

國立交通大學  
建築研究所  
碩士論文



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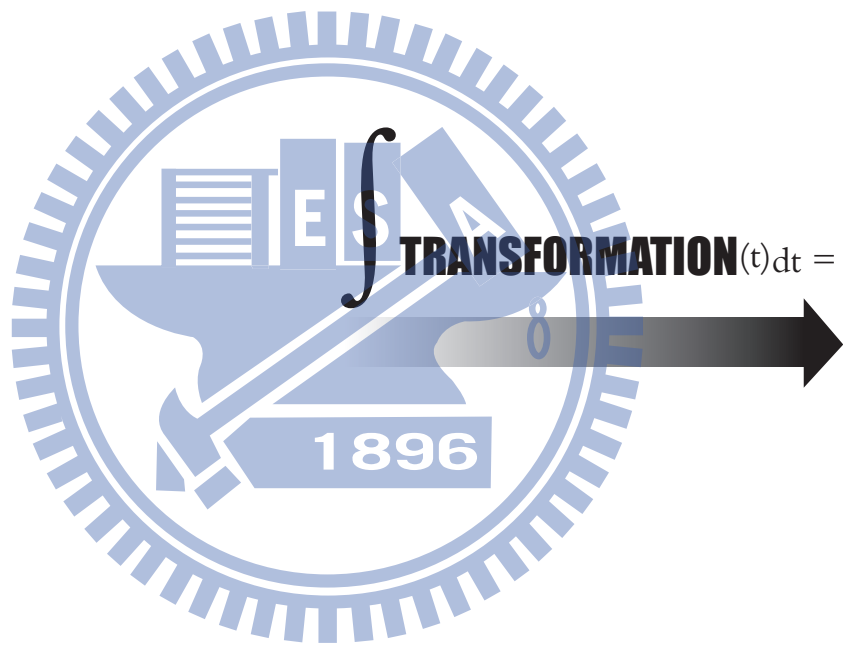
**ARCHITECTURE**(t) = 2006 - 2010 . Mei-Chih Chang



Chang Mei Chih. Portfolio(t) =  $\int$  **TRANSFORMATION**(t)dt









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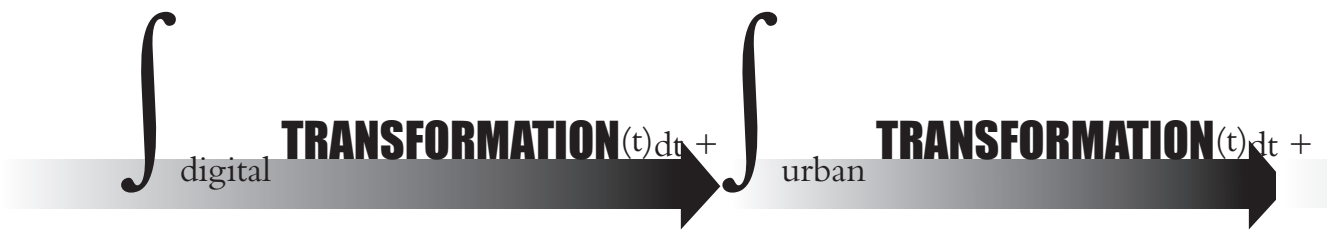
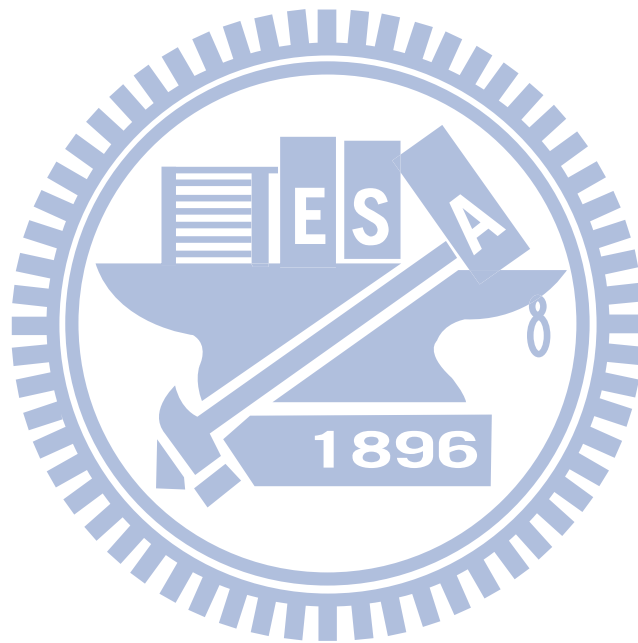
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**REFERENCE**

# PREFACE



“一位建築師當然不僅止於做出好的設計、妥善地處理空間、量體與形式上的關係。同時，擁有作為科學家的優秀氣質、具備社會關懷之動機的意志也是不可免的。雖然我常思考建築究竟是一種甚麼樣的存在，不過那就像是浮在海面上，如同冰山般的東西。眼睛可以看見，露出在海面上的部份或許真的很小，但是隱沒在海面下所看不到的部分，其實反而更加龐大。這個隱藏起來的部分和建築這個領域有著不可分割之關係，比方說社會學、人類學、歷史學、地理學、氣象學、科學等等，因著有這些相關知識與技術上的支持，建築才得以成立的啊。”

-RENZO PIANO, *World Architects in their Twenties*, 1999

#### 轉換(TRANSFORMATION)

在RENZO PIANO所述說的這個隱藏起來的部分和建築這個領域有著不可分割之關係，中的“關係”，亦是讓建築豐富有趣地存在的方法，而我試著用轉換(Transformation)來實踐這想法。不同的轉換，例如數位、都市、藝術、歷史轉換，都讓建築呈現不同但其異質的思想和樣貌。但這些部分和片段得經過時間的累積，像對時間積分般的累加，建築才漸漸視其完整面貌。目前在學校的學習階段只能約略整理出四種轉換，期待自己能在以後的專業工作中繼續填補其他片段。

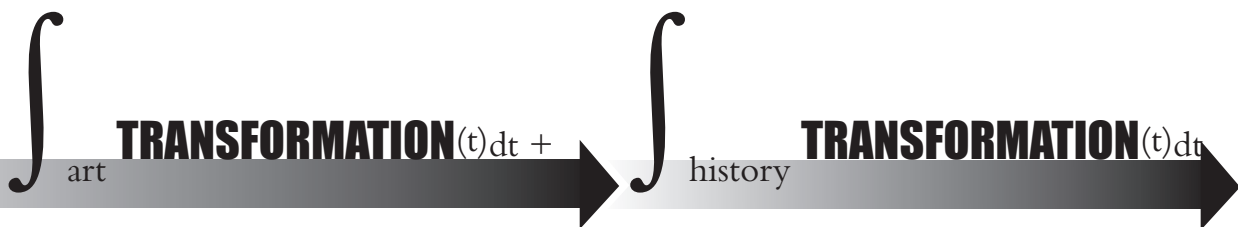
“...And this is essential to being an architect. It is not enough to just be good at designing, thinking space, volume and form, or being very good at science, a man of science, but also it's also very important to be socially comfortable, socially motivated.

And those years between 62-64, between those years for me was the time when I built up a lifetime of personal experiences which I call intellectual curiosity and social interest. And this is essential, because you know, I keep saying, „Architecture is like an iceberg,, and the visible part is very little, but all the part below is the one that makes architecture, and the part below is society, anthropology, history, geography, climatology, science, sociology. All these are there. Without that part pushing up, architecture does not exist. So, it is pure academism.”

-RENZO PIANO, *World Architects in their Twenties*, 1999

#### TRANSFORMATION

RENZO PIANO said „...but all the part below is the one that makes architecture,... Without that part pushing up, architecture does not exist.,, However, I think that the concept of „transformation,, is the connection between them. Architect should make the below part suit to architecture and the method is „transformation“. Different transformations make the architecture different style. They must be accumulated by time then they will be more integrated, otherwise they are just only fragments. So far, in the period of the university, I just develop 4 different transformations: digital, urban, art, and history. I will continue this work in future period of my life.





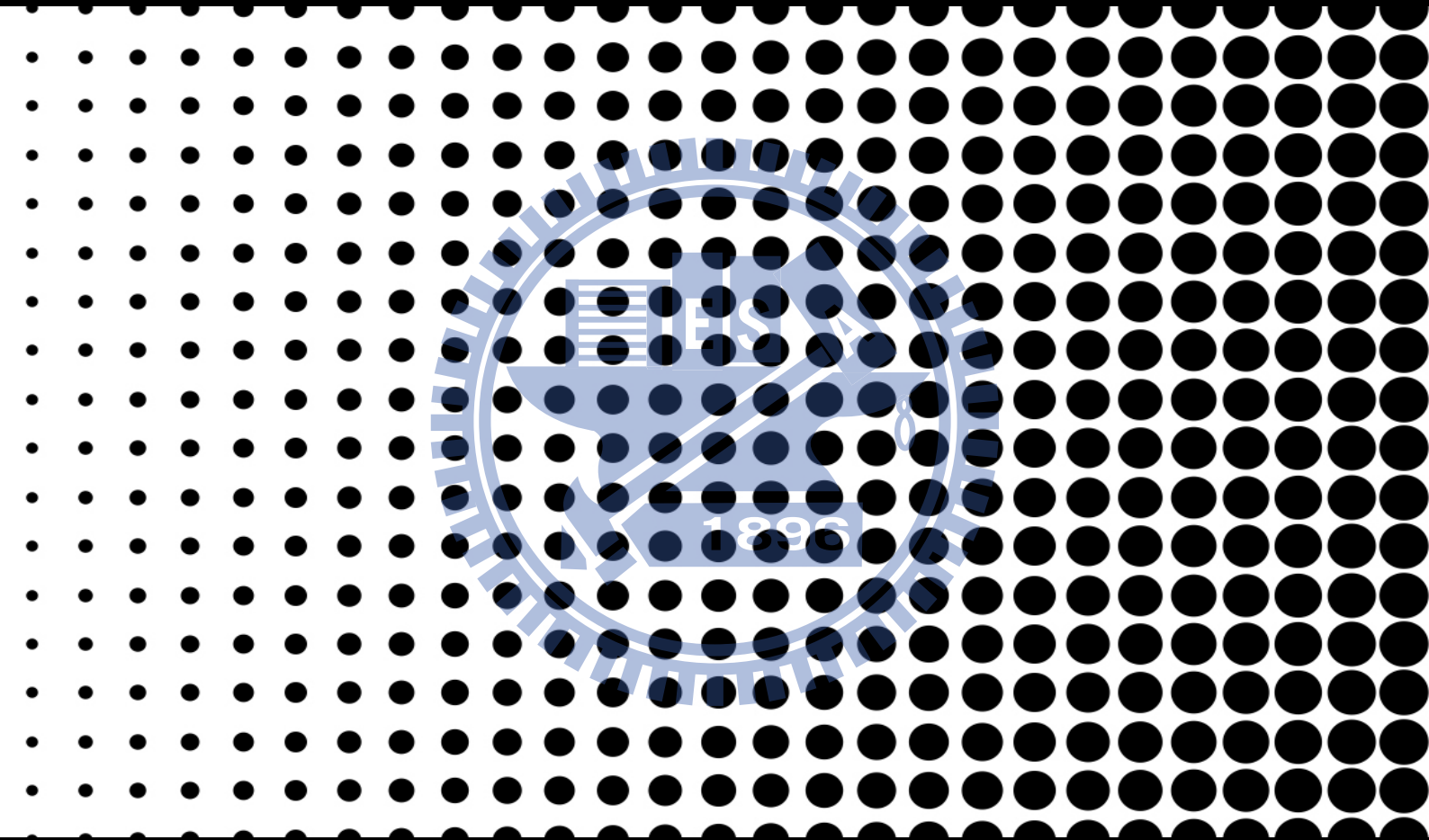


# Digital Transformation



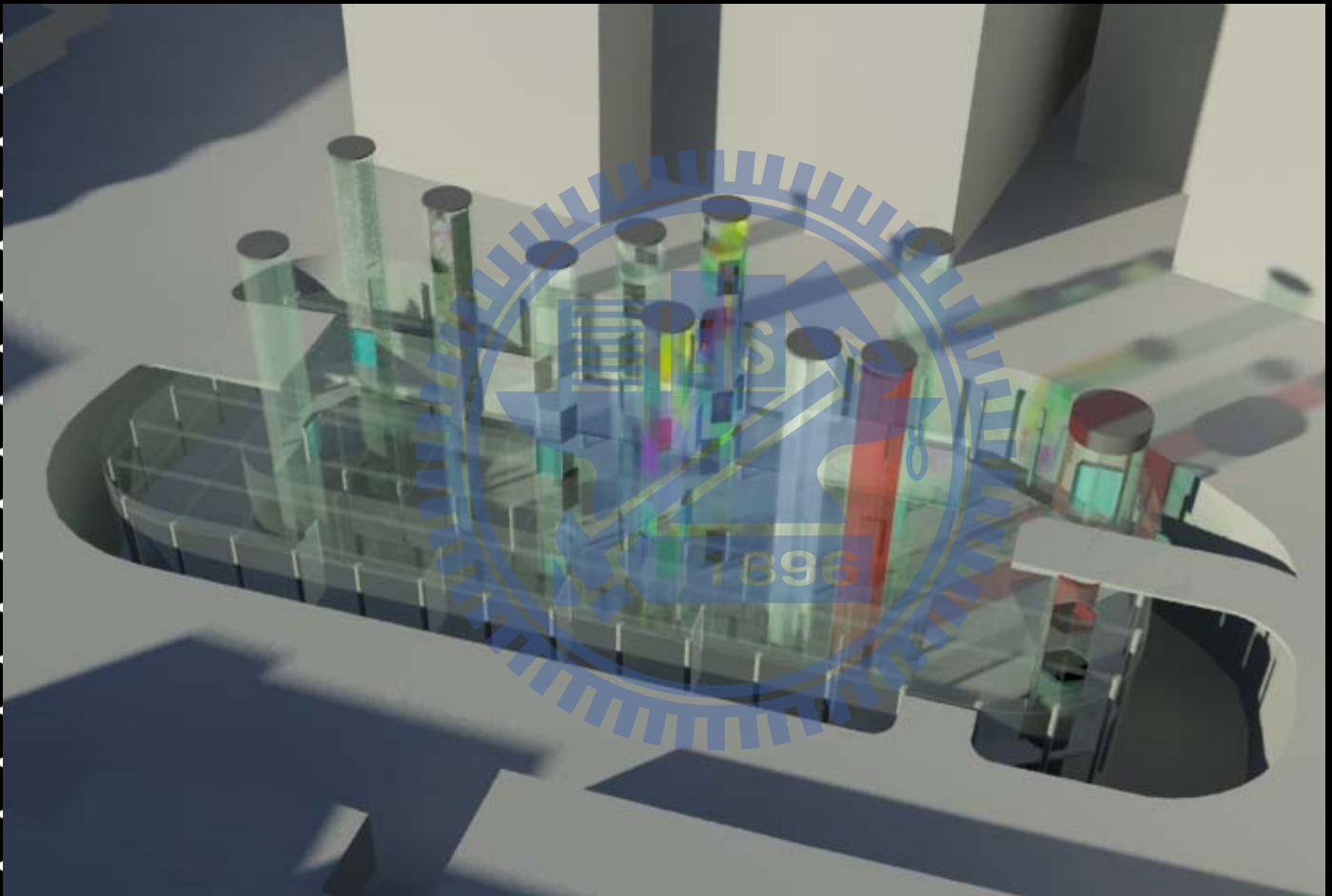
DIGITAL 01 -- 3C SUPERMARKET

DIGITAL 02 -- TERMIATE MOUND +  
SIMULATION PROGRAM





# 3C Supermarket



INCENSE CONCEPT

VIRTUAL WORLD

MIXED USE

# INCENSE CONCEPT

## THE MAIN PURPOSE

The main purpose of this project is to find a traditional culture event to enrich the 3C supermarket. My topic is the incense because this is a typical event when Taiwanese want to pray to God for help. They burn the incenses to express their respect to God and also pass their wish to him. Taiwanese think that after the burning, the God should know their wish. Therefore, the process of burning is important and this is why it is so slow.

## WHAT IS COMBUSTION

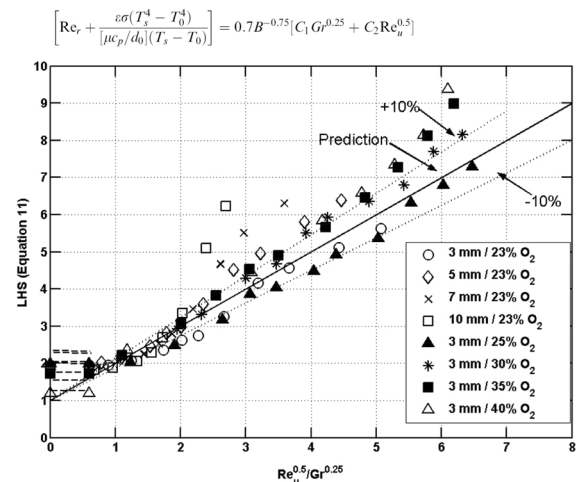
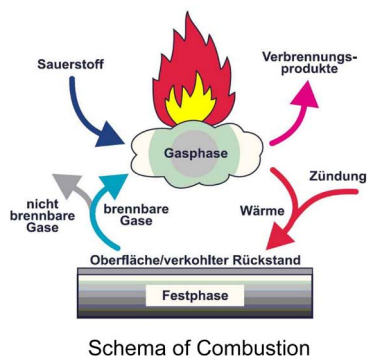
Combustion is the act or process of burning. For combustion to occur, fuel, oxygen (air), and heat must be present together.

## SMOLDERING COMBUSTION

Smoldering combustion is the least efficient phase of combustion and produces the most smoke per unit of fuel consumed. This phase lacks flame, and is associated with conditions where oxygen is limited – either by char of fuels (particularly those with large surface to volume ratios) or by tightly packed fuels like duff and organic soils or in wet fuels.

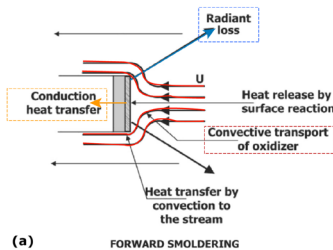
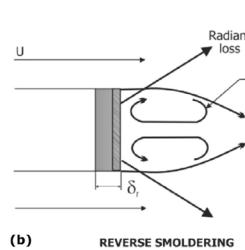
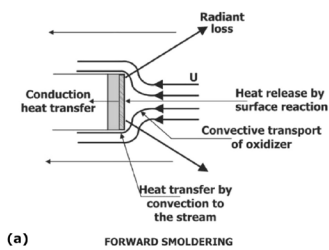
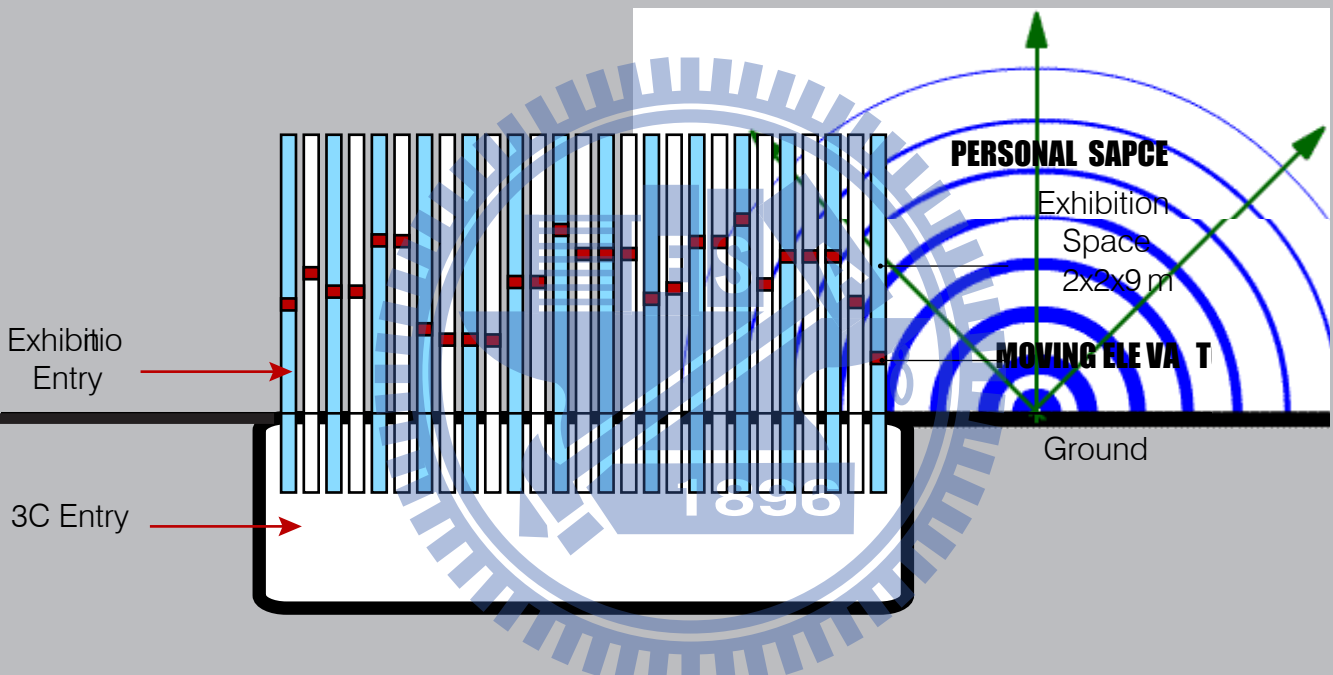
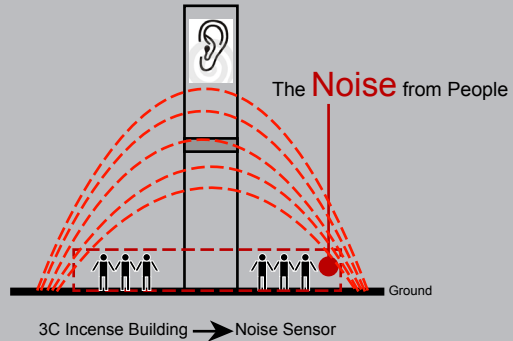
## A STUDY OF SMOLDERING COMBUSTION OF INCENSE STICK

There is a paper concerned with the experimental and modeling studies on the smoldering rate of incense sticks as a function of ambient oxygen fraction in air, the flow velocity and size. The results are explained on the basis of surface combustion due to diffusion of oxygen to the surface by both free and forced convection supporting the heat transfer into solid by conduction, into the stream by convection and radiant heat transfer from surface.[17]

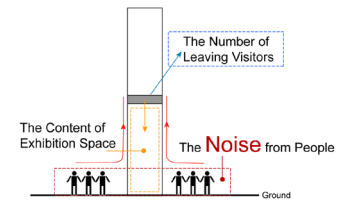


**3C INCENSE SUPERMARKET**

The most important issue for a 3C supermarekt is to attract people to come, therefore, I want to use the noise of people to be the fuel of the combustion of this 3C incense supermarket.



$$k \left[ \frac{dT}{dy} \right]_- - k \left[ \frac{dT}{dy} \right]_+ + \epsilon \sigma (T_s^4 - T_0^4) = HD \rho \left[ \frac{dY_{ox}}{dy} \right]_+$$



Smoldering Combustion of Incense Stick

Smoldering Combustion of Incense Stick

Smoldering Combustion of 3C Incense Building

# VIRTUAL WORLD

## THE CONTENT OF 3D SUPERMARKET

There are many different kinds of products sold in 3D supermarket. In order to rich the experience of shopping, we catalog the products of 3D supermarket by the sense of human and they are TOUCH, IMAGE, TEMPERATURE, SMELL, SOUND, VIDEO.

## THE MATERIALS

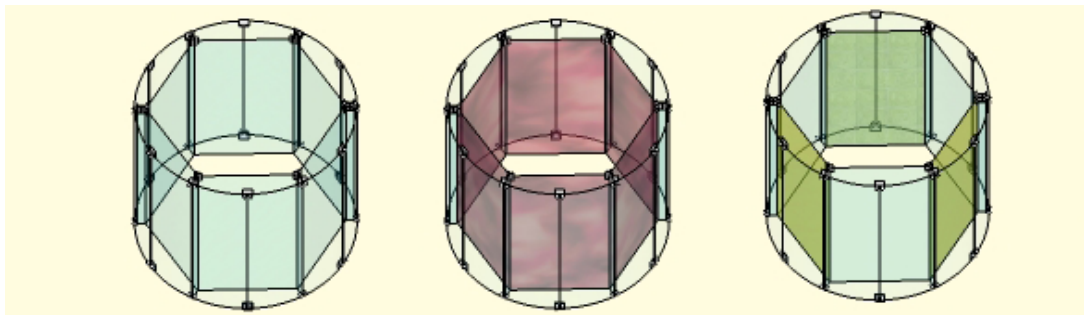
By using the different kind of glass materials, we can realize the concept of human sense. The right side of diagrams are the list of glass materials.



SOUND

TEMPERATURE

SMELL





TOUCH

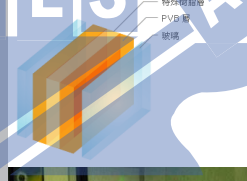
IMAGE

TEMPERATURE

SMELL

SOUND

VIDEO



兩色性玻璃 Dichronic Glass

LED玻璃

反射玻璃  
因隔熱性高，可節省能源。  
具鏡子效果，可視光線的反射效果。

網印玻璃 Cermatic Silk-screen Glass  
色澤多樣化，圖案多選擇。

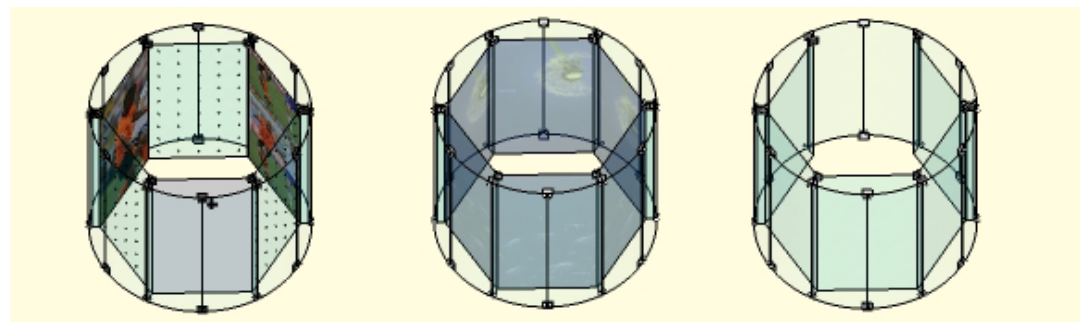
隔音膠合玻璃  
高性能隔音膜：是由三層構造合成，中間層使用具良好隔音效果之特殊樹脂層，兩側外表層則是使用高評價的PVB樹脂。

Polyscreen Glass

IMAGE

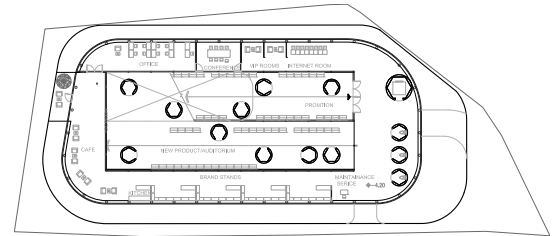
VIDEO

TOUCH

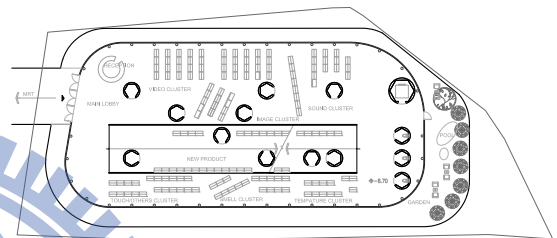


# MIXED USE

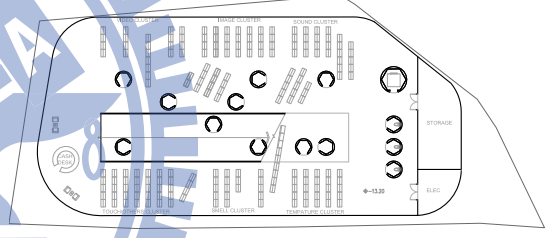
We mixed use the sense space and shop space.



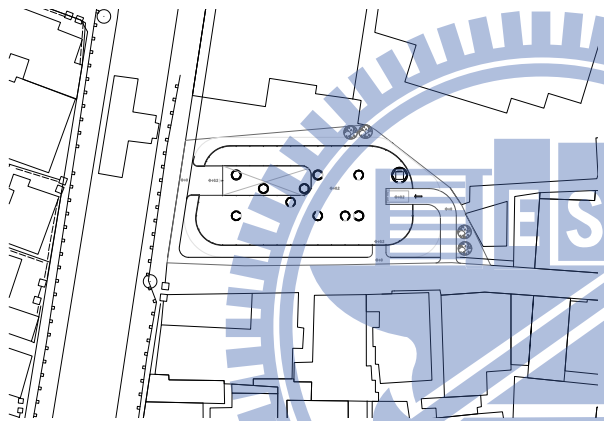
B1 PLAN



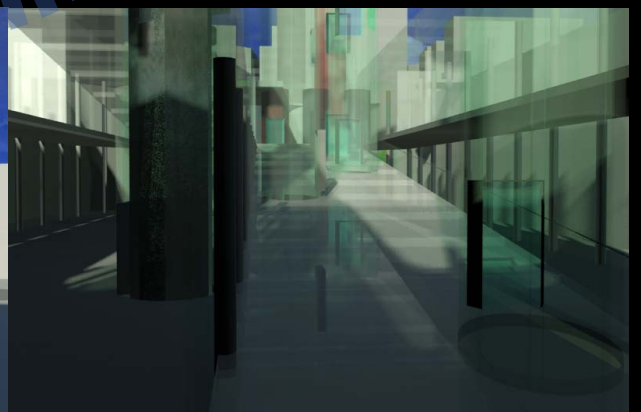
B2 PLAN



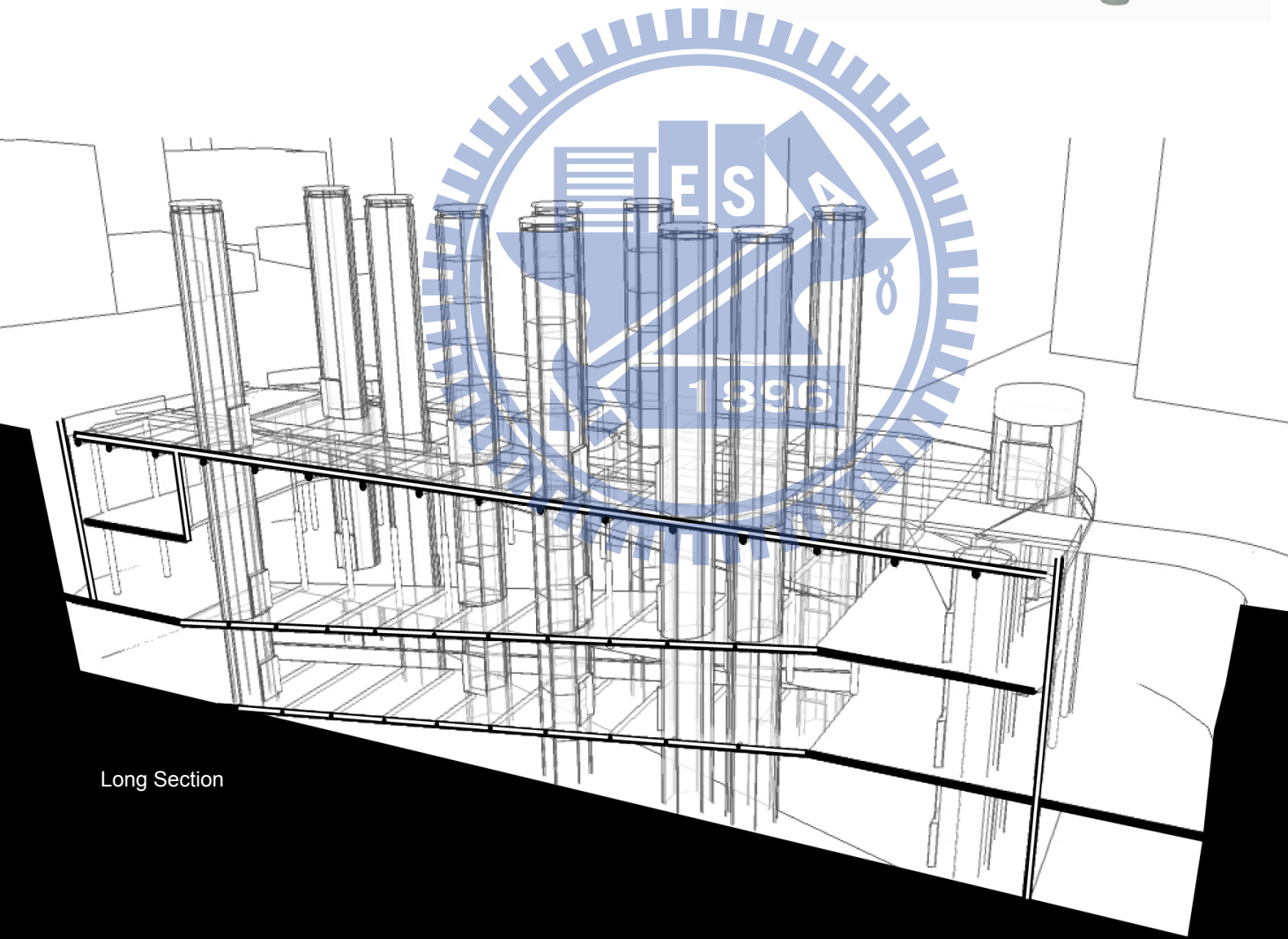
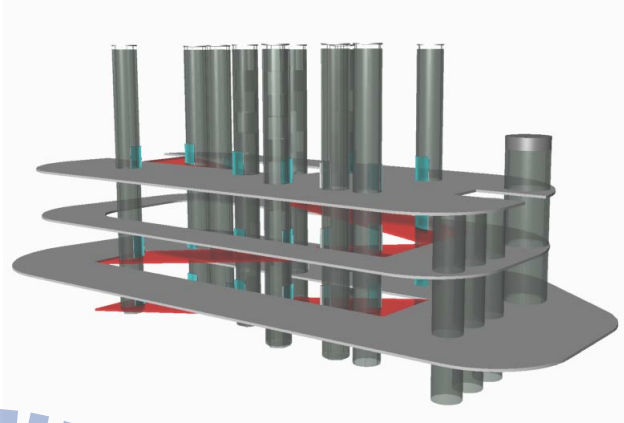
B3 PLAN



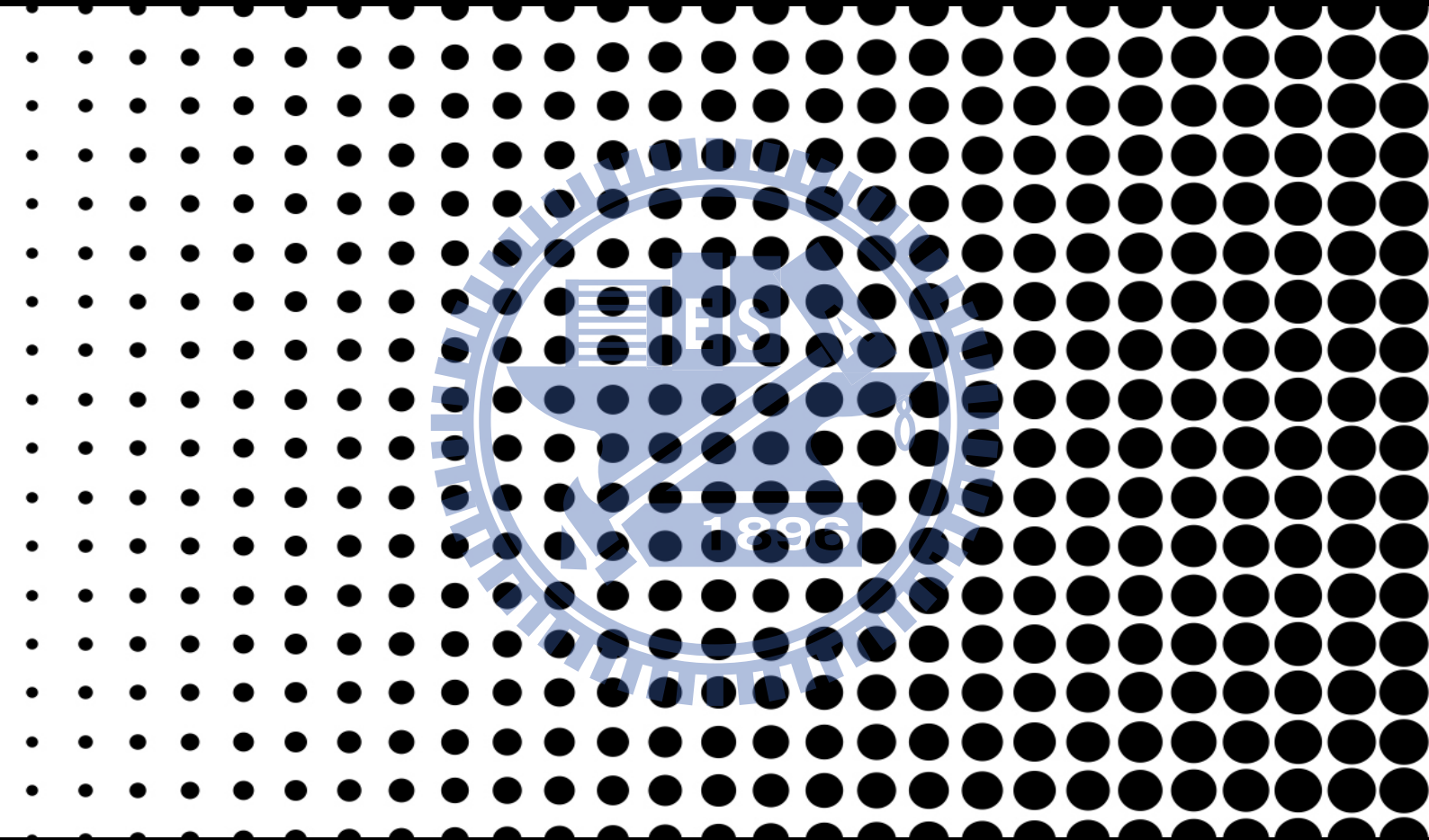
SITE PLAN



THE DIAGRAM OF SNESE SPACE AND SHOP SPACE

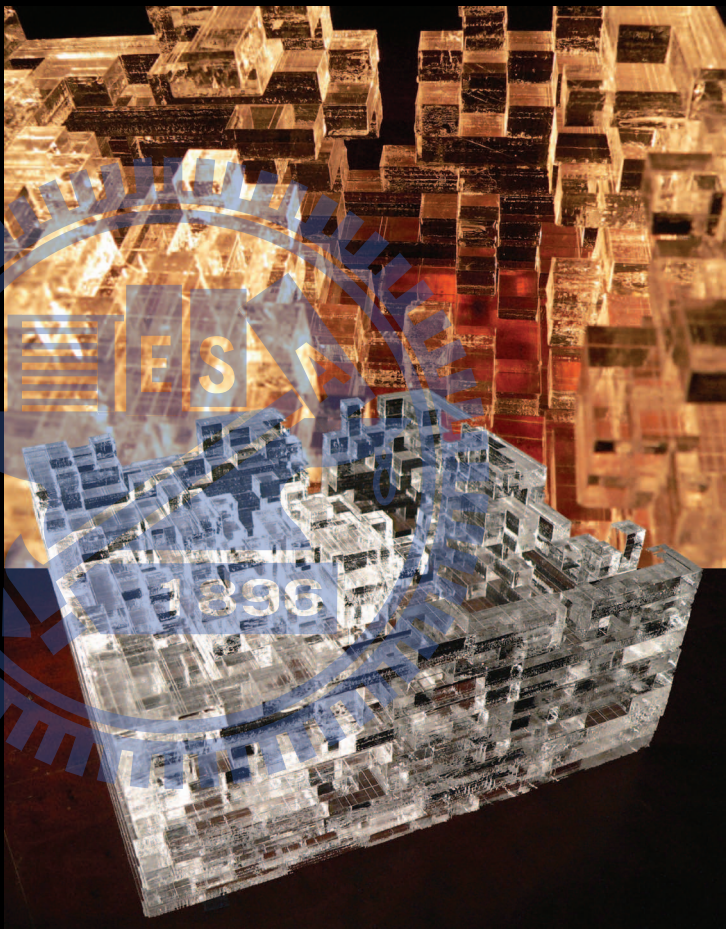
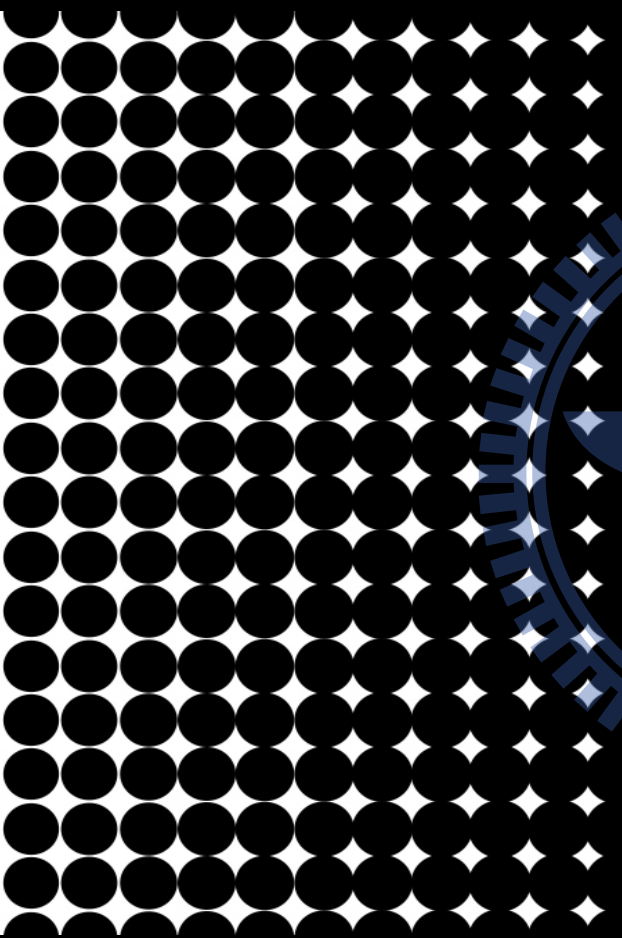


Long Section





 Termite Mound +  
Simulation Program



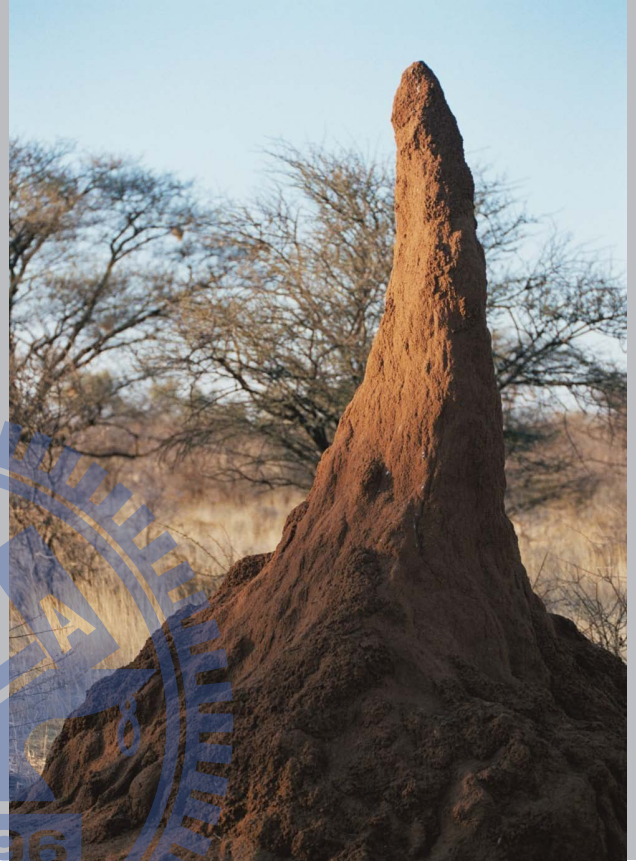
TERMITE MOUND

SIMULATION PROGRAM

# TERMITE MOUND

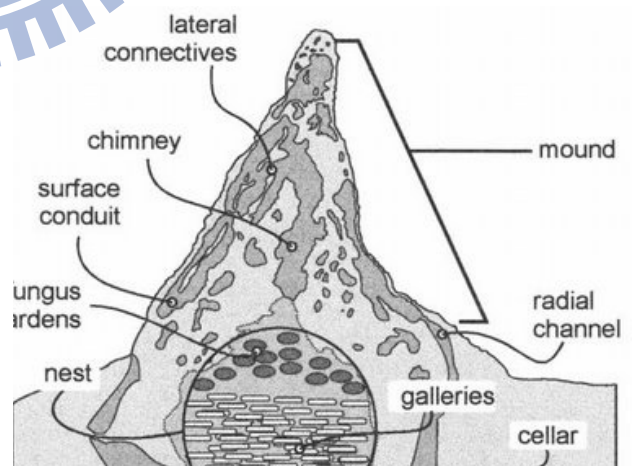
## TERMITE MOUND

About the freeform architecture, I want to do a rational design, to meet the requirement of the comfortable living space. Owing to the characteristic of the freeform structure, the smooth curve, it should can provide better ventilation than the traditional column and row system. I cant provide a exact evident, but in the organism extent, there is existed a system, *Macrotermes bellicosus*, the temperature of its mound can keep at exactly 87 degree F, while the temperatures outside range from 35 degree F to 104 degrees F. Therefore, we should can make use of the structure of the termite mound to meet what I want the rational design for freeform architecture.



## THE STRUCTURE OF TERMITE MOUND

- 1>The central chimney, which forms a large, vertically-oriented void above the nest.
- 2>The surface conduits, narrow channels approximately 20-30 mm below the mound's external surface.
- 3>The lateral connectives, a highly reticulated network of tunnels which connect the chimney and the surface conduits.



### HOW TERMITES BUILD THE MOUND

A more comprehensive understanding of how the termites accomplish their monumental structures requires the modeling the generative process that underline their collective construction.

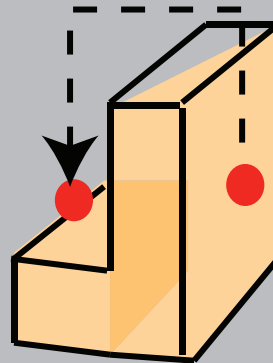
This collective behaviour is a decentralized self-organising systems to allow the investigation of termites by biologists and computer scientists.

### SIMULATED CONSTRUCTION RULES

1>Filling the world and moving around: rules and constraints step 1~3 and constraint.

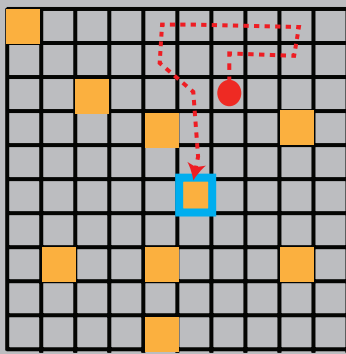
2>Using pheromones' diffusion

Constraint:  
Move on the surface

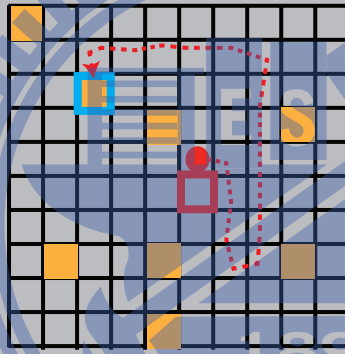


Rules:

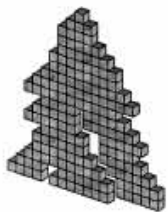
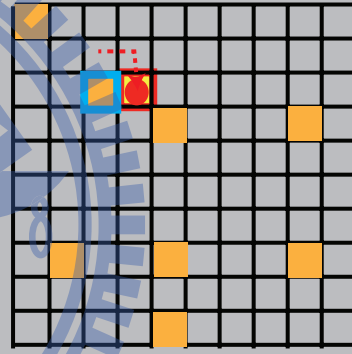
Step 1. Search-for-chip



Step 2. Find-New-Pile



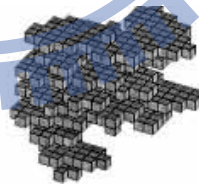
Step 3. Find-Empty-S



(a)



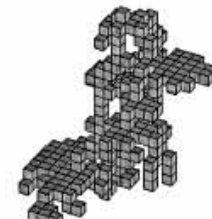
(b)



(c)



(d)





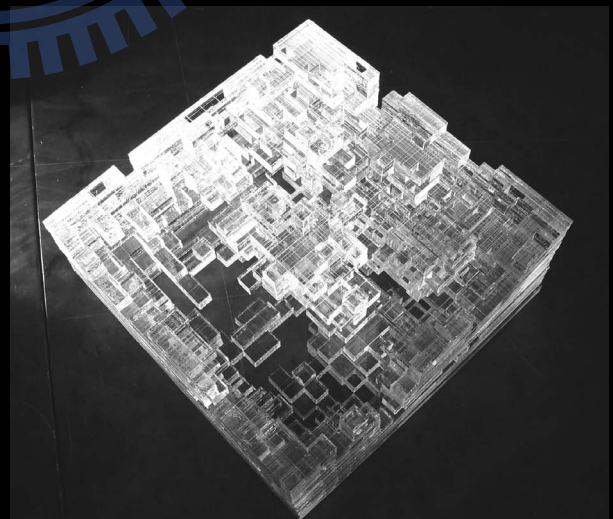
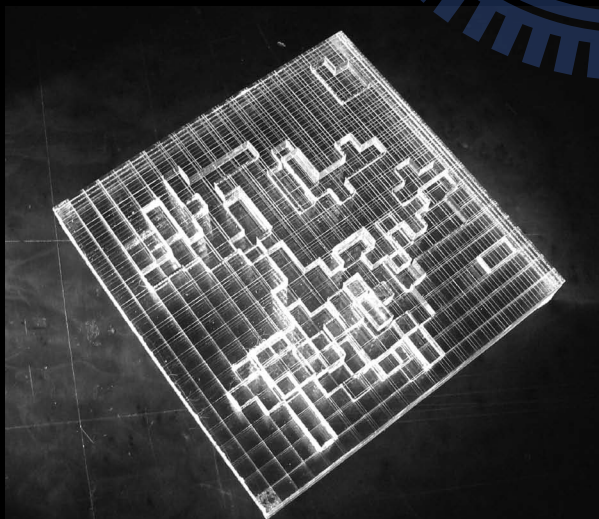
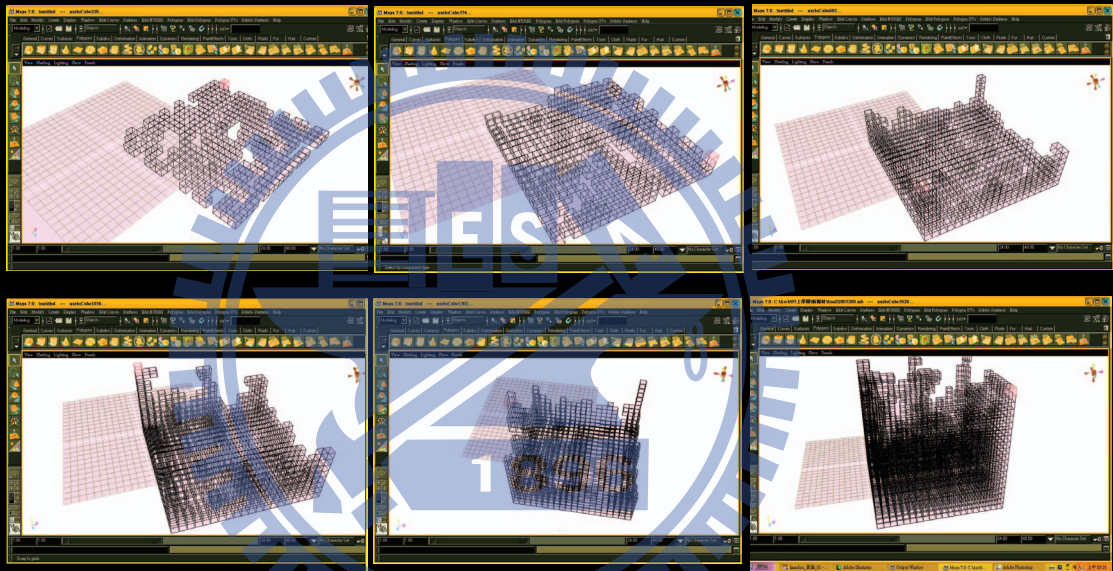
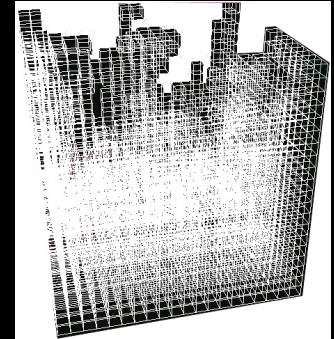
# SIMULATION PROGRAM

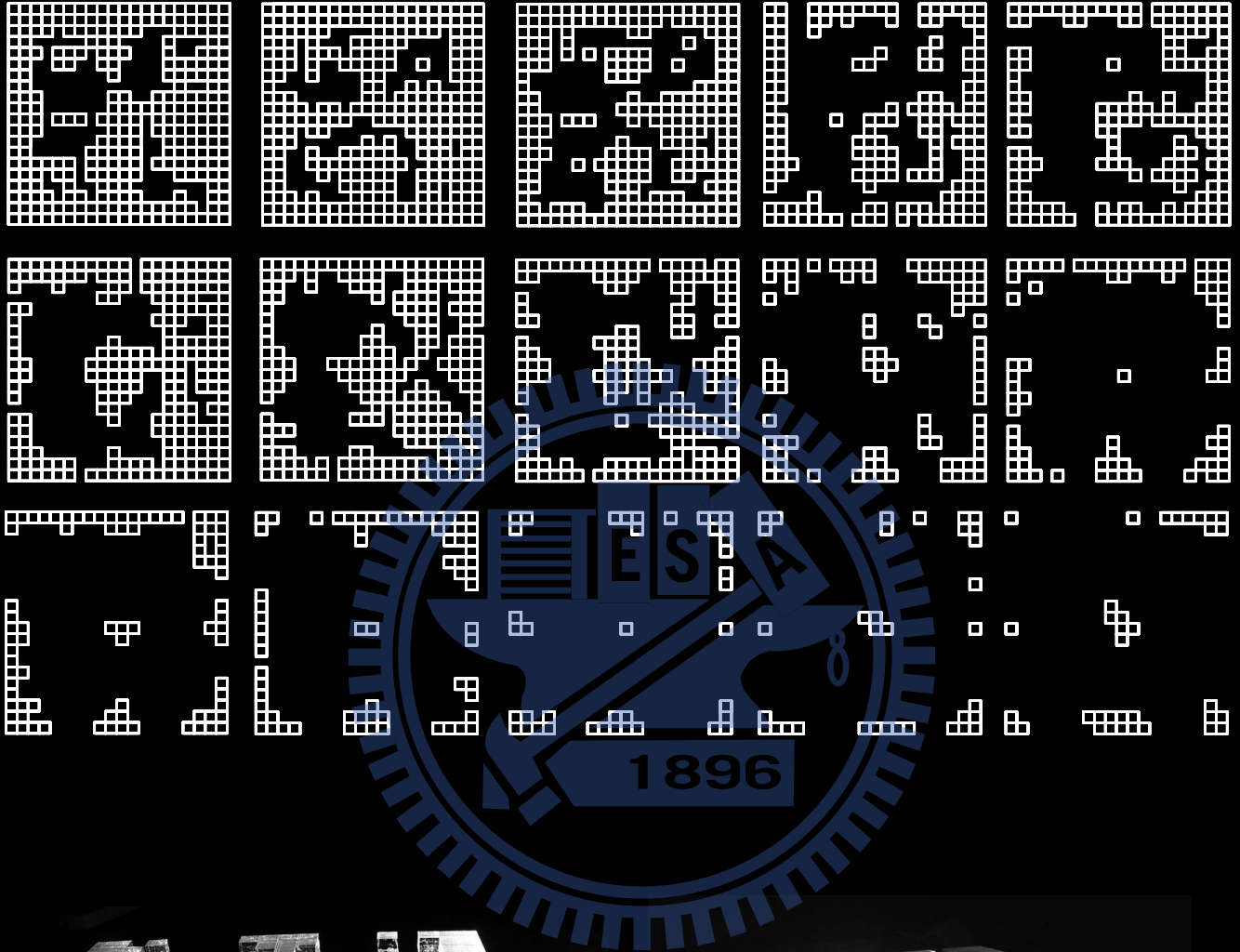
```
termite -mode 0 -sitewidth 20 -sitelength 20 -siteheight  
20 -termitenumber 5 -termitecarryfoodnumber 100  
-ratiooffood 5 -timeout 200
```

We use 8 parameters to set this simulation program. By setting sitewidth, sitelength, and siteheight, we can set the activity space volume.

By setting termitenumber, we can set the number of termites in the nest.

By setting timeout, we can see how the termites construct the nest.









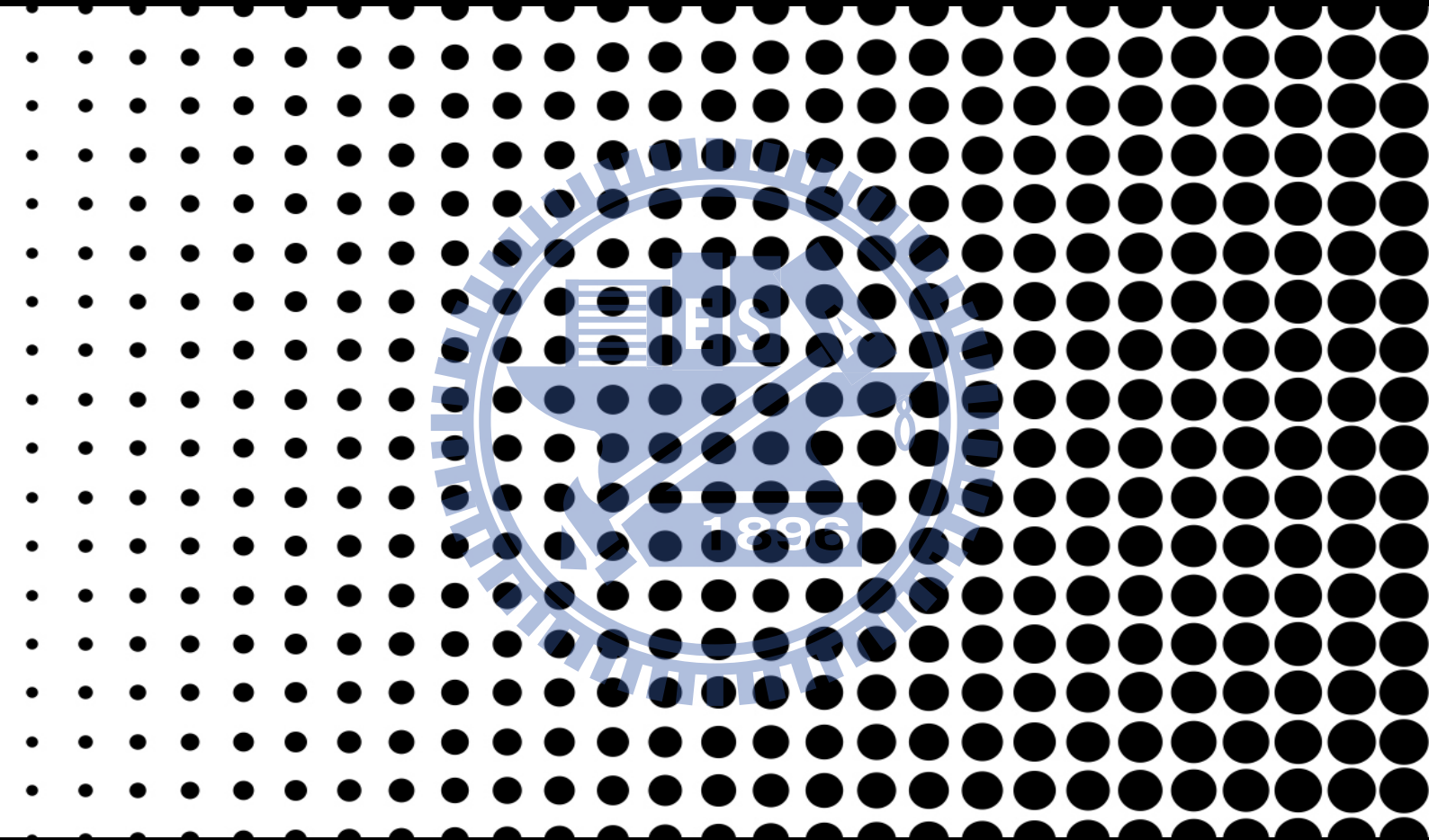
# Urban Transformation



URBAN 01 -- THE OASIS CITY

URBAN 02 -- BETWEEN URBAN AND  
RURAL LIFE







# The Oasis City



INTRODUCTION

HISTORY & WATER SYSTEM

THE PORTRAIT OF THE RIVER BARADA

FUTURE PROJECTS FOR WATER SUPPLY

# INTRODUCTION

Damascus (Arabic: دِمَشق, Dimashq, commonly known as دمشق ash-Shām also known as the „City of Jasmin“ Arabic: مدينة دمشق) is the capital and largest city of Syria as well as one of the country's 14 governorates.

## EARLY SETTLEMENT

Carbon-14 dating at Tell Ramad on the outskirts of Damascus suggests that the site may have been occupied since the second half of the seventh millennium BC, possibly around 6300 BC.[7] However, evidence of settlement in the wider Barada basin dating back to 9000 BC exists, although no large-scale settlement was present within Damascus walls until the second millennium BC. The city is considered to be the oldest continuously inhabited city in the world.

## BARADA RIVER

Damascus used to be surrounded by an oasis, the Ghouta region (الطوغا al-ṭūṭā), watered by the Barada river. The Fijeh spring, west along the Barada valley, used to provide the city with drinking water. The Ghouta oasis has been decreasing in size with the rapid expansion of housing and industry in the city and it is almost dry. It has also become polluted due to the city's traffic, industry, and sewage.

## AGRICULTURE

Agriculture was always a main pillar in the independent development of Damascus and as long as the ratio between the population and the production in the agricultural sector compared to the amount of water was reasonable it was one of the main reasons for the survival of Damascus in all history. But nowadays the international trade is covering all areas and the Ghouta can't produce anyway enough food for the whole city. Also is the climate in Damascus too dry and hot for a sustainable agriculture. More rainy places you'll find along the coastline and more south and in the Beeka Valley up in the mountains.

## RESEARCH

In this research, we try to find the history of water in Damascus, including Barada river, water system and agriculture. After understanding the history, we also visit this Damascus city to record the water phenomenon in this city. Then we also try to find any possible future of water.

## THESIS

Following this research, we pointed out some thesis:

1. River Barada lost its function as a lifeline.
2. The premodern water system doesn't work with the modern water system anymore.
3. Is Damascus still an Oasis, now, or in the future?



© The Hebrew University of Jerusalem & The Jewish National





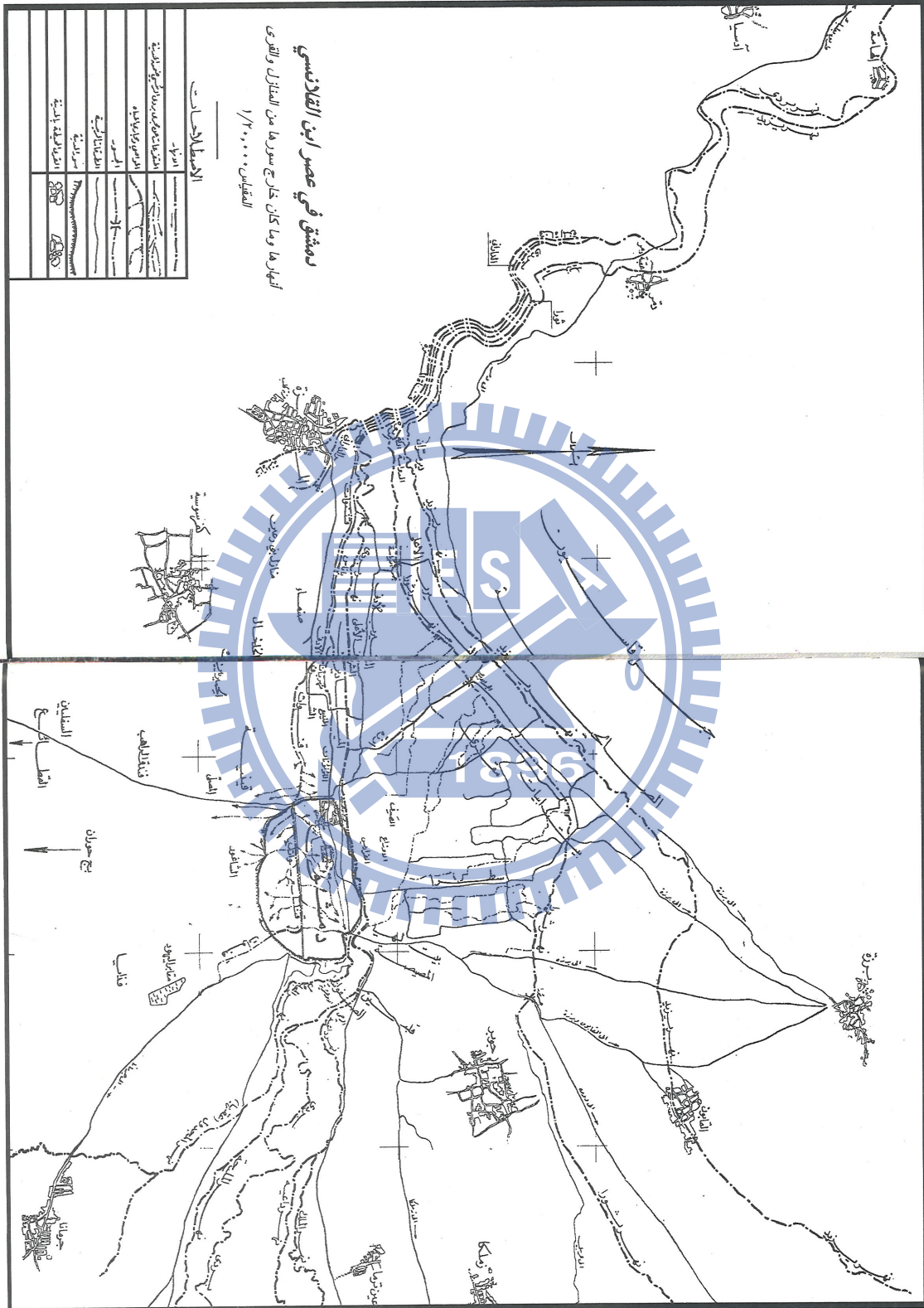
# HISTORY & WATER SYSTEM

## ANCIENT RIVER

Damascus is not documented as an important city until the coming of the Aramaeans, Semitic nomads who arrived from Mesopotamia. It is known that it was the Aramaeans who first established the water distribution system of Damascus by constructing canals and tunnels which maximized the efficiency of the Barada river. The same network was later improved by the Romans and the Umayyads, and still forms the basis of the water system of the old part of Damascus today. It was mentioned



19th century engraving of hajj pilgrims camping by the Takiyya al-Sulaimaniyya  
Courtesy of the Institut Francais d'Etudes Arabes de Damas



خريطة دمشق في عصر القلانسي القرن  
الثاني عشر الميلادي كما نشرت في تاريخ  
دمشق لابن القلانسي التي حققها الدكتور  
سليمان حسن

### SPRING ARCHITECTURE - FIGEH

Today , the ancient ruins at figeh spring proves that since at least three thousands of years, Syrians have known the importance of figeh to their lives and managed to draw figeh spring water to Damascus city . Thus, some ruins of the roman tunnel are still visible today in the versant of barada valley at basema's village.

In addition, the ruins of the roman temple show that Syrians at the time have built it on the top of the spring in order to keep its water out of pollution.

Figeh spring is considered one of Damascus glory, wealth and it is not an exaggeration to say that it is one of the important reasons of its existence and abidance till now as the oldest continuously inhabited city in the world.







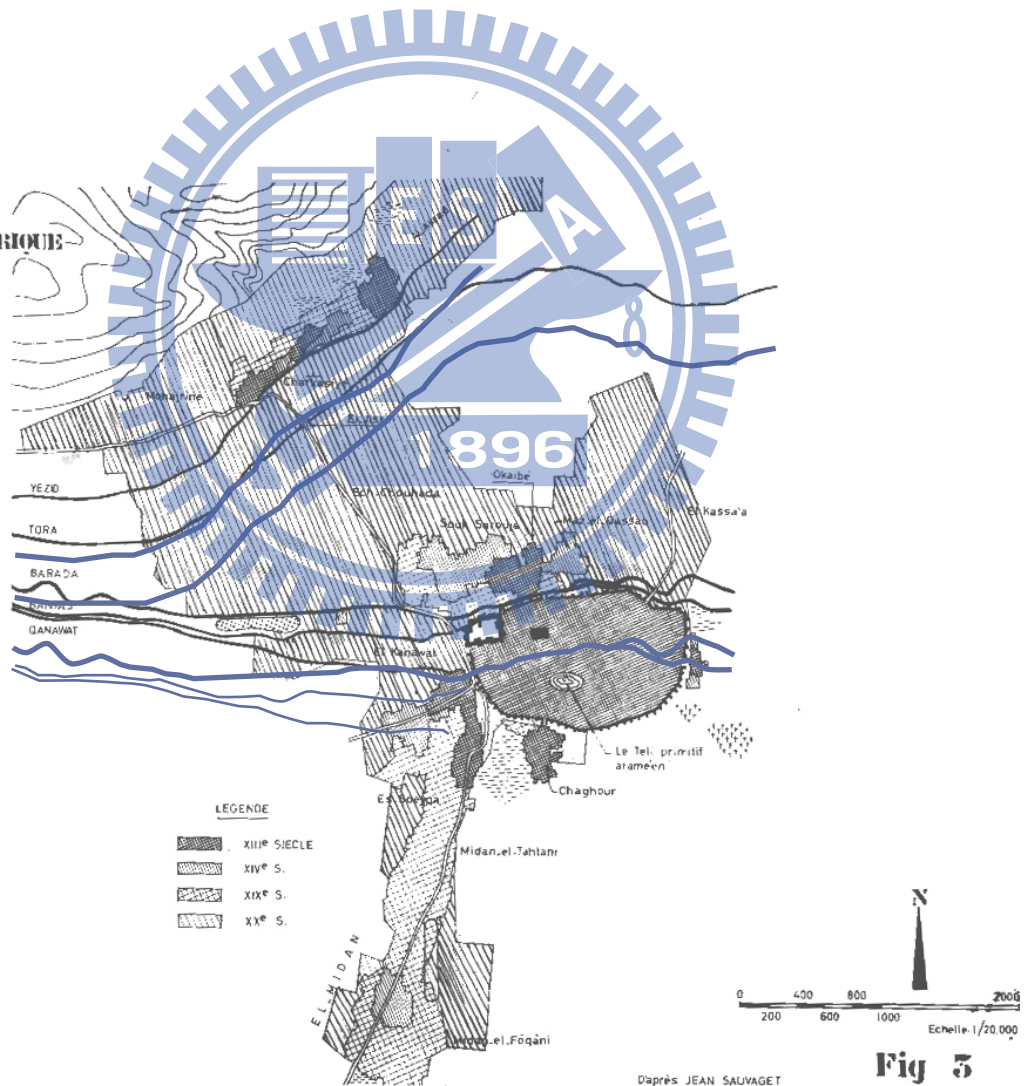
**DEVELOPMENT NOW AND THEN**

When Ecochard planned it Ecochard was obsessed with the idea of an oasis, he wanted to keep the city green and protected big areas. Also the president kept areas under protection until today. These huge green zones are still embedded in the city structure and now already surrounded by city.

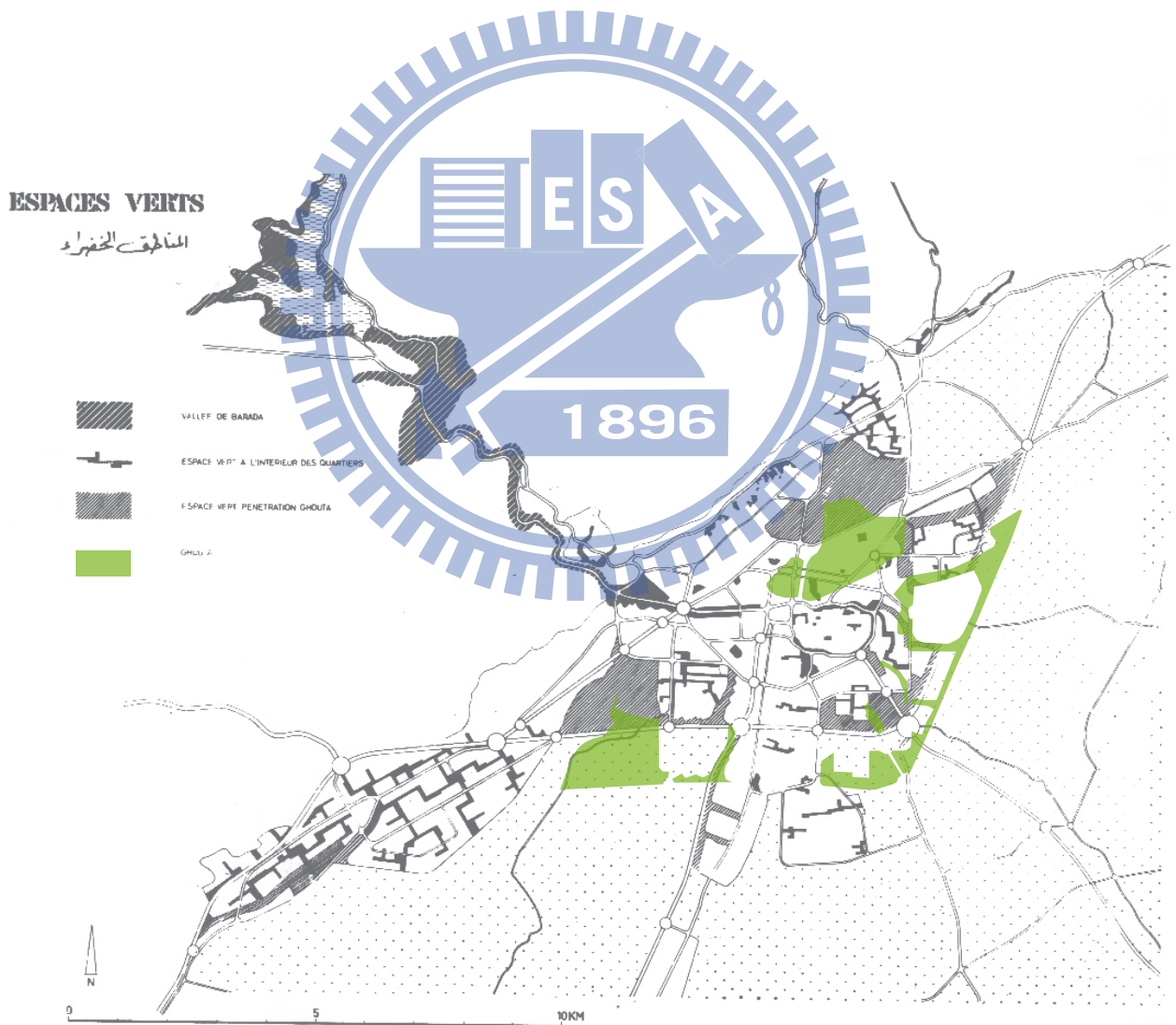
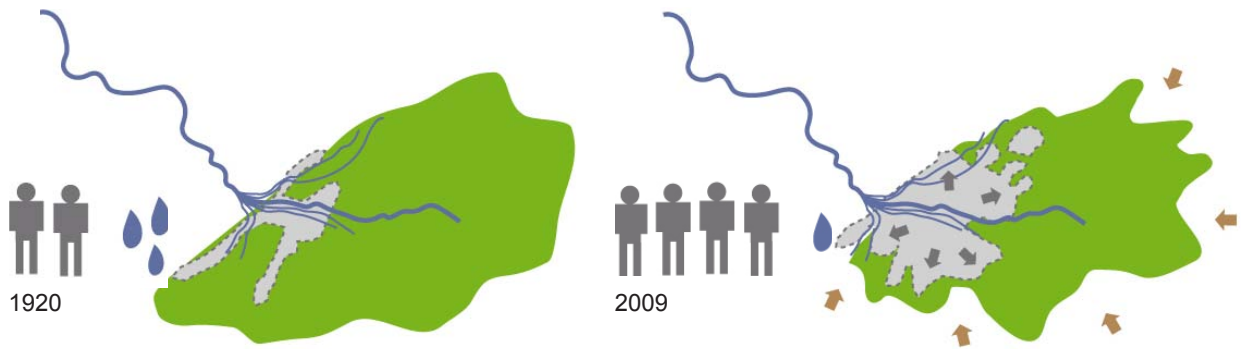


**DAMAS  
EVOLUTION HISTORIQUE**

دمشق  
التطورات التاريخية المتساقطة







Fig

## PIPESYSTEM

Fiegh development network was 1953 expanded of al-woroud's tank from 1500 m<sup>3</sup> up to 10,000 m<sup>3</sup>

1960 the fiegh water-pipe network installations in Damascus has been finished , with a length of 600 km, and another 14 tanks were erected with a capacity of 36,000 m<sup>3</sup> , and the storage capacity of all tanks at that time amounted to 50,000 m<sup>3</sup> 1968 the duplication of tunnel has been installed to store the surplus of water quantities which were amounted to 450,000 m<sup>3</sup> / day to the city , as well as the installations of 11 new tanks with total capacity of 125,000 m<sup>3</sup> cover the new areas in the city with a new network with a length of 850 km.

In newer settlement areas the state is installing the basic infrastructure as water, electricity and sewage.

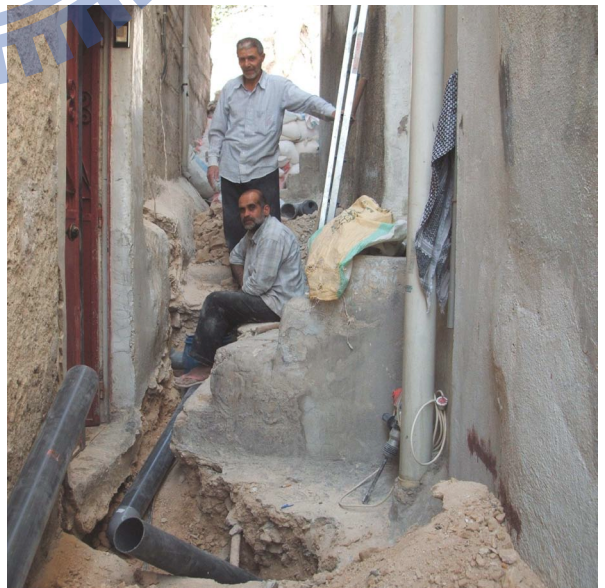
Informal areas as Al-Salihiyya get a basic infrastructure at certain edges or through the main street of the neighbourhood but the private connection to the house needs to be done by the inhabitants.

All the area of Damascus is connected to Water- and Sewage water systems. But because no one is strictly controlling the installations, there is still an abuse and untreated water can access agricultural fields and groundwater aquifers.

## PIPED WATER AND GRAVITY WATER

Piped water and gravity water systems are not compatible and so both systems existed side by side until the roman pipe system was not used anymore.

To run lines you don't have to take care of the geography and incline. Highrise buildings evolve and the city grows into the desert.



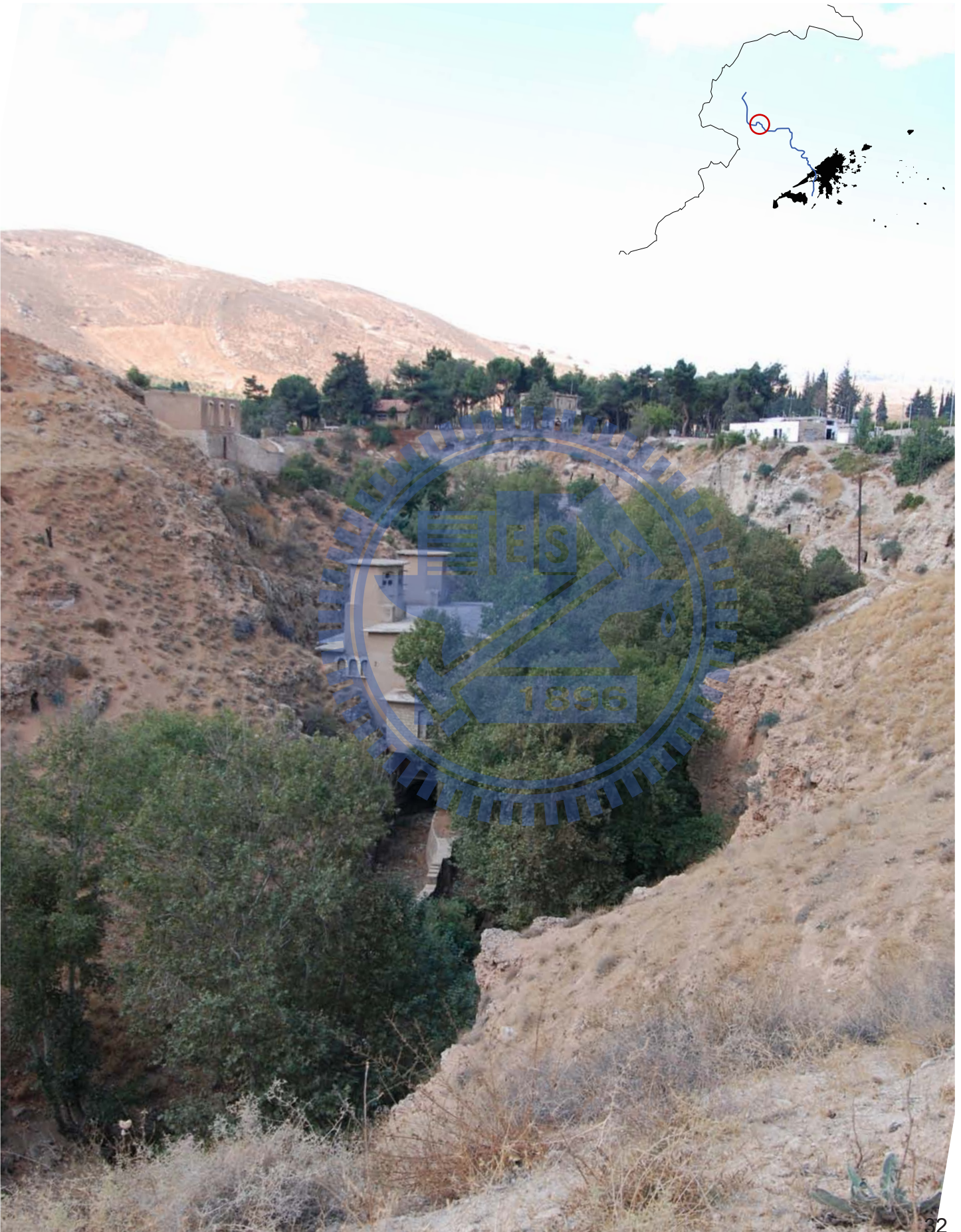




# PORTRAIT OF THE RIVER BARADA

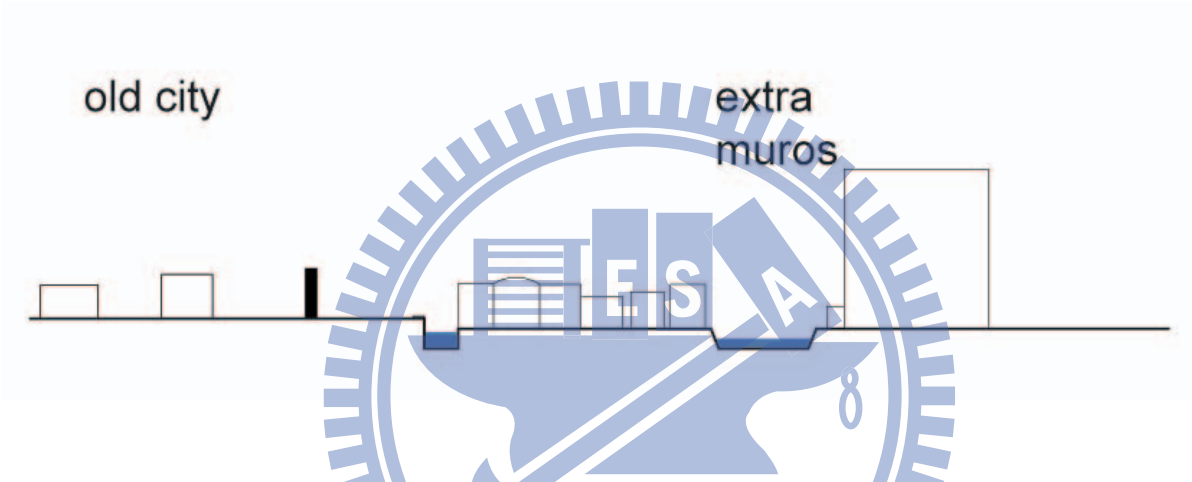








INTERACTION RIVER - CITY







# FUTURE PROJECTS FOR WATER SUPPLY

## The Water Crisis in the Middle East

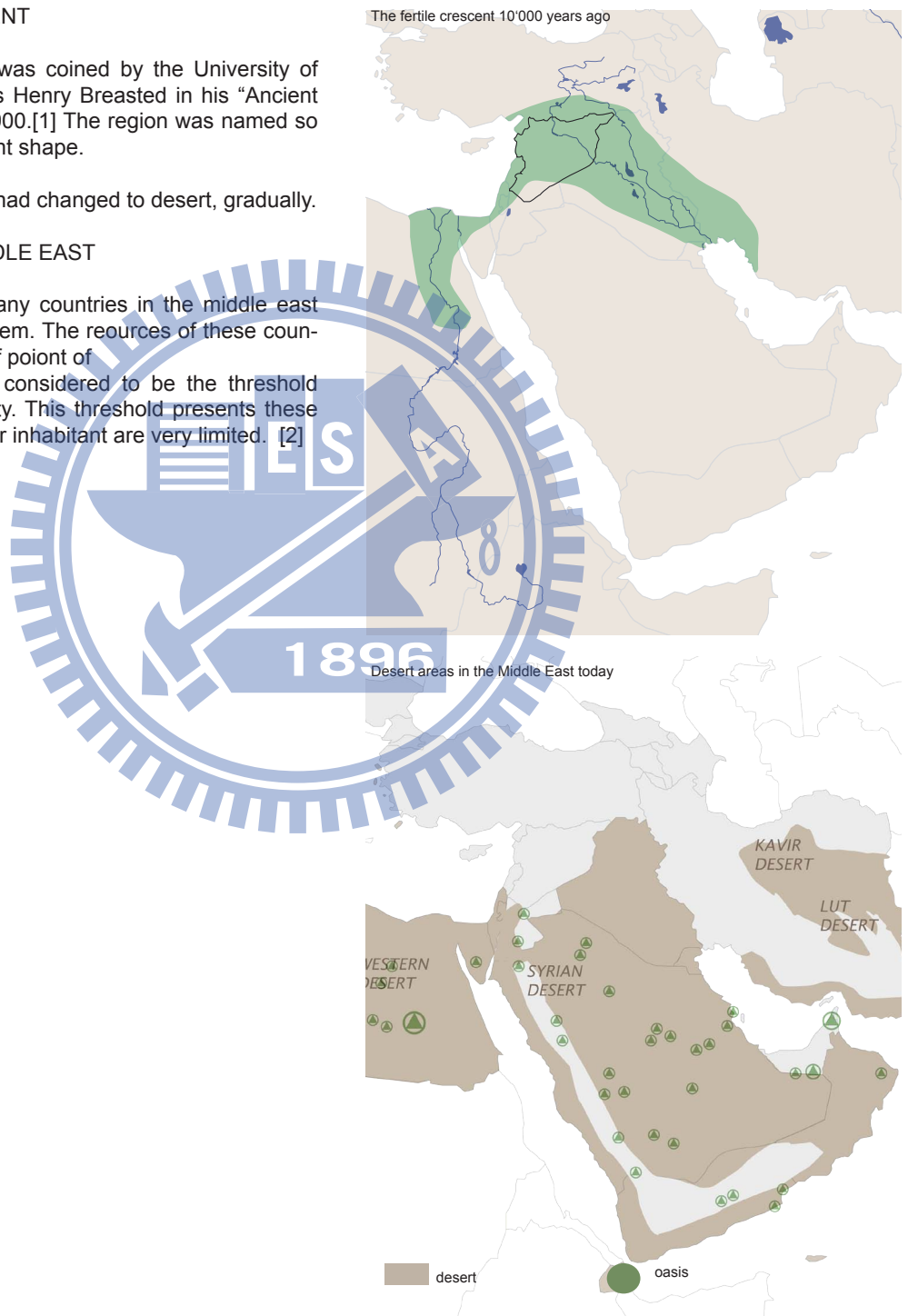
### ANCIENT FERTILE CRESCENT

The term "Fertile Crescent" was coined by the University of Chicago archaeologist James Henry Breasted in his "Ancient Records of Egypt", around 1900.[1] The region was named so due to its rich soil and crescent shape.

Now, this "Fertile Crescecent" had changed to desert, gradually.

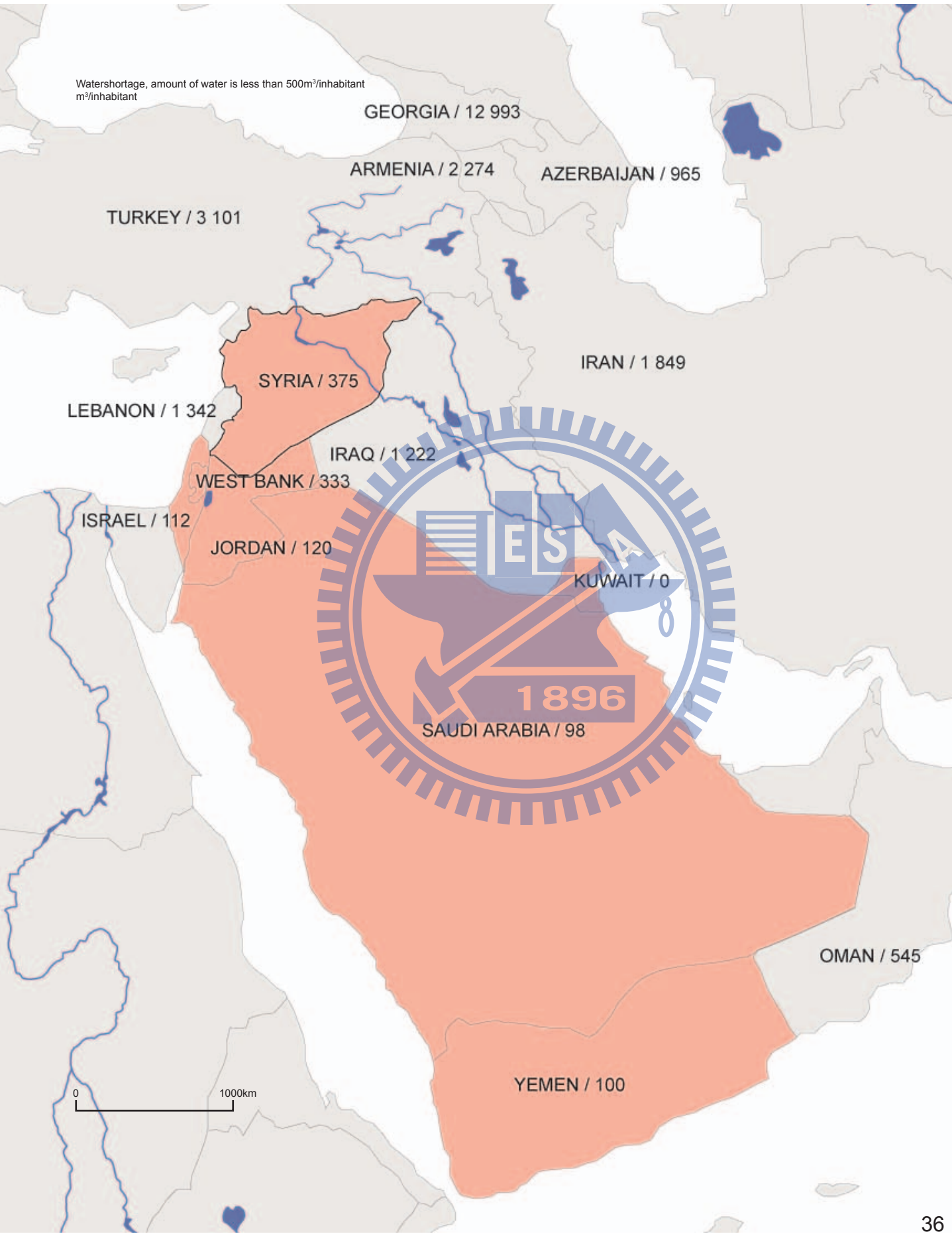
### WATER SHORTAGE IN MIDDLE EAST

Owing to climate change, many countries in the middle east face the water shortage problem. The resources of these countries are lower than the cut-off point of 500 m<sup>3</sup>/inhabitant per year, considered to be the threshold for the absolute water scarcity. This threshold presents these countries where resources per inhabitant are very limited. [2]





Watershortage, amount of water is less than 500m<sup>3</sup>/inhabitant  
m<sup>3</sup>/inhabitant



0 1000km

## WATER CRISIS IN DAMASCUS

### NEGATIVE WATER BALANCE

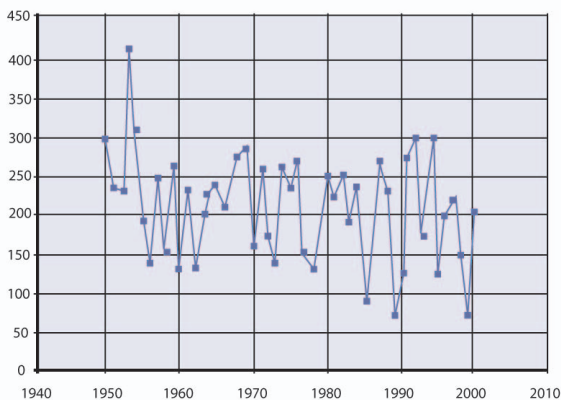
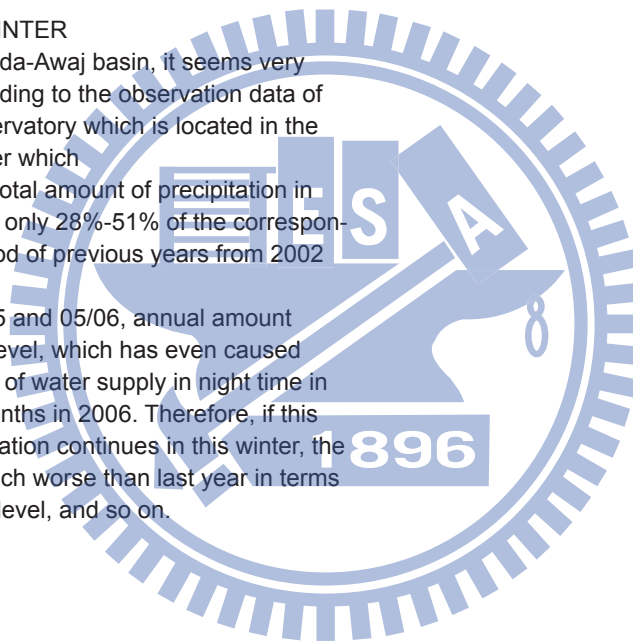
Syria's Ministry of Irrigation (MOI) issued a report in 2001 entitled "Work Strategy at the Irrigation Ministry." It shows that in 2000 water balance in the Barada/Awaj Basin was a negative 762 million m<sup>3</sup>, after two years of severe drought conditions.<sup>1</sup> The World Bank Report on the irrigation sector in Syria of August 6, 2001, quoting the 1997 JICA study, showed that the water balance was estimated in 1997 at a negative 450 million m<sup>3</sup>. The balance was also a negative 311 million m<sup>3</sup> for 2000, according to a study on irrigation policy in Syria conducted by Consuelo Varela-Ortega and Juan Sagardoy, based on an FAO project, quoting data from Syria's Ministry of Agriculture and Agrarian Reform in 2001.

### RAINFALL IN BASIN THIS WINTER

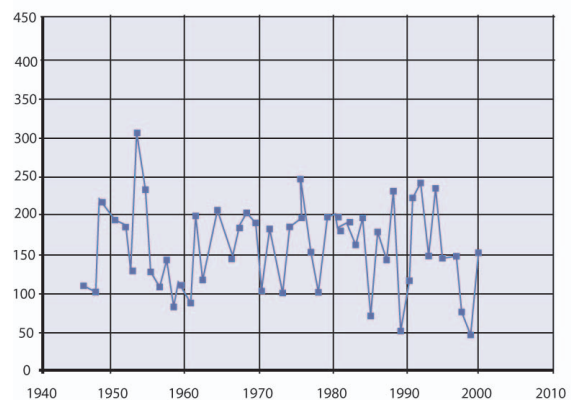
This winter, especially in Barada-Awaj basin, it seems very dry so far. For instance, according to the observation data of precipitation in Zabadani observatory which is located in the upstream area of Barada River which runs through Damascus city, total amount of precipitation in the period of Oct.06-Jan.07 is only 28%-51% of the corresponding amount in the same period of previous years from 2002 to 2006. In the previous years of 03/04, 04/05 and 05/06, annual amount of precipitation was average level, which has even caused considerably long suspension of water supply in night time in Damascus city for about 7 months in 2006. Therefore, if this situation of very small precipitation continues in this winter, the year of 2007 is likely to be much worse than last year in terms of water supply, groundwater level, and so on.

These observation data are warning of more serious shortage of water this year.

The long-term average annual rainfall at the western margin of the Damascus plain is about 250 mm (Meteorological Dept., 1977). The amount of rainfall decreases rapidly towards east and reaches only about 100 mm in the area of Al-Dmair, NE of the Barada-Awaj basin. Though the rainy season usually lasts from October to April, the main rainfall occurs from November to March with a maximum in December and January (JICA, 1996). Normally, there is no rainfall from June to September. Below two figures show the annual variations of rainfall at the climatic station of the old airport in the western outskirts of Damascus and at the Kharabo station at the center of Damascus Ghouta. [3]



1 Annual variations of rainfall at Old Airport in Damascus



2 Annual variations of rainfall at Karabo in Central Ghouta Plain





Harush Spring (dry)



Barada River in Damascus



BRING WATER BACK TO DAMASCUS?  
OR IT IS NECESSARY?

Facing such water crisis, it seems that bringing water back to Damascus is critical. But we still had to ask wether it is necessary. There are three future projects, in which, we maybe find some anwears.



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*Prefecti Syriae domus*

*Ecclesia S. Pauli*

*Navigabilis fluvius hinc  
quidam aqua nobili, orbem  
Damascenam irrigans.*

*Lic. D. Paulus bapti-  
zatus perhibetur.*

*Ecclesia Magna Damasci*

*Domus Soldani regis*

*DAMASCUS, orbs  
nobilissima ad Libanum  
montem, Totius Syriae  
Metropolis.*

# Future Water Projects in Syria

## FUTURE WATER PROJECT 1:

### INTER COUNTRY BASIN PIPELINE

#### 270 KM LONG PIPELINE

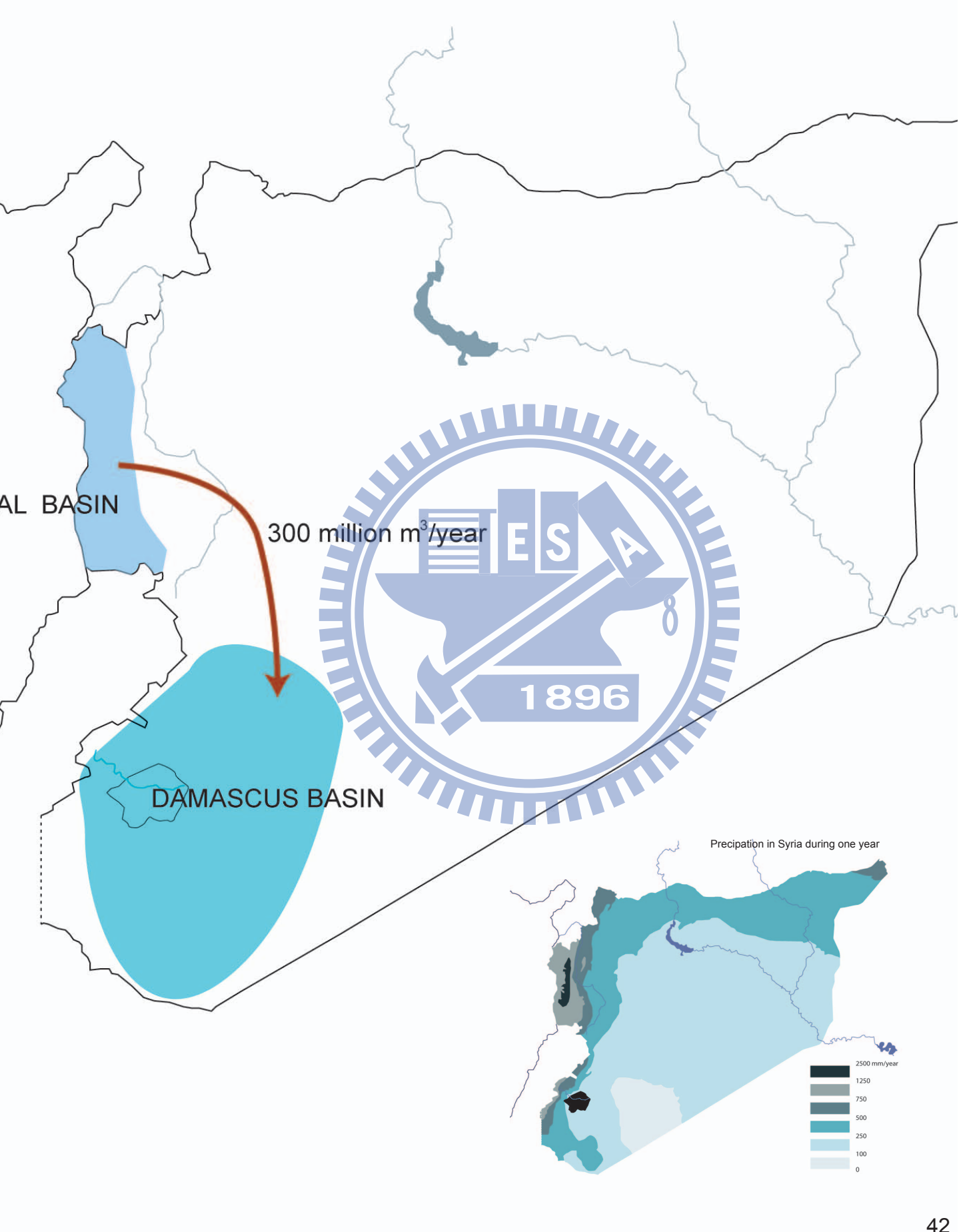
The water supply of Damascus City and Countryside depends today on local springs and wells. The present deficit is supposed to increase in the years 2020 and 2040 to 323 and res. 732 MCM/y. On the other side the Mediterranean coastal area of Syria from the Turkey border to the north and the Lebanon Border to the south is rich on precipitation. The project intends to withdraw the water surplus from the coastal area (surface runoff, groundwater) and to transport it by a 270 km long pipeline to Damascus.[4]

#### PRECIPITATION IN COASTAL AREA

The right bottom map shows the precipitation in syria per year and you can find the coastal area has more rainfall.



COAST





## PROJECT PROBLEMS

The Coastal Basin has a positive water balance according to the three sources in the below table. The largest estimate, however, is rather modest for the task of inter-basin transfer to the Damascus Region. The other two are dangerously small.ERM (1998: p.11) estimated that under the condition of a minor drought, predicted to occur in one out of every five years (i.e. a 20% probability each year), the Coastal Basin would be only 127 million m<sup>3</sup> in surplus in 2015. Furthermore, the heavily mountainous terrain of the basin and its dispersed water sources would make harvesting the waters difficult and expensive.

This may explain the Basin's rather low water utilization rate. While the seven basins in Syria have an average water utilization rate of 89%, the Coastal Basin's rate is 65%, second only to the Steppe Basin, which has a 60% rate. It is highly unlikely that the Coastal Basin water sources would make it a viable alternative for solving the water crisis in Damascus.[3]



Table 1 Statement of water sources and uses in the Coastal Basin (million/m<sup>3</sup>)

	Word Bank Report (2001)	FAQ Project Based study (2001)	Syria's MOI (2001)
Available Resources			
Resources	N/A	1,214	1,214
Recharge from waste water	N/A	0	68
Return drainage from irrigation	N/A	43	43
Total	N/A	1,257	1,325
Usage			
Irrigation	960	433	429
domestic	120	134	139
Industry	40	34	47
Evaporative loss	N/A	16	16
Total	1,120	617	627
Water balance	1,880	640	698

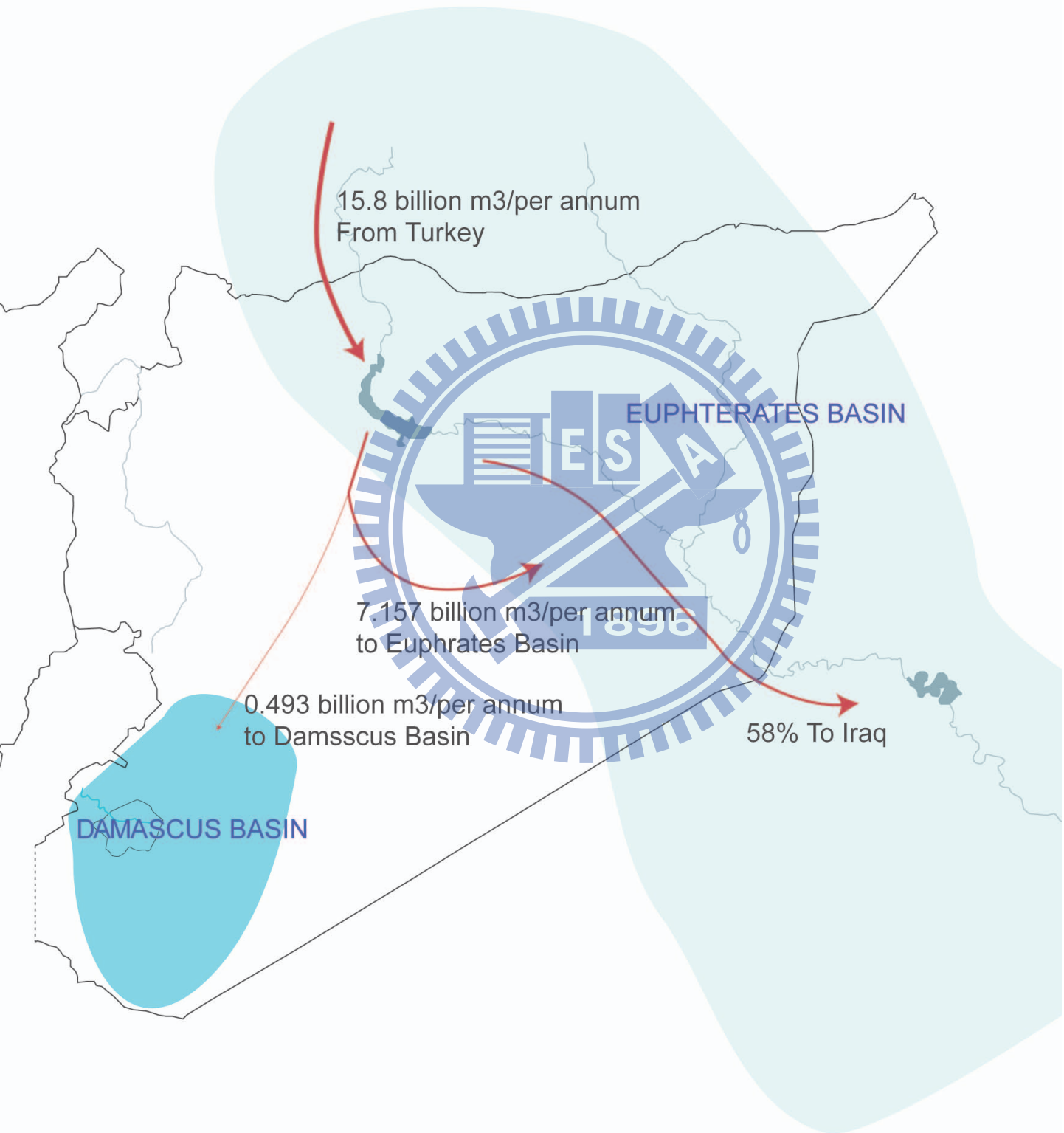


FUTURE WATER PROJECT 2:  
EXTRA COUNTRY EUPHRATES PIPELINE

THE EUPHRATE RIVER

The Euphrates River is the third longest river in the Middle East, after the Nile and the Tigris. It has an average flow of some 1,050 m<sup>3</sup> per second, or 33 billion m<sup>3</sup> per annum. The Euphrates River has over the millennia been Syria's major supplier of surface water. With over 700 km of its 3,000 km within Syria, it is the largest among the country's 17 rivers. It supplies about 50% of Syria's total water use of 14.7 billion m<sup>3</sup> per annum. On July 17, 1987, a protocol for the distribution of the Euphrates water, seen by Syria as temporary, was signed between Syria and Turkey to release a total flow of 500 m<sup>3</sup> per second to Syria and Iraq, or 15.8 billion m<sup>3</sup> per annum. On April 17, 1989 Syria and Iraq signed a memorandum, became effective on April 17, 1990 whereby Syria committed to give 58% of all incoming waters from Turkey to Iraq. As such, Syria's share of the Euphrates waters would be around 6.6 billion m<sup>3</sup> per annum. To this should be added 1.05 billion m<sup>3</sup> in return wastewater and return drainage from irrigation for a total of 7.65 billion m<sup>3</sup> in total surface water availability.[5]



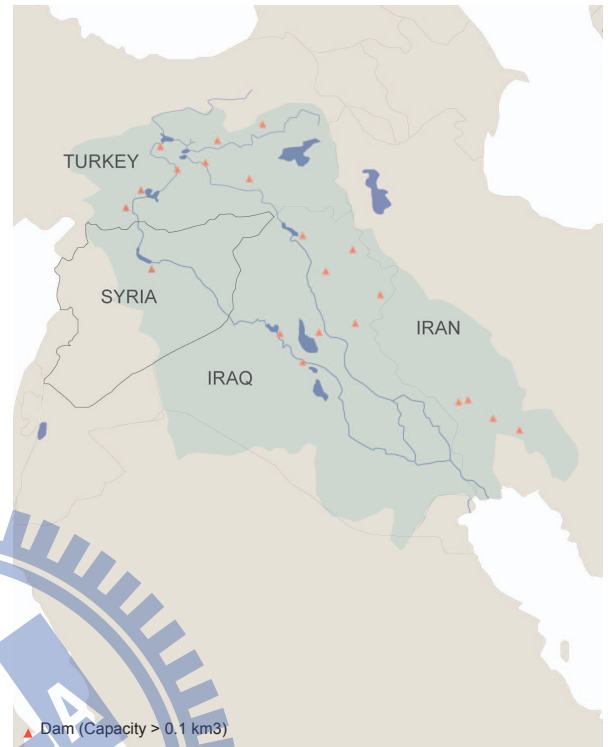


### TRANSBOUNDARY WATER ISSUE

Turkey's phased construction of the giant GAP project in Southeastern Turkey since the mid 1960s and its future expansion plans have rendered the volume of Euphrates River's flow from Turkey undependable.

The GAP project "envisages the construction of 22 dams and 19 hydroelectric power plants on the Euphrates and Tigris rivers and their tributaries. It is planned that at full development over 1.7 million hectares of land will be irrigated and 27 billion KWH of electricity will be generated annually with an installed capacity over 7,500 MW". Turkey began constructing the Keban Dam on the Euphrates in 1966 with electricity generation starting in 1974. The GAP project has caused a substantial decrease in the river's flow into Syria and Iraq.

This has become the cause of a serious water dispute among the three countries. GAP enhanced Turkey's ability to alter the flow of the River into Syria and Iraq. Notwithstanding pretensions to the contrary this has given the Turkish government a newly found leverage in dealing with her two neighbors. Even small variations in the water flow might now be interpreted as politically inspired. The age-old share of Syria and Iraq in the Euphrates waters has become a decision of Ankara's politicians.[5]



### MIDDLE EAST WATER WAR

These countries set up such many dams just because they can control water by their dams. Therefore, as this magazine describes: "Middle East Water, Scenarios of Upcoming War". In fact, these countries had started to negotiate with each other. In 2008, There were 18 water experts from countries to work toward the resolution of water-related problems. The countries involved were Turkey, the Syrian Arab Republic and Iraq. However, it is better for them to keep on dialoging to avoid war.





الامتداد السعودي :  
ميزانية متوازنة  
وزيادة في الإيرادات



وليد حنبلاط:  
يحب «هاثانا» ويقضي  
ساعات على الانترنت



قصة سعوديبن  
انتقلوا من الصحراء  
الى امريكا قبل 50 عاماً



اثرياء كرة القدم:  
اللاعبون الجدد  
جسعون واقوياء

# المجلة

مجلة العرب الدولية

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MAGAZINE OF THE ARABS

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ص 1425

مياه الشرق الاوسط

سيناريوهات حروب ستأتي

MIDDLE EAST WATER  
SCENARIOS OF UPCOMING WAR

**COMPARING PROJECT IN EGYPT - PIPELINE ALONG THE NILE RIVER**

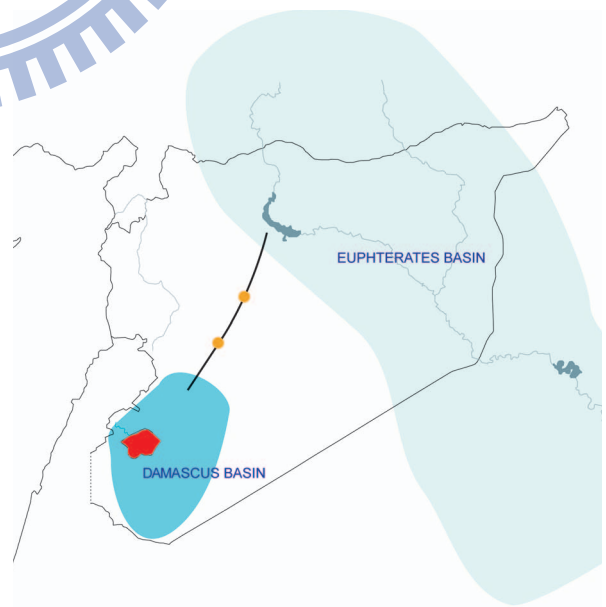
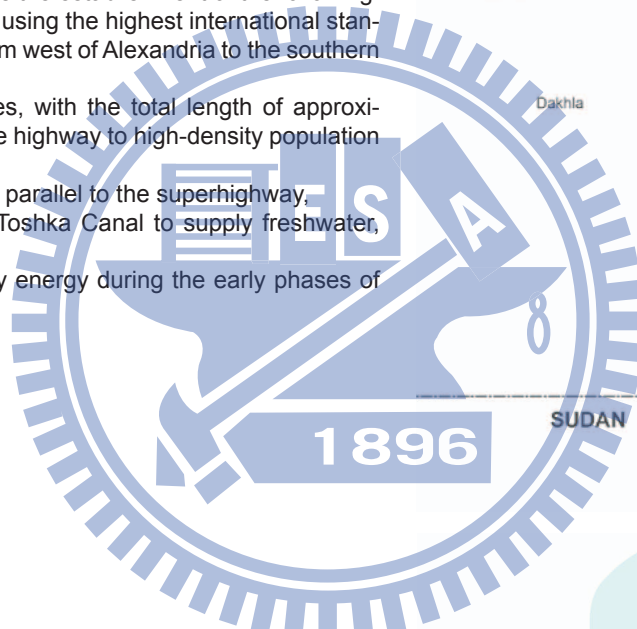
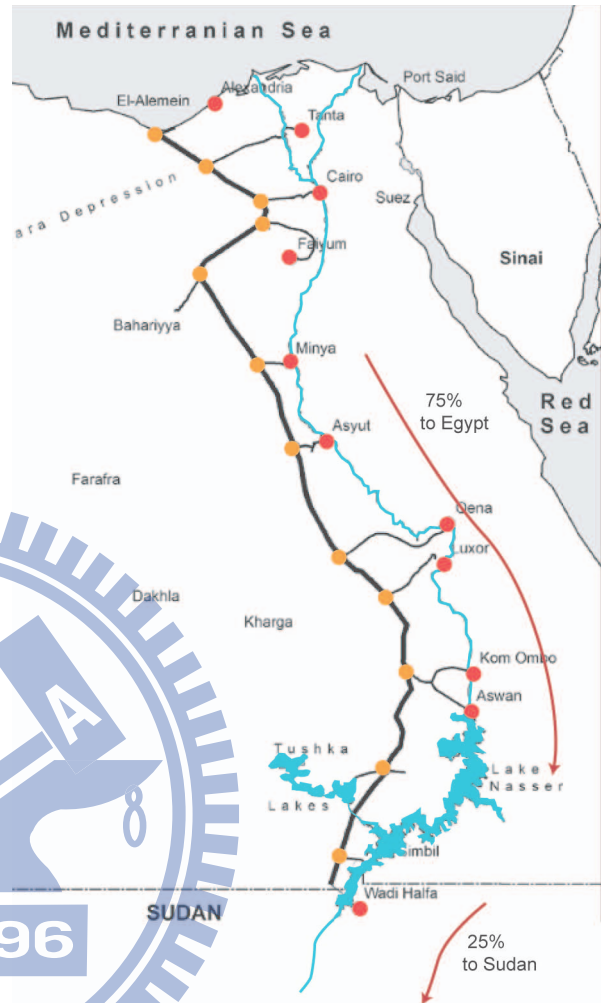
„Let the desert blossom“, said President Mubarak in 1997 as he launched at Tushka, thirty-six years after the laying of the first stone for the high dam. The Egypty press have nicknamed it „the inverted pyramid of the year 2000“. „New cities will be created and new power stations built,, added the Primer Minister. [5]

**DESERT PROPASAL**

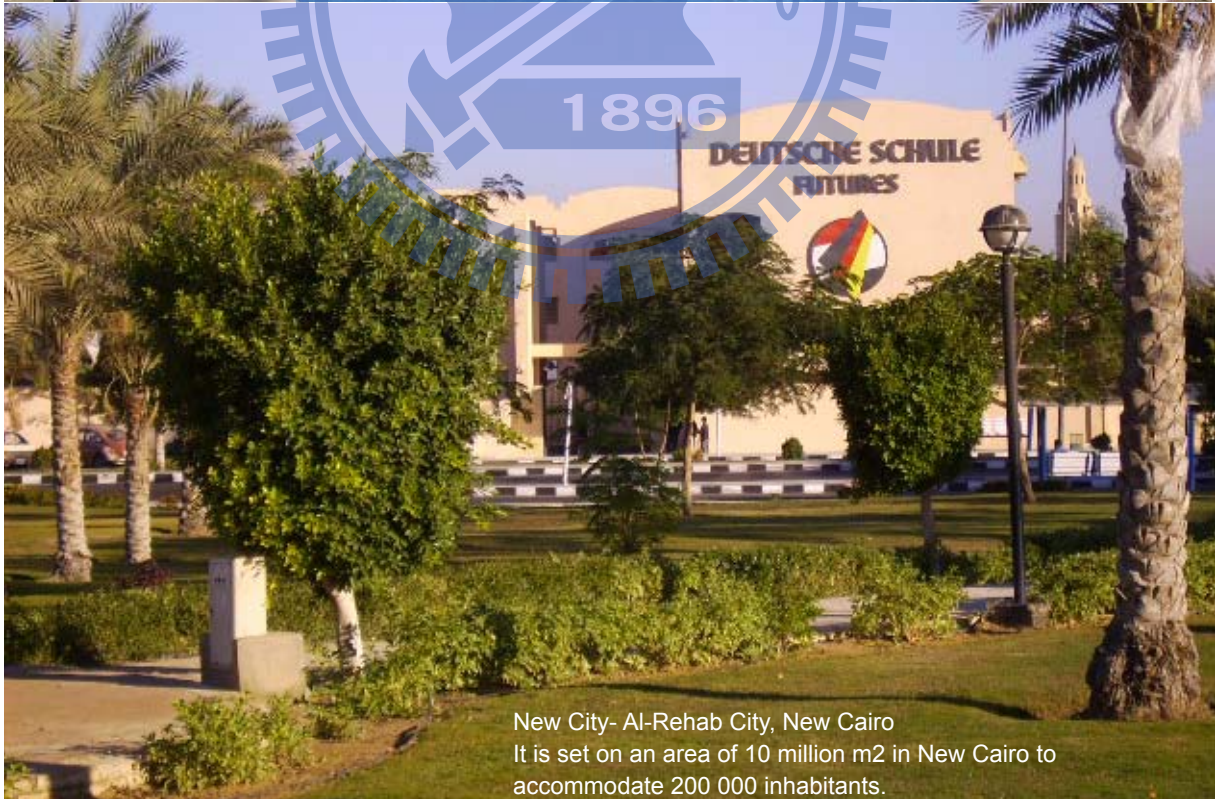
This project advances the case for a proposed superhighway west of the Nile from the Mediterranean Sea coastline to Lake Nasser. The proposal would provide numerous opportunities for the development of new communities, agriculture, industry, trade and tourism around a 2,000 km strip of the Western Desert.

The proposed project includes the establishment of the following:

1. A superhighway to be built using the highest international standards, 1,200 km in length, from west of Alexandria to the southern border of Egypt,
2. Twelve east-west branches, with the total length of approximately 800 km, to connect the highway to high-density population centers along the way,
3. A railroad for fast transport parallel to the superhighway,
4. Awater pipeline from the Toshka Canal to supply freshwater, and
5. An electricity line to supply energy during the early phases of development.[6]







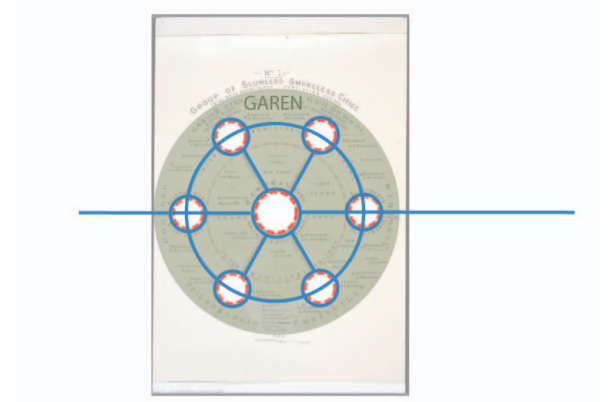
New City- Al-Rehab City, New Cairo  
It is set on an area of 10 million m<sup>2</sup> in New Cairo to accommodate 200 000 inhabitants.

**NEW DESERT CITIES?**  
a selection of ideas...

**Garden City**

Garden cities were intended to be planned, self-contained, communities surrounded by greenbelts, containing carefully balanced areas of residences, industry, and agriculture. The garden city would be self-sufficient and when it reached full population, a further garden city would be developed nearby. Howard envisaged a cluster of several garden cities as satellites of a central city of 50,000 people, linked by road and rail.

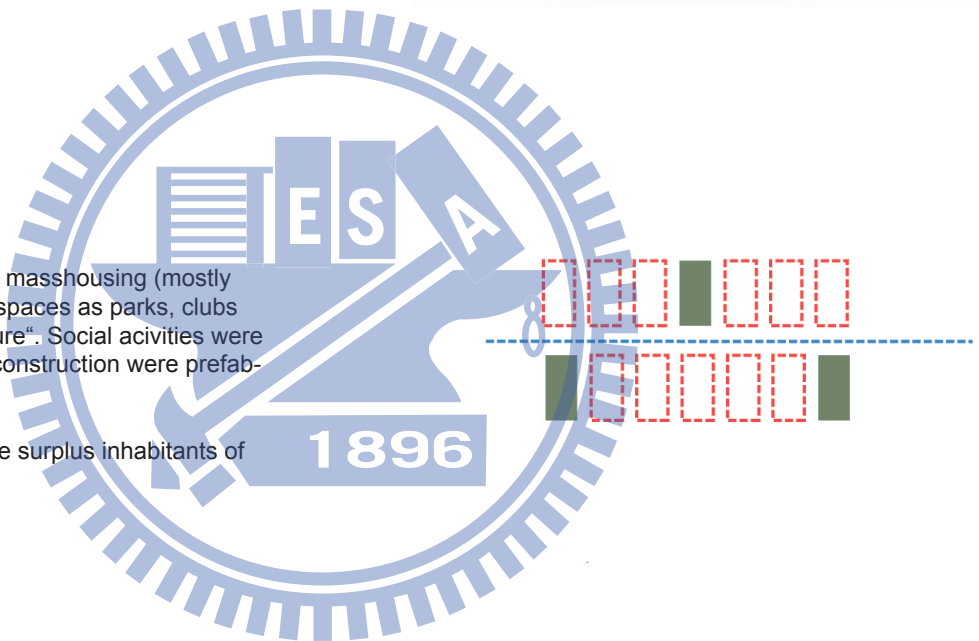
--Take again the idea of an oasis set up in the desert



**Socialist City**

The socialist city is defined by mass housing (mostly for workers), collective urban spaces as parks, clubs and so called „palaces of culture“. Social activities were important. The main building construction were prefabricated concrete slabs.

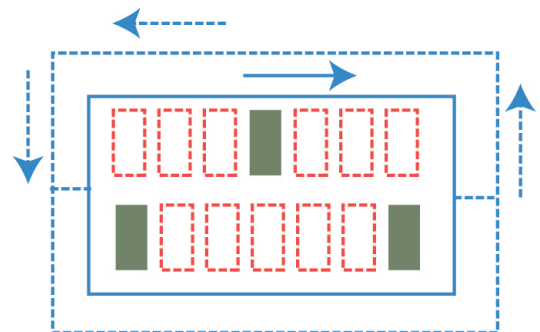
--Mass housing to move out the surplus inhabitants of Damascus



**Gated Community**

In its modern form, a gated community is a form of residential community or housing estate containing strictly controlled entrances for pedestrians, bicycles, and automobiles, and sometimes characterised by a closed perimeter of walls and fences. Mostly built for upper class.

--Better financing because of the wealth citizens









**FUTURE WATER PROJECT 3:  
INTRA CITY WATER CIRCULATION**

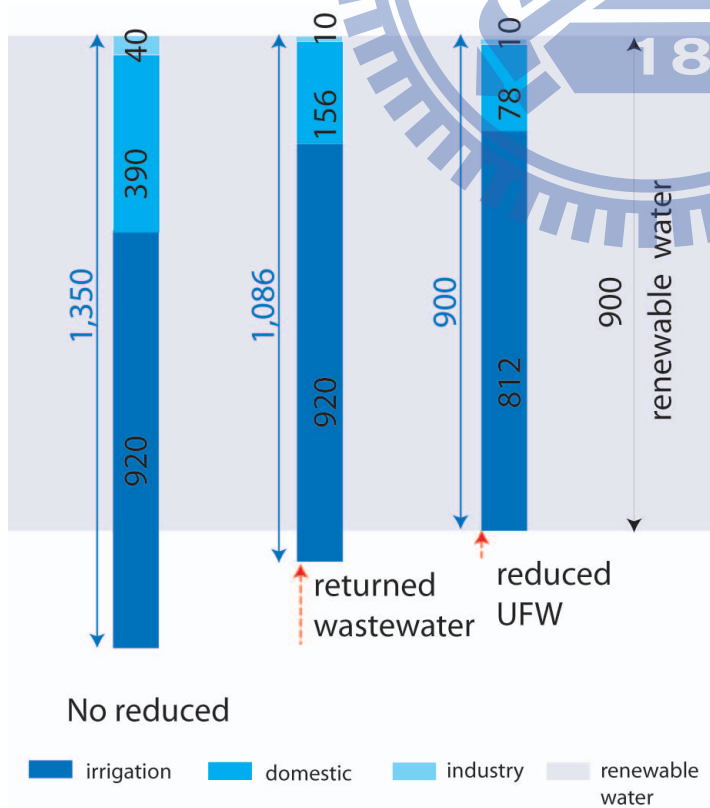
**SAVE WATER**

The right photo shows the status how the farmers discares about the usage of water because irrigating tomomates need a lot of water and famers plant a lot of them even if there is a shortage of water.

**MODERN IRRIATION TECHNOLOGY**

A drop of water saved is like a drop of water found, most often at a much lower cost. A priority here is to rehabilitate the Region's potable water distribution network.

With the objective of reducing water use, the Government of Syria (GOS) has decided that all irrigated areas will be equipped with modern irrigation techniques in four years. The Agricultural Cooperative Bank is providing loans to the farmers to purchase modern irrigation equipment at subsidized interest rates, with higher subsidies for cooperatives. Most of the new systems are of line canals from the headwork to the farm gate.





Fruit market in Damascus<sup>3</sup>



## VIRTUAL WATER

Professor John Anthony Allan from King's College London and the School of Oriental and African Studies was the creator of the virtual water concept, which measures how water is embedded in the production and trade of food and consumer products. Virtual water refers, in the context of trade, to the water used in the production of a good or service. For instance, it takes 1,300 cubic meters of water on average to produce one metric tonne of wheat. The precise volume can be more or less depending on climatic conditions and agricultural practice.[16]

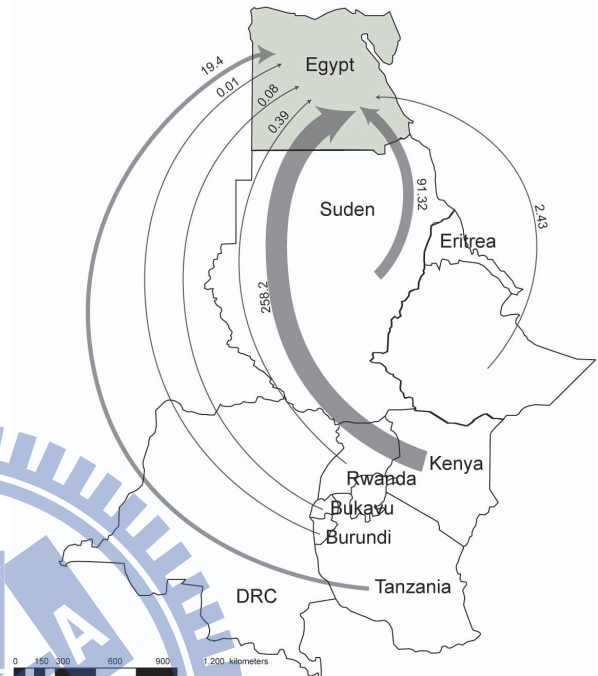
### A LONG TERM SOLUTION FOR WATER SHORTAGE?

'More water 'flows' into the Middle East each year as 'virtual water' than flows down the Nile into Egypt for agriculture'.[17]

Therefore, if Damascus also adopts the economic policy of Egypt then it seems to solve the increased population in the future. In fact, it is not so easy because it must be a global trading system. Therefore, it will be political issue, again.

For political leaders in the region political imperatives are more compelling than scientific facts. On water, these imperatives drive them to assert that their economies have not run out of water. An ex-Prime Minister of Egypt (Higazi 1994), and mid-1990s Egyptian ministers of water resources, of agriculture and of planning have vied in public in the vehemence of their assertions that Egypt has sufficient water. (Arab Research Centre 1995) The main reason that there can be such different interpretations by scientists and politicians is that the politicians do not specify what 'sufficient' means.[18]

Egypt: virtual water imports in crops from other NB countries (1998 - 2004) =  $371.76 \times 10^6 \text{ m}^3/\text{y}$





## Conclusion

What is the definition of an oasis or what is an oasis in a contemporary meaning?

During the whole research we looked at a city which is defined because of water since its origin. Damascus is or was part of the fertile crescent and exists because of the Barada river, the Quasium mountains and the oasis conditions.

But at least one of the three foundations is most of the year missing; the Barada.

It was used too heavily and too much sewage was put in that it can be used as a “natural” environment.

Although Barada was never “natural”, already in the earliest times Barada had been canalised due to the swamp that existed there before. Without canalising the

Damascus area would have never become an oasis.

So the Barada always was a technical instrument of the inhabitants of Damascus and they made it work for their interests.

But now the condition Barada doesn't exist anymore.

But they found another source: Fiegeh spring.

Also Fiegeh spring was connected to the city water system at roman times and it's one of the most productive springs in the whole Middle East.

The water is guided in pipelines into the city. It is invisible and not part of the environment anymore until it comes out at a fountain or the tap.

And this is the huge paradigm shift that happened in time: Pipelines are the reason for the new apartment-

„man should  
pa

Legendary sentence by Prophet Muhammad why he refused to enter Damascus, at his first sight.



building, highrises, parks (e.g. Tishreen). The growing of the city was mostly just possible because of pipes. And the pipes are also a reason why Barada lost its importance. People didn't need to worry anymore about water, it just comes out of the tap.

The biggest problem the city has is not that it lost a river, but it is losing a symbol. The river is an abstract symbol for the oasis and people try to keep it, even as a river, man-made and filled with water that sometimes not even come from the spring.

The abstract symbol of the river is important to keep the political power of water and the romantic dream of an oasis existing.

Although the city is getting more and more green with parks and on smaller scale, the ghouta, the agriculture belt, shrinks permanently.

So the future is very unsettled, but the shortage of water is a fact. That's why the main acting point for future development is to bring more drinking water from other sources to the still growing city. Ecochard planned his city for 2.5 Mio people, now there are living about 4 Mio.

The water shortage is a problem Syria can't solve on its own, although there is enough water in the country itself, the problem is a Middle Eastern one. Except the coastal regions, all the other parts are suffering from the crisis. This geopolitical problem has to be solved on a higher level than local politics, an international dialogue has already started but needs to be continued.

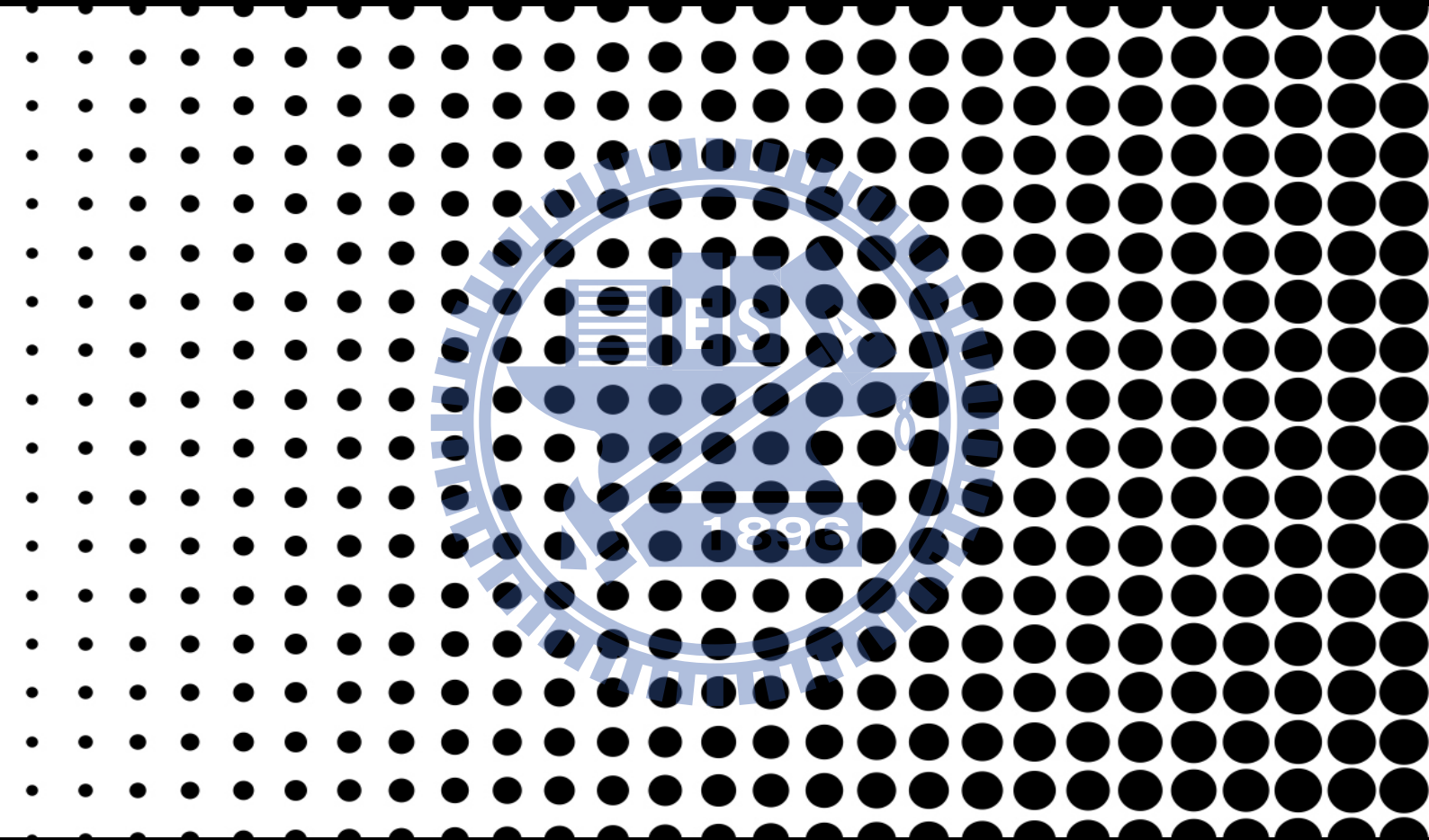
Main aim of the people in Damascus should be to protect the groundwater to create a sustainable coexistence with the water circulation.

That's a way they won't lose their adjunct: Oasis City



and only enter  
paradise once“

but is Damascus still paradise?



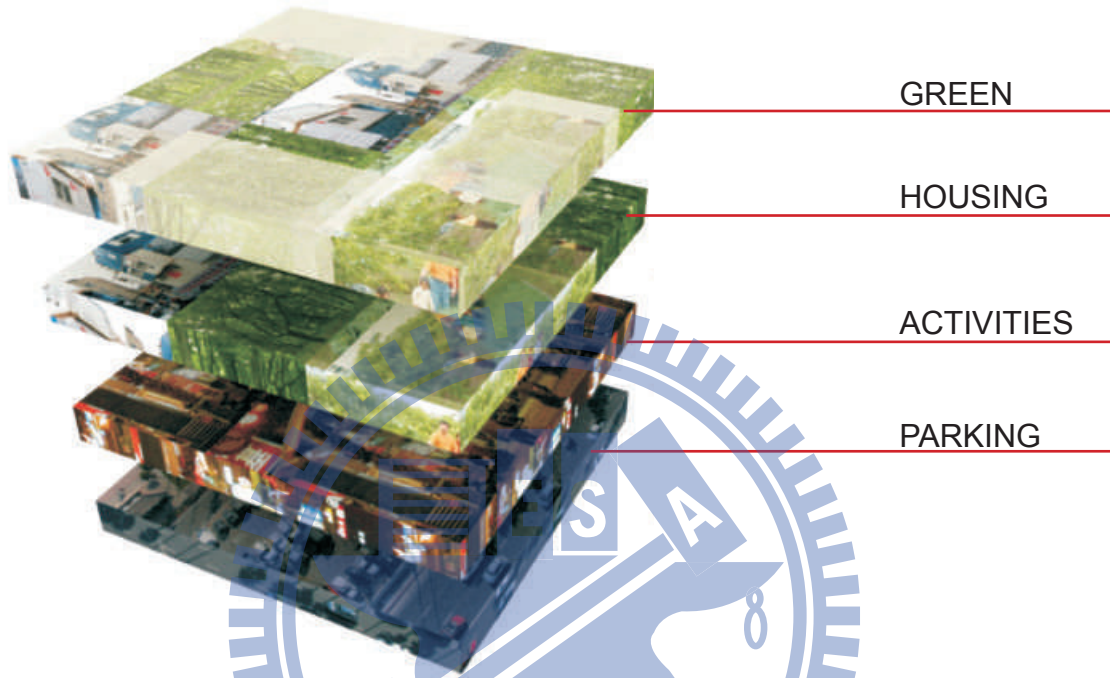
# Between Urban & Rural Life



STACK URBAN & RURAL



# STACK URBAN & RURAL



GREEN

HOUSING

ACTIVITIES

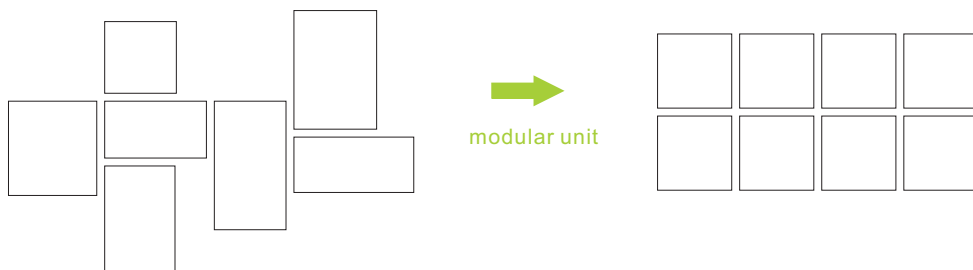
PARKING

SECTION



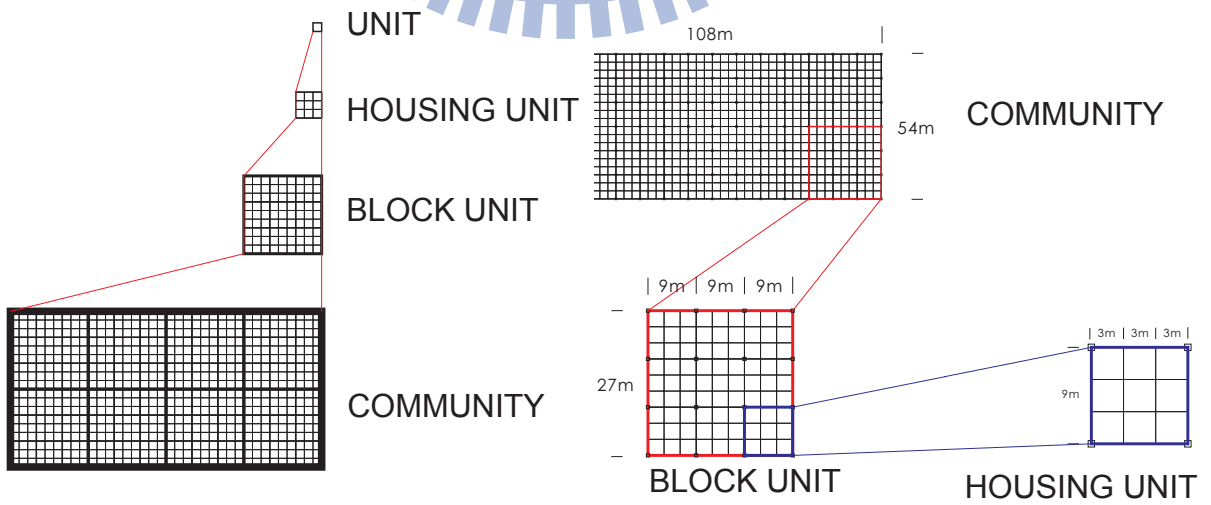
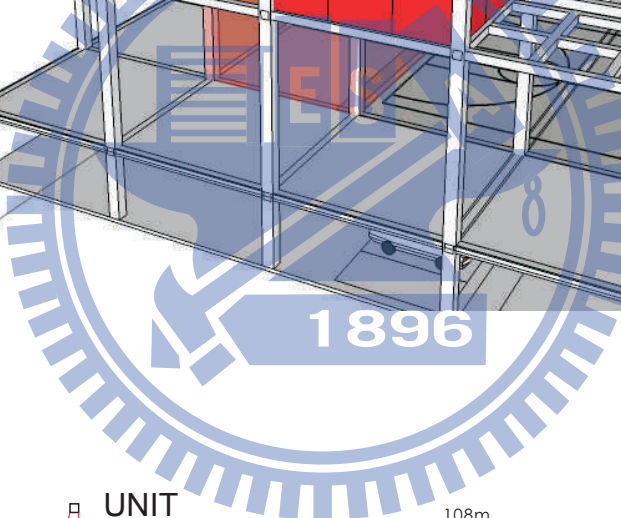
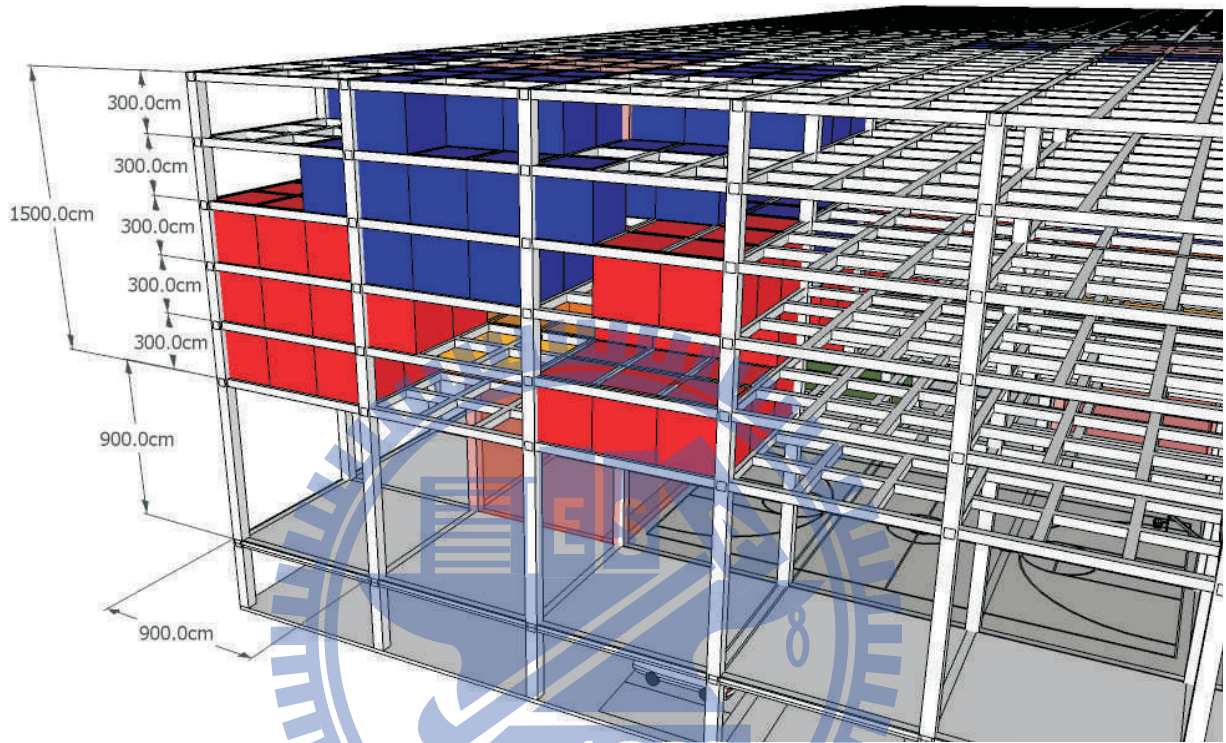
New ground plaza

PLAN



modular unit















# Art Transformation



Art 01  
TAIPEI PERFORMING ARTS CENTER INTER-  
NATIONAL COMPETITION



PROGRAM ZONING

MULTIFORM THEATER

GRAND THEATER AND THE PROSCENIUM PLAY-  
HOUSE

BACK STAGE CIRCULATION



# CONCEPT & SITE

The main purpose of this project is to build a Performing Arts Center to serve a variety of large-scale performance, including dramas and operas. The site of this project is very special because it will be adjacent to the Shihlin Night Market and located at the north of the Taipei Rapid Transit System's Jiantan Station. It is different from high class theater, but it will provide a real People's theater for young and middle-class audiences. In this project, we also focus on making this theater to have the features of youth and connect the different area of this set to each other.









## 機能分區 Program Zoning

### 1 大劇院 Grand Theatre

- 110 前廳 Hall
- 120 觀賞區 Auditorium
- 130 表演區 Stage
- 140 後台準備空間 Back Stage Space
- 150 控制/設備/儲存空間 Control rooms & Storage

### 2 鏡框式中劇場 Proscenium Playhouse

- 210 前廳 Hall
- 220 觀賞區 Auditorium
- 230 表演區 Stage
- 240 後台準備空間 Back Stage Space
- 250 控制/設備/儲存空間 Control rooms & Storage

### 3 多形式中劇場 Multiform Theatre

- 310 前廳 Hall
- 320 觀賞區 Auditorium
- 330 後台準備空間 Back Stage Space
- 340 控制/設備/儲存空間 Control rooms & Storage

### 4 表演服務空間 Performance Service Spaces

- 410.01 大型排練室 Large rehearsal studio
- 410.03 中型排練室 Medium rehearsal studio
- 410.05 小型排練室 Small rehearsal studio

### 5 表演支援空間 Technical Support Spaces

- 510.01 布景組裝工廠 Assembly scene shop
- 510.02 卸貨空間 Loading area
- 510.03 技術組各室 Technician's room
- 510.04 設備/儲存室 Equipment storage
- 510.05 附屬空間 Auxiliary facility space
- 510.06 服裝間 Wardrobe Room
- 510.07 洗衣間 Laundry room
- 510.08 員工餐廳 Restaurant/ Cafe
- 510.09 廚房 Kitchenette
- 510.10 廚房附屬空間 Auxiliary space

### 6 營運管理空間 Administrative Spaces

- 610 營運管理部門 Administrative / Management office
- 620 會議室 Conference Rooms
- 630 研修、資訊部門 Library

### 7 公共服務空間 Public Service Area

- 810 公共大廳 Common Lobby
- 710 餐廳及藝文商場 Restaurant & Arts shop arcade
- 720 停車場 Vehicle Spaces
- 730 設備機房 Electrical & Machine room

### A 大劇院 Grand Theatre

- 110 前廳 Hall
- 120 觀賞區 Auditorium
- 130 表演區 Stage
- 140 後台準備空間 Back Stage Space
- 150 控制/設備/儲存空間 Control rooms & Storage
- 410 表演服務空間 Performance Service Spaces
  - 410.01 大型排練室 Large rehearsal studio
  - 410.03 中型排練室 Medium rehearsal studio
  - 410.05 小型排練室 Small rehearsal studio
  - 510.06 服裝間 Wardrobe Room
  - 510.07 洗衣間 Laundry room

### B 鏡框式中劇場 Proscenium Playhouse

- 210 前廳 Hall
- 220 觀賞區 Auditorium
- 230 表演區 Stage
- 240 後台準備空間 Back Stage Space
- 250 控制/設備/儲存空間 Control rooms & Storage
- 4 表演服務空間 Performance Service Spaces
  - 410.01 大型排練室 Large rehearsal studio
  - 410.03 中型排練室 Medium rehearsal studio
  - 410.05 小型排練室 Small rehearsal studio
  - 510.06 服裝間 Wardrobe Room
  - 510.07 洗衣間 Laundry room

### C 多形式中劇場 Multiform Theatre

- 310 前廳 Hall
- 320 觀賞區 Auditorium
- 330 後台準備空間 Back Stage Space
- 340 控制/設備/儲存空間 Control rooms & Storage
- 6 營運管理空間 Administrative Spaces
  - 610 營運管理部門 Administrative / Management office
  - 620 會議室 Conference Rooms
  - 630 研修、資訊部門 Library
  - 510.08 員工餐廳 Restaurant/ Cafe
  - 510.09 廚房 Kitchenette
  - 510.10 廚房附屬空間 Auxiliary space

### D 公共大廳 & 餐廳及藝文商場 Performance Service Space

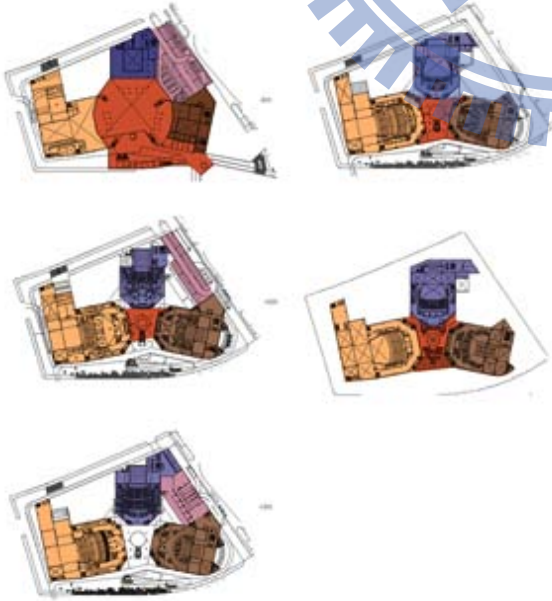
- 710 餐廳及藝文商場 Restaurant & Arts shop arcade
- 810 公共大廳 Common Lobby

### E 卸貨空間 & 停車場 & 設備機房 Performance Service Space

- 510.01 布景組裝工廠 Assembly scene shop
- 510.02 卸貨空間 Loading area
- 510.03 技術組各室 Technician's room
- 510.04 設備/儲存室 Equipment storage
- 510.05 附屬空間 Auxiliary facility space
- 720 停車場 Vehicle Spaces
- 730 設備機房 Electrical & Machine room



Multiform Theatre

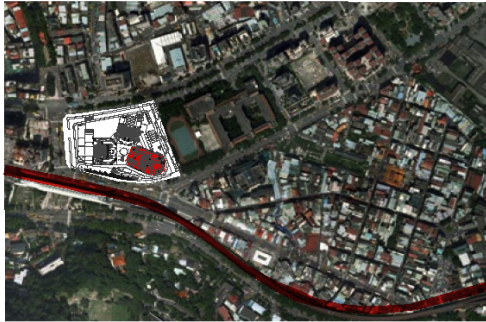




# 具野台戲性格的多形式劇場 Multiform Theater with characteristics of outdoor performing venue

## 1、多形式劇場的地理位置

The geographical location of the multiform theatre



東北角延文林路與基河路銜接士林商圈，因此利用多形式劇場來做都市轉換空間。

The site connects with Shilin Commercial District on the northeast corner along Wenlin Road and Chihe Road. Therefore, multiform theater is used as the urban transition space.

## 4、具野台戲性格的多形式劇場

Multiform Theater with characteristics of outdoor performing venue

被當作都市轉換空間的多形式劇場，不僅是都市空間轉換至劇場空間，亦是在地文化-野台戲轉換成精緻劇場之空間。

Multiform Theater is considered an urban transitional space; it is not only a transition from urban space to theater space, but also representative of local culture to refined theater.

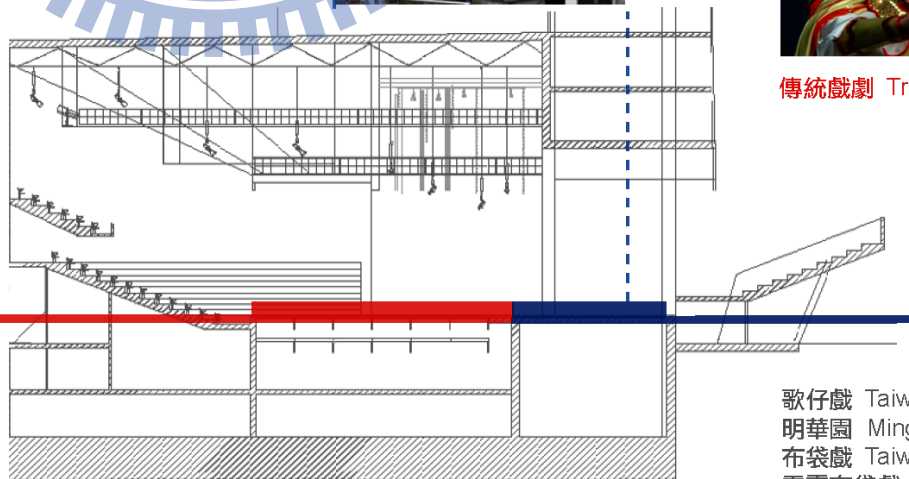


現代戲劇 Modern theater

- 舞團
- Dance company
- 台北越界舞團
- Taipei Crossover
- 劇團
- Opera 優劇團



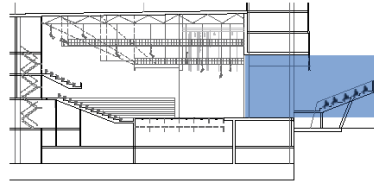
傳統戲劇 Traditional theater



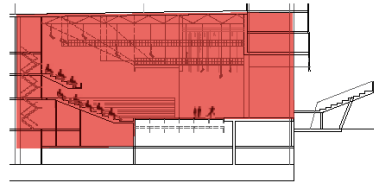
- 歌仔戲 Taiwanese Opera
- 明華園 Ming HWA YU
- 布袋戲 Taiwan puppet
- 霹靂布袋戲 Pili puppet

### 3、野台劇舞台與內部舞台間的關係

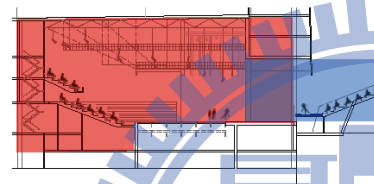
Relationship between outdoor theater and indoor theater



(a) 戶外舞台  
outdoor stage



(b) 室內舞台  
indoor stage



(c) 室內外舞台  
indoor & outdoor stage

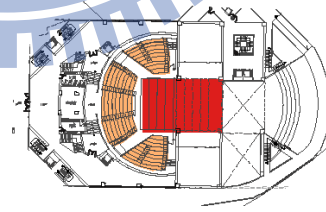
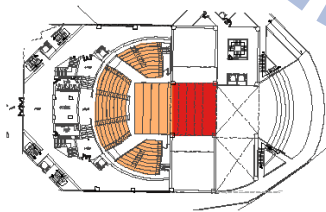
### 5、劇場內部舞台與觀眾席的關係

Relationship between stage and auditorium

一個好的表演不僅仰賴表演者的完美表演，與觀眾之間的互動，亦是成功的關鍵，因此利用不同形式的舞台與觀眾的關係，來增強彼此間的互動。 A good performance depends not only on performers' perfection, but good interaction between performers and audiences is also key to success. Therefore, different forms of stage-audience relationships can be utilized to augment interactions

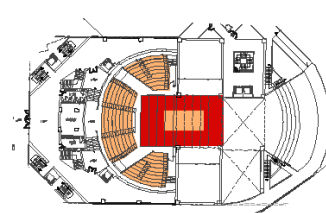
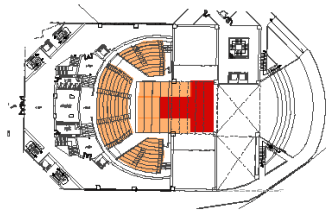
(a) proscenium stage

(c) thrust stage



(b) proscenium with apron stage

(d) center stage



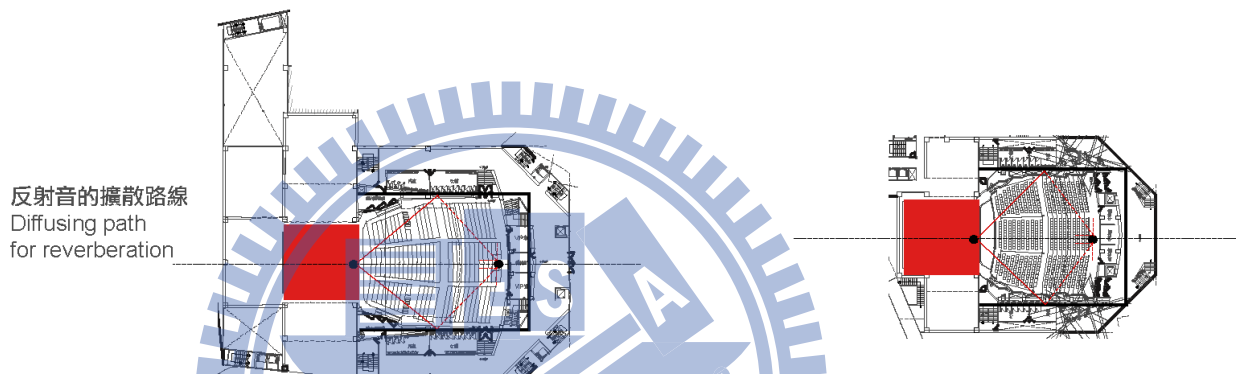
# 大劇院/鏡框式中劇場 - 具專業訴求的國際級劇場 Grand Theater and the Proscenium Playhouse

## 劇院設計概念 Theater design concept

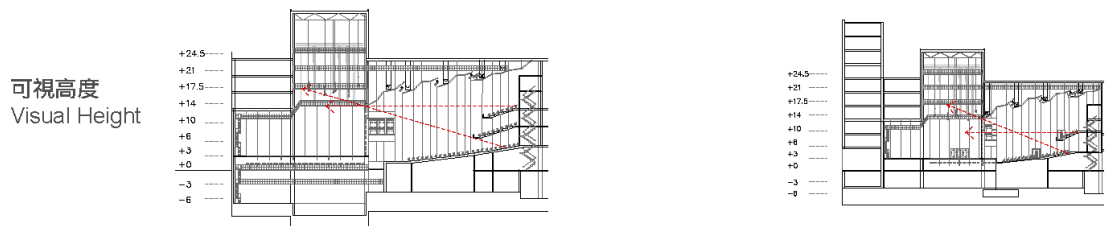
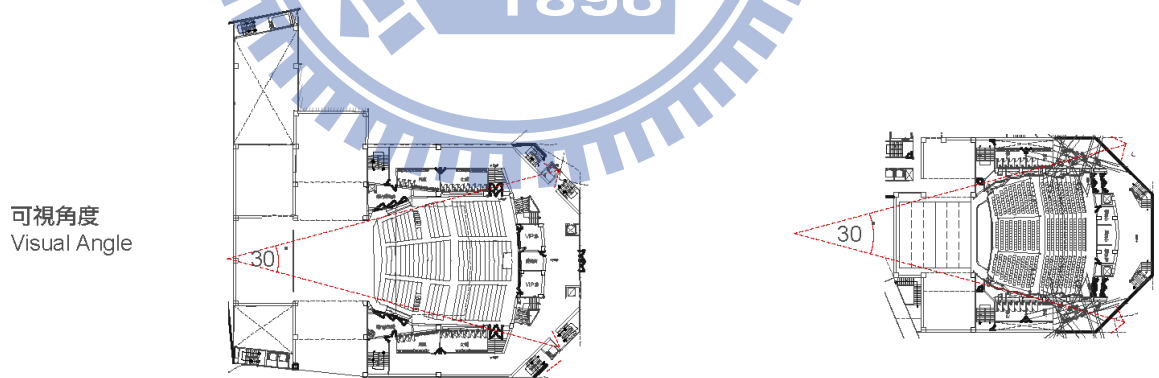
劇場的空間設計企圖提供表演者與觀眾一個優雅的表演空間，除了利用適合戲劇演出的建築聲學品質與理想的劇場空間與設備來滿足要：

The design goal is to provide an elegant performing venue for performers and audiences. Not only by creating an acoustical environment required by theaters, but also making use of building materials to enhance the quality of visuals and sounds.

- 1、適合戲劇演出的建築學品質 The architectural quality suitable to performing  
採用具最佳音響效果的鞋盒型演藝廳尺寸。  
Adopting the "shoe-box" configuration and dimension for optimum acoustical effects.



- 2、理想的劇場空間 Ideal space for theater  
觀眾席與舞台之間的關係符合理想的可視限界角度及高度  
Relationship between auditorium and stage that provides ideal range of visual angle and visual height.





## national theater that meets professional standards

空間的材料來提升視覺與聲音的品質。

configuration and atmosphere suitable for performing arts and adopting equipments and facilities re-

### 空間材料—精神式音響 spatial material- spiritual acoustics

Suntory Hall 顧問 Nagata Acoustics, 於建造洛杉磯迪士尼音樂廳時, 提出了一種未經科學證實的常識概  
念來說明一種「精神式的音響」, 意思是如果人們對於觀眾席的視覺品質有著舒適感, 對於聲音也會有  
較好的影響。因此我們劇院的內部空間都採用木製裝潢, 企圖創造友善、舒適的氣氛。

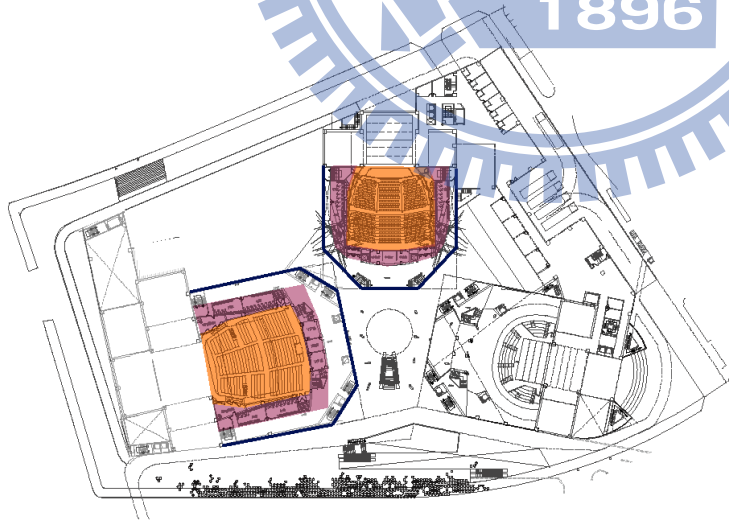
Although not confirmed by scientific proofs, the consultant, Nagata Acoustics, for Suntory Hall, pro-  
posed the idea of "spiritual acoustics" when designing the Disney Music Hall.

people are comfortable with the visual quality of auditorium, it will also exert positive impacts on  
sound. Therefore, the interior of the theaters utilizes wood as the surface material to create a pleasant,  
comfortable and friendly environment.

### 三層牆概念 triple wall concept

壓縮服務空間至劇院內部的隔音牆, 整合的服務與觀眾席空間, 讓劇院傳統的第二道牆變成非外牆。劇  
院走道也因此與內層隔音牆形成一層隔音空間, 允許大片採光進入室內。

The compressed service spaces are incorporated into the sound-insulating walls; the services and the  
auditorium spaces are integrated, enabling the conventional second wall to transform into non-exterior  
wall. The corridor and the sound-insulating wall create a layer of sound-insulating space, allowing  
abundant natural light to enter the interior via a large surface area.



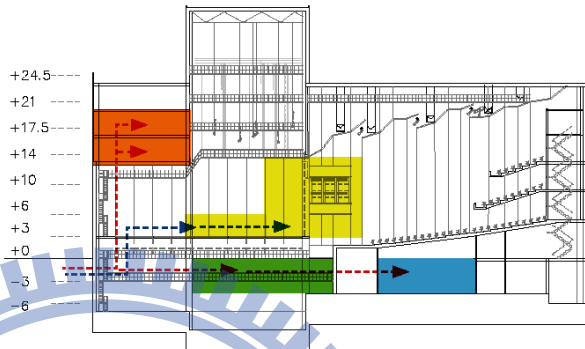
— 觀眾席空間 auditorium space — 服務空間 services space

# 後台動線 Back Stage Circulation

大劇場 Grand Theatre

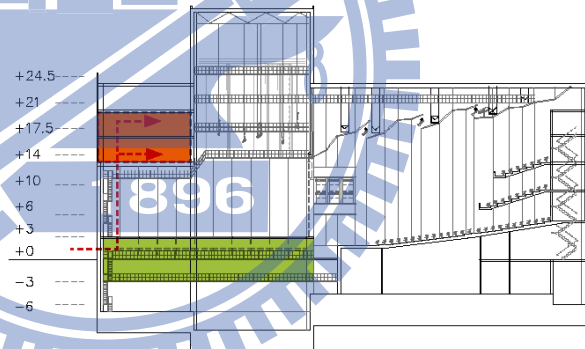
## 貨梯動線 Mechanical circulation

- 排練室 Rehearsal Room
- 服裝 樂器儲存室 Costume/Instrument storage
- 樂池下方設備及儲存空間 Under orchestra & Storage area
- - - 一般貨梯動線 General lift circulation
- - - 14m Trailer/Container lift Circulation
- 布景工廠及卸貨區 Assembly scene shop & loading area



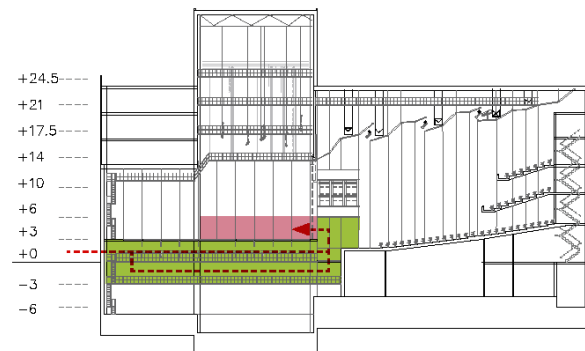
## 排練動線 Rehearsal circulation

- 排練室 Rehearsal Room
- 化妝室 Dressing Room



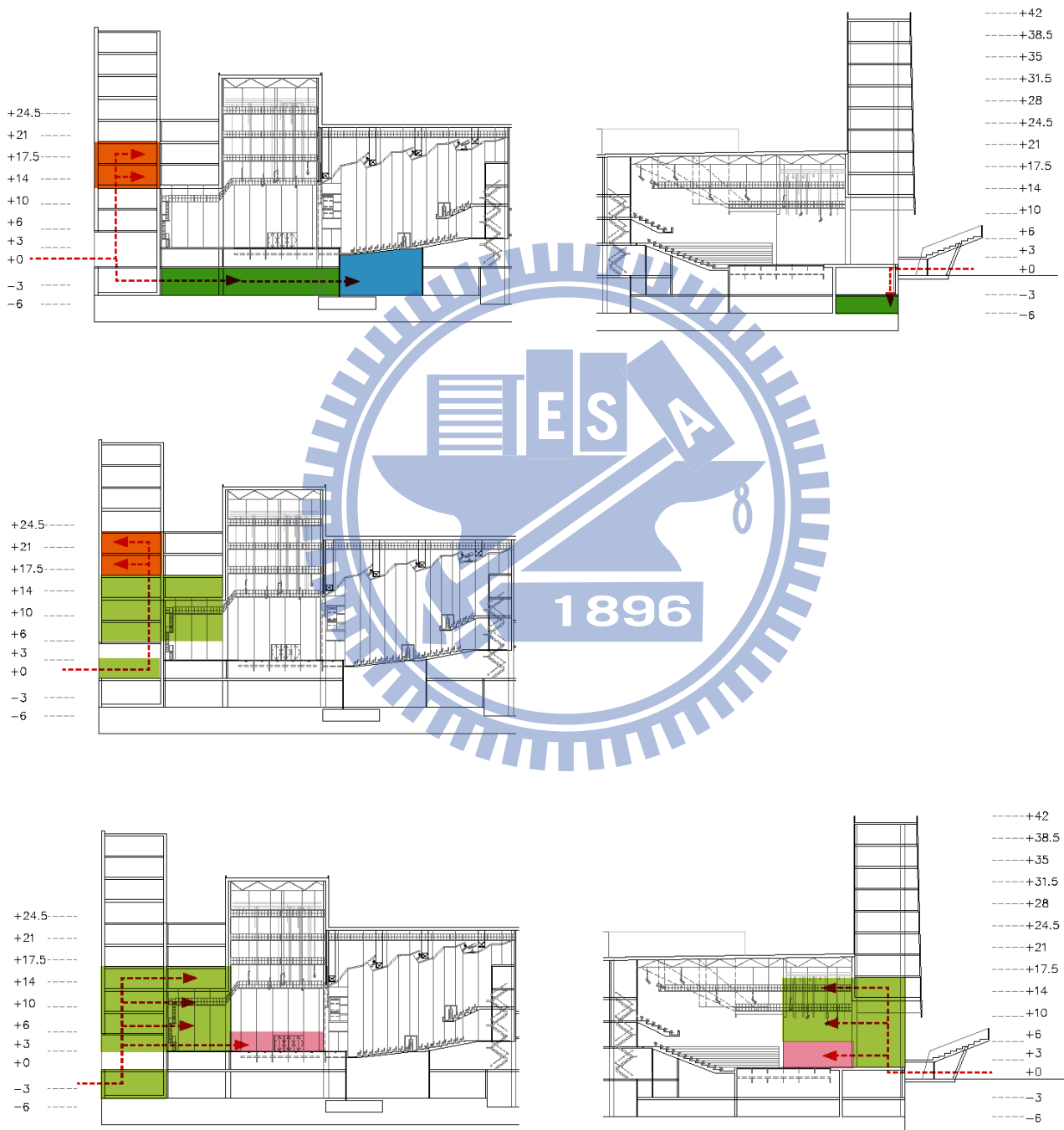
## 表演者動線 Actor circulation

- 化妝室 Dressing Room
- 主舞台區 Main stage



鏡框式中劇場 Proscenium Playhouse

多形式中劇場 Multiform Theatre







# History Transformation



HISTORY 01  
COMPOUND OFFICE BUILDING



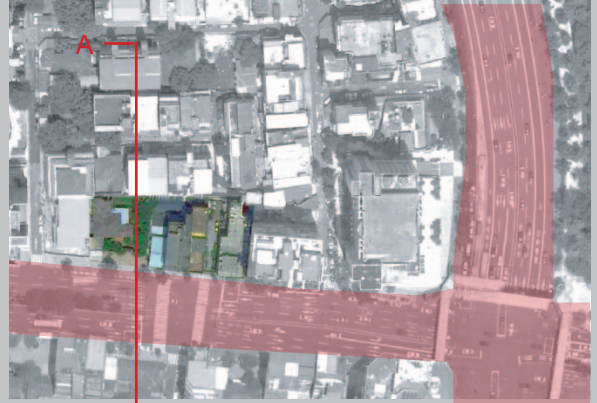
TRANSFORMATION CONCEPT  
PLANS, SECTIONS & MODELS



# TRANSFORMATION CONCEPT

## KINGSTONE CORPORATION

Kingstone Corporation is to start a Foundation focusing on the care for children of the low income households. After acquiring the 7 lots in Da An district, Kingstone found that there is a lack of public and affordable day care facilities. Kingstone Foundation attempts to build a building that would include the foundation office, a bookstore, speculative office spaces, a day care center and a multi-purpose room. The site constraints is the one-story wooden house on the next lot is to be preserved as a historical building. An it can be reused and incorporated into the program of the foundation.

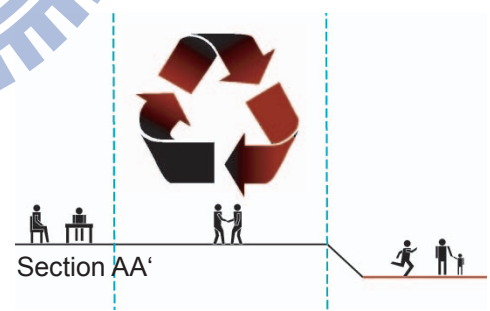


## TRANSFORMATION LAYER

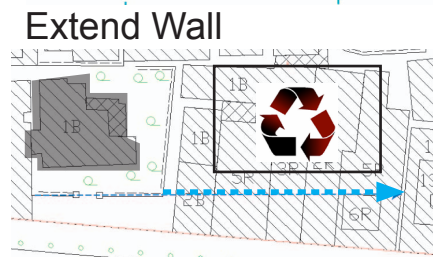
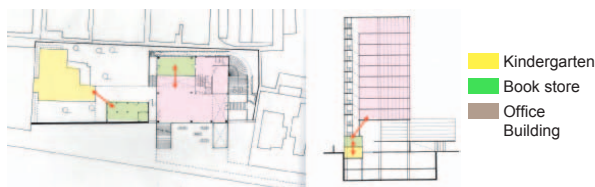
The relationship between the history building and new building is connected by the transformation layer. The discussion range of the transformation layer from urban texture, history texture, the transformation of the plan and section to program diversion. In term of the urban texture, the site provides a transformation from a big scale road to the small scale neighborhood space. The method of the transformation first uses the historical texture - tall wall - and it can diverse the open space of the outdoor to the new open space in the second floor of the new building. This new open space in the second floor is also the transformation space of all the functions. The functions include plans, sections and programs. The transformation of plans, sections, and programs are not only at this new open space floor but also at all floors of the building.



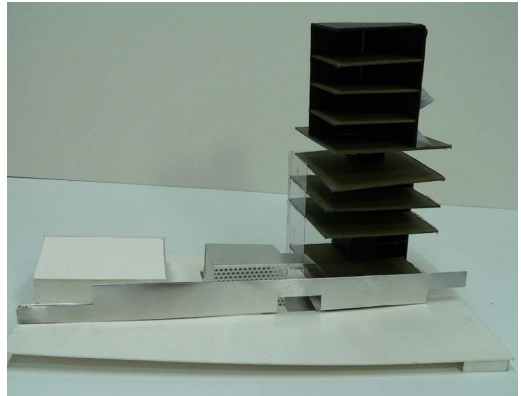
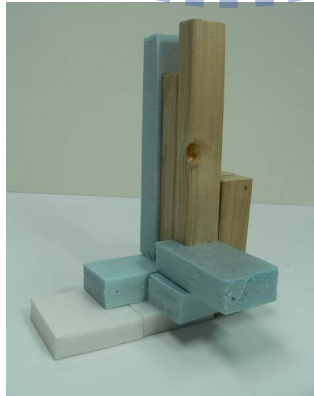
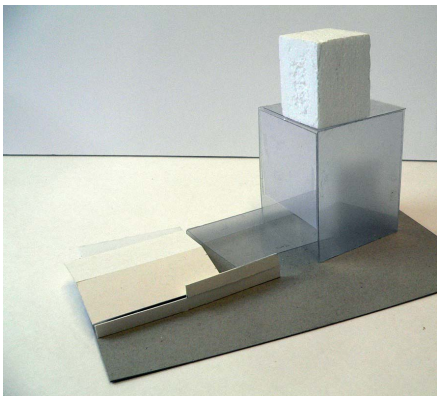
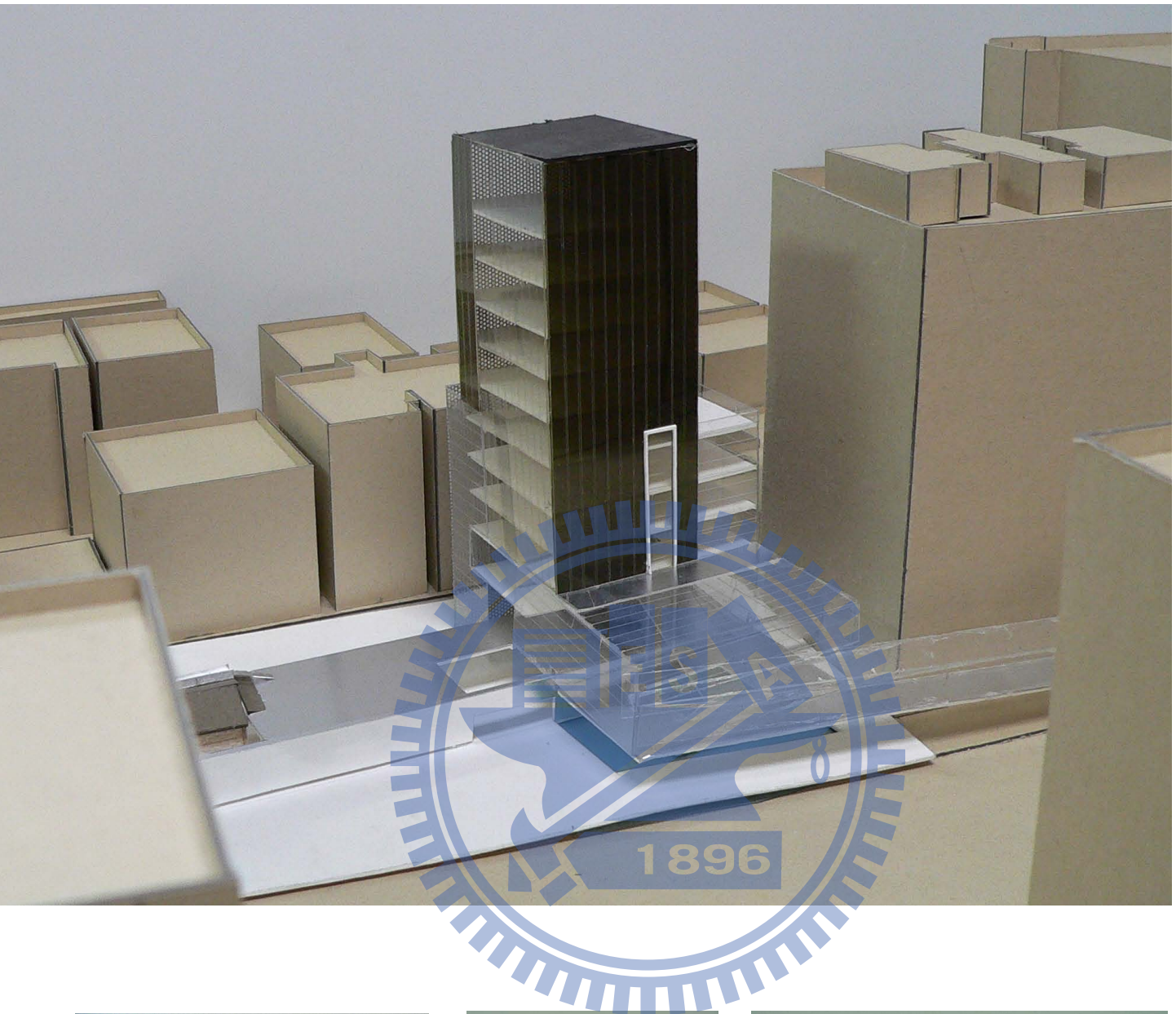
## Transformation Layer



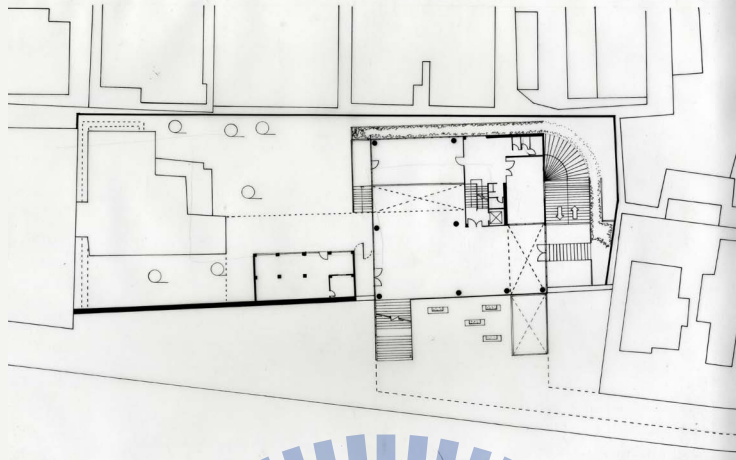
## Program



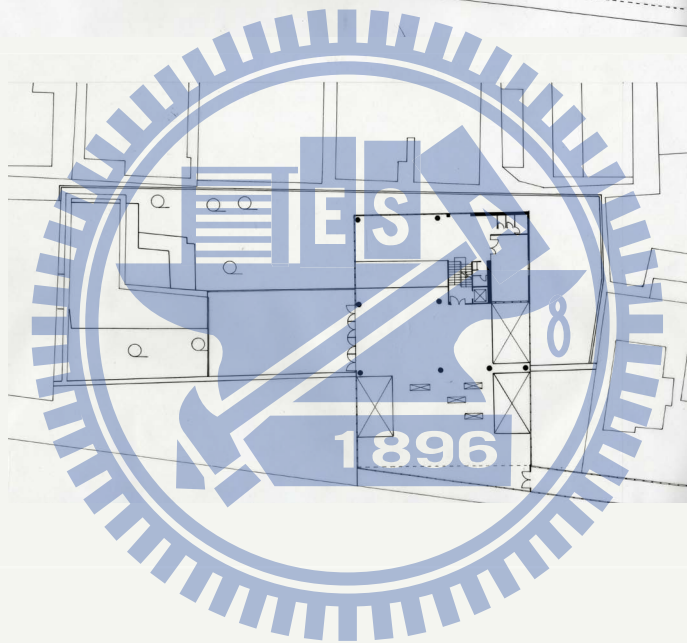




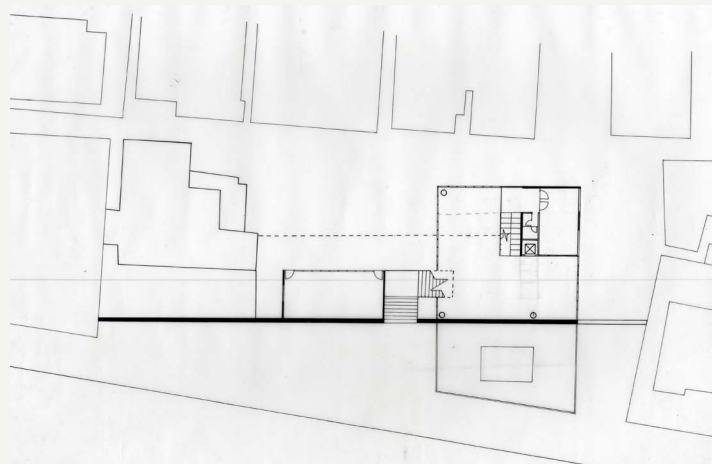
# PLANS, SECTIONS & MODELS



Ground Floor

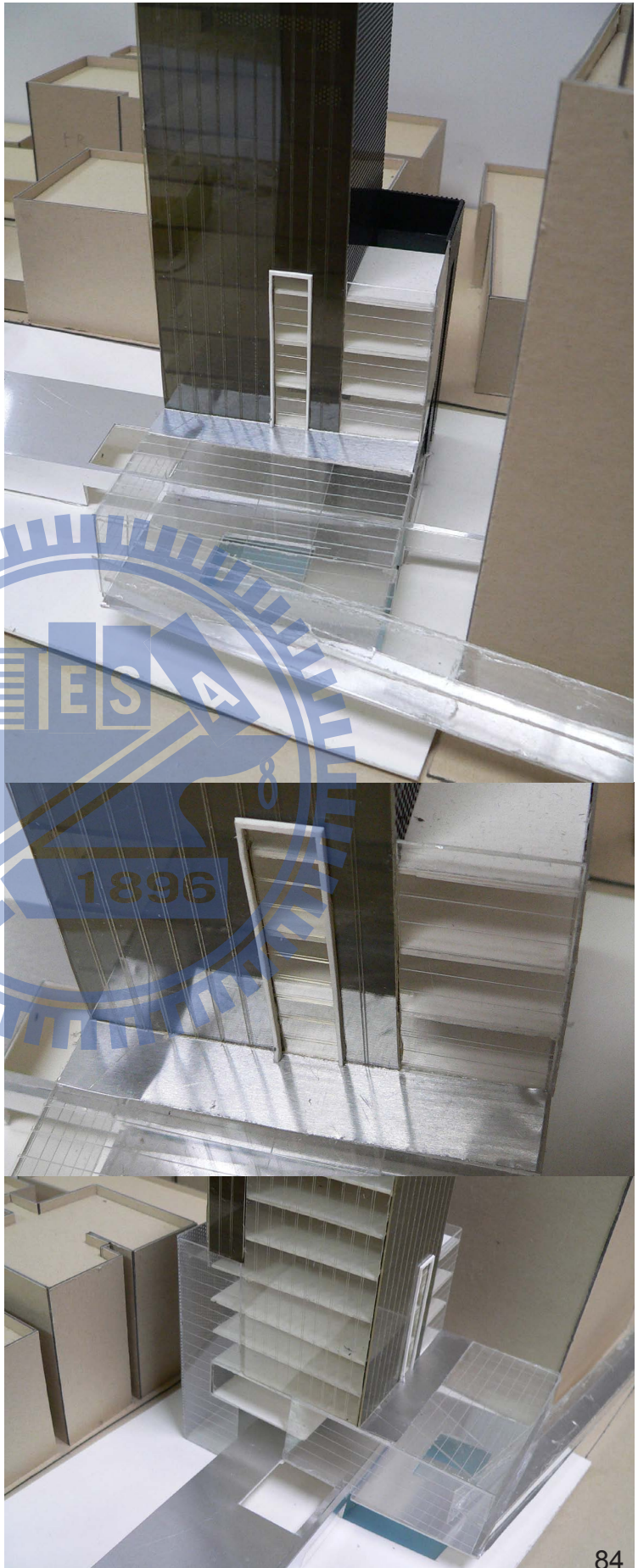
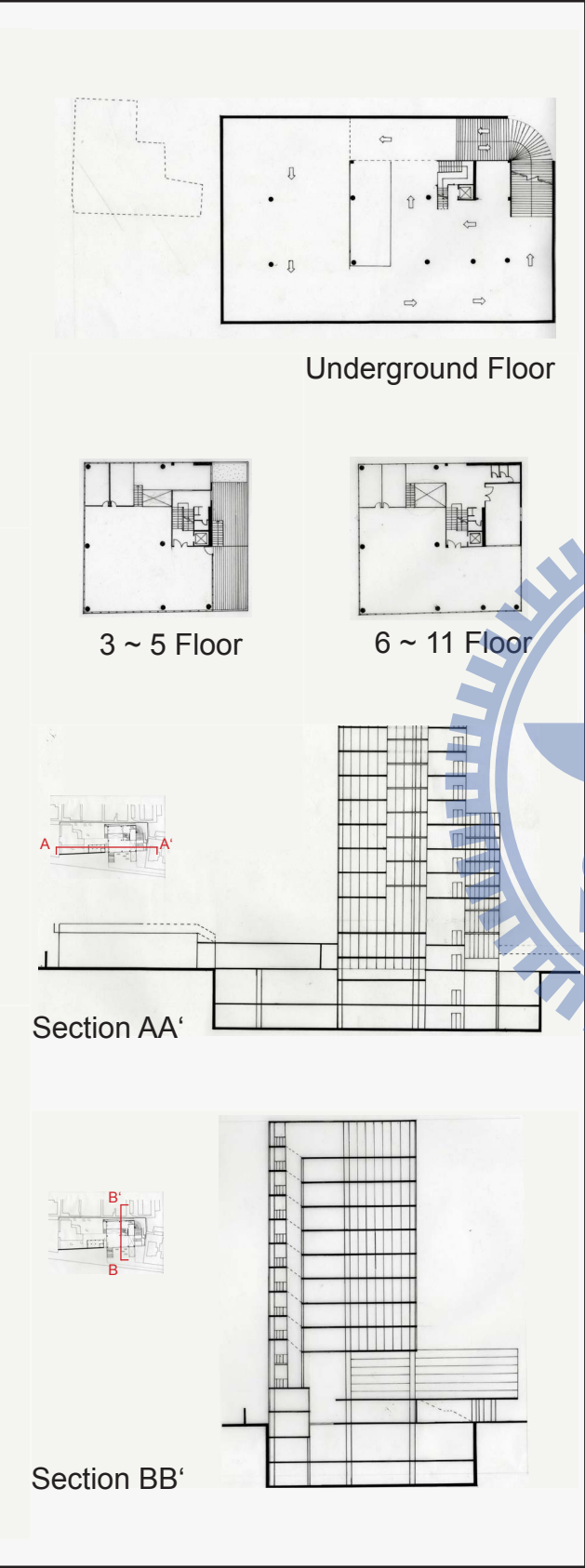


1 Floor



2 Floor







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