AGRI / CULTURE LIVING LAB 农业-文化-生活实验室

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MIT / TSINGHUA UNIVERSITY 麻省理工/清华
JOINT STUDIO 联合项目 **2012**

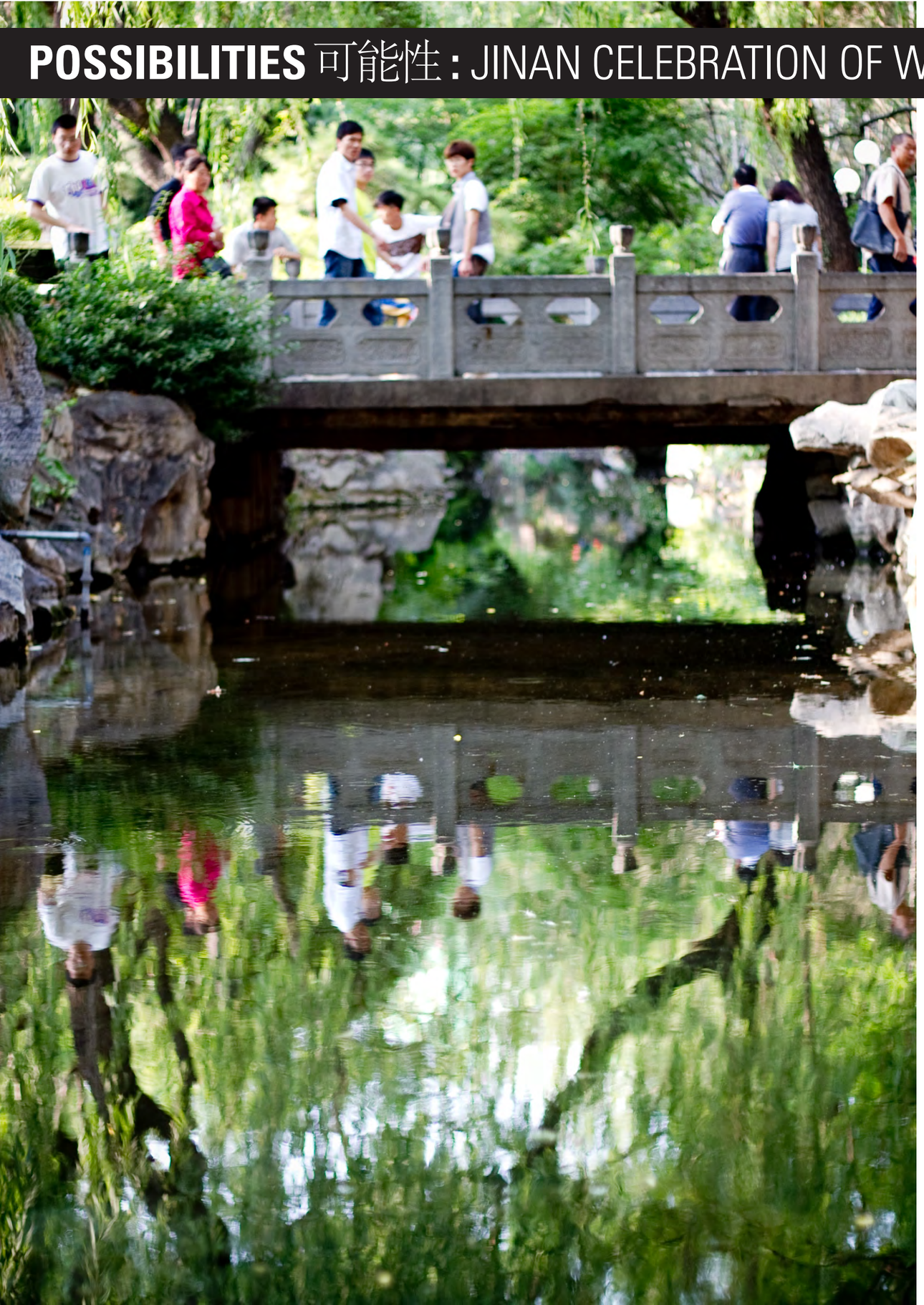
CONTEXT 背景

POSSIBILITIES 可能性 : CHINA & FOOD CULTURE 中华饮食文化

SHANDONG CUISINE :
ONE OF TEN MAJOR CHINESE CUISINES

POTENTIAL FOR GATHERING :
FOOD AS A COMMON HUMAN THREAD

POSSIBILITIES 可能性 : JINAN CELEBRATION OF WATER 济南的著名水系



POSSIBILITIES 可能性 : SHANDONG REGIONAL CONNECTIONS 北京和上海间的中

To Beijing

Shouguang

Jinan

Qingdao

Shandong Province

To Shanghai

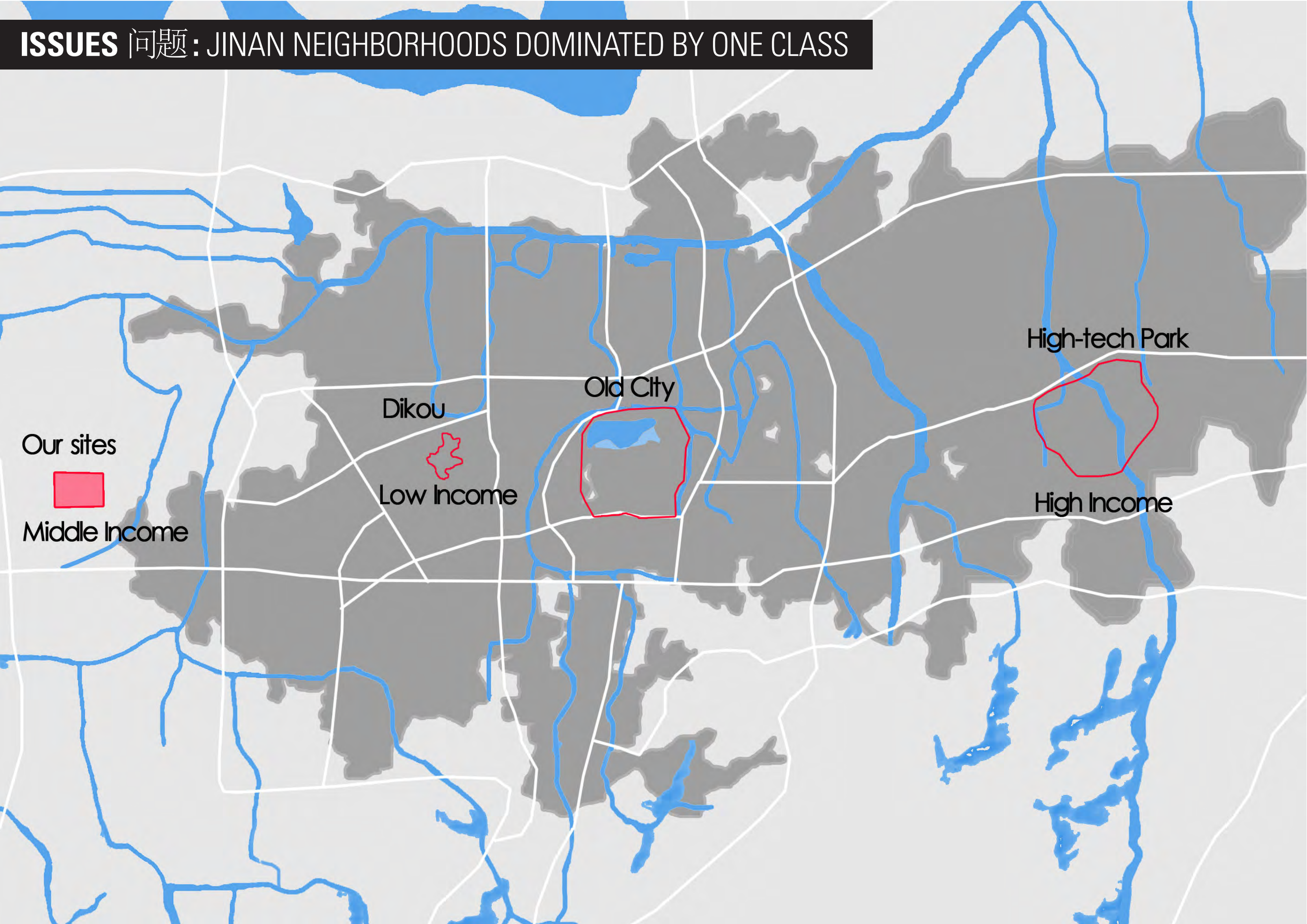
17 main Coal Power Plants

110,000 passengers per day on the high line

20,000 passengers per day to Jinan

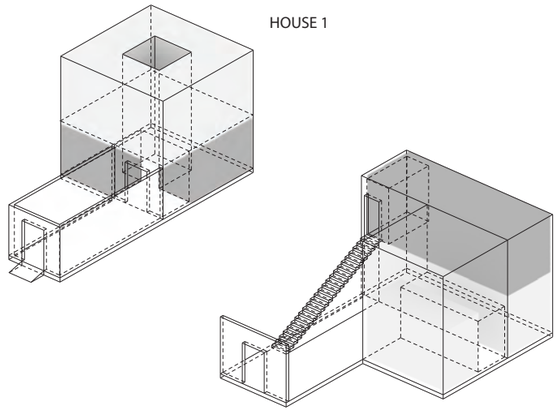
every **20** minutes a train

ISSUES 问题: JINAN NEIGHBORHOODS DOMINATED BY ONE CLASS



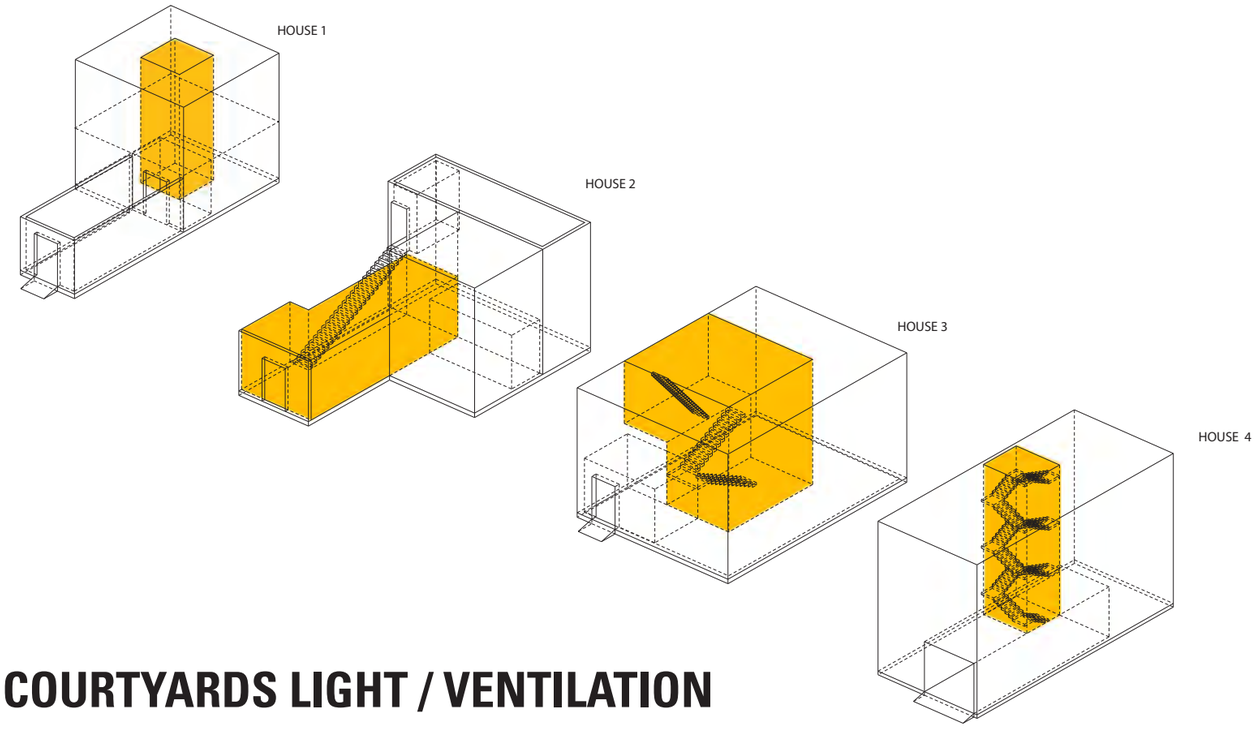
DIKOU RESEARCH

DIKOU : FIGURE GROUND



OWNER / TENANT INTEGRATION

OWNER: SINGLE FAMILY UNIT
TENANTS: SINGLE ROOM OCCUPANCY
SHARED SPACE



COURTYARDS LIGHT / VENTILATION

ISSUES 问题 : DIKOU & CITY VS. FARMS 被城市压倒的农业

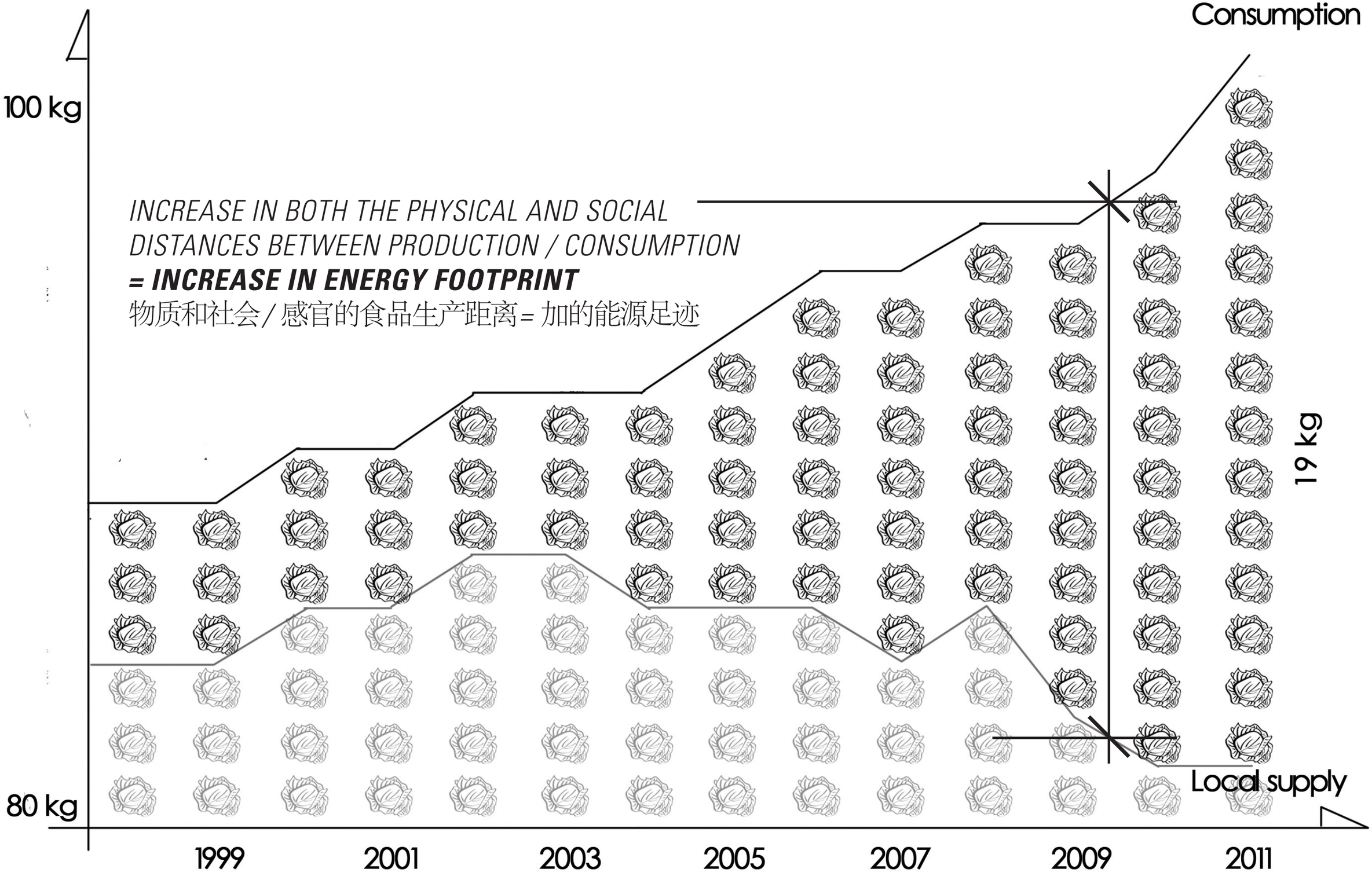
1970

275 ft
75 m

N

ISSUES 问题 : DIKOU & CITY VS. FARMS 被城市压倒的农业

ISSUES 问题 : LOCAL SUPPLY / CONSUMPTION GAP



5 PRINCIPLES 五个设计概念

COMMUNITY 社区
IDENTITY 身份
GRADIENTS 堤口的渐变
FLEXIBILITY 可变性
ENERGY 能源

VISION 愿景: AGRI / CULTURE LIVING LAB 农业-文化-生活实验室

GROWING 种植
EATING 饮食
COOKING 烹饪
+
BUSINESS 商贸
MANAGEMENT 管理
EDUCATION 教育
RESEARCH 研究
+
RECREATION 休闲
ENTERTAINMENT 娱乐
ENERGY 能源

VISION 愿景: AGRI / CULTURE LIVING LAB 农业-文化-生活实验室

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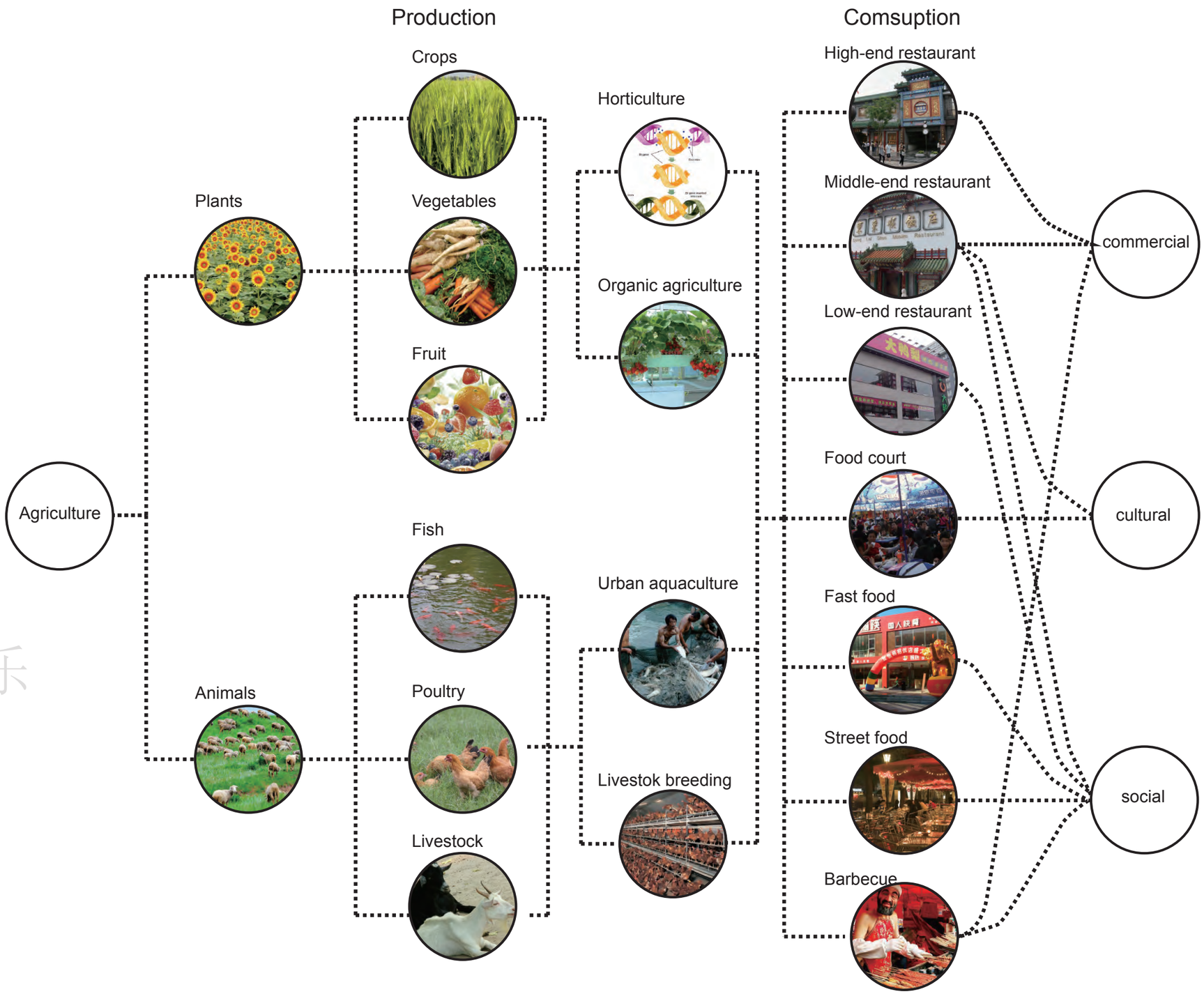
ENERGY 能源

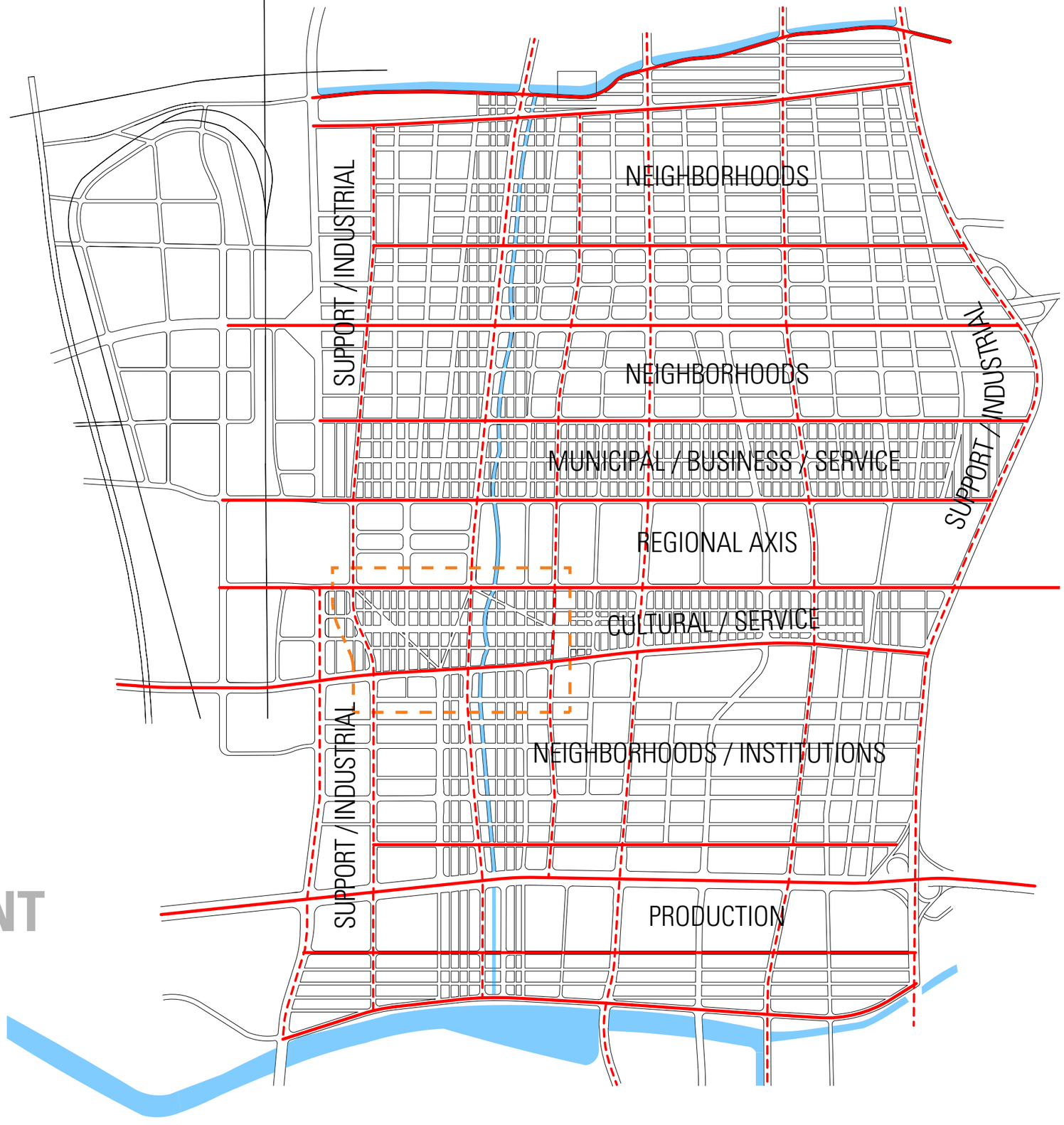
GROWING 种植 **EATING** 饮食 **COOKING** 烹饪 + **BUSINESS** 商贸 **MANAGEMENT** 管理 **EDUCATION** 教育 **RESEARCH** 研究 + **RECREATION** 休闲 **ENTERTAINMENT** 娱乐 **ENERGY** 能源



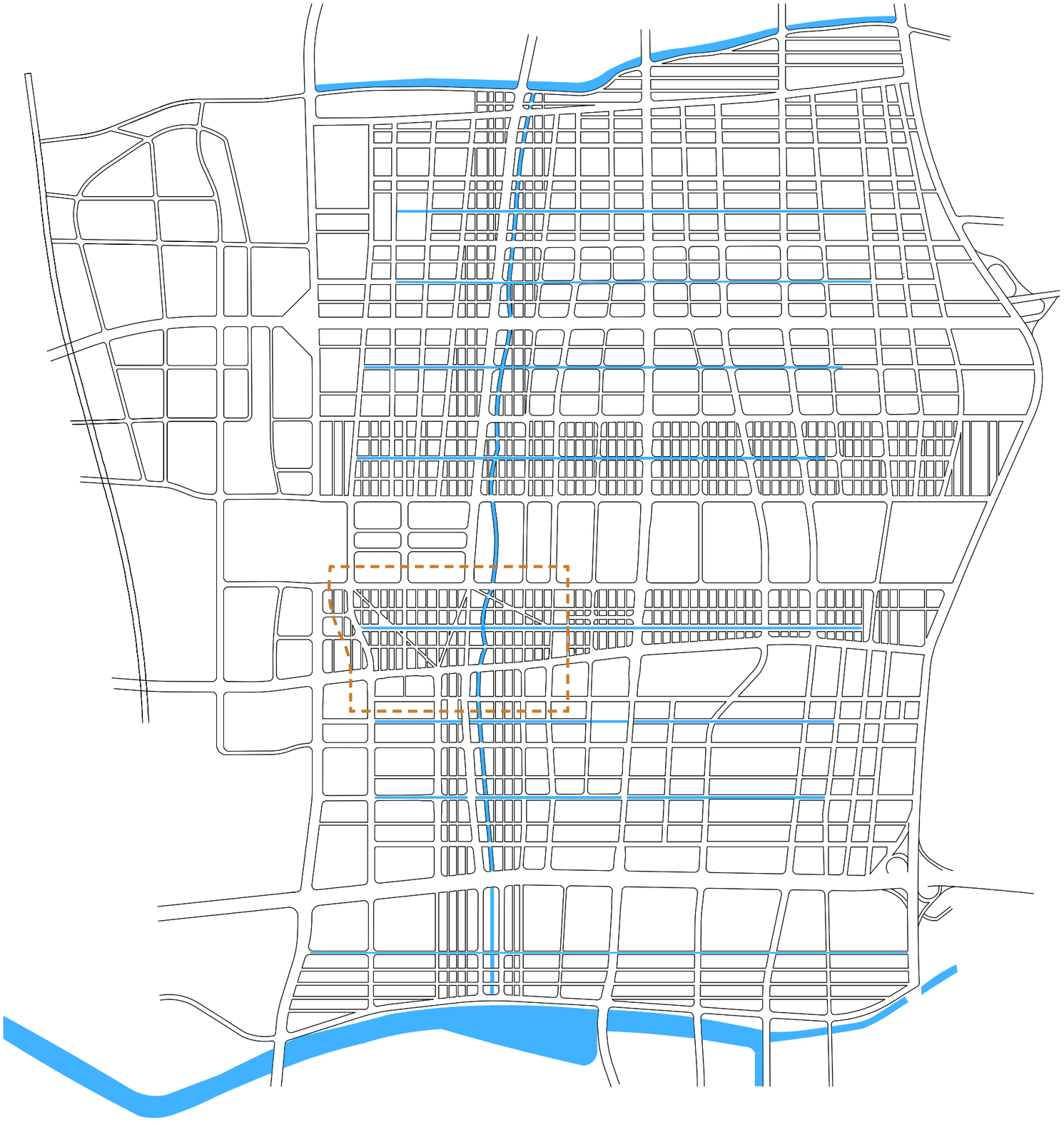
MASTERPLAN 总平面图

MASTERPLAN : DISTRICT STRIATIONS

GROWING
EATING
COOKING
+
BUSINESS
MANAGEMENT
EDUCATION
RESEARCH
+
RECREATION
ENTERTAINMENT
ENERGY

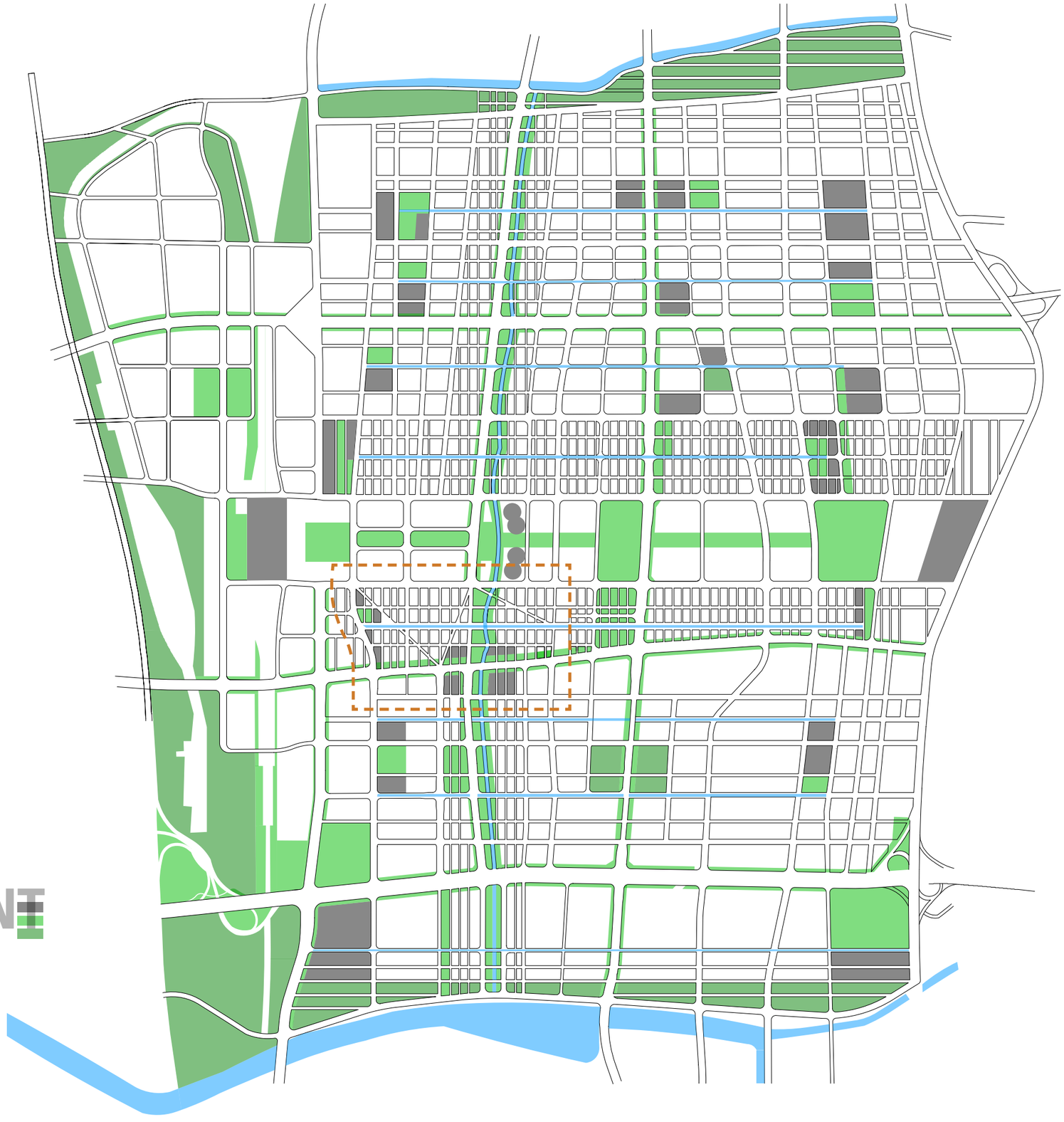


MASTERPLAN : STREET GRID

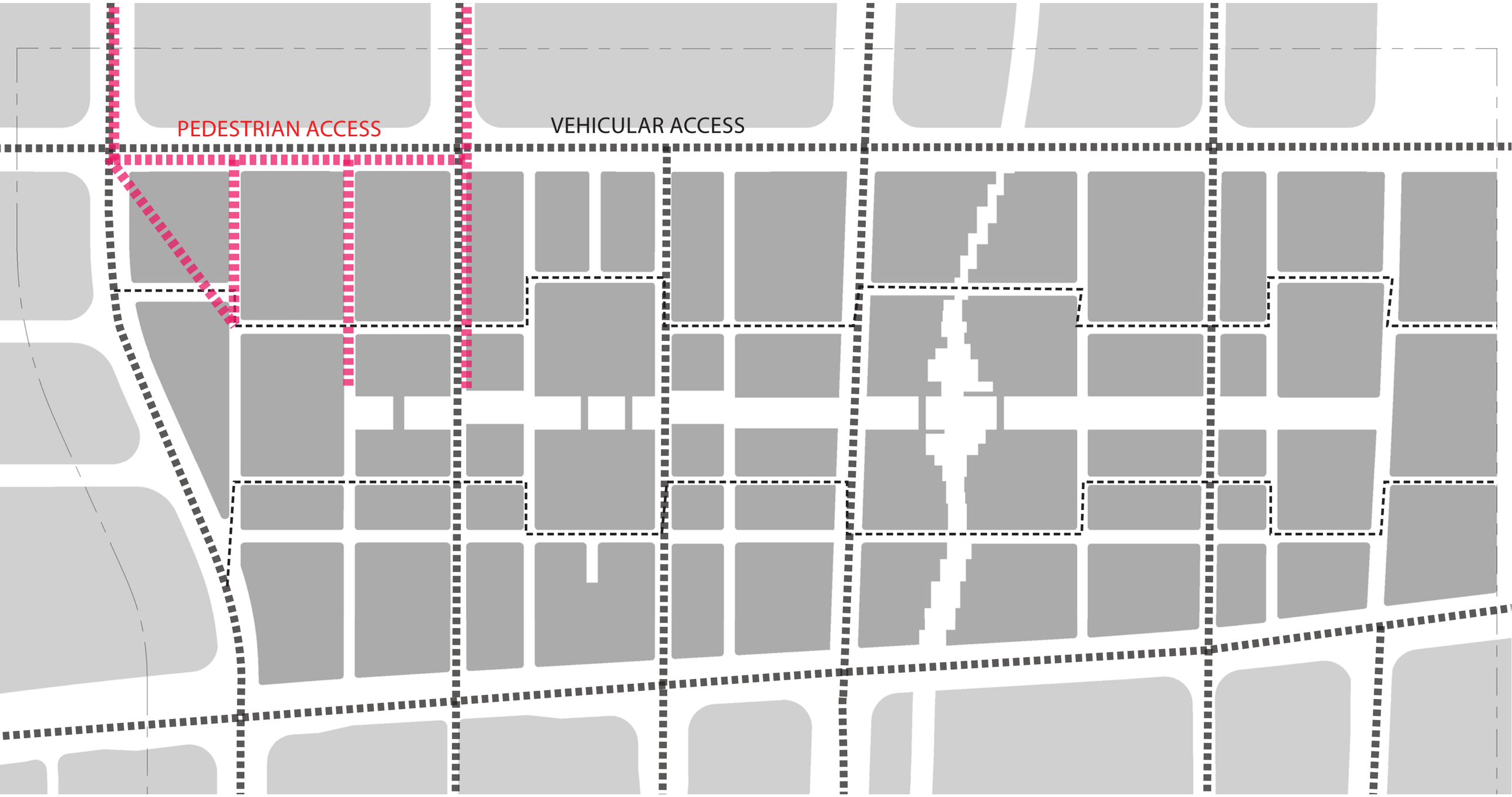


MASTERPLAN : LIVING LABORATORY

GROWING
EATING
COOKING
+
BUSINESS
MANAGEMENT
EDUCATION
RESEARCH
+
RECREATION
ENTERTAINMENT
ENERGY



SITE 地段 : ACCESS 可达性



SITE : LAND USE 土地利用

SITE 地段 : NODES / CONNECTIONS 节点

ENTRANCE:
TRAIN STATION

SOCIAL
CONNECTOR

MAJOR NODE

NODE 1

COMMERCIAL
CONNECTOR

ENTRANCE:
SUPER AXIS

MAJOR NODE

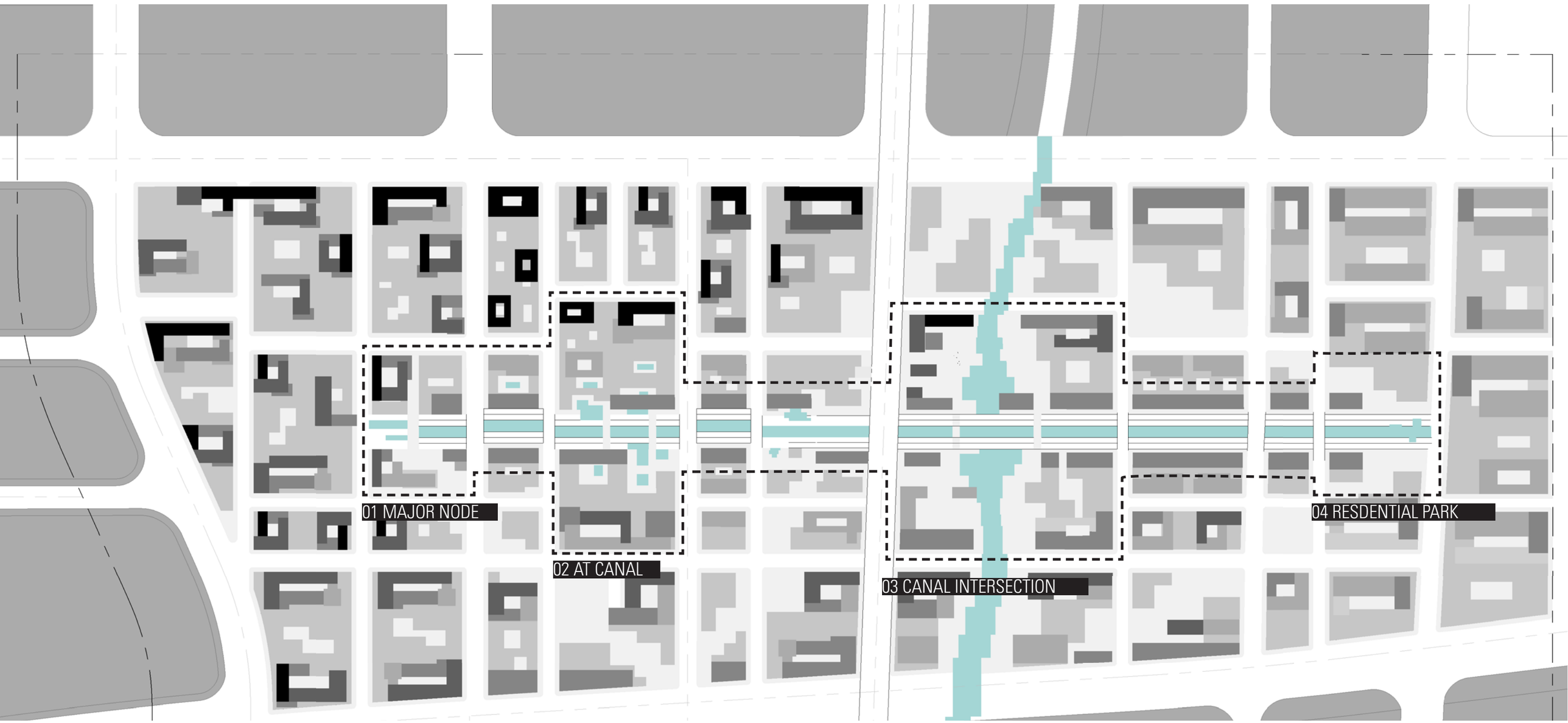
NODE 2

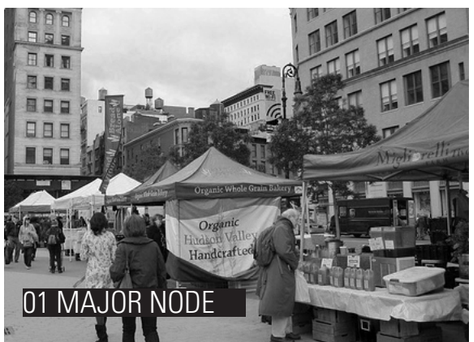
CULTURAL
CONNECTOR

ENTRANCE:
NEIGHBORHOOD

ENTRANCE:
UNIVERSITY

SITE 地段 : COMMERCIAL CONNECTOR 商业连接体

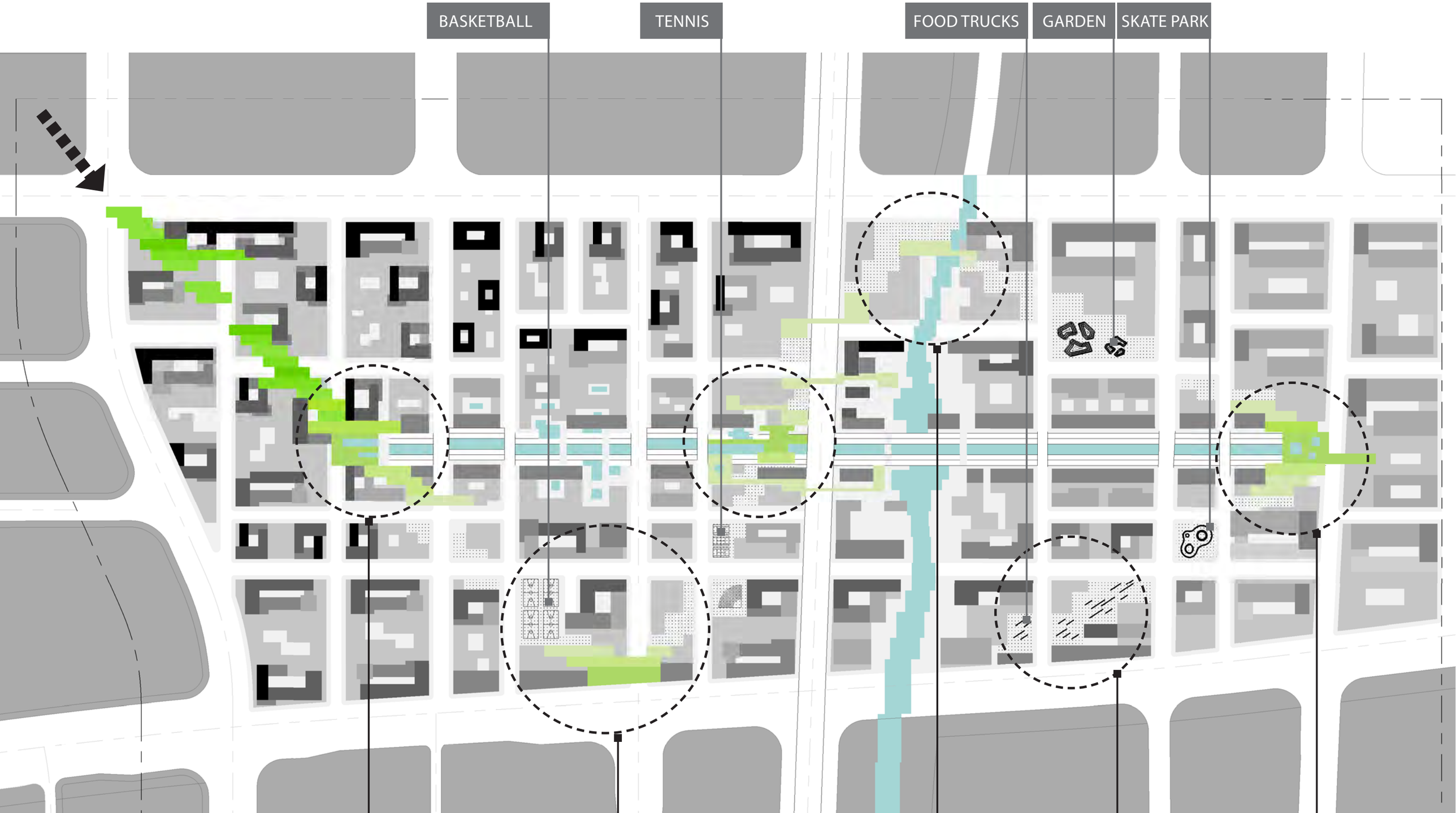




SITE 地段 : CULTURAL CONNECTOR 文化连接体

SCULPTURE PARK + URBAN AG

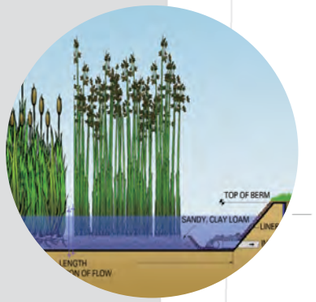
SITE 地段 : SOCIAL CONNECTOR 社会连接体



SITE 地段 : AGRICULTURAL PRODUCTION 农产品

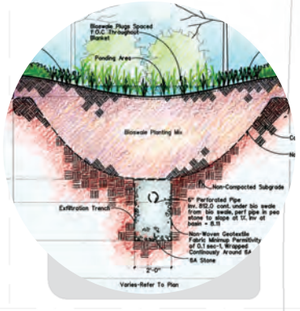
SITE 地段 : WATER SYSTEM 水源分布

A



A

B



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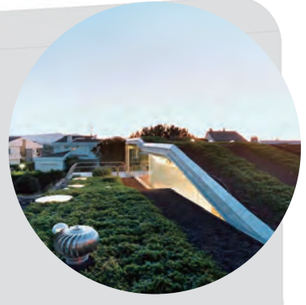
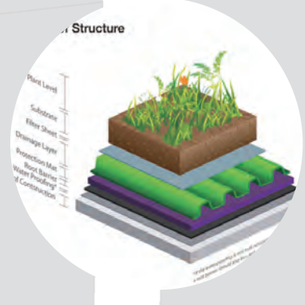


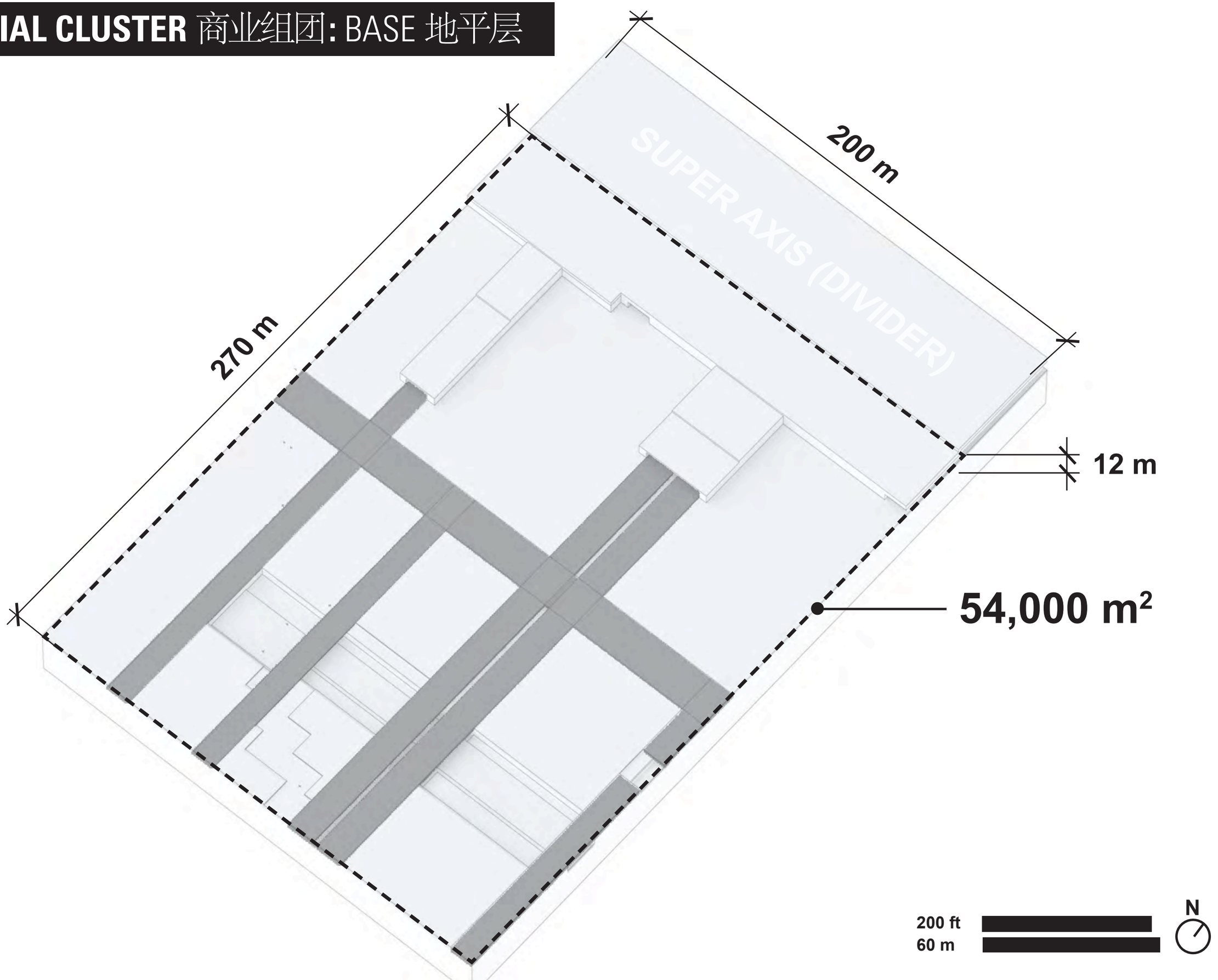


SITE 地段 : OVERALL 整体地段

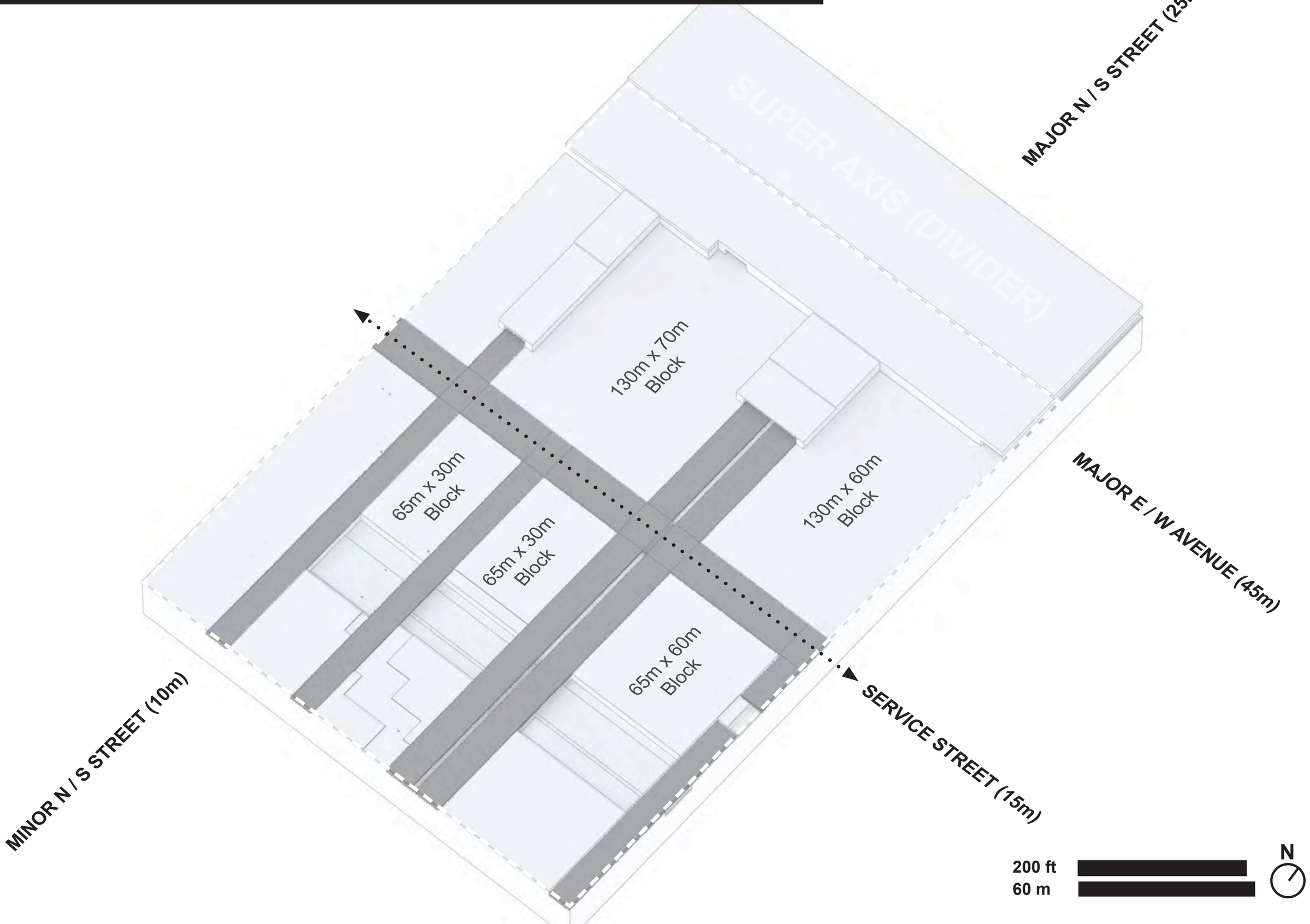
SITE 地段 : CLUSTERS 组团

COMMERCIAL CLUSTER 商业组团

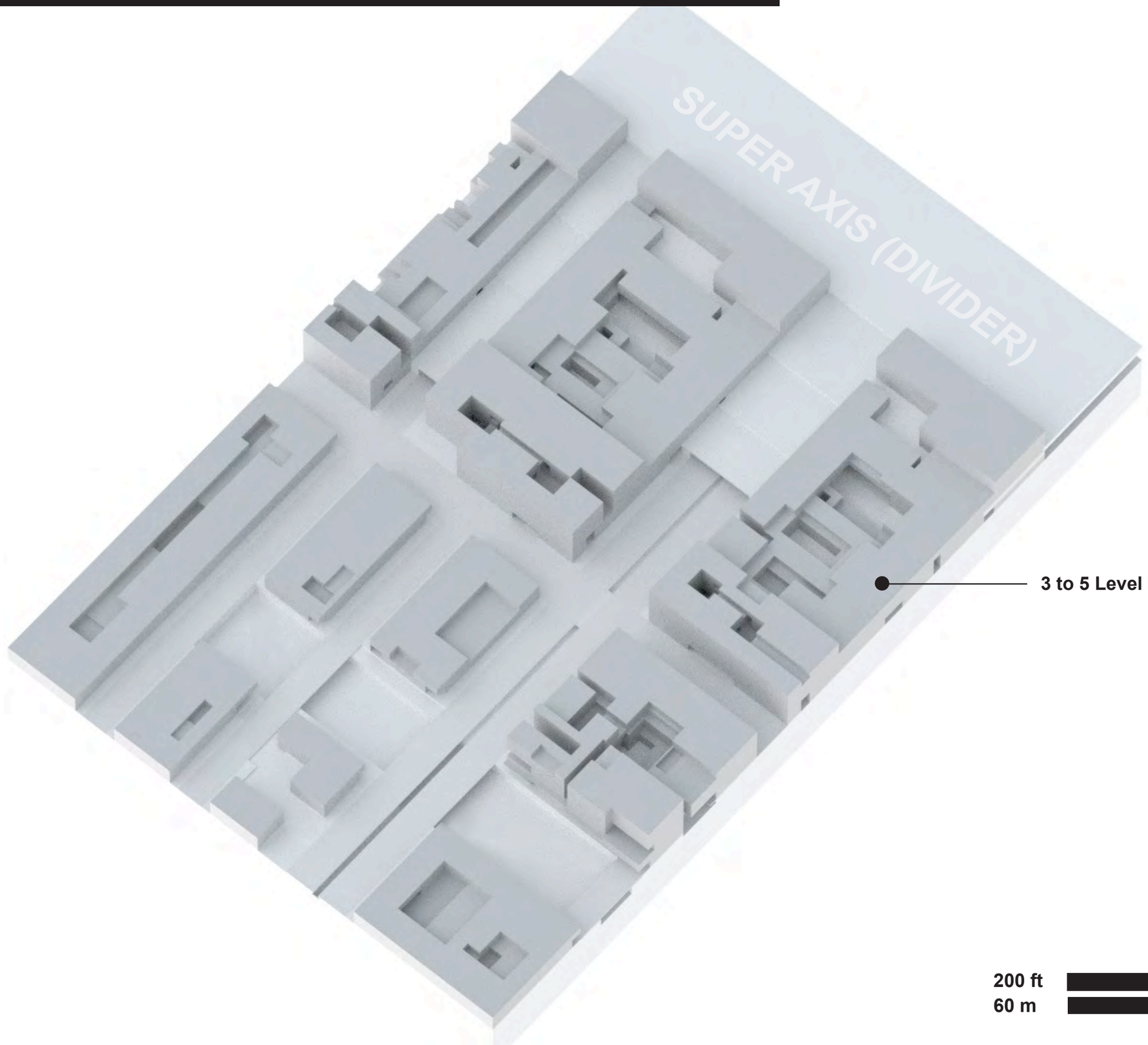
COMMERCIAL CLUSTER 商业组团: BASE 地平层



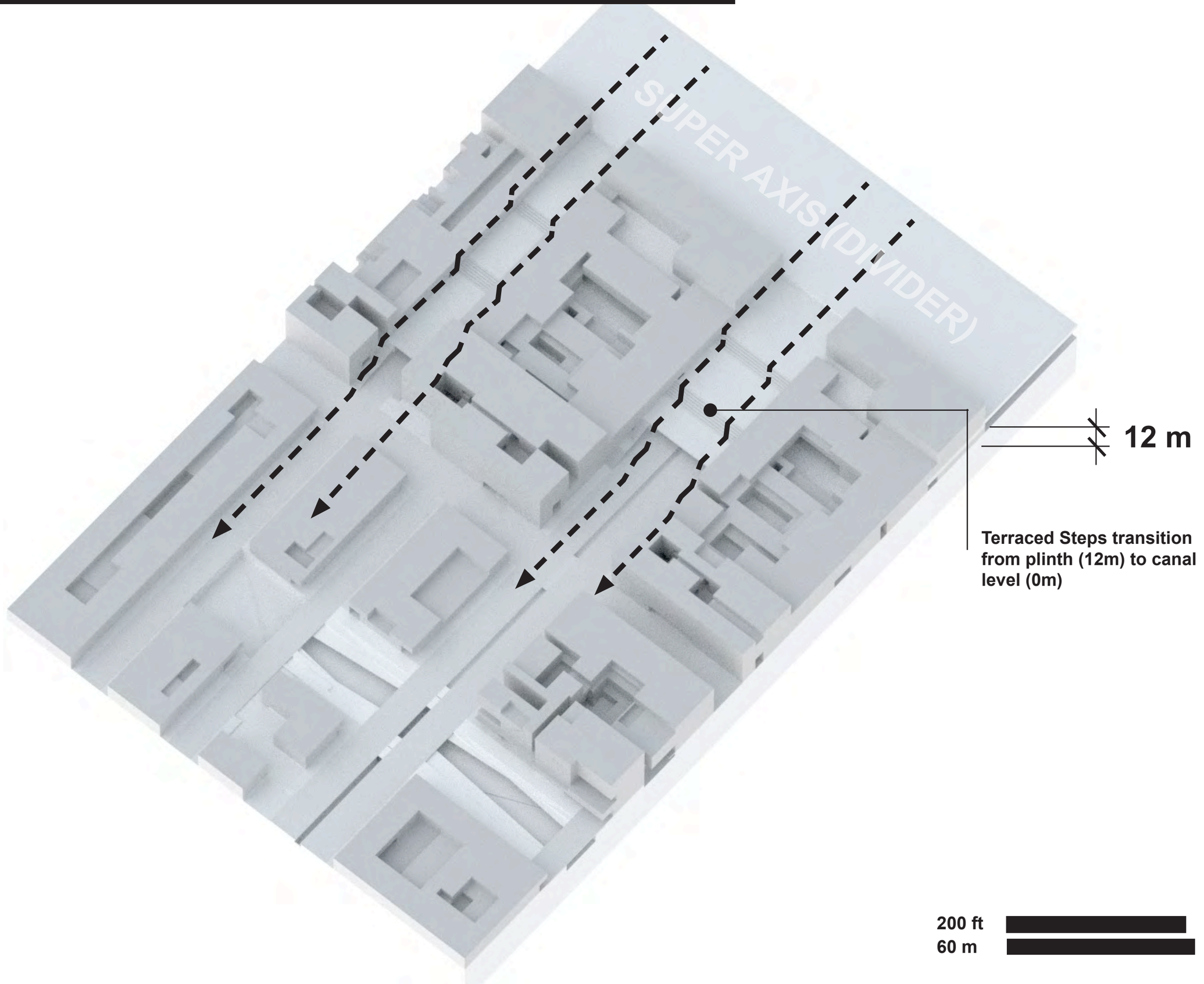
COMMERCIAL CLUSTER 商业组团 : STREET GRID 街道网格



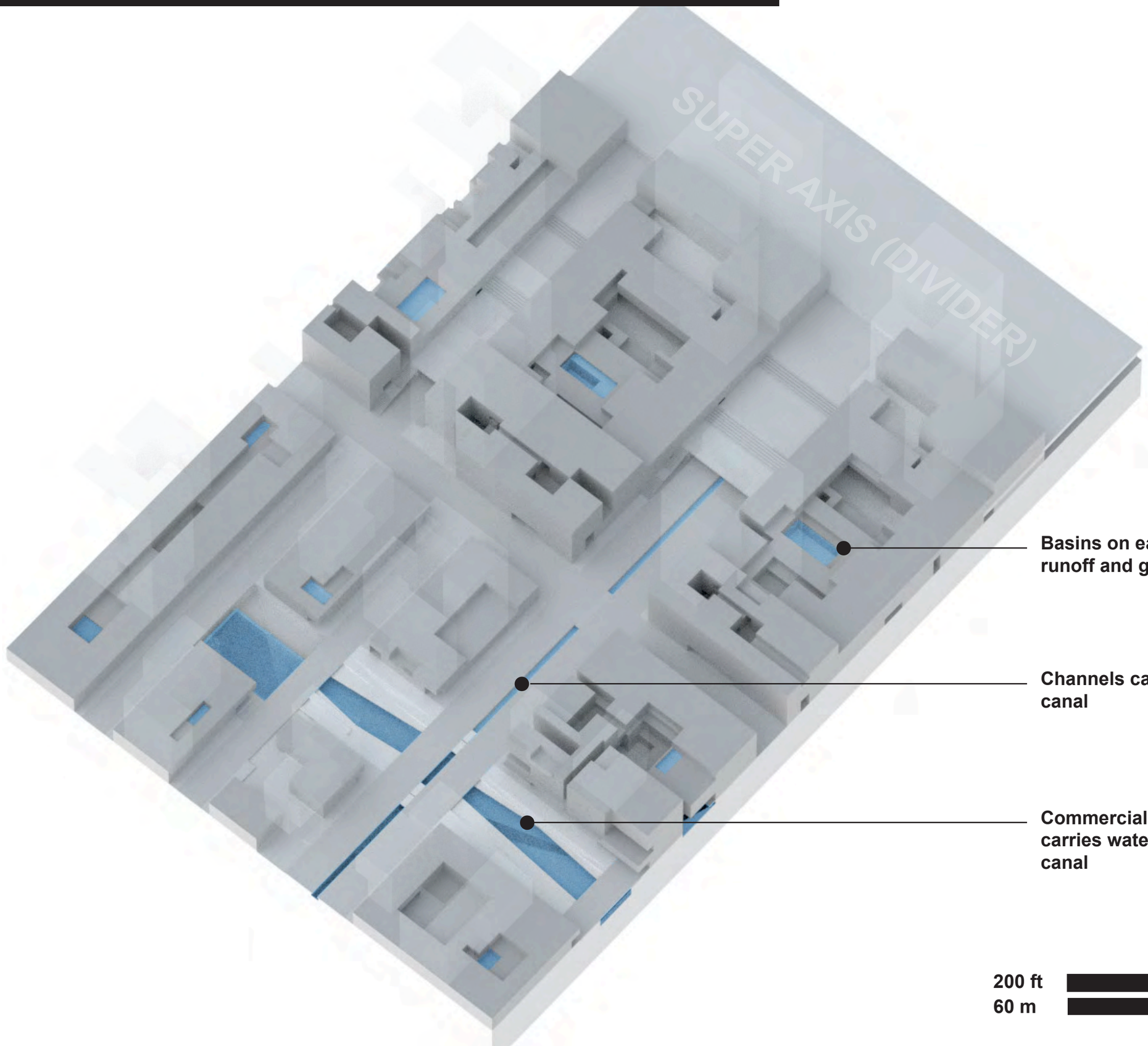
COMMERCIAL CLUSTER 商业组团: MATS 地平层



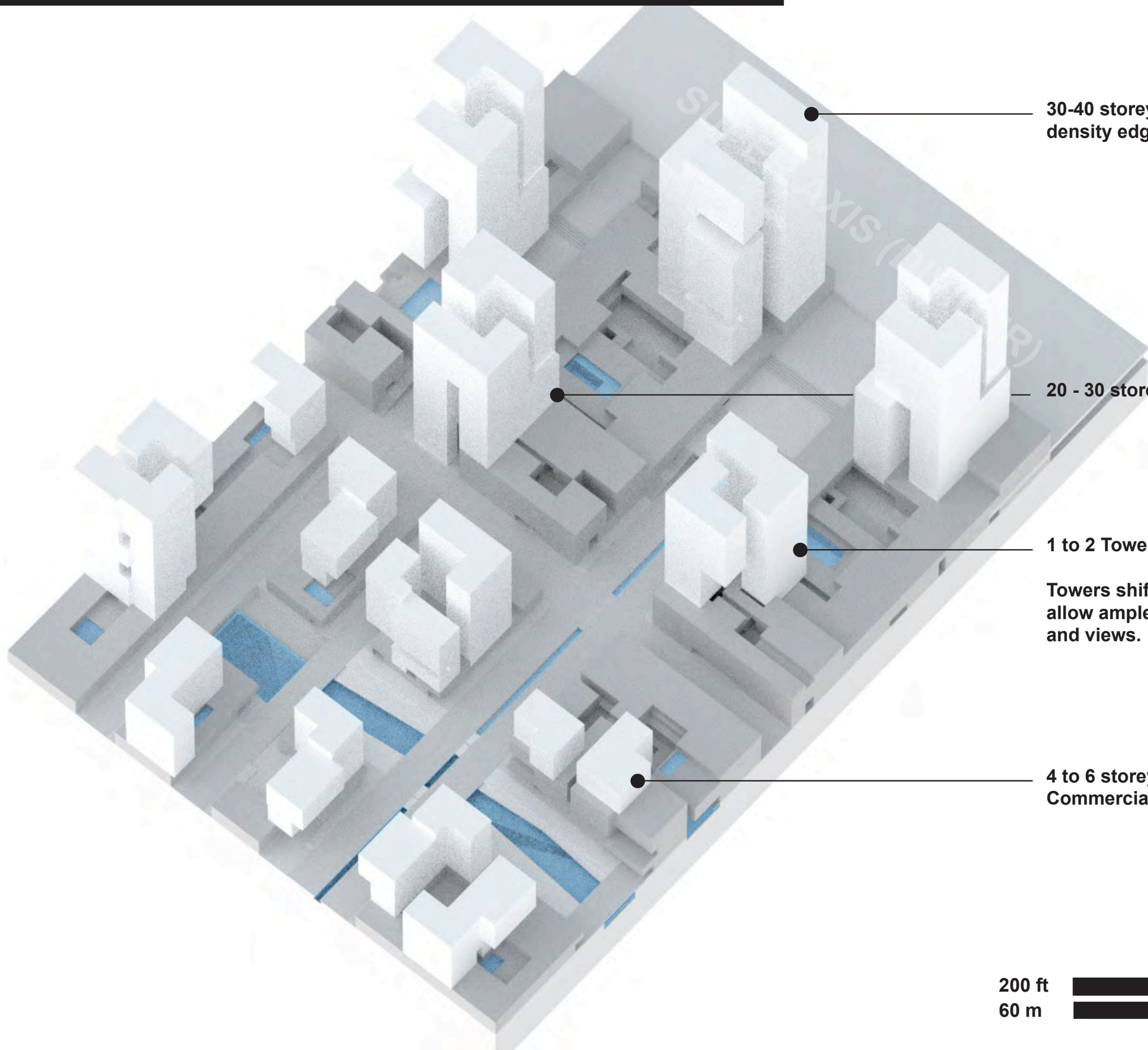
COMMERCIAL CLUSTER 商业组团: STEPPING 台阶



COMMERCIAL CLUSTER 商业组团: WATER 水系



COMMERCIAL CLUSTER 商业组团: TOWERS 塔楼



30-40 storeys along highest density edge

20 - 30 storey towers

1 to 2 Towers per Mat.

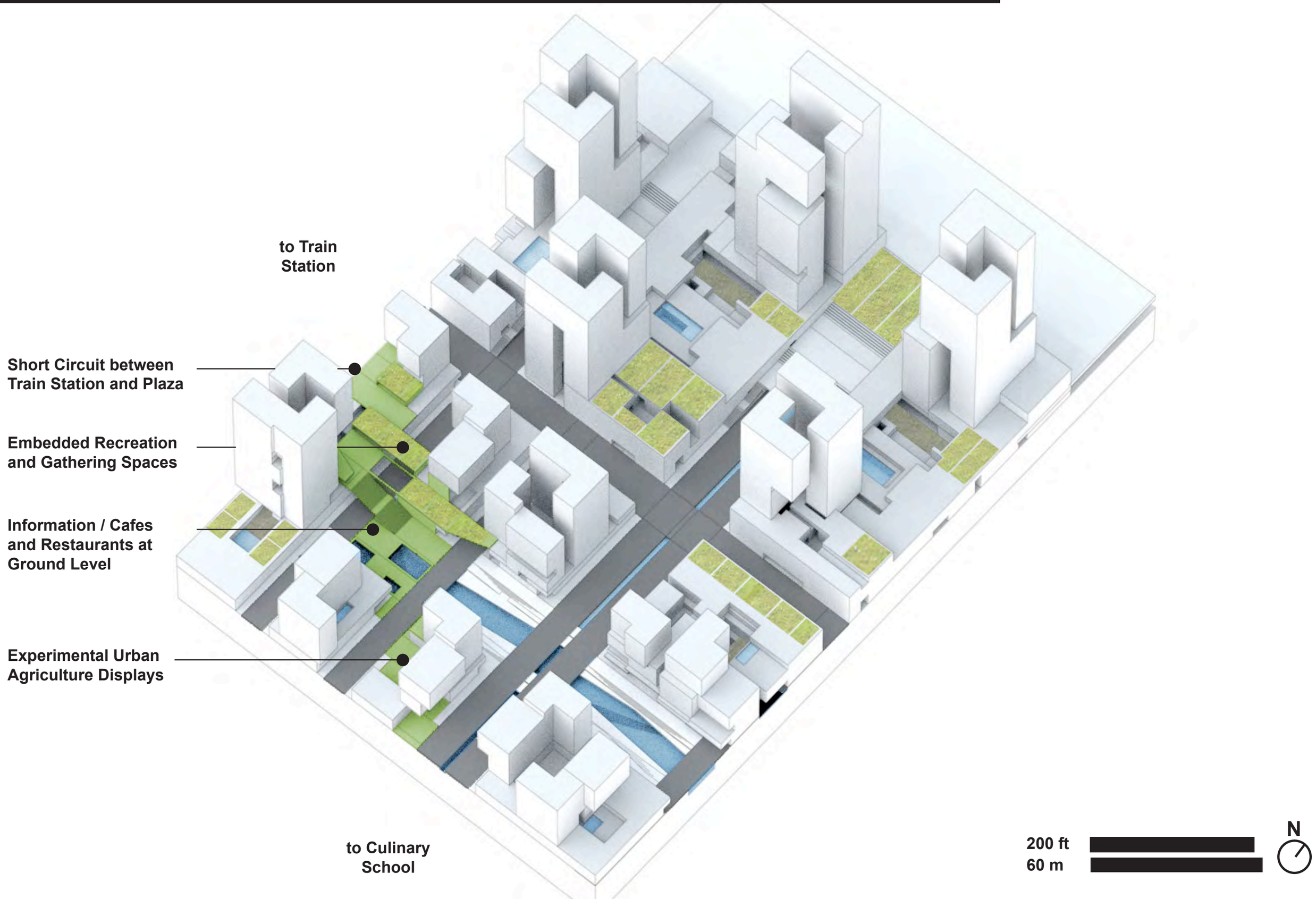
Towers shift and stagger to allow ample light, ventilation, and views.

4 to 6 storeys along Commercial Connector

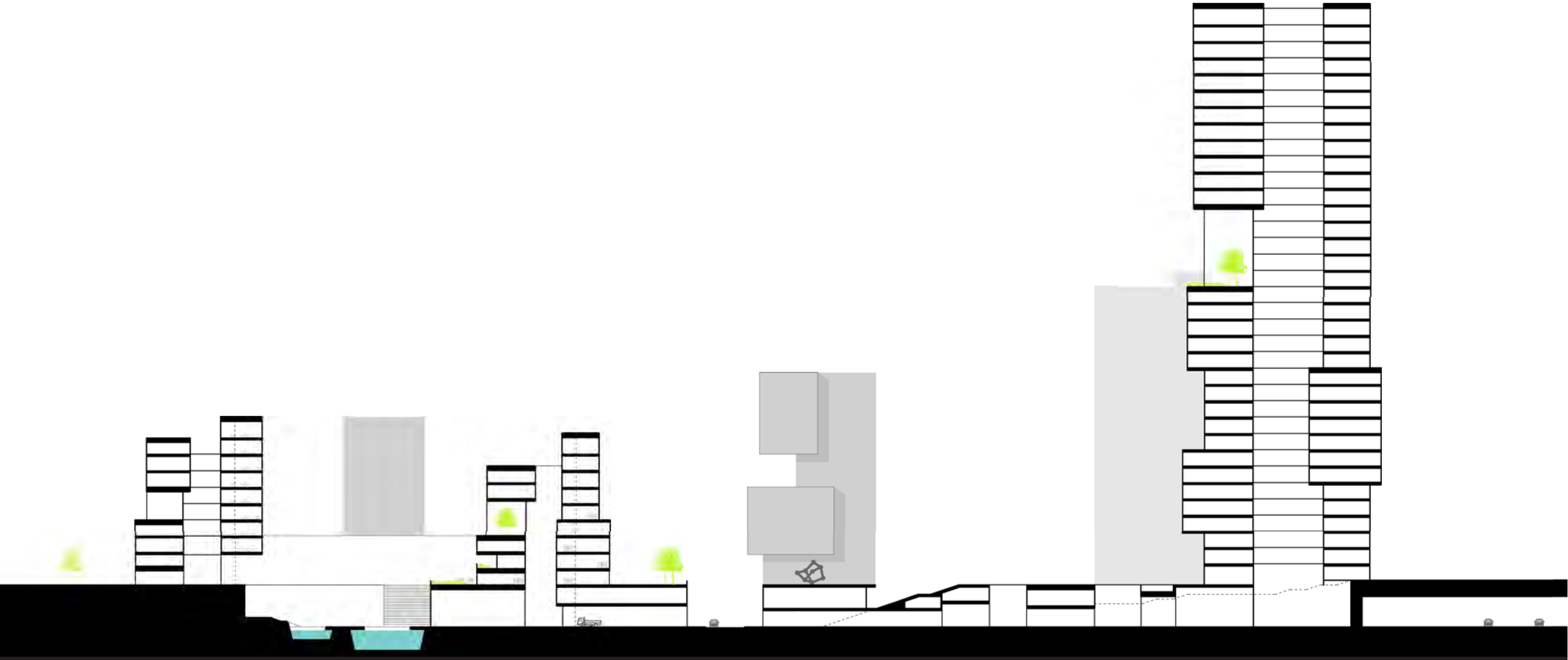
200 ft
60 m

N

COMMERCIAL CLUSTER 商业组团: SOCIAL CONNECTOR 社交集合体



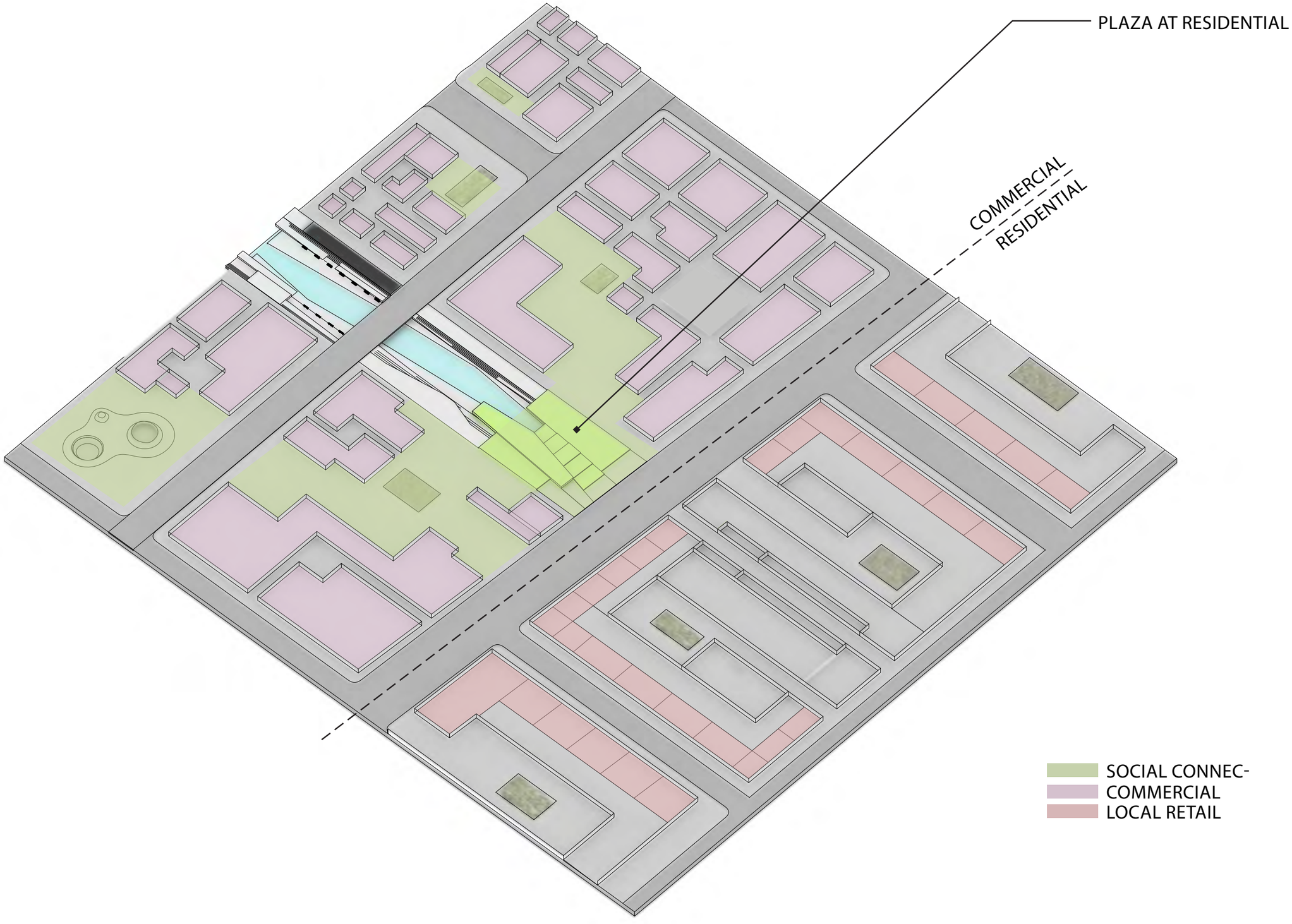
COMMERCIAL CLUSTER 商业组团: SECTION 剖面图



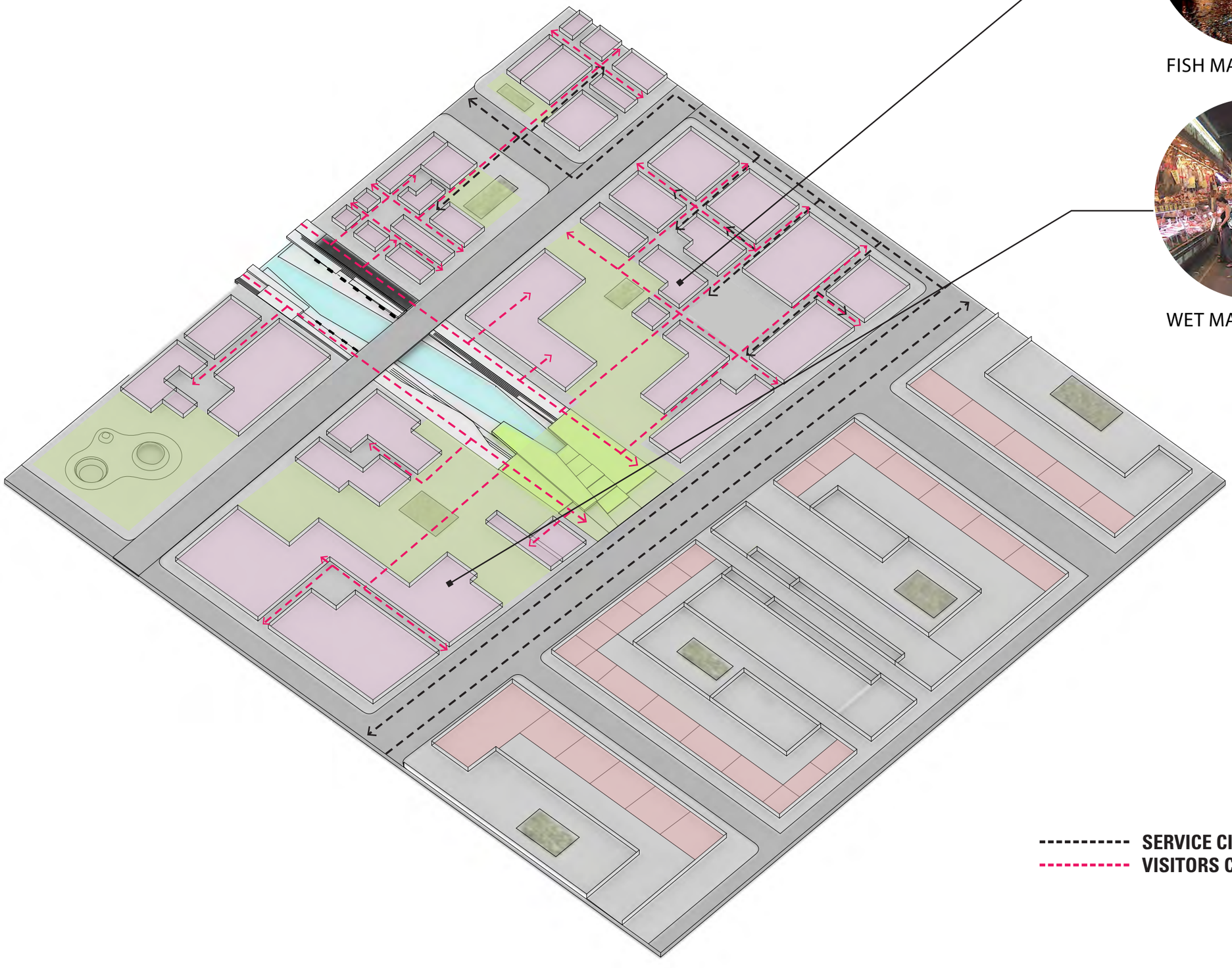
COMMERCIAL CLUSTER 商业组团: PERSPECTIVE 透视

RESIDENTIAL CLUSTER 居住组团

GROUND FLOOR 水平层 : SOCIAL VS COMMERCIAL社交和商业



GROUND FLOOR 水平层 : VISITOR EXPERIENCE 游客体验



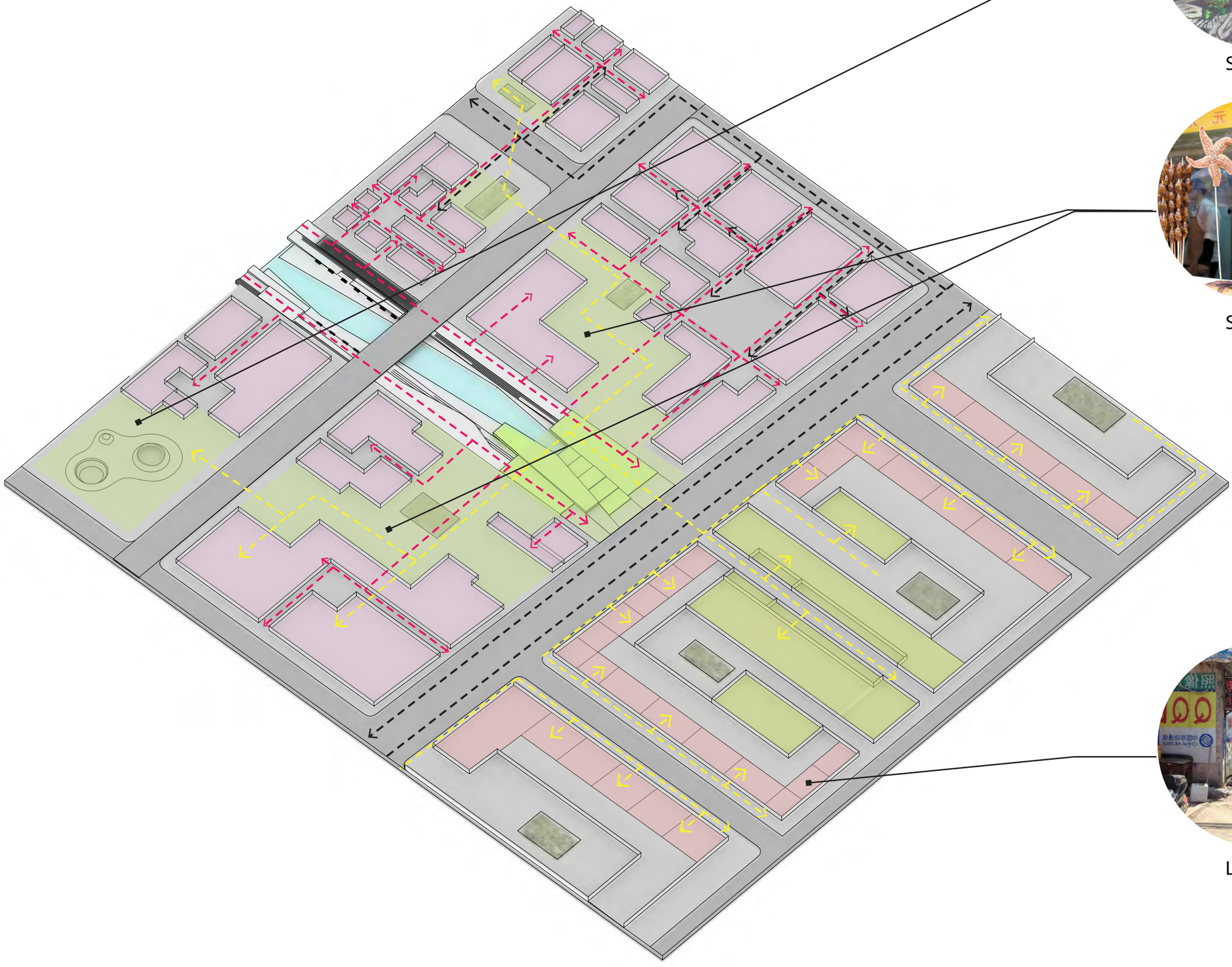
FISH MARKET

WET MARKET

SERVICE CIRCULATION

VISITORS CIRCULATION

GROUND FLOOR 水平层 : RESIDENT EXPERIENCE 居住者体验

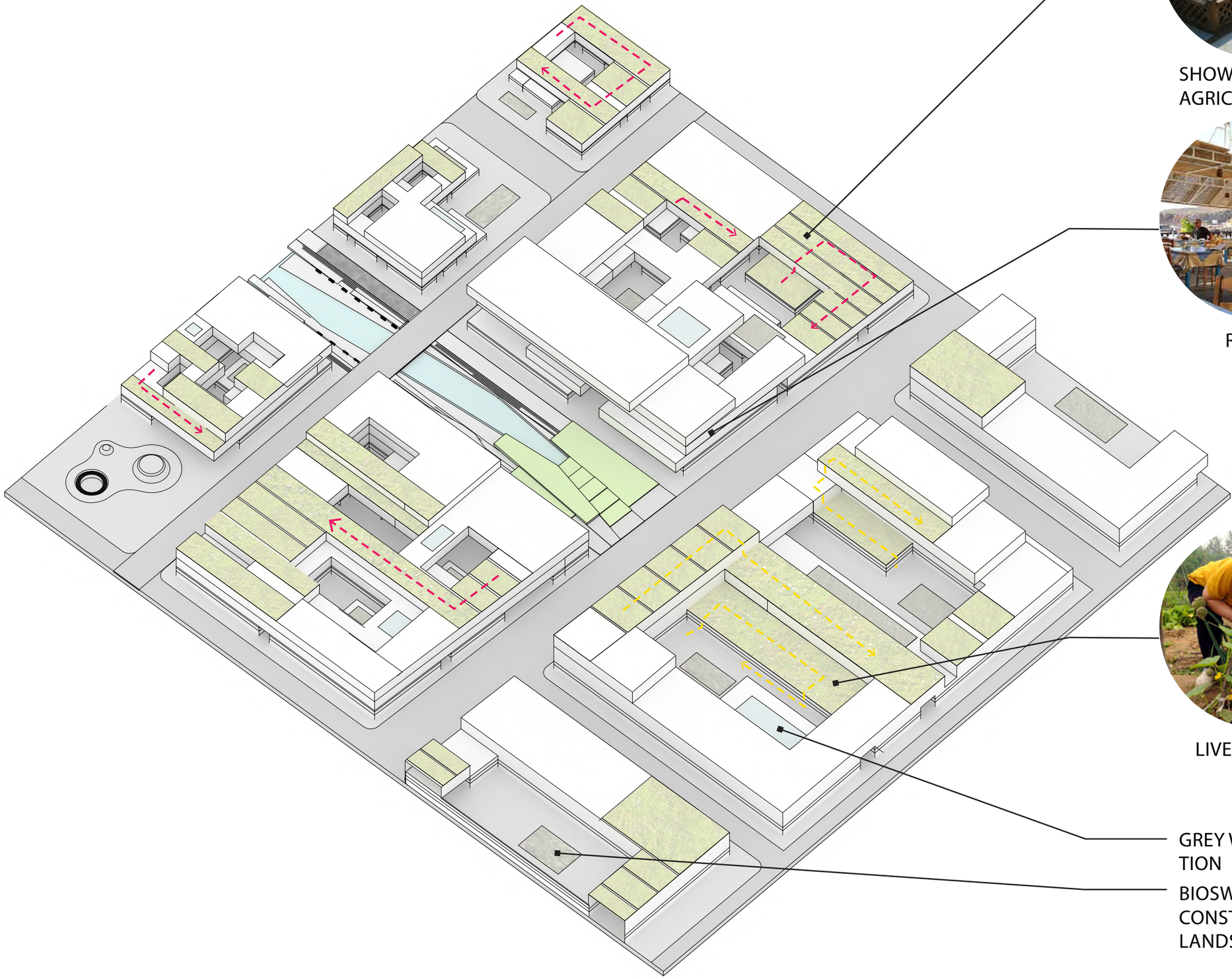


SKATE PARK

STREET MARKET

LOCAL SHOPS

MAT 裙房 : AGRICULTURAL EXPERIENCE 农业体验



SHOWCASE FARMING/
AGRICULTURAL TOUR-

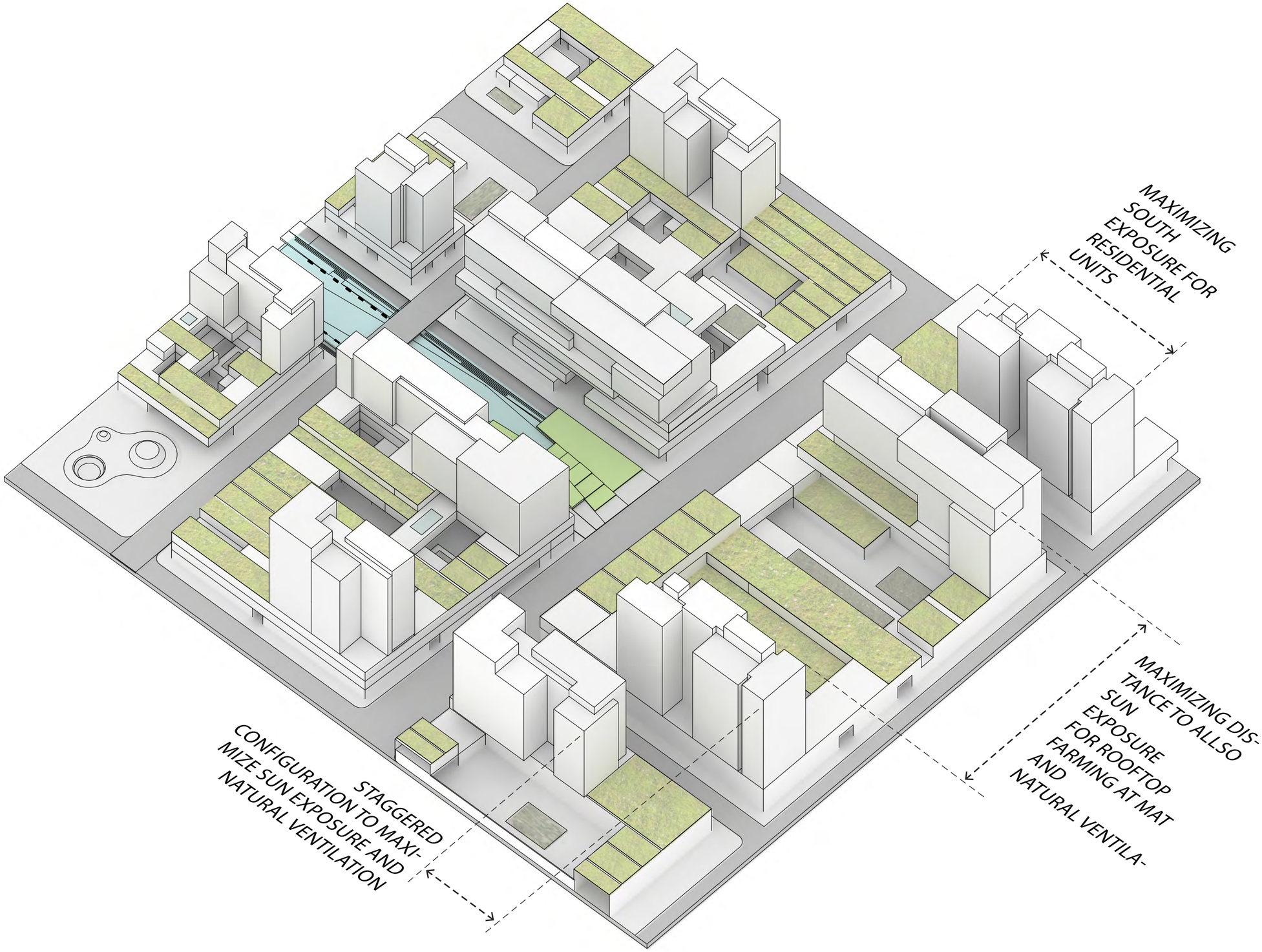
RESTAURANTS

LIVE WORK FARM-

GREY WATER COLLEC-
TION

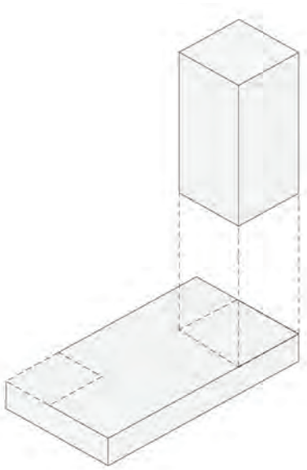
BIOSWALE/
CONSTRUCTED WET-
LANDS

RESIDENTIAL CLUSTER 居住组团 : OVERALL 鸟瞰

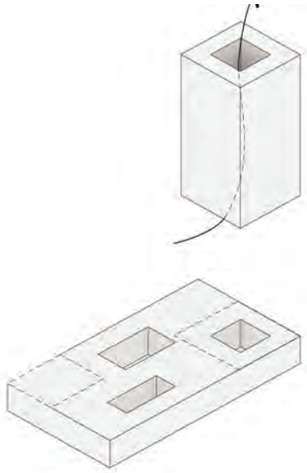


RESIDENTIAL CLUSTER : PERSPECTIVE 透视

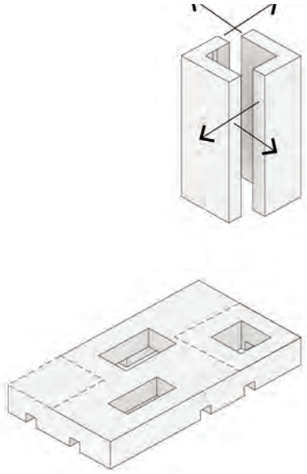
COMMERCIAL TOWER + MAT CONCEPTS 商业塔楼概念



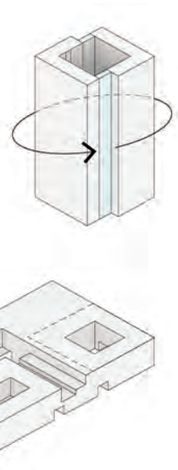
01_BASE MASSING



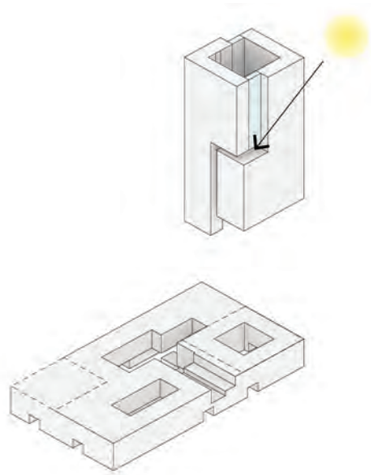
02_PRIMARY VOIDS



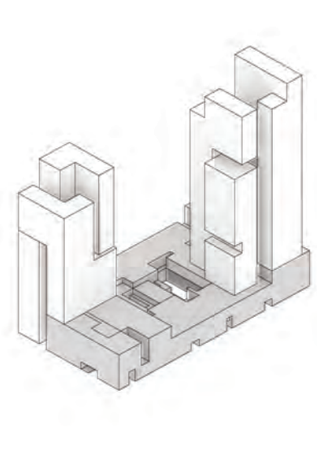
03_UNDERCUTS



04_OVERCUTS

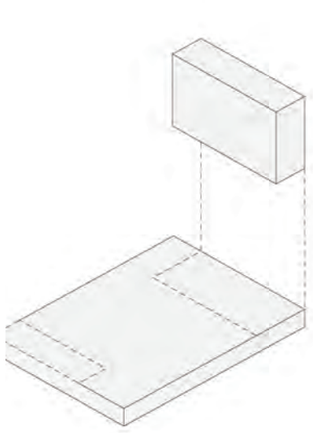


05_TOWER INTEGRATION



06_CUMULATIVE

RESIDENTIAL TOWER + MAT CONCEPTS 居住塔楼概念



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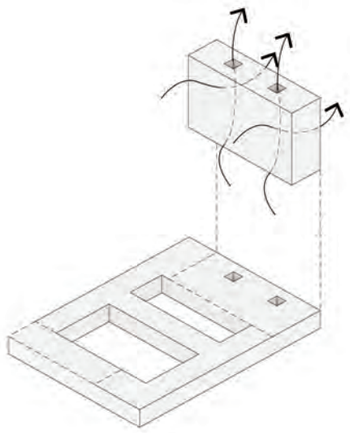
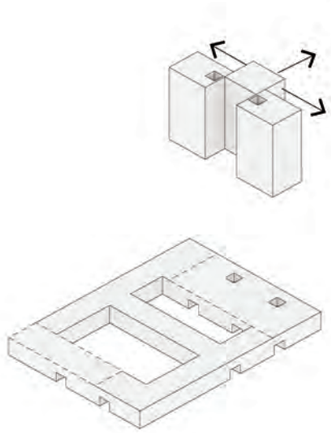
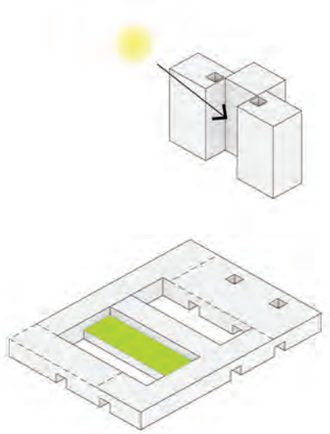


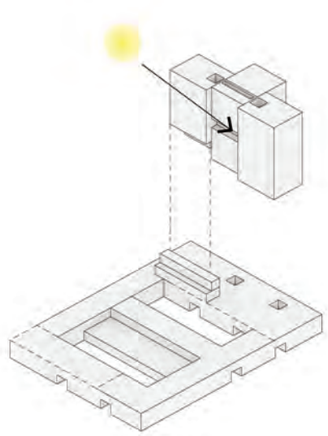
02_PRIMARY VOIDS



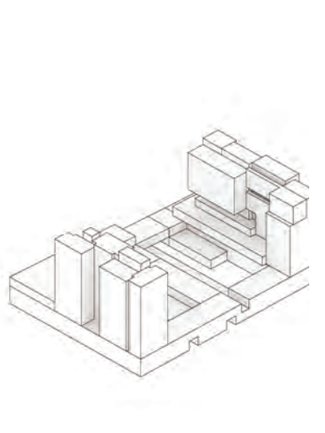
03_UNDERCUTS



04_OVERCUTS



05_TOWER INTEGRATION



06_CUMULATIVE

RESIDENTIAL TOWER + MAT 塔楼和裙房

LIVE WORK UNITS

LOCAL RETAIL AND RESTAURANTS

URBAN AG PRACTICE CENTER

COMMUNITY CENTER

TOWER RESIDENTS

EDUCATIONAL GREEN HOUSE

COMMUNITY CENTER

TYPES OF PRODUCTION

URBAN LIVESTOCK RAISING

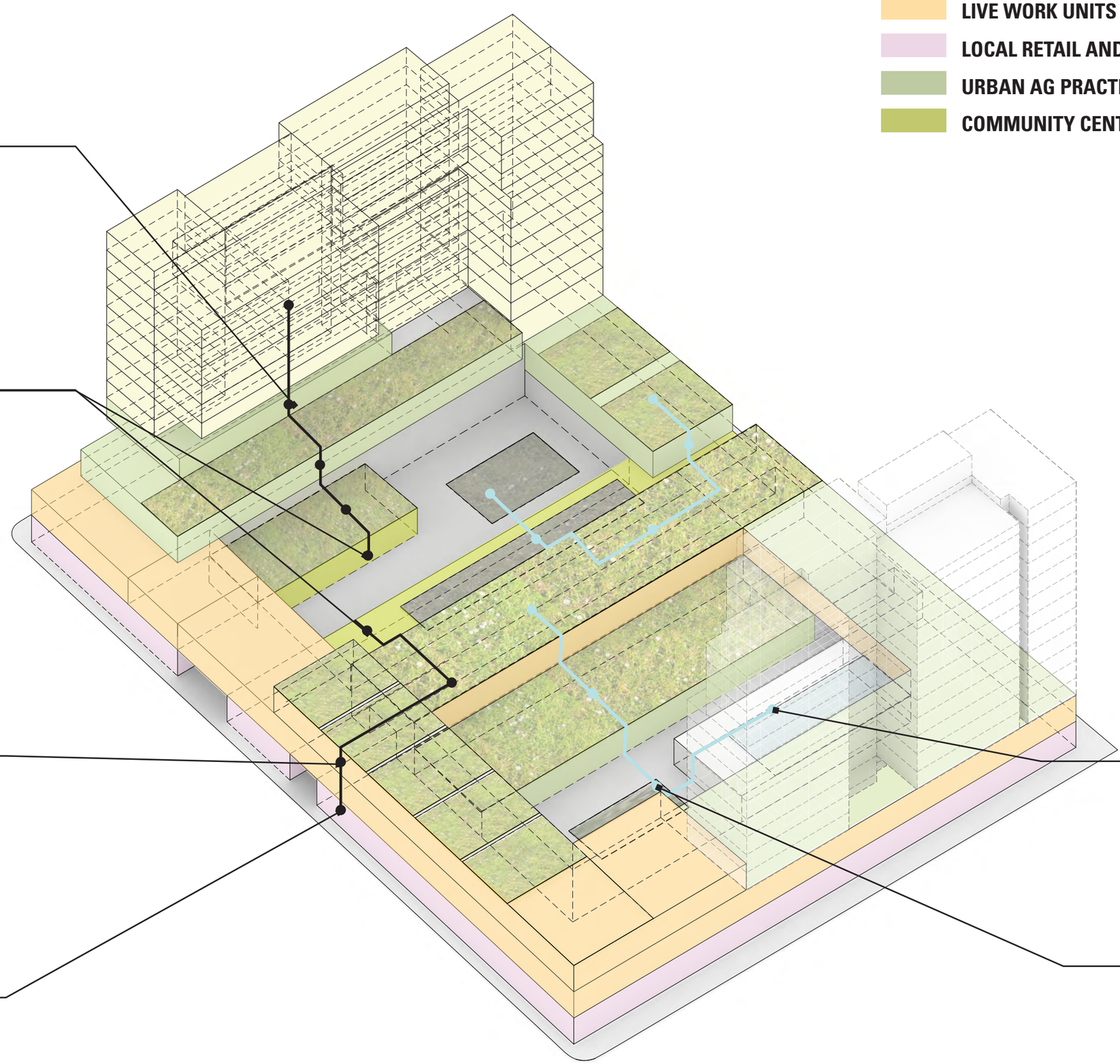
URBAN LIVESTOCK RAISING

VEGETABLES

MAT RESIDENCE

LIVE WORK UNITS

LOCAL SHOPS



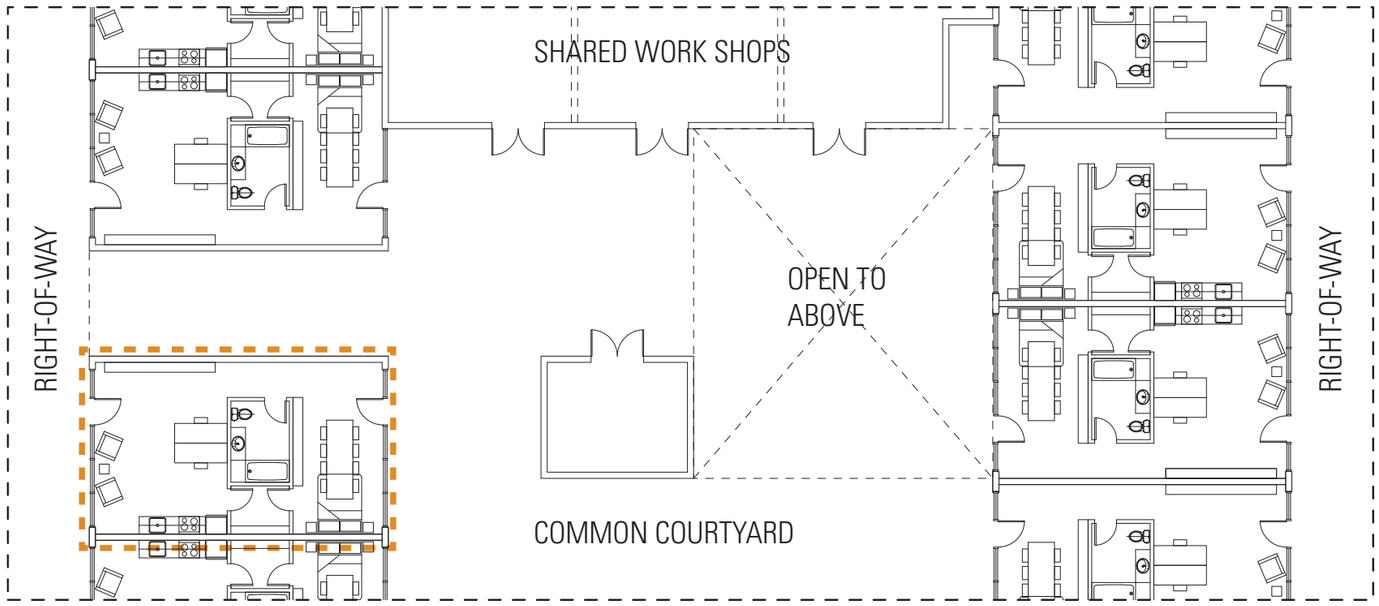
COLLECTED GREY WATER

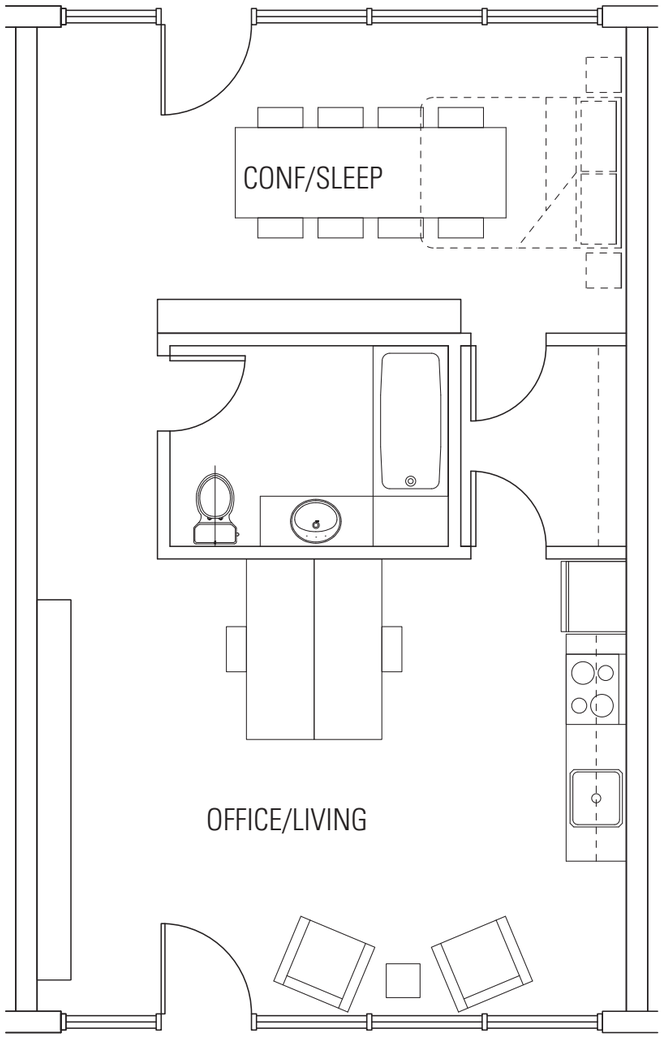
BIOSWALE

UNITS 单元

UNITS 单元 : LIVE/WORK 居住/工作

LIVE/WORK UNITS IN MAT SLAB

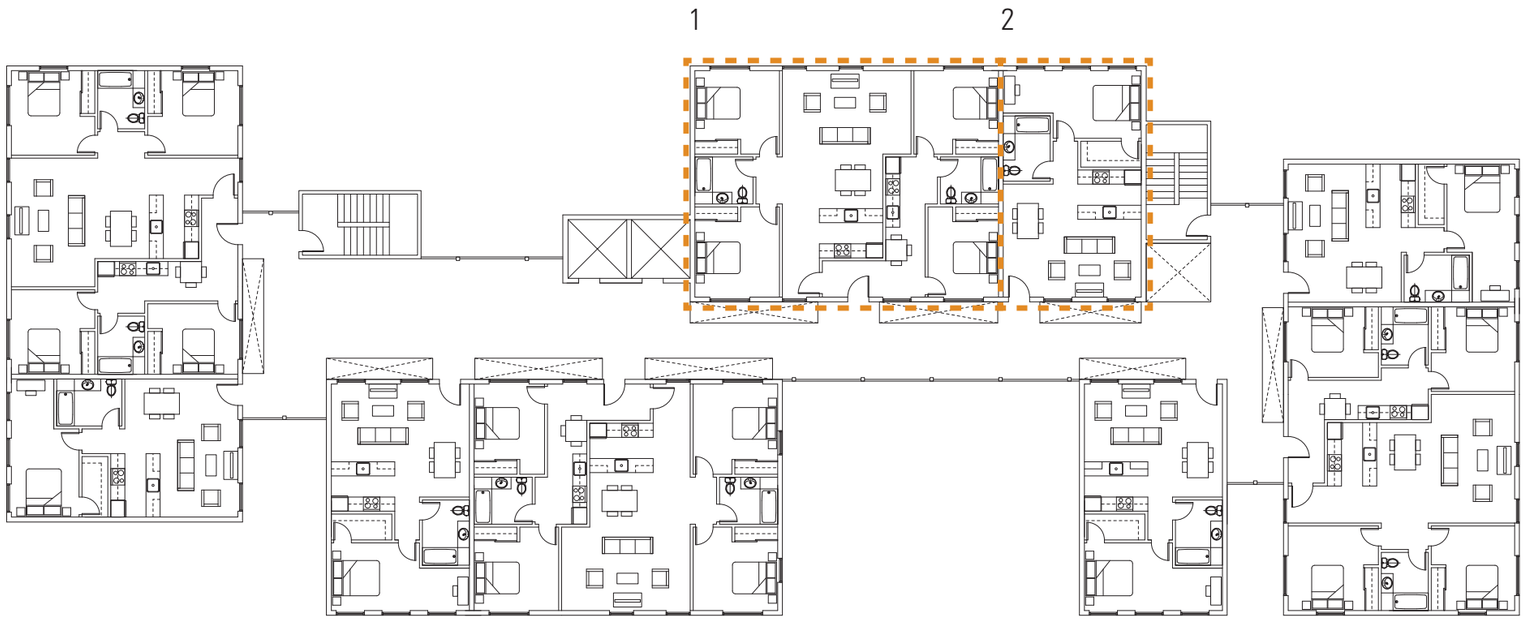


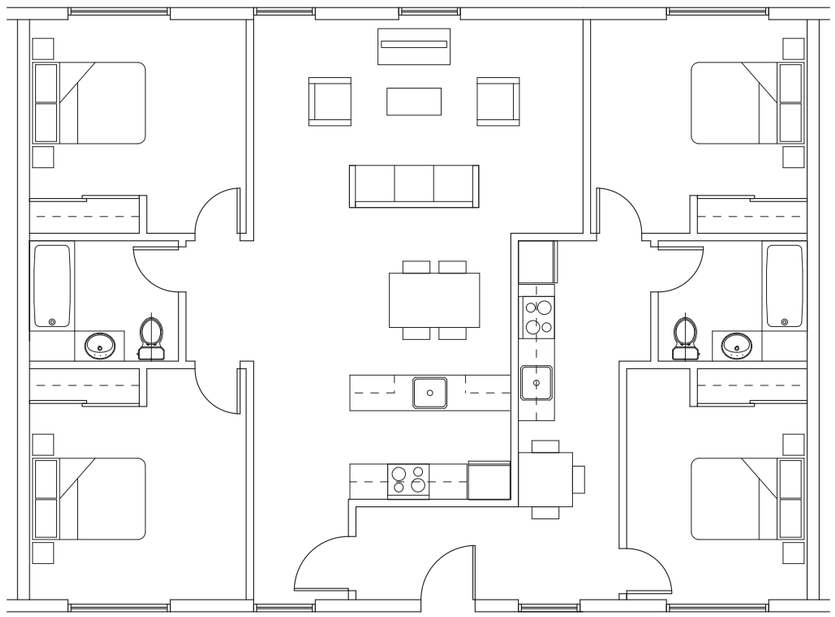


LIVE/WORK UNIT
70 SM

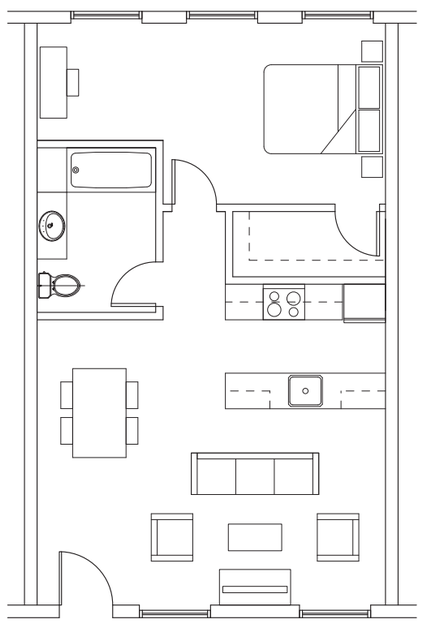
UNITS 单元 : RESIDENTIAL TOWER 居住塔楼

RESIDENTIAL TOWER WITH VERTICAL NATURAL VENTILATION





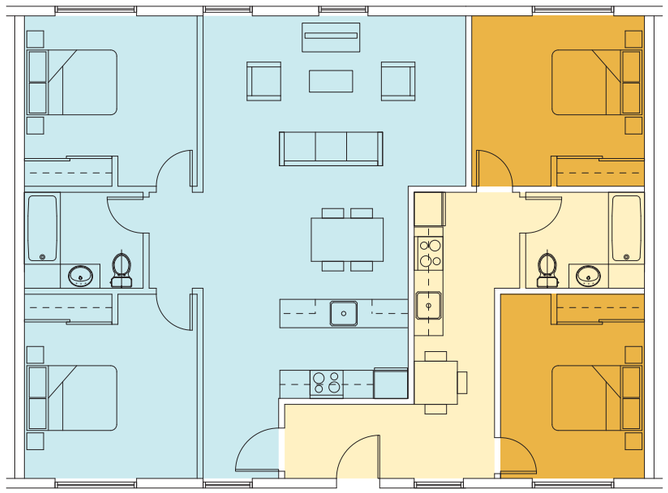
1_ECONOMIC DEVELOPMENT UNIT
130 SM [75 SM + 55 SM]



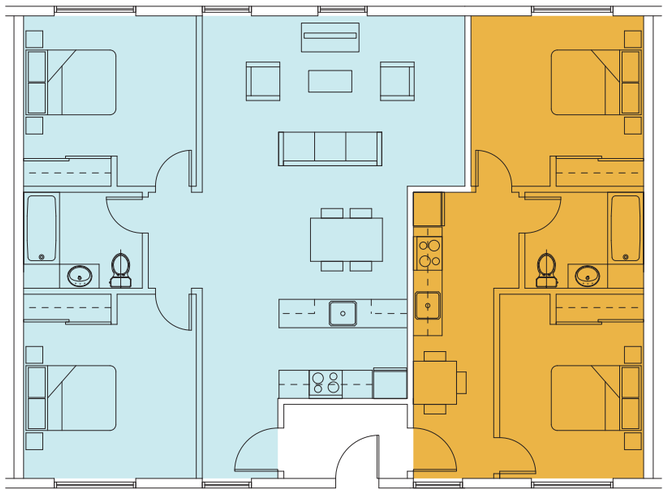
2_1 BEDROOM UNIT
65 SM

UNITS 单元 : ECONOMIC DEVELOPMENT 经济发展

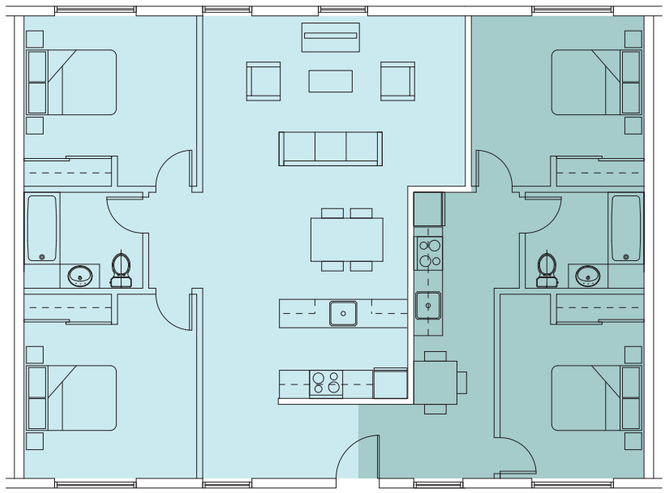
UNIT FLEXIBILITY BY CHANGING CONFIGURATION TO RESPOND TO CULTURAL OR FINANCIAL NEEDS



LANDLORD IN MAIN UNIT LEASING SRO'S WITH SHARED FACILITIES



LANDLORD IN MAIN WITH EXTENDED FAMILY IN ADJACENT UNIT

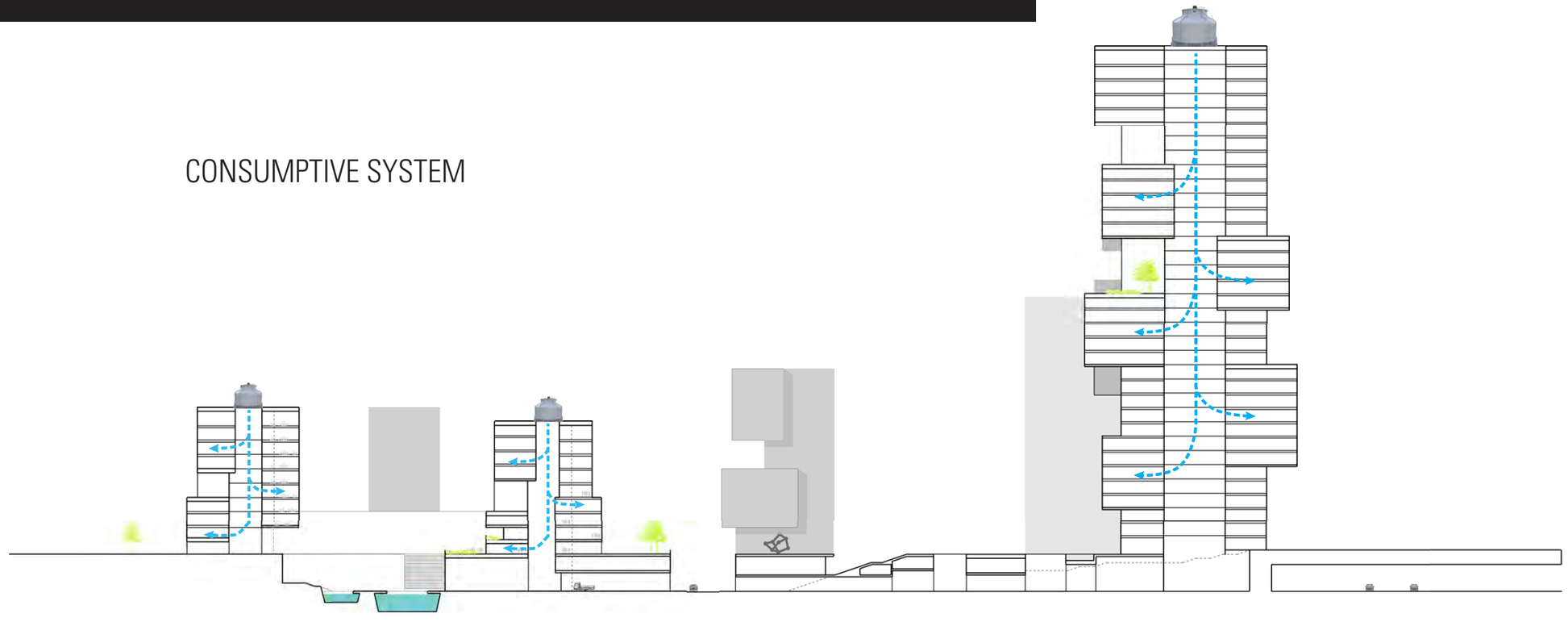


EXTENDED FAMILY MERGING UNITS INTO SINGLE UNIT

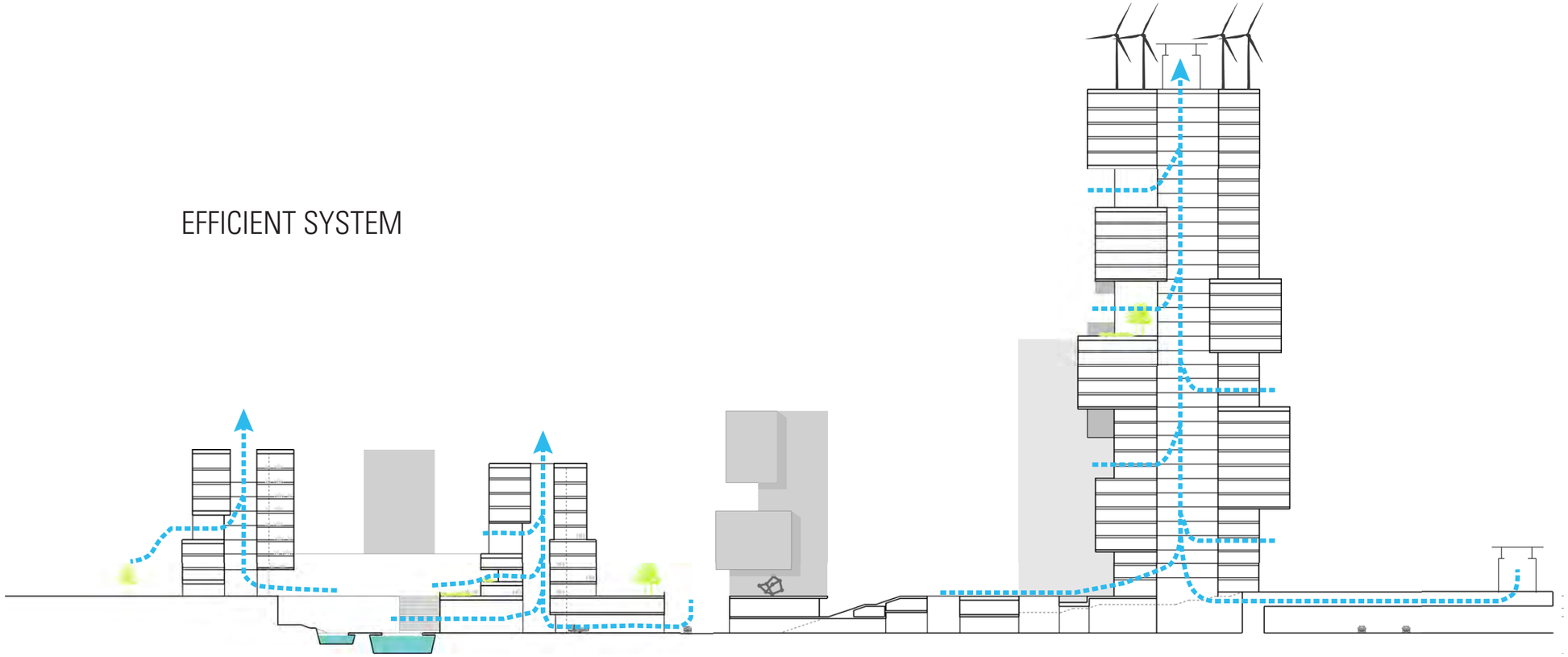
ENERGY PERFORMANCE 能源表现

VENTILATION & WIND STRATEGIES 通风和自然风策

CONSUMPTIVE SYSTEM

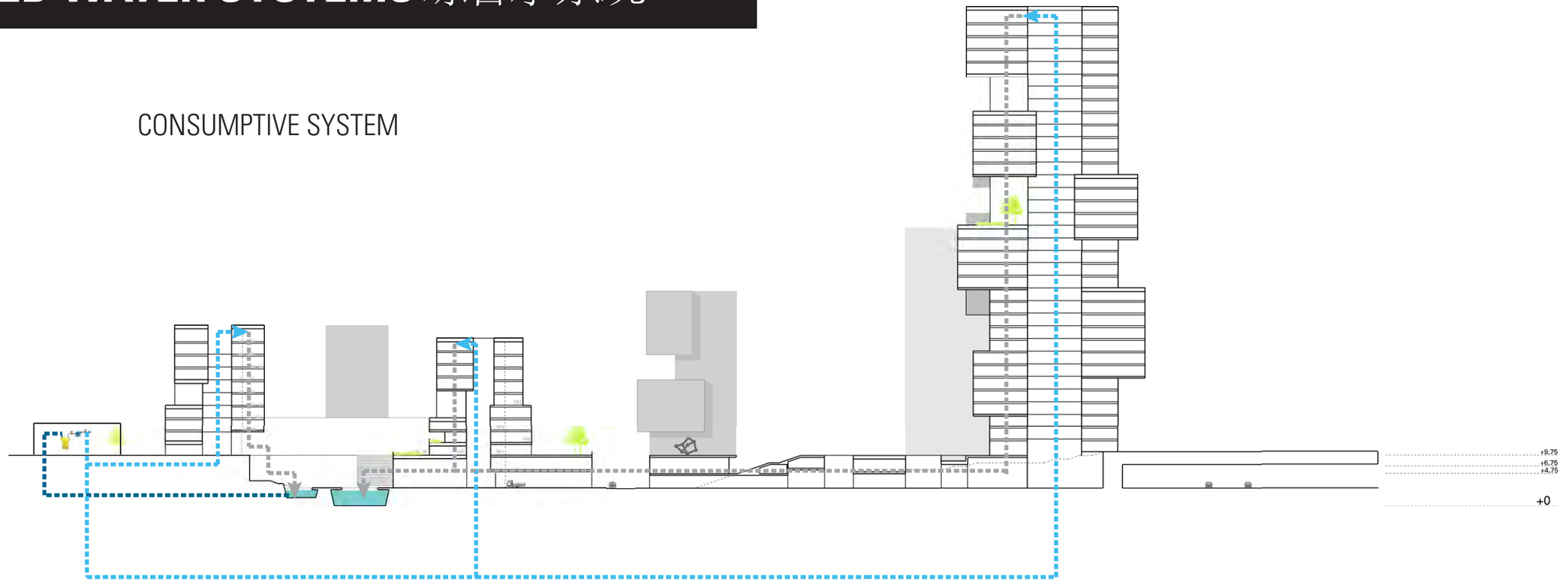


EFFICIENT SYSTEM

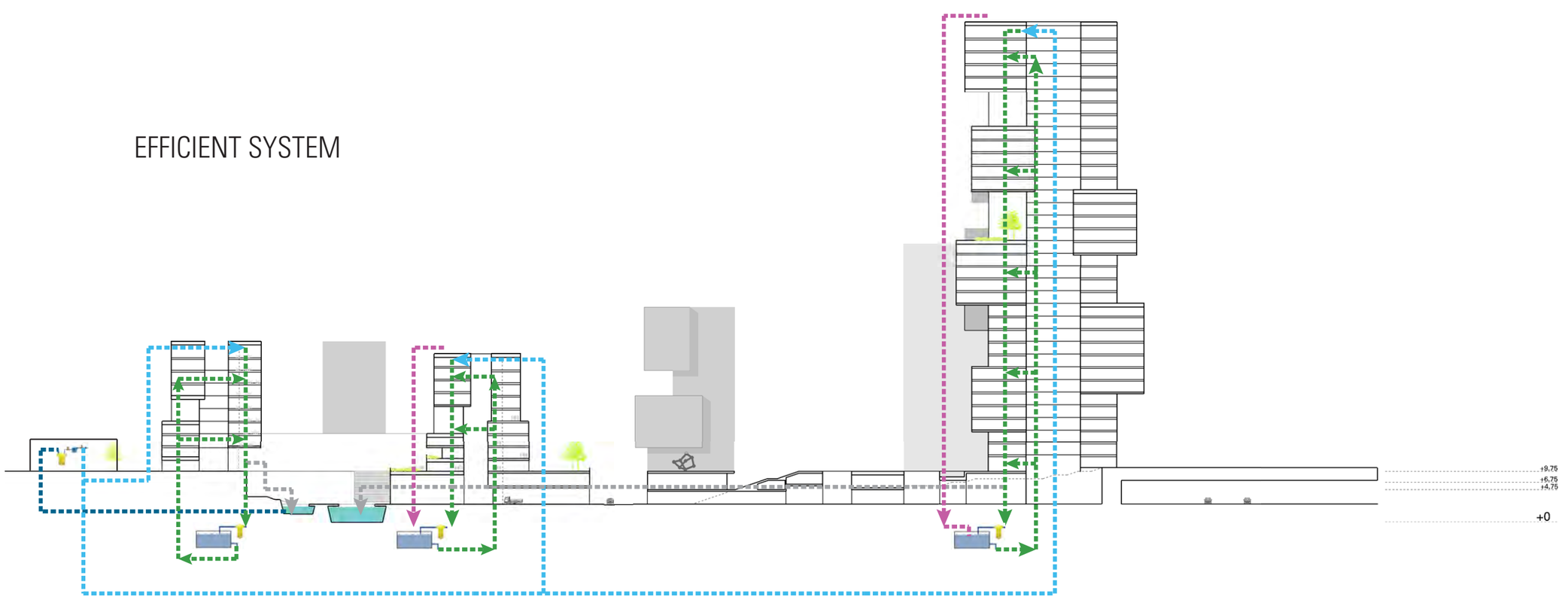


INTEGRATED WATER SYSTEMS 综合水系统

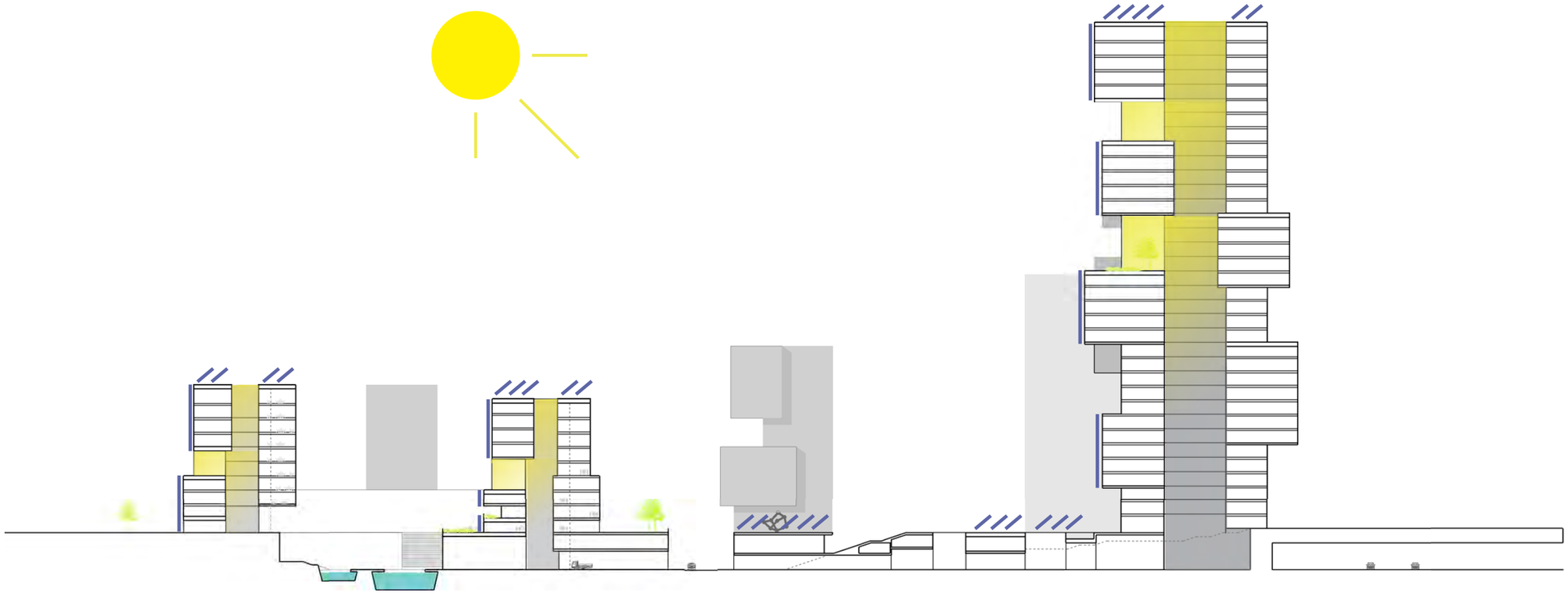
CONSUMPTIVE SYSTEM



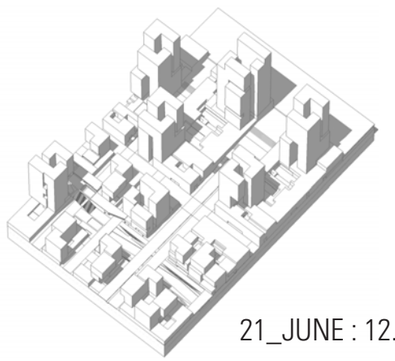
EFFICIENT SYSTEM



SOLAR & LIGHTING STRATEGIES 阳光和照明系统



21_JUNE : 9.00



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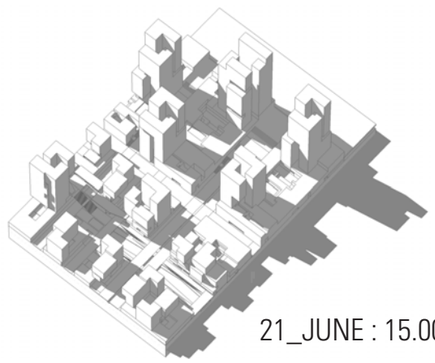

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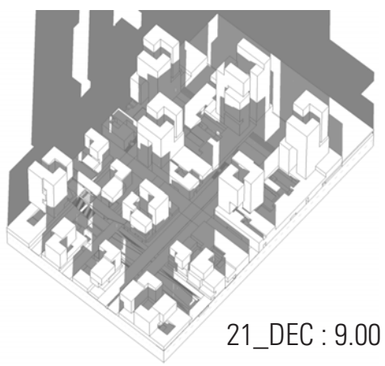

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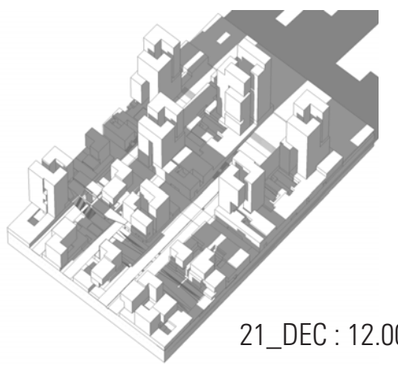

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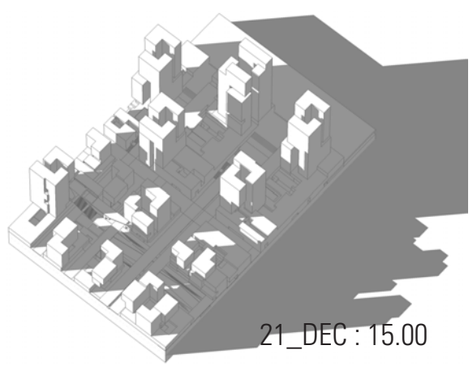
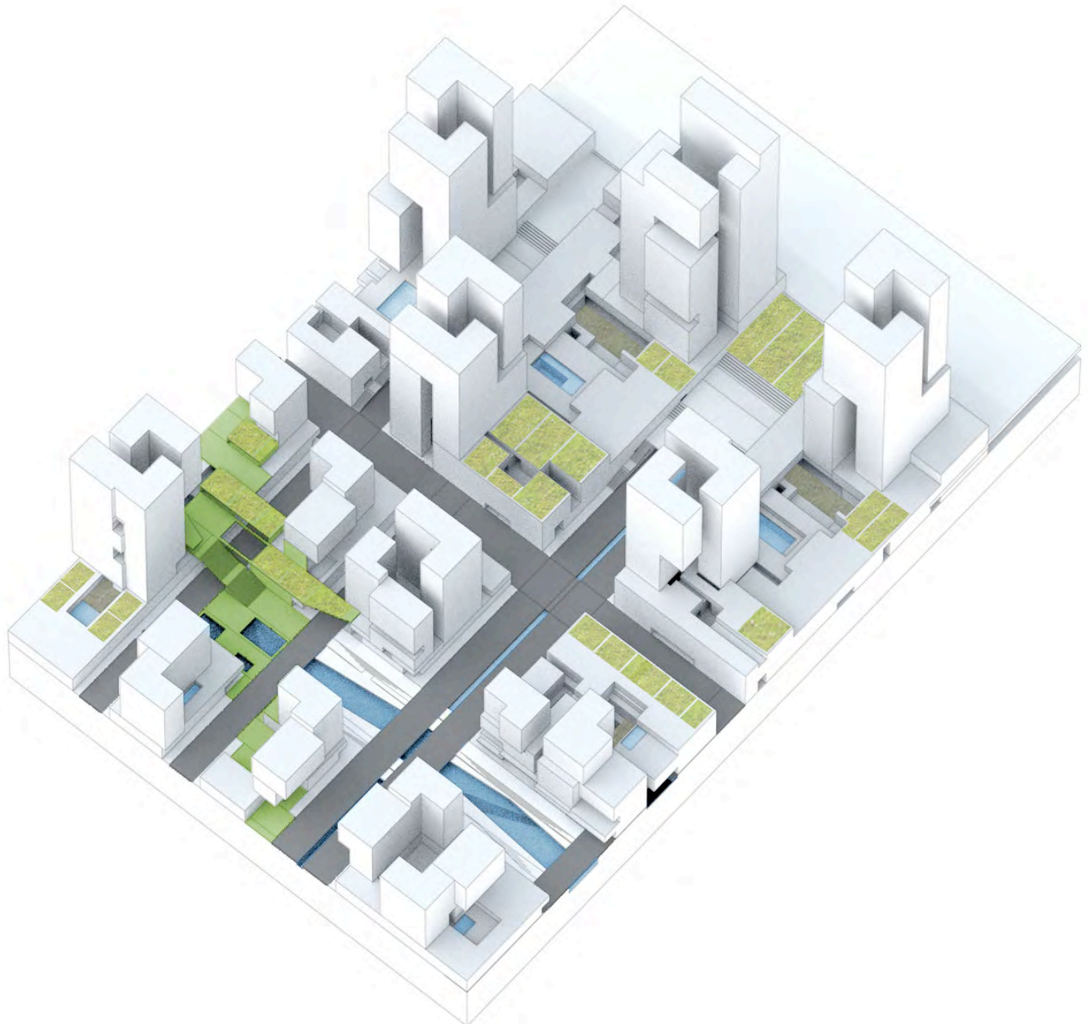
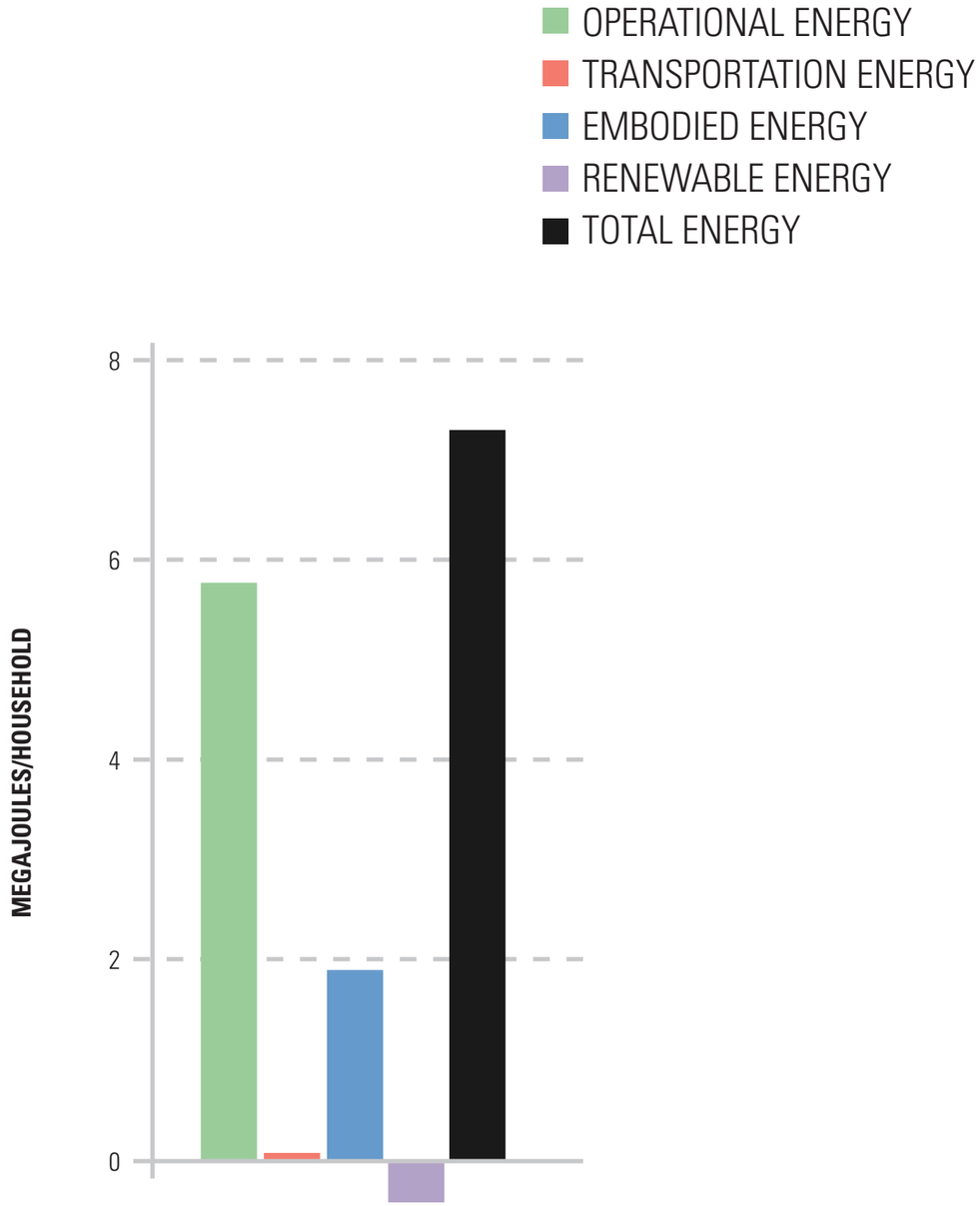


21_DEC : 15.00

SHADOW STUDIES :

ENERGY PERFORMANCE 能源效果

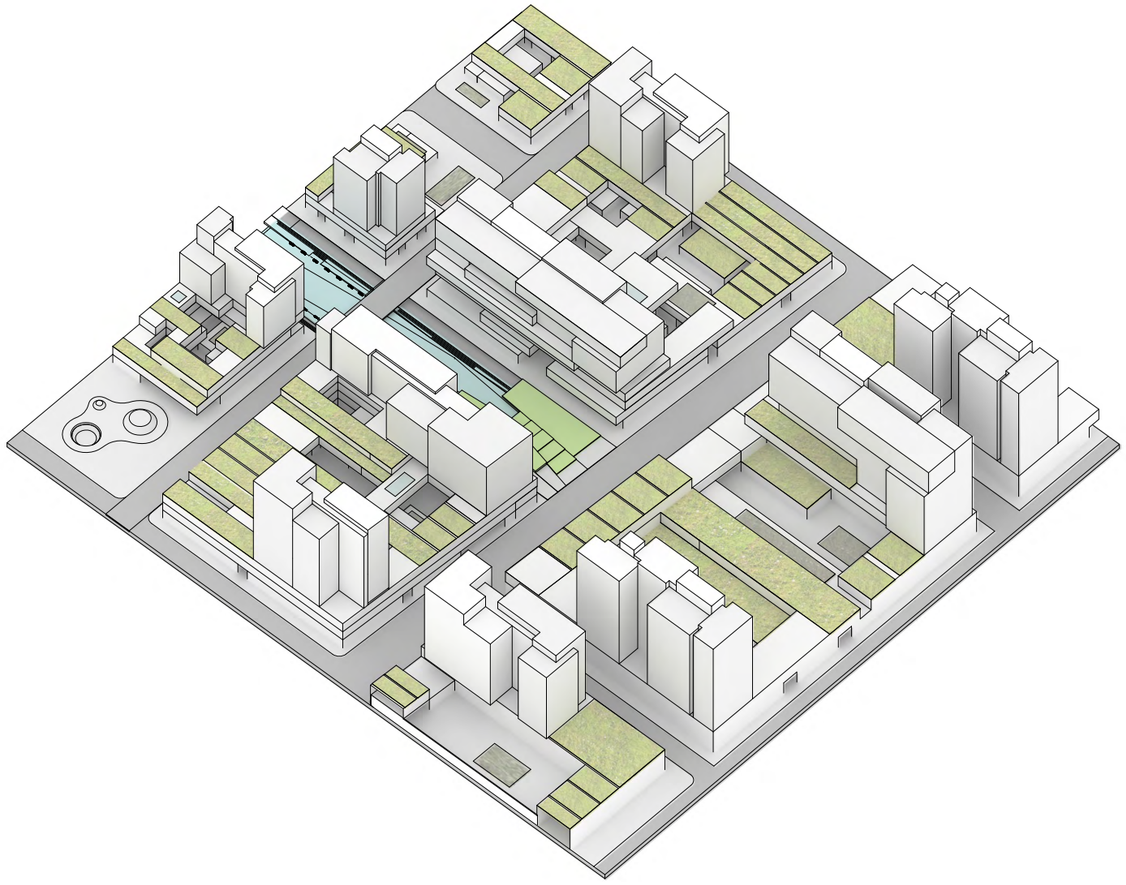




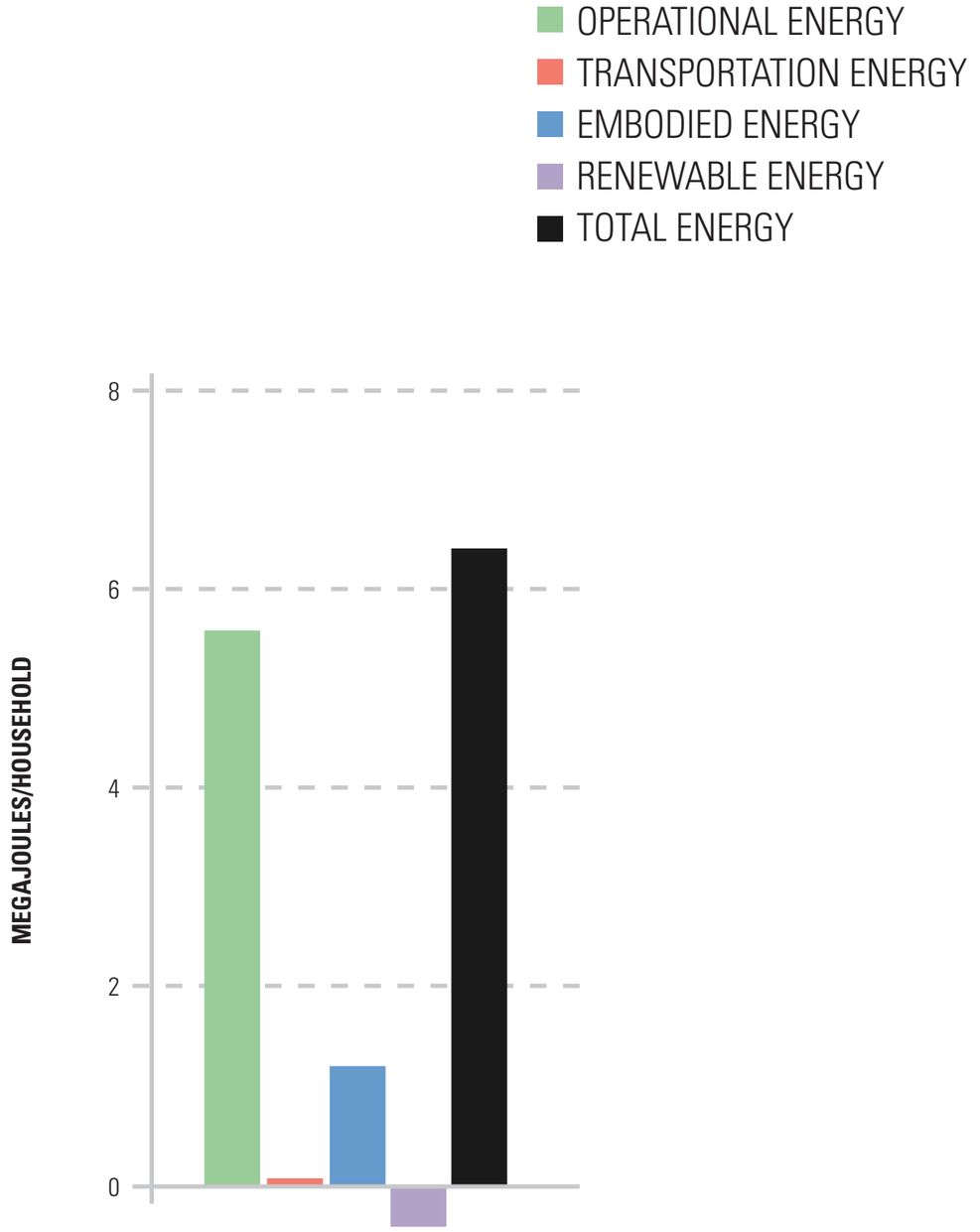
CLUSTER_01 : COMMERCIAL

OPERATIONAL ENERGY	57,600
TRANSPORTATION ENERGY	600
EMBODIED ENERGY	18,800
RENEWABLE ENERGY	-4,100
TOTAL ENERGY	72,900
FAR	6.74
POROSITY	0.57
POPULATION DENSITY (HH/SKM)	38,744

ENERGY PERFORMANCE 能源效果



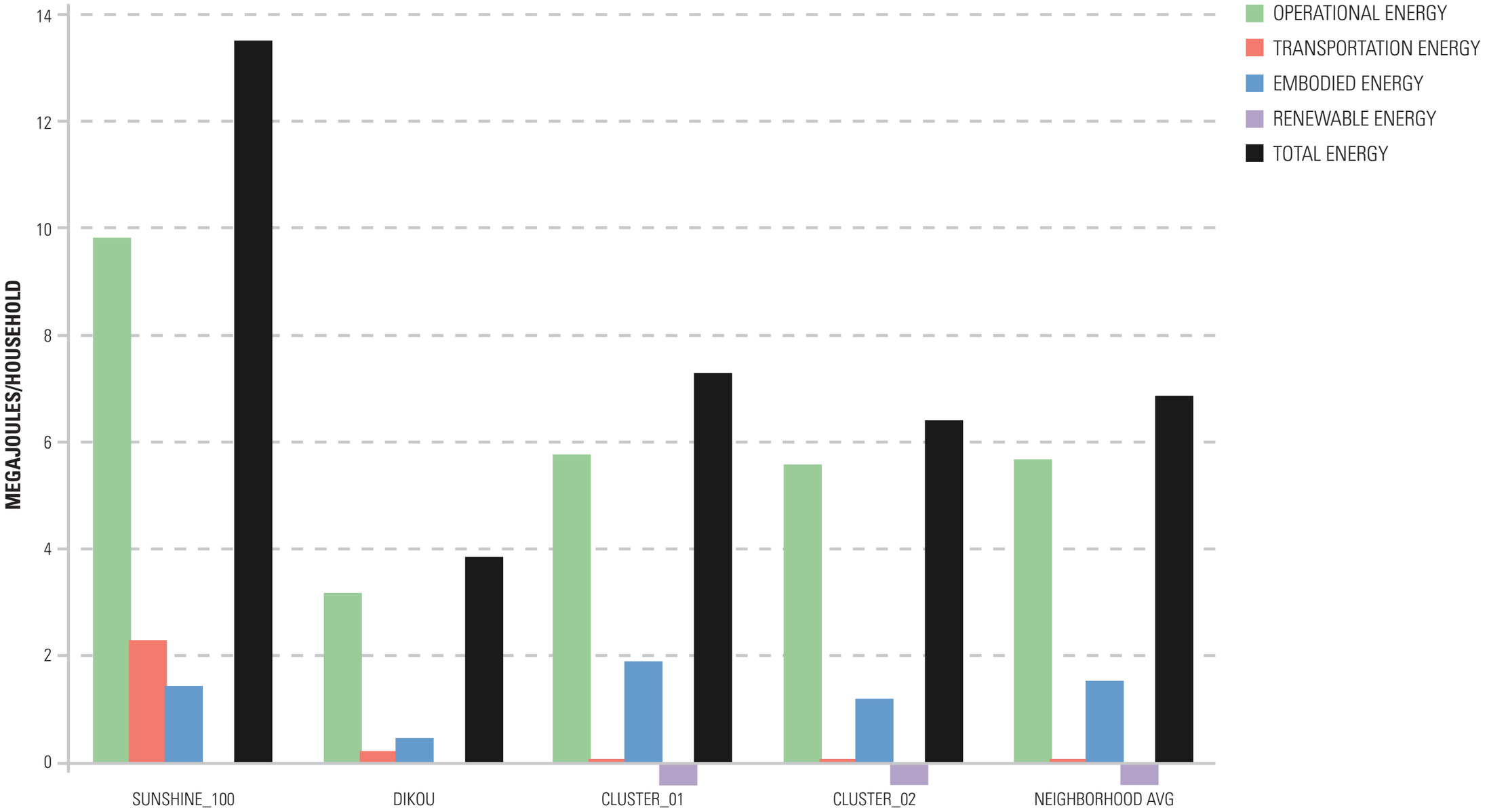
CLUSTER_02 : RESIDENTIAL



OPERATIONAL ENERGY	55,700
TRANSPORTATION ENERGY	500
EMBODIED ENERGY	11,700
RENEWABLE ENERGY	-4,000
TOTAL ENERGY	63,900

FAR	4.05
POROSITY	0.62
POPULATION DENSITY (HH/SKM)	39,377

COMPARATIVE PERFORMANCE 比较性效果

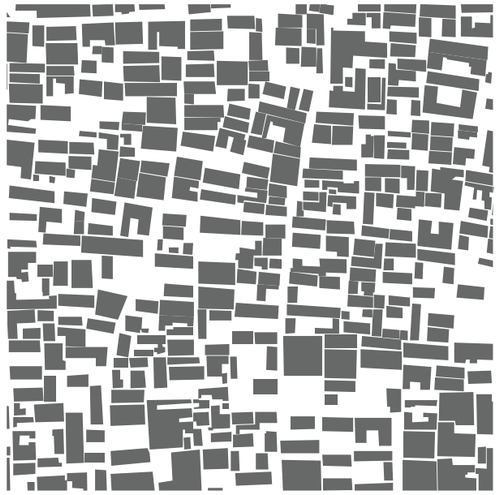


Metrics	Sunshine 100	Dikou	West Jinan Cluster 1	West Jinan Cluster 2	West Jinan Neighborhood Avg
Operational Energy Consumption (MJ/HH)	97,931	31,686	57,600	55,700	56,650
Transportational Energy Consumption (MJ/HH)	22,842	2,054	600	500	550
Embodied Energy Consumption (MJ/HH)	14,089	4,441	18,800	11,700	15,250
Renewable Energy Consumption (MJ/HH)	n/a	n/a	-4,100	-4,000	-4,050
Total Energy Consumption (MJ/HH)	134,862	38,180	72,900	63,900	68,400
Floor Area Ratio	2.15	0.99	6.74	4.05	5.40
Porosity	0.169	0.705	0.57	0.62	0.60
Populaton Density (HH/skm)	16,624	16,897	38,744	39,377	39,061

COMPARATIVE FORMS 比较性形式

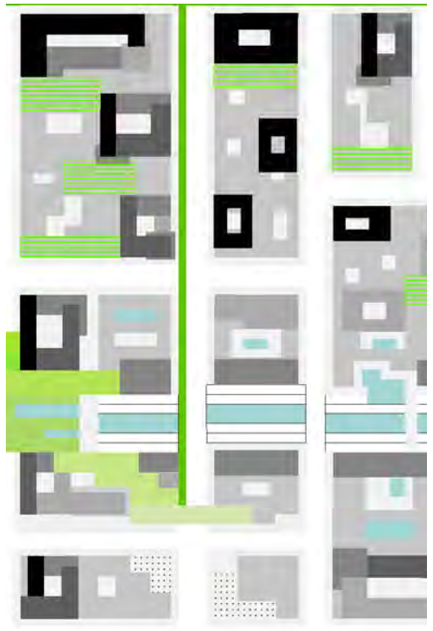
SUNSHINE_100

_SIMPLIFICATION OF FORM
_SINGLE USE
_CAR-ORIENTED & ISOLATED
_NON-RESPONSIVE TO CLIMATE & CULTURE
_TOO MUCH UNUSABLE GREEN SPACE
_NO RESIDENTIAL FELXIBILITY



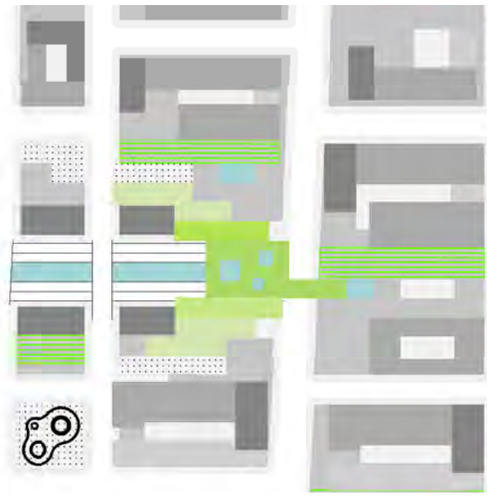
DIKOU

_VARIATION & COMPLEXITY OF FORM
_MIXED USE
_WALKABILITY
_INTEGRATED PASSIVE STRATEGIES
_RESPONSIVE TO CLIMATE & CULTURE
_LACK OF INTEGRATED GREEN SPACE
_USE OF ROOF AS EXTENSION OF HOME
_URBAN AGRICULTURE
_FLEXIBLE RESIDENTIAL STRUCTURES



CLUSTER_01

_VARIATION & COMPLEXITY OF FORM
_MIXED USE
_WALKABILITY
_INTEGRATED PASSIVE STRATEGIES
_RESPONSIVE TO CLIMATE & CULTURE
_INTEGRATED GREEN SPACE
_USE OF EXTERIOR AS EXTENSION OF HOME & PUBLIC REALM
_URBAN AGRICULTURE
_FLEXIBLE RESIDENTIAL STRUCTURES



CLUSTER_02

_VARIATION & COMPLEXITY OF FORM
_MIXED USE
_WALKABILITY
_INTEGRATED PASSIVE STRATEGIES
_RESPONSIVE TO CLIMATE & CULTURE
_INTEGRATED GREEN SPACE
_USE OF EXTERIOR AS EXTENSION OF HOME & PUBLIC REALM
_URBAN AGRICULTURE
_FLEXIBLE RESIDENTIAL STRUCTURES