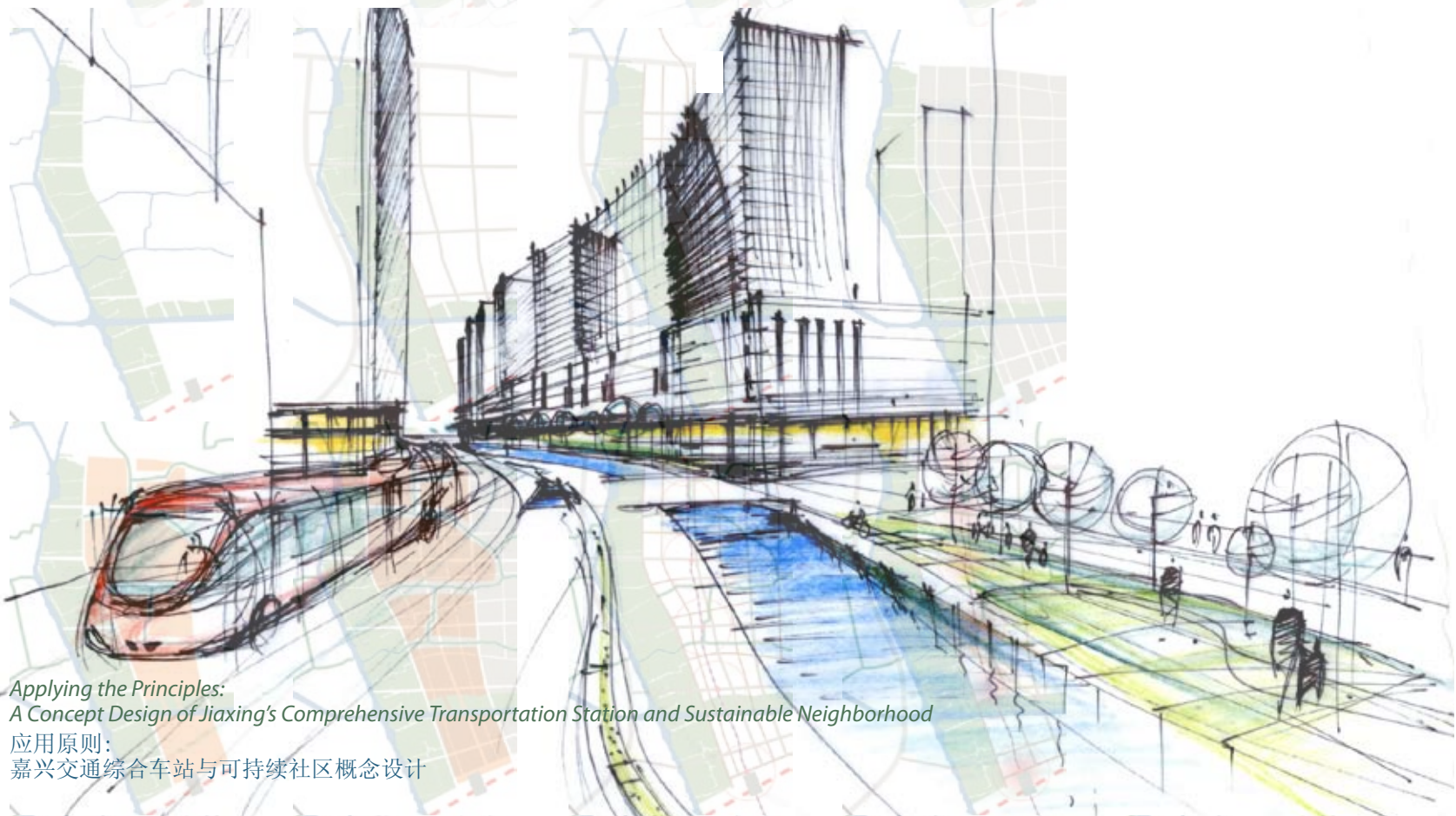


嘉兴

健康水都新生态

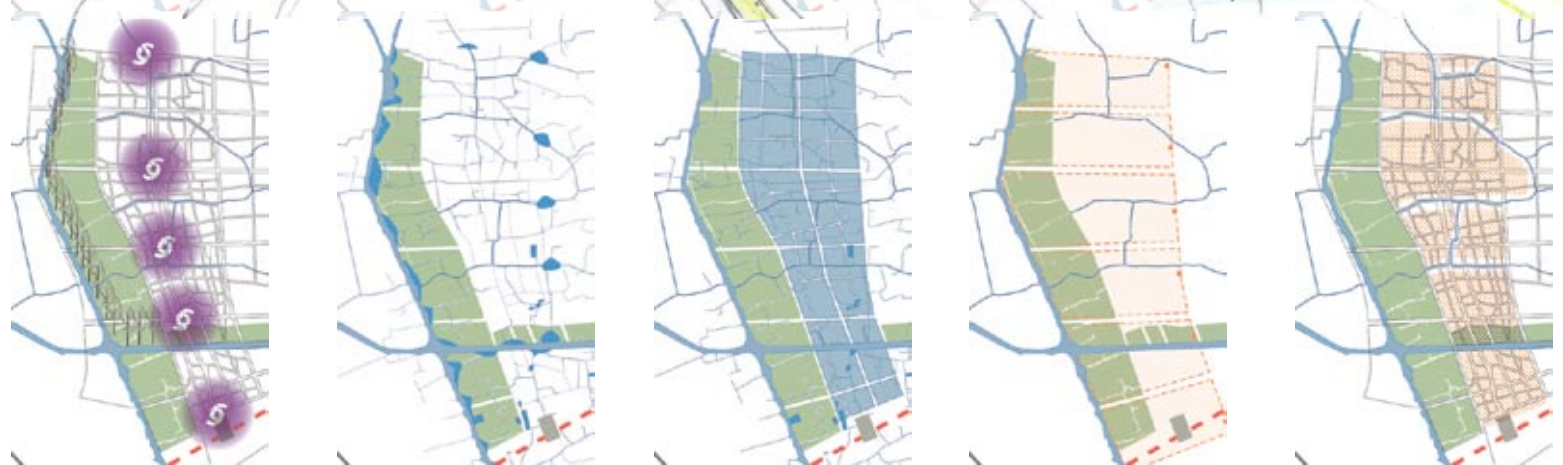
Green Jiaxing

Sustainable Design Principles for a Harmonious City



*Applying the Principles:
A Concept Design of Jiaxing's Comprehensive Transportation Station and Sustainable Neighborhood*

应用原则：
嘉兴交通综合车站与可持续社区概念设计



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Timeline

November, 2006: Contract signing ceremony for work
January: Berkeley students prepare for trip to China
February: China Trip: site visit, cultural exchange, teamwork, presentation
March-May: Berkeley students' studio work
April-June: Tongji students' studio work
May: Final presentation to government officials in Jiaying
June-August: Report writing and publication

时间安排

2006年11月: 伯克利与同济大学项目合作合同签署仪式
2007年1月: 伯克利学生准备中国之行
2月: 中国之行, 基地考察, 文化交流, 合作, 汇报。
3月-5月: 伯克利学生设计工作室
4月-6月: 同济学生设计工作室
5月: 向嘉兴政府官员汇报
6月-8月: 汇报书编写, 出版



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Acknowledgements

During the winter and spring of 2007, students at Tongji University in Shanghai, China and the University of California, Berkeley in the United States, collaborated on a design studio in Jiaxing, China. The group included undergraduate and graduate students pursuing coursework in architecture, landscape architecture, urban planning and urban design, as well as faculty and professionals from both countries.

The Gordon and Betty Moore Foundation, a private foundation based in San Francisco, California provided a grant to the group to explore international urban sustainability. The Jiaxing City Government in China partnered with the Berkeley/Tongji group and posed a set of urban development research questions to the students. On behalf of the faculty, students and staff at Tongji and Berkeley, we would like to thank the Moore Foundation and the Jiaxing Government for their support and guidance in this venture.

We prepared this report in the hope that our exploration of transit-oriented and sustainable development concepts will be useful to Jiaxing, and other cities, as they plan for population and economic growth. In addition, we sought to document the partnership between Tongji and Berkeley. Despite time differences and language barriers, the opportunity for collaboration was one of the most satisfying aspects of this project for both students and faculty.

Signed,



Harrison Fraker
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Tong Ming
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谢志

2007年冬去春至，中国上海同济大学与美国加州伯克利大学联合组成嘉兴城市交通设计工作室。组队来自两个国家就读建筑学、景观建筑学、城市规划与城市设计专业的本科生和研究生，还有教授学者。

来自旧金山的私人基金会——戈登与贝蒂摩尔基金提供项目组资助以探索研究国际范围的城市可持续性问题。中国嘉兴市政府与伯克利/同济工作组携手合作，并向学生们提出了一系列关于城市发展研究的课题。谨代表同济大学和伯克利大学师生员工，我们为摩尔基金和嘉兴市政府对此挑战性项目提供的支持和指导深表谢意。

我们制作这份报告并殷切期望我们在交通运输和可持续发展概念的探索能给予嘉兴和其他城市，在城市人口与经济增长的规划中以借鉴。另外，我们力图记录同济大学和伯克利大学两校的合作。尽管有时空的差别和语言的障碍，这种合作的机会仍然是此项目对于两校师生而言最尽人意的方面。

签名，



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Preface

"There is an ecological apocalypse unfolding in China right now."¹ The statistics bear the point. Of the world's 10 most polluted cities, five are in China. A new coal power plant is built every 10 days. The effects on the economy, nature and humans are severe. Pollution and environmental damage have created losses ranging from 7 to 20% of the GDP over the last two decades. There are approximately 300,000 premature deaths each year attributed to air pollution alone. A quarter of China's 1.3 billion people do not have access to clean drinking water. As farmland is urbanized, China is importing food to sustain its population. China has the world's fastest growing auto market, causing more severe traffic jams and air pollution. Increased car ownership has also made China the world's leader in vehicle fatalities and second in oil consumption behind the US. Currently, the world's second largest greenhouse gas emitter, China is on pace to surpass the US in 2008—some researchers even argue that it already has.

Despite these troubling statistics, there is opportunity to make real improvements in China's environment if the government and citizens choose to take on the challenge. Through sustainable design and policy measures, China has the potential to emerge from environmental crisis as an environmental leader.

前言

“中国正经历生态环境的预警。”¹统计如此表明。在世界10座污染最严重的城市中，中国占5席。平均每10天诞生一座燃煤电站，其影响对经济、自然以及人类迫在眉睫。在过去20年间，对环境的污染及破坏导致国内生产总值流失7-20%。每年仅空气污染就造成约30万人过早死亡。中国13亿人口中四分之一人口不能得到清洁的饮用水。农田被膨胀的都市蚕食使得中国需要进口食品以支撑人口需求。中国成为世界汽车市场发展最快的地方，导致更为严重的城市交通阻塞和空气污染。私家车的增加也促使中国的车祸事件在世界上首屈一指，并成为仅次于美国的石油消费大国。目前，温室气体排放量第二大的中国将逐步在2008年超过美国——甚至有研究学者争论认为中国已经是二氧化碳排放头号超级大国。

除去那些含糊不定的统计数据，若政府与人民选择面对挑战，对中国环境产生实质的改善尚有希望。通过可持续设计与政策，中国有潜力由处于生态环境危机转而成为环境领导者。

¹Porritt, Jonathon. "China: The Most Important Story in the World." Green Futures. September 2006:3.

¹ 资料来源：“中国：世界瞩目”绿色未来





INTRODUCTION

简介

Design Problem

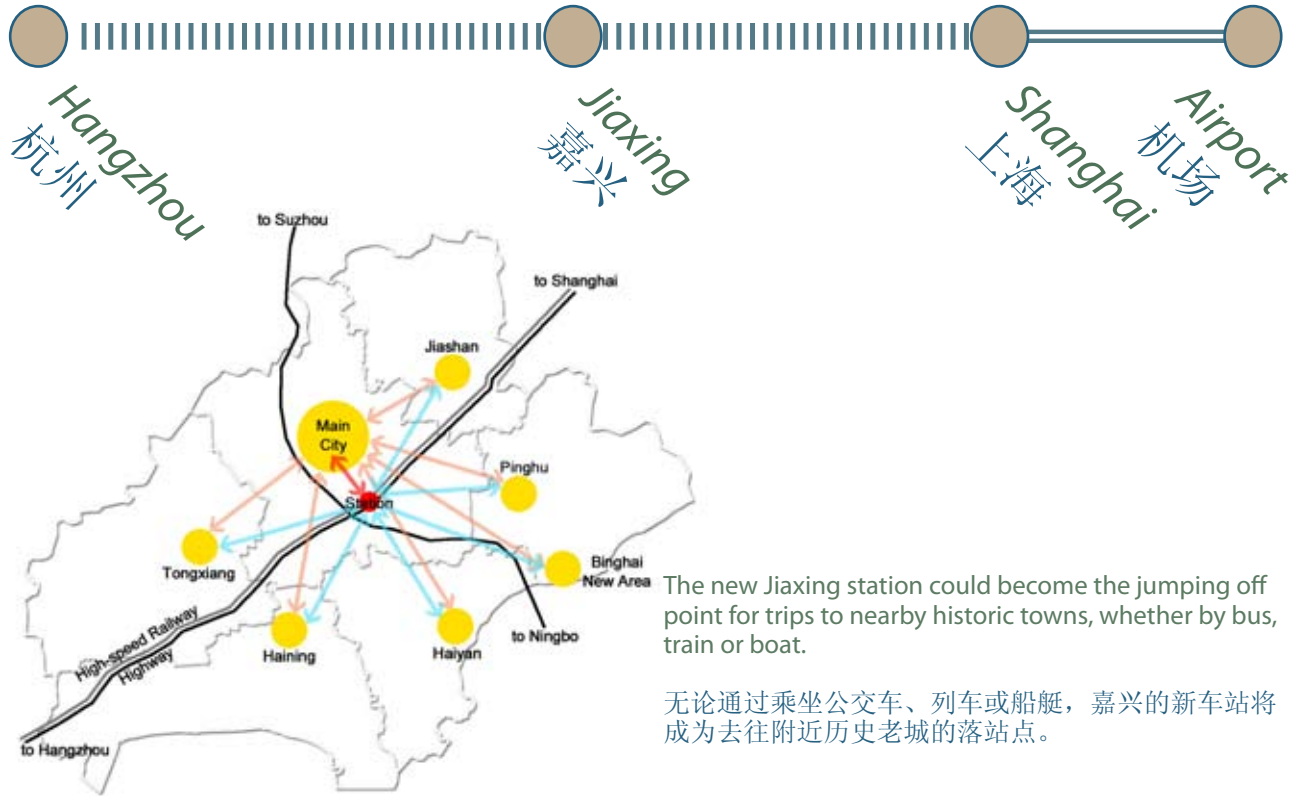
The Chinese Government has proposed a high-speed rail line to connect the Shanghai Pudong International Airport to Hangzhou, with stops in Shanghai and Jiaxing. A portion of this line already exists between the Airport and Shanghai. This new transportation infrastructure presents a huge opportunity for the City of Jiaxing, in terms of its development patterns and economic future—particularly since planners have identified a site for the proposed station stop in existing agricultural land, about 10 km south of Jiaxing's central city. This station could serve as the new transit hub for the greater Jiaxing region and as a catalyst for development in the City.

In 2004, a magnetic levitation train line opened, carrying passengers the 30km distance between the outskirts of Shanghai and the Airport in just 8 minutes.

设计问题

中国政府计划在上海浦东机场与杭州之间修建高速列车，在上海与嘉兴两处设停靠站。此干线在上海市区与机场之间的部分已建成。新设交通设施将为嘉兴市城市发展模式及经济前景提供广阔机遇——特别是由于规划者已指定车站基地处于一片距离城市中心区以南约10公里的农田地带。这个未来的车站将作为新的交通枢纽地区服务广阔的嘉兴市域并加速市区的发展建设。

2004年，磁悬浮列车通车，15分钟内行使30公里将乘客从上海市郊送至机场。



The new Jiaxing station could become the jumping off point for trips to nearby historic towns, whether by bus, train or boat.

无论通过乘坐公交车、列车或船艇，嘉兴的新车站将成为去往附近历史老城的落站点。

Research Questions

The Berkeley-Tongji studio team, with guidance from the Jiaxing Government focused on key research questions:

What is the impact of a high speed transportation hub on Jiaxing and the region?

How could this opportunity meet the Jiaxing government's goals for the City?

What land uses and programs are appropriate for the Jiaxing of the future?

How should development be phased over time?

Key Strategies

We developed two central strategies to address the design problem and ensure a high quality of life for current and future residents:

TRANSIT ORIENTED DEVELOPMENT

First, we proposed a transit corridor between the new station and the existing city center. We recognized the opportunity to create a new hub within the City. But, we also wanted to maximize accessibility to the new station and the central city, to encourage investment in both anchors as well as in the corridor between them.

SUSTAINABILITY

Second, we proposed an integrated sustainable design strategy for Jiaxing. We felt a responsibility to address the macro level problem of China's environmental crisis on this local level. We adopted the "3 E's" principles of ecology, economy and equity. We endeavored to improve Jiaxing's air and water quality, expand renewable energy sources and reduce waste, while maintaining a competitive economy. Moreover, we sought to create an equitable design that would accommodate all types of people, regardless of age, income or other status.

研究问题

伯克利-同济联合设计组在嘉兴市政府的指导下专注于几个关键研究问题：

高速列车节点对嘉兴市和地区有什么样的影响？

这个机遇如何切合嘉兴市政府对城市的规划目标？

对于嘉兴的未来应该选取何样的土地使用和项目为合适？

发展如何分期实现？

关键策略

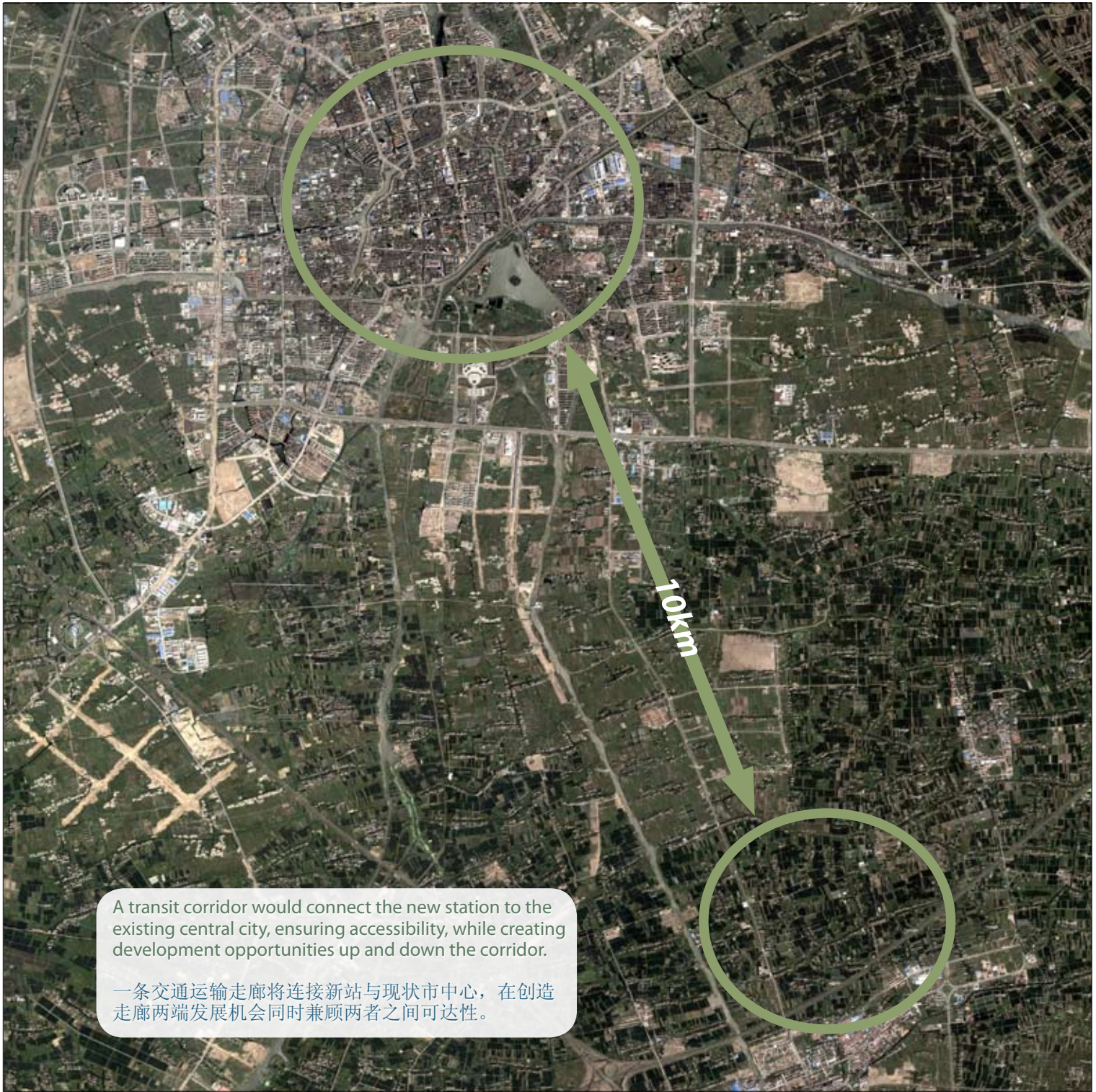
我们提出两个重点策略，以明示设计问题并确保现时与未来的居民有高质量的生活。

交通主导发展

首先，我们提议在新车站与现存市中心之间建立公共运输走廊。我们认为有可能创造一个崭新的城市中心，同时期望新站与市中心最大化的彼此通达以鼓励两翼及其间走廊地区的投资。

可持续发展

第二，我们为嘉兴提出一套综合的可持续城市发展策略。我们感到有责任在中国环境危机巨大背景下在这个地域层面有所应对。我们采用反映生态环境、经济和社会公平的“3E标准”。努力在保证嘉兴市经济竞争力的同时，改进城市空气、水质量，扩展再生能源并减少废弃物。更重要的事，我们力图创造一个公正的规划适应来自不同年龄、收入及他情形差异的人们。



A transit corridor would connect the new station to the existing central city, ensuring accessibility, while creating development opportunities up and down the corridor.

一条交通运输走廊将连接新站与现状市中心，在创造走廊两端发展机会同时兼顾两者之间可达性。

Why Transportation Options?

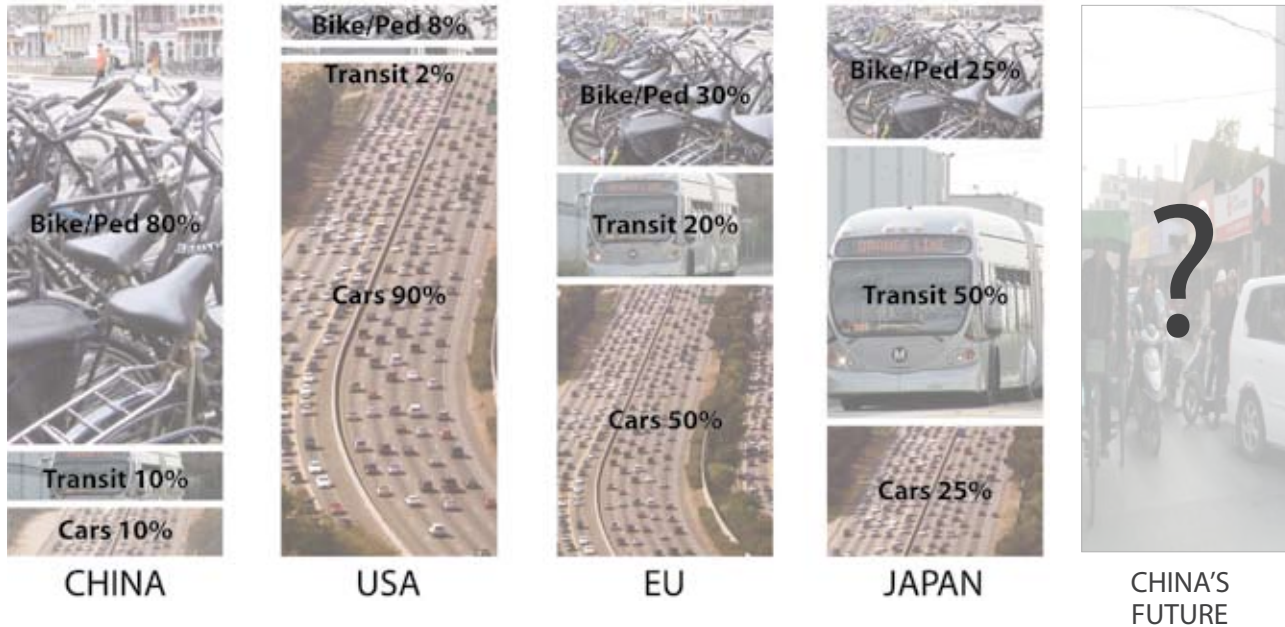
Walking, biking and public transit are more sustainable transportation options compared to driving. Automobiles contribute to air pollution, carbon emissions and traffic congestion. Public transit alleviates these effects through economies of scale, while walking and biking have added health benefits.

The following graphs estimate relative difference in travel mode share. Currently, China boasts the lowest vehicle use rate and the highest proportion of trips by bicycling and walking. In contrast, mode share in the United States is the opposite, with the vast majority of travel by car. Japan and Europe reflect more mixed mode share, with high levels of bike, pedestrian and transit use, but still a substantial amount of car travel. As China develops, which mode share will it resemble? It is essential that policymakers in China confront the effects of travel modes and align development patterns and transportation priorities.

如何选择交通方式

这些评估比较不同比例的交通出行方式。目前，中国步行，自行车，公共交通相比驾车是更加环保的通行选择。机动车辆会造成空气污染，碳排放与交通堵塞等问题。达到规模的公共交通可以舒缓此类问题，步行与骑自行车等则可以有益于健康而又不造成其他恶果。

以下图表评估了不同交通出行方式的相对差异。目前，中国值得自豪的是步行与自行车占出行很高比例而机动车使用率较低。美国的交通模式恰恰相反，出行几乎全靠驾车。日本和欧洲表现为混合的交通模式，骑车、步行和公共交通非常普遍，但还是相当依赖小汽车。在中国发展过程应该更类似于哪种模式呢？这也是中国政府决策者思考的核心问题，在出行方式保证发展速度的同时哪种交通运输应该被优先考虑。



Why Sustainability?

The “3 E” principle of sustainability provides a framework in which to develop design guidelines. Students sought to improve ecological conditions in a way that would satisfy the City’s economic goals and provide equal opportunities, in terms of access to housing, transportation, jobs, education and recreation for all residents. Chinese culture already has a strong entrepreneurial spirit of material reuse and recycling based on economic gain. But, the government must make a commitment to balancing natural and energy resource use with its production and growth goals.

The key to a sustainable China, according to the article “China’s Urbanization Challenging Sustainable Development” in the International Journal for Housing Science is the following: Legislation, sustainable urban planning practice, and cleaner production.

Legislation implies strengthening laws against environmental pollution and for more energy efficiency. The emphasis lies in enforcement, education, and incentives, especially at the local level. National environmental policies often place the regulatory burden on local governments who lack the training and resources to adequately address sustainability issues. Local governments also face enormous pressure to develop the economy—often at the expense of equity and the environment.

Legislation provides the means for governments to effectively promote sustainability, educate citizens and officials and strictly enforce its standards and deter polluting offenders.

Sustainable urban planning begins by “determining population growth by the availability of useable land” instead of “determining land use by population.”¹ Our guidelines for sustainable design practices and transit-oriented development grow from this planning principle. City and environmental planners must preserve adequate space for agricultural production and environmental processes and then determine the capacity for urban development.

Cleaner production means incorporating recycling and reuse production methods into the manufacturing process instead of using “end of pipe” methods to clean up contaminants post-production. City officials should work with manufacturing companies to encourage cleaner production processes and punish those to fail to do so.

Individuals, businesses and governments will need to cooperate in pursuing legislation, better urban planning and cleaner manufacturing processes. Educating citizens about the components of sustainability and ensuring that the implementation of these measures is culturally-appropriate, will be essential to its continued success.



¹Shen, Li-Yin.; Zhang, Zhi-Hui. China’s urbanization challenging sustainable development: International journal for housing science and its applications, vol. 26, no. 3, pp. 181-193, 2002

为何选择可持续发展模式？

可持续发展的3E法则提供了设计原则的框架。设计学生设法在确保城市经济目标和为全体居民在住宅、交通、就业、教育和休闲方面提供平等机会的前提下，改进生态环境。中国文化本身就对于基于经济原因的循环和再生格外推崇。但是政府必须承担起义务，在对自然与能源资源的利用和实现其生产与发展目标之间取得平衡。

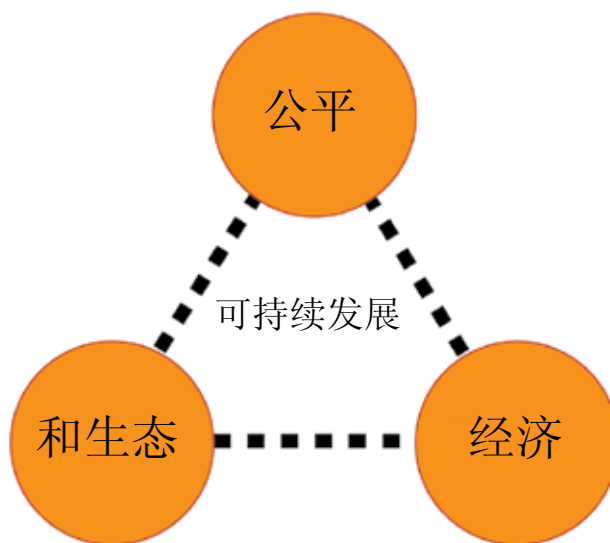
中国可持续发展的关键在于，制定相关法律，可持续性都市规划，以及更加清洁的产品。

制定法律意味着加强法律对于环境污染的治理和确保更高效使用能源。其重点在于地方阶层的执行，教育和激励制度。国家环境政策常常会对缺乏环保知识及培训的地方政府部门带来压力。同时，地区政府应面对巨大的经济发展压力——通常以牺牲平等和环境为代价。相关法律的制定可以为政府提供有效的促进可持续发展的手段，以教育人民和政府官员，并严格控制环保标准和制止违规行为。

可持续都市规划始于“可用土地决定人口”而非“人口决定土地使用”。我们的对于可持续设计实践和交通主导发展的理念亦基于此。城市和环境规划者必须在确定都市发展的承载力之前先预留足够的土地以供农业生产和环境需求。

更加清洁的产品意味着将再生和再利用产品方法结合到制造过程中，而不仅仅是治标不治本地清理污染物品。政府部门应该与制造企业合作，共同促进更加清洁的产品的生产和处罚违规制造者。

个人，产业与政府需要在立法，更好的城市规划和更洁净的生产这三方面通力合作。同时要使可持续建设成持久保持，核心还应该是教育大众并使可持续发展的观念能够深入人心。



Regional Context

The City of Jiaxing is located in Zhejiang Province, on China's central coast. Situated 80 km west of Shanghai, Jiaxing is part of a thriving Yangtze River Delta Region. While Shanghai serves as the financial capital of the region and country, the surrounding "second tier" cities, including Jiaxing, represent its industrial workhorses. These smaller cities must compete with one another for factories and businesses, by capitalizing on their relative strengths. For example, Suzhou is known for its beautiful canals and gardens, but also boasts the highest GDP and foreign capital investment in the region, after Shanghai. For Jiaxing, its geographic centrality will be a huge asset to building its competitiveness.

地域环境

嘉兴市位于中国沿海浙江省。地处上海以西80公里，嘉兴属于经济繁荣的长江三角洲。上海虽作为区域和全国的金融中心，其周围包括嘉兴在内的二级城市承担着它的工业重负。小型工业城市通过相对强势聚拢资本相互竞争争取制造厂和贸易商机。举例如众所周知的苏州因其秀美的水道与山水园林得名，但同时其国民生产总值与引入外资数额雄踞一方，仅次于上海。对嘉兴而言，其城市竞争力得益于地理中心优势。



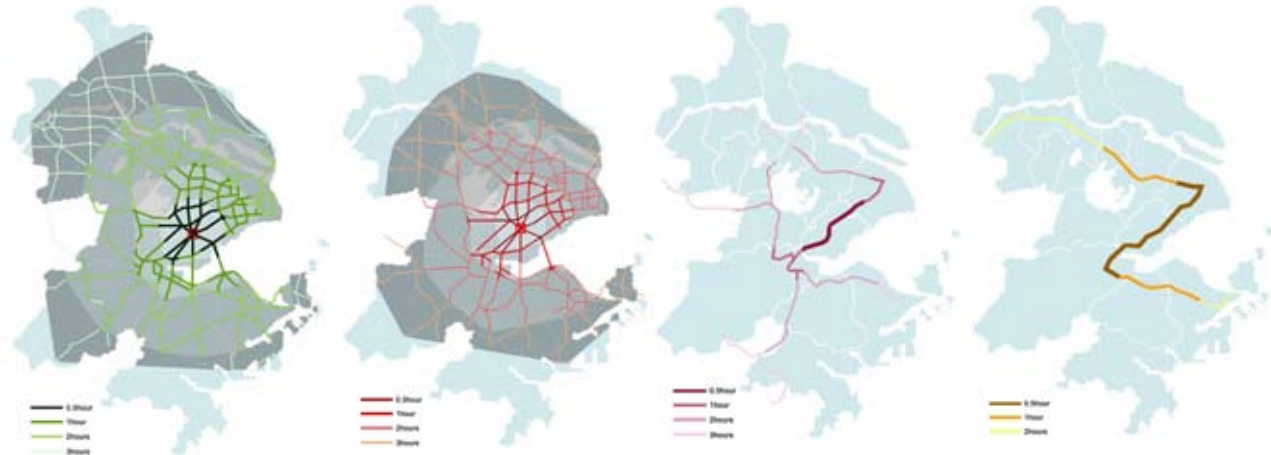
Jiaxing is well situated geographically, encircled by Shanghai and Hangzhou to the east and west, Ningbo and Suzhou to the north and south.

嘉兴市地理位置优越，东接上海西靠杭州，苏州宁波分别居其南北。



Shanghai hosts the region's front office business activities. The surrounding "second tier" cities compete for factories and businesses, based on their relative competitive advantages. The size of the red dots corresponds to relative population size.

上海囊括区域前台办公服务活动。周边二级城市依据他们侧重优势角逐贸易公司和商机。图示中红圈的大小对应城市人口规模。



Regional Car Commute
地区车辆交通

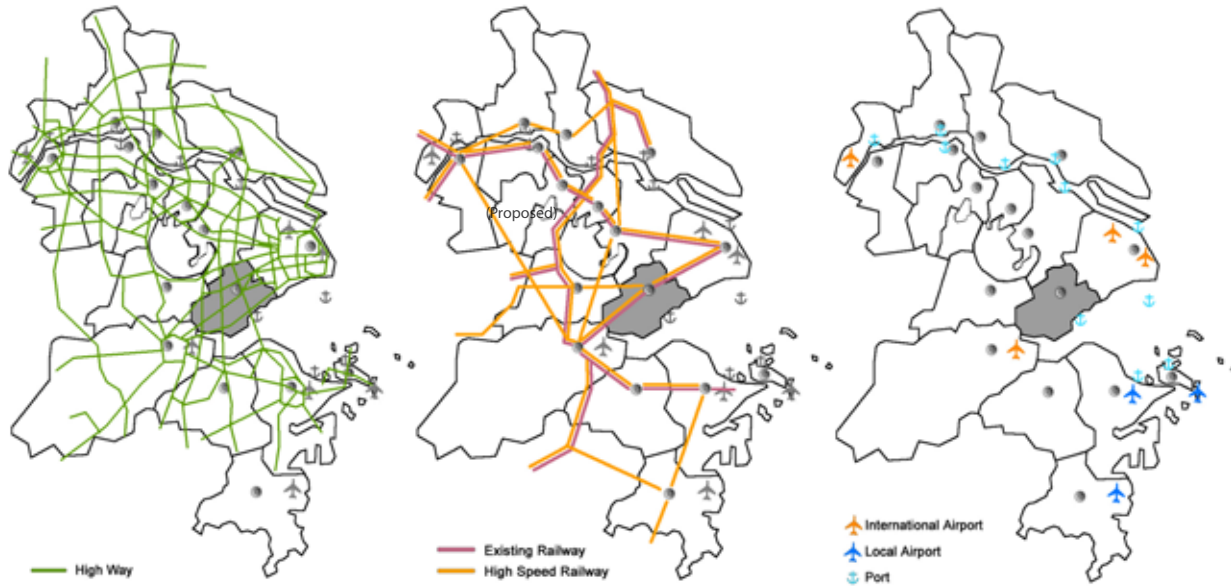
Regional Bus Commute
地区公共交通

Regional Rail Commute
地区铁路交通

Regional High Speed Rail Commute (Proposed)
地区高速道路交通（规划中）

Jiaying has highway access to surrounding cities, as well as heavy rail access to Shanghai and Hangzhou. There is a port located on the southern edge of Jiaying. The closest airports are in the major adjacent cities. As the City continues to grow economically and in population, Jiaying will need to increase its transit accessibility to remain regionally competitive.

高速公路连接嘉兴与周边城市，铁路通达上海与杭州。港口位于城市南翼，最近的空港分布于周围主要城市。随着城市经济继续发展和人口膨胀，嘉兴必将以增加交通可达性来保持区域竞争力。



Jiaxing is immediately surrounded by several historic water towns. These towns attract over one million visitors each year. Currently, cars and buses are the only way to access these towns from Jiaxing.

嘉兴市紧靠几个历史著名水乡。这些水乡每年吸引百万观光客。目前，乘小汽车和公共汽车是从嘉兴到达这些城镇的唯一途径。



Jiaxing City Characteristics & Projections

	2006	Projected	
		2010	2020
Demographics			
Population (millions)			
Greater Jiaxing City	3.3	3.5	3.8
Transient Population	1.5	1.6	1.7
Jiaxing City Center	0.6	0.8	1.5
MagLev Station Area	0.4		
Jiaxing City Density (persons/per km)	843	894	971
Economy			
Average Income			
Urban Population	Y16,000	Y18,240	Y20,794
Rural Population	Y8,000	Y8,960	Y10,350
GDP (2005)	Y115	Y131	Y150
Foreign Direct Investment	US\$2.5B		
Tourists (millions annually)	16.5		
Income from Tourism	Y13.5B		
Income from Industry	Y210B		

嘉兴市的特点与展望

	2006	规划目标	
		2010	2020
人口统计			
人口 (百万)			
市域	3.3	3.5	3.8
外来人口	1.5	1.6	1.7
市区	0.6	0.	1.5
车站地区	0.4		
人口密度 (人/平方公里)	843	894	971
经济统计人均收入			
城市	Y16,000	Y18,240	Y20,794
农村	Y8,000	Y8,960	Y10,350
国民生产总	Y115	Y131	Y150
外来投资	\$2.5B		
旅游人次	16.5		
旅游业收入	Y13.5B		
工业收入	Y210B		

Strengths

Water is the most prominent feature of the Jiaxing landscape. The City is part of the Yangtze River Delta, with a branch of the Grand Canal running through the middle of the City. It has an extensive system of natural and manmade canals, serving as transportation conduits, irrigation sources and recreation amenities.

Outside of the central city, agricultural land covers the landscape. Grain, fisheries, livestock and mulberry trees are some of Jiaxing biggest commodities and are important for the region's food supply. Informal agriculture, such as small vegetable plots, is found throughout the City, on roadsides and in the common areas of housing complexes.

Advantageous location: convenient to major cities and transit networks

Natural environment assets include ample open space for storage, manufacturing, and abundant agricultural production

Lower cost of living, including affordable land prices, compared to nearby cities

Historical significance and tourism resources

优势

嘉兴之水得天独厚。这座城市地处长江三角洲，又有京杭大运河穿城而过。自然与人工开采的航道共同担任城市的交通运输、农业灌溉和休闲娱乐。

老城外围，农田遍地。稻谷、渔场、家畜和桑槐供应日常生活。那些不着意的农艺，譬如小小的菜田遍布城市路边和寻常百姓的堂前屋后。

区位优势：到达各大城市方便快捷，交通网布周全。

自然环境资源丰富，有充分的开放空间以供仓储和制造业及农业生产。

生活开销小，和周边城市相比土地廉价。

蕴含历史渊源和可观的旅游资源。



Weaknesses

Jiaxing's water system is also quite polluted. Industrial waste, illegal dumping and agricultural runoff contaminate the waterways. Canals are often strewn with trash and debris. These factors threaten water quality for irrigated crops, riparian habitat, drinking water and recreation.

Less developed economy, infrastructure, transportation and education compared to surrounding cities

Air and water pollution

Competitive regional environment; overshadowed by larger cities

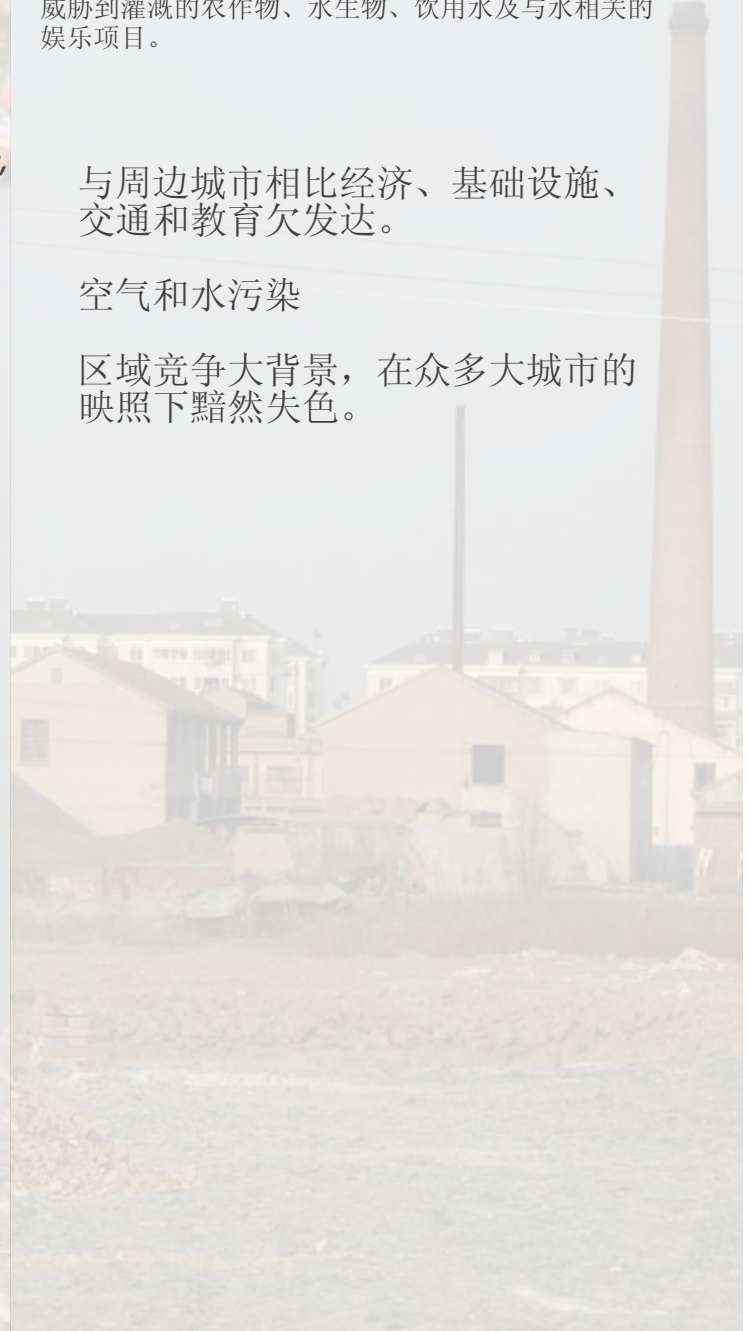
劣势

嘉兴城水环境已经遭到污染。工业非法倾泻及农业漫灌污染河道，常有垃圾残片淤积沟渠。这些因素严重威胁到灌溉的农作物、水生物、饮用水及与水相关的娱乐项目。

与周边城市相比经济、基础设施、交通和教育欠发达。

空气和水污染

区域竞争大背景，在众多大城市的映照下黯然失色。



Opportunities

The proposed high-speed rail line offers an incredible opportunity for Jiaxing to reestablish its significance in the region. With increased access to surrounding cities and a new multi-modal transit station, the City will enjoy new investment and development interest. With opportunity comes responsibility. Jiaxing must recognize the impact of its development patterns and plan for a more sustainable future.

A highly accessible regional transportation hub, connecting Jiaxing to Shanghai, Hangzhou and its surrounding historic towns

A new regionally competitive economic hub with diversified businesses, centered at the high-speed rail station

A healthy, clean and attractive city for people and the natural environment

The Jiaxing Government's expressed goals for the City are to:

Create a unique and strong identity for the City

Build and maintain a strong cultural and economic position in the region

Establish a new transit hub in the greater Jiaxing region

Attract investors, tourists and residents to the City

机遇

规划中的高速列车为重新塑造嘉兴的区域地位提供难能可贵的机遇。多元现代化车站的建成及通往各大城市的便捷交通状况，嘉兴将坐享新投资热潮和城市发展带来的利益。时机带来责任。嘉兴必须意识到发展模式冲击并考虑更可持续的前景。

嘉兴连接沪杭两地和周边历史名城水乡，区域枢纽核心。

以新站为核心将建立地域级现代化多元经济中心。

为人与自然提供更加健康、清洁的魅力城市环境。

嘉兴政府决心创建

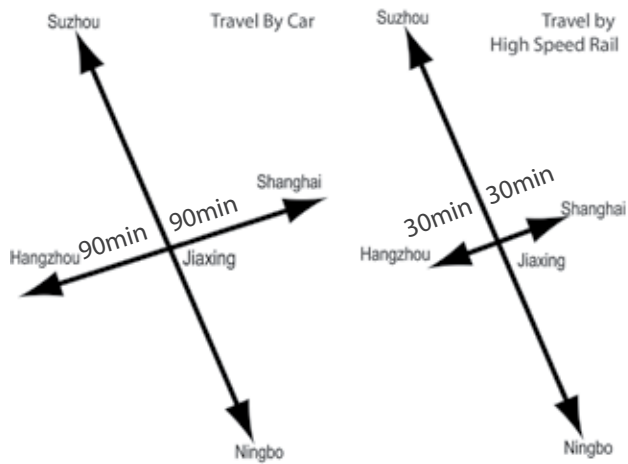
独特鲜明的城市形象

树立与继承城市在大背景下的文化经济地位，

建立嘉兴都市圈新型交通枢纽，

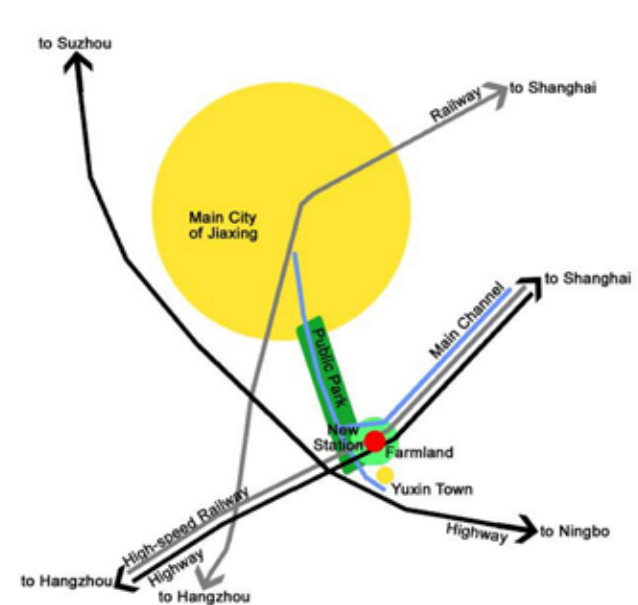
引进投资、旅游和常住居民。

The proposed high-speed rail will increase Jiaxing's accessibility dramatically—to Hangzhou, Shanghai and the world, by way of the Shanghai Pudong International Airport. Whereas it takes about an hour and a half to drive from Jiaxing to Shanghai under current traffic conditions, it could take 30 minutes or less with high-speed rail, depending on the type of train technology.



由于上海浦东国际机场，新开快速列车将大幅提高嘉兴的到达沪杭及世界各地的便捷程度。以目前的交通条件，从嘉兴开车行驶1个半小时到上海，而高速列车的加盟依照列车技术差别，将行驶时间压缩到半小时甚至更短。

The new station and proposed transit line connecting the station to the central city present a huge development opportunity in the intervening corridor. The Jiaxing Government has already proposed a new public park amenity.



中心区与新站地区之间由于新开设交通线路和车站本身的建设使得两者间走廊地带焕发巨大潜力。嘉兴市政府已在其间规划了城市公园。

Threats

There are several factors that could threaten Jiaxing's growth potential. The City must address these market-based and natural factors to achieve a sustainable future.

Unplanned urban growth

Environmental degradation

Loss of agricultural land to urbanization

Loss of City's identity as it develops

Lack of affordability with increasing land prices and cost of living

挑战

若干因素困扰嘉兴未来成长。必须要遵循市场经济和自然环境规律实现城市可持续发展前景。

未加规划的城市扩张

环境退化

都市化背景下耕地流失

城市的个性随发展流逝

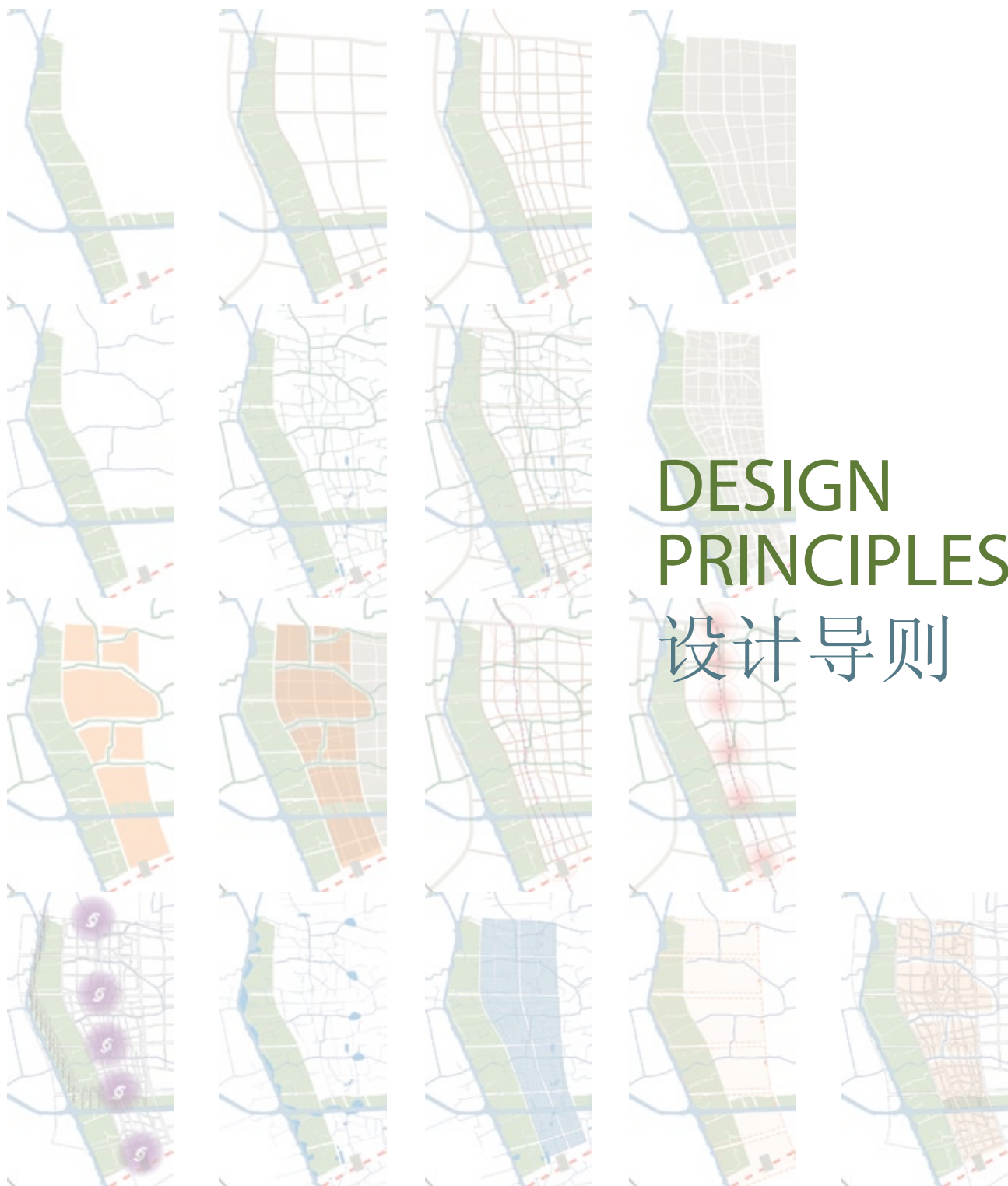
无力支付增长的土地价格和生活消费

Summary

There are more strengths than weaknesses, more opportunities than threats. Compared to surrounding cities in the region, Jiaxing has less developed infrastructure and lower levels of income and investment. Jiaxing has a unique opportunity to create a new identity as it grows. Our proposal takes advantage of Jiaxing's existing assets to create a cleaner, stronger, fairer and more sustainable Jiaxing.

概述

优势大于劣势，机遇重于挑战。与周围大城市相比，嘉兴城市基础设施建设、人民收入和金融投资相对滞后。但嘉兴具有得天独厚的时机在发展中创造崭新城市面貌。我们提议利用自身资源实现更加清洁、强大、公平和可持续的嘉兴。



To accomplish our dual objectives of transit-oriented and sustainable development, we propose a set of design principles within the following six categories:

*water
green space
mobility
urban design
architecture
energy*

为实现交通主导和可持续发展两大目标，我们制定了一系列设计导则，共分6类：

水
绿色空间
交通运输
城市设计
建筑
能源

This is not a master plan.

We developed our design ideas by studying individual transit nodes, exploring land use, density, block design, streetscapes, landscapes, and building design at specific locations. However, we decided to present the work as a set of principles by which to guide the preparation of a specific master plan. We recommend that the City hire experts to develop these principles using local, contextual knowledge to produce a meaningful plan.

这不是修建性详细规划

我们的设计始于通过对于各个特征性交通枢纽地区的研究，探讨用地，密度，组团，街道布置，景观，以及在特定地点的建筑设计等。然而，我们意图通过一系列导则的制定，来指导未来的详细规划。我们建议嘉兴政府通过请熟悉当地情况的城市设计专家进行具体规划时参考和发展这些导则。



WATER
水

The importance of water in the City, as a landscape feature and as a part of the City's identity, led us to use it as the basic unit to define the urban fabric.

City blocks are created and bisected by canals of various sizes and cross sections. Our designs enhance the waterway system and water quality for all of water's essential purposes in the City: transportation, flood protection, habitat, irrigation, recreation and household purposes.

水路在嘉兴历史上仅限对外河运用途，同时主要担负着土地划分和防洪。

水作为景观元素和城市特色在城市中的重要地位，引发我们利用这个水系统作为组成城市织理的基本单元。交叉口情况各异的大小河道形成或划分城市街区。我们的设计增强水道系统并且提高水环境品质，以利于所有以水为本的功能，例如：交通、防洪、动植物栖息、灌溉、娱乐和日常生活等。



Jiaxing Water Characteristics

The City is made up of 60% farmland, 30% built form, and 10% water.

There are approximately 145 lakes within City boundaries, including 27 lakes larger than one square kilometer.

There are nearly 14,000 km of canals throughout the City, including a canal that rings the central city.

The aerial photo on the opposite page demonstrates that water flows from the southeast to the northwest and northeast (large arrows). The central city gathers flows from four main directions (small arrows).

嘉兴水文特征

城市由60%农田，30%城市建成区和10%水体组成。

城市境内约145片湖泊，其中27个超过1平方公里。

包括护城河在内全城河道总长将近1.4万公里。

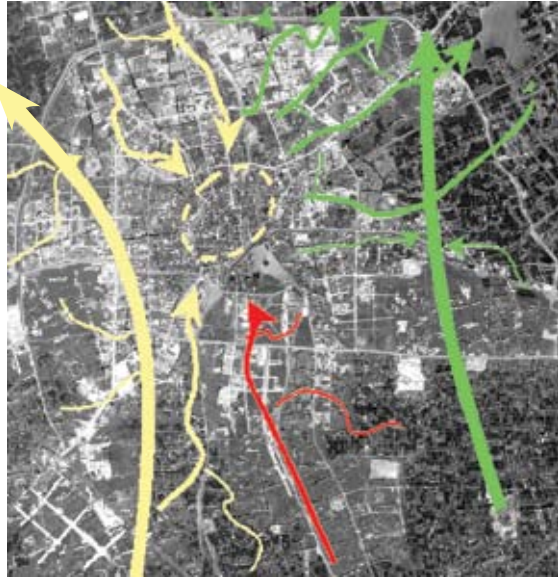
如对页航拍图所示，水势自东南向西北及东北（大箭头所示），中心城区汇集四面河流（小箭头所示）

Existing Conditions

The map at right shows existing built forms in the corridor between the central city and the proposed multi-modal station area, as well as existing water and green conditions at these sites. Rural residential areas typically have access to small and mid-sized canals from which they can draw water. Industrial uses (not shown) normally locate near larger canals so that they can transport materials in and out of the sites by boat. We suggest that Jiaxing maintain these important connections to the water, as the City develops more intensively.

城市建造现状形态

右图示多功能车站地区与市中心间走廊地带的建筑形态，以及场地范围内的水体及绿化状况。农舍区能从中小型支流汲取生活用水。工厂（图中没有显示）则利用当地大型河道靠船只与外地运输材料。我们建议嘉兴在城市集中发展的过程中保留这些与水系的重要连接处。



Water Hierarchy

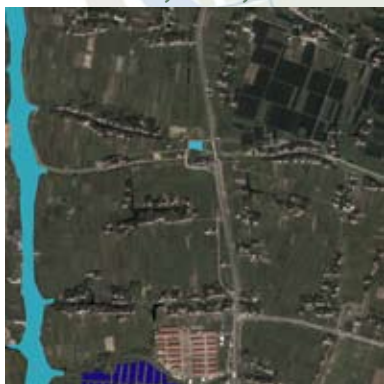
There is a hierarchy of canal types within the corridor area. The main branch of the Grand Canal is the widest and deepest canal. Smaller secondary canals branch from it and the smallest tertiary canals fill out the network.

河流等级

走廊地区河流形态等级各异。河身跨度与深度以京杭大运河为最，从中衍生二级河道和更小支流构成水网。

Primary Canal

Heavy Boat Traffic
Main Waterway to City Center

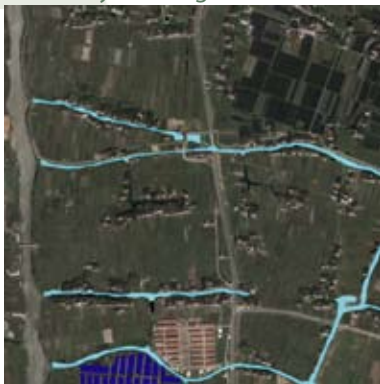


主要河道

重型船只
主要通往城市中心的水道

Secondary Canals

Small Boat Traffic/Aquaculture
Waterways to Neighborhoods



次级河道

小型船只
居住区水道

Tertiary Canals

Recreation/Stormwater Retention
Waterways in Neighborhoods



再次级河道

休闲/雨水蓄积
小区水道

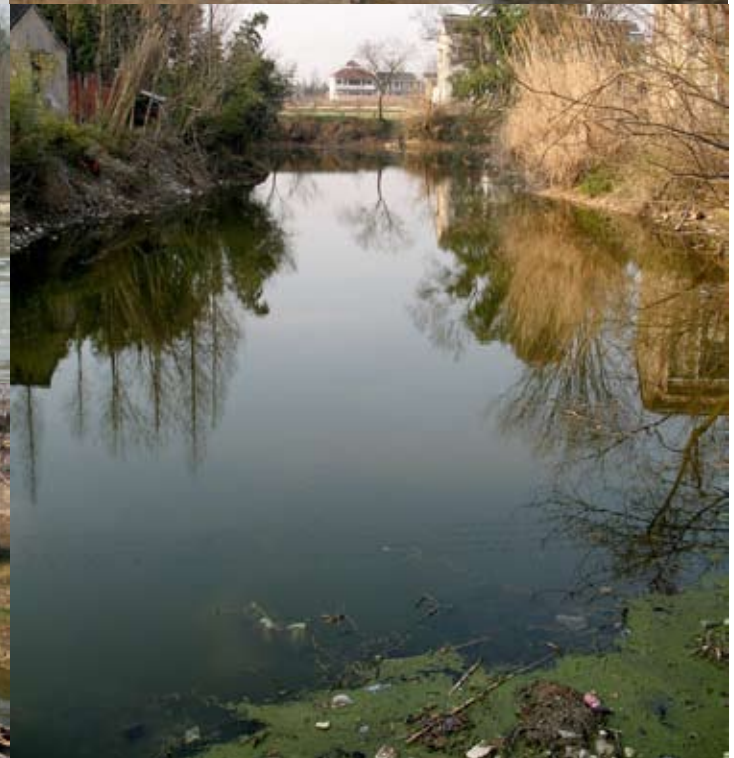


Water Quality

The groundwater is partially polluted, primarily from fertilizer, whereas the canal water pollution comes mostly from point sources. The primary canals, which have the highest rates of flow, are rated at the lowest standard acceptable for human contact according to National Classification Standards for Surface Water. Algal blooms grow where tertiary canals dead-end; this indicates eutrophication, as polluted effluent drains into the canals and causes overgrowth of aquatic plants and stagnation. By creating a connected system of waterways, our proposal allows water to flow naturally through the corridor. This corridor could be a model clean water system for the City and the region.

水质

地表径流已遭污染，水污染来源主要来自特定地区的田间化肥。国家地表径流分级标准规定，干流即径流量最高的河流与人们日常生活接触最少。这也意味着那些几乎停滞的次级河道和小型支流水质更糟。富营养化造成水藻团积在支流末端。在这次方案设计中走廊地带相互联通的水网将平衡径流流速。这将成为城市和地区的清洁的水网模型。



Clean Water Gateways

The “clean water gateways” are a series of wetlands which treat polluted water before it enters the corridor. Pollutants are extracted by plants and other organisms as the water moves through several wetland cells. Locks allow boats to enter and exit the corridor, while preventing polluted water from mixing with treated water.

净化河流门户

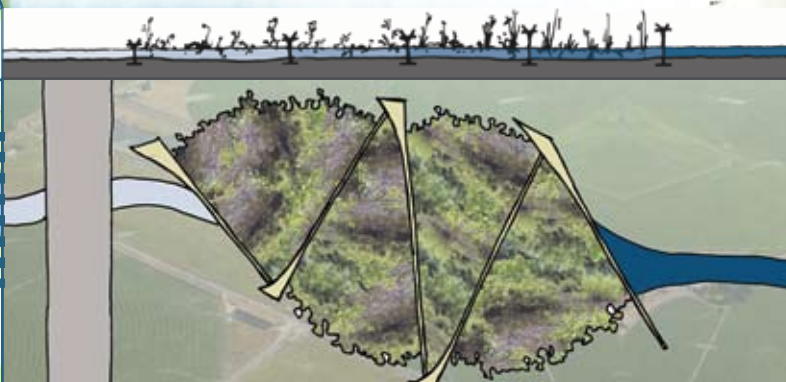
“净化河流门户”是一系列连续的湿地，受污染的水源先通过湿地过滤再流向廊道。污染物在通过系列湿地单元时在水生植物和有机物的作用下被清除。设置水闸令船只可以进出河段，同时避免污水和通过净化的水混合。

primary canal
主要河道

treatment wetlands for
primary canal
主要河道水处理湿地

Above: Clean Water Gateway for Primary Canal
Below: Clean Water Gateway Wetlands Diagram for
Secondary Canals--Plan and Section

上：主要河道净水口
主要河道水处理湿地图示——平面与剖面



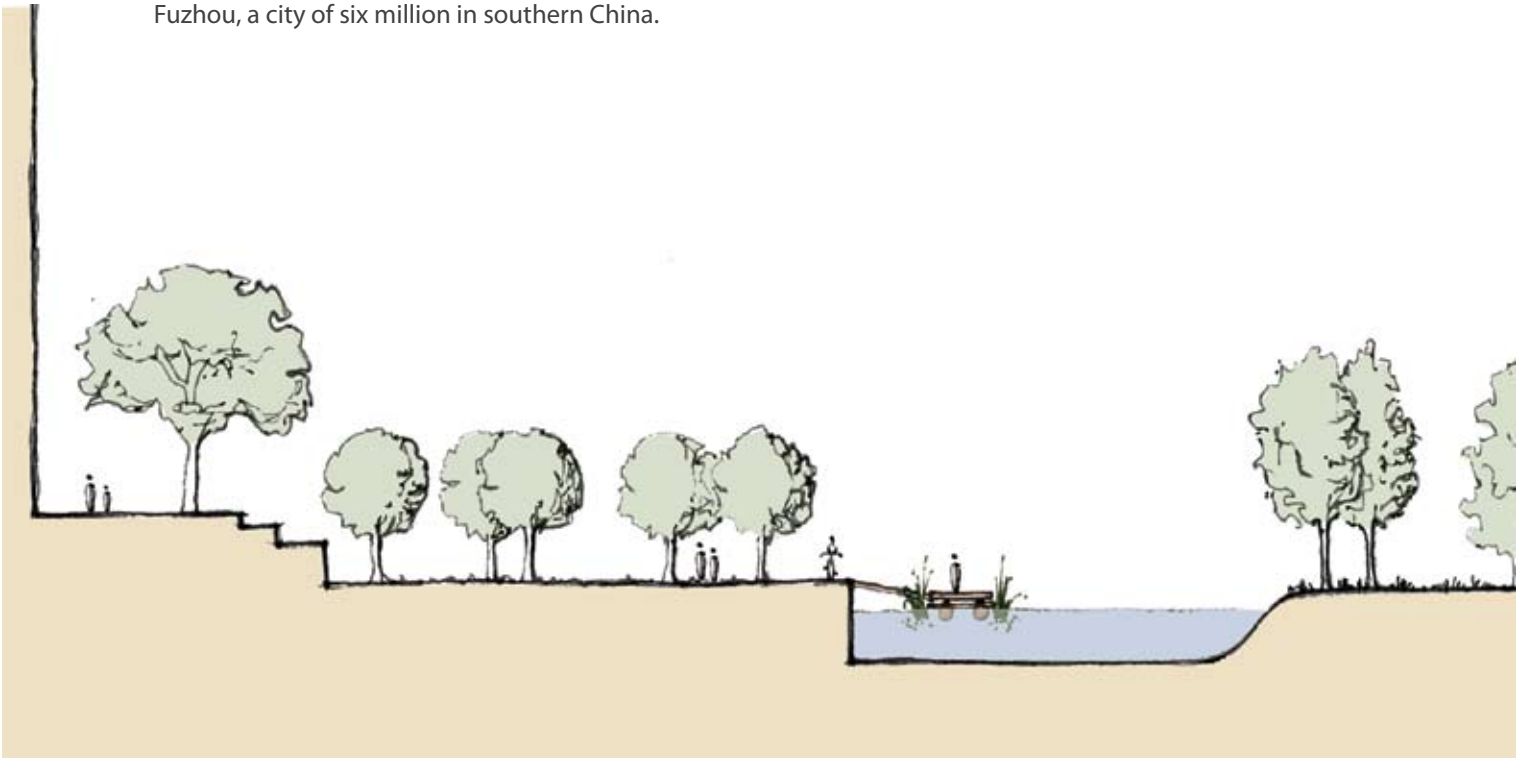


Restorer Boardwalks

As part of the clean canal initiative, floating restorer boardwalks treat the existing water in the canals, using natural biological processes. The restorers consist of a floating structure, air distribution system, and high surface-area media called bio-film, which support diverse microbial and plant communities. They also provide ongoing treatment as pollutants, although minimized, continue to enter the canal system. Organic agriculture and responsible industrial practices should be used to reduce pollutants from entering the system. There is precedent for restorers on the Baima Canal in Fuzhou, a city of six million in southern China.

清淤浮板

净化河流的举措还包括在水面上放置由表付结构，空气分配系统，和支持微生物群落的高表面积媒材-生物胶片。漂浮挡板阻挡哪怕最小的污染物浸入河流。应采用有机农业和可靠的工业治污措施减少污染物流入运河。采用生物学方法，木板中包含特殊高分子媒介又称生物膜辅助分解微生物和水生物。这项技术曾在中国南方城市6百万人口的福州白马河使用。

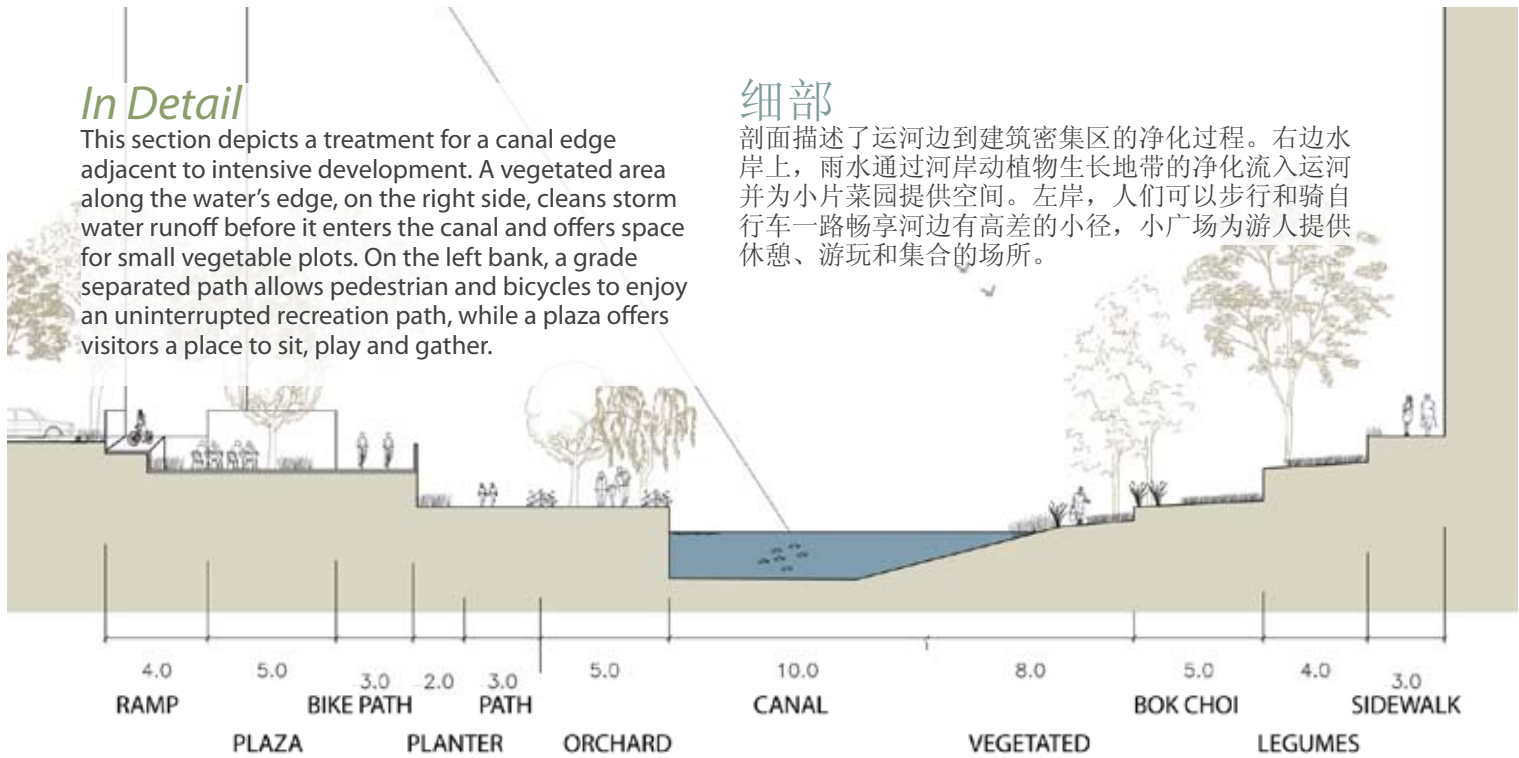


In Detail

This section depicts a treatment for a canal edge adjacent to intensive development. A vegetated area along the water's edge, on the right side, cleans storm water runoff before it enters the canal and offers space for small vegetable plots. On the left bank, a grade separated path allows pedestrian and bicycles to enjoy an uninterrupted recreation path, while a plaza offers visitors a place to sit, play and gather.

细部

剖面描述了运河边到建筑密集区的净化过程。右边水岸上，雨水通过河岸动植物生长地带的净化流入运河并为小片菜园提供空间。左岸，人们可以步行和骑自行车一路畅享河边有高差的小径，小广场为游人提供休憩、游玩和集合的场所。



San Antonio, Texas, provides a great example of a community that embraced its waterways as an economic development strategy. Annually, millions of residents and visitors enjoy the natural and commercial elements of the canals.

德州圣安东尼奥作为美国成功典范。宜人的亲水景观成为社区促进经济发展的策略。每年数以百万的居民和游客因其自然之美和商业繁华乐而忘返。



Swales

Canals running through urban areas provide a respite for residents and visitors. Swales help to control and clean stormwater before it enters the waterway system.

私人场所

河流流过城市的地区令居民和游人舒缓身心。洼地有助于在雨水流入河流之前加以控制和净化。



Permeable Paving

Permeable pavement aids in flood protection, assists in groundwater recharge and allows percolation. This photograph, taken in a housing complex in Jiaxing, demonstrates that the City already recognizes this design feature's contribution.

渗透型铺地

渗透型地面能减缓雨水流失, 有助于地下水的补充与过滤。照片取自嘉兴一处居住楼群, 说明城市已经意识到这种设计对生态环境的作用。





Key Water Functions

水的主要应用

Transportation

交通

Recreation

休闲

Irrigation

灌溉

Food Source

养料

Habitat

栖居

Environmental Protection

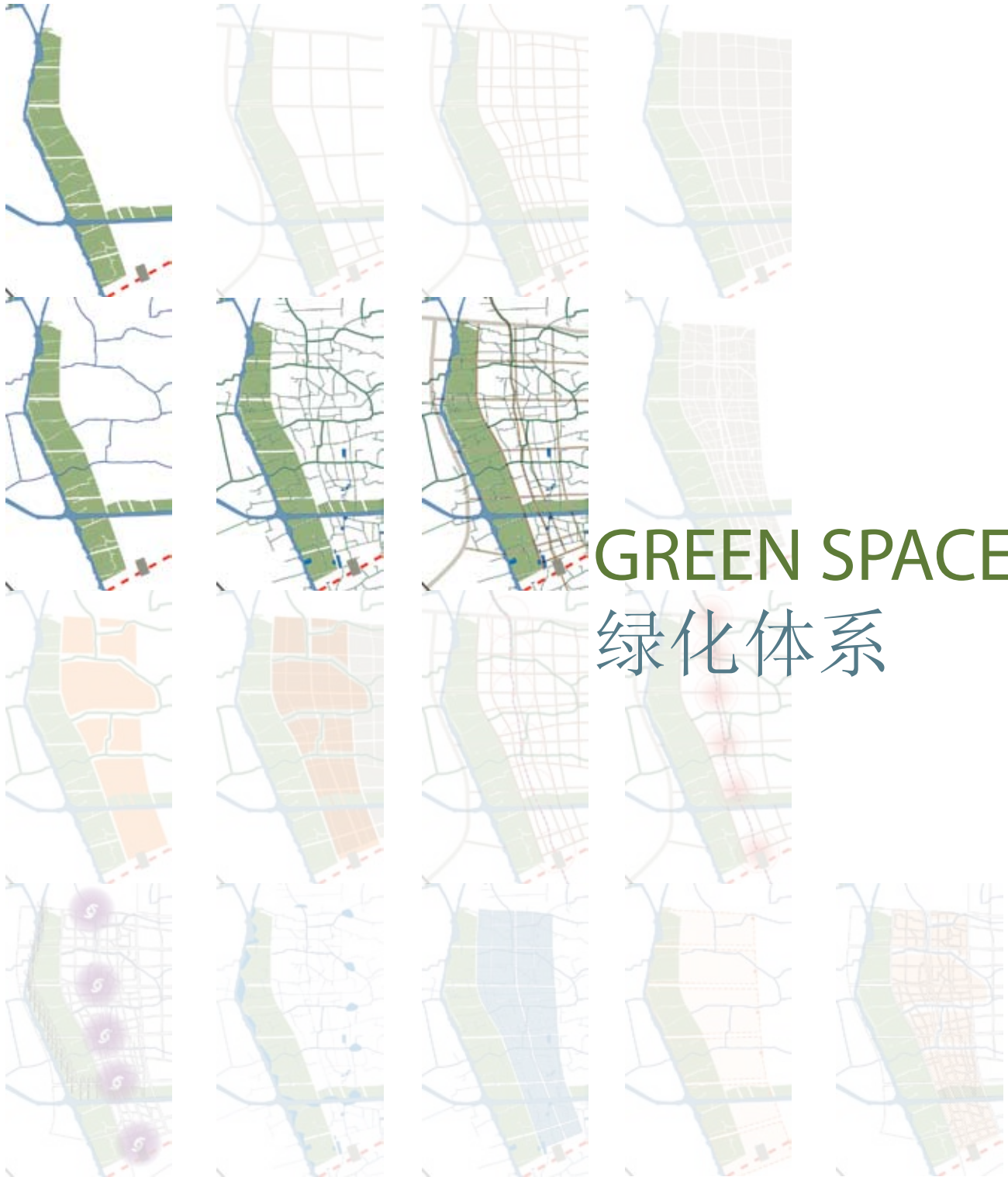
环保



Implementing the design elements described above will help to accomplish the multiple goals of water cleaning, storm water management and increased accessibility. As a central feature of Jiaxing's landscape, water can both define the urban form and provide an economic and recreation amenity.

实现上述设计元素有助于确保水净化，雨水处理和水路畅通的多元目的。作为嘉兴景观标志性的水文，既能够定义城市形态，又能够提供经济的娱乐设施。

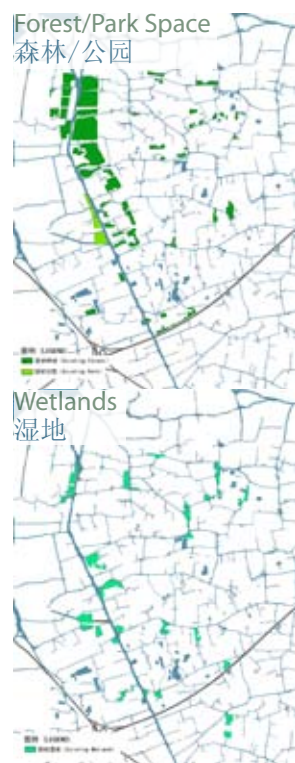




Green spaces complement the waterways, creating a place for productivity, mobility and recreation, and further defining the natural and built environment.

Green systems drain and clean storm water, provide a recreation amenity, delineate a transportation network for bicyclists and pedestrians, and sustain agricultural use. In our design, the green system provides the public open space and productive functions in the corridor. It is the City's responsibility to plan this system in advance of urban development in order to establish a cohesive green system. Individual developers may then build out their parcels between the branches of the natural system.

The maps on the left of the page, show existing site conditions. The map on the right depicts the City's plan for a network of open space.



开放空间与绿化相得益彰，形成对于生产，交通和休闲的场所 从而进一步明确环境要素

绿化系统收集并净化雨水，提供休闲娱乐活动，骑车与散步，并支持开发农业项目。在我们的设计方案中，绿化为这个地区提供开放空间和生产功能。城市有责任在都市发展建设之前规划这个系统以使绿带延续。私人开发者于是可以在天然分支之间建设小地块。

左边的图例表达的是绿化系统, 包括农业用地, 树林和几个公园作为水道系统的扩展。湿地沿河道零星分布。右图标示了一些城市规划案中存在的开放空间。我们推荐这些规划并建议政府进一步研究其他开放空间的可能位置, 例如, 哪里可用于农业生产的最佳地段; 湿地修建; 休闲场所? 开放空间可有助于形成建筑空间和非营建空间的平衡



The Park

The Jiaxing Government proposed a large park running north-south along a branch of the Grand Canal. We embraced this park as an opportunity to create a landscape that could be productive for agriculture and water filtration, and also used for recreation.

公园

嘉兴政府在走廊地带规划了一座巨大的沿大运河一支贯穿南北的城市公园。我们对这个景观创意乐此不疲，因其不仅可以用于农业生产和水体过滤，还为人们提供休闲好去处。



Park Comparison

Central Park in New York City and Golden Gate Park in San Francisco, California offer precedents for how large linear parks can support high-density development. In both examples, the park provides an amenity for residents living nearby, an attraction for visitors and increase local property values.

公园比较

纽约中央公园和加州旧金山金门大桥公园是城市大型带状公园支撑城市高密度开发的典范。两者无一例外，不仅为住在周围的居民享受，还吸引外地游客从而提升地价。



Jiaxing Park
嘉兴公园

Central Park, NY
纽约中央公园

Golden Gate Park, SF
旧金山金门公园

Frederick Law Olmsted's "Emerald Necklace" network of greenways in Boston, Massachusetts links over four square kilometers of green space in just eight linear kilometers. His intent was to provide meeting and recreation space for all different types of people, within an otherwise urban setting.



麻省波士顿市“翡翠项链”绿化工程，在8公里长的狭长地区连接4平方公里大面积的绿地。设计师弗雷德里克试图用截然不同的都市设计框架，为不同类型的人们提供会面和娱乐的场所。

Greenways

To increase the accessibility to the park, we lined all of the secondary waterways, running east out of the park, with green buffers. These greenways, roughly 80 meters wide, appear like fingers extending from a palm. They create distinct districts along the corridor between the city center and the rail station, delineating boundaries of future urban neighborhoods.

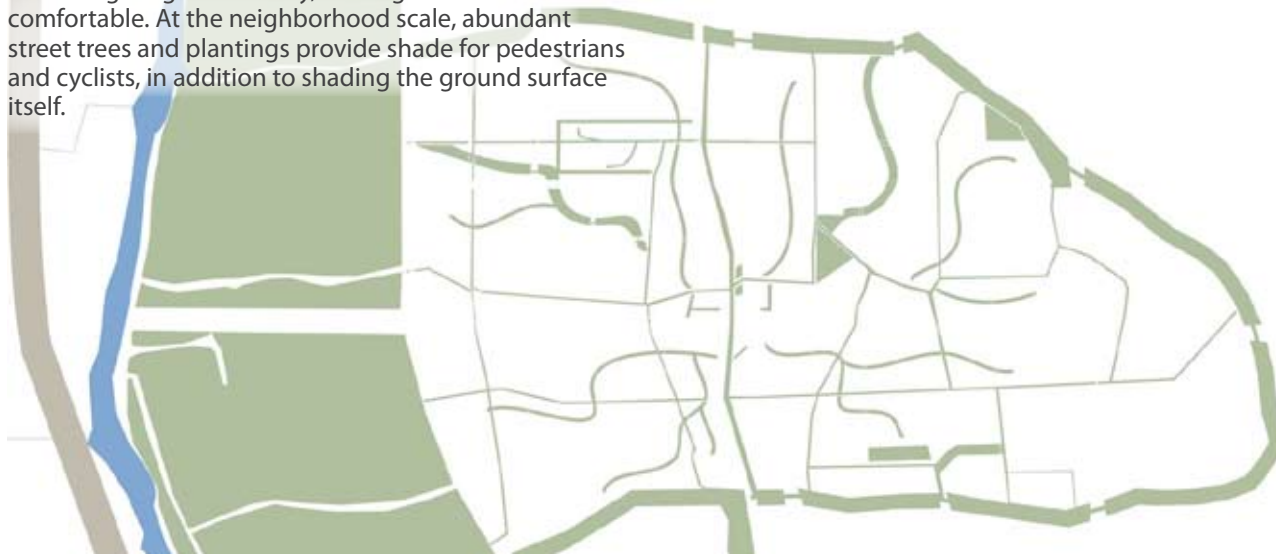
绿化体系

为了使人们更方便进入公园，我们将所有次级河道连通，从东面流出城市公园，河水两岸设绿化隔离带。绿带80米宽就像指从掌中生。这个绿化体系在车站-市中心间的走廊地带形成不同的分区作为未来居住区的边界。



Greenway Connections

Next, we proposed expanding the network of greenways, by adding green buffers to the tertiary canals. In some cases, we added waterways and green buffers to create a fully connected system. The result is a network of green that provides ample space for agriculture, water treatment, flood protection, recreation, and pedestrian and bicycle transportation. At the corridor scale, the park and green fingers act as cooling lungs for the city, making conditions more comfortable. At the neighborhood scale, abundant street trees and plantings provide shade for pedestrians and cyclists, in addition to shading the ground surface itself.



The size and uses of open space establish different types of pedestrian circulation. For example, the red lines running through the ark designate the citywide pedestrian paths, while the looping yellow lines show pedestrian circulation at the community level. The tan circles identify major pedestrian access points.



开放绿地的大小决定步行流线。例如，穿越公园的红色线表示城市范围内的步行路径，成环的黄色线表示社区级步行流线。棕色圈表示主要步行穿过点。

Greenway Connections

其次，我们在延伸的绿带体系中再在小支流两侧设绿化隔离带。有些情况下我们额外增加水路并设隔离带形成完整的连续体系。如此以来绿化网就有充足的开放地带为农业发展、雨水净化、防洪、娱乐还有骑车和散步。整个公园和伸入城市的指状绿地向绿肺一样起到降温作用，使城市环境更加舒适。而在居住区尺度上，大量的行道树和植栽为人们遮荫蔽日，令地表也更加荫凉。

While the linear park represents a major City attraction, shown in the large green circles, smaller community and residential parks create open space opportunities at the neighborhood level. Layering on the community pedestrian plan articulates a continuous open space network to access these neighborhood and city-level open space features.



在大的绿色圈中表示的线性公园是主要的城市吸引点，与此同时社区公园也在相应层面上营造开放空间。在社区行人规划上的层次清晰实现在城市与社区间形成公共空间的连接。

Hierarchy

The size and type of canal or greenway dictates the design treatment. For example, a tertiary canal along a rural farm may call for a natural edge, whereas a more urban secondary canal may require a hard edge.

划分等级

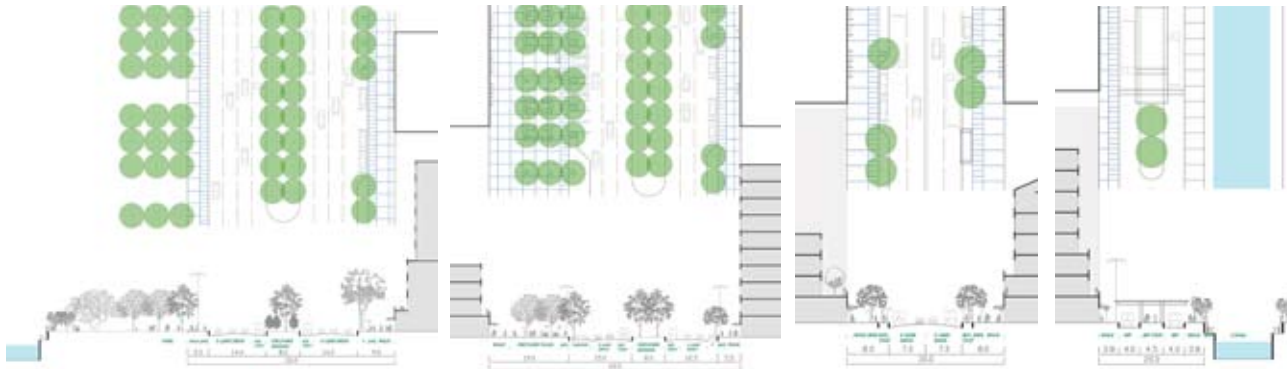
河流和绿化带的尺寸与类型揭示了不同设计手段。例如，农舍边的小溪流更倾向采用天然河岸，硬质河岸则会用于都市型河流。

滨河绿廊类型评价
Riverbank typology analysis

名称	自然要素分布特征				主要建筑类型	可能的断面形式
	农田	鱼塘	林地	裸地		
主干河道 First-class man-made riverbank	无	无	少	无	工业建筑、码头等基础设施等	
	少	少	多	多	以林地、湿地为主的自然地区	
次干河道 Second-class mixed riverbank	少	多	少	少	郊区住宅、农宅、工业区等混合	
	多	多	少	多	农田及未建设的自然地区	
支渠 Third-class village riverbank	少	少	少	少	自然村落及农宅	

滨河绿廊类型评价 Riverbank typology analysis

Hierarchy	Natural Descriptions				Building Type	Section
	Farmland	Fishpond	Woodland	Wetland		
Main flow First-class man-made riverbank	No	No	Rare	No	Industry, Marina, Infrastructure	
	Rare	Rare	Lot	Lot	Woodland and wetland	
Sub-wetway Second-class mixed riverbank	Rare	Lot	Rare	Rare	suburb housing, farmer's house mix with industry	
	Lot	Lot	Rare	Lot	Farmland and undeveloped virgin soil	
Branch Small village riverbank	Rare	Rare	Rare	Rare	Original village and farmer's house	



In Detail

Some greenways serve as streets for cars, bicycles, and public transit. Others only serve bicyclists and pedestrians.

例如

有时绿带在行车带为小汽车、小摩托和公交服务，而另一些为骑车和步行的人专属。



Public Space Integrated Agriculture

As agricultural land is converted to urban land in order to accommodate Jiaxing's growing population, the City can design opportunities to maintain productive agriculture and jobs for farmers. Fences that double as vines and greenways that host vegetable plots create attractive productive uses in an otherwise urban setting.

公共空间与农业结合

当人口增长带来越来越多的农田转化成都市型土地，嘉兴可以想一想怎样保障农业生产及农民的工作。双层的爬藤栅栏和绿化带之间的菜地，以别样的都市框架创造有吸引力的生产利用空间。

Source: *Continuous Productive Urban Landscapes: Designing Urban Agriculture for Sustainable Cities*





Green Space Uses

绿地功能

Neighborhood Definition

界定社区

Recreation

休闲娱乐

Stormwater Management

雨水处理

Agriculture

农业

Habitat

栖居地

Environmental Protection

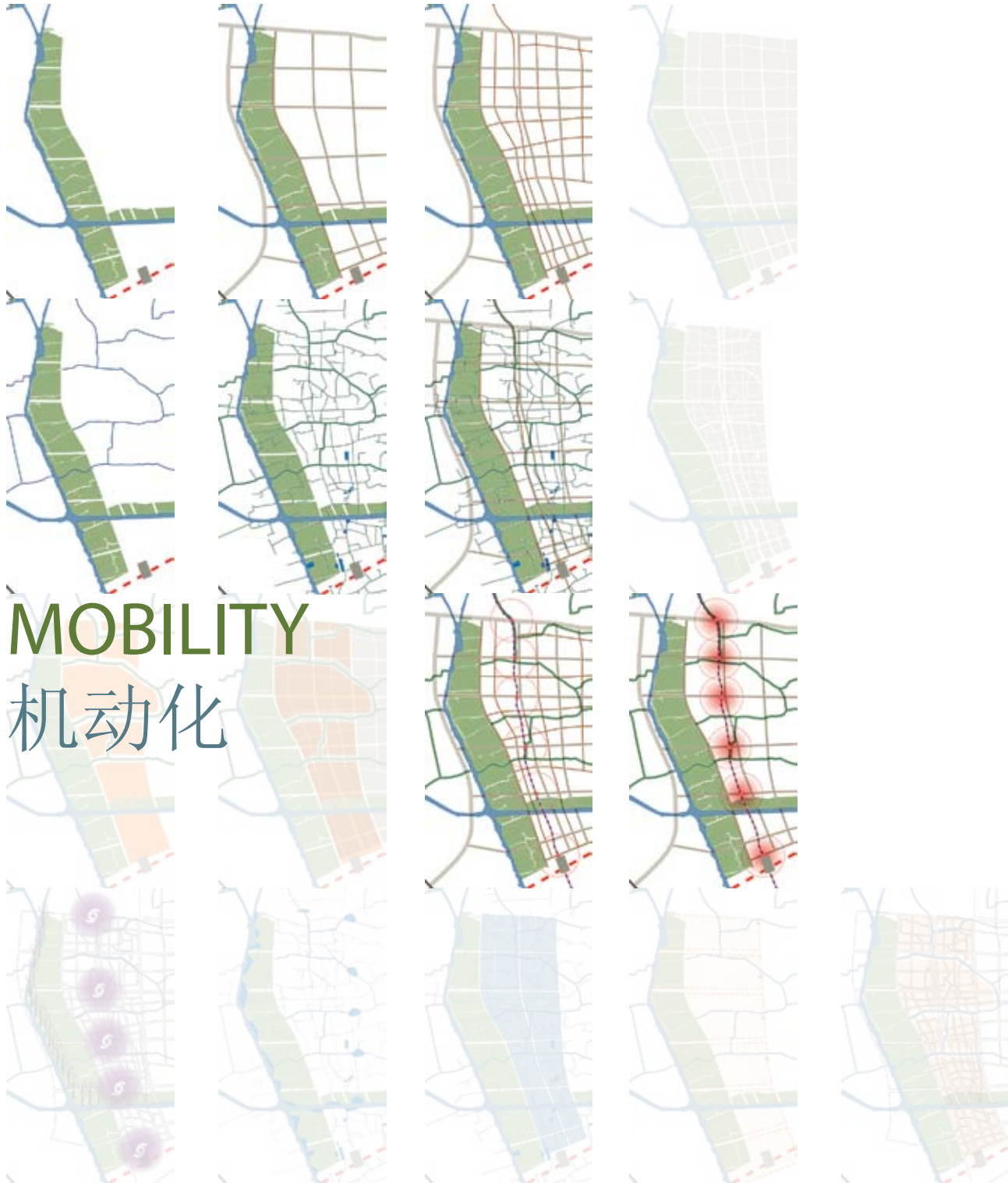
环境保护

Beautification

美化

The existing green space in Jiaying offers an incredible opportunity. The government must commit to planning the water and open space first, then allow development to respond, to create a productive and attractive city for residents and visitors.

[绿化小结] 嘉兴现存的绿地系统是一个很好的机会。市政府应首先对水和开放空间体系采取规划，然后让开发与其相适应，从而为居民和游人创造一个丰富活跃的趣味城市。



We have developed a mobility plan that emphasizes sustainability through multiple travel options.

By reducing the necessity of car use and supporting alternative modes, we can help create a more sustainable Jiaxing. Our plan prioritizes circulation for several modes of transportation: Bus Rapid Transit (BRT), motor vehicles, ferries, bicycles and walking. We propose a BRT connection between the new station area and the central city to facilitate movement up and down the corridor. After analyzing all different types of transit, we determined that BRT could provide the best service for the most value.

BRT is an enhanced bus system that provides the value and route flexibility of a bus, with features that allow for better performance: dedicated lanes, level boarding and off-board fare payment.



我们在机动化规划中强调基于步行，自行车和公共交通的出行方式。

减少不必要的小汽车使用并支持其他交通模式，有助于嘉兴的更可持续发展。我们在规划中公共交通以推荐程度依次为：快速公交、发电机车、渡轮、自行车和步行。快速公交在市中心和车站地区之间快速疏通人流。在研究多种公交方式之后，我们认为快速公交服务效率最佳。

快速公交是先进的公交系统，除了像一般公交那样运营经济，路线灵活，还拥有以下特点而令其综合性能更优越：使用专用车道，平板式上下车以及车外付费。



Defining the Corridor

The BRT line defines the central north-south axis in the corridor. There were many debates about where to locate the BRT line. Along the park edge? On a new BRT-only street? On the main thoroughfare? We all agreed that it was important to maximize development around the BRT stops and therefore decided to locate the line about 1km away from the park: far enough to allow for substantial development, but close enough to ensure a connection to the park. The Tongji students chose to situate the BRT line along a major thoroughfare; taking over existing lanes of traffic simplifies construction and keeps costs down. The Berkeley students chose to create a new street only for BRT, bicycles and pedestrians which runs along an existing canal. The design decision emphasizes the connection between sustainable mobility options and reduced impacts on the landscape—this concept is central to the corridor's identity.



BRT is aligned next to a greenway canal with limited vehicle access.

快速公交线与一道绿廊并行，汽车入口有限。



BRT is aligned along a boulevard with separate vehicle lanes.

快速公交线与林荫主干并行，有专用车道。



Community buses integrate with the BRT system, providing local service to passengers that live far from a BRT station. These local buses are particularly beneficial to elderly and disabled citizens.

社区公交车与快速公交结合，为远离快速公交站的居民提供便捷的交通服务。这些地方公交对老人和残障人士尤其便利。

界定廊道

快速公交线确定了公园廊道的南北轴线。我们曾就线路放置何处展开激烈讨论。是沿着公园边界？还是另辟专线道路？抑或在主干道上？我们一致认为能尽最大可能的开发快速公交车站周边地带很重要，因此公交线设置在离公园一公里外，既留出足够的未来建设空间又足以与公园连通。同济学生方案将快速公交线与主干道合并在一起，利用现有的道路能简化工程建设并降低成本。伯克利大学学生选择沿着一条现有的水道另外开辟一条新路，专为快速公交，自行车与步行所用。这一设计决策既强调了可持续的机动出行方式之间的联系，又减少了对环境的冲击——这也是廊道的核心概念所在。

Phasing

The BRT line may begin service with just a few stops: the station and stops adjacent to the existing central city. As development and travel demand increase along the corridor, the BRT stops can be developed accordingly. In order to create a thriving transit system, the BRT should ultimately expand into a complete system that covers all major corridors in the City. This type of phasing also allows the City to spread capital investment over time.

分期

快速公交线路从少数站点开始启动运行：总站（快速列车站）和靠近现有中心城区的站点。随着廊道一带的建设与出行需求增长，可相应增设新站。为了促进公交体系的繁荣，快速公交线最终应该覆盖主城的所有主要通廊而形成完整的系统。这种分期建设也有利于城市长期的资本运行。



Ferries

We recommend that Jiaxing capitalize on its existing waterway assets and expand the City's ferry system to connect key interest points around the City. Tourists and residents could catch a ferry at the train station and take a scenic ride up a canal to the lake, central city or one of the surrounding water towns.

渡船

我们建议嘉兴利用现有的水道资源将城市的渡船系统拓展联系到市区周边的主要景点。旅游者和居民能在火车站搭上渡船一路向北看两岸风光，直到南湖，市中心或周边的其中一个水乡小镇下船。

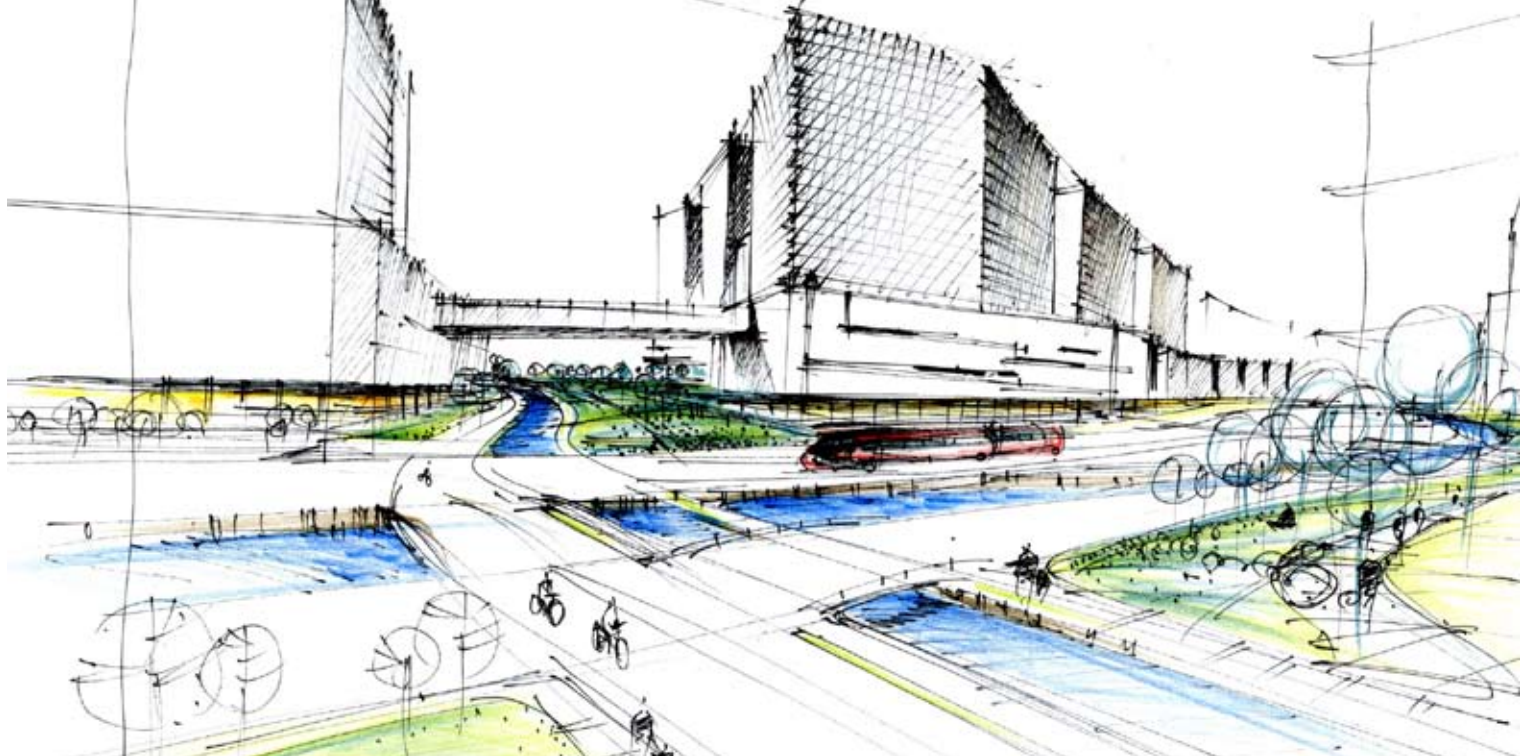
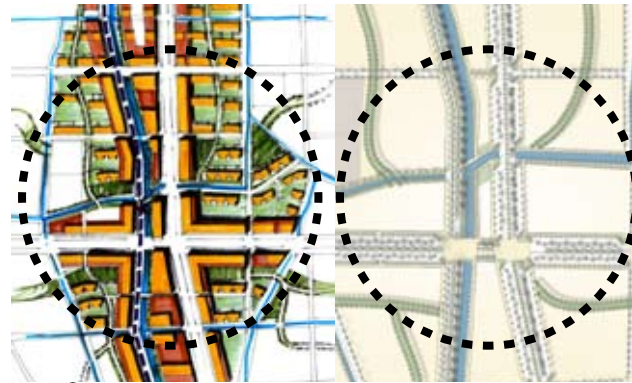


Pedestrians & Bicyclists

Greenways connect to every BRT stop, offering pedestrians and bicycles their own routes through the City without interference from cars.

步行和骑自行车

绿廊连接所有的快速公交站，令步行者和骑自行车的人拥有与汽车分离的专用道在城市中穿行。



Bus Rapid Transit

Bus Rapid Transit (BRT) is an enhanced bus system that provides the value and flexibility of a standard bus, with the technology and design features of rail. The result is an efficient, reliable and comfortable bus ride that can serve expansive cities and carry millions of passengers each day.

There are several essential components to BRT to ensure high quality transit. First, dedicated lanes give BRT buses their own lanes, to move quickly through traffic. Level boarding through multiple automatic doors at station platforms and off-board fare payment machines speed up the process of entering and exiting the BRT. Other components, such as real time arrival signs and well-lit protected bus shelters improve the waiting experience for BRT riders.

Several large and mid-sized cities in China have already adopted this technology. Guangzhou is planning the largest BRT system in the world. Closer to Jiaxing, Hangzhou and Suzhou already have BRT systems built and planned, respectively.



快速公交系统

快速公交是一种增强的公交系统。它运用轨道交通的技术和设计，提供标准公交车的价值和灵活性。最终结果是一种高效，可靠又舒适的乘车感受，可以为扩张的城市服务，每天承运百万旅客。

快速公交系统通过几个基本的组成部分保证高质量的运输。首先，快速公交汽车使用专用车道使其可以快速通过交通阻塞。平板式站台上的复合自动门和与车分离的付费机器可以加快人们出入快速公交车的速度。其它一些部分，比如实时到达时间标识和有充分照明保障的候车棚等，都改善了行坐快速公交车者的候车感受。

中国的一些大中型城市已经采取了这种技术。广州正在规划世界最大的快速公交系统。离嘉兴较近的杭州和苏州已经分别规划并建设了快速公交系统。



Land Use & Density

The tallest buildings and most intensive uses are located at the BRT stations. In this scenario, we have located 20-30 story mixed use buildings at the BRT station, with retail on the ground floor, office on the next several stories and residential units above. Densities decrease as distance from the BRT stop increases, as shown by the dark red to yellow gradient in the diagram on the bottom right.



土地使用/密度

最高的建筑和地块使用强度都安排在快速公交站周边。在这样的前提下，我们在站点附近设20-30座功能混合建筑，首层商业，低层办公，高层居住。离车站越远建筑密度越低，如下分析图中从深红色到黄色的色梯所示。



The movement of people and goods is essential to a thriving economy and a high quality urban experience. By encouraging the existing modes of transit, including walking, biking and public transit, the City can limit carbon emissions and air pollution and create safe convenient circulation.

BRT Precedent for Transit Oriented Development

Curitiba, Brazil has one of the world's most impressive BRT networks. Concentrating development along the BRT corridor with a mix of uses at the stops creates easy transit access to work and shopping locations and therefore encourages more ridership. Properties at these locations have become some of the highest valued properties in the city.



在交通主导建设中运用快速公交系统的先例

巴西的库里提巴拥有世界上最发达的快速公交之一。沿快速公交线站点进行混合使用功能的密集开发，令前往购物和工作交通便捷，因而大大鼓励人们乘车，车站附近也成为城市中物业价值最高的地点。



物流和人流的畅达对于兴旺的经济和高质量的都市经历都非常必要。通过鼓励现有交通模式，包括步行，骑自行车和公共交通，城市可以控制碳元素的排放和空气污染，令交通便捷而安全。

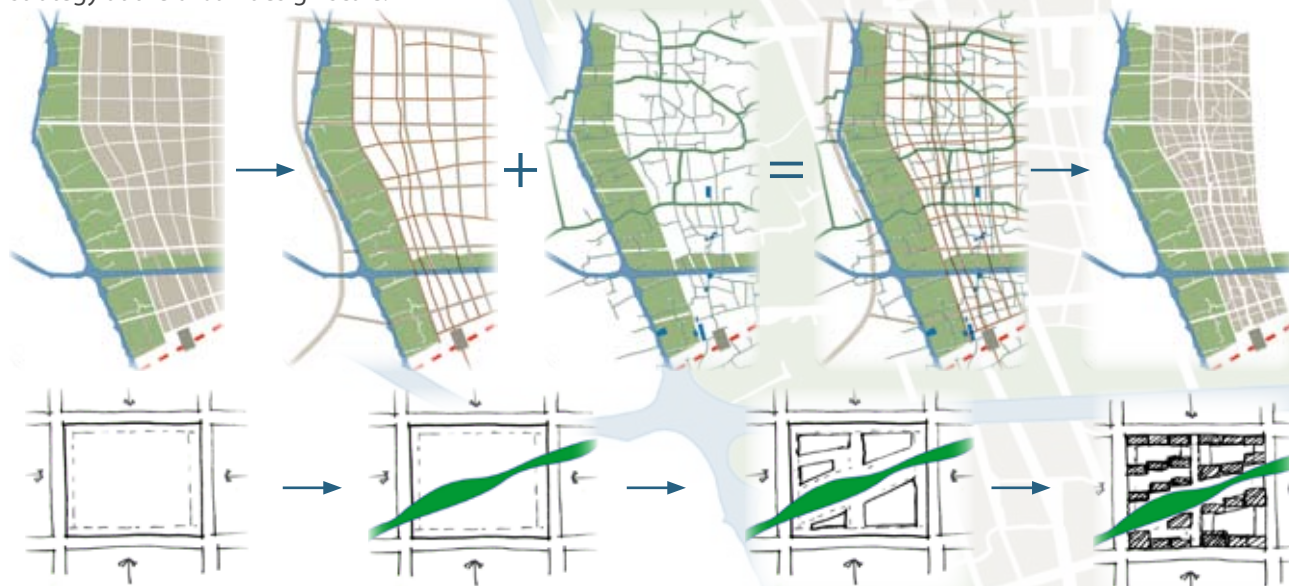


Our urban design plan uses the water, open space and mobility systems to create a unique block pattern and high-quality urban experience.

We layered the water and greenway network with our BRT proposal and the City's planned road network. This process resulted in a pattern of interesting shaped blocks, scaled appropriately for people. We called these blocks, "water blocks." This process also helped to define the density gradient within the corridor. Recalling that the BRT stops become the most accessible places with the tallest buildings, we recommend a mix of uses around these locations. A combination of residential, office, shopping and public uses create neighborhood centers and give people a reason to be on the streets, using the built and open spaces. Lastly, a comprehensive water treatment system creates a sustainable water use strategy at the urban design scale.

我们的城市设计让景观为先觉因素统领方案生成嘉兴城市独特的街区形态。

我们罗列出河道体系与绿化体系，规划的快速公交与规划实施城市道路系统这些层次，结果产生非常不寻常的适合人的尺度的街区形态，我们称之为“河道分区”。这种设计方法还有助于确定整个廊道地区的密度梯次。呼应快速公交车站附近设置最大高度建筑的想法，我们建议在这些地方多功能混合。由住宅、办公、商铺和公共设施组成的社区中心人们上街使用那些建筑场所和开放空间。最终，城市设计层面运用一套综合的水处理系统形成可持续的河流使用政策。



Road Block
道路街区

Road block with public right-of-way subdivision
被公众可通行街道次级划分的街区

Parcels delineated by access points and right-of-way setbacks.
由入口与街道退缩红线界定的地块

Site specific development
因地制宜的详细设计

The water and landscape inspire and delineate the location of the built environment. Residential and community-oriented uses can take advantage of the beauty of the canal, the recreation and productivity benefits of the greenways and the transportation value of the ferry service and intersecting BRT.

城市独特的河流与景观激发并勾画出开发地带的位
置。住宅及社区型开发项目可依仗河流景致，休闲娱
乐和生产型开发则受益于绿廊，以及水上轮渡和快速
公交构成的便捷交通。

Compared with the rational rectilinear blocks or
“road blocks,” these water blocks require site-specific
development and allow for more dynamic spaces.

与直来直去的“道路分区”相比这种“河道分区”则
需要因地制宜的开发，并且获得更具趣味与动感的
设计方案。



canal frontage
滨水

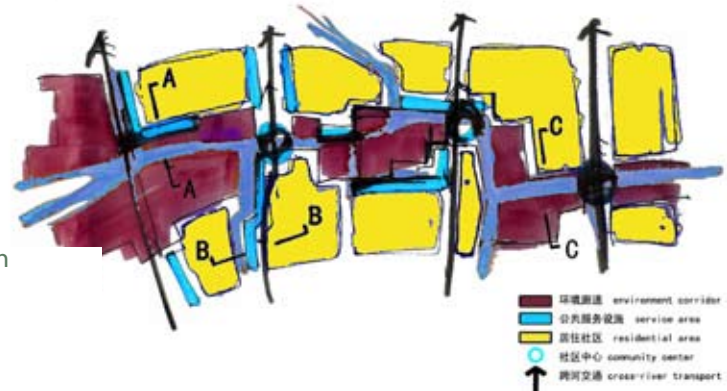
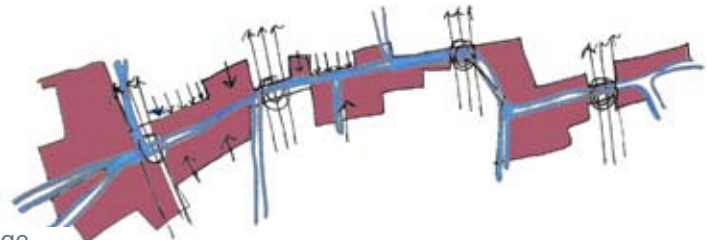
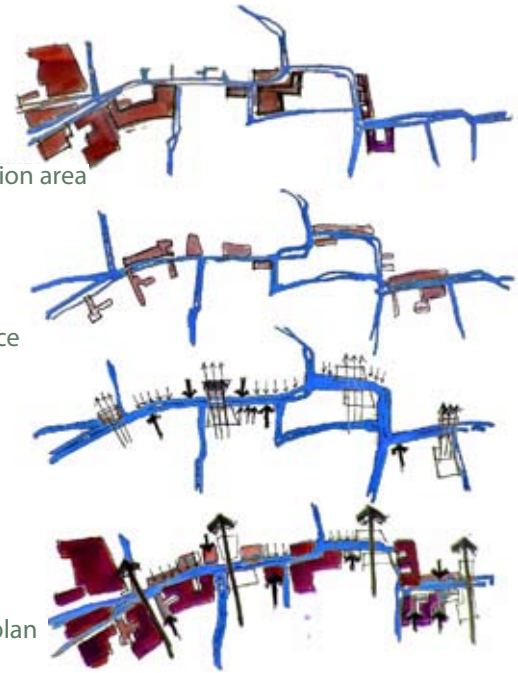
landuse plan
土地使用

preservation area
保护地带

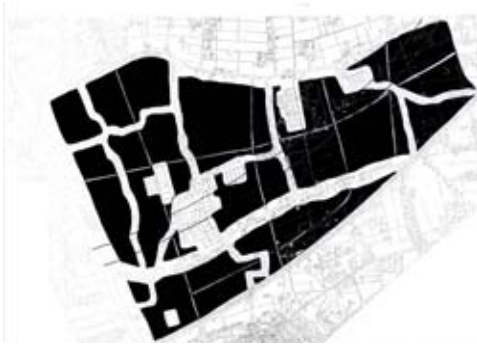
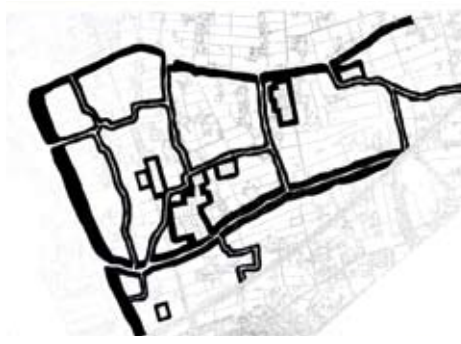
open space
开放空间

access
入口

concept plan
概念设计

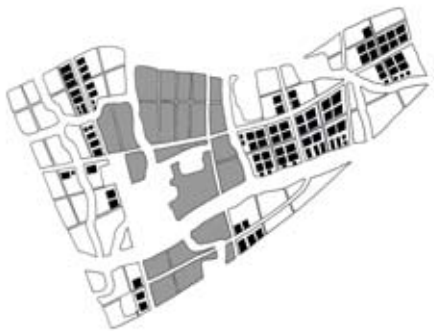


- 环境廊道 environment corridor
- 公共服务设施 service area
- 居住社区 residential area
- 社区中心 community center
- ↑ 跨河交通 cross-river transport



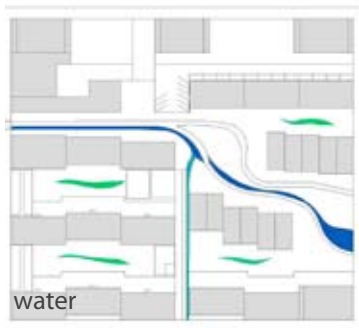
The results of the water blocks are oddly shaped blocks that require site specific circulation and building design.

“河道分区”造成奇特的街区形状，因此需要根据情况组织交通和建筑设计。



This residential block describes how different elements of a typical block interact. A waterway flows through the block. The surrounding greenway offers a public pathway to avoid the main thoroughfare to the north. Located near a neighborhood center, commercial uses line this main road, with residential buildings tucked behind.

这些住宅街区描绘了典型街区中各种因素的相互关系。河流穿过街区，避开向北的主要干道，河道及周围的绿带成为公共通路。在中心地带，商业沿主要街道布局，后面排列住宅。



A range of housing types accommodates residents of different incomes, ages and family sizes. This type of mixed-use development makes everyday shopping needs more convenient and creates active and safer street life at all times of the day. The highest building heights run along the busiest street on the north side of the block, because of the high foot traffic and accessibility.

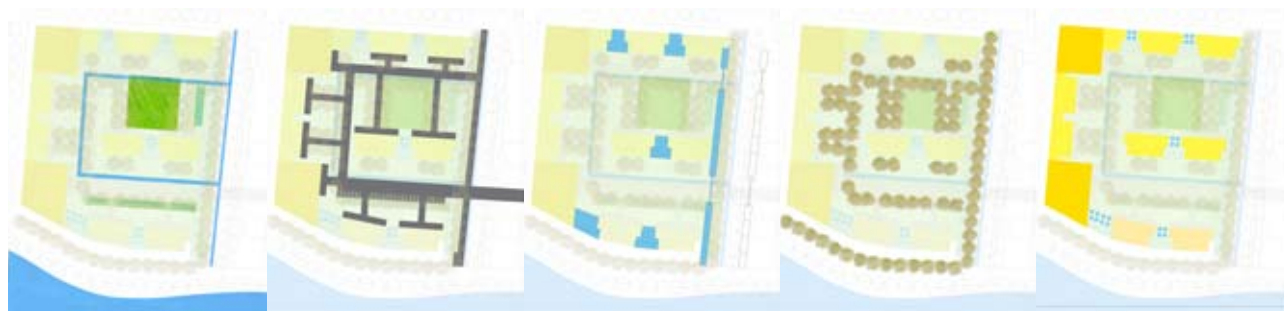
多样化的住宅类型以适合不同收入、年龄和家庭规模的居住者。混合型的开发使得日常采购更加便利，令市井街巷生活一整天都丰富多彩。最高的建筑物在最繁忙的街道即街区北侧，因为这里步行最方便。



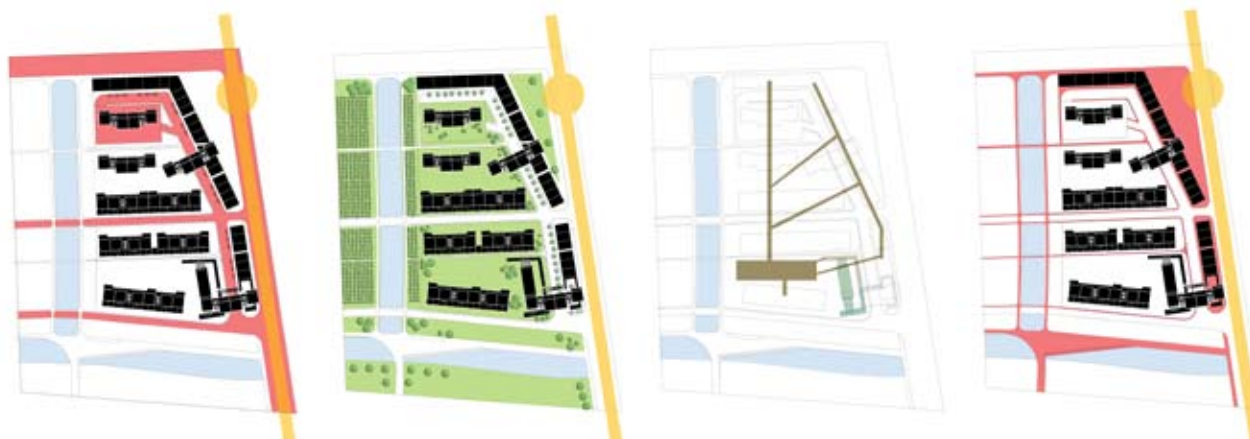
Block Study #1 街区研究1



Block Study #2 街区研究2

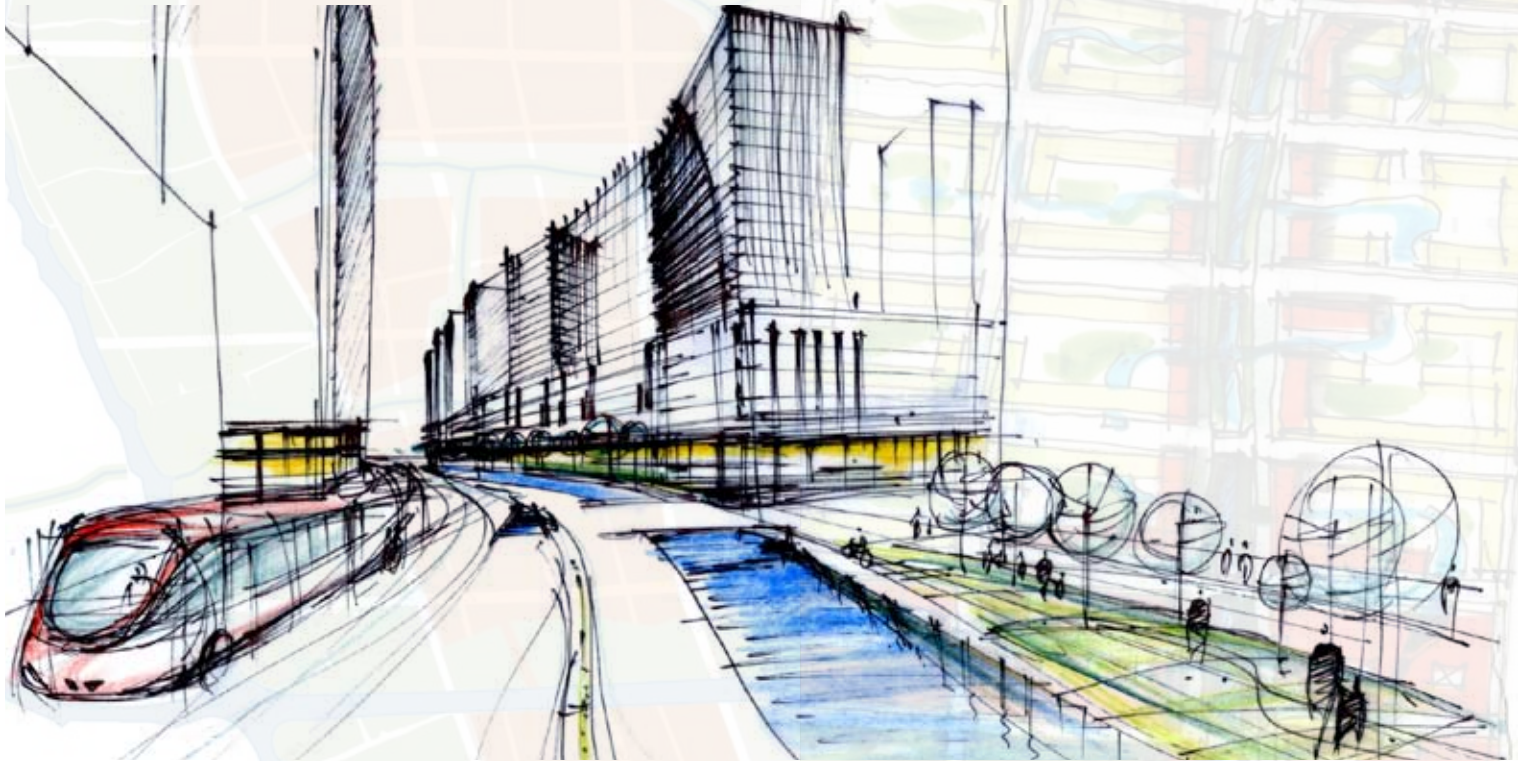


Block Study #3 街区研究3



We propose a distributed land use program to incentivize residents and tourists to travel along the corridor. The City can build off of the existing civic uses at the top of the corridor and the proposed Tongji University Extension, to create a cohesive civic and education area. Reserving space for industrial and agricultural activities in the middle of the corridor can enhance these existing economic sectors. The multi-modal station area provides an opportunity to develop another economic hub within the City.

为鼓励居民和旅游者频繁穿越走廊，我们建议分散式的土地利用布局。城市可以脱离现有的走廊北面的市政中心建同济大学校区成为市政教育联合功能区。在走廊中部为工业和农业保留部分空间能提升现有的土地价值。在多功能车站地区建立集宾馆、办公和会议一身的新经济中心区。



Agriculture

We propose preserving some of Jiaxing's existing agriculture to maintain this economic driver in the City and ensure a continued supply of food. Particularly in the park, the City should preserve agricultural productivity and consider retaining some of the low impact farmer housing where appropriate. Although much of the agricultural land will be converted to urban uses, the greenways within the corridor and greenbelt just east of the corridor, allow for most of this productivity to continue. A more mixed land use plan that develops densely in appropriate areas and leaves land open for agricultural productivity can help the City achieve its economic goals, accommodate its growing population and ensure an overall great city.

农业图示

我们将保护嘉兴相当部分现有耕田以保持城市经济长远发展动力和食品供应。特别是在城市公园里，城市保持一定的农业生产力，并在适当的位置考虑保留一些影响不大的农民住宅。虽然绝大部分的耕地都将转化成都市开发，整个走廊地区的绿色长廊和走廊以东的绿带仍然为继续施行农业生产留有空间。适当的地方采取更加混合型的土地使用规划密集型开发以及留出足够空地为农业生产，能促进城市经济目标的实现，适应人口增长并保证城市在整体上出色。

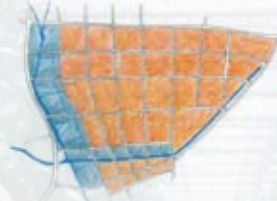


EXISTING CONDITIONS*

Farmland	70%
Unproductive Land	30%
Farmer Housing	Yes
Economic Value	Low

现状用地*

农田	70%
非生产型用地	30%
农舍	有
经济价值	低



SPRAWL DEVELOPMENT*

Farmland	0%
Unproductive Land	>80%
Farmer Housing	Rare
Economic Value	Unknown

蔓延型的发展*

农田	0%
非生产型用地	80%
农舍	很少
经济价值	未知



SMART GROWTH*

Farmland	>50%
Unproductive Land	40%
Farmer Housing	Yes
Economic Value	High

精明成长*

农田	>50%
非生产型用地	40%
农舍	有
经济价值	高



*estimated *估计

Sustainable Water Infrastructure

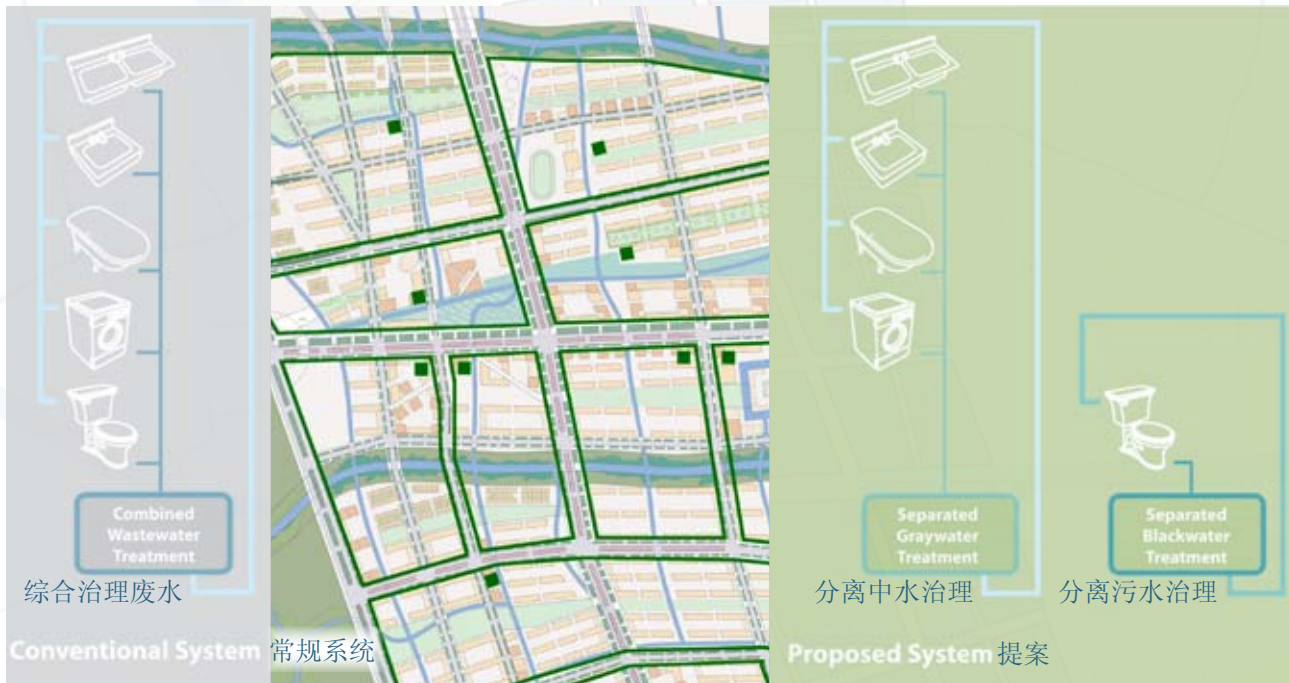
Within our urban design scheme, we have proposed a renewable approach to water consumption, water treatment and the sewage treatment system. Series of blocks within the corridor form potable water districts, within which these treatment processes take place.

This system provides an ongoing source of water, contributes to renewable energy production, produces local aquaculture, and helps define a sense of community. The flow of water is separated into a graywater cycle and a blackwater cycle. Graywater is wastewater generated from washing, bathing, and laundry. Blackwater is wastewater generated from the toilet. Both of these cycles utilize the natural processes of plants and bacteria to remove impurities from the water.

循环用水工程

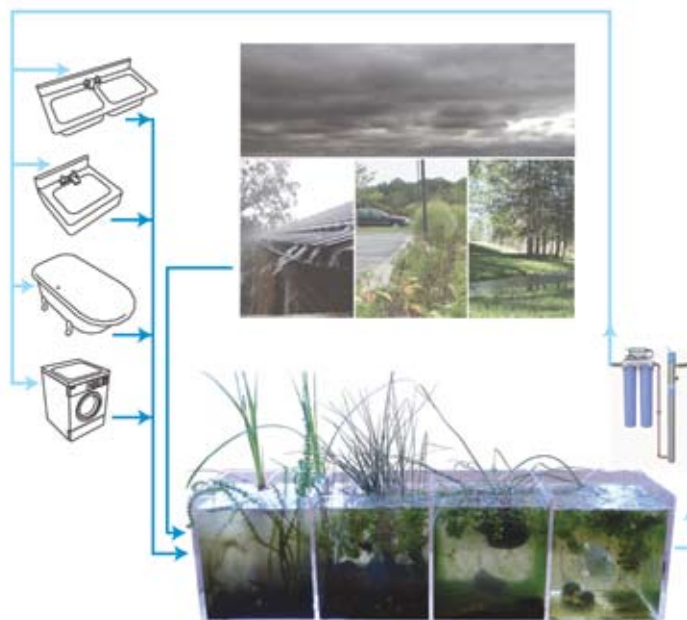
在城市设计方案中，我们提出用水、水处理和污水处理的可再新系统。经过这个系统的处理，很多街区都能在当地得到干净的饮用水。

我们在规划中提供循环的水源帮助生产再生能源，促进当地水产业，并确立地区特色。水被分为中水和污水两个系统。中水之日常清洗、淋浴和洗衣用水，厕所排出的水是污水。两个系统都使用植物和细菌自然处理法去除水中杂物。



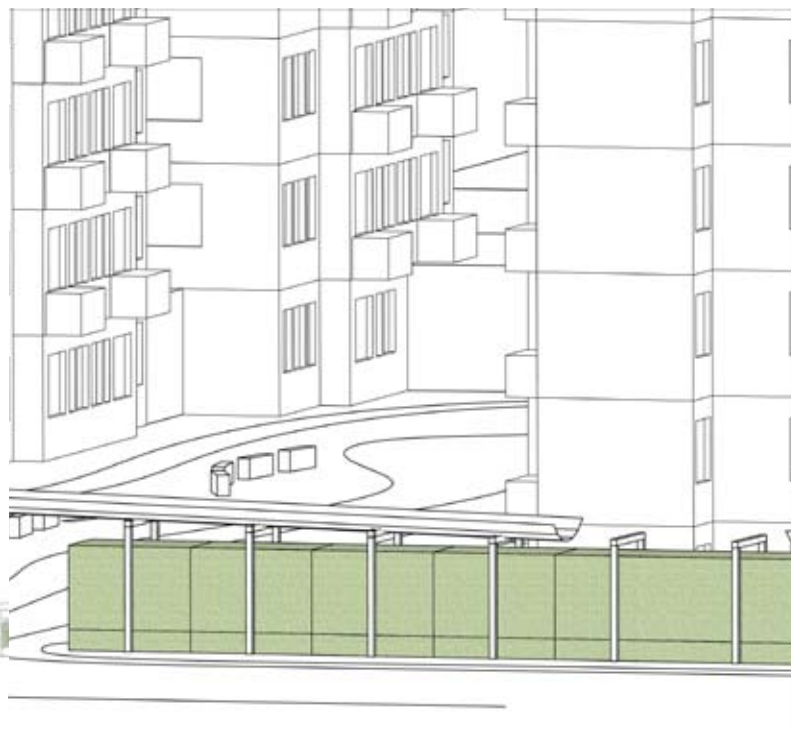
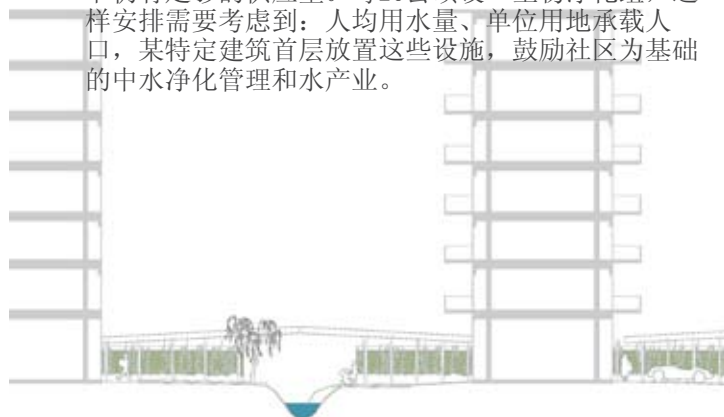
Graywater Treatment

Graywater treatment centers, called Living Machines™, replicate the natural processes in wetlands in a more compact and efficient system. Graywater flows through a series of tanks filled with plants and other organisms, which remove pollutants, such as Nitrogen and Phosphorous. The tanks should be enclosed in a temperature-controlled space to maintain the efficiency of the system. The water flowing out of the final tank is of very high quality and needs only UV Filtration to reach potable standards. The loss of water due to evaporation and transpiration is made up by rainwater collection, which, even in the driest month, provides sufficient quantity. Living Machines™ are located every 20 hectares based on the following considerations: the water volume required per person, how many persons per land area would contribute to the system, the desire to house the living machines in the ground floor of one building, and the desire to encourage a community-based management of graywater treatment and aquaculture.



中水处理

中水处理中心又称生物净化组，是与天然湿地净化同样原理而更高效集约的系统。中水经过一系列装有植物和有机物的水槽，能去除污染物质，如氮和磷。水槽需要封闭并处于一定温度的控制下来维持净化系统的效率。最后一道水槽里流出的水质会非常清洁，只需经过紫外线照射即可达到饮用标准。蒸发和气化的部分水分可以通过收集雨水补偿，即使在最干旱的季节仍有足够的供应量。每20公顷设一生物净化组，这样安排需要考虑到：人均用水量、单位用地承载人口，某特定建筑首层放置这些设施，鼓励社区为基础的中水净化管理和水产业。



Living Machines™

A variety of wetland plants can be employed in Living Machines® to remove pollutants from household wastewater. They accomplish this through three primary mechanisms: uptake, immobilization and degradation. The first two processes involve absorption into the plant tissues or attachment to the outer surface of the plant (roots, stem, etc.). In these cases, toxins such as heavy metals still exist within the plant, and for that reason, harvested plants must not be eaten. The third process, degradation, involves a chemical change in the pollutant as a result of interaction with the plant or microbes on its root system. In this case, the original pollutant no longer exists in the system. All three processes result in clean water.

Bottom Left:
Living Machine at Dierenpark in Emmen, Netherlands
Bottom Right:
Living Machine at Ethel M Chocolates in Las Vegas

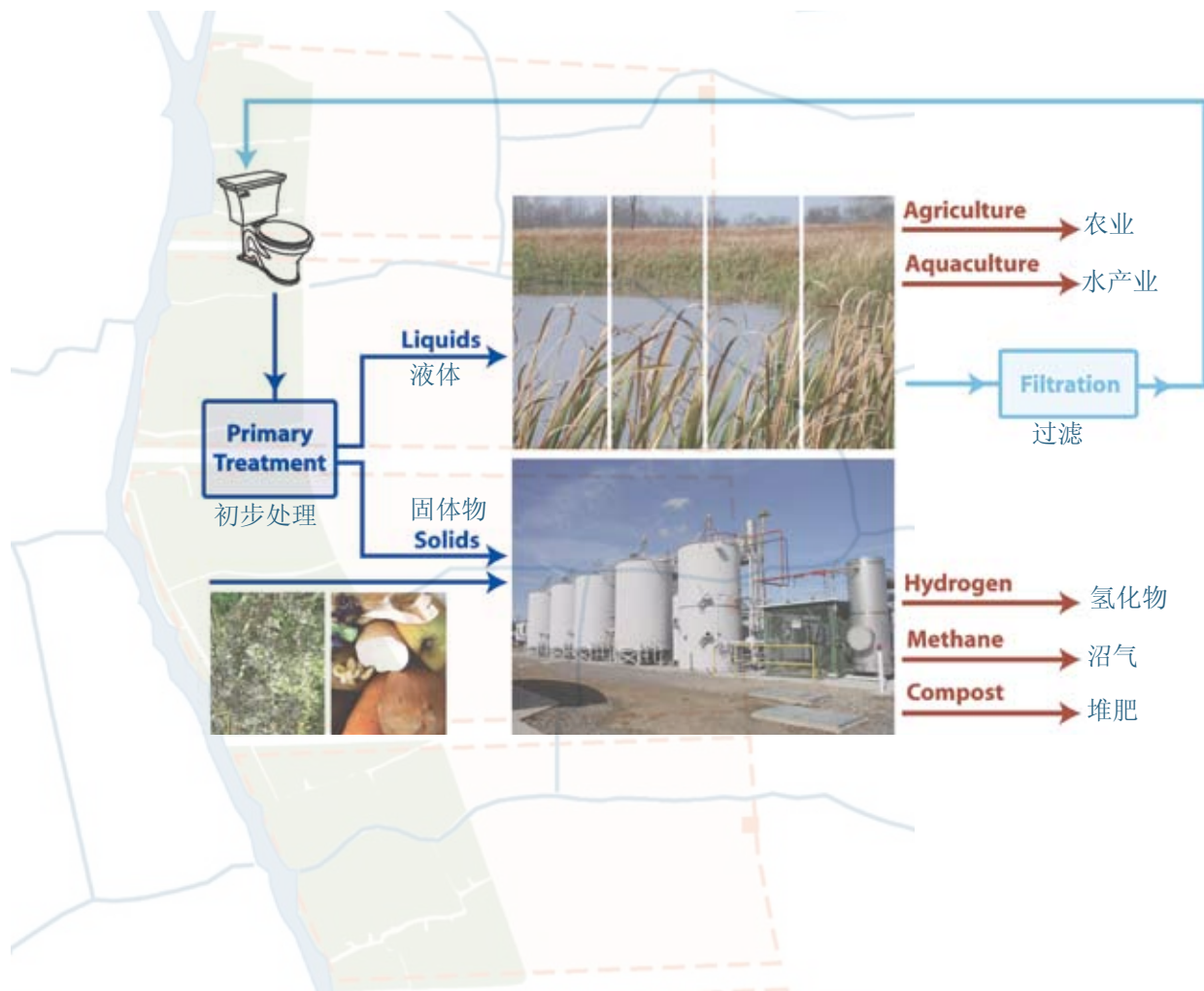


Living Machines™

在生物净化组中使用不同品种的水生植物以去除生活污水中的有害物质。主要通过三个步骤实现：悬浮、停止流动并沉淀。前两个步骤包括植物组织的吸收作用或表皮附着作用（根茎等）。如此以来，重金属等毒素将存留在植物体内因此不可食用。在第三个步骤中，由微生物在植物根部作用产生的化学变化而获得沉淀效果。因此，整个系统不再存在原先的有害物质，最终得到清洁的水。

左下：
荷兰埃玛生物净化组
右下：
内华达州拉斯韦加斯 Ethel M 生物净化组





Blackwater Treatment

The treatment of blackwater is more complex, requiring more stages, equipment, and management. There are six blackwater treatment centers, each adjacent to the anaerobic digestors (described in detail in the Energy section) and treatment wetlands along the eastern edge of the corridor. The treatment of blackwater first requires the primary separation of solids and liquids. The solids are then fed into the anaerobic digester and the liquids enter the treatment wetland. The water flowing out of the final cell of the wetland is safe for human contact, but not potable. It may be circulated through buildings for flushing only.

污水处理

污水处理相对更复杂，需要更多步骤、设备和管理措施。设有6个污水处理站，每个紧靠走廊地区东侧的厌氧分解处理湿地。处理污水首先需要将固体和液体物分离。固体垃圾投入厌氧分解设备，液体部分交给湿地净化。从最后一块湿地流出的水对人体接触无害但不能饮用，仅用于建筑内部循环和冲厕。



PARK & PRIMARY CANAL
公园与主运河



PRIMARY ROADS
主干道



SECONDARY ROADS
次干道



ROAD BLOCKS
道路街区



SECONDARY CANALS
次级河道



TERTIARY CANALS
三级河道/支流



CANALS & ROADS
河流与道路



WATER BLOCKS
河道街区

The water, landscape and transit systems work together to form our urban design framework. The synthesis of these elements determines block shapes. When scaled up to the city-level, these blocks create a unique urban form in which people and architecture can interact with the natural environment.

水，景观与交通系统共同组建我们的城市设计框架。这些元素的综合决定了街廓的形态。当处在城市的尺度，这些街廓创造出独一无二的都市形态，人与建筑都能在其中与自然环境密切结合。



DISTRICTS
分区



DISTRICTS & BLOCKS
分区与街廓



BRT & ROADS
快速公交与道路



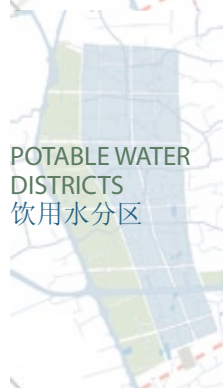
BRT & CANALS
快速公交与河道



WIND ENERGY
风能



CLEAN WATER GATEWAYS
净化河流门户



POTABLE WATER DISTRICTS
饮用水分区



BIOGAS DISTRICTS
沼气分区



SOLAR ENERGY
太阳能



We propose rethinking architecture's role in the City.

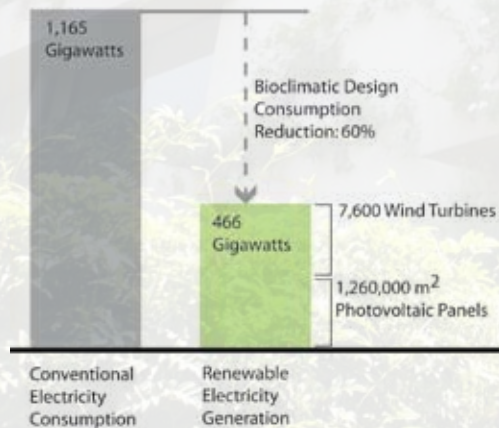
Instead of an energy sink, further adding to environmental degradation, architecture can help contribute to the environment's recovery by acting as a host for renewable energy production. We propose a set of components for architecture, including sustainable materials and energy-efficient treatments, but do not prescribe what buildings should look like or what their functions should be.

Bioclimatic Design

Strategies such as solar access, shading, natural ventilation, and renewable energy generation are already common elements in the Chinese built landscape and should be expanded. They provide for comfortable living and reduce impacts on the environment. Typical residential units in this climate require six square meters of south-facing glazing in order to achieve sufficient solar gain for heating. Office spaces have enough internal gains from people, lights, and equipment that they do not require as much sun exposure.

According to research conducted by ARUP, a global business and consulting firm, a combination of these designs can reduce electricity demand by approximately 60% annually.

根据全球经济与消费机构ARUP调查，这一系列方案的联合作用将减少近60%的用电量。

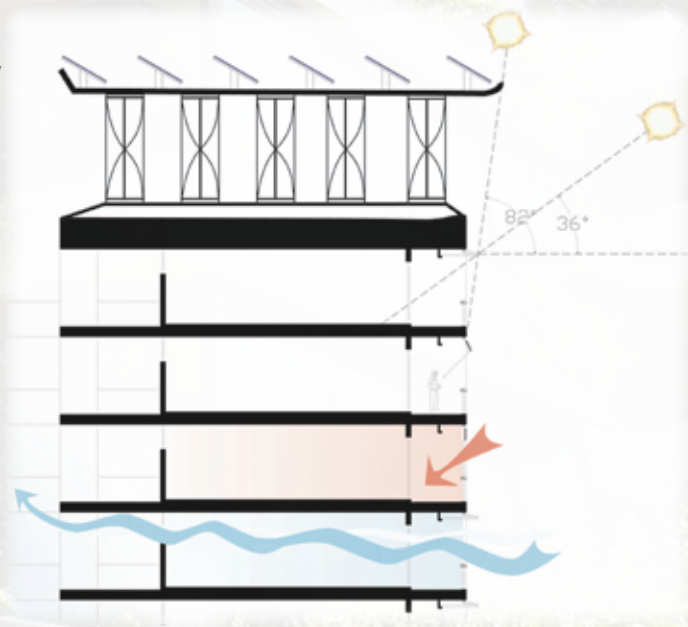


我们重新思考建筑在城市中的意义。

建筑不再仅是能源的消耗场使环境不断恶化，作为利用可再生能源的主要角色，建筑应该能够对环境的恢复循环有所贡献。在方案中，我们并不具体表述单体建筑应该什么形象或什么功能，而是设计了一些建筑组成要素，包括环保材料和节能处理。

与生物与气候学相关的设计

自然通风、采光，遮阳和产生可再生能源等原则都已经在中国建筑景观中广泛使用并应该得到推广。这些原则提供了舒适的生活环境和减少对环境的负面影响。[转向能源部分]在这个地区的典型的居民住宅需要6平方米朝南向开窗确保充分采光以取暖。办公空间不需要这样多日照，因为室内产生来自建筑、人体、灯光和设备的热源足以维持供暖。



Material Sustainability

Material sustainability includes both how a building can be designed to promote renewable material cycling, as well as how the materials of the building itself can be sustainable. Developers should select materials which have low embodied energy, are rapidly renewable, locally available, and do not give off harmful vapors. They should install plumbing infrastructure that separates graywater and blackwater. Buildings can assist in the reusing and recycling of materials through a vacuum system that conveys organic material, recyclable material, and waste from each unit to designated locations in order to use them as energy inputs.

Energy-Efficient Appliances and Design Features

As incomes rise and people purchase new household appliances, they should choose energy-efficient products. Lighting, equipment, and appliances should be selected according to recommendations from the Collaborative Labeling and Appliance Standards Program <http://www.clasponline.org/main.php> Horizontal overhangs on the south facade block the summer sun and permit the winter sun. Exterior screening or vertical fins, comprised of living plant materials, photovoltaic integrated glass, or fritted glass, can provide shade on the east and west facades.

Hammarby Sjostad in Sweden is a pioneer for material cycling at the neighborhood level, reusing and recycling material to produce energy.

瑞典 Hammarby Sjostad 作为生活社区层面，通过回收并再利用材料产生能源的典范。

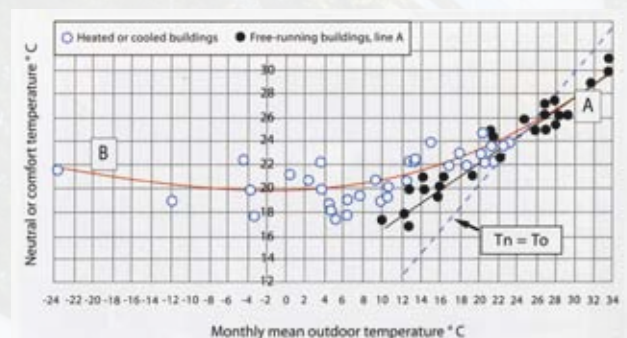


环保材料

材料方面绿色建筑原则包括设计如何使建筑更加利于再生材料循环以及建材本身可持续使用。建筑商可以选用低耗、快速再生、无排放有害物质的当地建材。安装中水和污水分离的排水系统。建筑可以循环利用那些真空压缩处理有机废物、回收材料和指定的再生利用垃圾获得的再生建筑材料。

节能与设计

随着收入的提高人们会更换家电，他们应该选择节能的产品。灯具、设备和家电的选择依据联合商标与产品标准联合会（质检部门）的推荐。需要获得更多关于质检部门的信息请访问他们的网页。在南向的外墙上放置水平遮荫板可以冬夏调解日照需求。室外反光幕或垂吊盘藤、光电玻璃或烧结玻璃材料防止西晒。



Thermal comfort varies throughout the year based on relative outdoor temperatures.

Embodied energy of some building materials in kWh/kg

Low-energy materials < 1kWh/kg	sand, gravel	0.01
	wood	0.1
	concrete	0.2
	sand-lime brickwork	0.4
	lightweight concrete	0.5
Medium-energy materials 1-10 kWh/kg	plasterboard	1.0
	brickwork	1.2
	lime	1.5
	cement	2.2
	mineral fibre insulation	3.9
	glass	6.0
High-energy materials > 10 kWh/kg	Porcelain (sanitary ware)	6.1
	Plastics	10
	Steel	10
	Lead	14
	Zinc	15
	Copper	16
Aluminium	56	

Sources: Vale, B. and Vale, R. (1991) Green Architecture, London: Thames and Hudson



Comfortable Environment

We recommend paving and cladding materials that have a high Solar Reflectance Index, meaning that they reflect as much of the sun's light and heat as possible. Such materials can help reduce the Urban Heat Island Effect, the artificial increase in urban temperature. Using permeable paving and plantings that provide shade can also reduce this effect.



舒适的环境

我们在设计中提倡采用高太阳能反射率铺地与面层材料，指的是它们能尽可能反射日光。这样的材料可以减少人工环境导致城市地区气温上升即热岛效应。另外，可渗透铺地、增加绿地植栽以及避免使用热辐射材料能起到同样作用。

Our approach to sustainable material cycling also extends to the food supply. For residential buildings, we designed a balcony space or exterior garden for every unit so that household food production is viable. For office buildings, trellis structures on the western façade support vine-growing vegetables, while shading the interior. In every building type, entrance canopies and stairwell trellis structures can offer additional growing surfaces.

我们推行的使用环保材料策略也涉及食品供应方面。在居住建筑中，我们设计了阳台或室外花园从而家家户户的栽培情景可以被看到。办公建筑西立面的格架上种植爬藤类蔬菜，同时为室内遮阳。每个建筑形态中，入口凉棚和楼梯井格架都可以作为植物生长的表面。



Unique Urban Form

The walled residential complex has been a development component in China for centuries. These walls often cut off the existing landscape, articulate a single entrance and exit to the complex and, more recently, have led to rectilinear buildings laid out in rows. Similarly, traditional urban development in the United States cuts off natural features by laying out a grid of streets. Buildings face out to the streets with alleyways or private gardens in the middle of blocks.

Our proposal recommends something different. Instead of buildings and streets driving development, the landscape should drive development, including the shape and size of blocks, and thus, building footprints. In this way, the built form in Jiaxing becomes more unique, the environment more livable and ultimately helps create a stronger City identity.

San
Francisco,
California

加州 旧金山



500m

独特的城市形态

围合式的集合住宅已经在中国通行了一千多年。这些围墙阻断了自然存在的景观，明确住宅集群的单一出入口，尤其是近年来，已经导致了一排排住宅建筑直来直去。无独有偶，美国传统的城市发展也由于排列网格状的道路切断了自然要素。建筑就这么面对着大街，街廓当中设小路和私人花园。

我们设想不同寻常的方式。与其以建筑和街道主导发展，我们建议景观引导开发，包括形态和建筑基底的大小。只有这样，嘉兴的城市建设才能更加独特，环境更宜居，最终产生强烈的城市特色。

Shanghai,
China

上海，中国



500m

Cities in China already implement several of these sustainable design features. Jiaxing should recognize this competitive edge and take it to the next level, demonstrating itself as a leader in the sustainable design movement.

中国城市已经实施了许多可持续发展的设计政策。嘉兴市应意识到城市间的角逐激烈，并将它推向更高境界，示范其自身在可持续发展设计行动中的领先地位。



Our approach to sustainable energy for Jiaxing is focused on three renewable energy sources: wind, sun, and biogas.

These energy sources can provide 100% of the corridor's needs with substantially less impact on the environment compared to fossil fuel sources.

Wind Energy

Since wind speeds in Jiaxing are low (2.15-2.85 meters/second), we propose mounting vertical axis wind turbines on rooftops and building corners. According to the Uniform Building Code, windspeed will increase by a factor of 1.2 at the top of a 12-story building and 1.63 at the top of a 30-story tower. Wind turbines can be mounted high on poles, providing sculptural form in public spaces. They can also be incorporated along high-speed rail lines in order to take advantage of wind gusting. New vertical-axis turbines are more quiet than traditional horizontal-axis models, making them more compatible with urban uses.



我们对嘉兴城市可持续能源的方法是符合生物及气候规律的建筑设计及三种主要可再生能源，即风能、太阳能和沼气。

这些能源可以维持整个走廊地区100%的电力供应，而对自然环境的冲击远远小于燃煤和石油等生物能。

涡轮风能（风涡）发电

因为嘉兴地区平均风速低（2.15-2.85 米/秒），我们建议在建筑屋顶和拐角处使用涡轮风能发电机。根据美国建筑法规，12层屋顶高处风速为地面的1.2倍，30层高可达1.63倍。涡轮还可以架放在高处呈灯竿状，在城市公共场所造成雕塑效果。涡轮发电机也能利用高速列车阵风效果沿铁路架设。新型竖轴涡轮比起传统水平轴模式更加安静，使其更适合在城市中使用。

Installing 7,600 vertical axis wind turbines throughout the corridor would generate approximately 233.1 Gigawatt-hours of renewable energy per year. This power represents 50% of the total yearly electricity demand in the corridor.

以沿走廊安装7600座竖轴涡轮发电机能产生的电量看，每年产生的可再生电力在整个走廊地区达到233.1十亿瓦特-小时，即相当于走廊总需电量的50%。



Sun

Our design utilizes three specific products that capture the sun's energy: solar hot water heaters, photovoltaic panels, and building-integrated photovoltaic glass. Solar hot water eliminates consumption of gas for water heating while photovoltaic panels and glass generate a renewable electricity supply.

Solar Water Heater

Many residents in Jiaxing already utilize solar hot water heating, in the form of after market units. These units can be located on the roof or on a southern façade, extending out from the balconies. Developers should consider purchasing the units in bulk to create a unified design.

Photovoltaics

We propose using photovoltaic panels in locations with full sun access. On rooftops of low-, mid-, and high-rise buildings, they should be mounted facing south and tilted 30 degrees. They can also be mounted near-vertically on the portions of mid- and high-rise eastern and western facades that are not shaded by other buildings.

Similar to the panels, building-integrated photovoltaic glass transforms the sun's energy into electricity, but in this case, the cells are sandwiched between two layers of glass. This creates a fritted effect and offers additional design applications. When there is direct sun access, this material could be utilized as a canopy, BRT station roof, or sun shade in a public plaza. Photovoltaic power represents 50% of the total yearly electricity demand in the corridor.



阳光

设计中采取三种方法收集太阳能：太阳能热水器、光电板、光电玻璃。太阳能热水器消减天然气烧水供热，而采用光电板和光电玻璃收集太阳能产生再生能源供应。

太阳能热水器

嘉兴目前市场上已经有居民在购买住宅后安装使用太阳能热水器，这些器材可以放在屋顶或建筑南面的阳台。开发商可以考虑在开始统一采买并在建筑屋顶一次性安装获得整齐划一的效果。

太阳能光电板

我们建议在日照充足的地方使用光电板。在各种高度的建筑屋顶上，这些光电板朝南并向倾斜30度安装。也可将接近垂直的安置在中高层建筑东西立面没有被其他建筑遮挡的部分。

和光电板类似，合成光电玻璃能将阳光的能量转化成电能，只是光电池夹在两层玻璃之间。这需要烧熔玻璃和进一步设计加工。当日光直射在这种材料表面上时，可以被用作遮阳篷，快速公交车站屋顶，或者公共广场的阳伞。太阳能光电板发电量相当于走廊一年需电量的50%。

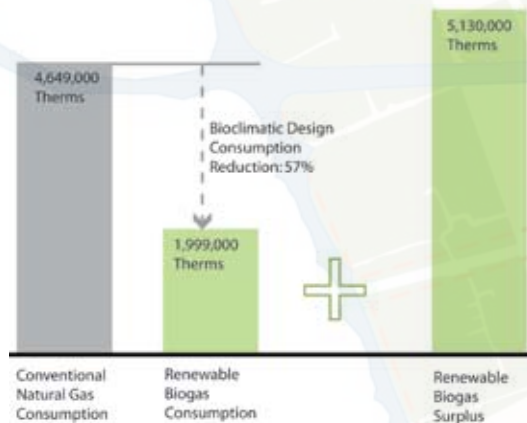


Biogas

We propose anaerobic digesters in our plan to transform waste into valuable fuel. The anaerobic digestion process naturally produces biogas, a gas composed primarily of methane and carbon dioxide. In controlled conditions, the gas contains 60-80% methane, close to the methane content of natural gas.

We located six digesters adjacent to the eastern “clean water gateways” and agricultural land, so that the digesters could take in sewage, food, plant material and livestock waste. The sewage, specifically blackwater, is separated into solids and liquids. The solids are conveyed into the digester and the liquids flow through a series of cells in the treatment wetland. Each anaerobic digester receives organic material from approximately five square kilometers of the corridor or about 70,000 residents.

Under conventional development conditions, gas demand in the corridor would be 4,469,000 Therms per year. Providing heating through bioclimatic design reduces the gas demand to 1,999,000 Therms per year. Based on data from University of California, Davis and OnSite Power Systems Inc.(facility shown at right), a conservative estimate for the total biogas produced is 7,131,000 Therms per year. This easily provides 100% of the total gas demand as well as a surplus of 5,132,000 Therms per year.



生物气

我们推荐厌氧菌分解转化成有用的燃料。这种方式自然产生的生物气包含沼气和二氧化碳。在一定控制下，产生的气体中含60-80%沼气，接近天然气所含的沼气含量。

沼气分区与操作示意：我们在西面的“水体净化门户”及农田设置6座厌氧分解站，使得系统能取用下水道污水、实物、农作物秸秆和家畜粪便。下水道污水被分解成固体和液体。固体部分送至分解站，液体流入一系列湿地净化池。每座厌氧分解站容纳来自5平方公里约7万居民的有机废料。

按照通常情况，整个走廊地区每年需要4.469百万千卡天然气。利用沼气供热能每年减少至只需1.999百万千卡的天然气消耗。根据加州达拉斯分校和OnSite数据显示，保守估计每年产生7.131百万千卡。因此使用生物沼气并不费力的达到全部天然气年5.132百万千卡的需求量。



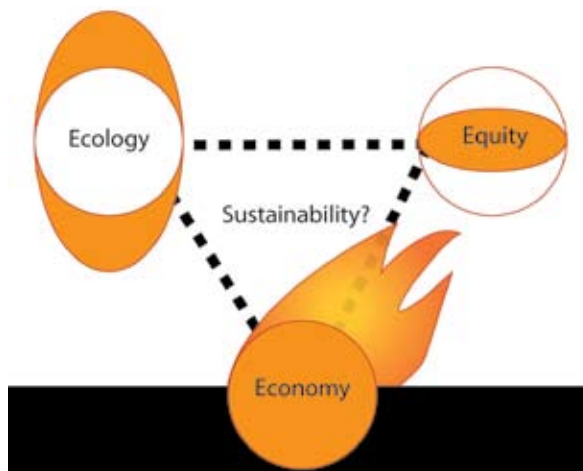


As China's energy needs continue to grow, it must choose a better energy alternative to polluting coal-fired power plants. Renewable energy technologies offer local, clean and affordable solutions to energy needs. Energy policy and infrastructure offer China an opportunity to show the world its leadership in clean energy technologies.

正因中国能源需求持续增长，才必需找出比燃煤发电更好的方法。再生能源低技术含量、清洁并低廉供应能源。能源政策和基础设施为中国创造了领先世界的使用清洁能源技术的机遇。

China's economy is on fire. If it does not address the pressing ecological and social equity issues, it may crash and burn. The design principles mentioned in this section present a way to balance the three elements that comprise sustainability.

中国经济是一团火焰。如果再不致力于生态和社会公正，中国经济将因过度燃烧而崩溃瓦解。这提示了平衡三者的法则是保证可持续发展的要素。



Summary

All of these principles work harmoniously to create a city that accommodates people's needs and fulfills their desires. Sustainability also offers China an opportunity to embrace new economic markets. Still, these design guidelines will only be successful in Jiaxing if they are relevant, understood and accepted. They must be refined and implemented in a way that is culturally sensitive and appropriate to residents in their communities. The government should include an education component in their implementation program to help people understand how these measures can improve the environment and make financial sense.

概要

这些设计原则共同创造一个城市，它承载人们的需求并能够实现他们的愿望。可持续发展还为中国提供新型市场经济的机遇。当然，这些设计原则只有被嘉兴城市参考、理解和施行，才算是成功的。确定并贯彻这些原则需要文化上的认同并且适合当地居民。政府应在执行这些方案时对人们加以指导使他们理解这些措施是怎样促进环境和经济的。

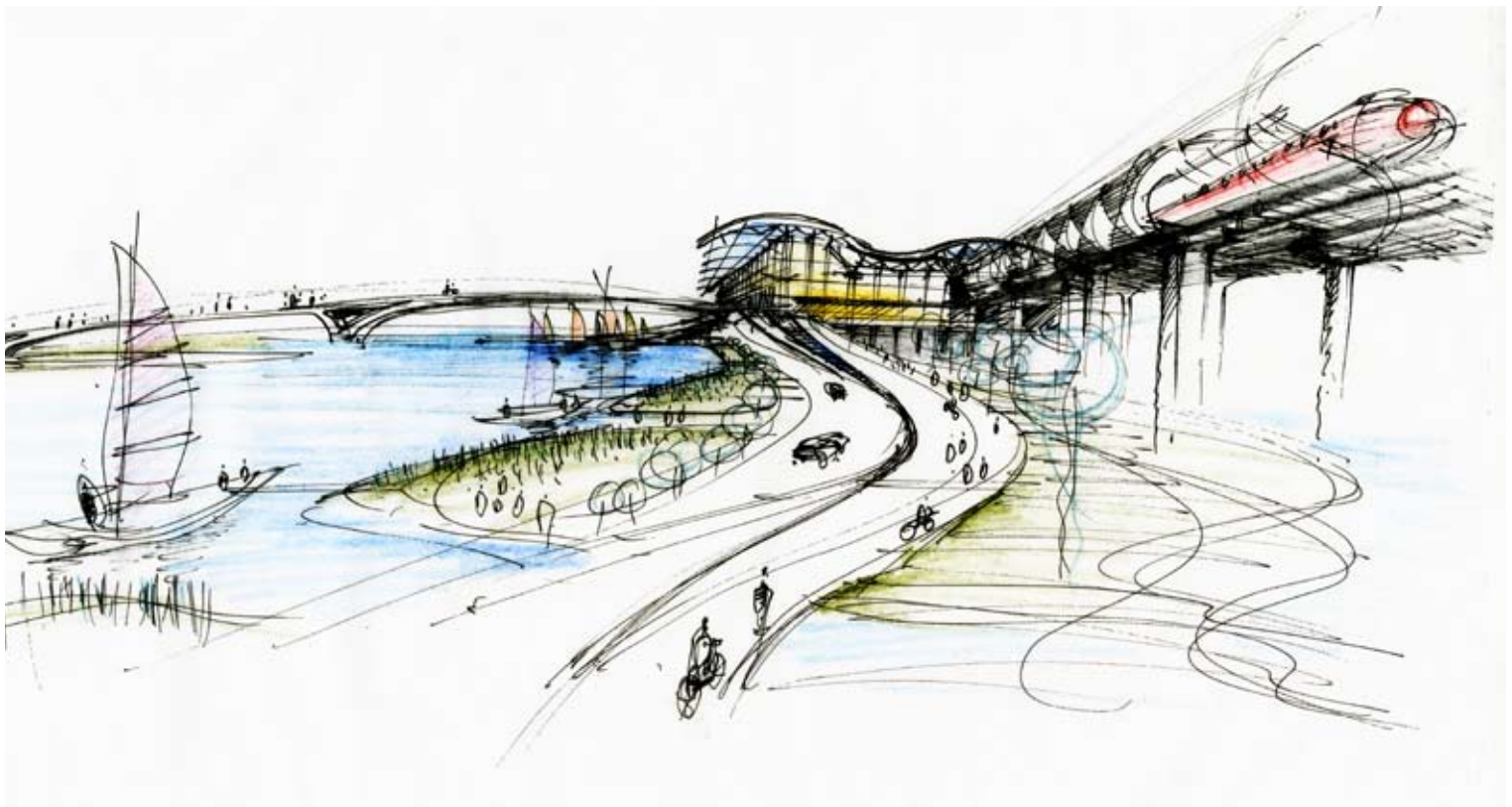


APPLYING THE PRINCIPLES

A Concept Design of Jiaxing's Comprehensive Transportation Station and Sustainable Neighborhood

应用原则

嘉兴交通综合车站与可持续社区概念设计



The transit station area creates a “green room” in which visitors arrive.

The transit station concept design applies all of the principles presented in this book. Centered on a lake, surrounded by water-cleaning wetlands, the room is framed by the transit station to the south, a commercial center to the east, mixed-use buildings to the north, and the great park to the west. Each block provides for pedestrian and vehicle access, as well as open space and canal access. The density of this district focuses around the transit station and the BRT line.

车站地区为旅游者到访创造了一个“绿色容器”

本书体现的所有设计原则都将运用在车站的概念设计中。人工湖在车站区中央，自净湿地环绕周围，车站 在南，东为商业中心，混合建筑区在北，西侧有大型城市公园。每个街区不仅有步行及车行入口通道，还通向开放空间和河流。该区高密度集中在车站及快速公交线旁。

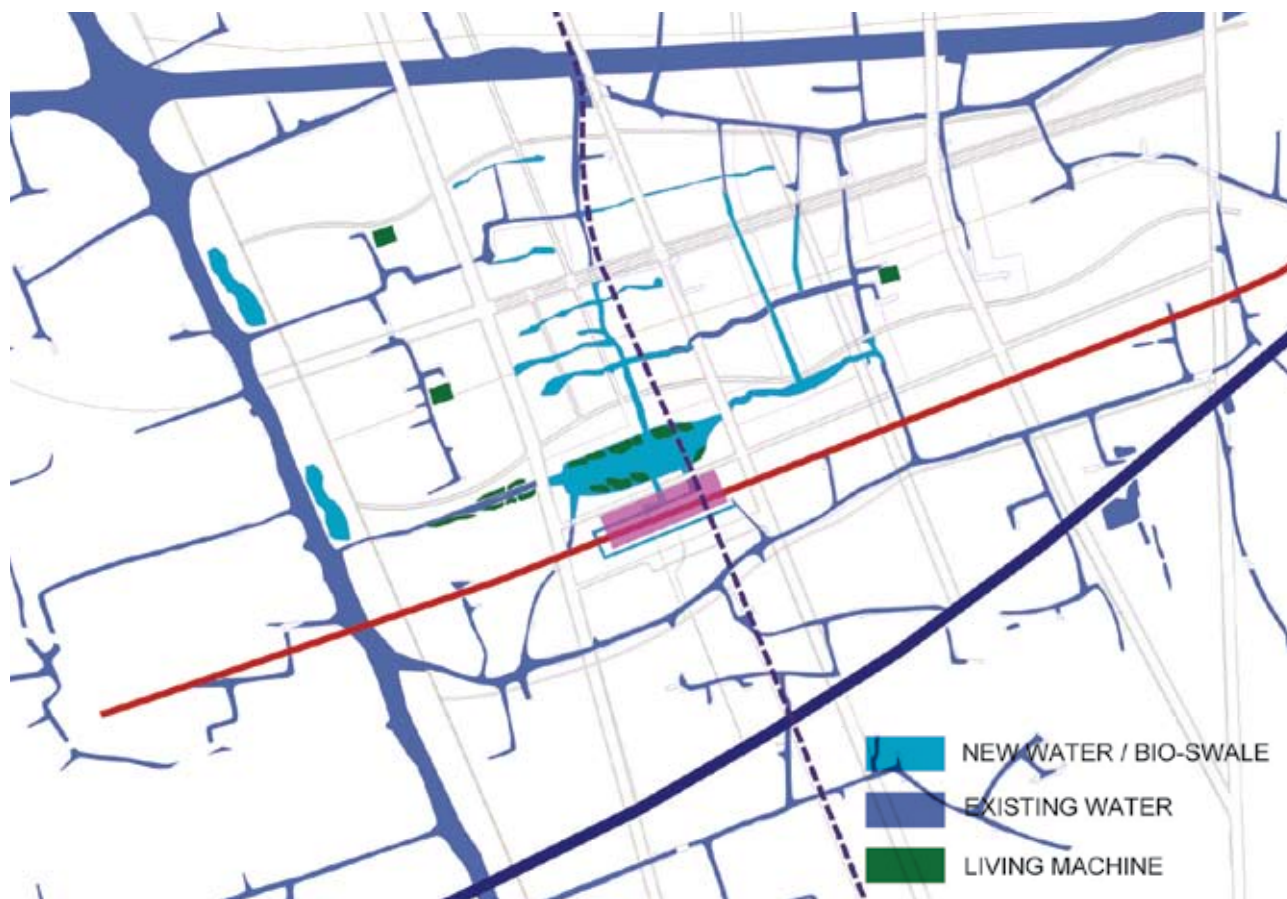


Water

The water system is proposed as a demonstration for how Jiaxing can clean its water using natural processes. Existing canals are connected together with new ones to create a balanced, functioning water system. Canal water is circulated through constructed wetlands surrounding the central lake and adjoining canals, removing pollutants through bio-remediation. Storm water is cleaned in bio-swales along the streets and parking areas before draining into the canals. Primary sewage is treated by neighborhood settling tanks, secondary treatment by “living machines”, and tertiary treatment by reverse osmosis and ultraviolet disinfection. All water is recycled.

水

在这里水系统将作为嘉兴如何运用天然方式实现河水自净。将现有的河流与新开的河道连通，成为布局平衡、有一定功能的水网系统。河水将与新建的中央湖面周围的湿地、周边的河流循环流通，以此通过生物方法清除水中的污染物质。雨水经过街道及停车场地区的生物净化洼地变清。主要污水在社区内储罐内处理，“生物净化组”的进一步处理，最后经过反渗透和紫外线消毒处理。所有的水都将循环使用。





Green Space

Green space corridors surround the water network providing alternate circulation for pedestrians and bikes connecting to the main park and transit stops. They are proposed to have multiple functions, providing recreation, shade, urban agriculture, flood control, biomass for energy and aesthetic amenities for residents.

绿色空间

水网周围的绿色廊道成为步行者和自行车通向主要公园及公交站点的另一选择。这些绿色空间具有多样化的功能，包括休闲娱乐、提供绿荫、都市农业、防控洪灾、生物沼气能源以及优美的生活环境。



Mobility

A multi-modal transit system creates a balanced network for pedestrians, bicycles, water transit, cars and parking, local and regional bus, Bus Rapid Transit to downtown Jiaying, regional light rail, and high speed rail.

交通

多种形态的大众运输系统为步行、自行车、水上交通、小汽车及停车、地方及地区公交车、到达嘉兴市中心的快速公交、区域轻轨和高速铁路创造了平衡的交通服务网络。



Architecture & Energy

Urban Design coordinates the water, green space and mobility systems with the architecture and energy systems to create a sustainable district.

建筑与能源

城市设计将结合水、绿色空间、交通系统和建筑能源体系共同创造可持续发展的地区。

Potential Development Phasing

1st Phase

- (1) Office
- (2) Modern service industry
- (3) Convention & exhibition center
- (4) Hotel, serviced apartment
- (5) Special market
- (6) Mixed-use building:
Residence/office/commerce/hotel
- (7) High quality international school
- (8) Sport facilities
- (9) Retail
- (10) Residential
- (11) Park, entertainment and leisure
- (12) Infrastructure facilities

2nd Phase

- (1) Office
- (2) Modern service industry
- (3) International research institute
- (4) Hospital and health care
- (5) Sports facilities
- (6) Entertainment and leisure
- (7) Residential

3rd Phase

- (1) Residential
- (2) Public facilities
- (3) Light industry

预计分期开发

一期

- (1). 办公.
- (2). 现代化服务
- (3). 会展中心
- (4). 旅馆, 招待所
- (5). 专业化市场.
- (6). 混合建筑: 居住/办公/商贸/旅馆
- (7). 国际学校
- (8). 体育运动设施.
- (9). 零售;
- (10). 居住
- (11). 公园、娱乐休闲.
- (12). 基础工程.

二期

- (1). 更多办公.
- (2). 更多现代化服务: 财经、信息服务、广告等.
- (3). 国际研究组织
- (4). 医疗
- (5). 运动设施
- (6). 休闲娱乐.
- (7). 居住.

三期

- (1). 居住.
- (2). 增加公共设施
- (3). 环保工业.

Phasing begins with the framing of the "green room." 实施步骤从“绿色容器”开始



Defining the "Green Room" Transit Station Area

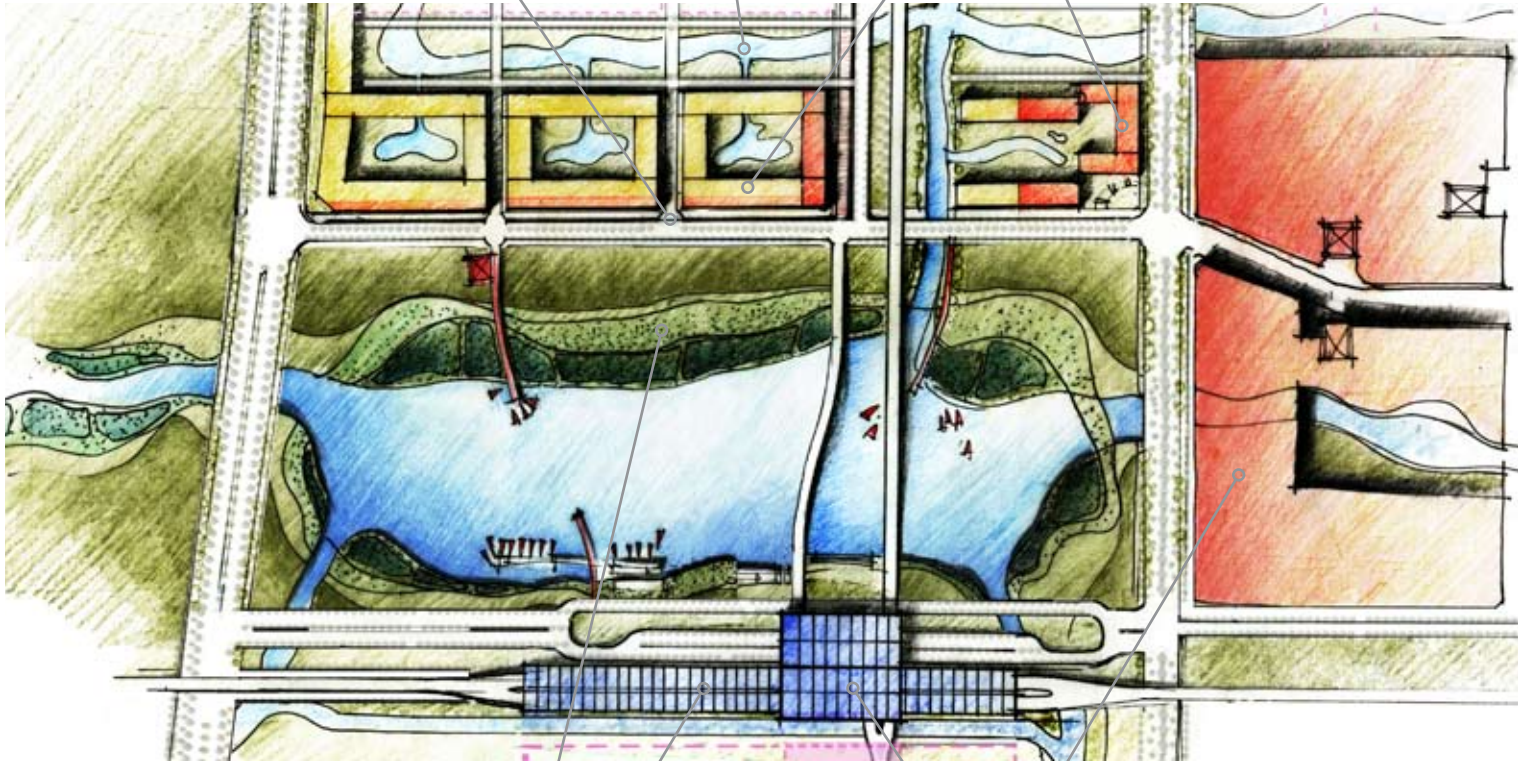
确定车站地区的“绿色容器” 系统

Canal network for stormwater cleaning, recreation and transportation.
用于雨水自净、休闲娱乐和运输功能的河流系统

Corner-building wind turbines
建筑转角涡轮风能机

Mixed-use Residential
混合住宅

Hotel and Convention
酒店及会议



Cleaning Wetlands along waterfront.
沿河自净湿地

Roof integrated photo-voltaic panels
屋顶整体光电板

Commercial/Office/Retail
商业/办公/零售

Transit Station
车站

Sustainable Strategies Station Area

Flow-through ventilation allows cool air to pass into the building and pushes hot air out through operable clerestories; this helps to maintain a comfortable temperature inside the station. The roof shell faces south and is lined with photovoltaic panels in order to capture energy from the sun. We have proposed a manmade lake in front of the station, symbolizing a gateway to Jiaxing and allowing visitors and residents to leave the station and catch a water taxi to their destination. The lake also contributes to the station's energy efficiency. Water from the lake feeds into two canals that run through the inside of the station, mimicking the landscape outside. Canal water is piped into the station, up to the platform levels where it flows back down through wire-screened walls in order to cool the air in the enclosed waiting and shopping areas.

Neighborhood

The first strategy is to apply the highest standards of energy conservation. Second, the back up energy is supplied by on-site renewables, creating a self-sufficient energy infrastructure. The integrated system design can provide all the energy needs of the neighborhood.

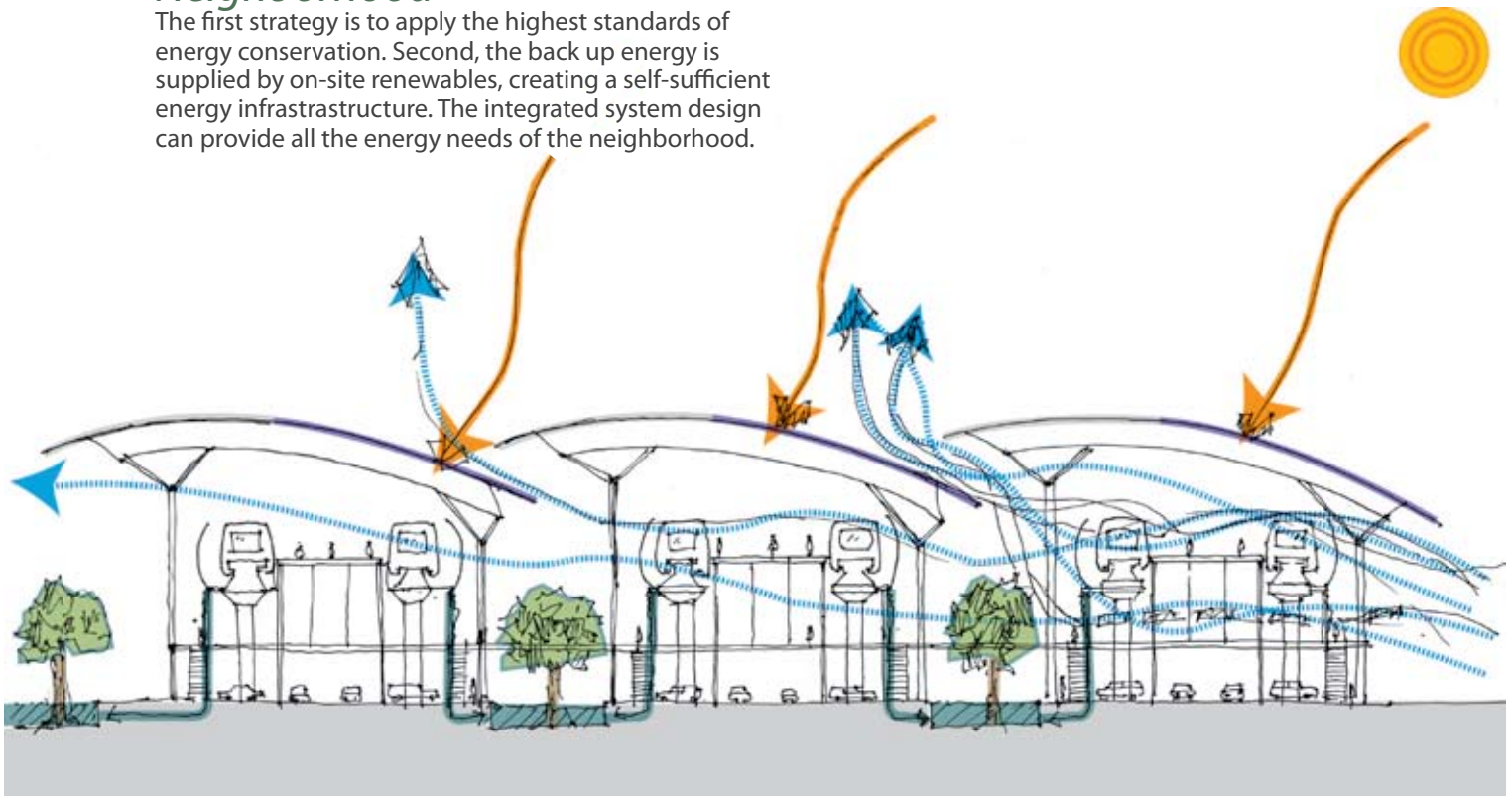
可持续因素

车站

自然通风使得凉风沁入建筑并通过可调节天窗带走热风，在车站内保持舒适的温度。壳状屋面朝南并安装电光板以收集太阳能。在站场前规划人工湖，成为嘉兴城市的门户标志，游客和市民下了车站可以乘坐渡船去往目的地。人工湖有助于车站高效使用能源。湖水流入两条河流经过车站建筑内部，模仿室外的情形。水泵将河水升向月台再流进金属网面墙体，为候车厅及购物场所的热风降温。

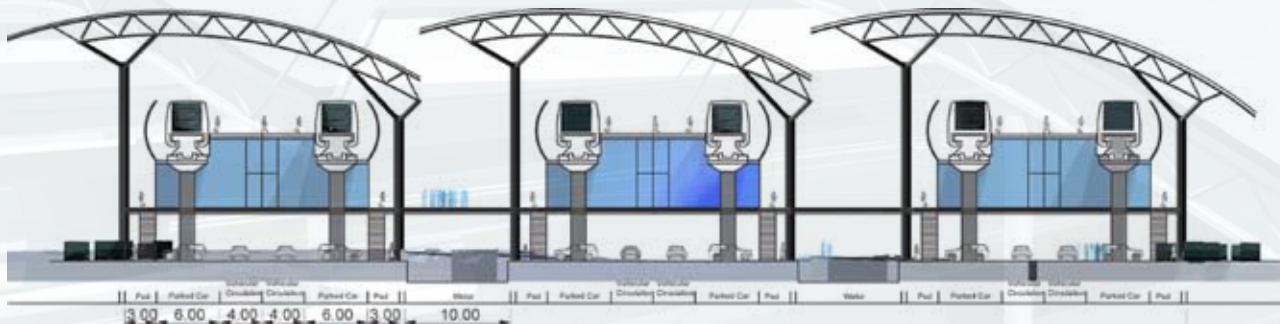
社区

高度节能标准为开发的首要策略，其次，本地提供的再生能源，创造自给自足的能源基础设施作为后备能源。在此基础上，整个系统的设计将能够供应社区所需的全部能源。



Transit Station

Our design for the multi-modal transit station highlights several energy-saving components within a flexible structure that can be expanded over time. The Chinese government has proposed several different transit lines to pass through Jiaxing, including high-speed rail, heavy rail and light rail. In order to accommodate several lines at different points in time, we have proposed a nested shell structure. Construction of the station can take place one bay at a time, as the transit lines are built.

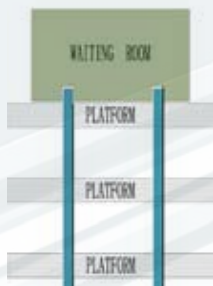
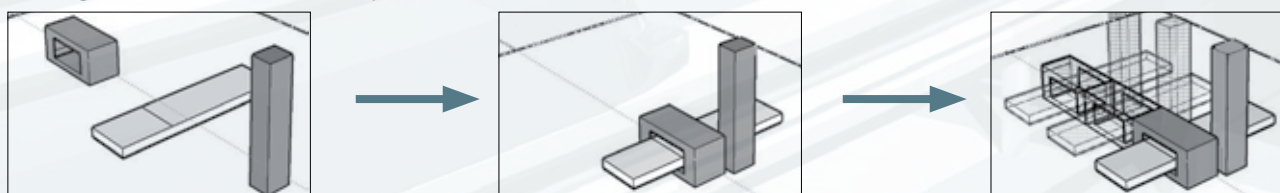


As an alternative on this design, we explored incorporating office and hotel functions into the station design. This diagram shows the integration of the waiting area and platforms (horizontal light boxes), shopping and services for passengers (encircling box) and high rise urban development (vertical boxes). Parking access is below the train platforms.

快速列车车站

我们的多功能车站采取能应对不同时期需要而扩建的灵活的建筑结构，其结构强调了节省能源的各个因素。中国政府规划了若干条不同的公共交通线经过嘉兴，可能包括快速列车、铁路和轻轨。为了在不同的时间容纳这些交通线，我们选取嵌套的壳状结构。车站的施工建设可以在不同时间的交通线建好后依次实施。

作为这个设计的一个变化方案，我们尝试将办公和旅馆功能与车站设计全盘考虑。如图所示一体化的候车区及站台（水平浅色框）、乘客购物及服务（围框）和高层都市开发（竖直框）。停车入口设在车站平台下方。



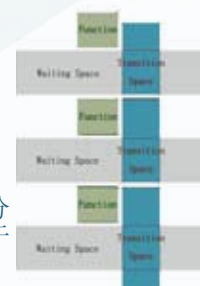
In traditional stations, a single large waiting hall accommodates all passengers.

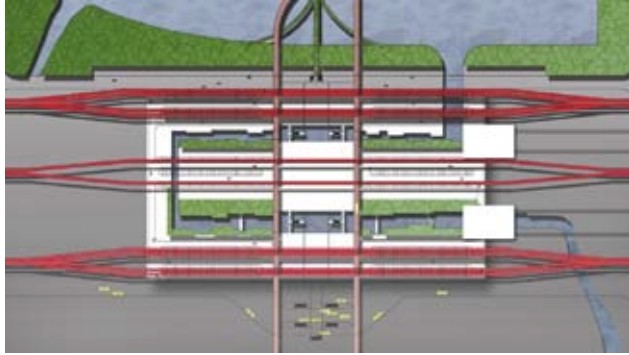
传统火车站，单一的候车大厅聚集所有乘客。



In our design, we placed individual waiting areas below each platform, to allow for phasing and to improve circulation.

我们的设计中，独立的候车区分别布置在站台下方，以此有助于分期建设和人员流通。



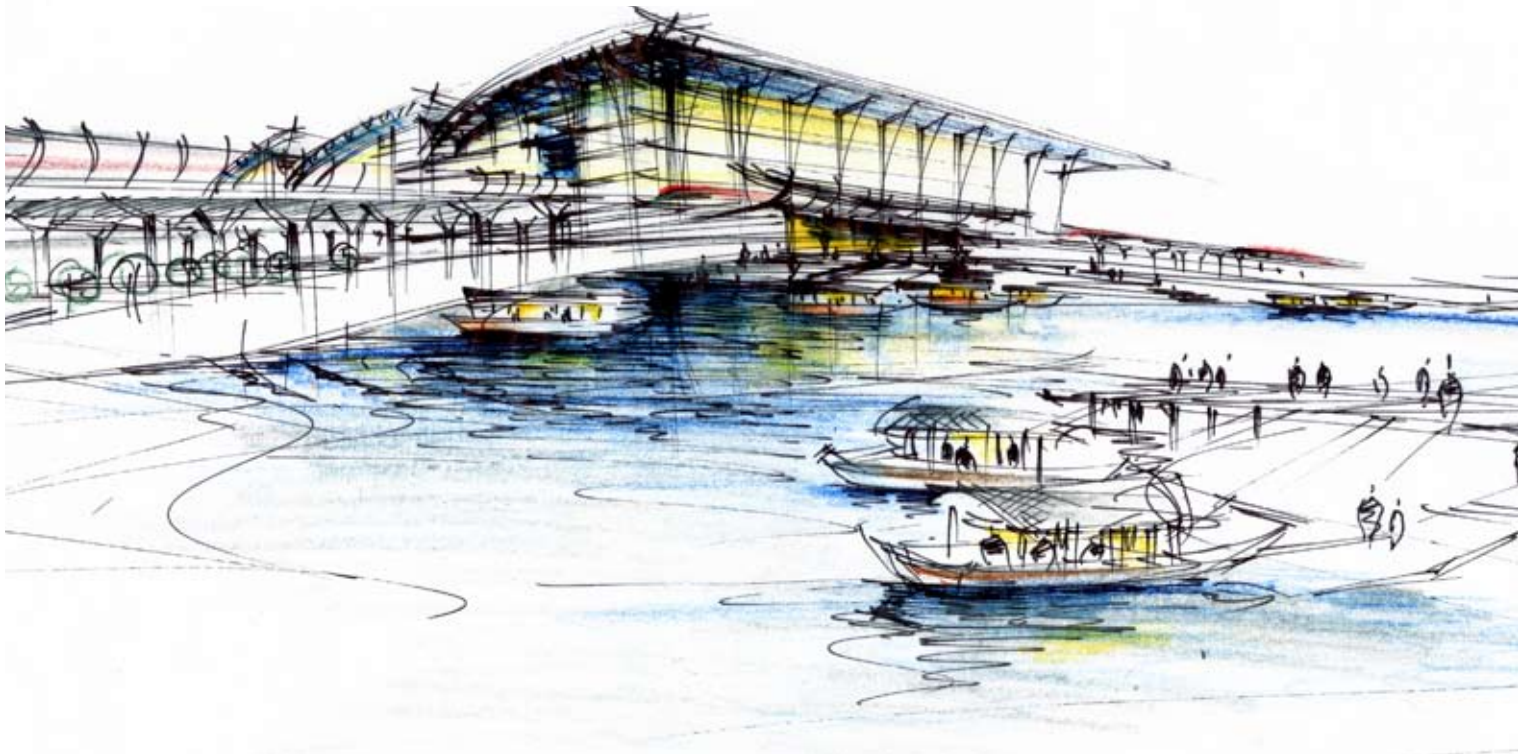
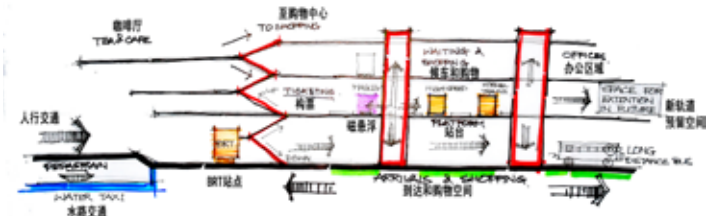
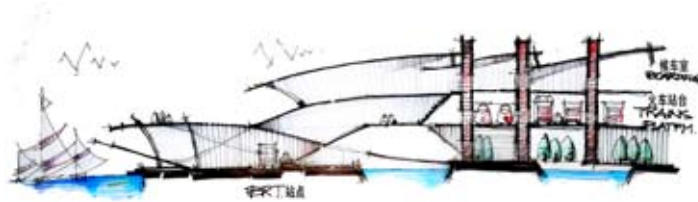


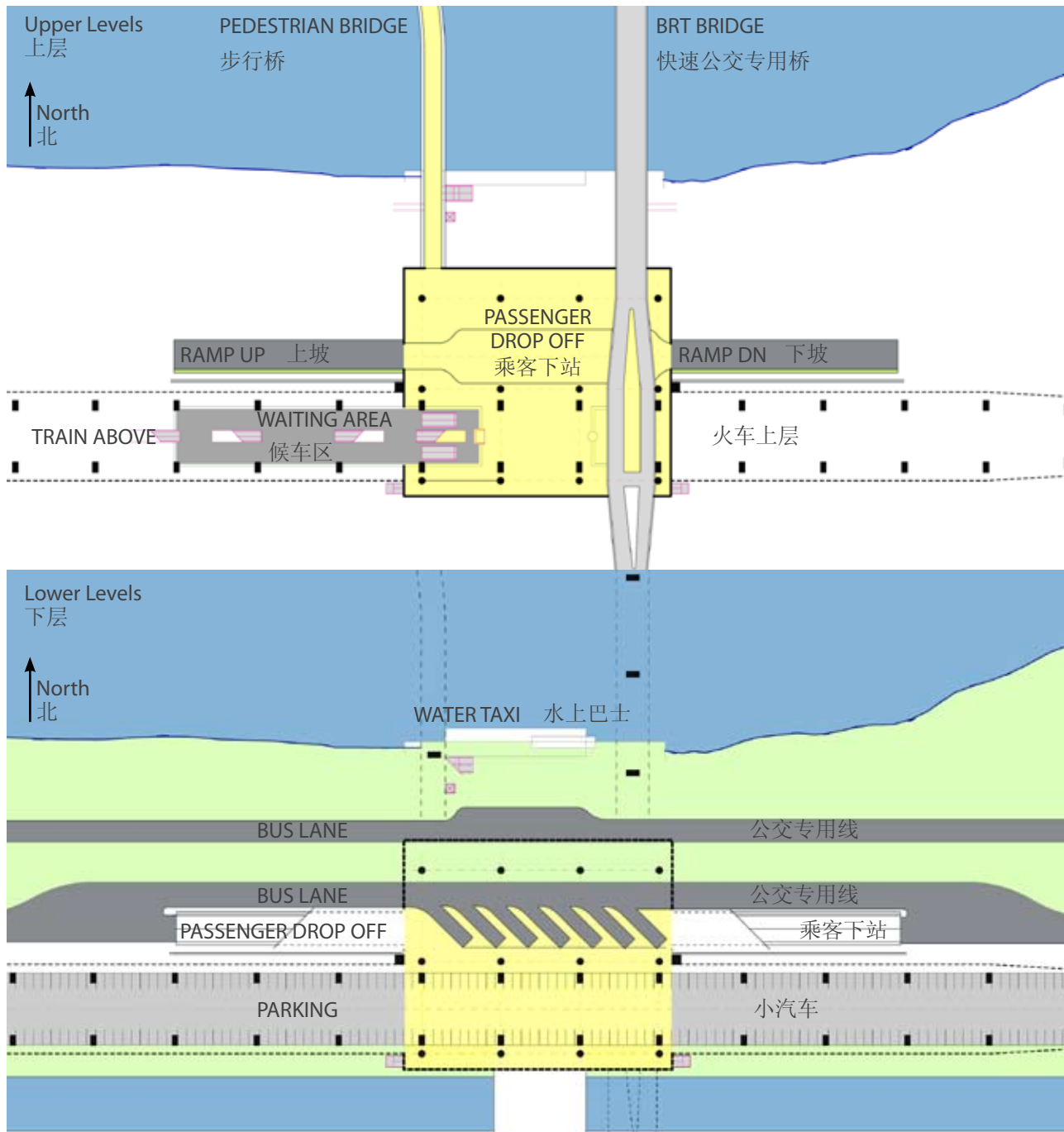
Alternative Program Design for Station Area

At the proposed multi-modal station site, the City has an opportunity to create a new economic hub, with hotel, office and conference facilities centered around the lake, which is a symbol of the new Jiaying. Development can be phased over time in order to accommodate demand and stretch out capital investment.

车站地区备选方案

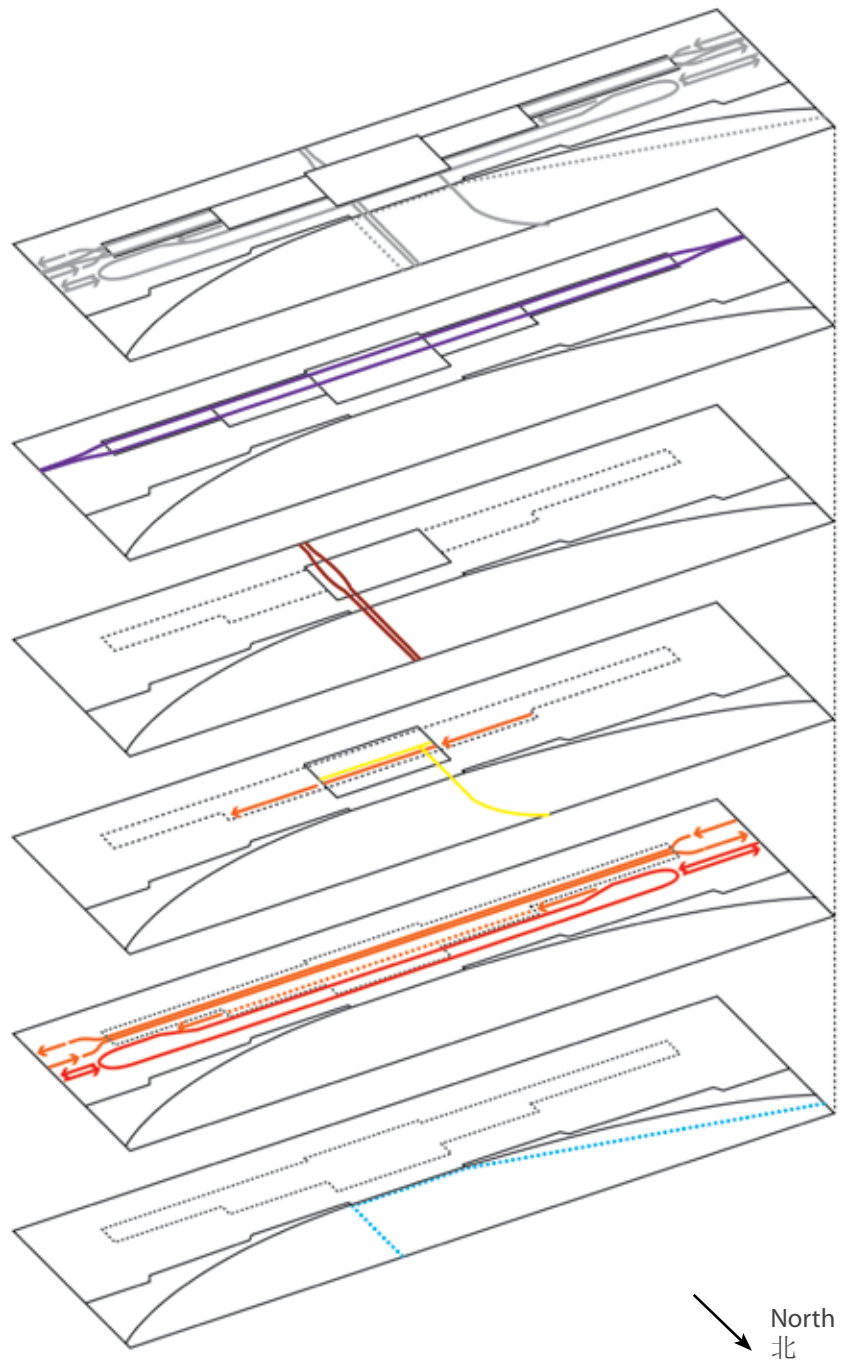
在多功能车站地区，城市有机会建立集宾馆、办公和会议一身的新经济中心区。发展可以长期分期实现的，以逐渐满足需求并延伸资本投资。

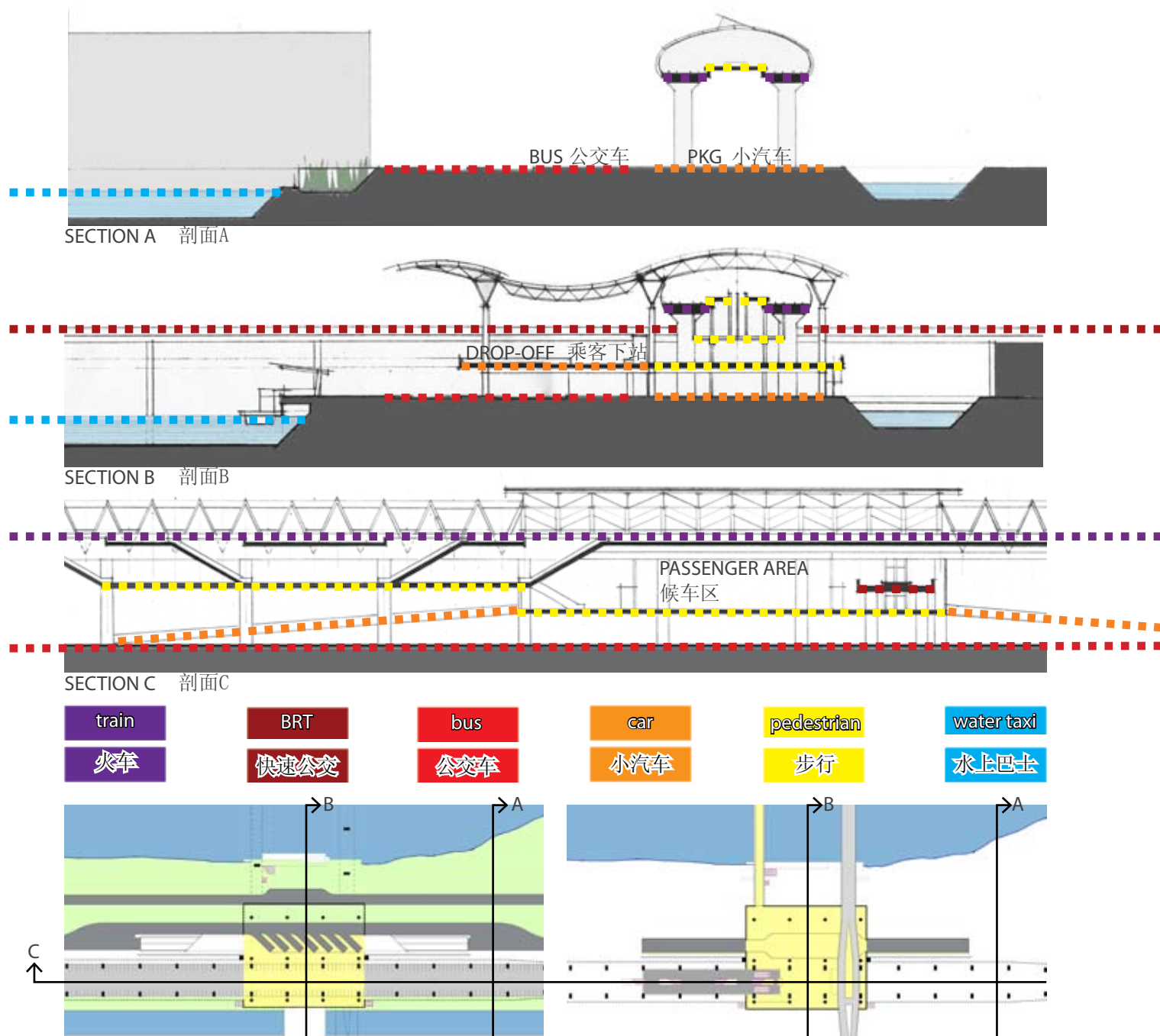




Mobility Diagram 交通示意图

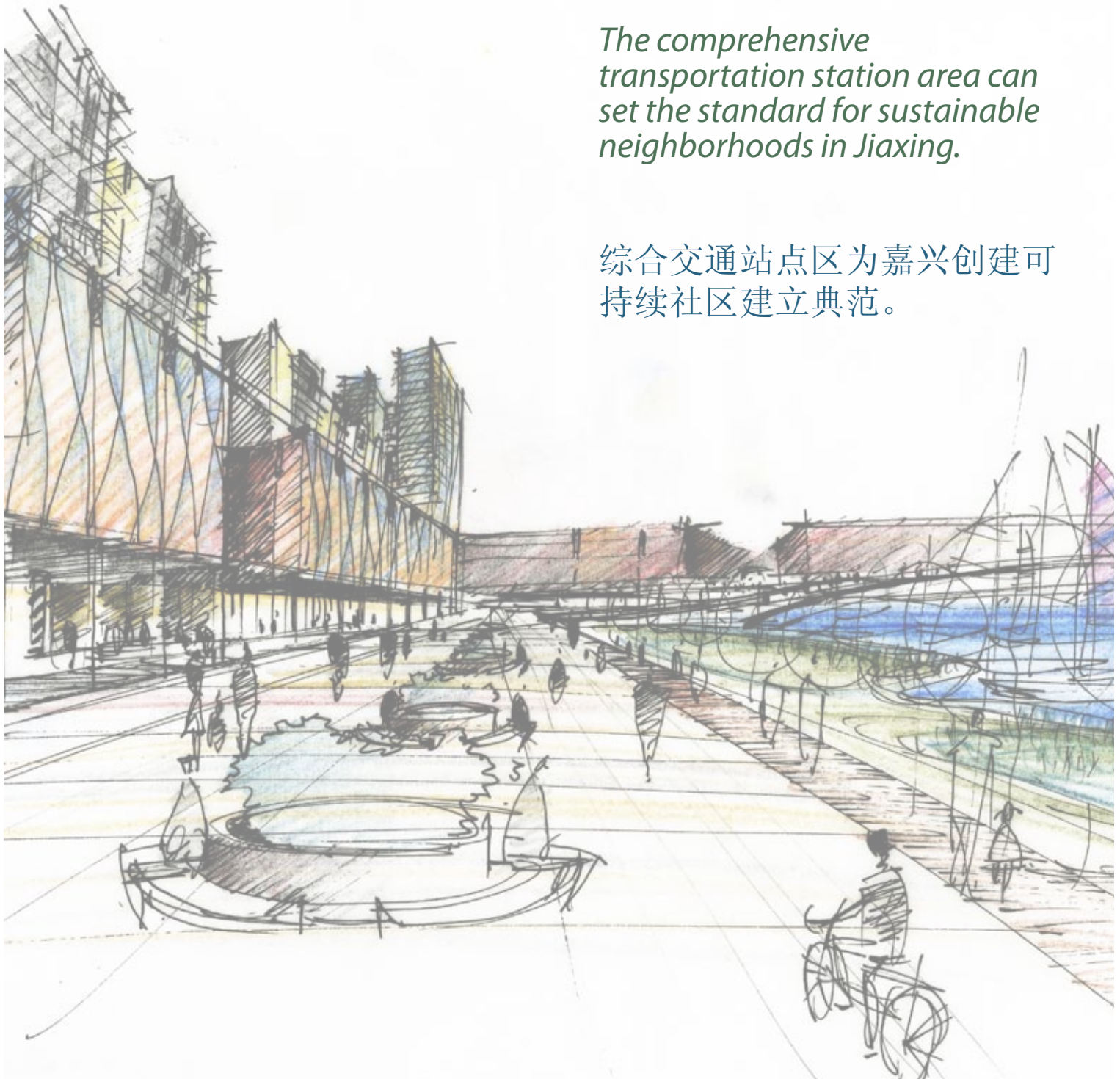
Roof Plan	屋顶平面
Train Platform	车站站台
train	火车
BRT Bridge	快速公交专用桥
BRT	快速公交
Passenger Area	候车区
pedestrian	步行
car	小汽车
Ground Level	地面层
bus	公交车
car	小汽车
Water Level	人工湖水层
water taxi	水上巴士





The comprehensive transportation station area can set the standard for sustainable neighborhoods in Jiaxing.

综合交通站点区为嘉兴创建可持续社区建立典范。



CONCLUSION

综述



Compared to many other countries, the Chinese government has the ability to make rapid change. Environmental protection is an opportunity for China to lead the world by example. To clean up its air and its waterways. To build a renewable energy facility each week rather than a coal fired power plant. The City of Jiaxing is in a particularly good position to serve as a model for sustainable development in China. As the City develops large portions of land for the first time, it can choose to develop in a responsible sustainable way. The City has an opportunity to be more innovative in its designs to satisfy local economic goals and establish a unique identity in the region.

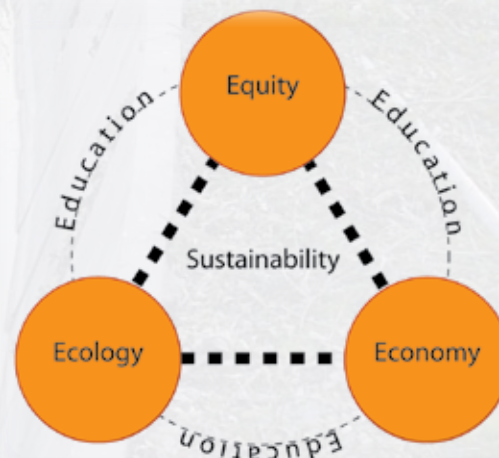
Still, just cleaning up the environment and improving development policies is not enough. Such a transformation will require an interdisciplinary whole systems approach that considers natural systems, energy resources, design and development policies. The sustainability triangle is secured by "3 E's": equity, economy and ecology. China must develop an economic strategy that is aligned with higher environmental standards. It must pursue development activities that accommodate people at different income levels and needs. But, China must go one step further, by adding a fourth "E"—education—to ensure that these policies can be maintained and adopted over time. China must educate its people and itself on the consequences of poorly planned development and on more sustainable ways to live and grow.

The time is now. The central government has taken the initiative in the 11th Five-Year Plan. But, now it must follow through on policy, training, implementation and enforcement to achieve these sustainable goals. China is opening its doors to the world over the next few years, as the host of the 2008 Summer Olympic Games in Beijing (the self-titled "Green Olympics") and the 2010 World Expo in Shanghai, with its theme, "Better City, Better Life." China could become the world leader on sustainability. Let Jiaxing show other Chinese cities that it can provide its citizens a better life and a more environmentally sound, economically strong, and equitable society.

与其它很多国家相比，中国政府更具有快速改变的能力。环境保护是中国成为楷模引领世界的一个机遇。净化空气和水路，每周建设可更新的能源设施而不是煤燃烧电力设施。嘉兴位于一个尤其好的区位，可以作为中国可持续发展的典范。由于这是第一次开发大规模的土地，城市可以选择以一种负责的可持续发展的方式发展。城市有条件在设计上更具创新性，从而满足地方经济发展目标并确立其区域中的独特性。

然而，仅仅净化环境并改进开发政策是不够的。改革需要将自然体系、能源、设计和开发政策全方位跨领域协作才能实现。可持续发展三角是由“3E”保证的：公平（equity），经济（economy）和生态（ecology）。中国必须发展一种与更高环境准则一致的经济策略，必须追求那些可以满足不同收入水平人们需求的发展活动。进而，中国应该在此基础上更进一步，加上第四个“E”——教育（Education）——以确保这些政策能历经时间的考验被保留和采用。中国应该教育其人民和整个国家，让他们了解缺乏规划发展的恶果，也了解更为可持续的生存和增长方式。

天赐良机，中央政府已经开始实施十一五计划的法案。然而，要达到这些可持续发展的目标必须遵循政策、训练、贯彻执行和增强措施。中国在下面的几年里会通过北京2008夏季奥运会（口号：绿色奥运）和2010年上海以“更好的城市，更好的生活”为主题的世博会向世界敞开自己的大门。中国可以成为世界可持续发展的领袖。让嘉兴向其它中国城市展示，它可以为自己的市民提供更好的生活，提供健康的环境、强盛的经济和平等和谐的社会。





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Energy Assumptions

Bioclimatic design and energy efficient building components reduce energy consumption 60%. [ARUP, Qingdao project]

1 vertical axis wind turbine yields 30,656 kWh per year. [ARUP, Qingdao project]

1 sq m of photovoltaic panel yields 185.8 kWh per year. [pvwatts.com]

1 ton of on-site power by organic material yields 23 Therms of energy.

Cooking accounts for approximately 5% of total domestic gas consumption. [US Department of Energy]

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生物气候设计和高效能源建筑元件降低能源消耗的60%
[ARUP, 青岛项目]

一个竖轴风力发电机一年可以产生30,656千瓦时的能源
[ARUP, 青岛项目]

一平方米光电板每年可以产生185.8千瓦时的能源
[pvwatts.com]

1吨有机材料可以产生23千卡能量

烹饪消耗的天然气占全国整体天然气消耗的5%[美国能源局US Department of Energy]





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