

LULUA SOHAR MASTER PLAN



SHUMOOKH

شموخ الإستثمار والخدمات
Shumookh Investment and Services





“You walk for days among trees and among stones. Rarely does the eye light on a thing, and then only when it has recognized that thing as the sign of another thing: a print in the sand indicates the tiger's passage; **a marsh announces a vein of water**; the hibiscus flower, the end of winter. All the rest is silent and interchangeable; trees and stones are only what they are.”

— Italo Calvino, *Invisible Cities*

AI BATINAH REGIONAL FRAMEWORK PLAN

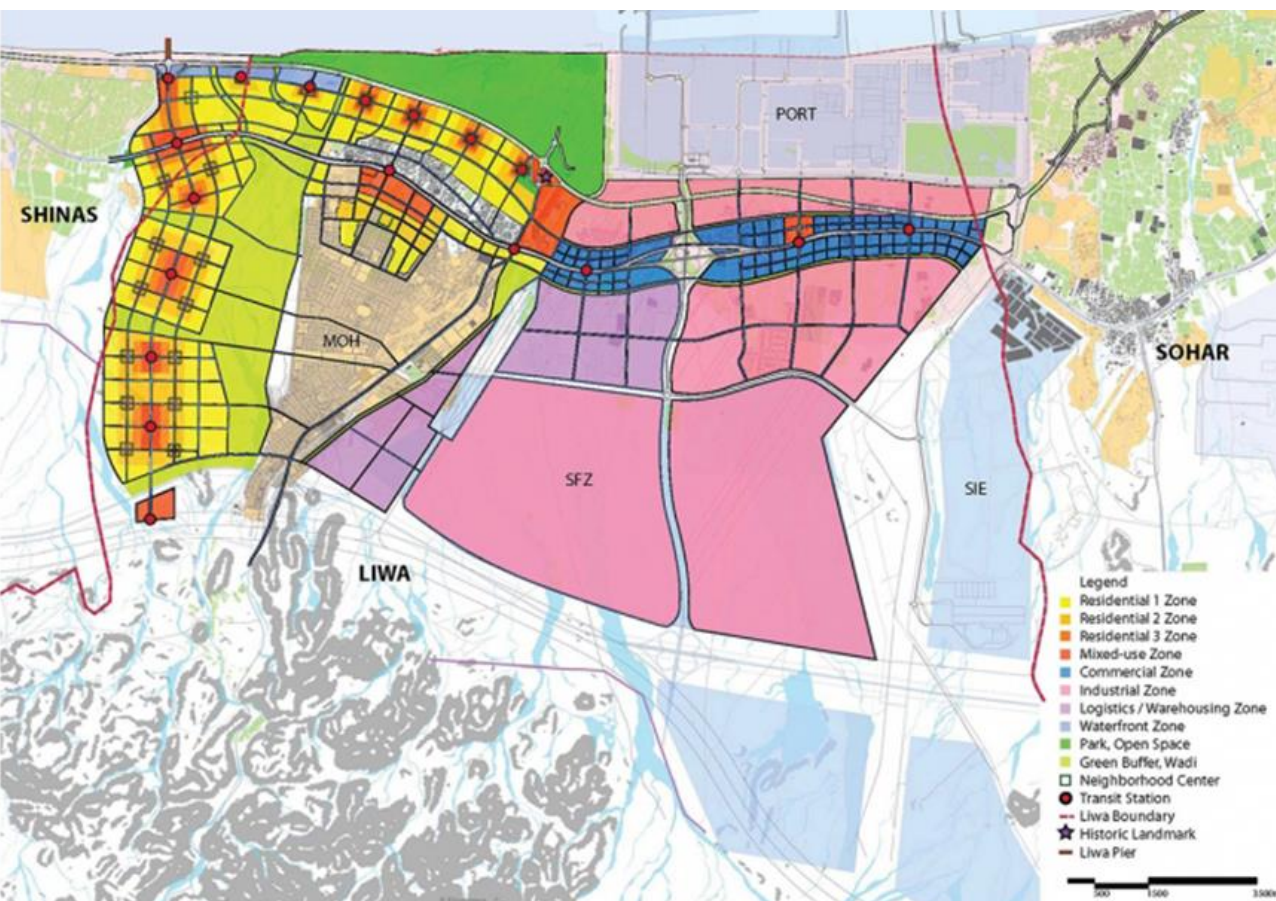
During the past 4 decades Oman has been facing high population growth. In combination with considerable rural to urban migration, urbanization rate in the country has reached in 2009 84% according to UN statistics. Nearly 60% of the Omani population is at work-production age (15-64). About 35% are under 14 years of age. This indicates that most of the Omani population is at an age that requires jobs and shares in governmental services, such as residential and recreational spaces.

Al-Batinah occupies a strategic geographical and economic location along the coast of Gulf of Oman. Its fertile agricultural plain and its numerous mineral deposits account for Batinah being the most populous region of Oman. Liwa plays an important role in the Omani economy as a commercial outlet and major industrial center, including the Greater Sohar Port and Industrial area.

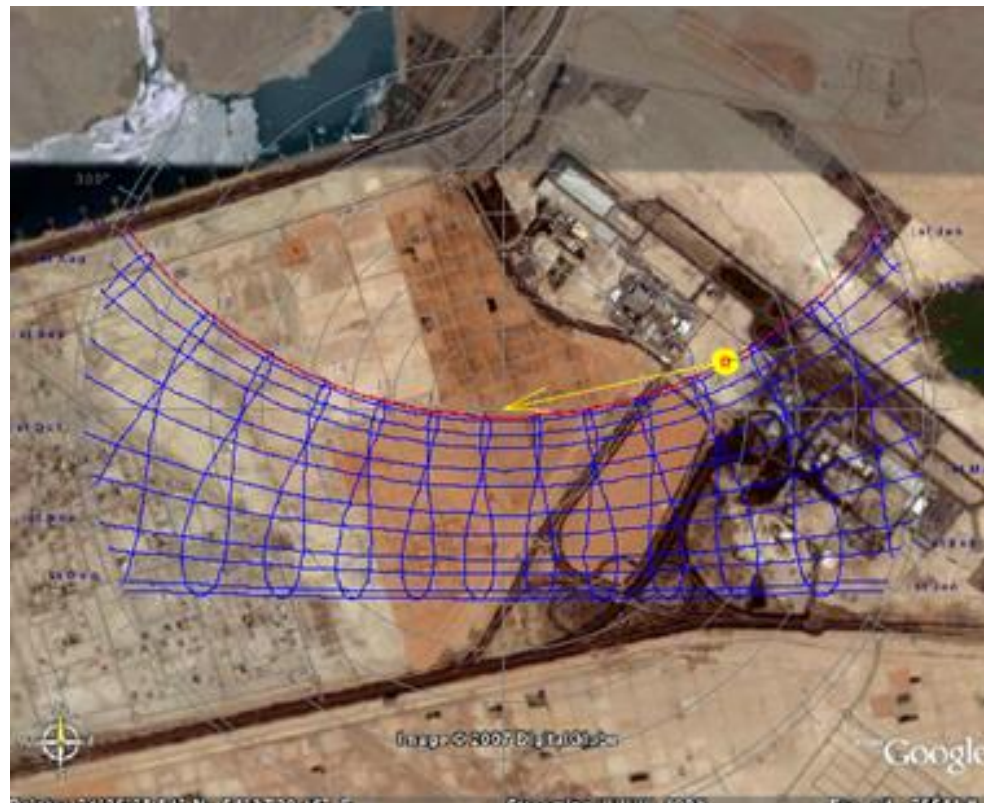
The regional plan advocates for the necessary balance between accommodation of urban growth and preservation of valuable agricultural land for farming. Detailed planning studies identified a key planning framework for future socioeconomic development in this coastal region, to help diversify the economy, identify future infrastructure requirements, provide detailed land uses that are coordinated and harmonious with the existing context, and provide a comprehensive sustainable growth management strategy for the area.

Our site is strategically located on the right side, near the SIE (Sohar Industrial Estate) blue area, between the airport

Source: <http://perkinswill.com/work/al-batinah-regional-plan>



ENVIRONMENTAL BASELINE



Site Characteristics

The project site is located within Sohar Industrial Port Area (SIPA), which covers an approximate land area of 2,000 hectare (20 km²), located on the Batinah coast. SIPA is situated about 20 km from Sohar town and 240 km northwest of Muscat. A number of industries are planned to be put up in the industrial area, which currently features fully operational businesses along with large scale construction activities.

Topography

The proposed project site is relatively flat and featureless. The site has a ground elevation of 2 to 4 m above mean sea level. Prior to the development of SIPA, the area was flat and similar to other undeveloped areas along the Batinah coast. The industrial area was built-up to the present elevation using dredged material, recovered during development of coastal facilities of the industrial area.

Climate

Like the rest of the country, the Batinah region experiences a hot and humid climate. The nearest meteorological station to the site is at Majis, which is located about 1 km southeast of the site. The data recorded from Calendar Year (CY) 2006 through 2008 shows higher mean ambient temperature varies between 15 and 35 °C. The maximum temperature occurs during the months from May to August with the peak temperature touching up to 38 °C; while the minimum occurs during November to February going as low as 13 °C.

The mean relative humidity in the area varied between 45 and 80% during the three years from 2006 to 2008.

The minimum and maximum relative humidity recorded during the three years were 27 % (May 2008) and 87 % (August 2007), respectively. The mean wind speed ranged between 5 and 6 knots, with the predominant wind direction being towards east during summer, and towards west-southwest during winter. Most of rainfall occurred during the winter months between December and April/May.



(Note: this is another site, do site specific diagrams for our site with Ecotect)

ENVIRONMENTAL BASELINE

Geology and Soil Quality

The Sohar area forms a part of the Batinah plain comprising piedmont and coastal zones dominated by late tertiary- quaternary alluvial deposits. The piedmont zone comprises the slightly elevated Batinah plain that extends between the coastal plain and the western Al-Hajar mountain foothills.

The SIPA is established within the coastal zone that extends between the piedmont zone and the Gulf of Oman. The coastal zone is extremely flat and comprises extensive sand and gravel plain. Immediately adjacent to the coast, aeolian sands of recent to sub-recent age predominate commonly

intermingled with deposits of clay and silt. A thin veneer of beach sand stretches along the foreshore.

Hydrology and Hydrogeology

Two major wadis (a valley, ravine, or channel that is dry except in the rainy season), Wadi Suq and Wadi Fizh / Bani Gharbi originating from the southwest slopes of the Western Al-Hajar Mountains make up the wadi system in the SIPA area.

These wadis along with numerous braided channels drain large areas and carry large volumes of water during rainfall events.

However, since the establishment of the SIPA, a peripheral storm water drainage has been constructed which is designed to collect and convey the storm water flow from these wadi systems away from the developments within the SIPA. During rainfall events, this storm water drain empties the flow into the sea on the north-western and south-eastern sides of SIPA.

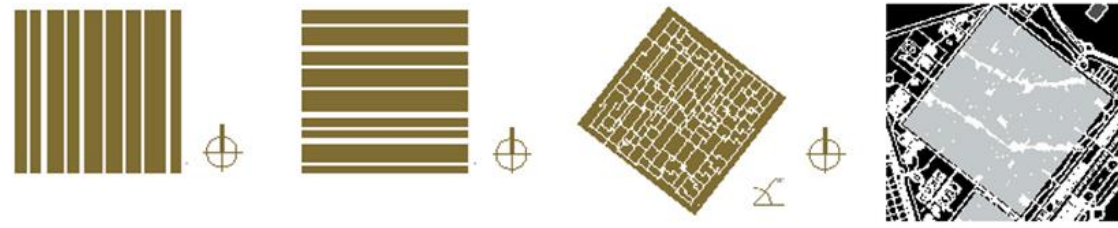
The natural surface drainage extends from the western Al Hajar Mountains towards the sea providing variable infiltration throughout the region. Typically, alluvial deposits found in wadi channels will allow surface water to quickly dissipate. Batinah region has a coastal aquifer system, which provides most of the current water demands of the region for agricultural and urban developments along the coast. The current system of water supply is provided by the abstraction of groundwater through the use of dug/bore wells and pumps. Earlier sampling and analysis of groundwater collected from a well in Al Hadd village located near SIPA indicate that the quality of water in the region is well within the applicable standard limits.

Ambient Air Quality

The ambient air quality in SIPA has been affected by emissions from the construction and operation of various industries in SIPA, vehicle traffic within SIPA and on Muscat-Sohar highway, and operation of construction equipment within SIPA. The ambient air quality monitoring conducted for the area show that the ground-level concentrations (GLCs) of critical pollutants and the ambient dust levels are within applicable standards.



CLIMATIC RESPONSE



North/South

The North-South orientation of streets allows sunlight penetration of the urban structure with a subsequent increase in cooling loads requirements.



East/West

An East/West alignment also results in an increase in cooling load requirements due to the street exposure of ground walls to sunlight.



Northeast/Southwest

The diagonal grid provides optimal shading.

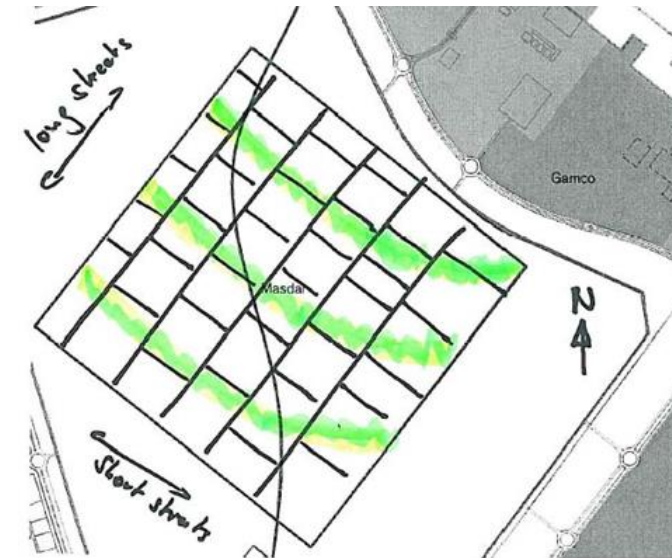


Northeast/Southwest

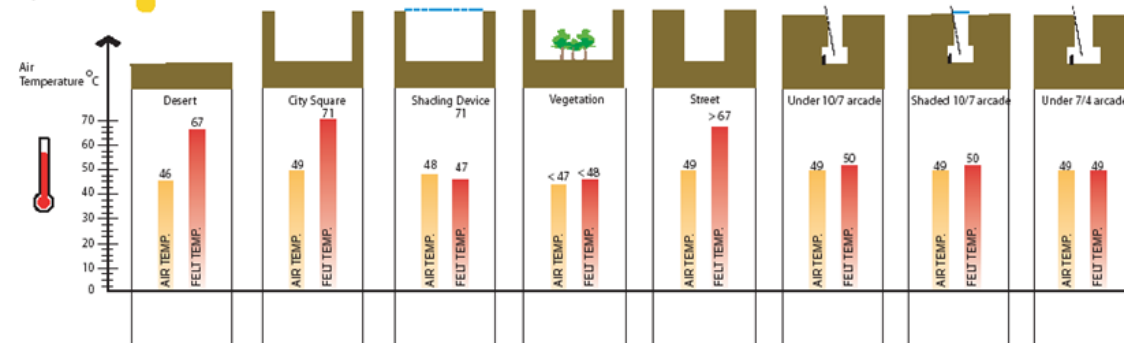
The northeast/southwest orientation of the city fabric provides optimal shading.



ORIENTATIONS

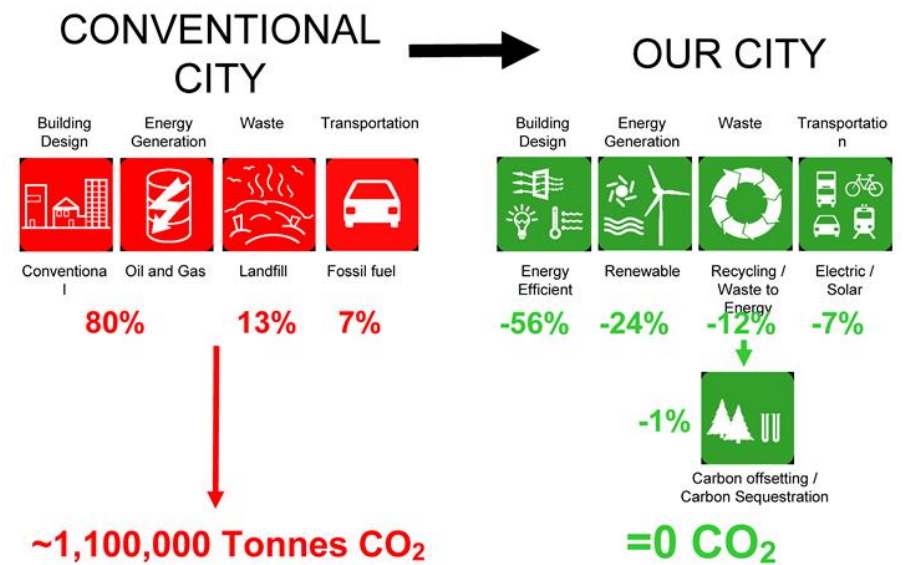
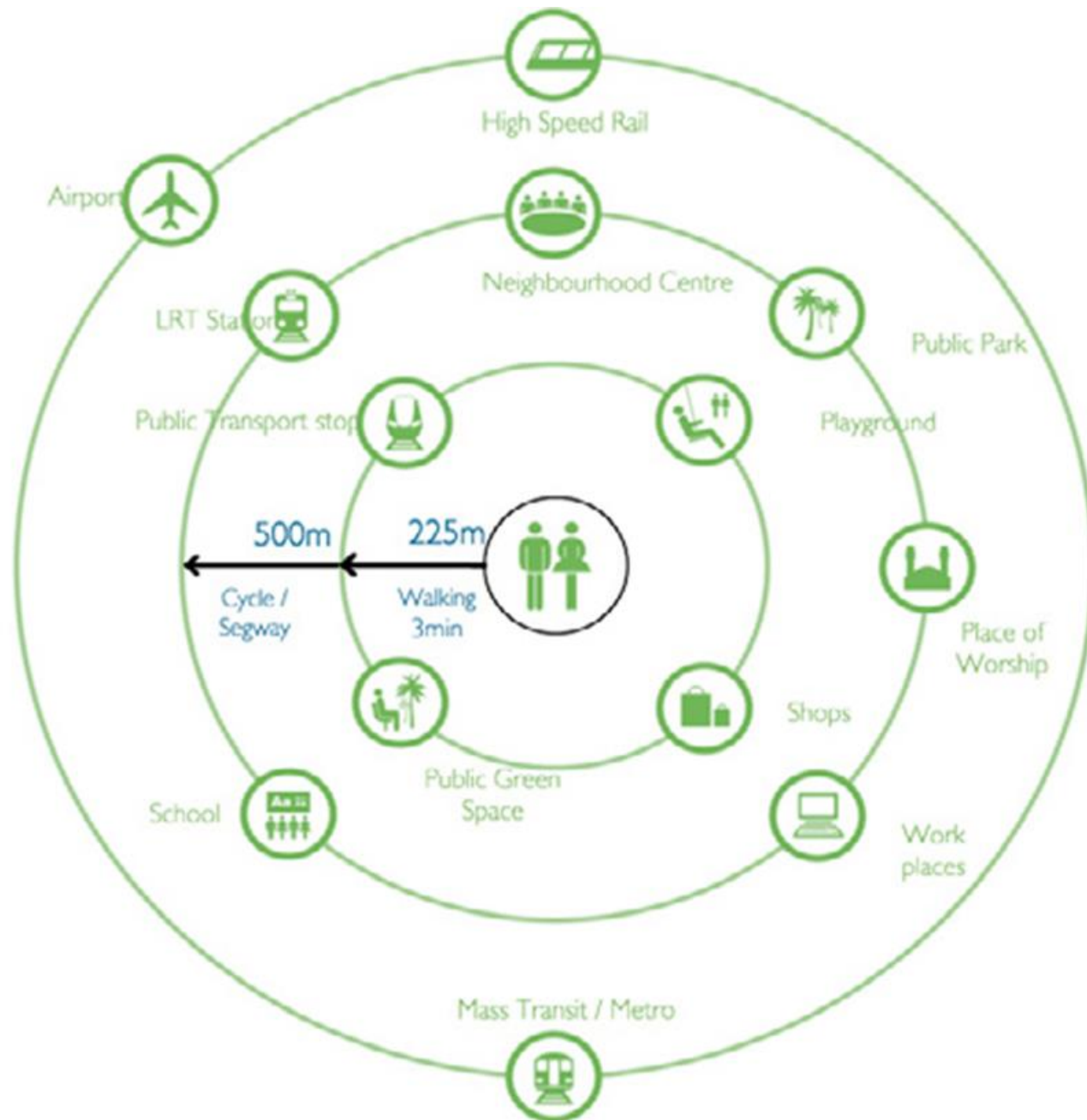


Day Time



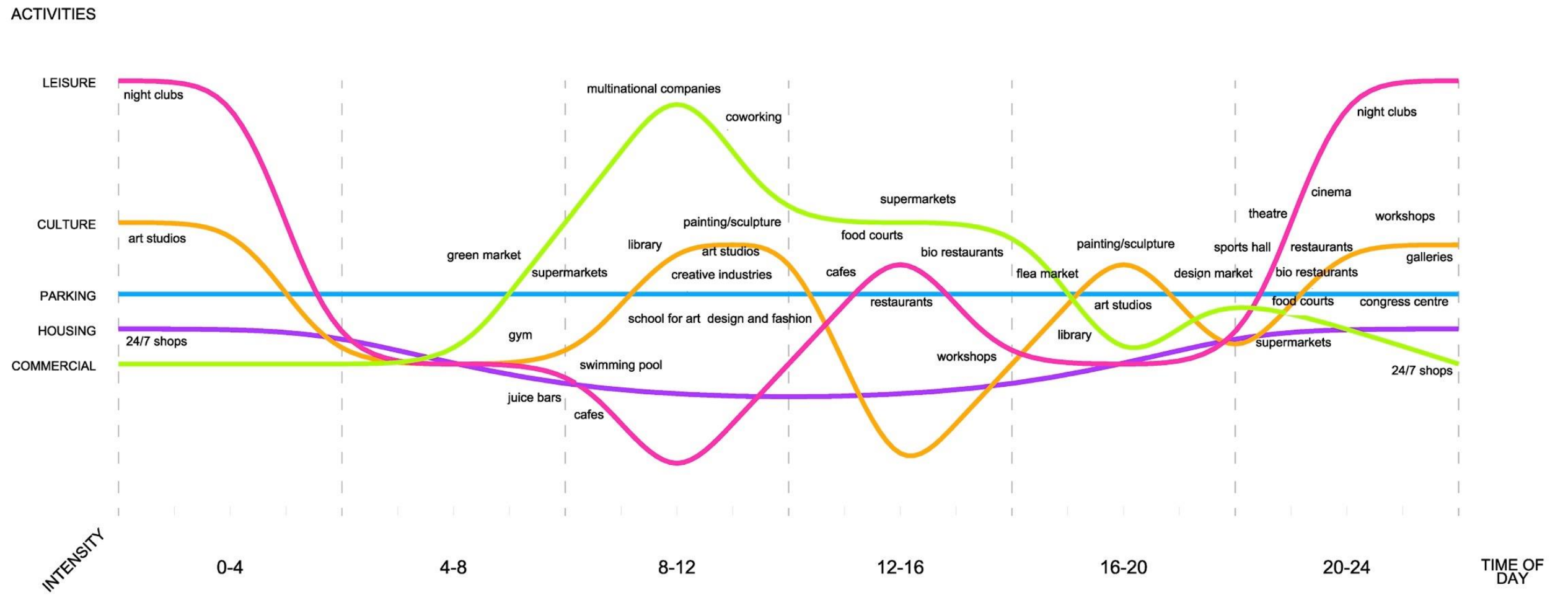
AIR TEMPERATURE RELATED TO THE STREET SECTION CONFIGURATION

WALKABILITY

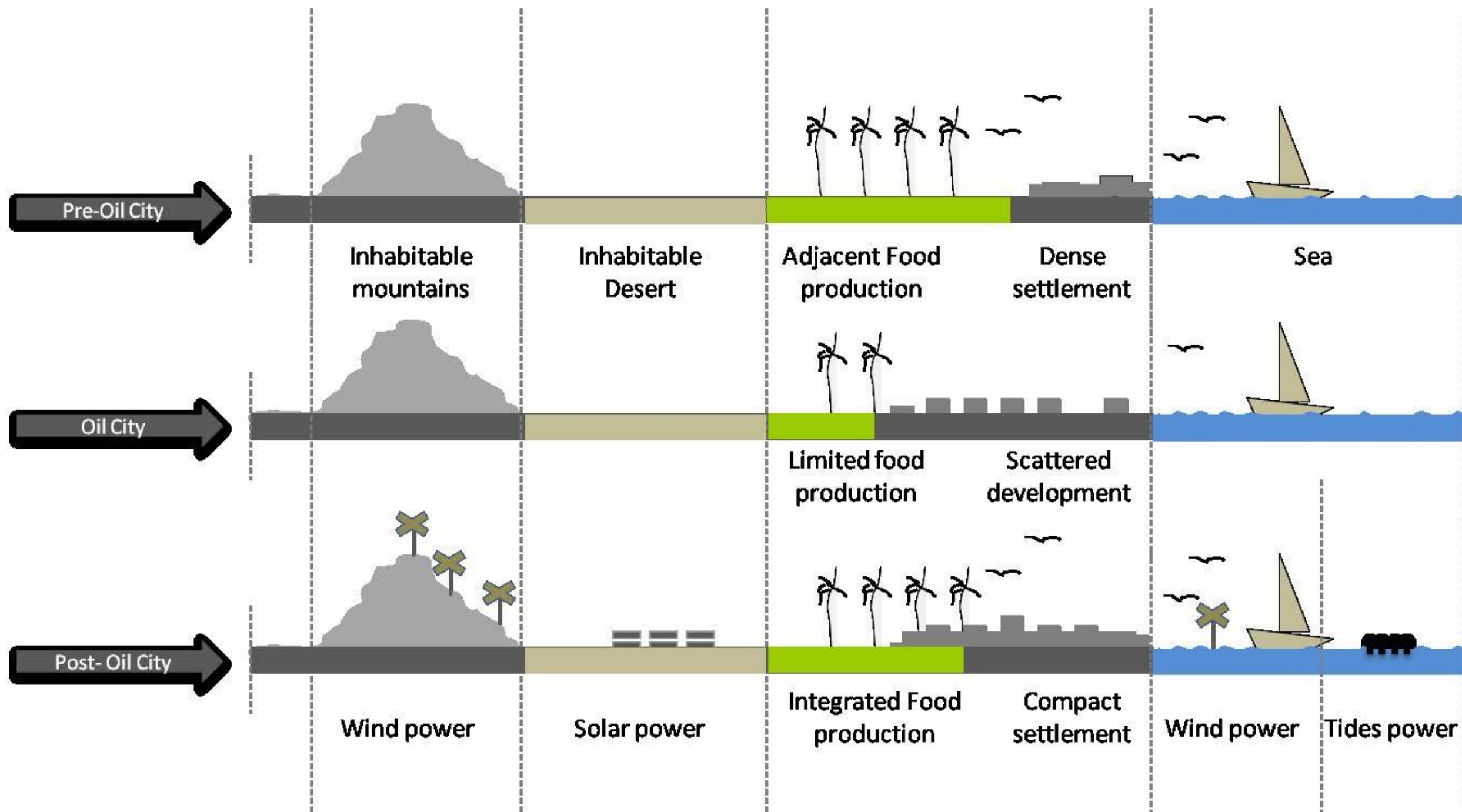


CARBON BALANCE

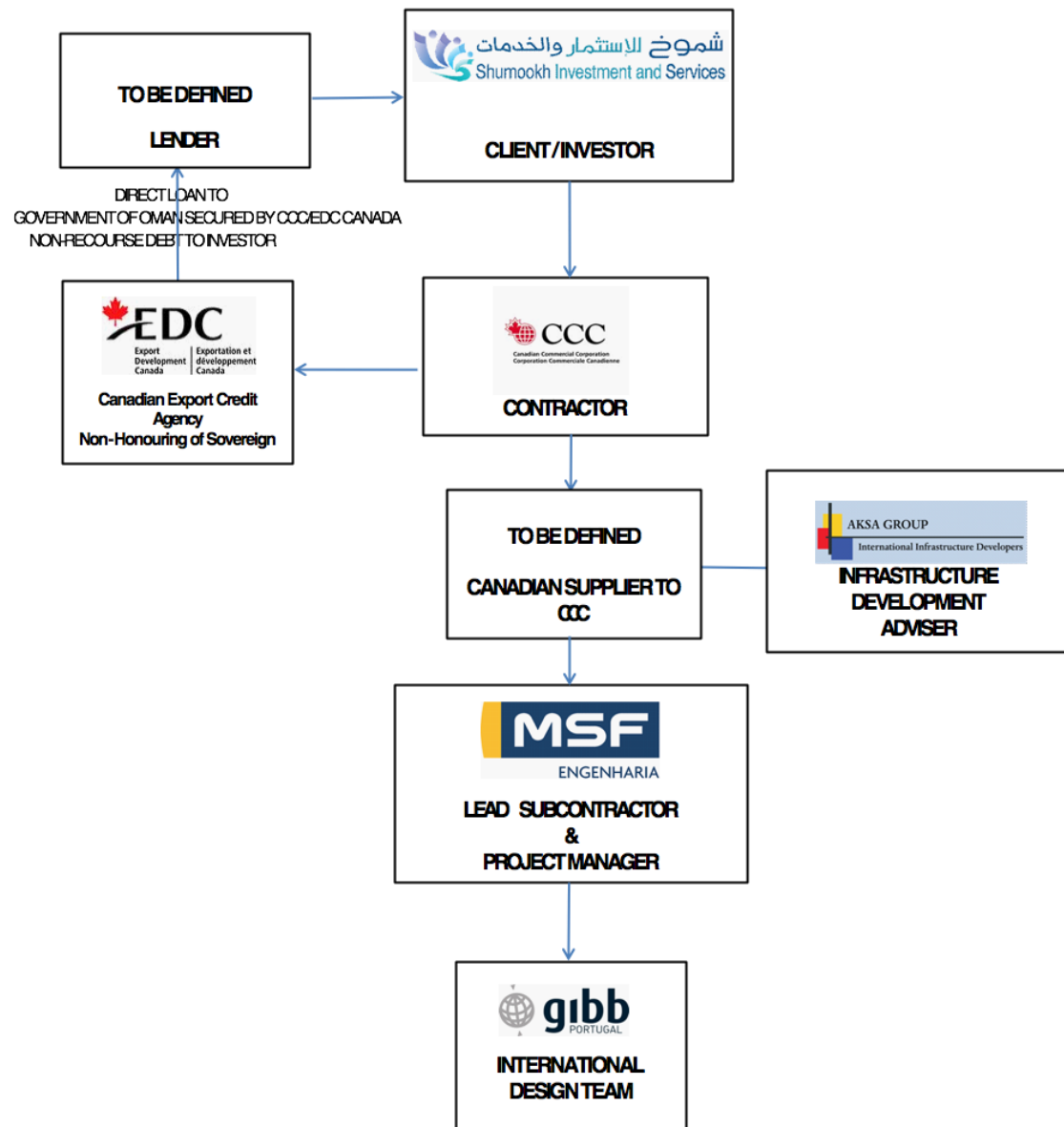
URBAN VITALITY



POST OIL



ORGANIZATION CHART STAKEHOLDERS AND PARTNERS



1. CCC, Contractor and debt guarantor under a direct loan secured by the Canadian Export Development Corporation (“EDC”) and provided by a Lender (<http://www.ccc.ca/>).

2. AKSA Group, International Infrastructure Developer (in association with the Canadian Commercial Corporation (“CCC”)) (<http://www.aksagroup.ca/>).

3. MSF Engenharia as the lead subcontractor & Project Manager, responsible for Design and Build of all project (<http://www.msf.pt/>),

4. Gibb Portugal (<http://www.gibbportugal.com/>) as Design Team working with local Consultants.

ECONOMIC VIABILITY AND PLANNING

The project components that have been established and will be implemented in phases in accordance with a plan that will have to be discussed and approved by the investor in tune with the local administrative authorities. Lulua's masterplan is designed to be highly flexible. Its linear development is divided into three sectors, bridged by an organic linear stream, and may be constructed in 5-6 year's (including design and all approvals from client and local authorities).

The design phase is estimated to last one year and will be immediately followed by the implementation of the infrastructures, a phase that will take two years to be completed. In the second year of the infrastructures' construction may start the buildings and facilities construction. This last phase of the project is anticipated to end after four years.

The detailed planning will be presented later, properly in order to obtain a social and economic sustainable urban development, respecting all the concerns of cultural and environmental nature that the location of this project requires. Temporally the construction will be held in 5-6 year's, where be included Design Phase and phase for the construction of general infrastructure and all buildings and facilities.

A concern that shall weight during the planning phase will see the mobilization of financial resources.

The investments decision needs to be supported by sound feasibility Studies. The above master-plan is major project that is expected to be developed in Phases. To assess the immediate investment potential the following needs to be done:

- Conduct of a comprehensive market assessment study: The master plan indicates a range of potential commercial activities. The market research study will focus on the immediate requirements some of the components in the master plan and focus on estimating the demand, analysis of the competition and establish the potential market share that will get accommodated in the facilities being built in the master plan. The immediate requirements could include recreation facilities, vocational training centers, etc.
- Conduct of Technical analysis: On completion of the market analysis the market requirements need to be translated into project ideas / concepts and the technical aspects including the tentative capital investments required for establishing the projects as well as the operational costs required for maintaining the facilities needs to be assessed.
- Developing a Financial Model: The findings of the market research and the technical analysis shall be integrated into an interactive financial model. This model will be used for assessing the financial attractiveness of the project. The financial model shall also indicate the potential for the project to repay the debt solicited for establishing the projects.
- Integrated Techno-Economic Feasibility Report (TEFR) : All the above aspects shall be integrated into a TEFR, that shall be presented to the investor for final decision.

Lulua City combines advanced technologies with the planning fundamentals of traditional Arab settlements to create a community that aims to be carbon neutral and zero waste. This 100-hectare city will accommodate in permanency 5.000 people and receive a visiting and commuting population of approximately 25.000 people each day in a mixed-use, low-rise, high-density development that includes a theme park, a signature 18-holes golf course, and an all-inclusive (university-cum-incubator) technology campus to boost regional economy.

Strategically located within Al-Batinah's transport infrastructure, Lulua is linked to neighbor communities, Sohar's port and the international airport by existing roads and a proposed light rail system. With a maximum distance of 200 meters to the nearest rapid transport links and amenities, the city is designed to encourage walking, while its shaded streets and courtyards offer an attractive pedestrian environment, sheltered from climatic extremes. The land surrounding the city will contain wind and photovoltaic farms, agricultural fields and plantations, allowing the community to become self-sufficient.

Its linear development is divided into three sectors, bridged by an organic linear stream, and may be constructed in phases. The masterplan is designed to be highly flexible, to allow it to benefit from emergent technologies and to respond to lessons learnt during the implementation of the initial phases. Expansion has been anticipated from the outset, allowing for growth while avoiding the sprawl that besets so many cities.

Infrastructures

Energy Production

Our proposal presents guidelines aiming to define a qualified set of solutions to provide reliable sources of both energy and water to the new city of Lulua. It was possible to identify a few solutions of compromise that will allow overlooking and solving, at the same time, energy and water issues.

These solutions will require desalination of seawater by use of reverse osmosis processes. The energy needed for desalination as well as to satisfy the consumption of the city residents and visitors will be produced locally from wind farms, solar water heating and photovoltaic panels integrated in buildings and a low consumption diesel system.

Water Supply

There will be two parallel water supply systems, each one with different water quality level (Q1 and Q2), mainly with different dissolved salts contents (TDS). All the water for these two systems will obtain from the sea and will be desalinated.

There will be different desalination steps providing the above mentioned water quality levels:

- Q1 water is fresh and potable water for human use with no restrictions;
- Q2 water will be used in general services, toilets, pavements washing, irrigation, fire fighting, etc..

The seawater will be taken from drilled wells (taking advantage of the porous environment) or directly from the sea, using concrete wells built at the port. The desalination water treatment plant will include all the pre and post treatment systems, as well as the storage and flow regulation tanks, and final pumping stations.

The location of these equipment's will be done according to the Master Plan and will include:

- Two water distribution networks;
- Water tower near the city (Q1 water);
- Water tank near the theme park (Q1 water);
- Water reservoir/lagoon for Q2 water in the golf area, using sealing membranes.

Sewage and Wastewater System

There will be two independent wastewater networks:

- Sewage; and Rainwater and drainage of irrigated areas.

Sanitary sewers will take the collected wastewater to the wastewater treatment plant, foreseeing its future reuse. It is proposed a secondary treatment level, with a possible future extension to a tertiary level, seeking nutrient recovery. It is mandatory to assure a high degree of sanitary safety, so there will be a UV radiation disinfection system.

The proposed wastewater treatment plant will have an activated sludge: extended aeration (oxidation ditch) system, followed with UV disinfection. The resulting sludge can be used for agriculture purposes.

After treatment wastewaters will be stored, along with drained water from irrigated areas and rainfall, in buffer reservoirs, mainly small lagoons.

Irrigation of the Golf Course

The irrigation of the golf course will be one of the main consumers of water, implying significant volumes of water. Therefore we propose that only some of the areas of the golf course (“tee’s”, “green’s” and driving range) will be irrigated.

These areas should be sealed with membranes, allowing the remains of the irrigation water to be drained and blended with recycled wastewater and some freshwater, as above mentioned.

Furthermore precautions should be taken:

- Use of grasses highly tolerant to water shortage and high concentrations of dissolved salts, specially sodium chloride;
- Using new improved or synthetic grasses.

Solid Waste Management System

Solid waste will be, mainly of the residential and commercial types, with significant amounts of organic putrescible wastes, implying the need for its quick removal. The other types of solid wastes will be:

- Glass;
- Packages (plastic, cardboard, tin cans, wood, other metals), Paper and cardboard, Batteries, Textiles, Special wastes (including bulky items, consumer electronics, white goods, oil and tires).

The integrated solid waste management plan, with an autonomous and independent system, will include collection, handling and separation, transportation and disposal, favoring separated wastes at the source as well as recycling.

The system will imply:

- Individual responsibility of all residential units’ tenants in separating and removing waste to appointed gathering sites;
- Hotel and commercial units management responsibility in separating and removing waste to appointed gathering sites;
- Installing eco-waste gathering sites, where the above-mentioned separated wastes will be collected in different containers (with suitable conditions) until transportation;
- Removal of wastes, according to its different types, to a site with compactors and suitable storage systems, for further removal to final disposal;
- Transfer for disposal to be made in accordance with municipal services.

Putrescible waste in warm weather may cause the breeding of “vectors” (flies, mosquitoes, roaches, rats) that must be controlled.

LULUA SOHAR AREA MASTER PLAN								
PARCEL A			PARCEL B			PARCEL C		
Zoning	Plot Area	Built-up area	Zoning	Plot Area	Built-up area	Zoning	Plot Area	Built-up area
Building	m2	m2	Building	m2	m2	Building	m2	m2
Retail outlets	10 355,00	8 463,00	Multi-speciality Hospital	61 963,00	86 264,00	Shopping Mall	74 441,00	83 768,00
Restaurant		4 382,00	Emergency Block	10 502,00	13 884,00	Exhibition Complex	73 694,00	50 152,00
Fuel station	15 646,00	2 493,00	Condominium 4	27 297,00	27 981,00	Seminar and Conference hall	18 773,00	27 493,00
Condominium 1 / 2 / 3	15 800,00	46 500,00	Condominium 5	25 858,00	24 981,00	Food court	17 362,00	20 754,00
Office Space 1	16 568,00	19 179,00	Hostel	18 736,00	24 911,00	Technical Display halls	4 836,00	24 911,00
Office Space 2	15 329,00	13 458,00	Indoor stadium	12 673,00	15 086,00	Outdoor Exhibit Area	6 421,00	7 104,00
Office Space 3	24 330,00	31 129,00	Vocational Training Centre	63 173,00	67 235,00	ML Car Parking	10 352,00	36 966,00
Office Space 4	4 145,00	6 000,00	Academic Support facility	18 575,00	24 653,00	Condominium 6	22 900,00	63 750,00
4/5 Star Hotel	24 239,00	29 860,00	Admin Block	6 252,00	6 854,00			
Café corner	6 252,00	6 854,00	ML Car Parking	3 138,00	38 033,00			
Social Center	12 604,00	14 203,00						
Womens association		12 558,00						
Library	21 925,00	5 779,00						
ML Car Parking	5 396,00	35 014,00						
Sub-Total	172 589,00	235 872,00	Sub-Total	248 167,00	329 882,00	Sub-Total	228 779,00	314 898,00
Infrastructure			Infrastructure			Infrastructure		
Road	50 300,00		Athletic Track	11 880,00		Future Development	43 808,00	
Parks na Open Spaces	22 843,00		Road	59 656,00		Road	18 179,00	
Green Belt	36 481,00		Parks na Open Spaces	23 157,00		Parks na Open Spaces	7 548,00	
			Green Belt	55 141,00		Green Belt	24 754,00	
Sub-Total	109 624,00		Sub-Total	137 954,00		Sub-Total	50 481,00	
Grand Total	282 213,00	235 872,00	Grand Total	386 121,00	329 882,00	Grand Total	323 068,00	314 898,00
Grand Total of Plot Area .			991 402,00		Grand Total of Built-up Area .			880 652,00

LULUA SOHAR PROPOSAL - AREA MASTER PLAN								
PARCEL D			PARCEL E			PARCEL F		
Zoning	Plot Area	Built-up area	Zoning	Plot Area	Built-up area	Zoning	Plot Area	Built-up area
Building	m2	m2	Building	m2	m2	Building	m2	m2
University Campus 1	80 000,00	52 000,00	Golf Field	795 000,00		Theme Park	0,00	28 000,00
University Campus 2	75 000,00	37 000,00	Resort Hotel - Club House	15 000,00	19 000,00	Zoo Park	130 000,00	7 800,00
University Residences	8 700,00	30 000,00	Resort Houses	37 000,00	18 500,00	Educational Farm	35 000,00	6 300,00
Tecnological Center	65 000,00	53 000,00				Equestrian Center	27 000,00	5 800,00
						Hotel	30 000,00	54 000,00
						Technical Zone	10 000,00	1 500,00
Sub-Total	228 700,00	172 000,00	Sub-Total	847 000,00	37 500,00	Sub-Total	232 000,00	103 400,00
Infrastructure			Infrastructure			Infrastructure		
Road	45 500,00		Road	45 000,00		Road	28 000,00	
Parks na Open Spaces	28 000,00		Parks na Open Spaces	12 000,00		Parks na Open Spaces	105 000,00	
Green Belt	101 000,00		Green Belt	32 000,00		Green Belt	161 000,00	
Sub-Total	174 500,00		Sub-Total	89 000,00		Sub-Total	294 000,00	
Grand Total	403 200,00	172 000,00	Grand Total	936 000,00	37 500,00	Grand Total	526 000,00	103 400,00
Grand Total of Plot Area .			1 865 200,00		Grand Total of Built-up Area .			312 900,00

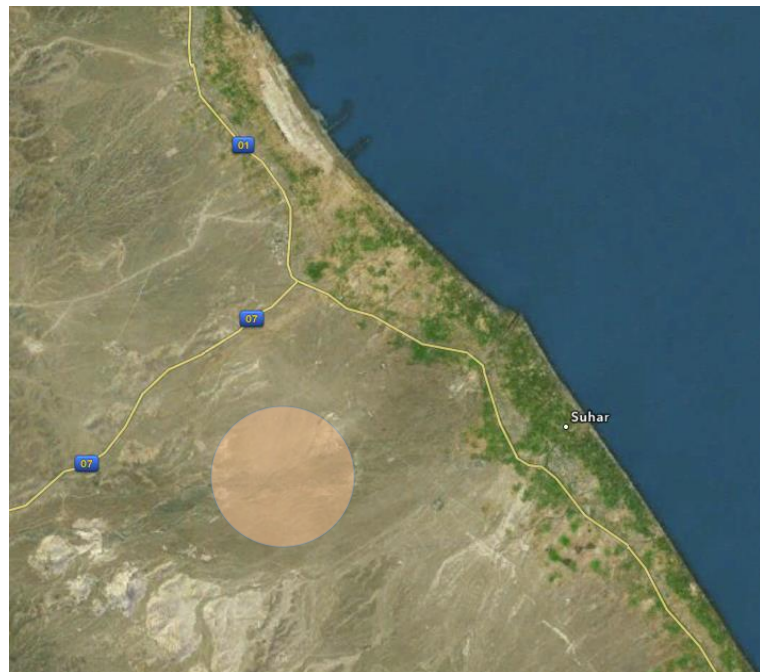
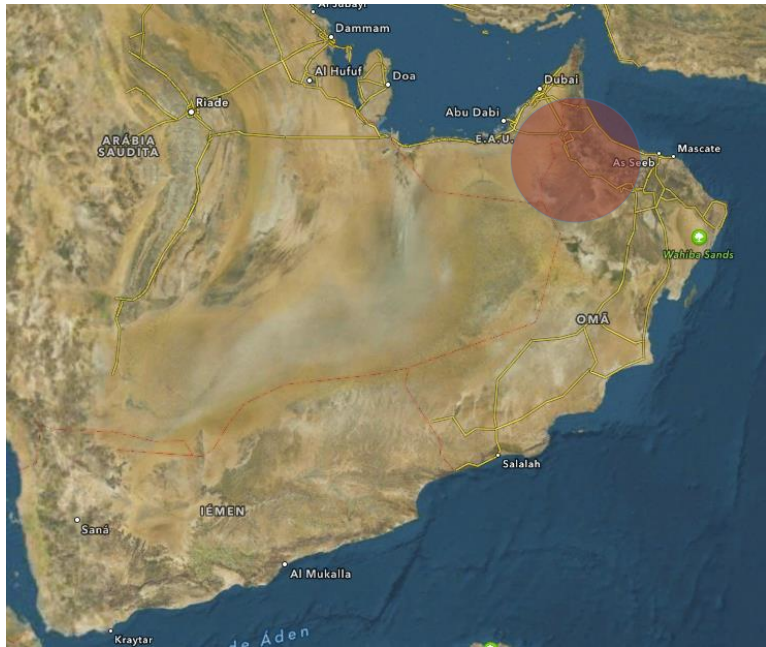
Grand Total of Plot Area .

2 856 602,00

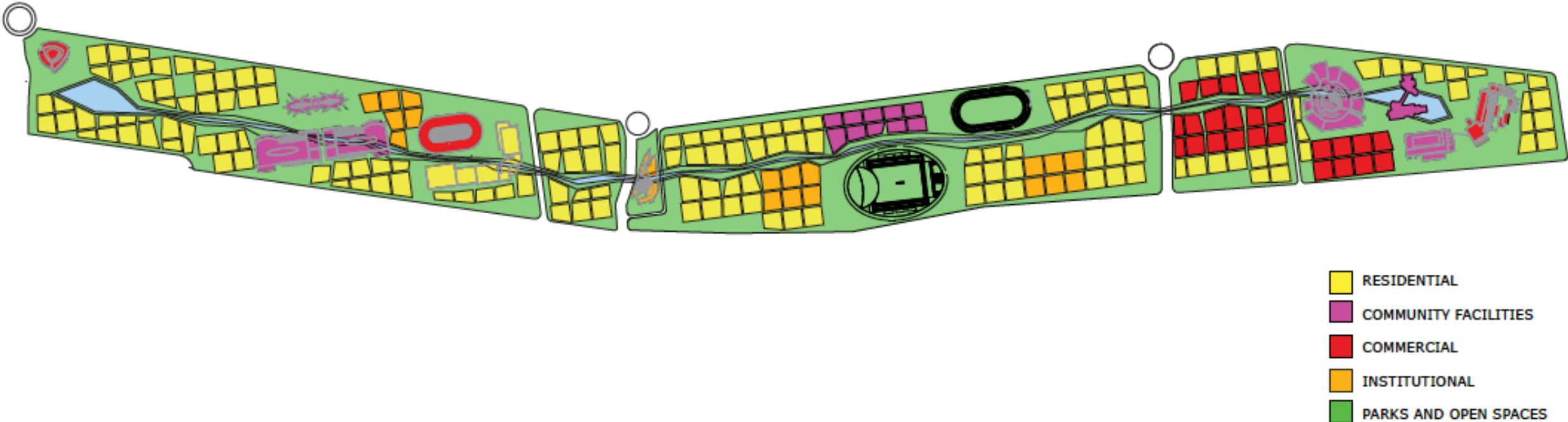
Grand Total of Built-up Area .

1 193 552,00

THE SITE



SCHEMATIC MASTER PLAN






MOBILITY



LRT Port

LRT Airport

-  LRT Port-Airport
-  Electric Shuttle / Cycle
-  Walk

MASTER PLAN PROPOSAL



MASTER PLAN - PARCEL A

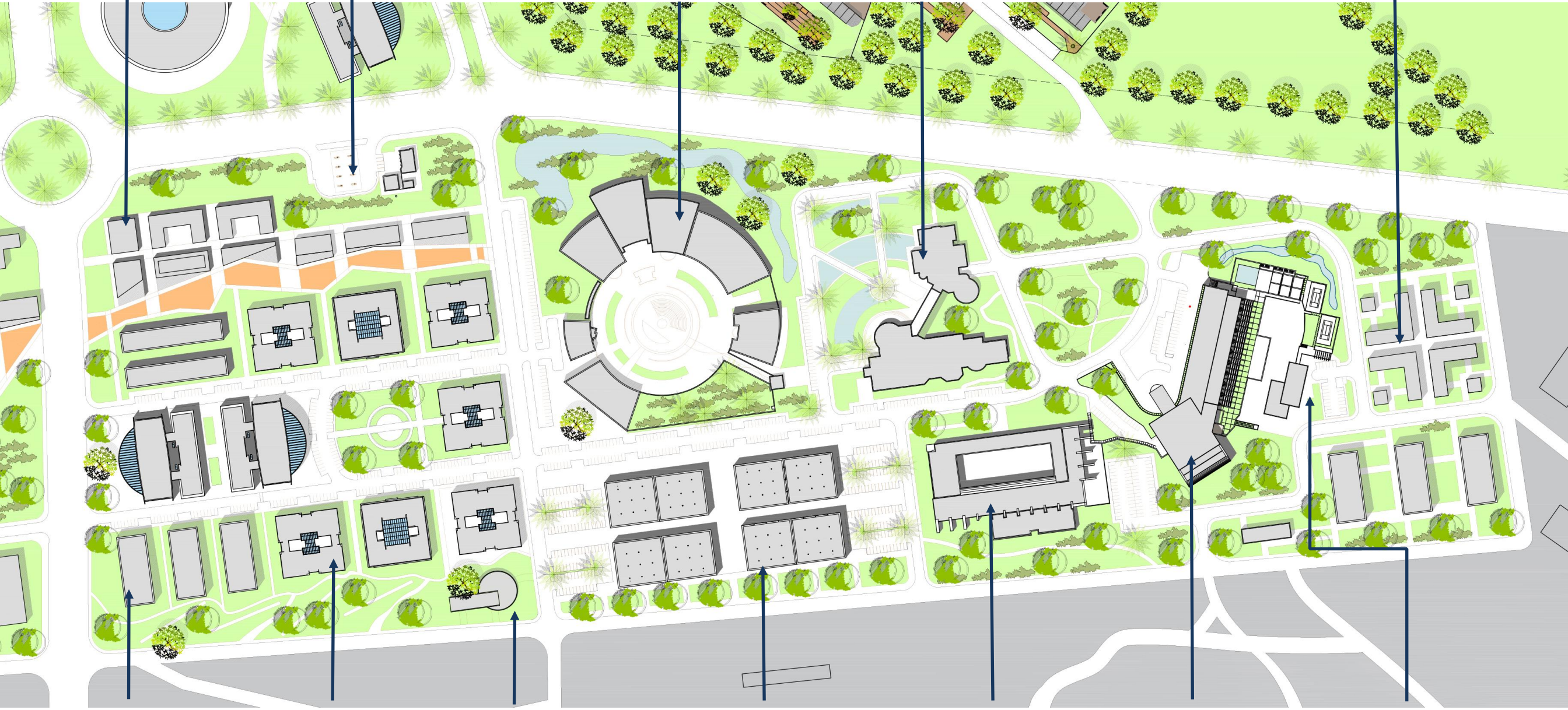
CONDOMINIUM 2

FUEL STATION

SOCIAL CENTER

WOMEN ASSOCIATION

CONDOMINIUM 1 / 2



BUSINESS APARTMENTS

OFFICE COMPLEX

RESTAURANT

RETAIL OUTLETS

LIBRARY

STAR HOTEL

CLUB HOUSE

MASTER PLAN - PARCEL B



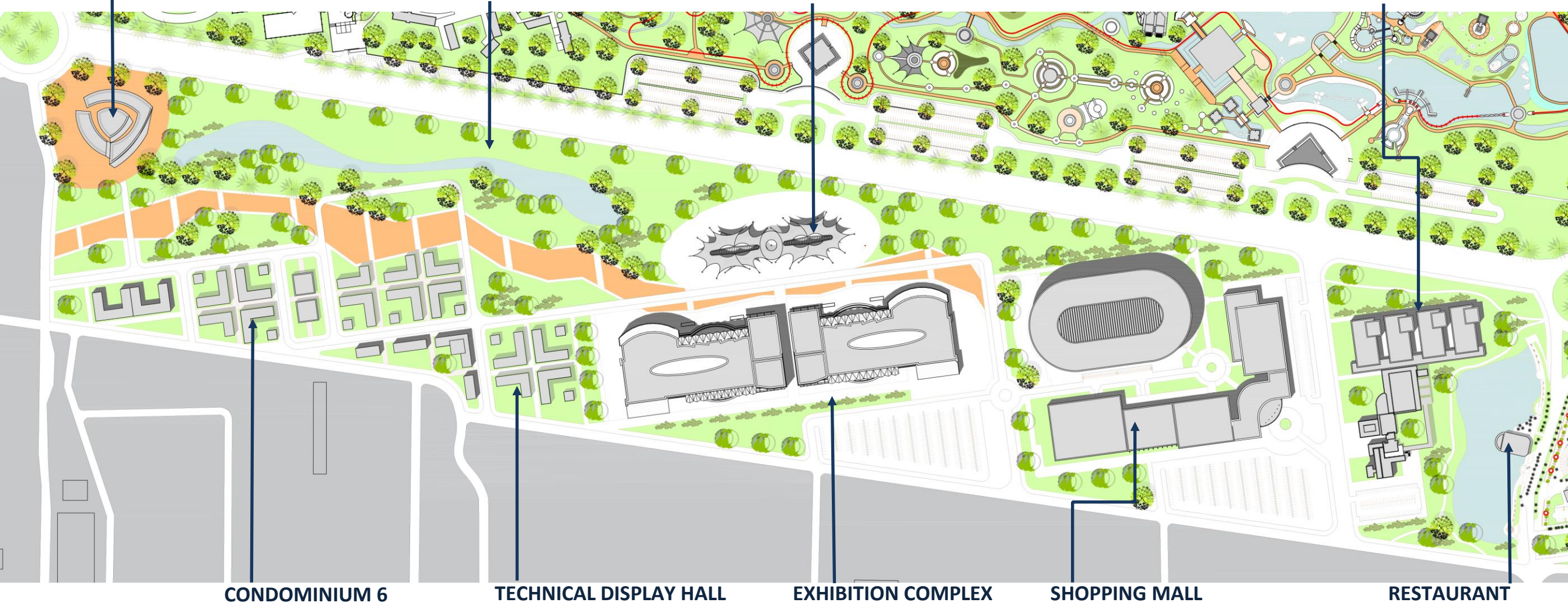
MASTER PLAN - PARCEL C

RESTAURANT

GREEN PARK

OUTDOOR EXHIBITION AREA

SEMINAR AND CONFERENCE HALL



CONDOMINIUM 6

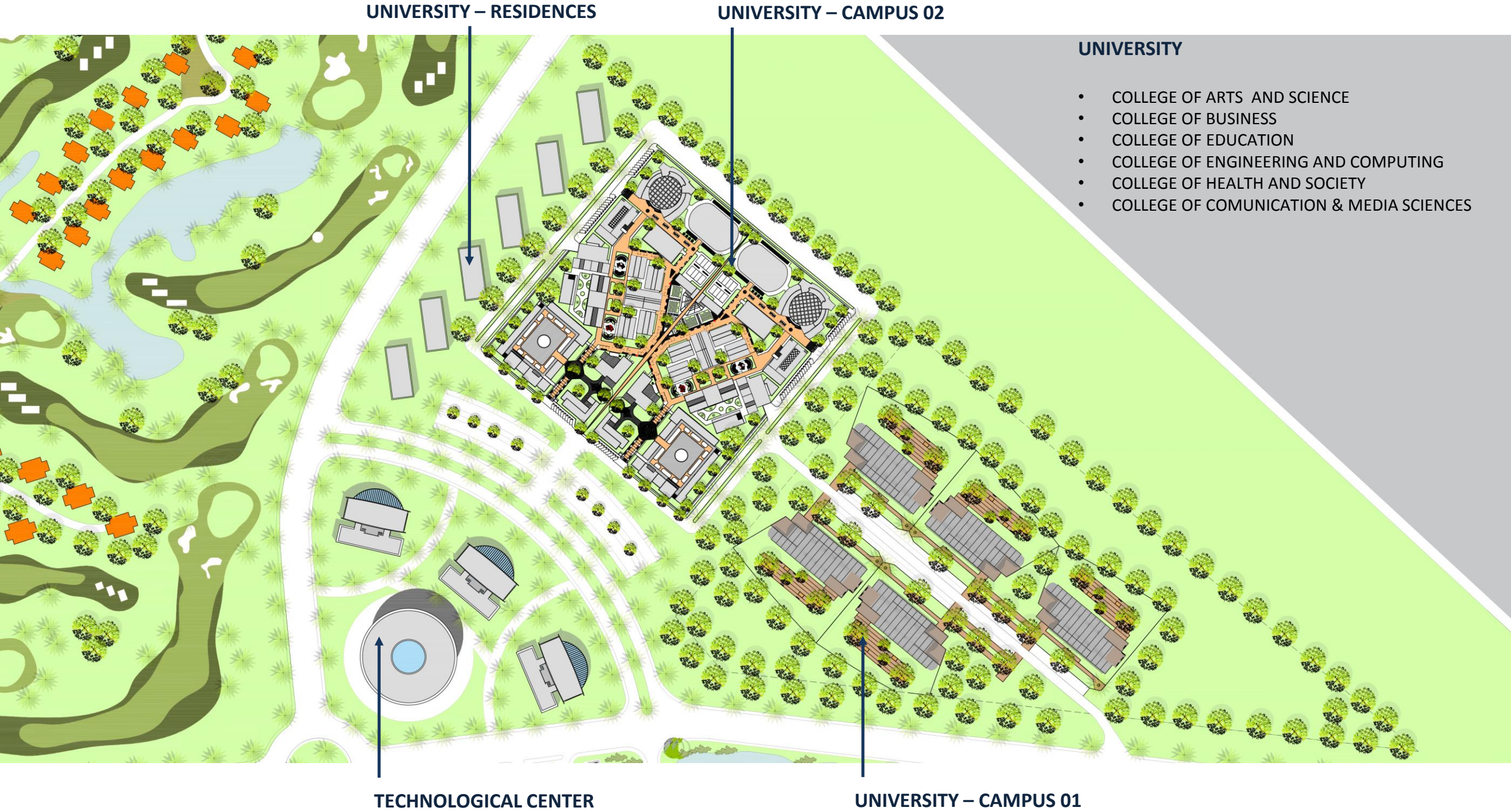
TECHNICAL DISPLAY HALL

EXHIBITION COMPLEX

SHOPPING MALL

RESTAURANT

MASTER PLAN – PARCEL D



UNIVERSITY CAMPUS – TECHNOLOGICAL CENTER – UNIVERSITY RESIDENCES

MASTER PLAN – PARCEL E

HOTEL – CLUB HOUSE

RESORT - HOUSES



GOLF RESORT – 18 HOLES

MASTER PLAN – PARCEL F



MASTER PLAN – THEME PARK

NATURAL HISTORY MUSEUM – RESTAURANT - SHOPS

OCEANARIUM – RESTAURANT - SHOPS



AMUSEMENT AREA

AQUATIC CENTER

MASTER PLAN – ZOO – EDUCATIONAL FARM – EQUESTRIAN CENTER

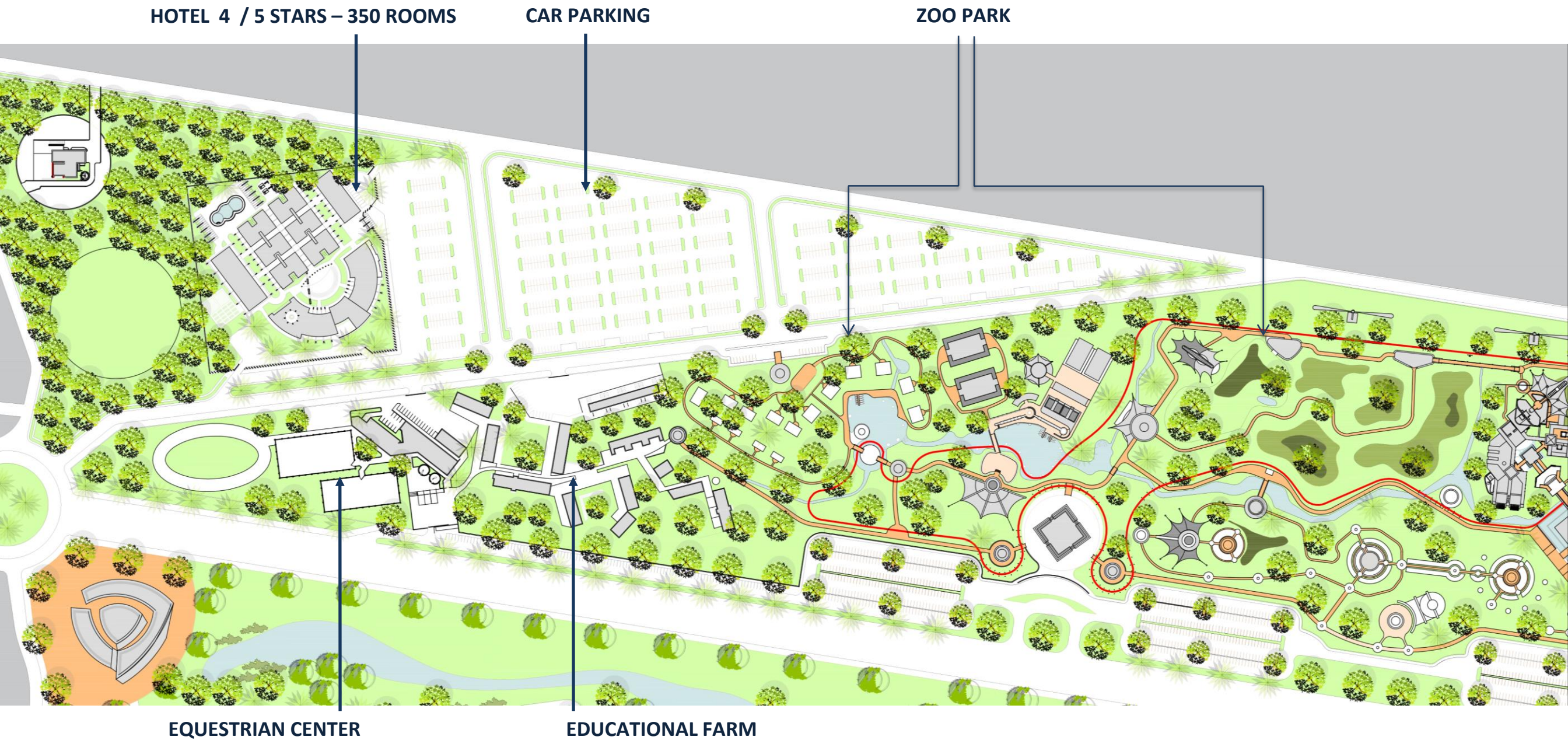


IMAGE REFERENCES

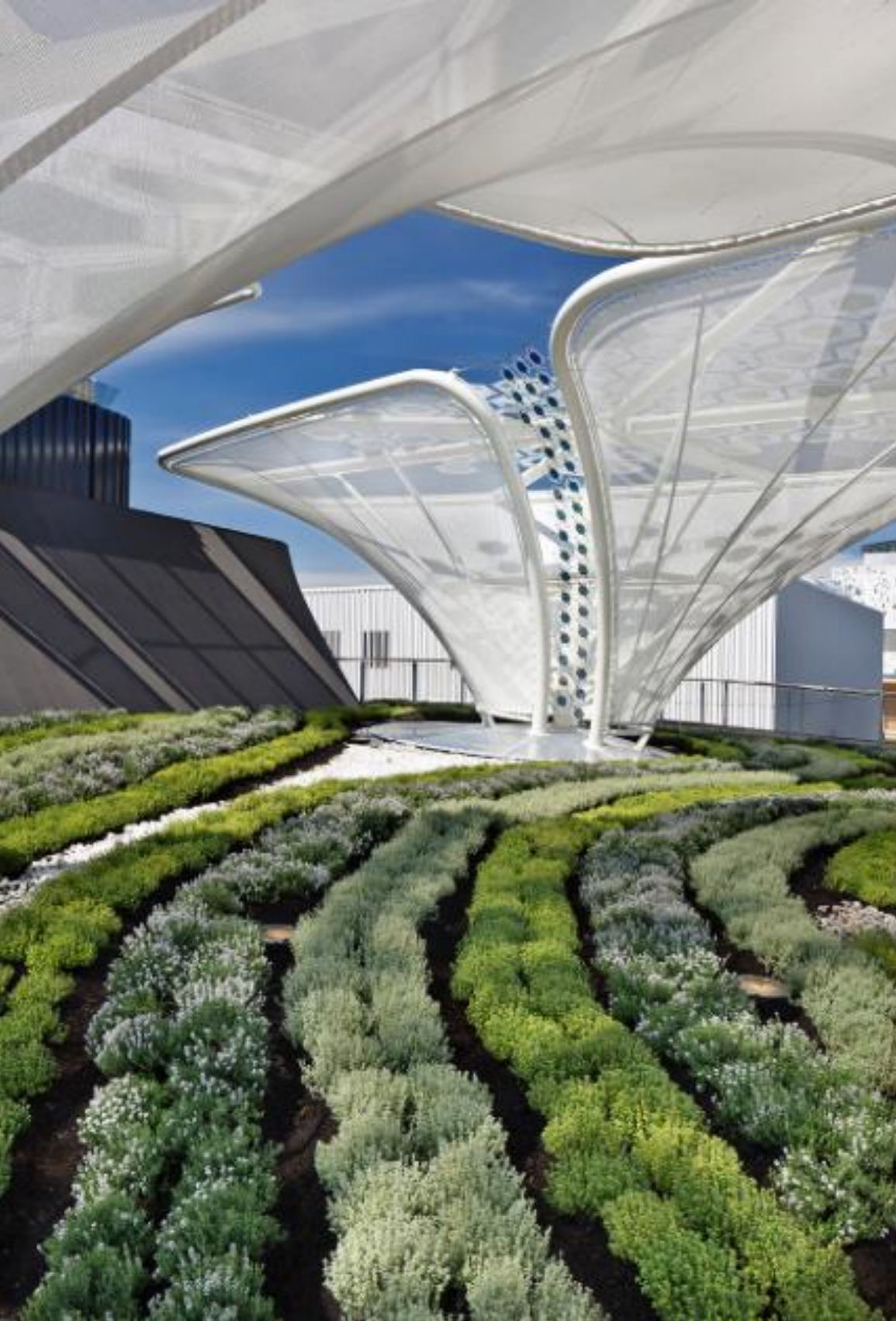
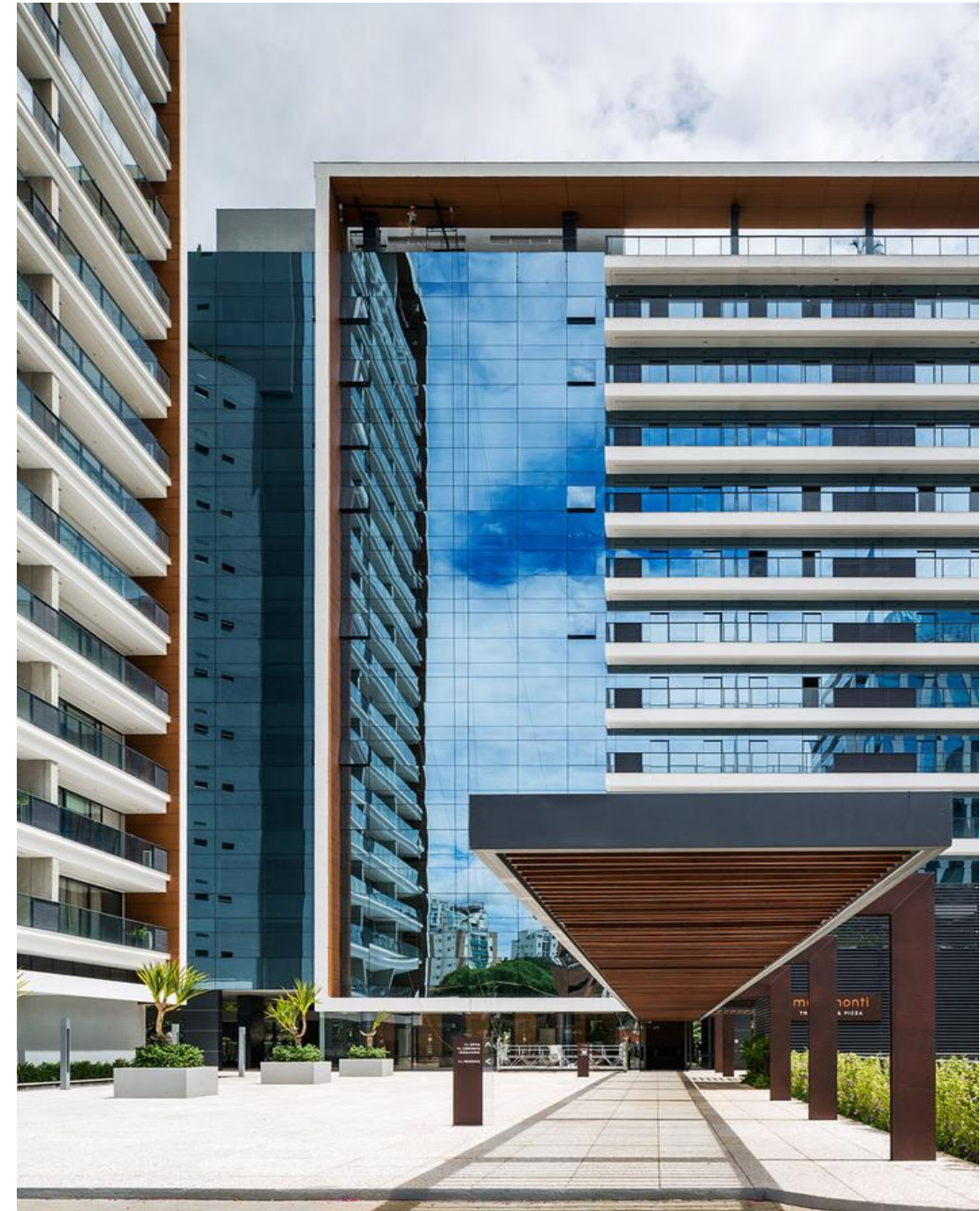


IMAGE REFERENCES



OFFICES

IMAGE REFERENCES

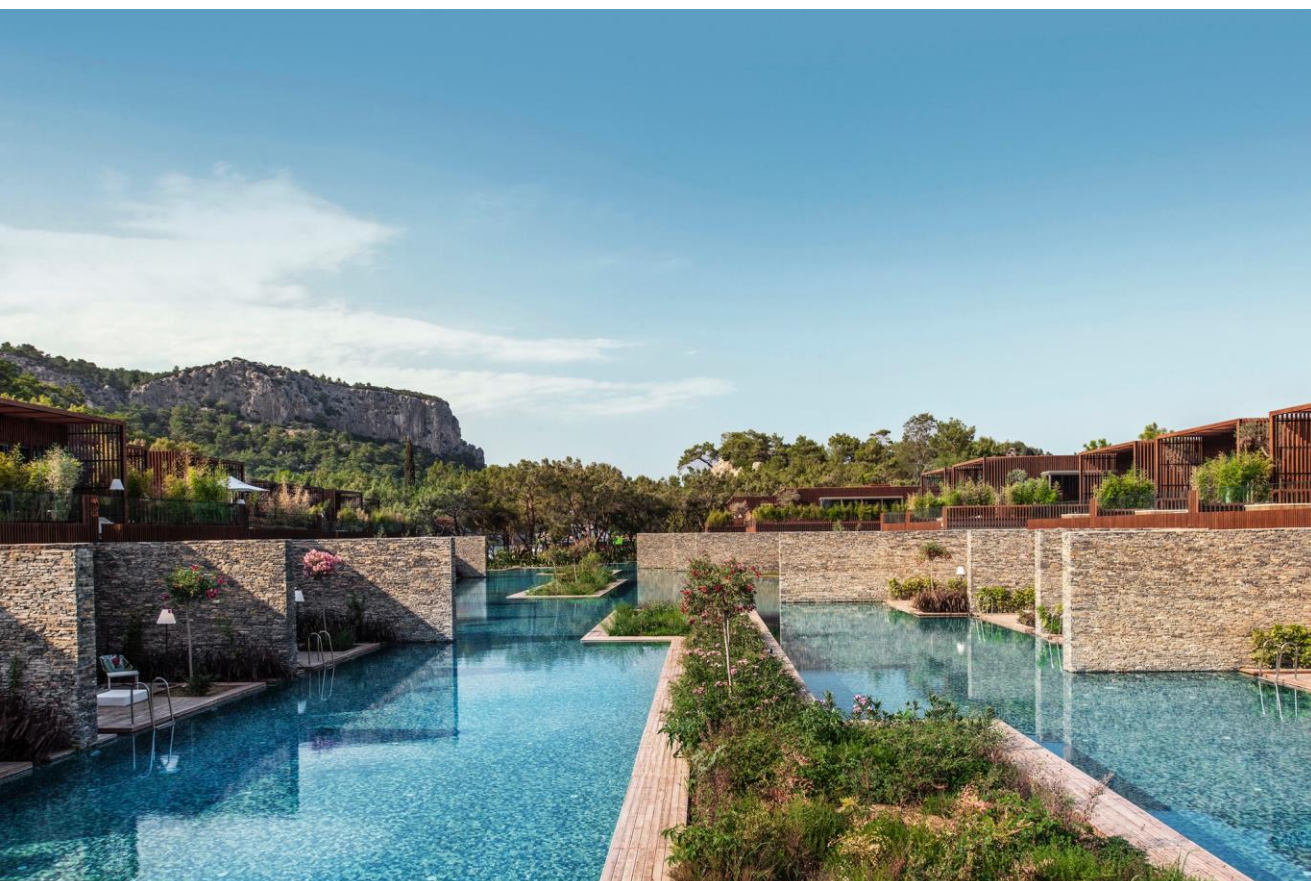


IMAGE REFERENCES



HOSPITAL

IMAGE REFERENCES

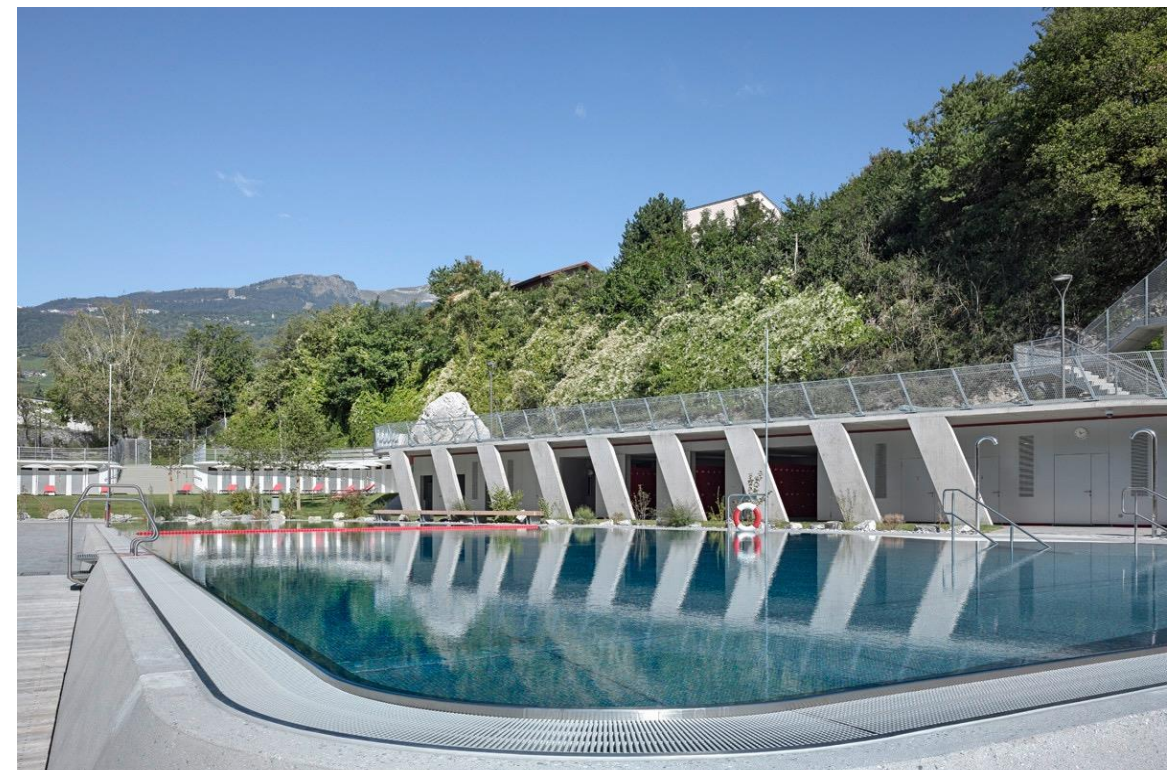


IMAGE REFERENCES



IMAGE REFERENCES

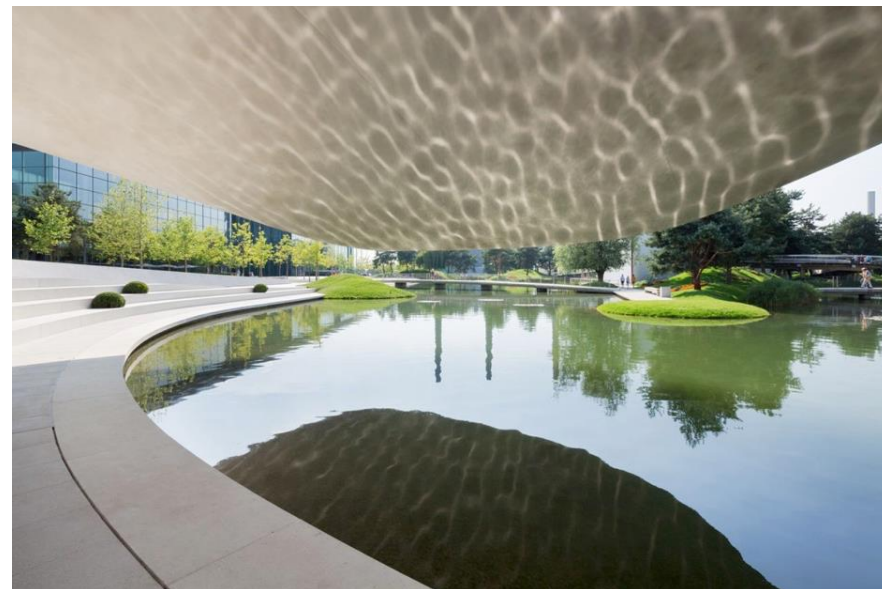


IMAGE REFERENCES

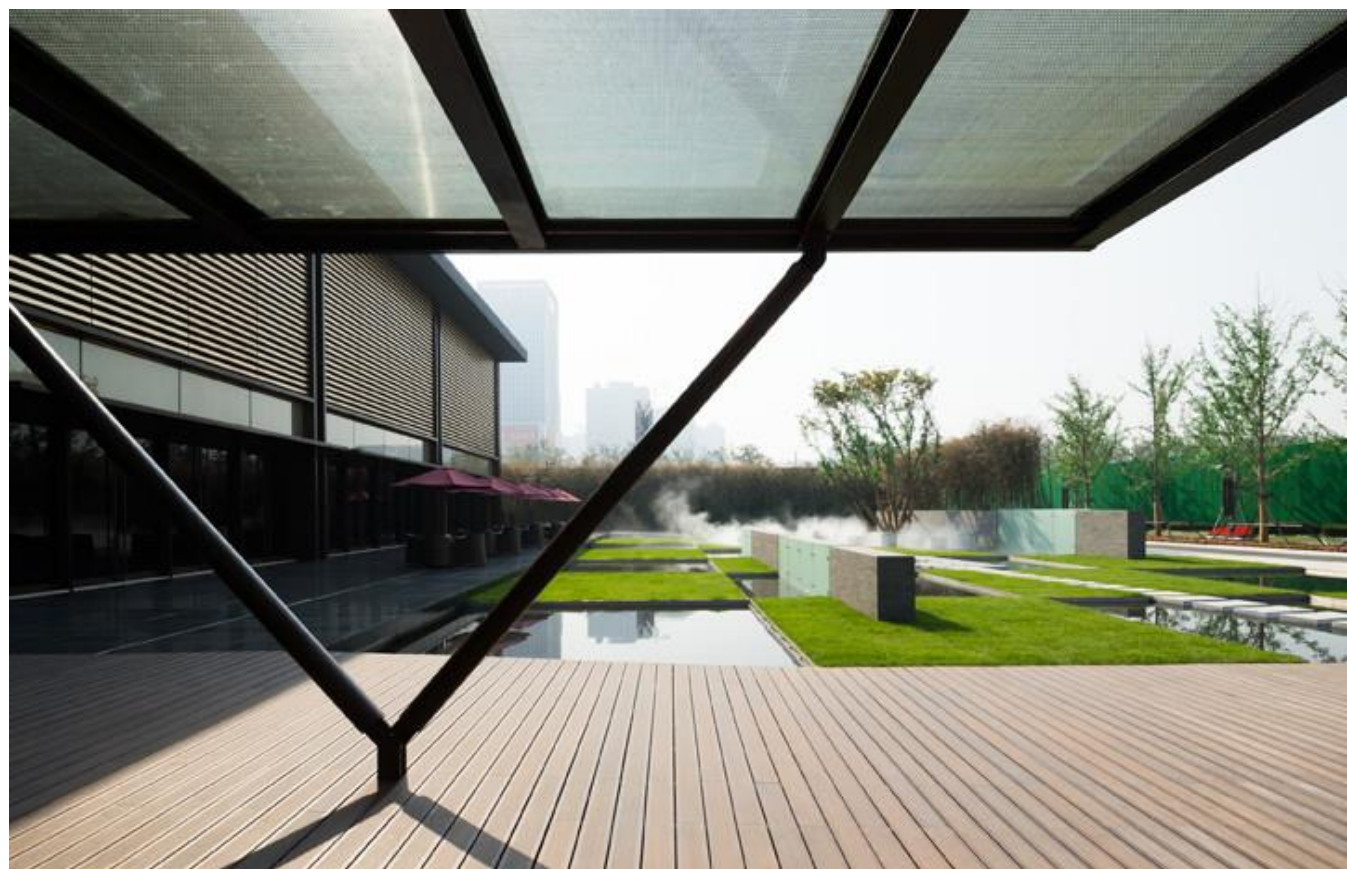
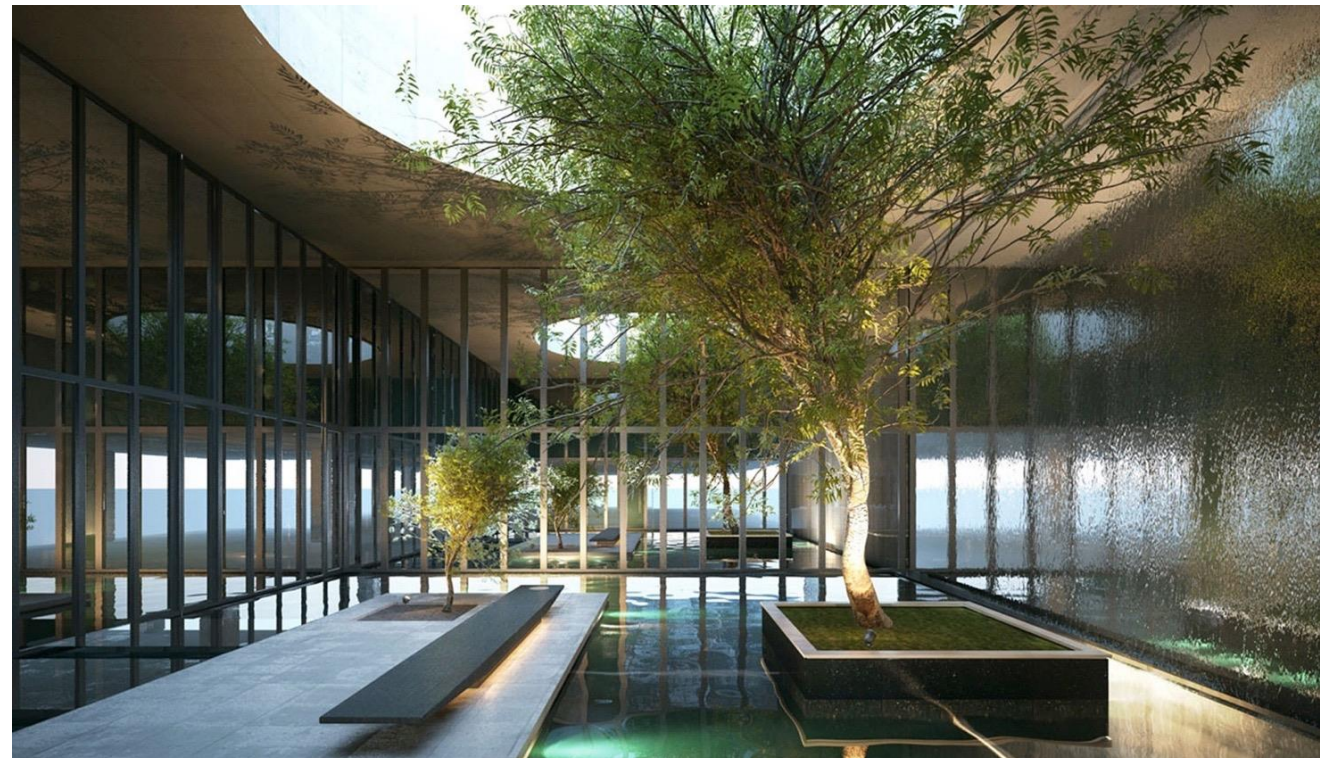
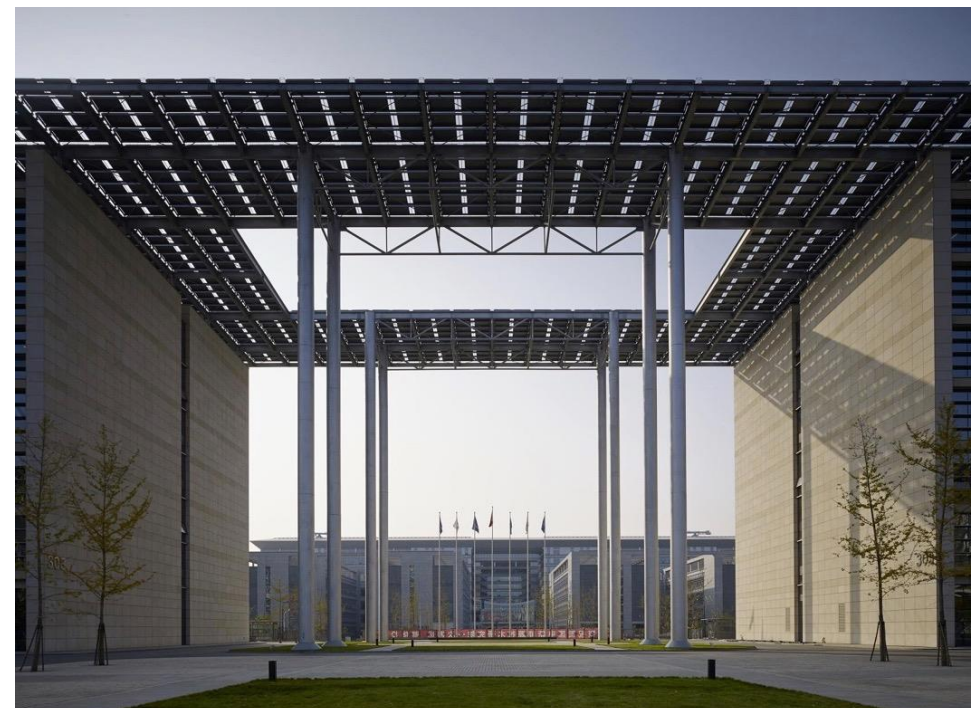


IMAGE REFERENCES



SEMINAR AND CONFERENCE HALL

IMAGE REFERENCES



EXHIBITION COMPLEX

IMAGE REFERENCES



SHOPPING MALL

IMAGE REFERENCES



IMAGE REFERENCES



IMAGE REFERENCES



IMAGE REFERENCES



THEME PARK

IMAGE REFERENCES



IMAGE REFERENCES



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