Ghana Green Building Council public launch

examples of green buildings in South Africa

eric noir, WSP GBD

17 August 2011

UNITED BY OUR DIFFERENCE

WSP

MAJOR SPONSORS

PLATINUM

micheletti
civil engineering & building contractors

GOLD

Laurus
DEVELOPMENT PARTNERS

ROYAL
ALUMINIUM SYSTEMS Ltd.

energy

a ‘ticking time bomb’

energy

biodiversity

six interrelated 'ticking time bombs'

. tipping point

. compelling each other

energy

biodiversity

water

six interrelated 'ticking time bombs'

. tipping point

. compelling each other

energy

biodiversity

water

waste

six interrelated 'ticking time bombs'

. tipping point

. compelling each other

energy

biodiversity

water

waste

people

six interrelated 'ticking time bombs'

. tipping point

. compelling each other

energy

biodiversity

water

waste

people

food security

six interrelated 'ticking time bombs'

. tipping point

. compelling each other

energy

biodiversity

water

waste

people

food security

can the built environment professions address holistically these problems?

. integrated design

. multidisciplinary approach to design

integrated approach to design

. integrated approach to design is no eco-gadgetry
. realising the increasing role of the professions
  in the built environment, at the building and urban scale
  when it comes to sustainable design
. breaking the silos of the current professional practice

truly multi-disciplinary professional teams are:
. adding value on a project specific basis
. seeking solutions collectively beyond the box
. increasing the potential for cross-pollination of thoughts and
  technical solutions
. providing a fertile ground for the inquisitive quality that prevails
  in sustainable approach to design
. contributing to reduction of excess fat in design allowances

The **True Size** of **Africa**

A small contribution in the fight against rampant *Immappancy*, by **Kai Krause**

Graphic layout for visualization only (some countries are cut and rotated)
But the conclusions are very accurate: refer to table below for exact data

COUNTRY	AREA x 1000 km²
China	9.597
USA	9.629
India	3.287
Mexico	1.964
Peru	1.285
France	633
Spain	506
Papua New Guinea	462
Sweden	441
Japan	378
Germany	357
Norway	324
Italy	301
New Zealand	270
United Kingdom	243
Nepal	147
Bangladesh	144
Greece	132
TOTAL	**30.102**
AFRICA	**30.221**

In addition to the well known social issues of *illiteracy* and *innumeracy*, there also should be such a concept as "*immappancy*", meaning *insufficient geographical knowledge*.

A survey with random American schoolkids let them guess the population and land area of their country. Not entirely unexpected, but still rather unsettling, the majority chose *"1-2 billion"* and *"largest in the world"*, respectively.

Even with Asian and European college students, geographical estimates were often off by factors of *2-3*. This is partly due to the highly distorted nature of the predominantly used mapping projections (such as *Mercator*).

A particularly extreme example is the worldwide misjudgement of the true size of *Africa*. This single image tries to embody the massive scale, which is larger than the *USA*, *China*, *India*, *Japan* and *all of Europe..... combined!*

Top 100 Countries

Area in square kilometers, Percentage of World Total
Sources: Britannica, Wikipedia, Almanac 2010

		AREA km²	%
1	Russia	17.098.242	11,50
2	Canada	9.984.670	6,70
3	China	9.596.961	6,40
4	United States	9.629.091	6,40
5	Brazil	8.514.877	5,70
6	Australia	7.692.024	5,20
7	India	3.287.263	2,30
8	Argentina	2.780.400	2,00
9	Kazakhstan	2.724.900	1,80
10	Sudan	2.505.813	1,70
11	Algeria	2.381.741	1,60
12	Congo	2.344.858	1,60
13	Greenland	2.166.086	1,50
14	Saudi Arabia	2.149.690	1,40
15	Mexico	1.964.375	1,30
16	Indonesia	1.860.360	1,30
17	Libya	1.759.540	1,20
18	Iran	1.628.750	1,10
19	Mongolia	1.564.100	1,10
20	Peru	1.285.216	0,86
21	Chad	1.284.000	0,86
22	Niger	1.267.000	0,85
23	Angola	1.246.700	0,85
24	Mali	1.240.192	0,83
25	South Africa	1.221.037	0,82
26	Colombia	1.141.748	0,76
27	Ethiopia	1.104.300	0,74
28	Bolivia	1.098.581	0,74
29	Mauritania	1.025.520	0,69
30	Egypt	1.002.000	0,67
31	Tanzania	945.087	0,63
32	Nigeria	923.768	0,62
33	Venezuela	912.050	0,61
34	Namibia	824.116	0,55
35	Mozambique	801.590	0,54
36	Pakistan	796.095	0,53
37	Turkey	783.562	0,53
38	Chile	756.102	0,51
39	Zambia	752.612	0,51
40	Myanmar	676.578	0,45
41	Afghanistan	652.090	0,44
42	Somalia	637.657	0,43
43	France	632.834	0,43
44	C. African Rep	622.984	0,42
45	Ukraine	603.500	0,41
46	Madagascar	587.041	0,39
47	Botswana	582.000	0,39
48	Kenya	580.367	0,39
49	Yemen	527.968	0,35
50	Thailand	513.120	0,34
51	Spain	505.992	0,34
52	Turkmenistan	488.100	0,33
53	Cameroon	475.442	0,32
54	Papua New Guinea	462.840	0,31
55	Uzbekistan	447.400	0,30
56	Morocco	446.550	0,30
57	Sweden	441.370	0,30
58	Iraq	438.317	0,29
59	Paraguay	406.752	0,27
60	Zimbabwe	390.757	0,26
61	Japan	377.930	0,25
62	Germany	357.114	0,24
63	Rep o.t. Congo	342.000	0,23
64	Finland	338.419	0,23
65	Vietnam	331.212	0,22
66	Malaysia	330.803	0,22
67	Norway	323.802	0,22
68	Côte d'Ivoire	322.463	0,22
69	Poland	312.685	0,21
70	Oman	309.500	0,21
71	Italy	301.336	0,20
72	Philippines	300.000	0,20
73	Burkina Faso	274.222	0,18
74	New Zealand	270.467	0,18
75	Gabon	267.668	0,18
76	Western Sahara	266.000	0,18
77	Ecuador	256.369	0,20
78	Guinea	245.857	0,17
79	United Kingdom	242.900	0,16
80	Uganda	241.038	0,16
81	Ghana	238.539	0,16
82	Romania	238.391	0,16
83	Laos	236.800	0,16
84	Guyana	214.969	0,14
85	Belarus	207.600	0,14
86	Kyrgyzstan	199.951	0,13
87	Senegal	196.722	0,13
88	Syria	185.180	0,12
89	Cambodia	181.035	0,12
90	Uruguay	176.215	0,12
91	Suriname	163.820	0,11
92	Tunisia	163.610	0,11
93	Nepal	147.181	0,10
94	Bangladesh	143.998	0,10
95	Tajikistan	143.100	0,10
96	Greece	131.957	0,09
97	Nicaragua	130.373	0,09
98	North Korea	120.538	0,08
99	Malawi	118.484	0,08
100	Eritrea	117.600	0,08
	TOP 100 TOTAL	132.632.524	89,34

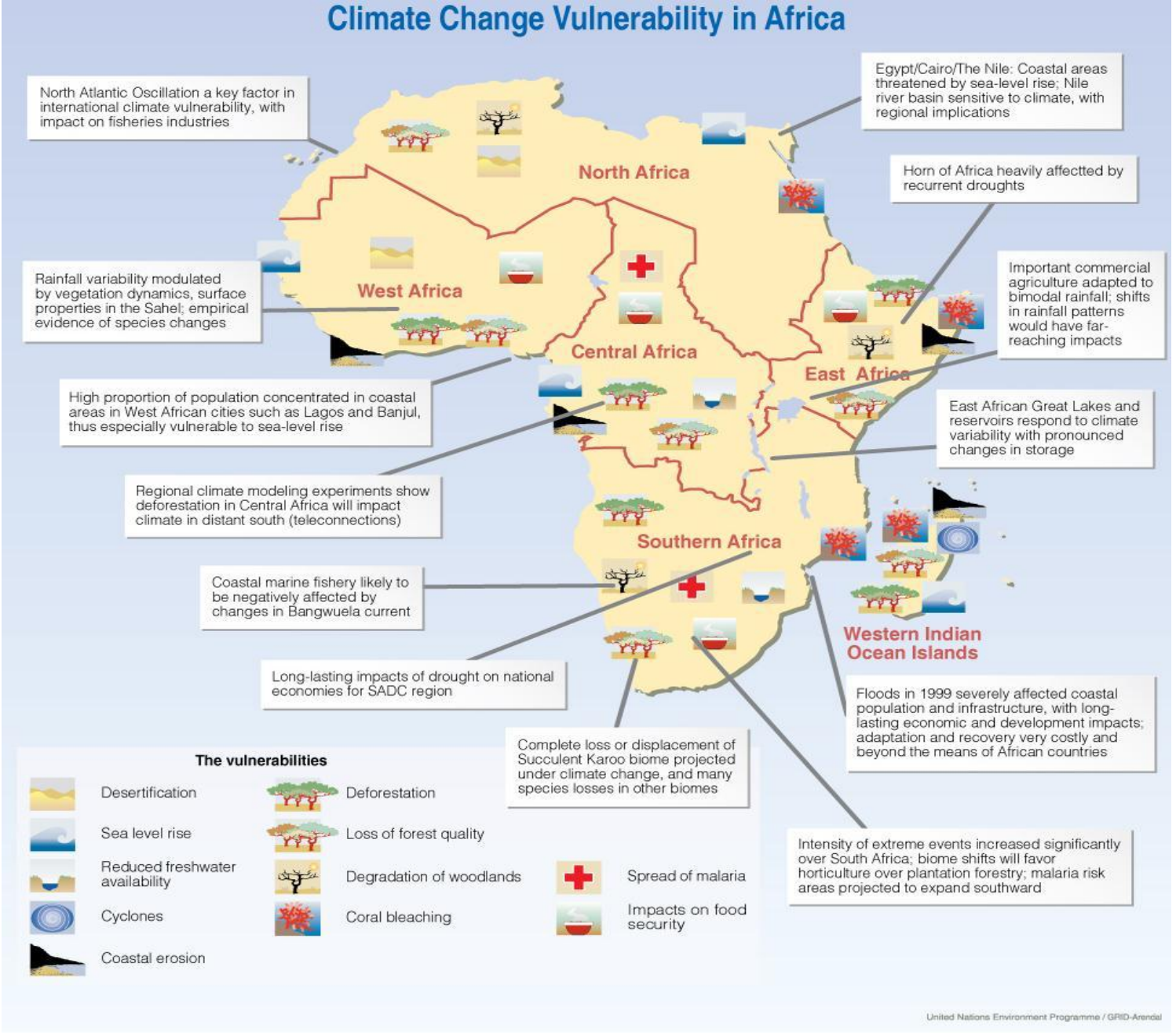
Africa needs to prepare for unprecedented urban growth

. urbanised population will triple in the next 40 years
. almost 200 million people currently live in slums
. parts of North Africa has successfully reduced the amount of people living in slums by about 20%

many cities are already facing problems of :
. overcrowding
. irregular supplies of water and energy
. poor sanitation and transport infrastructure

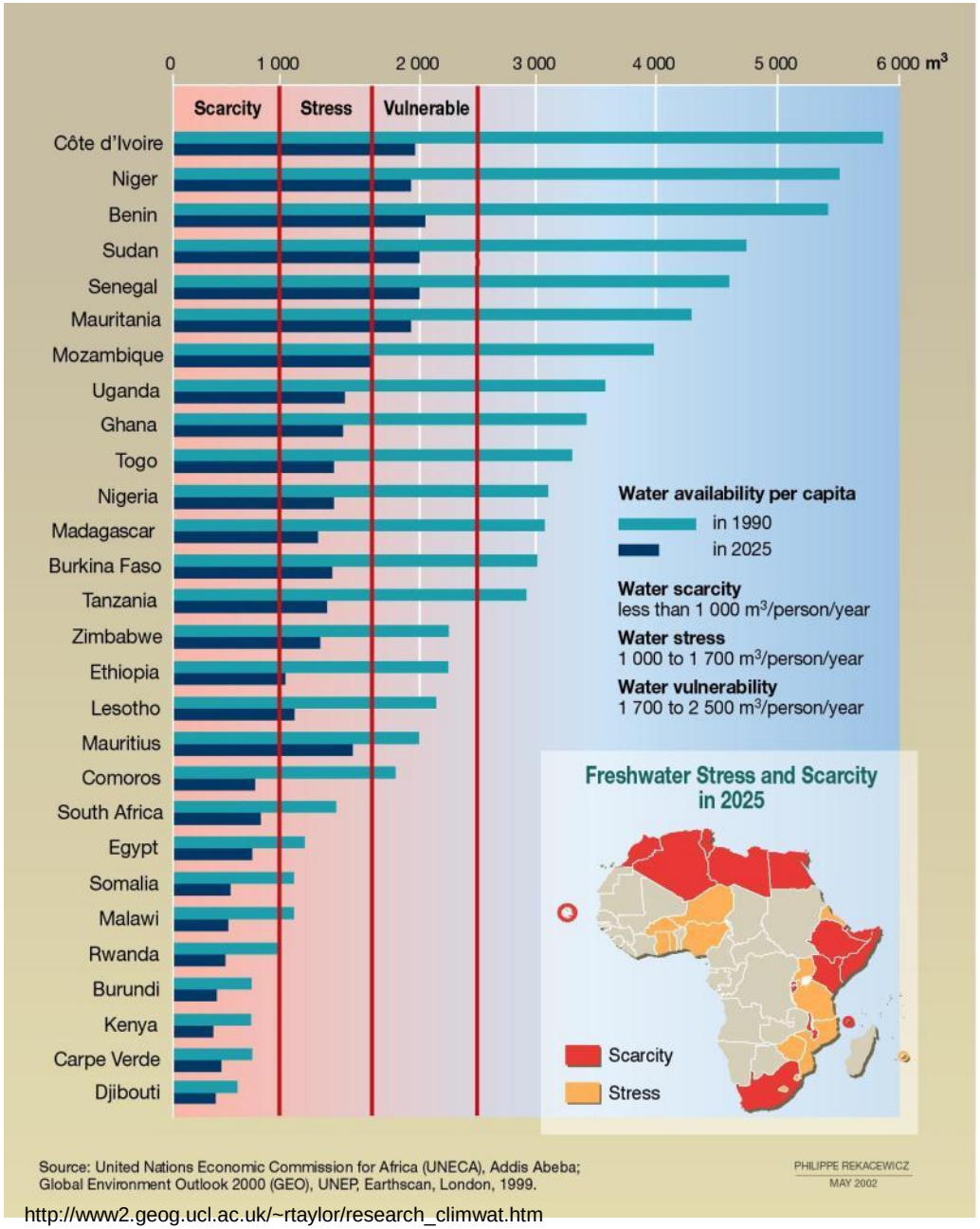
social spending is absorbing financial, time and expertise resources and is appropriately considered an uppermost priority

infrastructure costs about twice as much in Africa as it does in developed countries (Africa Development Forum, Africa's infrastructure: a time for transformation, World Bank 2009)


Climate Change Vulnerability in Africa
North Atlantic Oscillation a key factor in international climate vulnerability, with impact on fisheries industries
Egypt/Cairo/The Nile: Coastal areas threatened by sea-level rise; Nile river basin sensitive to climate, with regional implications
North Africa
Horn of Africa heavily affectted by recurrent droughts
Rainfall variability modulated by vegetation dynamics, surface properties in the Sahel; empirical evidence of species changes
West Africa
Important commercial agriculture adapted to bimodal rainfall; shifts in rainfall patterns would have far-reaching impacts
Central Africa
East Africa
High proportion of population concentrated in coastal areas in West African cities such as Lagos and Banjul, thus especially vulnerable to sea-level rise
East African Great Lakes and reservoirs respond to climate variability with pronounced changes in storage
Regional climate modeling experiments show deforestation in Central Africa will impact climate in distant south (teleconnections)
Southern Africa
Coastal marine fishery likely to be negatively affected by changes in Bangwuela current
Western Indian Ocean Islands
Long-lasting impacts of drought on national economies for SADC region
Floods in 1999 severely affected coastal population and infrastructure, with long-lasting economic and development impacts; adaptation and recovery very costly and beyond the means of African countries
Complete loss or displacement of Succulent Karoo biome projected under climate change, and many species losses in other biomes
The vulnerabilities
Desertification
Deforestation
Sea level rise
Loss of forest quality
Reduced freshwater availability
Degradation of woodlands
Spread of malaria
Cyclones
Coral bleaching
Impacts on food security
Coastal erosion
Intensity of extreme events increased significantly over South Africa; biome shifts will favor horticulture over plantation forestry; malaria risk areas projected to expand southward
United Nations Environment Programme / GRID-Arendal
Sources: Anna Ballance, 2002

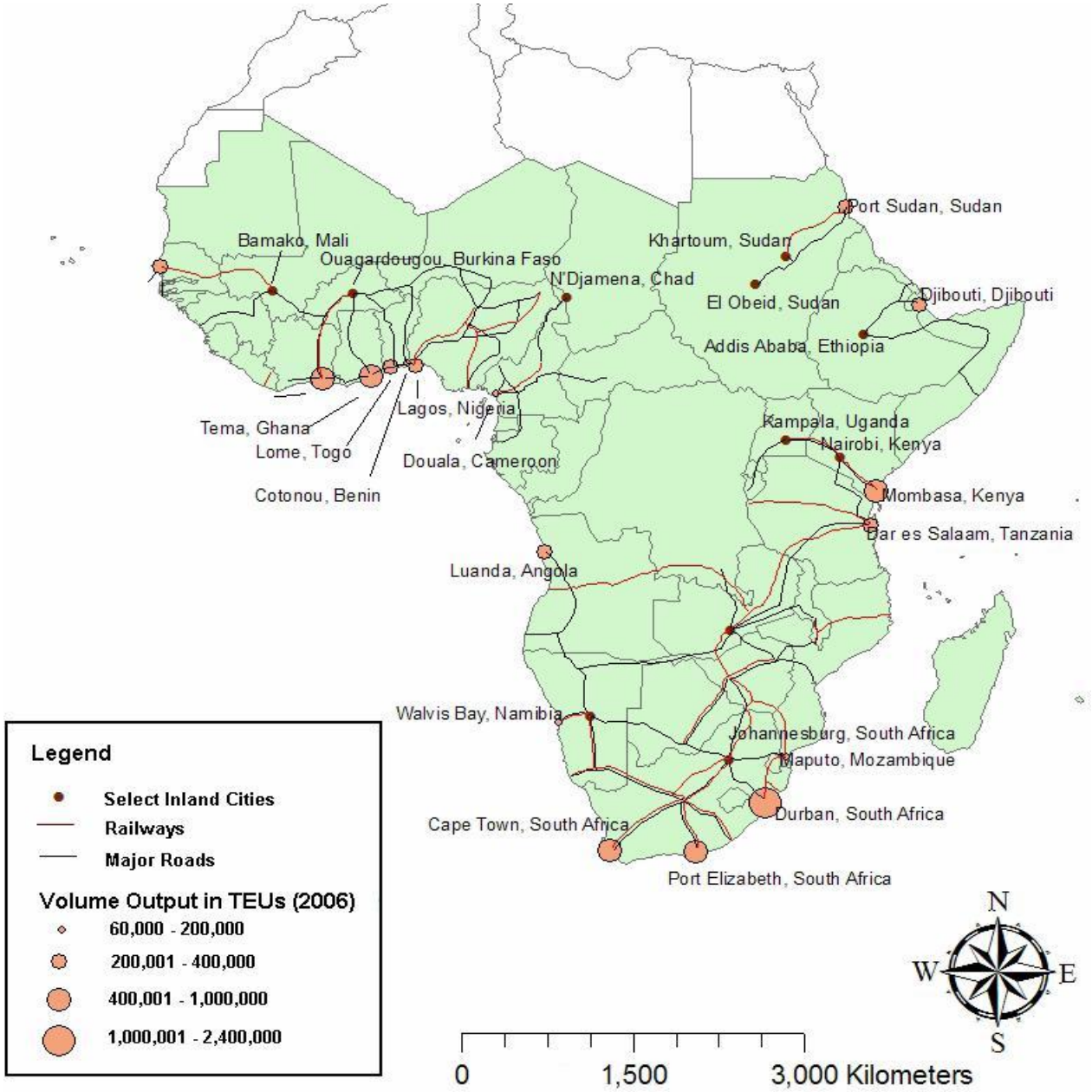
infrastructure:
water scarcity in Africa

. the future is now



http://www2.geog.ucl.ac.uk/~rtaylor/research_climwat.htm

infrastructure:
Africa transport map



http://www.lynettegitonga.com/2010/03/impact-of-transport-on-intra-regional.html

1 ton of good emits about the same amount of carbon in transport for:

. 800km by truck
. 4'000km by train
. 8'000km by ship

trains currently travel at an average of 10 km/h

trucks are travelling at about 25 km/h

ships cruise at 45 km/h

South Africa carbon reduction target: 34% by 2020

. carbon intensive energy mix

RSA 960gr of CO_2 per kilowatt of electricity, European average of 630gr., Switzerland 143gr.

. cities morphology

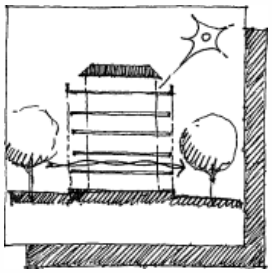
sprawling cities, primarily individual car based mobility, mono-use zoning

. intercity distances

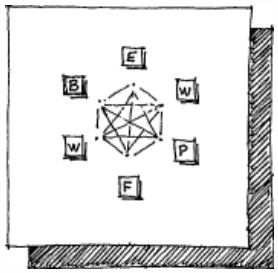
greater reliance on air travel

. need for economy growth

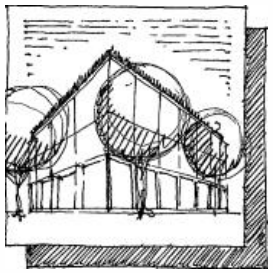
increased pressure on the built environment to achieve national targets



UIA / AUA



UN Habitat



WGBC

Africa Network of Green Building Councils
is envisaged by:

. International Union of Architects (UIA) / Africa Union of Architects (AUA)
. UN Habitat
. World Green Building Council

emerging Green Building Councils:
Egypt, Ghana, Kenya, Mauritius, Morocco, Namibia, Nigeria

initiative | **ANGBCs** Africa Network of Green Building Councils | **RCBVA** Réseau des Conseils du Bâtiment Vert d'Afrique

reflexion

buildings have evolved almost in a Darwinian way towards least-cost: to change this for a sustainable outcome, we are nothing less than up against 'evolution'

it is about market transformation, and our role is overcoming resistance to change

we must focus on the process rather than the product

Africa is not that different to the rest of the world

only the symptoms of sustainability illness are exacerbated

It is Africa's hope and ambition, as well as my personal conviction that, in return for subsidies and developmental aid, Africa will offer global, original and appropriate solutions to the careful balancing act of reconciling socio-economic issues with the broader sustainability imperative

property portfolio

sustainability

built environment typical

procurement procedure

marketing

human resources

public relations

social responsibility

major benefits

corporate social responsibility

type of responses

eco-gadgetry implementation

as opposed to design process

orientated decision making

R10 / m^2 / month energy & water

R100 / m^2 / month rental

R1’000 / m^2 / month salary mass

modern ways of working & sustainability: beneficial synergy

schools: 20% better test performance

hospitals: 2½ day earlier discharge

retail: increase in sales per square meter

factories: increased production

offices: 2-16% increased productivity

Vivian Loftness, GBCSA, 2008

the first modern day
sustainable building
in Southern Africa

Eastgate building
mixed use (office & retail)
Harare, Zimbabwe
Mick Pearce architect

1996

Katorus Market Society
Special Presidential Project
Kathlehong, Tokoza, Vosloorus township

completion 1999

urban regeneration
architecture

Eric Noir, project architect
GAPP Architects & Urban Designers
(prior establishment of GREEN by DESIGN)

"the planning professions should be appearing before the Truth and Reconciliation Commission"
L. Bremner, Chair of Architecture, Wits, 1996

ARCHITECTS
KrugerRoos architects urban designers
JoshuaConrad architects

DEVELOPER
Victoria & Alfred Waterfront Company

ELECTRICAL ENGINEER
Solutionstation

FAÇADE ENGINEER
LC Consulting Engineers WSP

FIRE ENGINEERS
Bramley and Associates

LANDSCAPE ARCHITECTS
Waterfront Landscape Architects

MAIN CONTRACTOR
Grinaker LTA

MECHANICAL ENGINEER
Spoormaker and Partners
Basil Nair Assoc

QUANTITY SURVEYOR
Letchmia, Daya Varachhia Quantity Surveyors

STRUCTURAL & CIVIL ENGINEER
LC Consulting Engineers WSP
OWS Consulting Engineers
PD Naidoo and Associates

SUSTAINABILITY CONSULTANT
GREEN by DESIGN WSP

WET SERVICES ENGINEER
Benatar Consulting

RED brief
broad-based claim
SA benchmark

ENERGY:

- overall energy consumption of the serviceable areas not to exceed 115kWh/m^2/an

  (light 15kWh/m^2/an; fans and pumps 5kWh/m^2/an; small power 20kWh/m^2/an; heating/cooling 70kWh/m^2/an; hot water 5kWh/m^2/an)

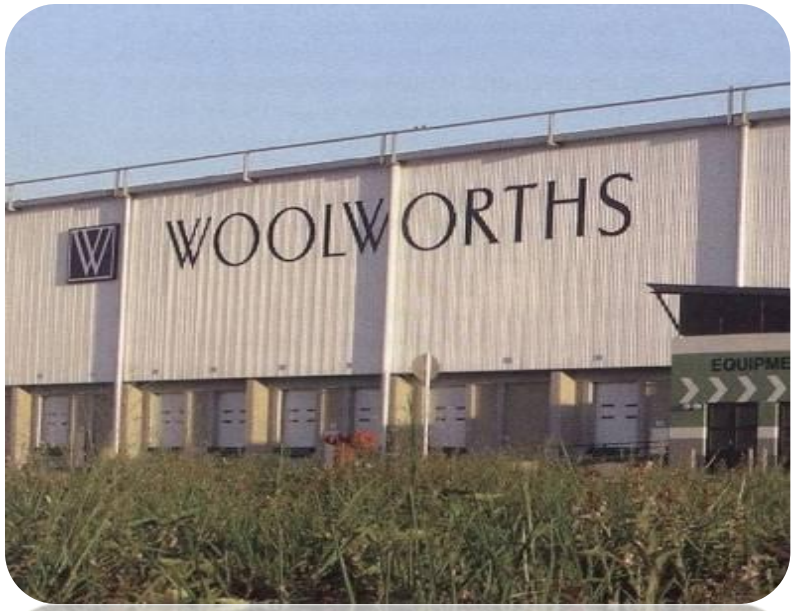
- 10% of the overall energy should be from a renewable source

RESOURCE EFFICIENCY:

- municipal water consumption set to be at least 20% better then that of an equivalent conventional building
- building materials sourced locally from the Cape area where possible and imported components kept to a bare minimum
- substantial proportion of recycled materials to be used in the construction process
- construction waste to be sorted and recycled where possible

COMMUNITY, SOCIAL & ECONOMIC:

- provision of high quality working environment with high levels of comfort
- good range of amenities to be provided to supplement working conditions
- good proportion of the construction contracts to be undertaken by SMME's
- majority of the contractors to be from the Cape area



Woolworths
New national distribution centre
Midrand Johannesburg

completion 2007

PROJECT MANAGER
MDSA Project & Construction Management

QUANTITY SURVEYOR
NWS - Norval Wentzel Steinberg

REFRIGERATION PLANT
WS&B Worthington Smith & Bouwer WSP

STRUCTURAL ENGINEER
Africon

SUSTAINABILITY CONSULTANTS
GREEN by DESIGN WSP

WET SERVICES
Ubunye Engineering Services (Pty.) Ltd WSP

ARCHITECTS
R&L Architects

CIVIL ENGINEERS
Africon

COLD ROOM PANELLING
WSP Consulting Engineers

EARTHWORKS
Concor Roads

ELECTRICAL ENGINEER
CKR Engineering (Pty) Ltd

ENVIRONMENTAL IMPACT ASSESSMENT
Mills & Otten CC

FIRE SAFETY ENGINEER
SFT - Specialised Fire Technology

GENERAL CONTRACTOR
WBHO

HEALTH AND SAFETY
Cairnmead Consultancy

LANDSCAPE ARCHITECT
Newtown Landscape Architects CC

LOGISTICAL PLANNING
LPC International Limited

MECHANICAL ENGINEER
WSP Consulting Engineers SA

question everything
design-led approach
post-occupancy
evaluation


WOO
2


WOOLWORTHS


1
EQUIPMENT


SUBSTATION


3


3


2
2


WOOLWORTHS
1





60


Nedbank phase II
new office building
Johannesburg

completion 2010

ARCHITECTS
GLH Architects / Terra Ether Architects

DISABILITY SPECIALIST
Disability Solutions (Pty)

ELECTRICAL ENGINEER
Claasen Auret Inc.

FIRE ENGINEER
TWCE

LIFT SPECIALIST
Building Transportation Consultants

MECHANICAL ENGINEER
Africon

PROJECT MANAGER
Coffey Projects

MAIN CONTRACTOR
Group 5 Building

QUANTITY SURVEYORS
SBDS / LDM JHM Inc.

STRUCTURAL ENGINEERS
WSP Structures/Asakheni

SUSTAINABILITY CONSULTANTS
GREEN by DESIGN WSP

SUSTAINABILITY DESIGN REVIEW
GREEN by DESIGN / PJCarew Consulting / CSIR

WET SERVICES
WSP Group

sustainability
design review
SBAT assessment
'shades of green©'
1st greenstar certified building
in South Africa
greenstar sa office v1,
'design' & 'as built' rating

images courtesy of GLH Architects / Terra Ether Architects

Nedbank phase II

- extension of Nedbank Phase I (Practical Completion Nov 2001)
- located on the corner of Rivonia and Maude Street in Sandton
- 41’946 sqm of office GFA
- 36’246 sqm of office UA
- 3’455 sqm of retail GFA
- ground floor with offices & retail
- eight floors of offices
- five levels of underground parking with 1’598 parking bays
- 3’000 employees to occupy the building

	conventional practice	best practice	worldwide cutting edge
land	land selected on availability / opportunity EIA basic requirements	land selected on proximity to amenities and retail stores improved EIA requirements mimic eco-system functions	land selected on proximity to amenities, retail stores, medical facilities, schools, etc on site food production exceeded EIA requirements assumed ecosystems functions
water	minimum legal requirements for stormwater discharge standard fixtures municipal potable water used for all uses	improved requirements for stormwater discharge by passive filtration waterwise fixtures stormwater retention for irrigation target: 20% municipal	exceeded requirements for stormwater discharge by bio-active filtration waterwise and waterless fixtures stormwater accumulation for irrigation greywater recycling
energy	conventional energy sources standard electrical fittings and equipment	10% energy consumption from renewable sources energy efficient fittings and equipment natural ventilation and passive solar design target: 20% reduction in energy consumption from non-renewable sources	purely rely on renewable energy and produce surplus super efficient fittings and equipment, heat & coolth recycling building physics to assume by natural means most of heating-cooling, lighting and ventilation

	conventional practice	best practice	worldwide cutting edge
materials	selection based on aesthetics and affordability in a global economy	selection based on national production: reduced transport reduced packaging stimulation of local economy "think globally - act locally" materials from renewable sources recycle waste	selection based on local economy and embodied energy content use recycled materials to build biosphere/technosphere principles (ink on paper or embossed logo)
emissions	no concerns for non-industrial applications	reduced: urban heat island air particles water contamination light pollution noise emission	treatment of sun energy absorbing surfaces with landscape shading active air filtration bio-active water filtration reduce & shading outside lighting advanced acoustic measures
people	comfort based on functionality, aesthetics	comfort based on functionality, aesthetics improved views, levels of privacy natural light thermal control	comfort based on functionality, aesthetics improved views, levels of privacy natural light thermal control social activities neighbourhood watch

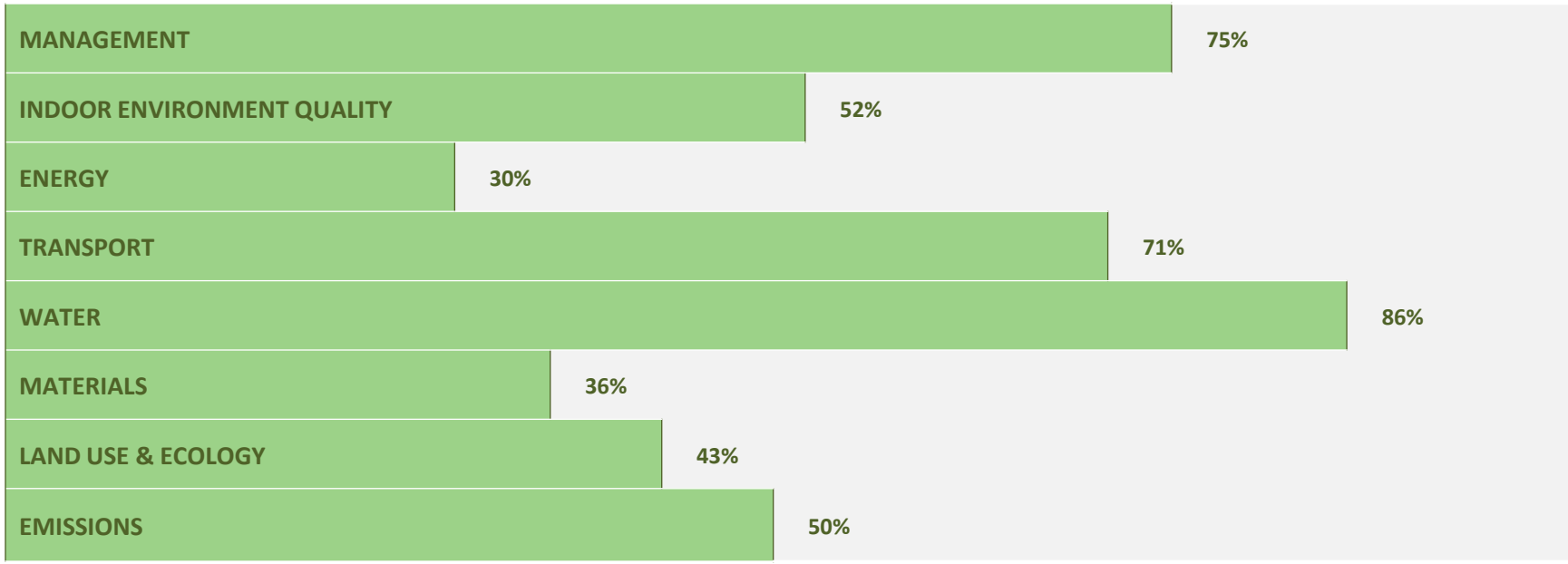
the 'shades of green' evaluation

topic / project	good practice	best practice	context cutting edge
8. glasing			
9. blinds			
10.off-gasing materials			
11.recycled content materials			
12.low embodied energy mat.			
13 urbanism			
14/15. economy cycle		partial	full
16/17/18. grey water	irrigate landscape	flush toilet	full grey water
19.no hot water on floors			
20.vegetarian meals			
21.basement management			
22/23/24 light switching	presence	presence and natural light	Dali system
25.laptop based operations			
26.renewable energy		20%	50%
27.metering			
28.skills transfers			
29.construction waste			
30.locally sourced materials			

topic / project	good practice	best practice	context cutting edge
8. glasing		- R 582’870	- R 582’870
9. blinds		R 1’189’703	R 1’189’703
10.off-gasing materials			value R 500’000
11.recycled content materials			value R 500’000
12.low embodied energy mat.			value R 500’000
13 urbanism	R 200'000	R 200'000	R 200'000
14/15. economy cycle		R 917’074	R 8’550’530
16/17/18. grey water	R 1’186’452	R 2’422’904	R 3’959’356
19.no hot water on floors		- R 80’000	- R 80’000
20.vegetarian meals			saving
21.basement management		R 0	R 0
22/23/24 light switching	R 825’000	R 1’115’000	R 3’379’590
25.laptop based operations		R 5’570’000	R 5’570’000
26.renewable energy		R 0	R 0
27.Metering	R 300'000	R 300'000	R 300'000
28.skills transfers		value R1’000’000	value R1’500’000
29.construction waste		R 0	R 0
30.locally sourced materials		R 0	
total CAPEX	R 2’511’452	R 12’051’811	R 25’486’309
total CAPEX base R427’499’126	R 430’010’578	R 439’550’937	R 452’985’435
increase	0.59%	2.82%	5.96%

topic / project	good practice	best practice	context cutting edge
8. glasing		R 0	R 0
9. blinds		R 0	R 0
10.off-gasing materials			R 0
11.recycled content materials			R 0
12.low embodied energy mat.			R 0
13 urbanism	R 0	R 0	R 0
14/15. economy cycle		R 170’997	R 331’594
16/17/18. grey water	R 72’813	R 100’470	R 242’724
19.no hot water on floors		R 37’403	R 37’403
20.vegetarian meals			saving
21.basement management		R 363’434	R 363’434
22/23/24 light switching	R 153’138	R 177’699	R 200’177
25.laptop based operations		R 768’552	R 768’552
26.renewable energy		- R 1’085’254	- R 2’713’135
27.metering	R 0	R 0	R 0
28.skills transfers		R 0	R 0
29.construction waste		R 0	R 0
30.locally sourced materials		R 0	
total RUNEX saved per annum	R 225’951	R 1’618’555	R 1'943'884
total RUNEX base R4’244’027	R 4'018'076	R 2'625'472	R 2’300’143
savings (without renewable)	5.32%	38.14%	46.80%

category scores



round 1 submission

- 12 week collection period for the professionals
- 2 week collation period
- 59 points claimed in submission
- 6 week assessment period by the GBCSA

round 1 results

- 22 points approved

Rating	Score	Represents	
One Star	10	Minimum practice	★
Two Star	20	Average practice	★★
Three Star	30	Good practice	★★★
Four Star	**45**	**Best practice**	★★★★
Five Star	**60**	**South African Excellence**	★★★★★
Six Star	**75**	**World Leadership**	★★★★★★

round 2 submission

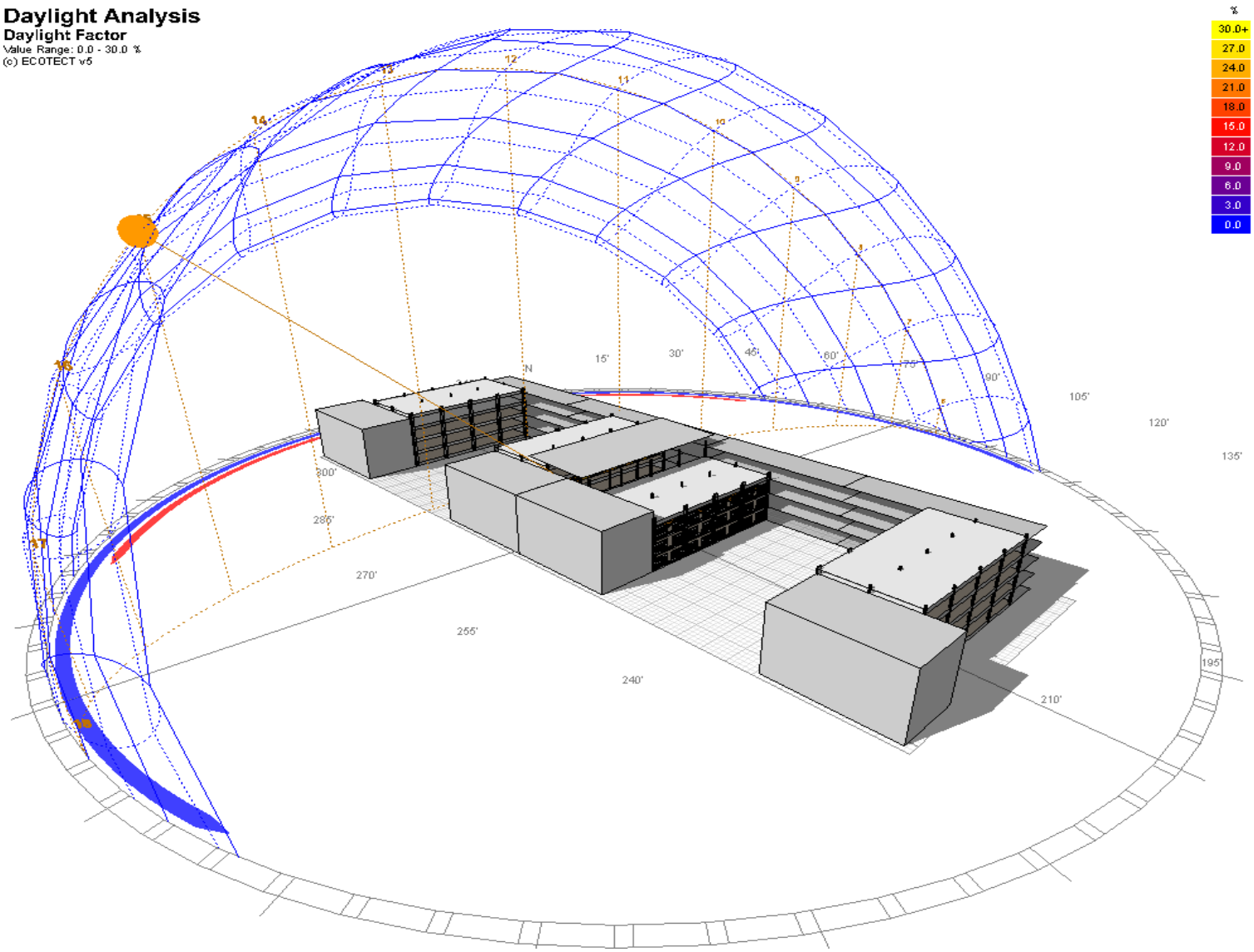
- 20 separate credits to be resubmitted
- 2 week collection period for the professionals
- 1 new credit submitted
- 1 new innovation credit submitted
- 1.5 week collation period
- 57 point submitted
- 4 week assessment period by the GBCSA

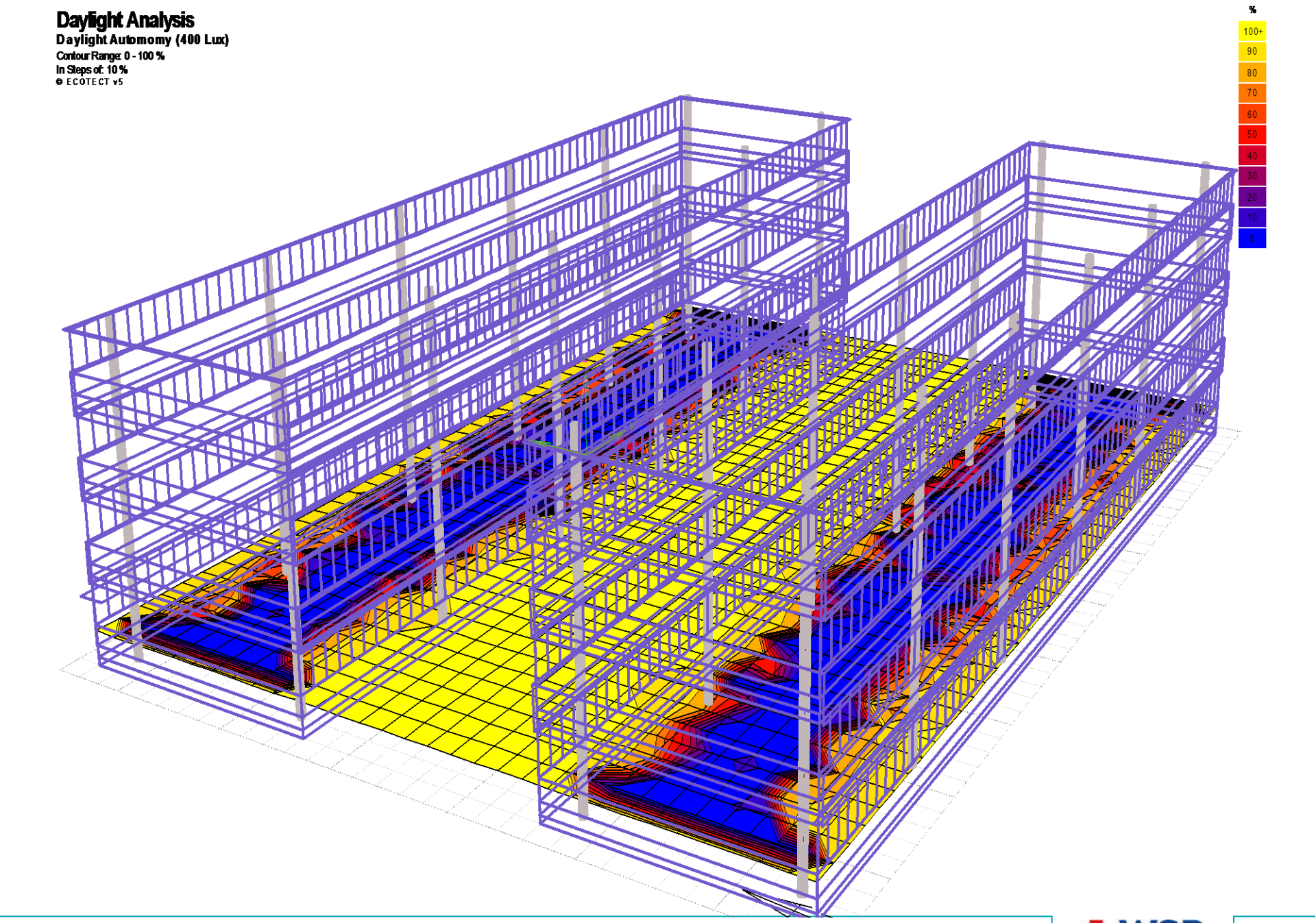
round 2 results

- 54 points approved

Rating	Score	Represents	
One Star	10	Minimum practice	★ ★ ★ ★ ★ ★
Two Star	20	Average practice	★ ★ ★ ★ ★ ★
Three Star	30	Good practice	★ ★ ★ ★ ★ ★
Four Star	**45**	**Best practice**	★ ★ ★ ★ ★ ★
Five Star	**60**	**South African Excellence**	★ ★ ★ ★ ★ ★
Six Star	**75**	**World Leadership**	★ ★ ★ ★ ★ ★

3d modeling

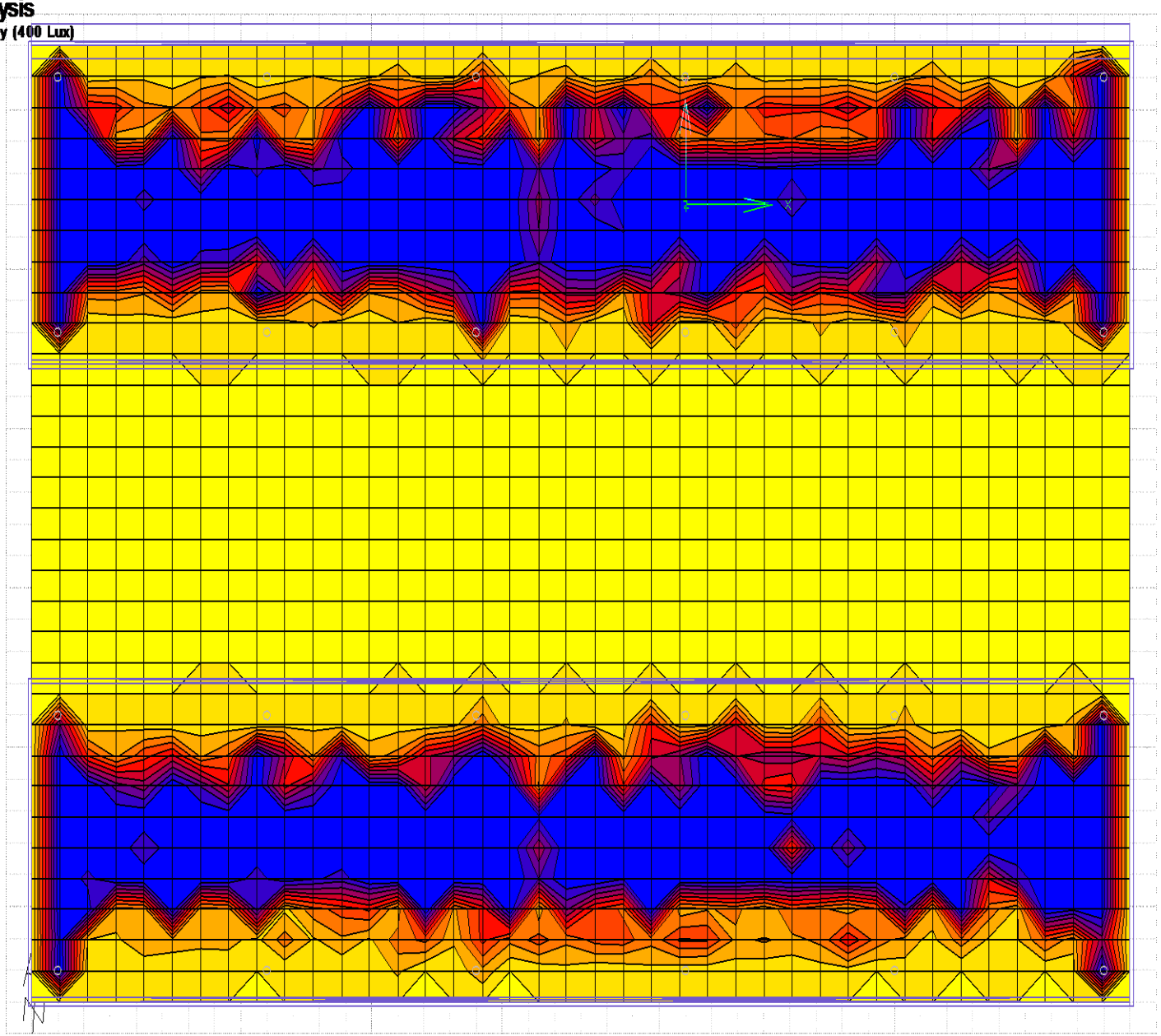

Daylight Analysis
Daylight Factor
Value Range: 0.0 - 30.0 %
(c) ECOTECT v5
%
30.0+
27.0
24.0
21.0
18.0
15.0
12.0
9.0
6.0
3.0
0.0
N
15'
30'
45'
60'
75'
90'
105'
120'
135'
300'
285'
270'
255'
240'
210'
195'


Daylight Analysis
Daylight Automomy (400 Lux)
Contour Range: 0 - 100 %
In Steps of: 10 %
ECOTECT v5
%
100+
90
80
70
60
50
40
30
20
10
0

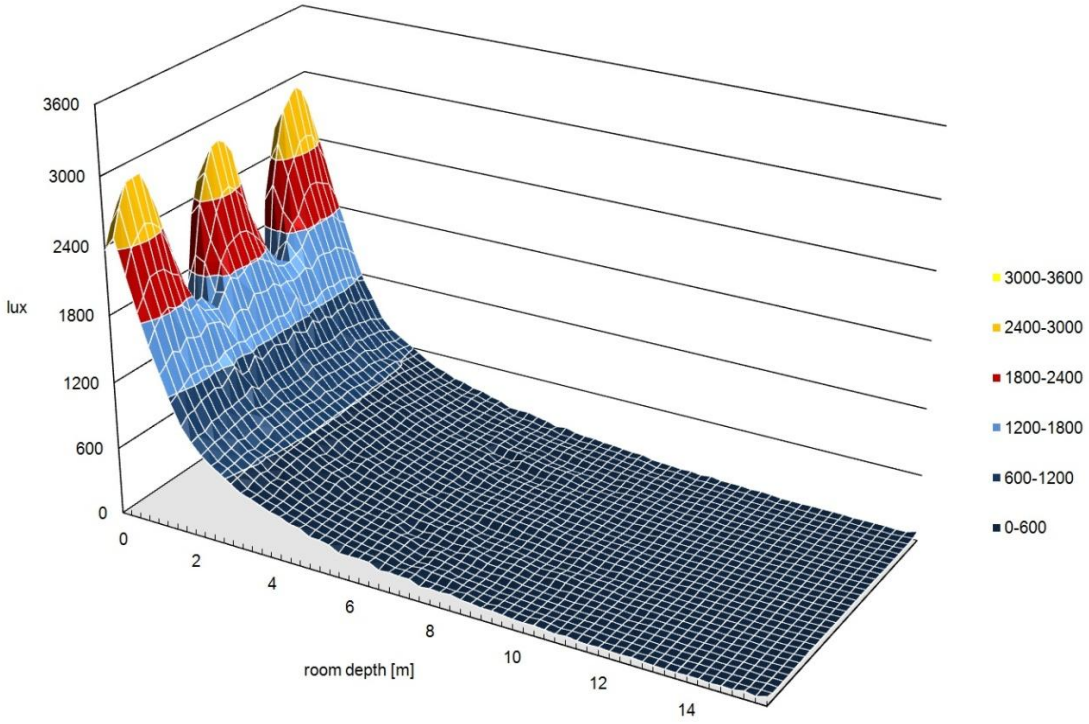
Daylight Analysis

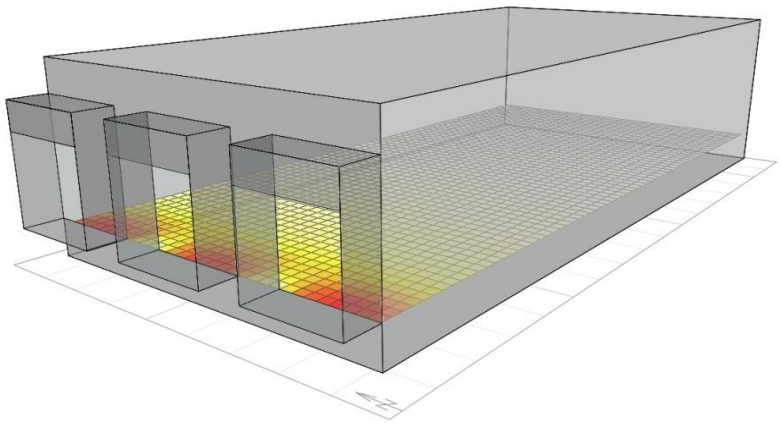
Daylight Automomy (400 Lux)

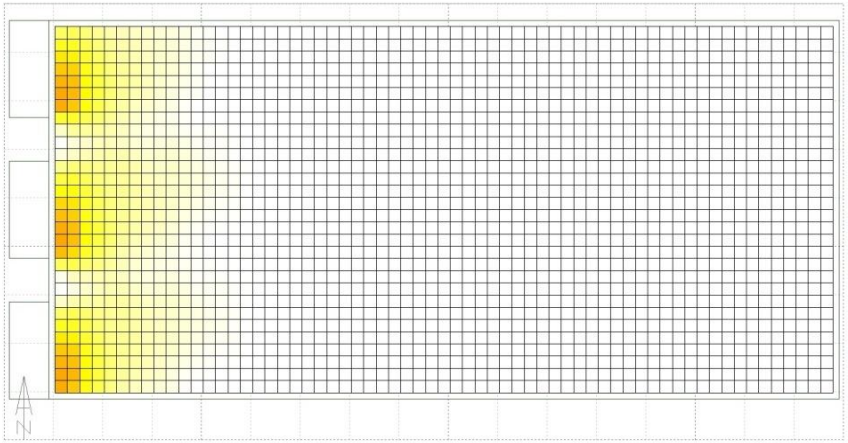
Contour Range: 0 - 100 %
In Steps of: 10 %
ECOTECT v5



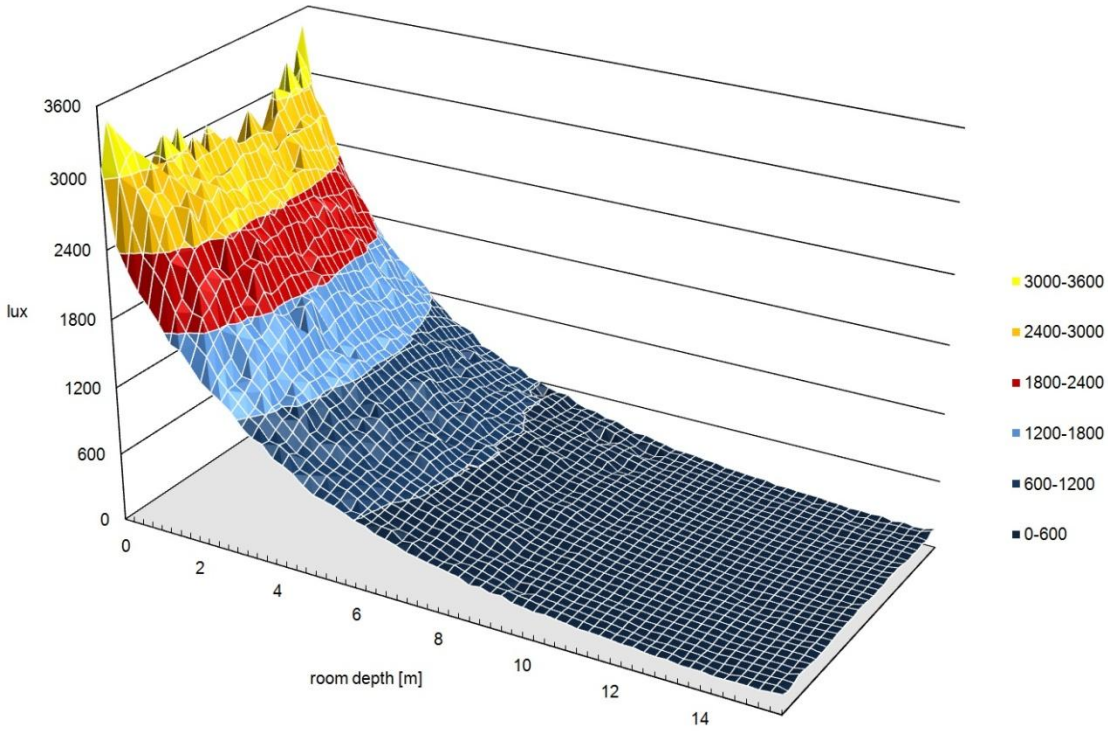
box facade

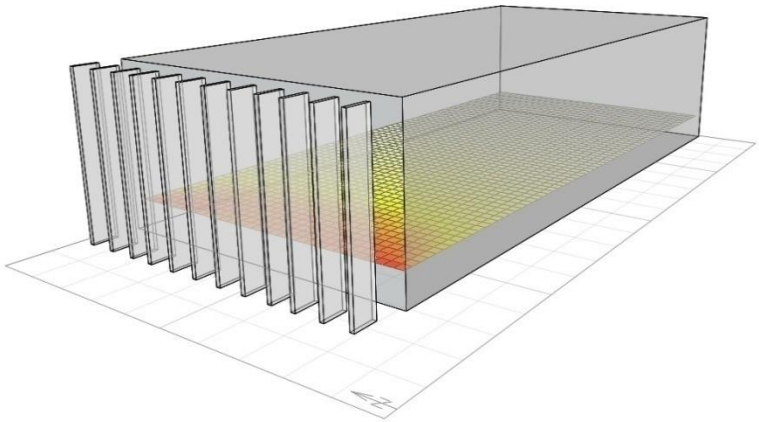

3600
3000
2400
1800
1200
600
0
lux
0
2
4
6
8
10
12
14
room depth [m]
3000-3600
2400-3000
1800-2400
1200-1800
600-1200
0-600

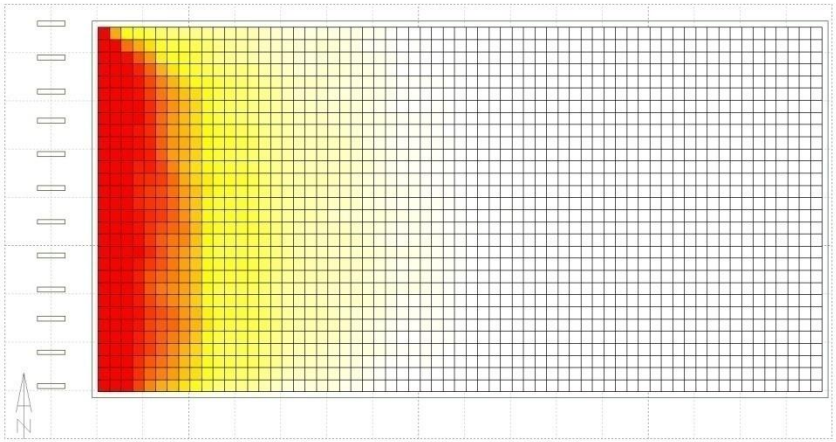


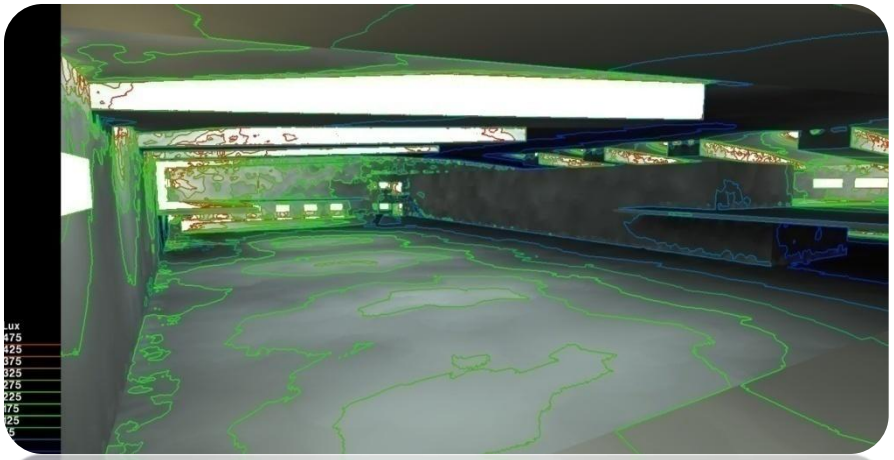

N

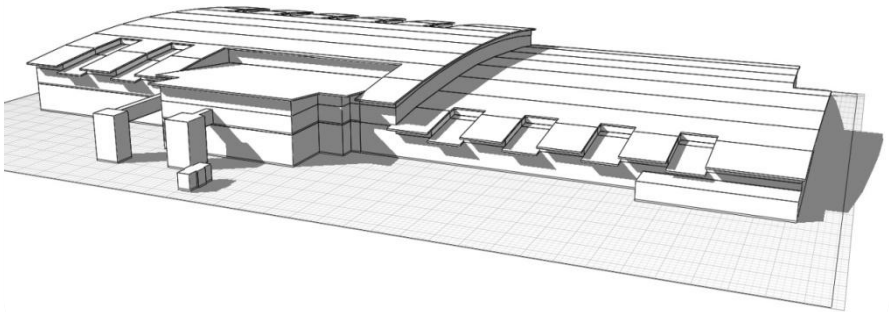
fully glazed louvred facade

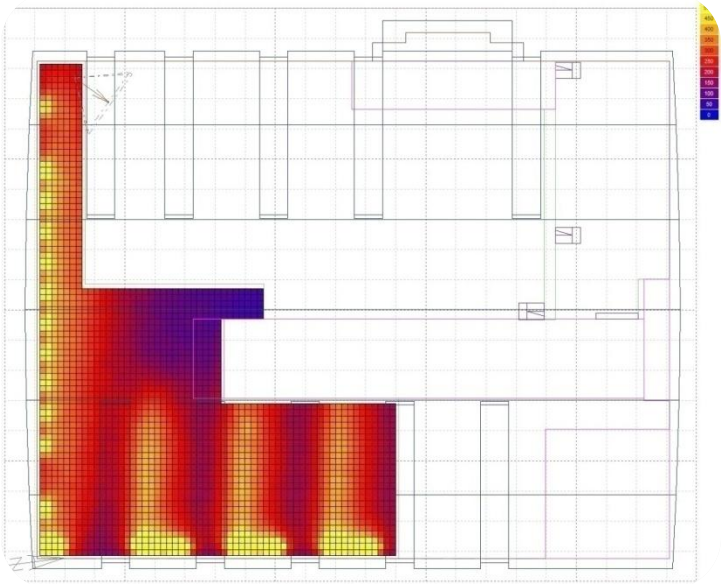


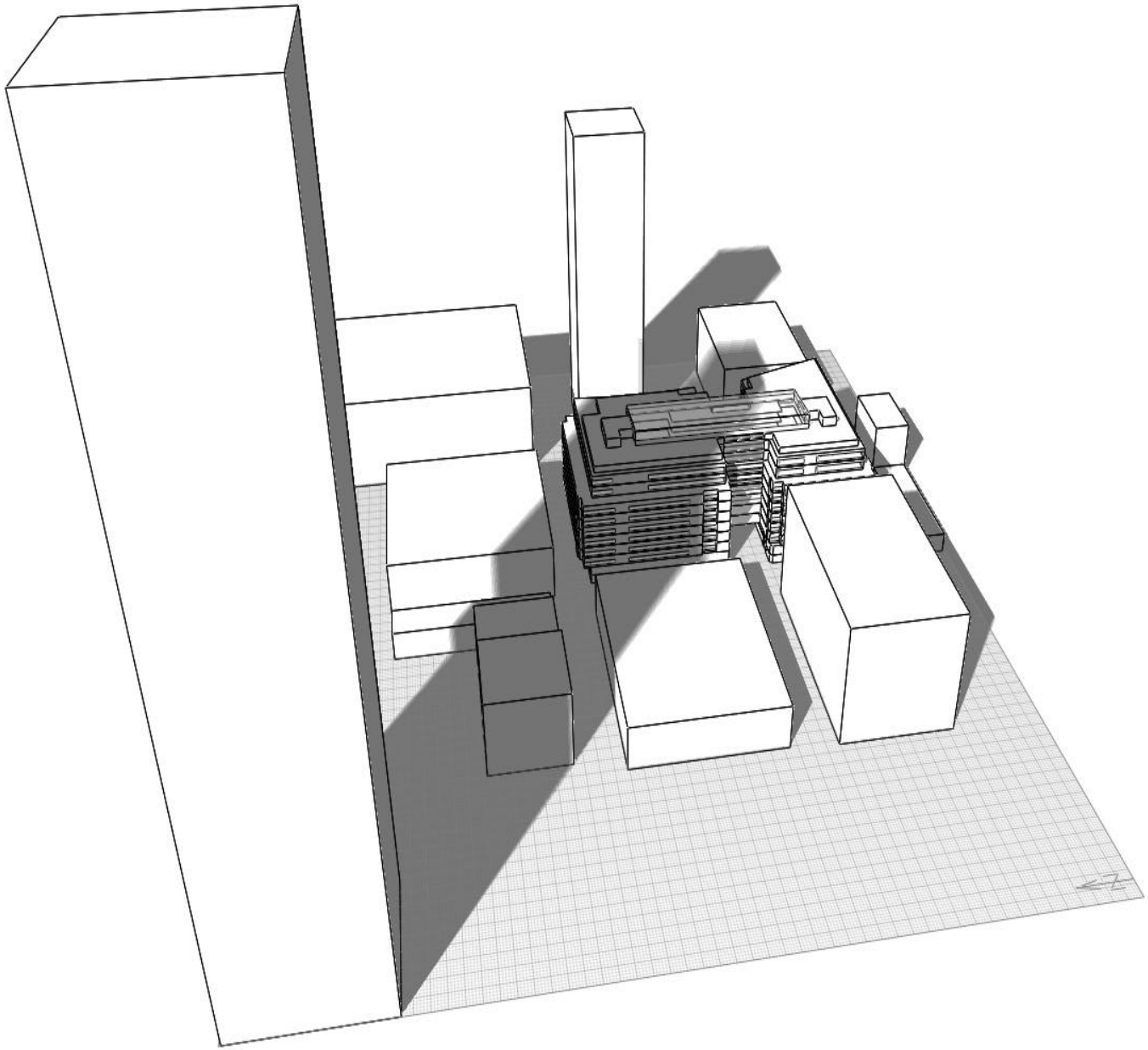





Lux
475
425
375
325
275
225
175
125
75







DesignBuilder - ABSA 1505 No Reset_data.dsb - Activity - ABSA Towers West, Buildings A & B, 6th floor

File Edit Go View Tools Help

View rotation: Axonometric | Normal

Navigate, Site

Site | Components | Templates

- Stair 8
- Stair 9
- Store NorthEast
- 8 th Floor
  - Atrium Main
  - Core Cluster A, North
  - Core Cluster A, South
  - Core Cluster B, North
  - Core Cluster B, South
  - Executive Conference
  - Executive Dining B, NE
  - Executive Dining B, SE
  - HVAC A
  - HVAC B
  - Kitchen Prep North east
  - Kitchen South
  - Lift View L6
  - Lift View L8
  - Plenum A
  - Plenum B
  - Stair 6
  - Stair 9 & Passage
  - Terrace A
  - Terrace B
- 9 th Liftroom North
  - Motor Room 1
  - Stair 15
  - Store
- 9 th Liftroom South
  - Motor Room 3
  - Motor Room 4
  - Passage
  - Stair 16
  - Store
- 9th Floor
  - Atrium in Roof
- 6th floor
  - Atrium Main
  - Bathroom cluster 5
  - Core Area A, North
  - Core Area B, South
  - Core Cluster A, South
  - Core Cluster B, North
  - Data B
  - Data B, South
  - Data room A, North
  - Director's gym
  - HVAC & Projector A
  - Kitchenette
  - Lift 5 6, stairs view
  - Lift 7 8, stairs view
  - Office B, East

ABSA Towers West, Buildings A & B, 6th floor

Edit | Visualise | Heating design | Cooling design | Simulation | CFD

Model Data

Options

Activity | Construction | Openings | Lighting | HVAC | CFD

Activity Template
- Template: RSA ABSA_OpenOff
- Sector: Office
- Zone type: 1-Standard
- Zone multiplier: 1
- Include in model?

Occupancy
- Density (people/m2): 0.0700
- Schedule: RSA GS Office_Occ

Metabolic
- Activity: Light office work
- Factor [Men=1.00, Women=0.8...: 0.90

Clothing

DHW

Environmental Control

Heating Setpoint Temperatures
- Heating (°C): 20.0
- Heating set back (°C): 12.0

Cooling Setpoint Temperatures
- Cooling (°C): 24.0
- Cooling set back (°C): 28.0

Humidity Control

Ventilation Setpoint Temperatures

Minimum Fresh Air

Lighting

Computers

Office Equipment
- On
- Gain (W/m2): 11.00
- Schedule: RSA GS Office_Equip
- Radiant fraction: 0.200

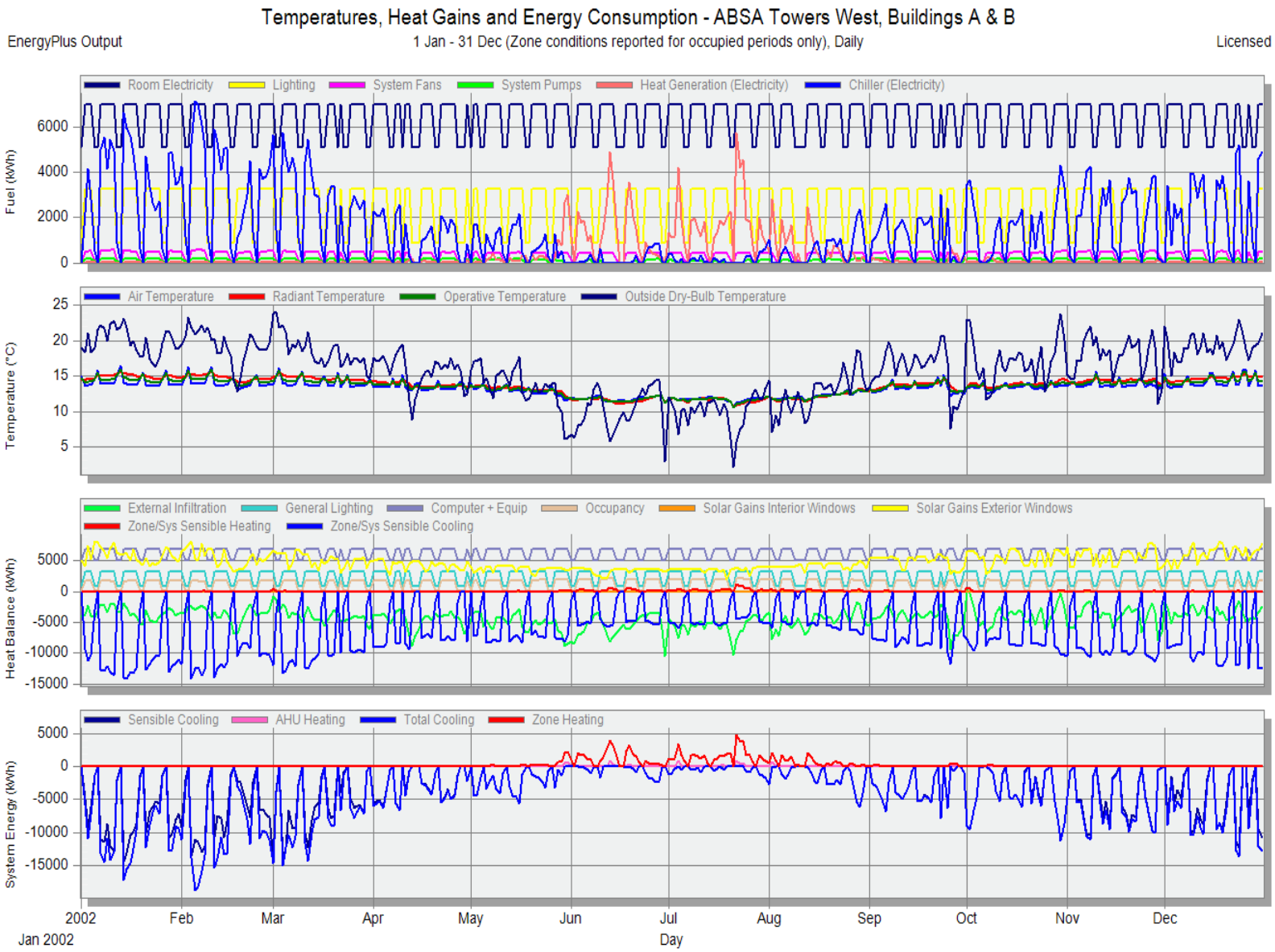
Miscellaneous
- On

Catering

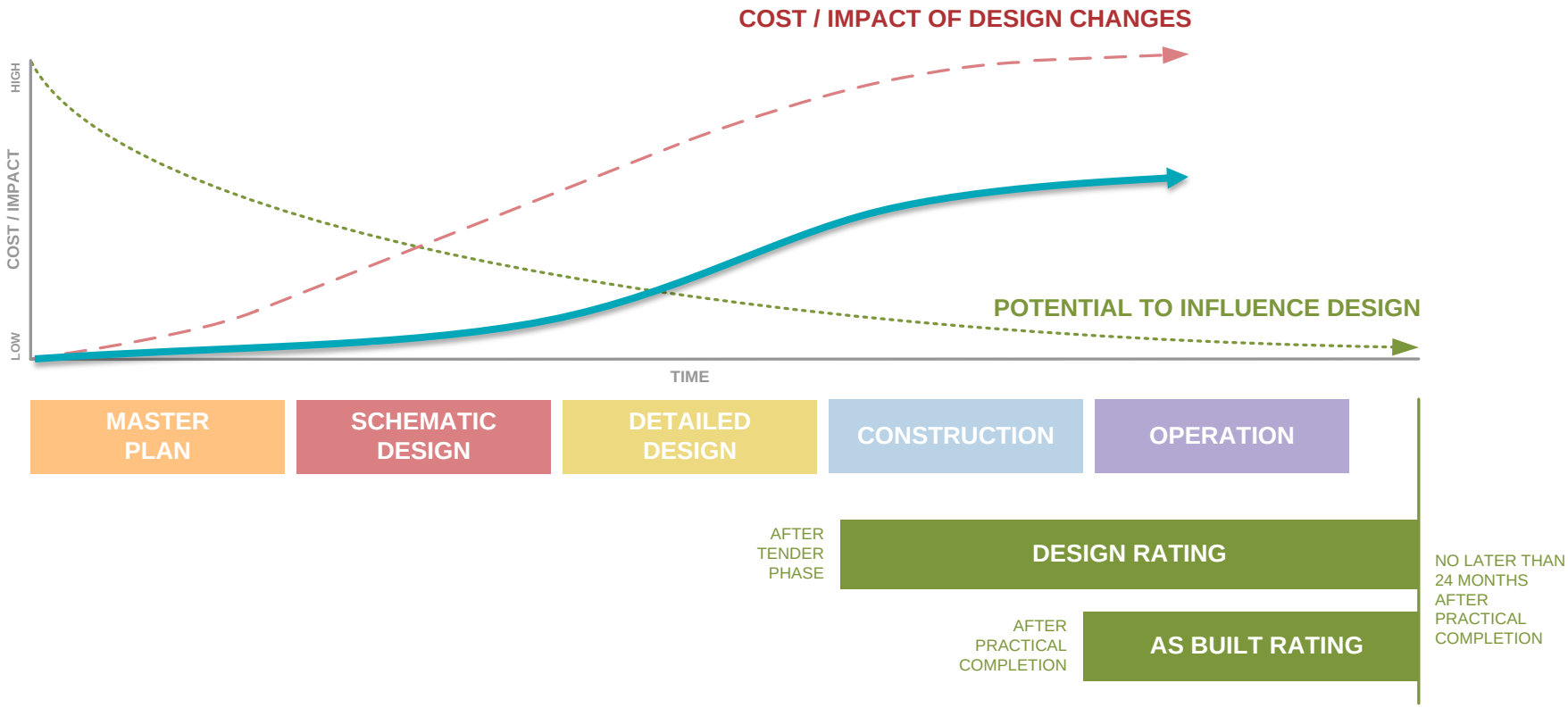
Process

Edit Activity Data...

X = 12.966m Y = 22.280m Z = 32.100m


Temperatures, Heat Gains and Energy Consumption - ABSA Towers West, Buildings A & B
EnergyPlus Output
1 Jan - 31 Dec (Zone conditions reported for occupied periods only), Daily
Licensed
Room Electricity
Lighting
System Fans
System Pumps
Heat Generation (Electricity)
Chiller (Electricity)
Fuel (kWh)
6000
4000
2000
0
Air Temperature
Radiant Temperature
Operative Temperature
Outside Dry-Bulb Temperature
Temperature (°C)
25
20
15
10
5
External Infiltration
General Lighting
Computer + Equip
Occupancy
Solar Gains Interior Windows
Solar Gains Exterior Windows
Zone/Sys Sensible Heating
Zone/Sys Sensible Cooling
Heat Balance (kWh)
5000
0
-5000
-10000
-15000
Sensible Cooling
AHU Heating
Total Cooling
Zone Heating
System Energy (kWh)
5000
0
-5000
-10000
-15000
2002
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan 2002
Day

WATER INPUT		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	annual
	rain Pretoria	136.0	75.0	82.0	51.0	13.0	7.0	3.0	6.0	22.0	71.0	98.0	110.0	674
0.95	rain clear roof	516.8	285.0	311.6	193.8	49.4	26.6	11.4	22.8	83.6	269.8	372.4	418.0	2561
0.75	rain vegetated roof	612.0	337.5	369.0	229.5	58.5	31.5	13.5	27.0	99.0	319.5	441.0	495.0	3033
0.95	rain hard landscape	1292.0	712.5	779.0	484.5	123.5	66.5	28.5	57.0	209.0	674.5	931.0	1045.0	6403
0.5	rain soft landscape	68.0	37.5	41.0	25.5	6.5	3.5	1.5	3.0	11.0	35.5	49.0	55.0	337
	potable	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	
	grey production	529.2	529.2	529.2	529.2	529.2	529.2	529.2	529.2	529.2	529.2	529.2	529.2	
	blowdown/condensate	206.9	193.6	189.3	165.5	150.0	127.1	131.4	146.0	177.0	187.3	192.3	199.6	
	total water input	3812.9	2683.3	2807.1	2216.0	1505.1	1372.4	1303.5	1373.0	1696.8	2603.8	3102.9	3329.8	27807
WATER CONSUMPTION														
	potable (whb+kitch)	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	7056
	toilets	318.4	318.4	318.4	318.4	318.4	318.4	318.4	318.4	318.4	318.4	318.4	318.4	3821
	hvac	727.4	702.3	677.3	602.0	551.8	476.6	501.7	551.8	652.2	677.3	677.3	702.3	7500
	irrigation	625.4	687.8	571.4	402.3	525.1	504.0	502.6	619.9	817.0	875.6	817.0	941.6	7890
	total water consumption	**2259.3**	**2296.5**	**2155.0**	**1910.7**	**1983.3**	**1887.0**	**1910.7**	**2078.2**	**2375.5**	**2459.3**	**2400.6**	**2550.3**	**26267**
WATER USAGE														
potable (whb+kitch)		588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	**7056**
source	municipal	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	588.0	7056
toilets		318.4	318.4	318.4	318.4	318.4	318.4	318.4	318.4	318.4	318.4	318.4	318.4	3821
source	rain clear	516.8	285.0	311.6	193.8	49.4	26.6	11.4	22.8	83.6	269.8	372.4	418.0	2561
	hard landscape	1292.0	712.5	779.0	484.5	123.5	66.5	28.5	57.0	209.0	674.5	931.0	1045.0	6403
deficit	from borehole	.0	.0	.0	.0	-145.5	-225.3	-278.5	-238.6	-25.8	.0	.0	.0	-914
surplus	discharge to hvac	1490.4	679.1	772.2	359.9	.0	.0	.0	.0	.0	625.9	985.0	1144.6	6057
hvac		727.4	702.3	677.3	602.0	551.8	476.6	501.7	551.8	652.2	677.3	677.3	702.3	7500
source	surplus toilets	1490.4	679.1	772.2	359.9	.0	.0	.0	.0	.0	625.9	985.0	1144.6	6057
	rain vegetated	612.0	337.5	369.0	229.5	58.5	31.5	13.5	27.0	99.0	319.5	441.0	495.0	3033
deficit	from borehole	.0	.0	.0	-12.6	-493.3	-445.1	-488.2	-524.8	-553.2	.0	.0	.0	-2517
surplus	discharge to irrigation	1375.0	314.3	463.9	.0	.0	.0	.0	.0	.0	268.1	748.7	937.3	4107
irrigation		625.4	687.8	571.4	402.3	525.1	504.0	502.6	619.9	817.0	875.6	817.0	941.6	7890
source	surplus hvac	1375.0	314.3	463.9	.0	.0	.0	.0	.0	.0	268.1	748.7	937.3	4107
	blow down/condensate	206.9	193.6	189.3	165.5	150.0	127.1	131.4	146.0	177.0	187.3	192.3	199.6	2066
	rain soft landscape	68.0	37.5	41.0	25.5	6.5	3.5	1.5	3.0	11.0	35.5	49.0	55.0	337
	grey water	529.2	529.2	529.2	529.2	529.2	529.2	529.2	529.2	529.2	529.2	529.2	529.2	6350
deficit	from borehole	.0	.0	.0	.0	.0	.0	.0	.0	-99.7	.0	.0	.0	-100
surplus	discharge to ground wells	1553.6	386.8	652.1	317.9	160.6	155.8	159.5	58.2	.0	144.5	702.3	779.4	5071
ground acc.	wells water in	1553.6	386.8	652.1	317.9	160.6	155.8	159.5	58.2	.0	144.5	702.3	779.4	5071
	borehole pumping	.0	.0	.0	12.6	638.8	670.4	766.7	763.4	678.7	.0	.0	.0	3531
	total water accumulation	**1553.6**	**386.8**	**652.1**	**305.3**	**-478.3**	**-514.6**	**-607.2**	**-705.2**	**-678.7**	**144.5**	**702.3**	**779.4**	**1540**


COST / IMPACT OF DESIGN CHANGES
HIGH
COST / IMPACT
LOW
POTENTIAL TO INFLUENCE DESIGN
TIME
MASTER PLAN
SCHEMATIC DESIGN
DETAILED DESIGN
CONSTRUCTION
OPERATION
AFTER TENDER PHASE
DESIGN RATING
AFTER PRACTICAL COMPLETION
AS BUILT RATING
NO LATER THAN 24 MONTHS AFTER PRACTICAL COMPLETION

thank you