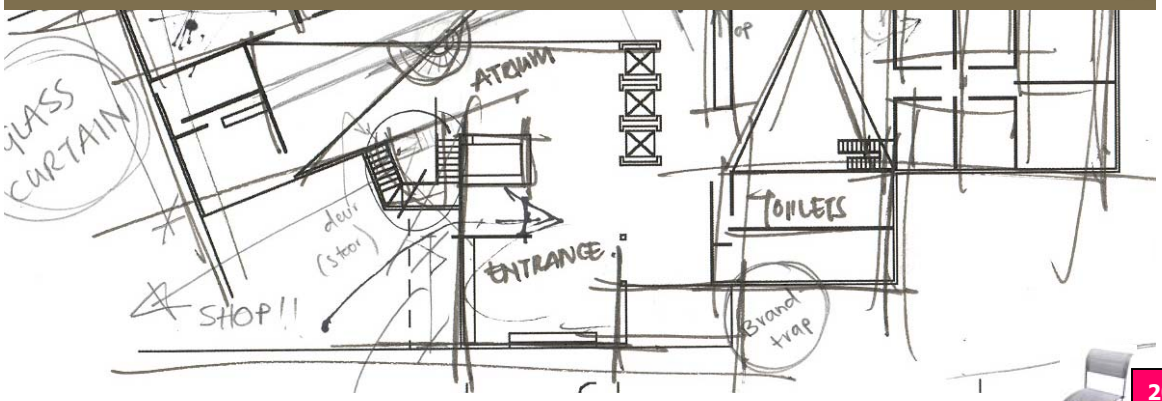


Fig. 108 - Scale and functional differences have been solved through the design and planning of spaces.



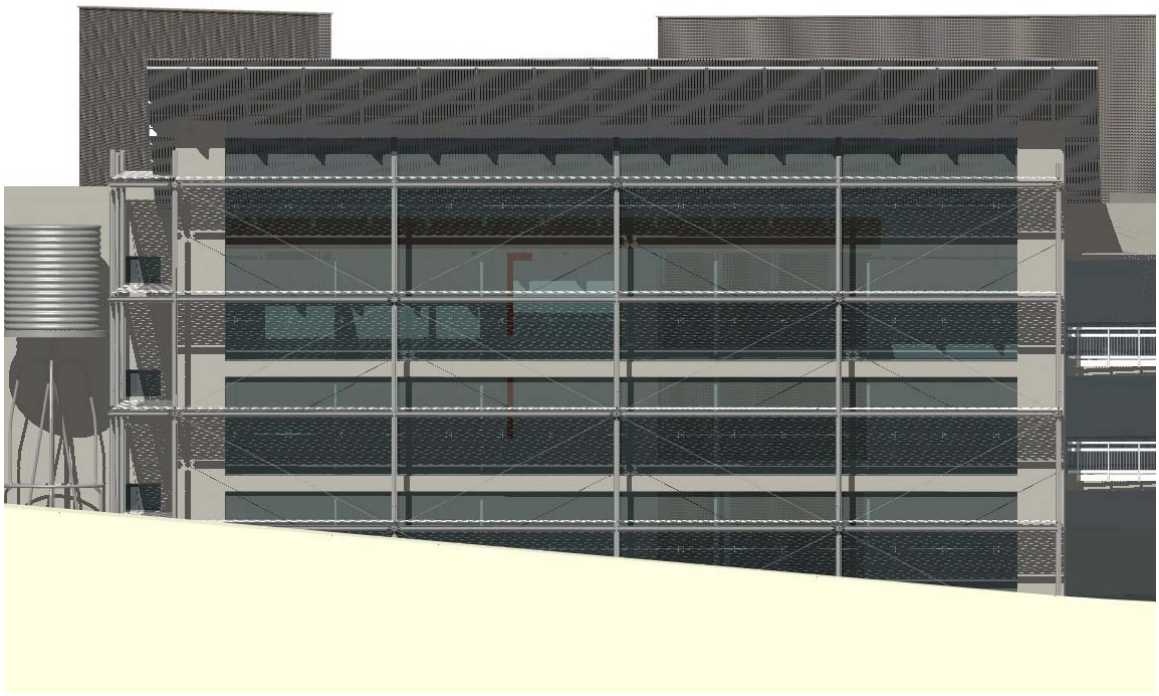


Fig. 109 – North elevation – glass curtain wall.

Fig. 110 – North-east perspective.

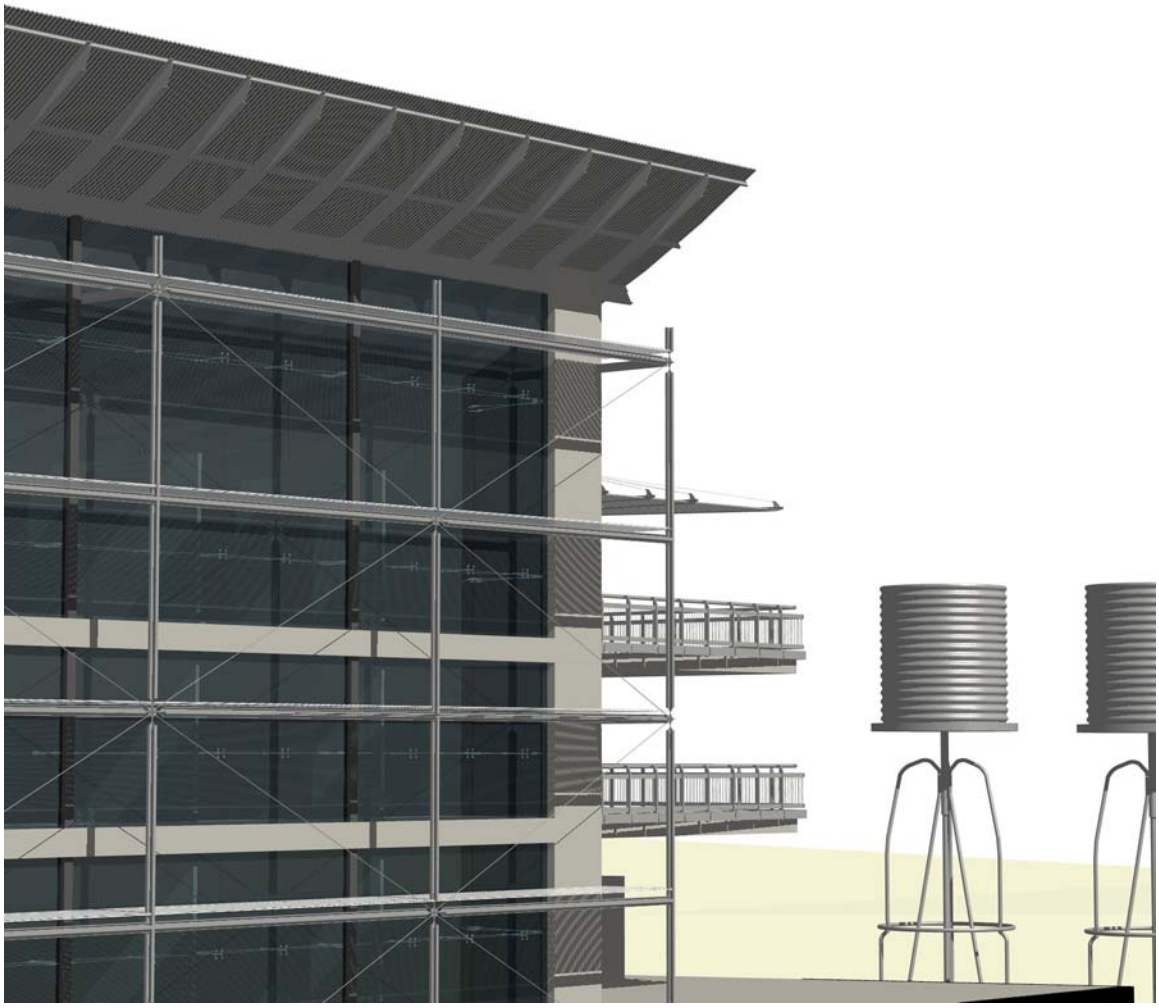


Fig. 111 – North elevation.

Fig. 112 – North-east perspective.

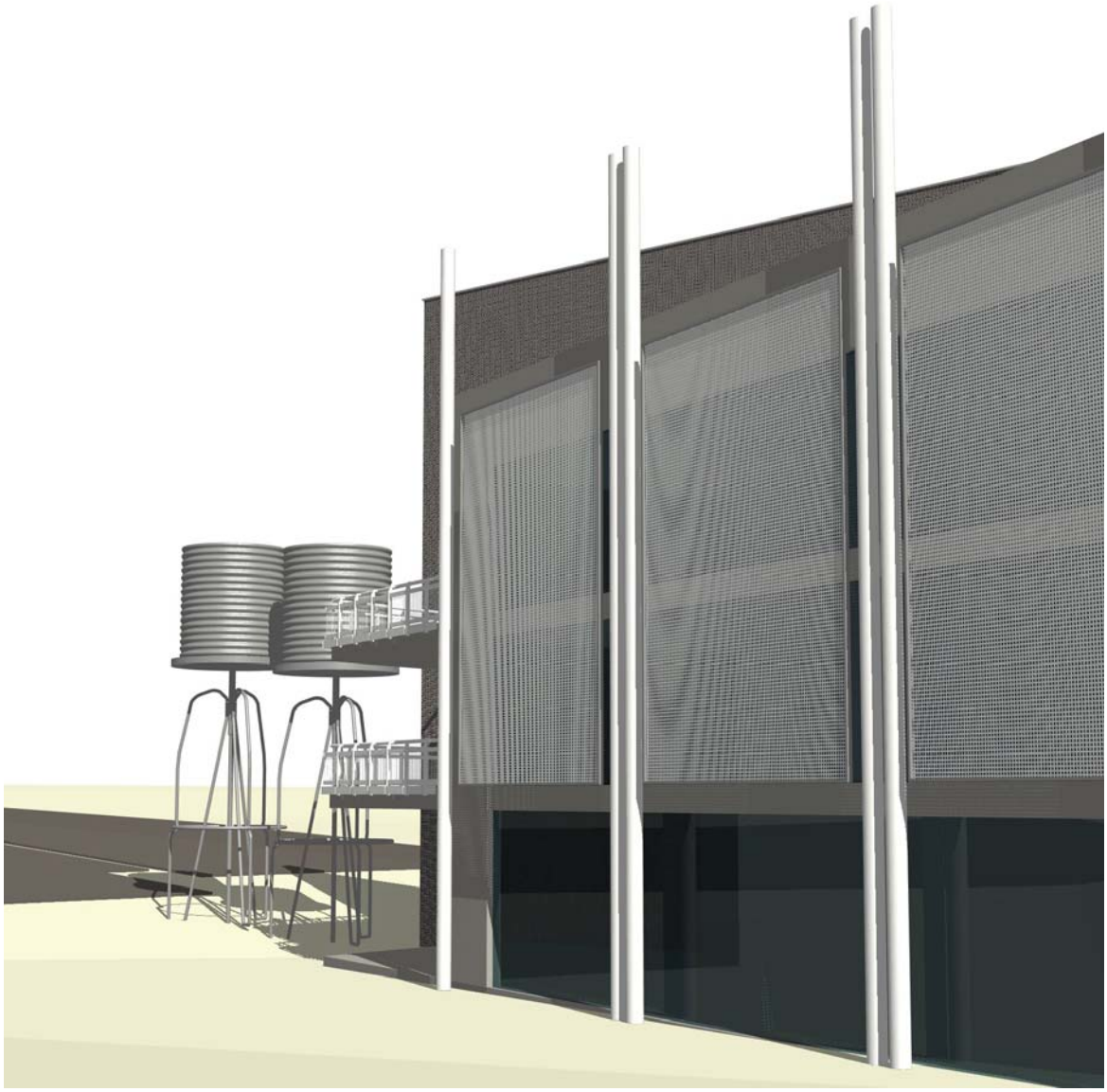


Fig. 113 – Advertising louver panel – east elevation.

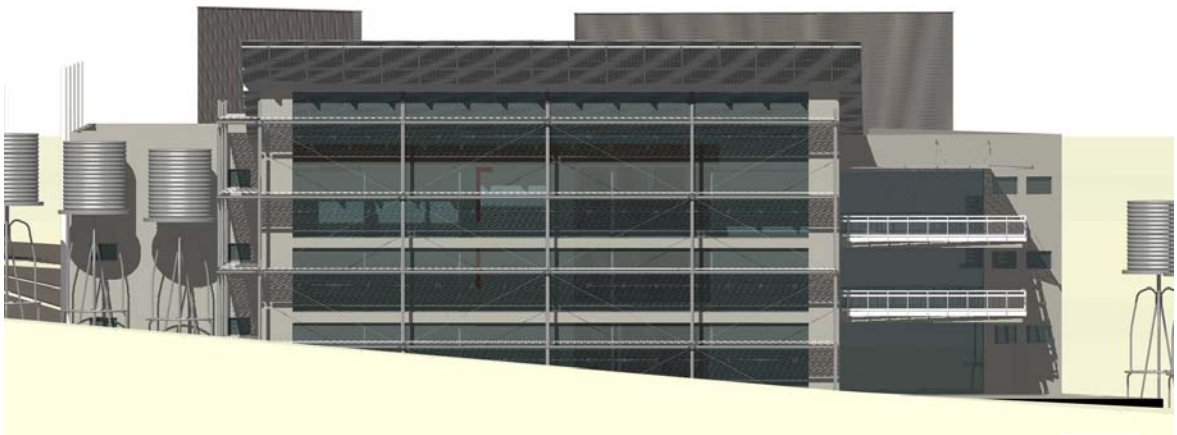


Fig. 114 – North elevation.

Fig. 115 – North-west perspective – view from N3-highway.

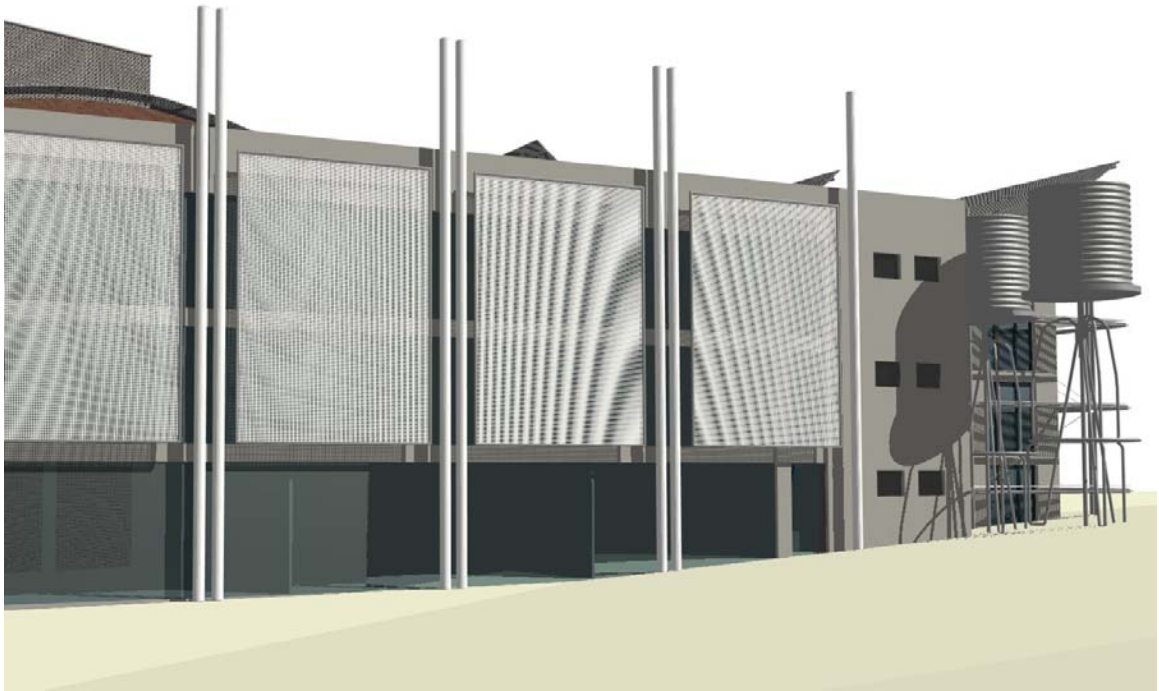


Fig. 116 – East elevation – advertising louver panel.

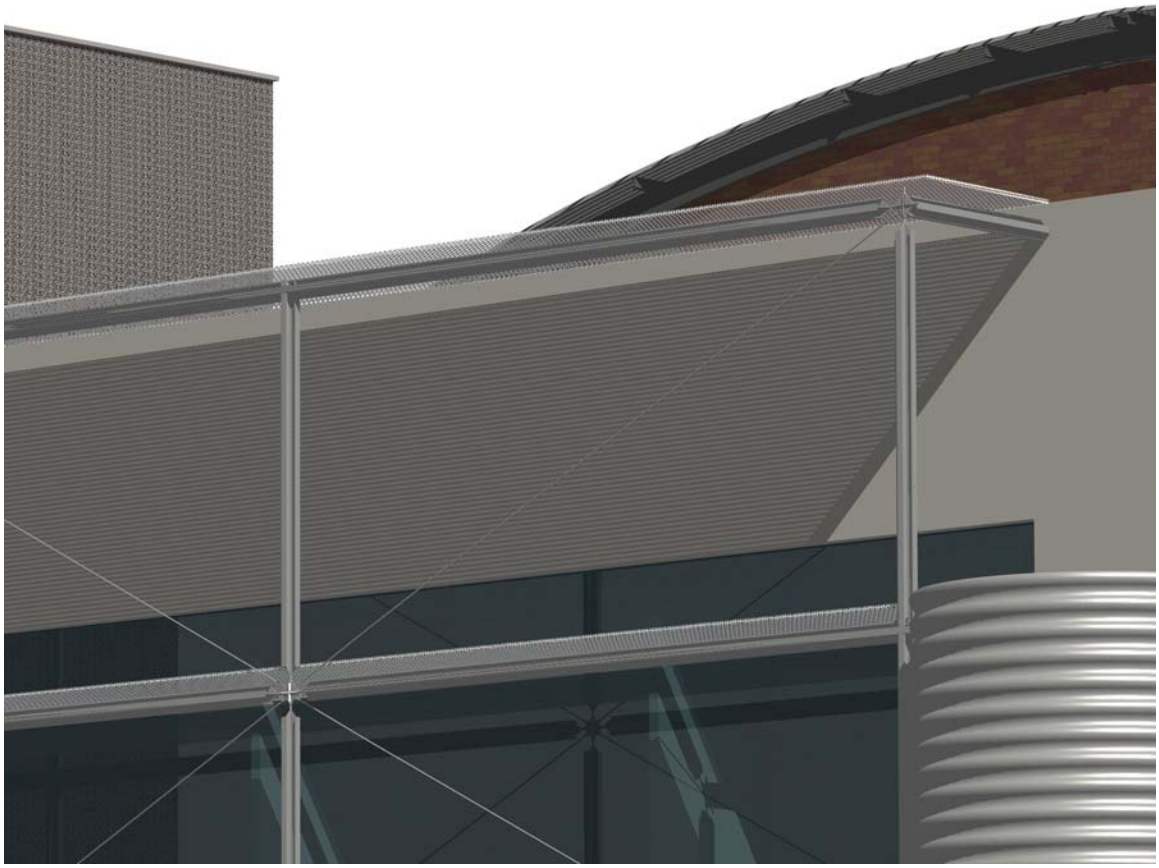


Fig. 117 – Three dimensional detail of louver panel.

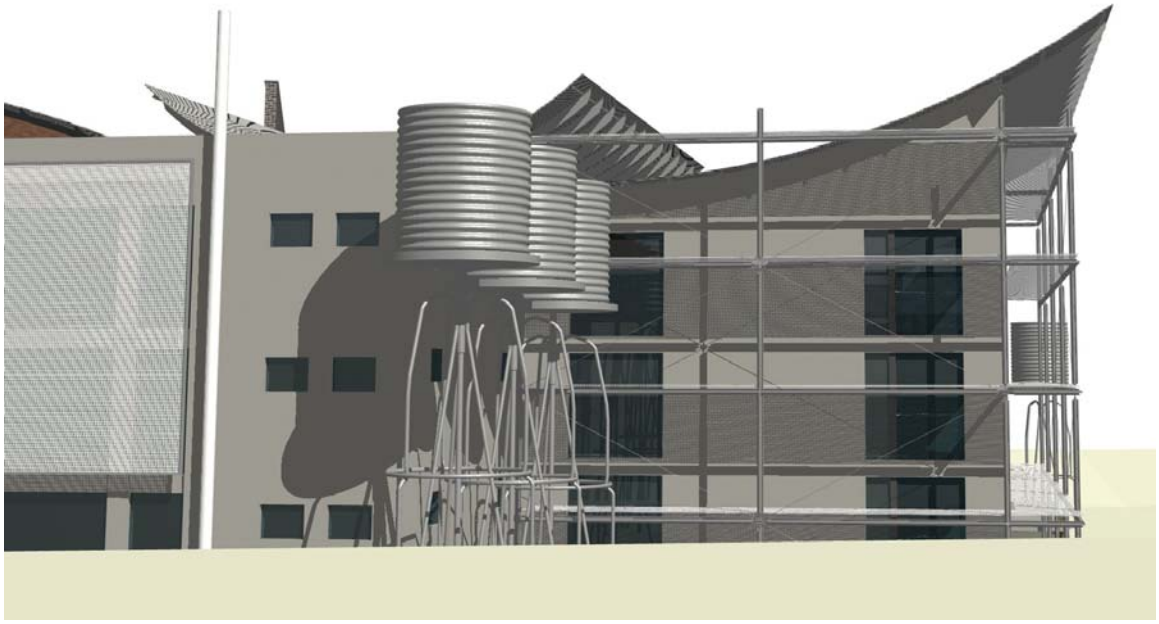


Fig. 118 – East elevation – "glass box" on the right (shops).

Fig. 119 – North-west perspective.

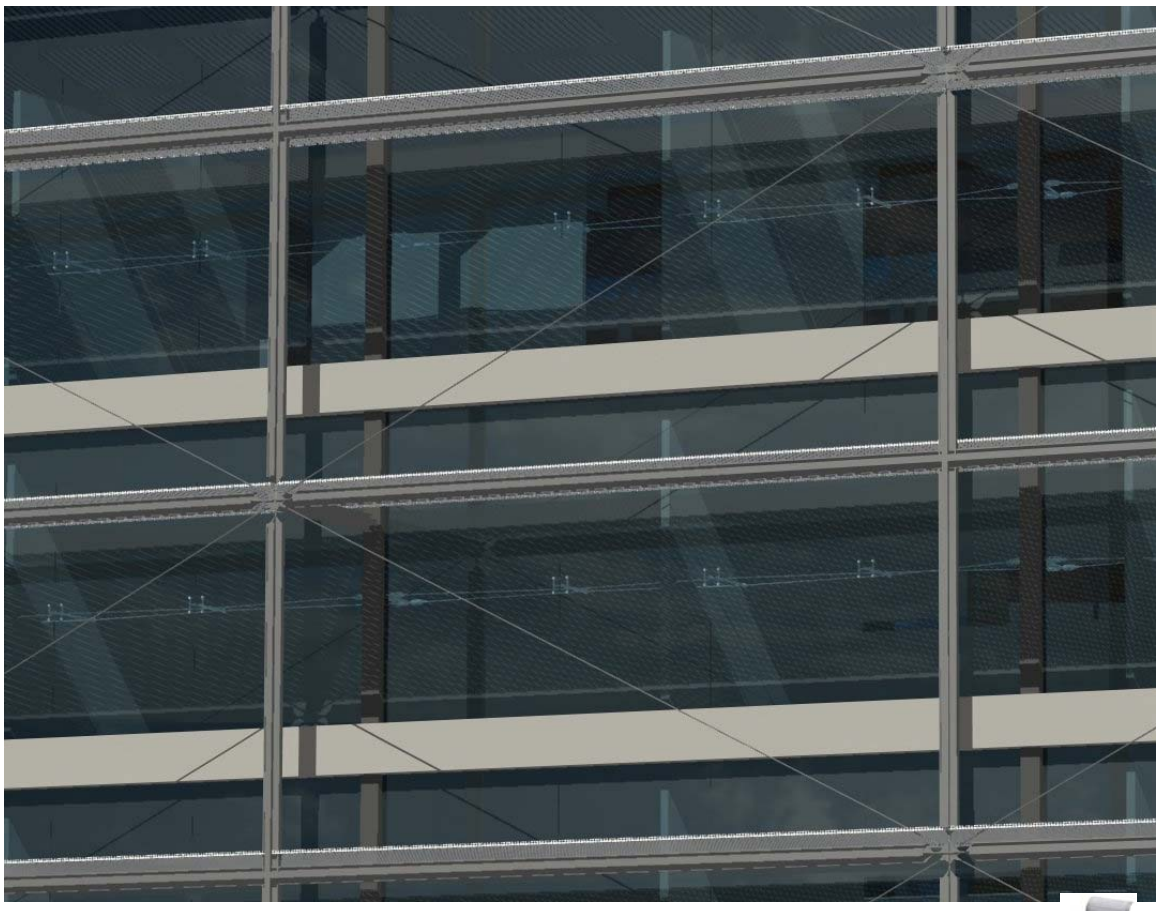


Fig. 120 – Three dimensional detail of glass curtain and louver panel – "glass box".

Fig. 121 – Detail of water tank and louver panel.

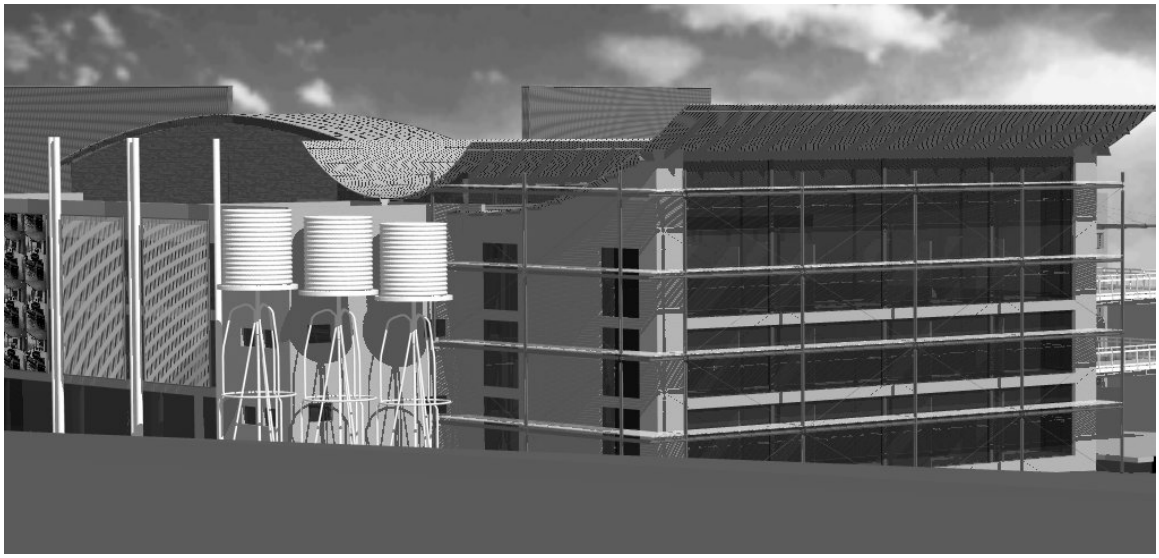


Fig. 122 – A three dimensional model of DiD Warehouse – north-east.

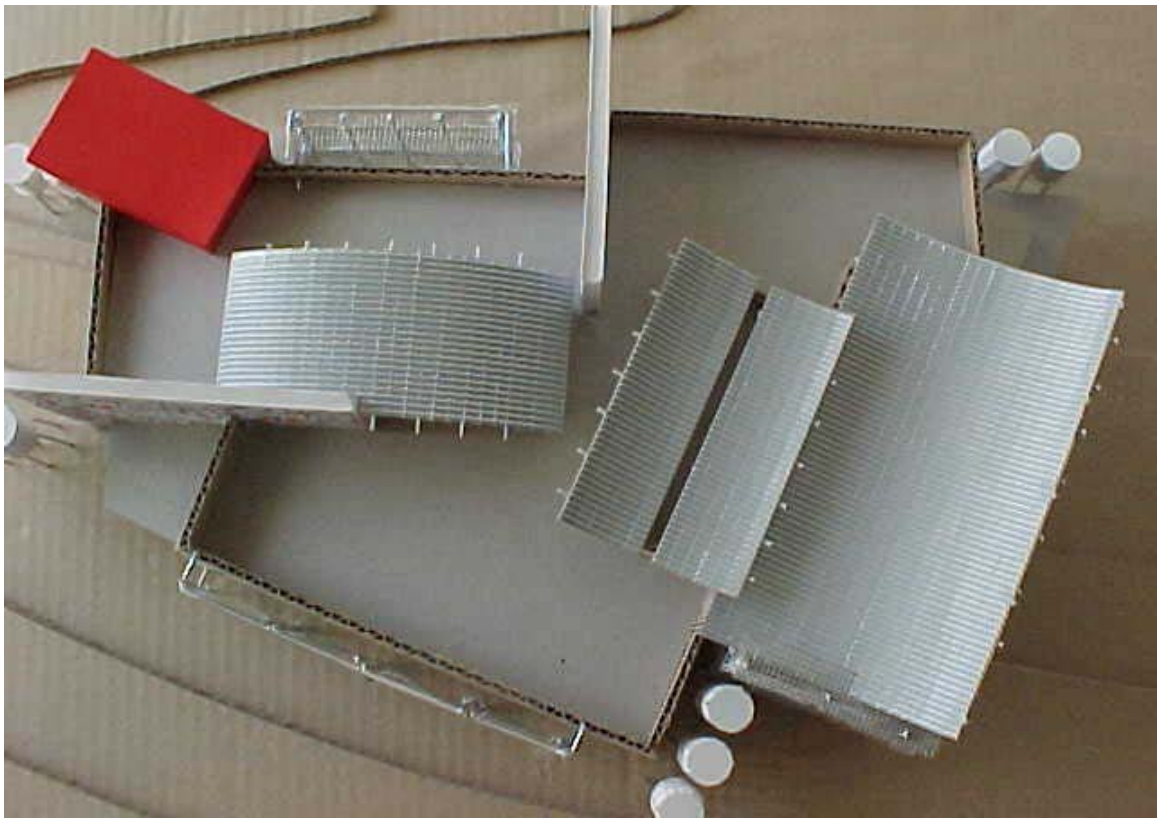


Fig. 123 – Model – roof plan.

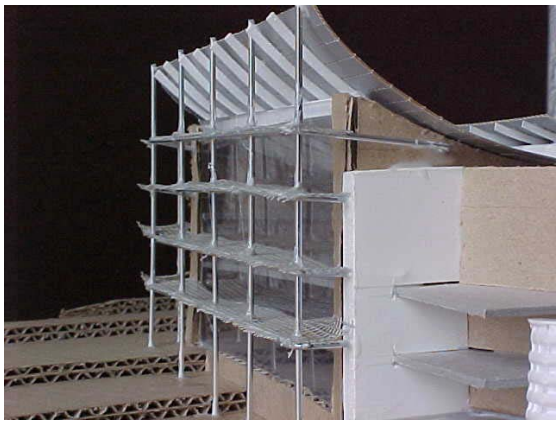


Fig. 124 – North elevation.

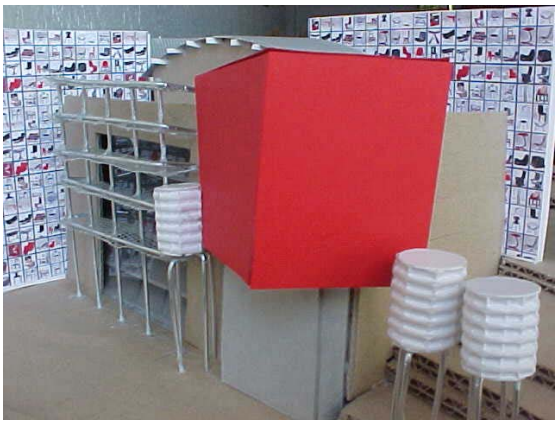


Fig. 125 – South-west elevation.

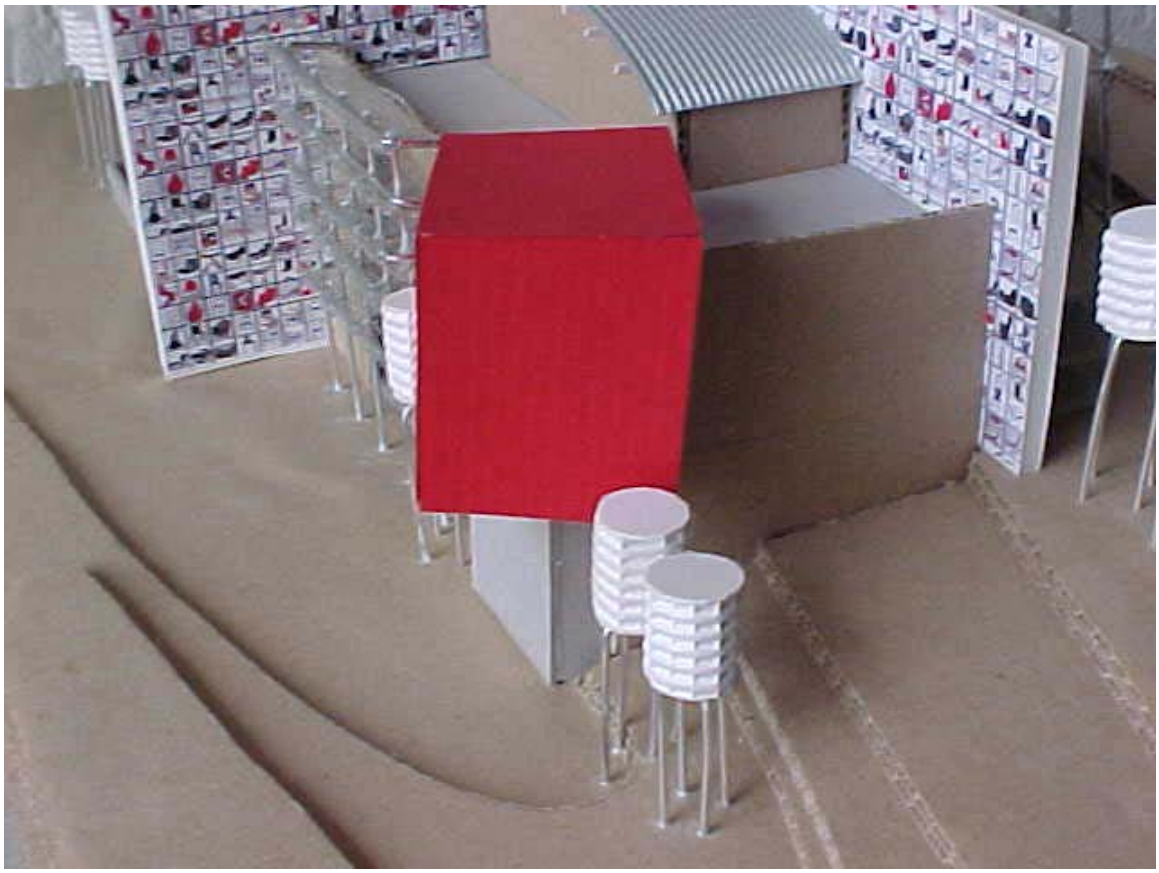


Fig. 126 – South elevation – natural dry-packed stone walls.

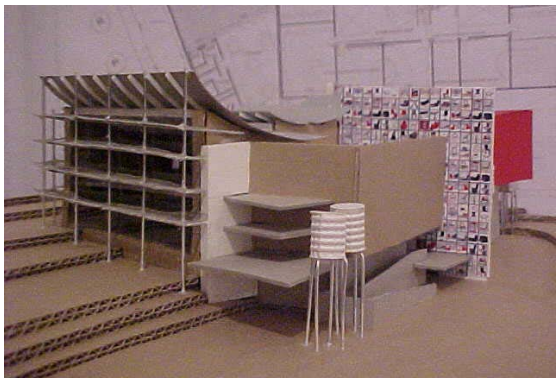


Fig. 127 – North-west elevation.

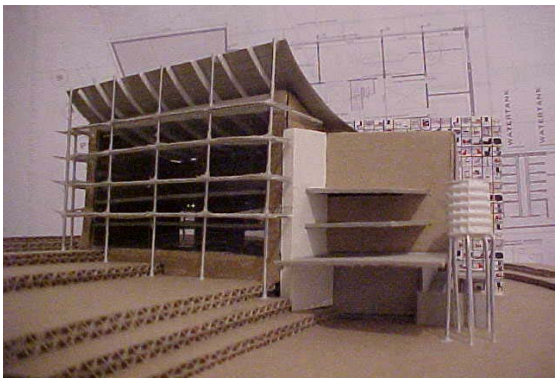


Fig. 128 – "Glass box" – north elevation.

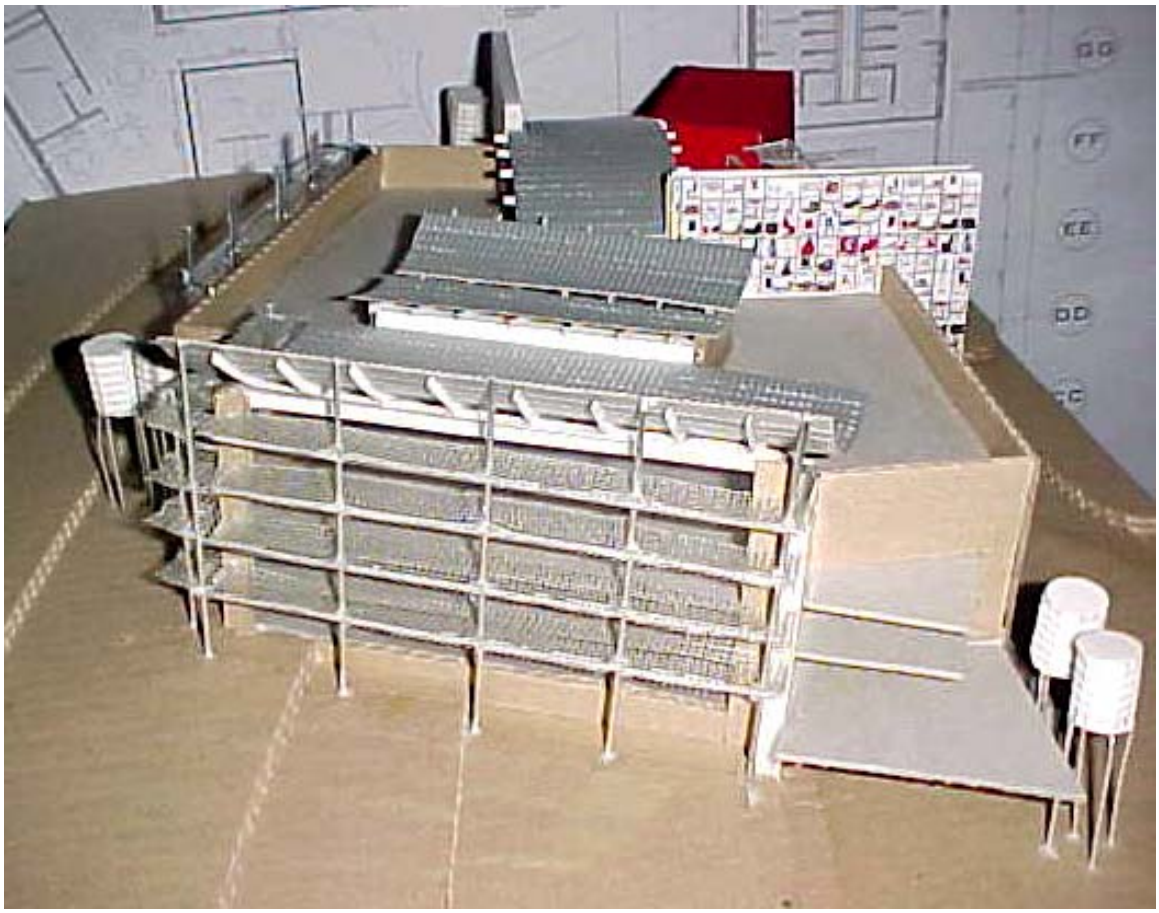


Fig. 129 – Model of DiD Warehouse.

Fig. 130 – Curved roof – north façade.

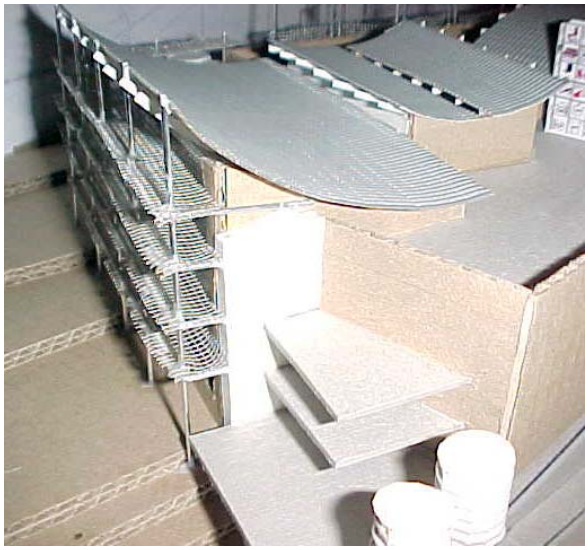


Fig. 131 – Balconies at corner – north-west.

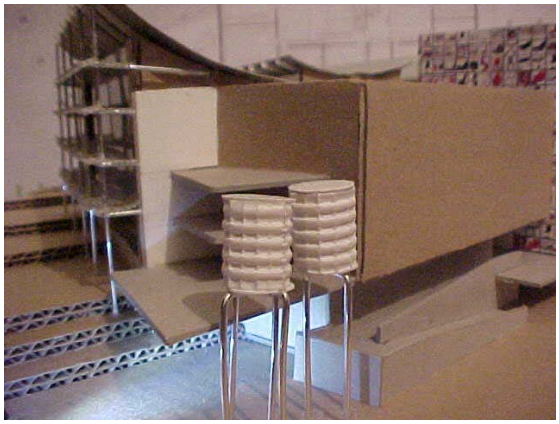


Fig. 132 – Ramp to west entrance.

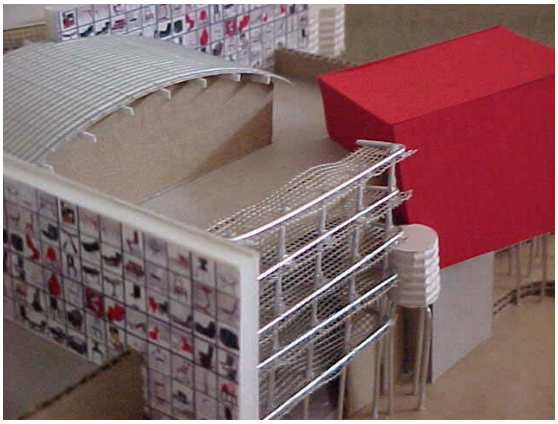


Fig. 133 – Stone walls, louver panel and service box.

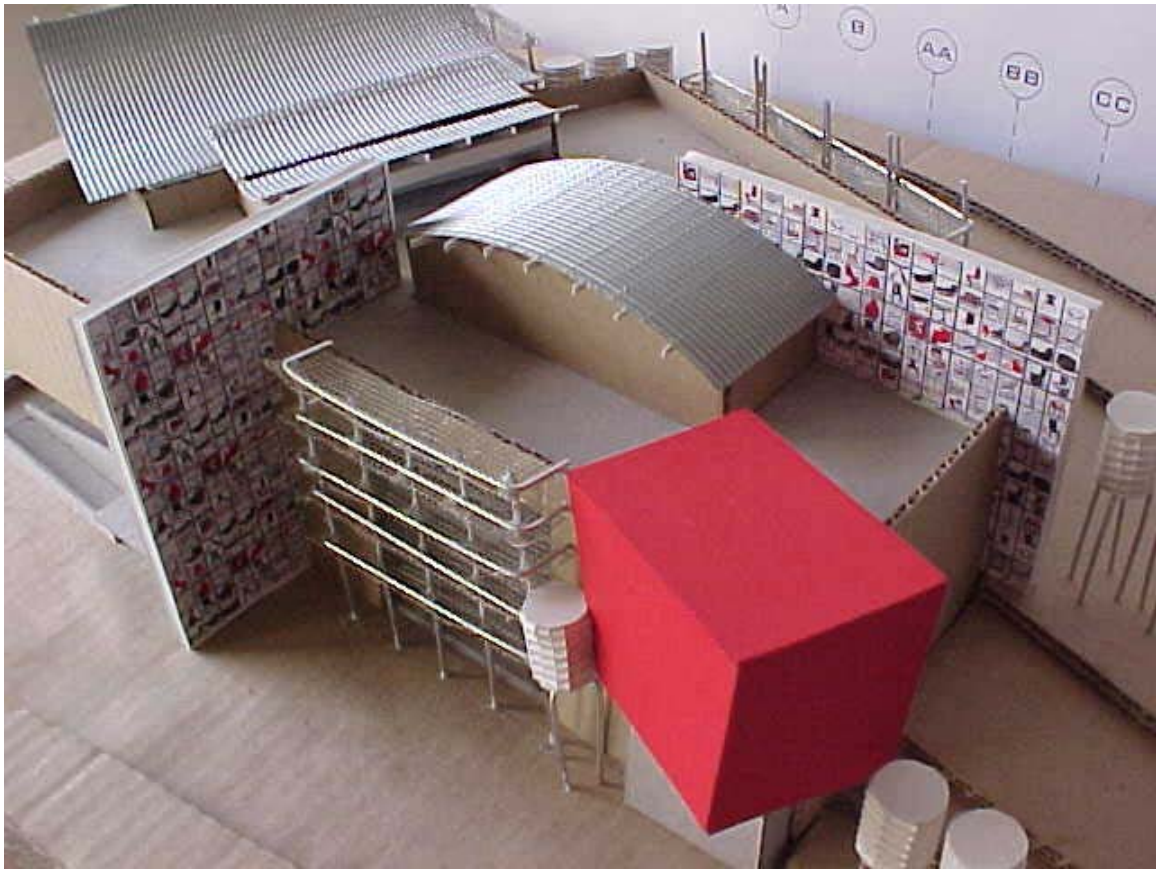


Fig. 134 – DiD Warehouse – south-west isometric.

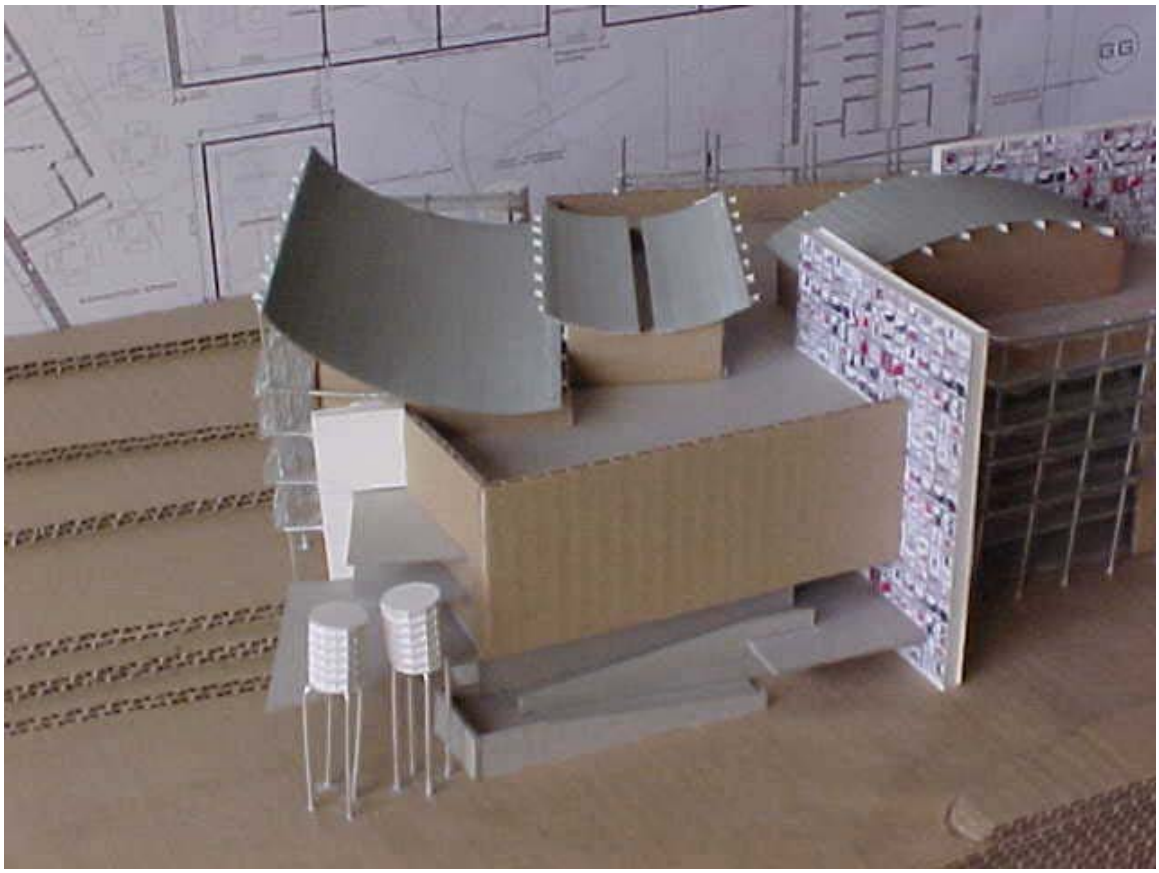


Fig. 135 – View from N3-highway – a reflection of the function and activities of DiD Warehouse.

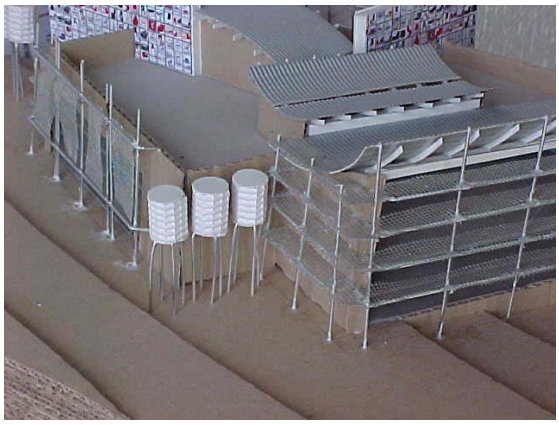


Fig. 136 – North-east perspective.

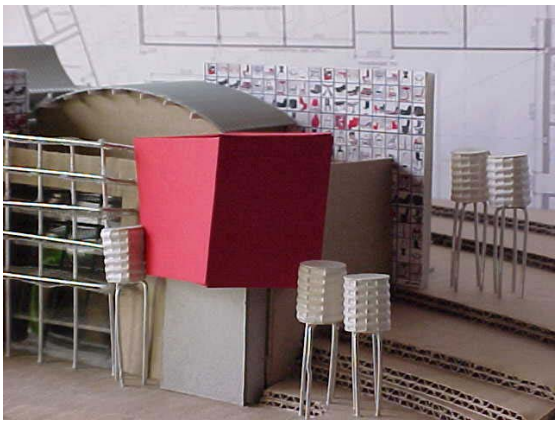


Fig. 137 – South-west perspective.

Fig. 138 – Isometric – north-west.

Fig. 139 – North-east perspective.

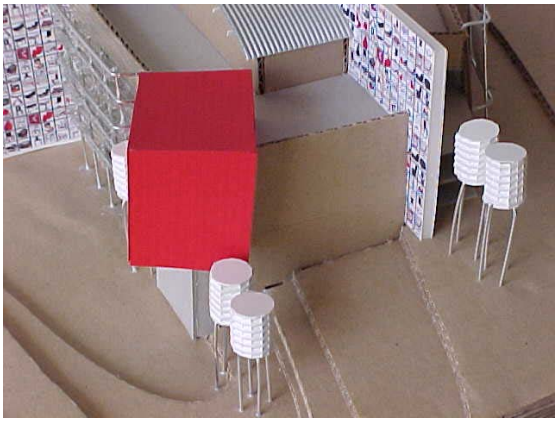


Fig. 140 – South elevation.

DID WAREHOUSE

Fig. 141 – Sunset views of DiD Warehouse.

Cost estimate

APPENDIX

COST ESTIMATE DATED 25-10-2003		
DID WAREHOUSE ON ERF 59 - LINBRO BUSINESS PARK AT MIDRAND		
BUILDING		
BASEMENT FLOOR AREA	1 801m2 @ R2 000,00	R3 602 000,00
SHOWCASE FLOOR AREA	1 657m2 @ R2 200,00	R3 645 400,00
GROUND FLOOR AREA	2 216m2 @ R2 500,00	R5 540 000,00
FIRST FLOOR AREA	2 168m2 @ R2 400,00	R5 203 200,00
SECOND FLOOR AREA	2 168m2 @ R2 400,00	R5 203 200,00 R23 193 800,00
EXTERNAL WORK		
SECURITY FENCING (2,4m HIGH)	324m @ R200,00	R 64 800,00
PAVED ROADS AND PARKING AREAS	3 010m2 @ R200,00	R 602 000,00
STATURE WATER TANK AND STANK	10 @ R10 000,00	R 100 000,00
PAVED WALKWAYS	120m2 @ R160,00	R 19 200,00
TILED CONCRETE PAVINGS	155m2 @ R240,00	R 37 200,00
STORMWATER DRAINAGE	90m @ R300,00	R 27 000,00
SOIL AND WASTE WATER DRAINAGE	180m2 @ R200,00	R 36 000,00
EXTERNAL WATER SUPPLY	250m2 @ R120,00	R 30 000,00
SHADEPORTS	74 @ R1 500,00	R 111 000,00 R 1 027 200,00
PROVISIONAL SUMS AND PRIME COST ACCOUNTS		
ELECTRICAL INSTALLATION		R2 000 000,00
FIRE PROTECTION SYSTEM		R 600 000,00
LIFTS		R 750 000,00
AIR CONDITIONING AND VENTILATION		R 900 000,00
ELECTRICAL SECURITY SYSTEM		R 200 000,00
LANDSCAPING AND GARDENING		R 200 000,00
MUNICIPAL ELECTRICAL CONNECTION		R 100 000,00
MUNICIPAL SEWER CONNECTION		R 50 000,00
MUNICIPAL WATER CONNECTION		R 20 000,00 R 4 820 000,00
TOTAL DIRECT BUILDING COST		R29 041 000,00
ADD: PRELIMINARIES (10% SAY)		R 2 904 000,00
SUB-TOTAL		R31 945 000,00
ADD: 14% VAT		R 4 472 300,00
ESTIMATED TOTAL BUILDING COST		R36 417 300,00
STATISTICAL ANALYSIS:		
R3 638,09/m2		
NOTE:		
THE FOLLOWING ITEMS ARE NOT INCLUDED IN THIS ESTIMATE:		
(i) LAND COST		
(ii) ESCALATION IN BUILDING COST		
(iii) PROFESSIONAL FEES		
(iv) LOOSE FURNITURE AND EQUIPMENT		

Schedule of accommodation
APPENDIX

DID WAREHOUSE - DÉCOR, INTERIOR, DESIGNER FURNITURE WAREHOUSE

SCHEDULE OF ACCOMMODATON

SPACE DESCRIPTION	NO OF SPACES	AREA PER SPAC	TOTAL AREA	
ADMINISTRATION	1	50	50	3600
SECURITY	1	25	25	3600
SITTING AREA	2	60	120	3600
OFFICE	5	150	750	3600
SHOWROOMS	5	500	2500	3600
SHOPS	20	150	3000	3600
RESTAURANTS	2	200	400	3600
GALLERY	1	150	150	3600
SKILLS LEARING AREA	3	50	150	3600
LIBRARY/INTERNET	2	100	200	3600
CIRCULATION AREA	1	250	250	3600
SERVICES	1	45	45	3600
GALLERY/ATRIUM	2	150	300	3600
SANITATION	2	100	200	3600
TOTAL			10,000	3,600

Schedule of accommodation
APPENDIX

COST
180000
90000
432000
2700000
9000000
10800000
1440000
540000
540000
720000
900000
162000
1080000
720000
36,000,000

RISK MANAGEMENT FOR DID WAREHOUSE - APPENDIX

	POWER			LEVEL OF CONCERN		
STAKEHOLDER GROUP	**INFLUENCE OF OTHERS**	**DIRECT CONTROL OF RESOURCES**	**Y-AXIS**	**TECHNICAL**	**SOCIAL**	**X-AXIS**
	0,35	**0,65**		**0,2**	**0,8**	
1. Client (RPP Developments)	5	5	5	5	4	4,2
2. Directors/Managers (Shops)	4	4	4	5	4	4,2
3. Users (Linbro Business Park)	3	2	2,4	1	4	3,4
4. Community	2	1	1,4	1	3	2,6
5. Environment	3	1	1,7	1	3	2,6
6. Municipality	3	1	1,7	1	2	1,8

Fig. – Analysing Stakeholder Influence.

- 0 = Minimum
- 5 = Maximum

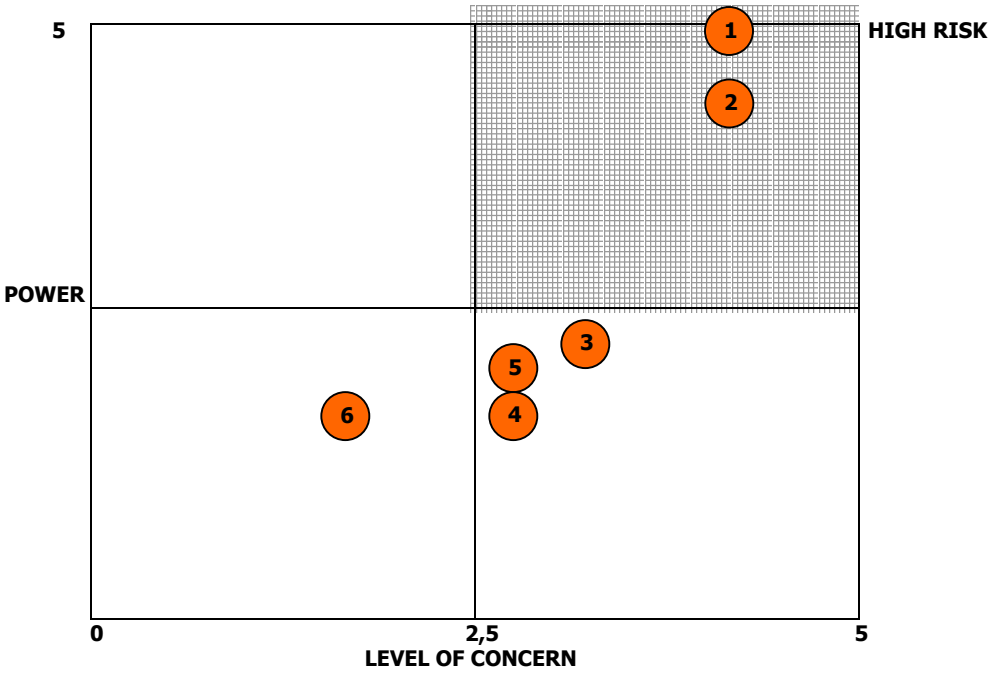


Fig. – Plot Results.

This tool has been used to analyse the configuration of DiD Warehouse. To consider the influence that each stakeholder has over the resources, a weighting was given:

- influence (0,35)
- direct control (0,65)
- technical (0,2)
- social (0,8).

The results have been plotted onto a grid and the stakeholders whose scores fall into the top right hand block are those with the most influence and impact on DiD Warehouse. The most important stakeholder is the client, RPP Developments, who will have the greatest influence over the whole project. They will, in a way, determine the success of this project concerning financial aspects and future prospects.

Next in line are the Directors/Managers, who will of course have an influence on decisions concerning DiD Warehouse. The Users of Linbro Business Park, Community and Environment, have lesser influence as stakeholders of this project, but still contribute valuable input and they need to be considered as well. The Municipality does not play such a big role, but it is important to consider all the stakeholders. The Environment and Community have more or less the same level of importance in this project.

As the major stakeholder, it is clear that the client, RPP Developments, will have the most control over the project. According to the graph, the client's directors will have a great influence as well and they will to a large degree determine its success. All the stakeholders, however, must be taken into consideration, and each will make a valuable contribution on different levels of the project.

RISK ASSESSMENT:

CONSEQUENCE MEASURE		**LIKELIHOOD MEASURE**		**RISK RESULT MEASURE**	
Catastrophic	5	Likely	5	High	15 – 25
Major	4	Moderate	4	Medium	7 – 14
Moderate	3	Unlikely	3	Low	2 - 6
Minor	2	Rare	2		
Insignificant	1				

RISKS:

STAKEHOLDERS	**EXTERNAL** (unpredictable)	**EXTERNAL** (predictable)	**INTERNAL** (non-technical)	**TECHNICAL**
Users – (Linbro Business Park)	Regulatory: import control	Market risks: economics	Management: staff changes	Design: fire safety
Municipality	Natural hazards: storms			
	Deliberate intent: safety, vandalism			
	Failure of completion - financial support			

RANK DESCRIPTION	**CONSEQUENCE (C)**	**PROBABILITY (P)**	**RISK FACTOR (RF = C X P)**	**RISK RESULT**	**MITIGATION MEASURE**
Users – Linbro Business Park	Moderate 3	Unlikely 3	9	Medium	Comply with all regulations set by Linbro Business Park in terms of design, control, alterations, building finishes etc.
Municipality	Moderate 3	Unlikely 3	9	Medium	Design according to their LIDP Proposals for Region 7, and comply with zoning regulations.
Regulatory: import control	Major 4	Moderate 4	16	High	Managers should be appointed to ensure that stock would arrive on time and regulatory in terms of import control. It is

					extremely important that DiD Warehouse should keep sufficient stock, and that new stock is available on time to ensure successful exhibitions and sales. Stock delays can have serious consequences.
Natural hazards: storms	Moderate 3	Unlikely 3	9	Medium	Although storm damage to the building is highly unlikely, this risk should be taken into account. Landscaping as well as roofs should be designed for the rapid removal of stormwater.
Deliberate intent: safety and vandalism	Major 4	Moderate 4	16	High	Due to the fact that DiD Warehouse will house valuable articles and furniture, security will play a pivotal role in its management. Effective security inside and outside the building is imperative.
Failure of completion: financial support	Major 4	Unlikely 3	12	Medium	RPP Developments will provide the necessary funds for the erection of the building, and income will be generated through the rental of shops, offices and exhibition spaces. All funds must be managed judiciously.
Market risks: economics	Moderate 3	Moderate 4	12	Medium	The local economy will have an indirect influence on the percentage of profit that DiD Warehouse will generate.
Management: staff changes	Major 4	Moderate 4	16	High	Due to the fact that the management process of DiD Warehouse will be very specialized, requiring that the management team will have to be highly trained, it will have a negative impact if too many members of the team change or withdraw too soon. Benefits, remuneration, and interpersonal relationships will be important considerations.
Design: fire safety	Catastrophic 5	Unlikely 3	15	High	The main technical risk existing within the building will be that of fire. Due to the high value of the contents of the building, its design will have to comply with fire regulations in terms of fire escape routes, fire extinguishers, ventilation, etc, to ensure that sufficient safety measures can be taken in case of fire.

MATRIX – RISK QUANTIFICATION:

CONSEQUENCE	LIKELY 5	MODERATE 4	UNLIKELY 3	RARE 2
5. Catastrophic	25	20	15	10
4. Major	20	16	12	8
3. Moderate	15	12	9	6
2. Minor	10	8		
1. Insignificant				

KEY:

High Risk 15 to 25

Medium Risk 8 to 14

Low Risk 2 to 7

List of figures

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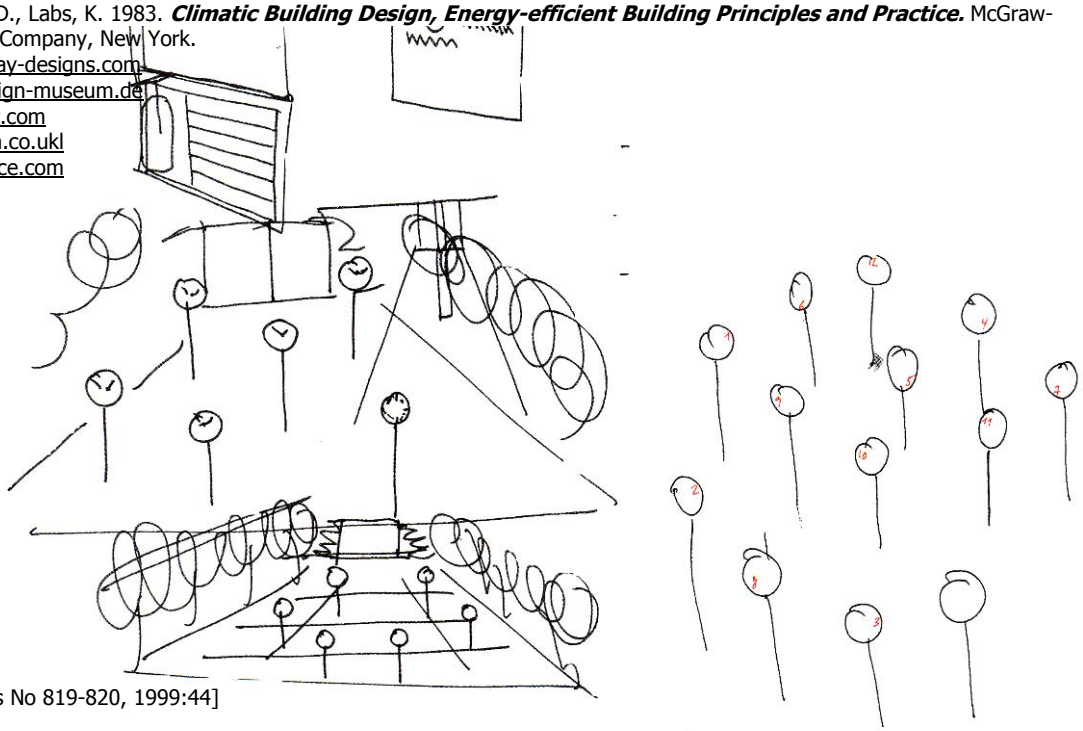

[Domus No 819-820, 1999:44]

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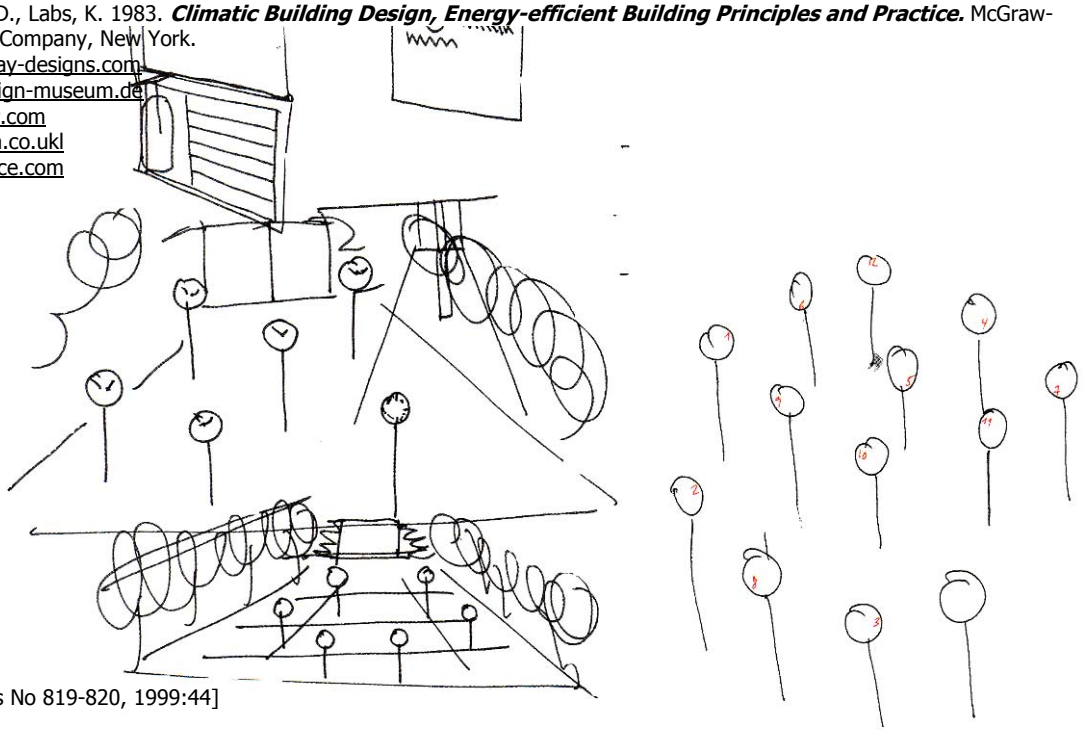

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