系統融合下的尺度變異

質化與量化設計方法-建築作爲人與環境整合性介面設計策略

Scale Variations Through Systematic Mergence in Architecture

Architecture as Interface,
Quantified and Qualitative Meta-Design Strategies
Between Human and Environment

國立交通大學建築研究所

碩士論文

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Abstract

Keywords: 人與環境介面、系統尺度變異、設計策略、物理環境控制、空間原型

建築經歷著環境的變動，一則以不變應萬變，一則以互動的方式回應著環境的動態，藉此提供人們一種透視這個世界的眼光。爲了要控制建築內的環境，環境控制系統成爲人與外部自然的代理者，因此縱使狂風驟雨，或而烈日炎炎，我們在室內環境中也能從容於理想化的常態—機械控制下的人造自然。

建築界定著人與環境的關係，內在環境因外部能源供應的環境控制漸漸與建築自身產生分離，人也因此與外部環境脫離。物理環境控制被視爲建築科技發展，在業務上多由科學方法和工具甚至專業人員來幫助建築師解決問題，漸漸產生一個難以整合設計發展的環節，普遍地變成一種條件或附加價值。建築師可以進一步將這問題視作設計機會，超越效標要求的層次進而成爲一種整合性的設計策略。

策略(Strategies)指的是重複出現在建築師作品中的機制、程序、範例以及形式手法等等用來建構的工具〔注1〕。在機能性價值確定下建築師可以在設計發展初期就全盤掌握設計方向與品質。世界上的物質與能量以一種比例關係有機地存在，建築定義物質狀態並形成空間，在物質狀態被操作下同樣能影響能量的質與量，建築內容所包含的活動都被能量驅動著，在設計中有許多如仿生等系統轉化的方法，其對象與建築目的之自身尺度與尺度差異蘊含著能量的可操作性足以成爲整合性的設計方法來發展人與環境介面下活動、機能、能源、空間形式等複層次建築課題和解決方案。面對一個基地環境所包含的複雜與衝突性，尋求正確尺度將新系統介入，方法〔註2〕可依序分作三個可往復進行的階段：

1.解析(Divergence)：多元地尋求外部系統作爲基地問題的分析工具。
2.轉換(Transformation)：尋找正確的外部系統介入尺度。
3.整合(Convergence)：將其轉化並滿足建築要求。

在這四個studio均由不同面向嘗試以建築師可掌握的技術基礎下、非效能本位，物理環境作爲出發點對人和環境關係進行新詮釋，並且據此進行演練與分析。面對四個條件各異的基地涵構與課程方向所相互構成的設計條件各提出一個系統與其空間原型(Prototype)的方案，這四個方案在設計方法上可分作質化與量化進行嘗試，並在這四個案例中分析他們如何運用多元尺度的系統融合策略尋找、分析並解決問題。

這些實作與討論包含幾個意志：

1.透過一個設計定義作爲切面：建築是透過物質/空間操作的方式將脈絡調整爲一個更具某種正向價值的關係組態，思考人-建築-環境關係該如何透過尺度變異的系統進行重構。
2.環境控制不再僅滿足人因需求，進而改變需求，提供program與可能性發展設計。
3.新系統介入，基地遭遇多元尺度的狀態時，什麼該變，什麼該保持熟知常態。
4.盡可能地解放建築於機械設備與外部能源(質：類型上、構成上/量：能源上、材料上)

Euryholinescape與華江熱地景兩個設計案以量化設計法爲基礎進行演練與探討。自然元素透過建築被有意識地精準作用的力量，透過系統所呈現出來在自然力被可視化的環境樣貌。系統作用同時滿足建築需求的前提下尋找特質化空間美學的可能性。

交大學生活動中心與Zip珍本圖書館典藏暨閱覽空間兩個設計案以質化設計法爲基礎進行演練與探討。建築有1/3樓地板面積被機電與設備等工程人員掌控，當環境控制從機械被解放回建築中，建築也從凝固的時間中掙脫正視眞實世界的動態。

〔註1〕Rafael Moneo, Eight Contemporary Architects, 2008
〔註2〕分析、轉換、整合的方法架構是一種相較於傳統設計方法更偏向於系統設計方法的新設計方法，詳見John Christopher Jones, Design Methods, 1992

Abstract
(English Version)

Keywords: Human-Environment Interface、System Scale Variations、
Design Strategies、Environmental Control、Spatial Prototype

Buildings stand with environmental variations. Some of them maintaining the status quo, but the others commit interactive ways to respond to the dynamic environment, and provide people a perspective of this world. In order to control the building environment, environmental control systems to become the agent of human and external nature. So even the weather is extremely hard, environment in the buildings can also be calm in the idealized norm □ An artificial nature under the machinery control.

Buildings define the relationship between human and the environment, due to environmental control what supplied by external energy, the internal environment gradually isolated from buildings architecture, and also separated people form external environment. Environmental control has been developed as building technology. Problems always were solved with scientific methods and tools or even solved by professional engineers in architects' business. Gradually, it became a difficult part of design development, and generally became a sort of condition or bonus. Architects can further this issue as a design opportunity, beyond the level of criterion require and then become an integrated design strategy.

[1] Strategies means mechanisms, procedures, practices, and forms what repeated in and architect's works as constructional tool. The architects can deal with both dimensions and qualities of design in the initial process if functional values have been decided. Substance and energy existed in the world in organic ratios. Architecture define the status of substance to form spaces, under design operations, status of substance can affect both qualities and quantities of energies. Activities in the buildings are driven by energies, There are many systematic transformation methods like biomimetics in the domain of design, scales and scales varieties of their objects and purposes contain energies operation possibilities are sufficient to become to a integrated design methodology to develop the solutions for the multi-layers issues such as activities, functions, energies, and space form in human-environment interface. Environment of a site contains a complexes and conflicts, to figure out the correct scale for the new system involving, [2] the method can be sequentially divided into three stages can be carried back and forth:

1. Divergence: To explode varied external systems as analysis tools for problems on the site.
2. Transformation: To look for a correct scale for systematic mergence
3. Convergence: To transform systems to an integrated one with architectural demand.

All of these four studios were trying to represent the relationship between human and environment out of environmental control versions: chargeable by architect's technical base, but not performance prerequisite. Face such four varies conditions consist of contexts of the sites and dimensions of lessons. One spatial prototype was proposed for each program. These projects contain both qualitative and quantified method in design, and use multi-scale systematic mergence strategies to find problems, to analysis and to solve them.

These exercises and discussions are including a few purposes:

1. In a vision of a design definition: Architecture through physical / spatial operation to adjust the context to become a configuration with more positive value, and to think how to reconstruct human-building-environment relationship through a merged system with new scale.
2. Environmental control is no longer only satisfy human's need, but then also change them, so as to provide programs and possibilities for design development.
3. When the new system involved, varies scales came across on the site, then what should be changed, and what should be kept the norm what familiar to people.
4. To release Building from machinery and on external energy sources as far as possible. (Quality: for typology, for composition / quantity: for energy, for material)

"Euryhalinescape" and" Heat Map" are designed with quantified design methods. Elements of nature visualise nature energies as environmental appearance through the intentional accuracy in architecture. To seek individualised possibilities of spatial aesthetics under the premise that system is workable and also adequate in architecture.

"Town and Gown" and" Zipping Library "are basis on qualitative design methodologies. 1 / 3 of floor area in a Building are in the charge of mechanical and electrical engineering staffs, when the environmental control release from mechanism, then, architecture returns to real-world dynamic from static time.

[1] Rafael Moneo, Eight Contemporary Architects, 2008

[2] "Divergence,Transformatio,Convergence" is one of new design methods which system design bias more than traditional design methods, see John Christopher Jones, Design Methods, 1992

謝誌

當阪本龍馬看到黑船的時候，瞠目結舌地幾乎跌坐在礁岩上，嘴里吐著無法連續地驚嘆：「黑…黑船、這就是黑船啊！」（日本浦賀、1853）

不同的時空，百餘年後的交大建研所，我也感到歷經了一次黑船的洗禮。不全然是技術與智識上的，復有一種相對於黑船的巨大，這裡有限規模所展現出來的動力與活力，所有人都傾全力向前突進的意志。

在此求學過程當中承蒙曾成德、龔書章、黃明威、曾瑋老師在議題發展、建立觀點與論述、設計發展、研究方法等多方面的啓發和指導，以及侯君昊、許倍銜老師對於數位領域的介紹並引領我走出諸多學習上的困惑，在此學習獲得許多同學技術上、想法上甚至生活上的滋養，這群各懷特長又熱情洋溢的建築學人引發我的改變將持續發酵。

於此也要對東海大學建築系的邱浩修、林昌修等多位老師表達深忱的謝意，在大學五年中帶著我建立建築的基礎能力、觀點與探索動力據以進入研究所階段獲得進一步學習。

最後，絕非公式化地誠摯感謝支持我的家人與朋友。求學之路無坦途，每每陷入膠卓、困難之時，總能得到他們的關懷、鼓勵與諫言，讓我秉持信念走過充實的兩年。

Catalogue

質化

從基礎設施到空間元素

如果將中水處理系統縮小爲空間序列

Programming

外部系統特徵→環境衝突與需求→空間類型/處理程序→人/資源流動的處理疊合

Form Logic

解構程序→程序特徵→尺度變異→空間類型

Material & Tectonic

水與水汽+AR資訊(軟，變動)/鋼構玻璃空腔+RC等(硬，常態)

Town and Gown

Site: 交大邊界(台灣)

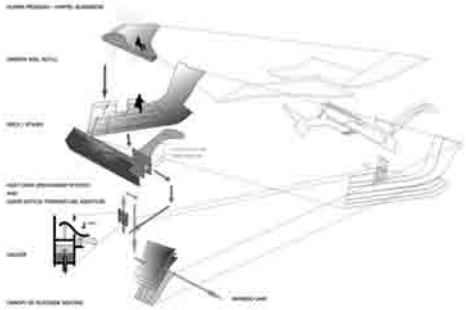
Duration: 9/2009-1/2010

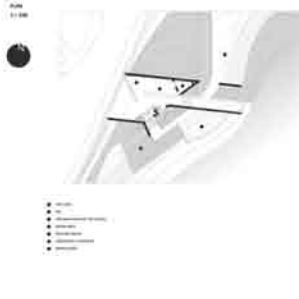
Adviser: 曾成德

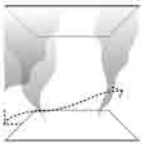
這是一個學生活動中心提案，我將學生活動視爲學校教育-社會教育的生活學習，因此活動中心可以做爲學校與社區的新介面來思考。

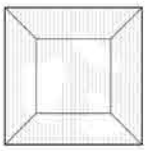
然而校園邊界面臨大學城學生與居民生活連結與矛盾的複雜。在房屋租賃、設施機能上相互依賴，活動特質、生活步調卻又有所歧異。

雙方共同需要的部分可作爲設計發展基礎，基礎設施與物環是居住環境的普同需求，我從對學校而言具象徵意義的竹湖發仞，將活動中心以地景建築的方式轉化成一個縮小的中水處理系統處理由竹湖引入的水，並將系統中每個步驟質變轉化爲program及其空間，雙方各自進行生活的同時也正處理著每天所用之水，不協調的活動衝突隨著水與污物分離，協調的活動伴隨著雙方透過建築提供良好水質的善意，藉此營造人與水program和流程序列多層次疊合所產生機能的詩意，並建立精神與實質的建築友好。

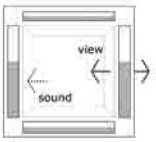






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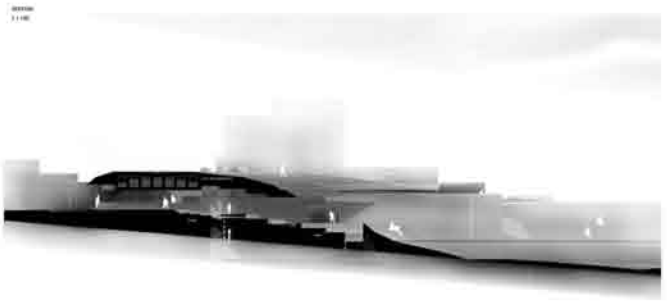
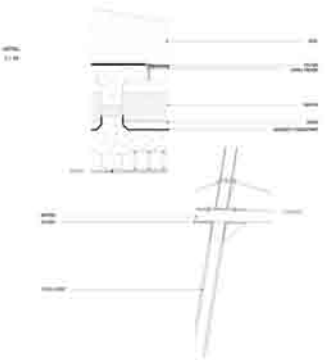



學生居住品質良侑不齊

外來活動的負面效益

都市紋理與校園景觀的不協調

虛擬實境娛樂、ktv與影音 a

機車棚與活動月台 b

餐廳、鬆餅屋與小商家 c

HUMAN MOBILITY

Taking students' activity as life education

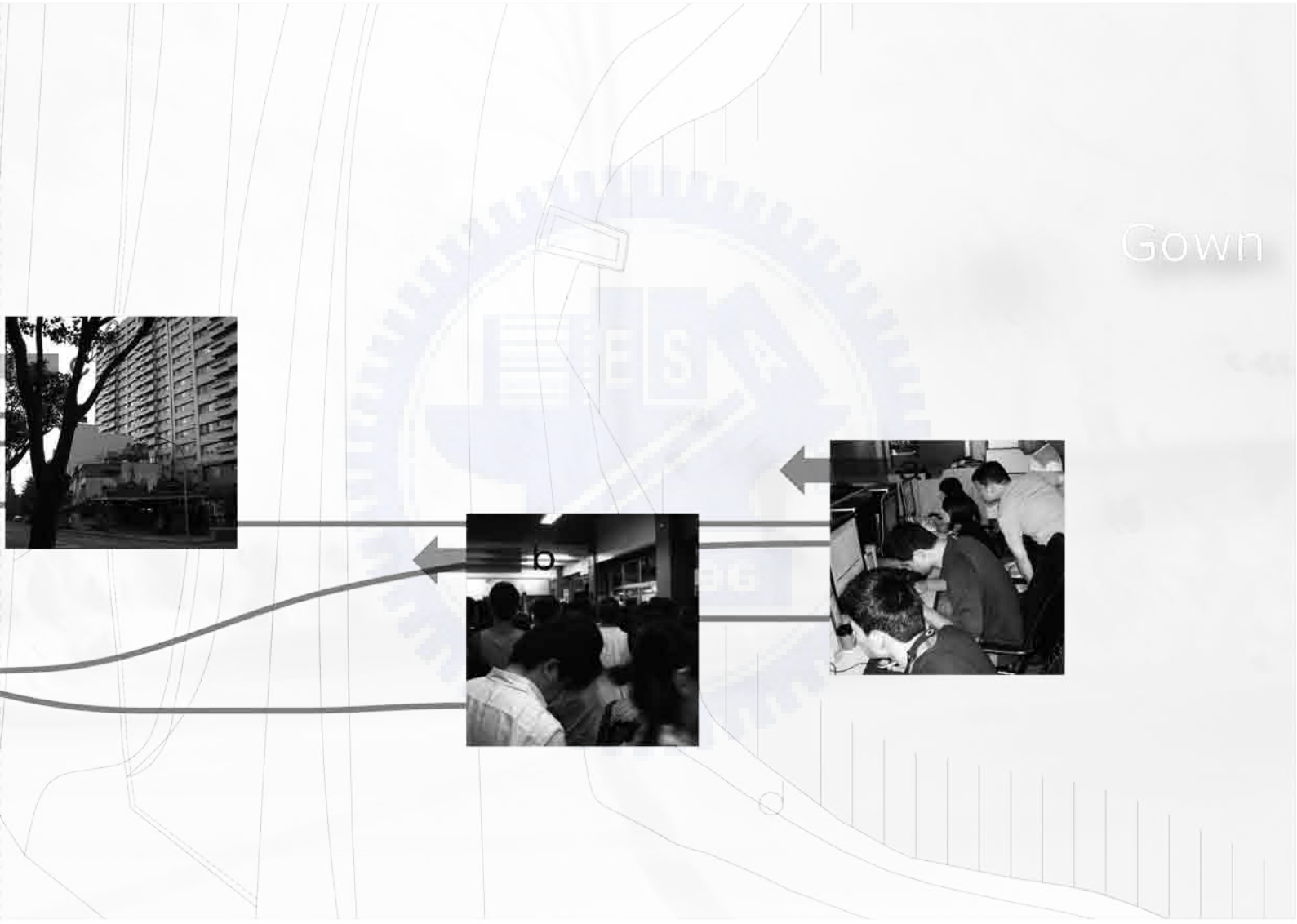
WATER MOBILITY

Taking extended lake as new interface

1 租屋導覽

2 運動、熱點誘導

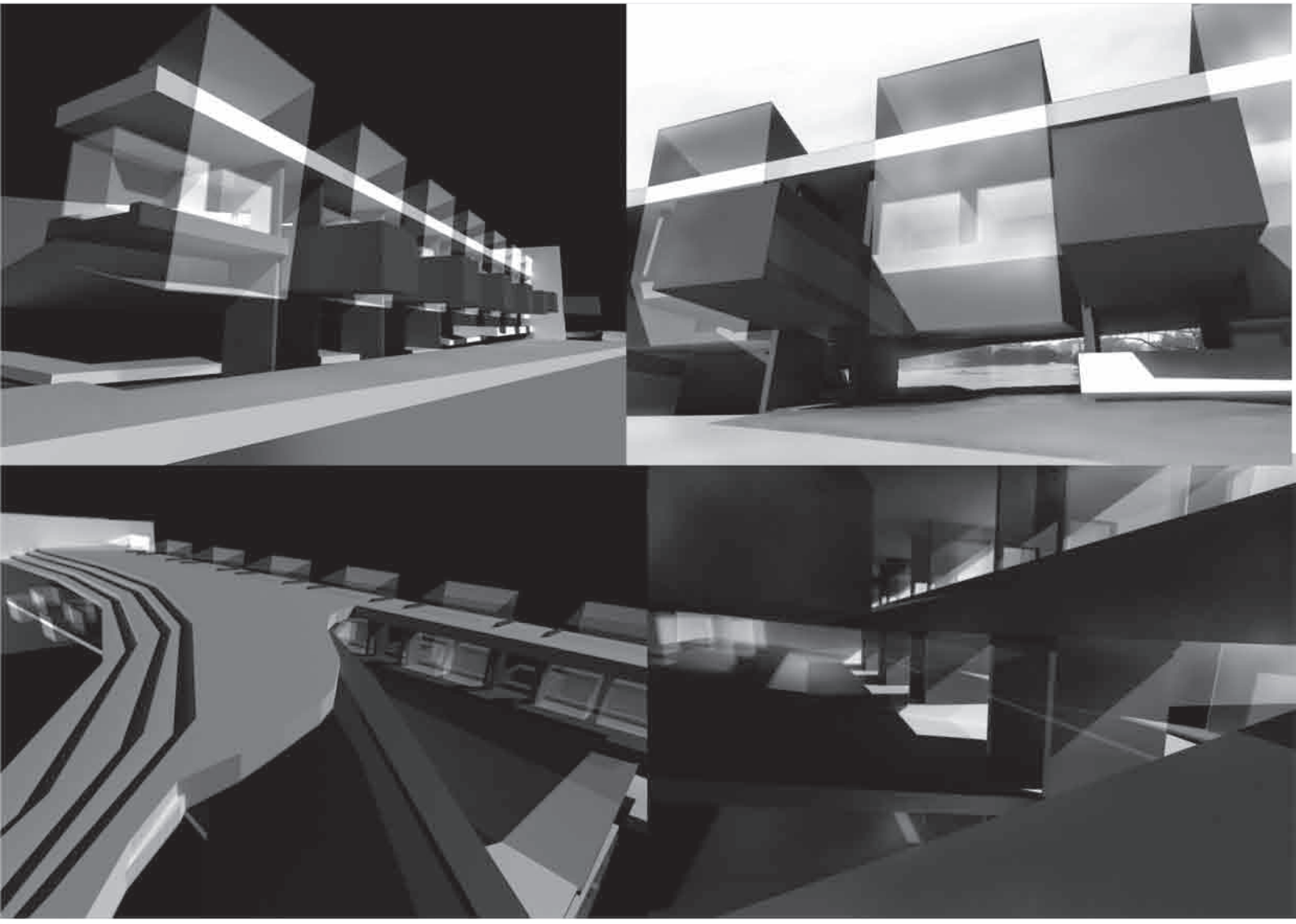
3 緩衝的自然介面



學生生活娛樂的副作用

空間/機能佔據

社區土地利用的單一性



❶ Garden

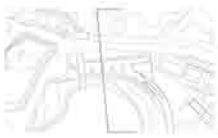
❷ Car Lane

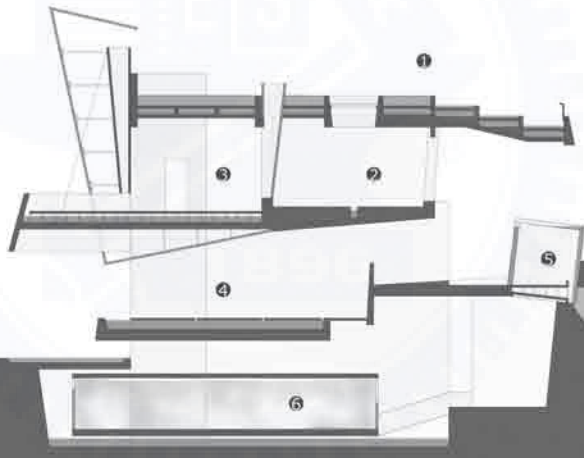
❸ Residents Guide

❹ Restaurant

❺ KTV box

❻ VR Game Zone





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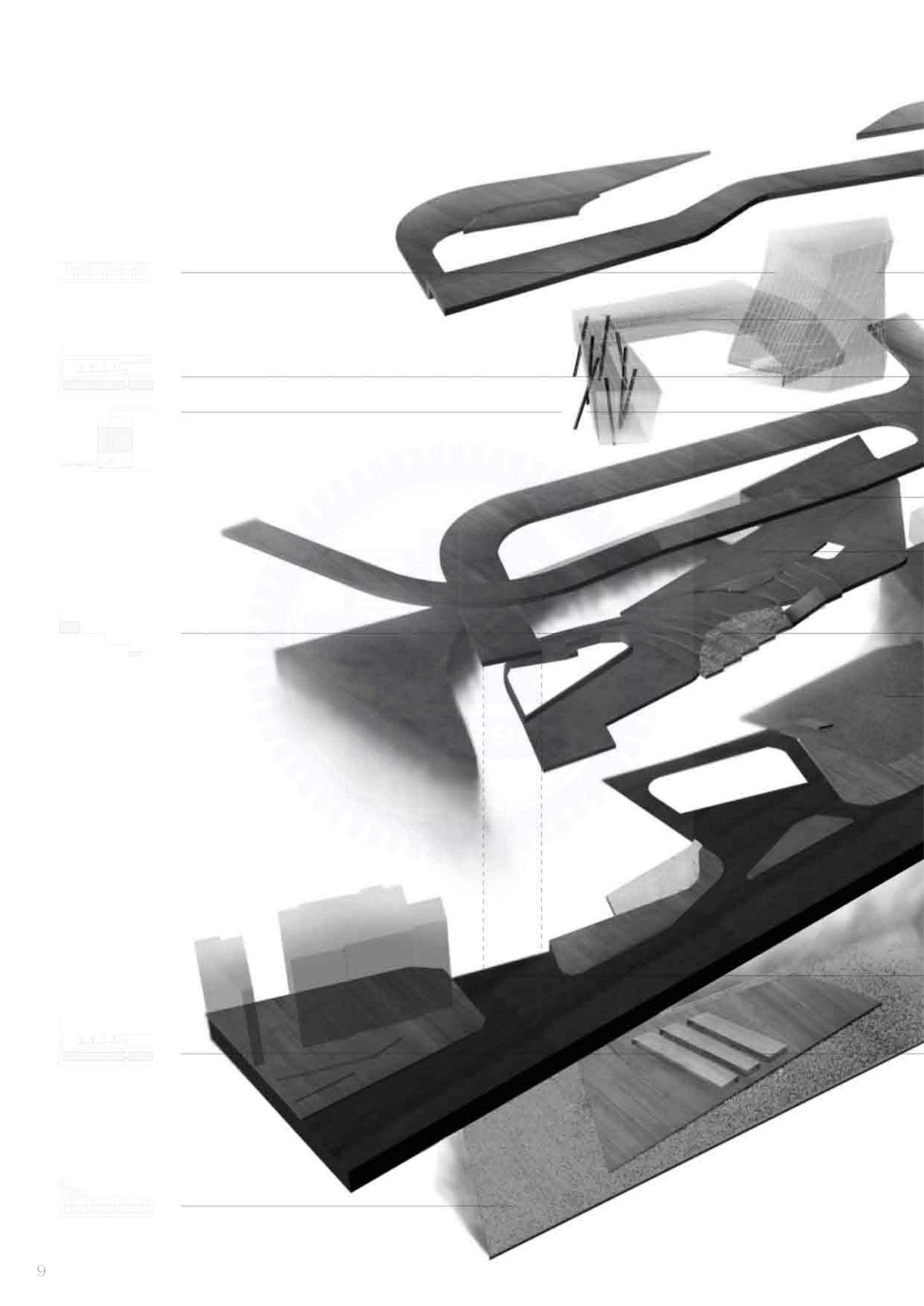
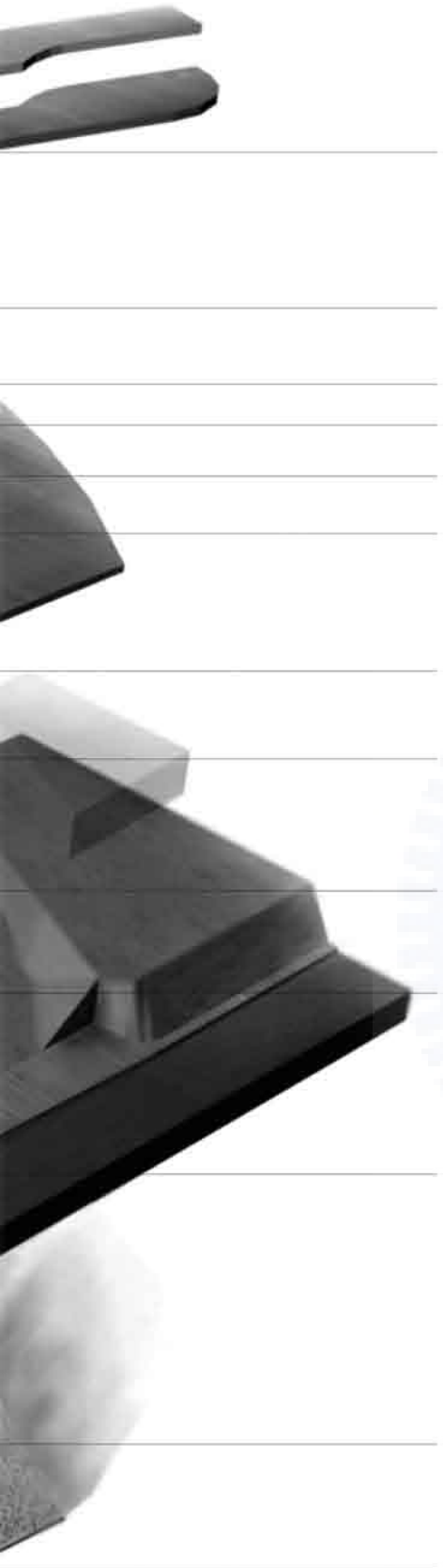




Roof

Roof

Sunshine Tower

Bus Station

Toward Inside of Campus

AR House Guide

Pillar / Pipe

Upper L

Lane for Car

Open Space with Vagetations

GL
(Campus)

Pool Stairs

Waffle House / Restaurant

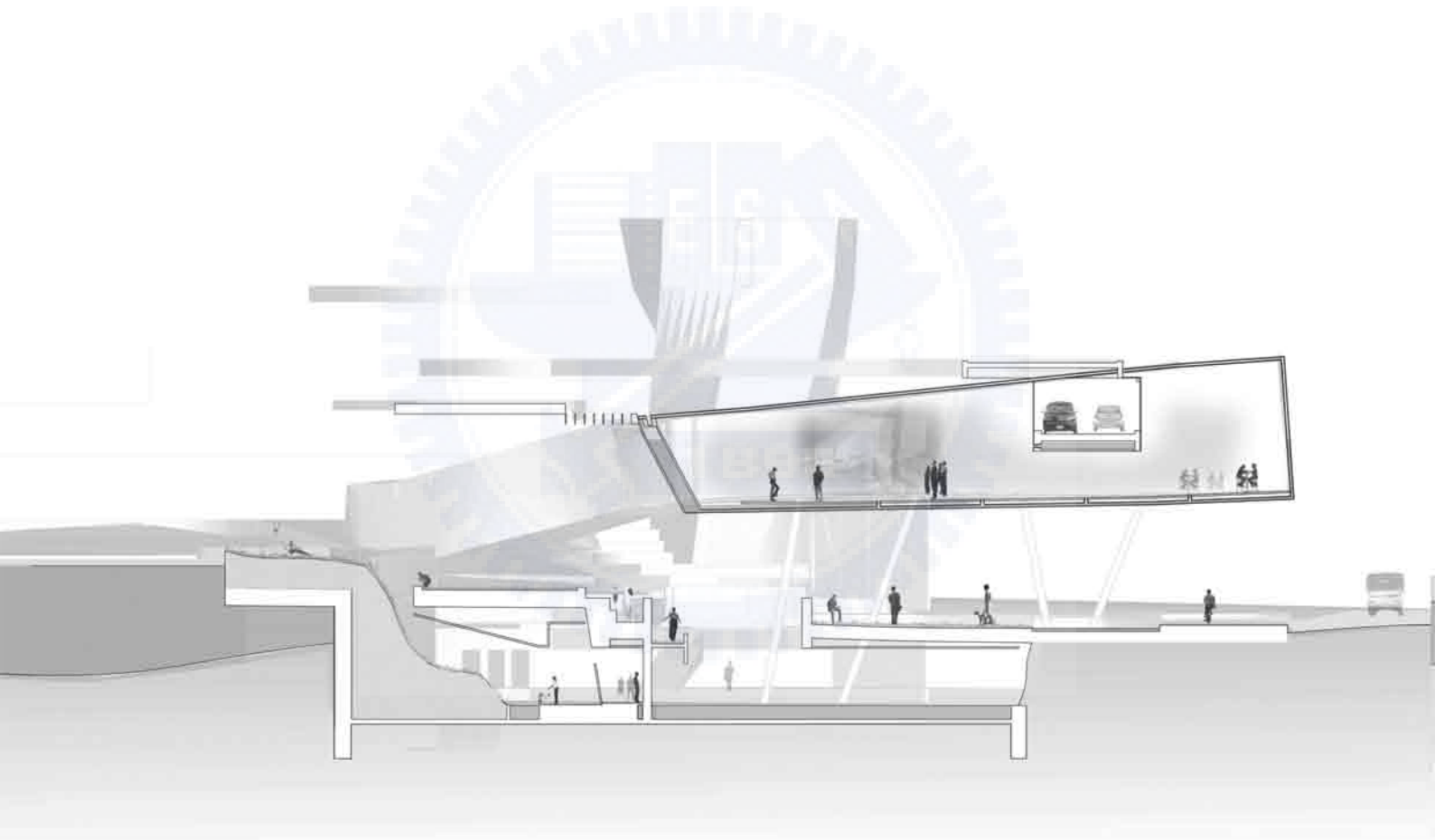
Motorcycle and Bike Parking Lots

GL
(Town)

Entrance

AR Entertaining Space & Network

Under L



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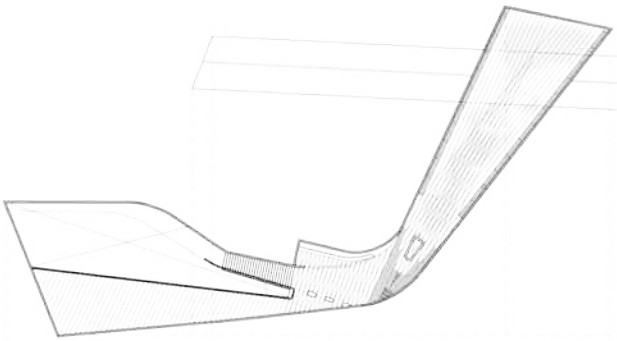
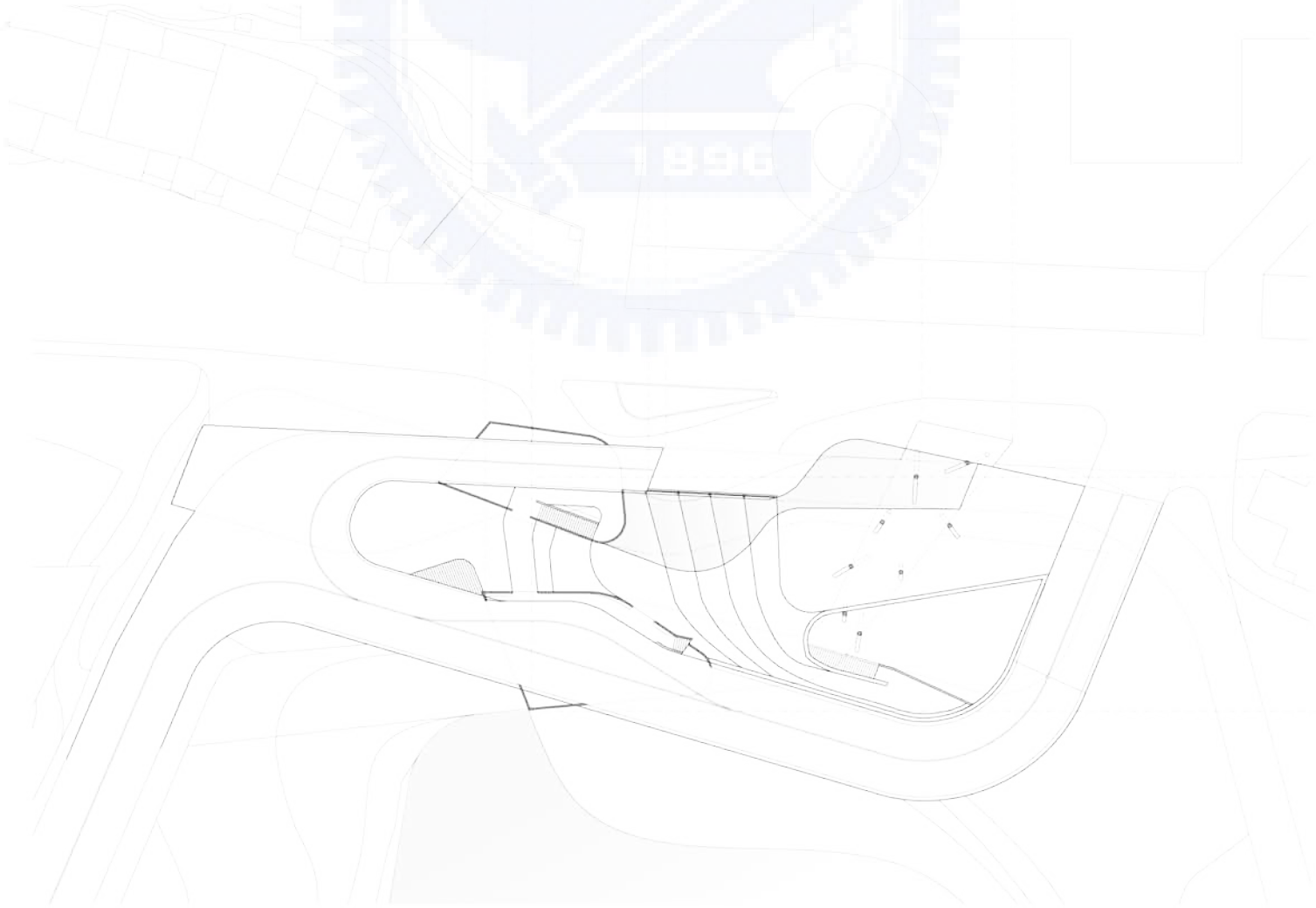
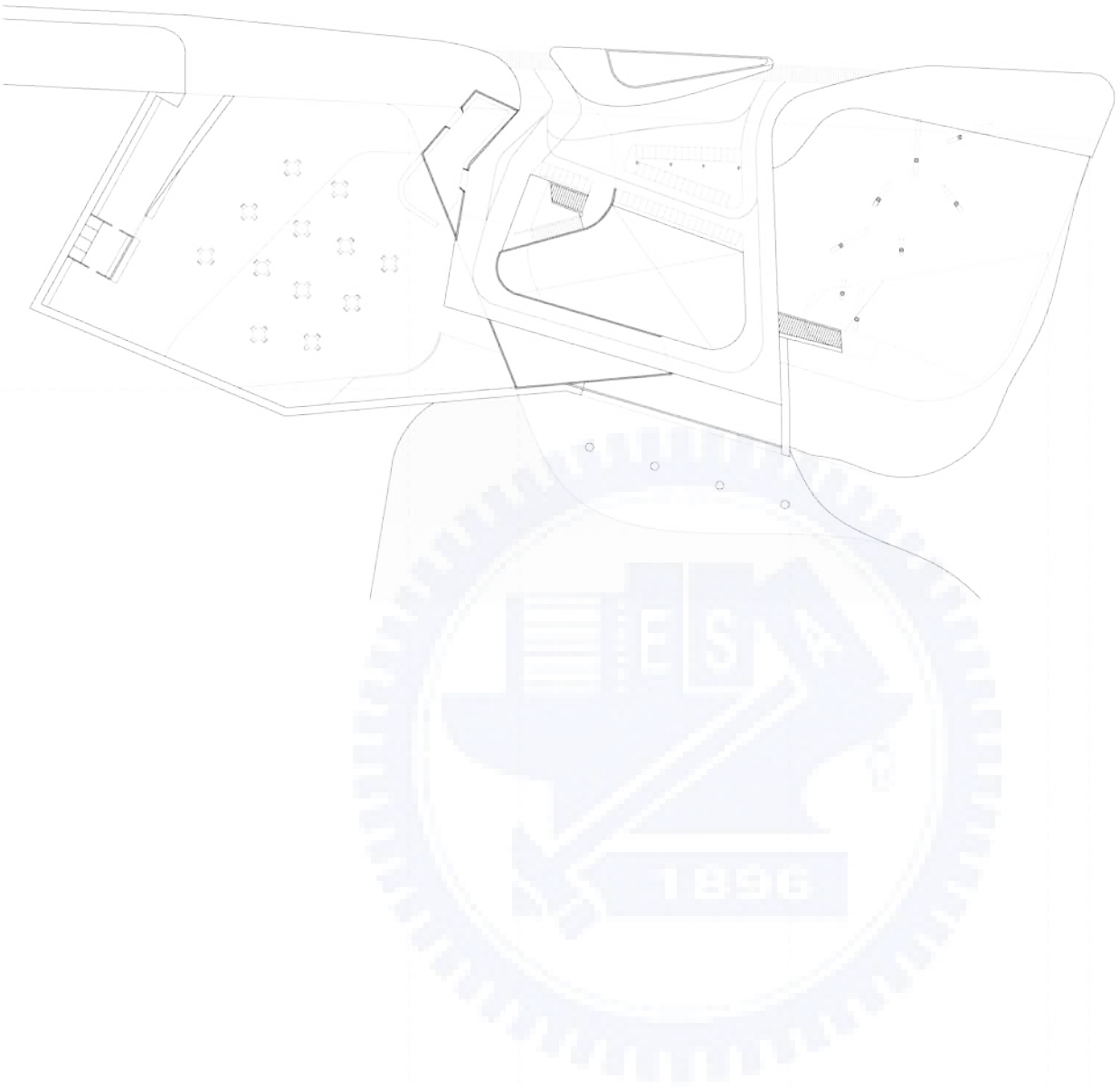


Upper Level Plan

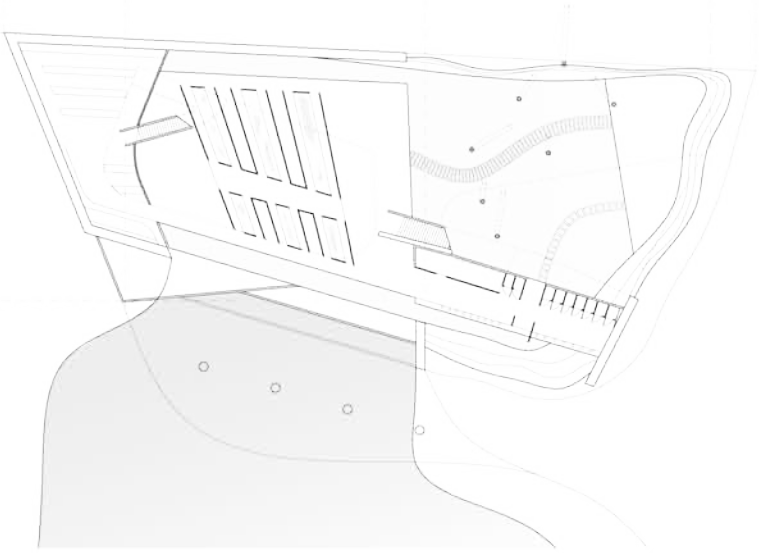
GL / Public Side Plan

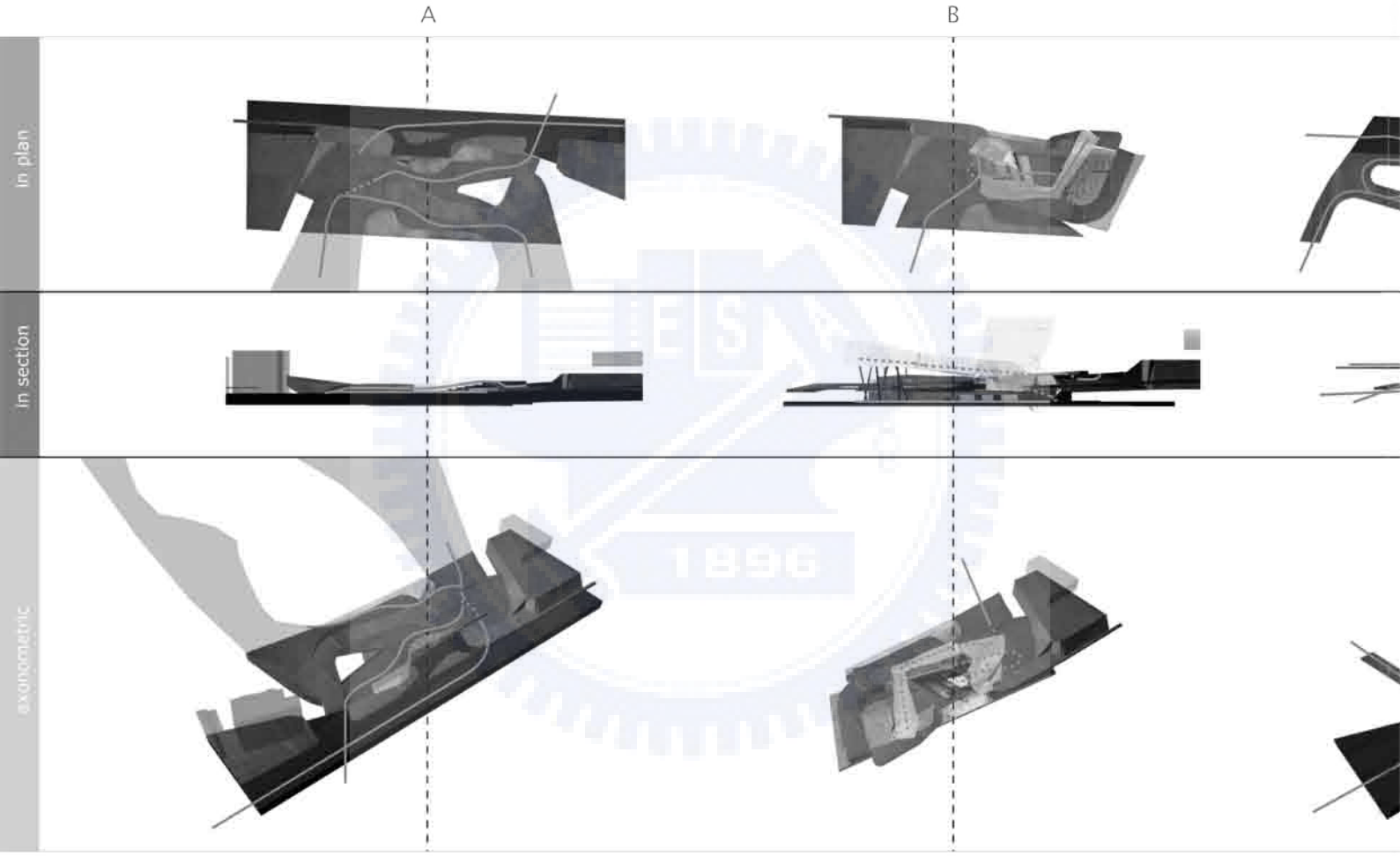


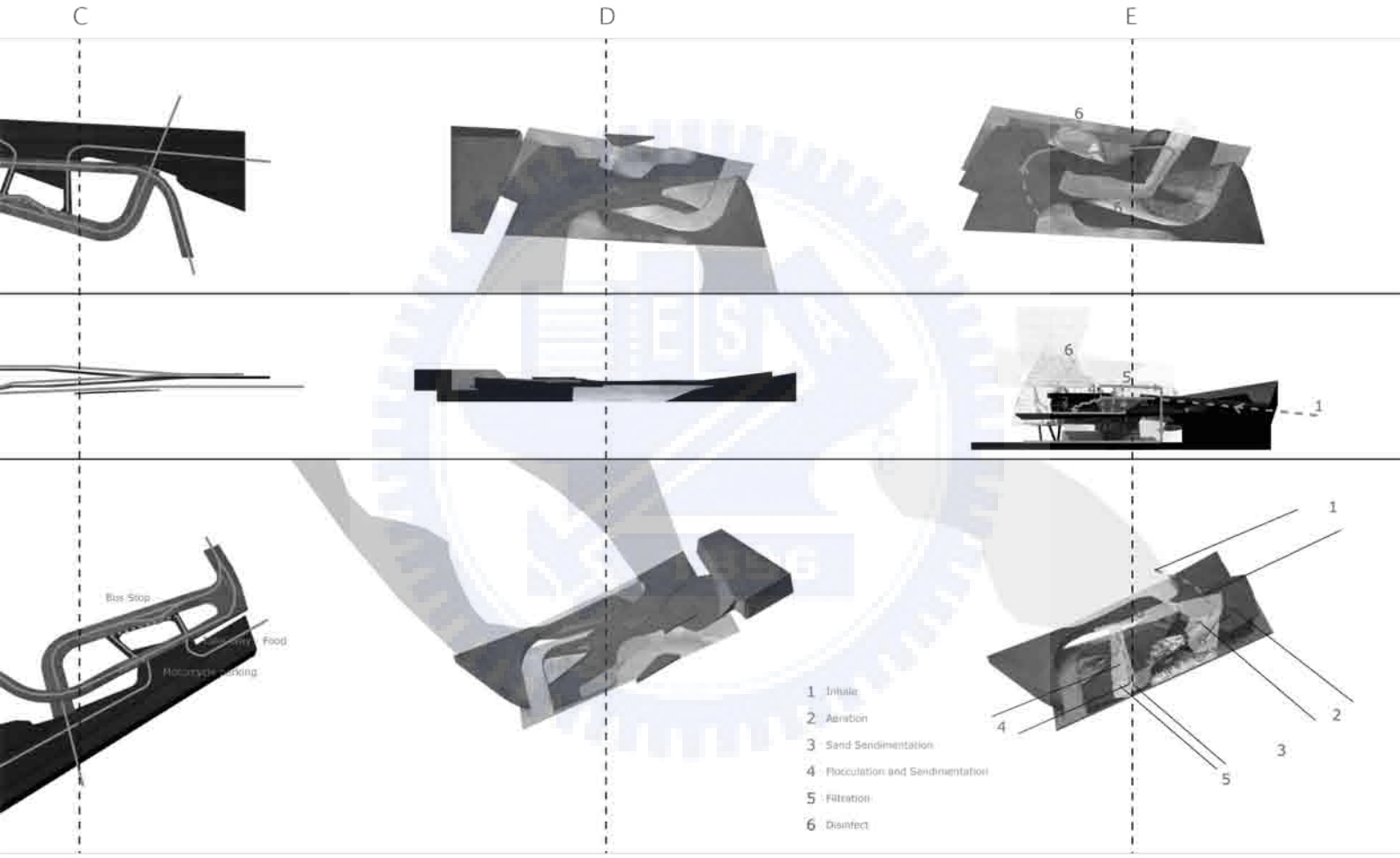
GL / Campus Side Plan



Under Griond Level Plan




A
B
in plan
in section
axonometric



A Community

B Stundents

C Motor Circulation

D Landscape - Green and Water

E Water Process