Manufactured Landscape: Strategies for Peri-Urbanism in Dongguan by Chit Ying Natalie Wong BA (ArchStud) The University of Hong Kong, 2007

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SUBMITTED TO THE DEPARTMENT OF ARCHITECTURE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARCHITECTURE AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

FEBRUARY 2011

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Manufactured Landscape: Strategies for Peri-Urbanism in Dongguan by Chit Ying Natalie Wong

Submitted to the Department of Architecture on January 14, 2011 in partial fulfillment of the requirements for the degree of Master of Architecture

Thirty years of Open Door Policy has brought about a series of urban restructuring of cities in the Pearl River Delta of China. The Peri Urban fabric 5 of the these cities are formed as a result of complex orchestration of urban processes. In particular, rural hinterland are increasing being exploited as a vacuum for industrial expansion. The mono-functional spread of industrial estate has a limited life span, it is vulnerable to economic downturn, and undermine the possibility of small scale farming, an economic practice that is proved still relevant given the fact that rural and urban citizenship still maintain a clear distinction.

This thesis proposes a new model of industrial facility that addresses the conflict of rural land resources rapid industrialization. It provides the necessary infrastructure for a constantly changing rural urban economic model. It is invested in creating an urbanity out of this unique economy without necessarily abiding to the conventional zoning model. Architecturally the project transforms the generic conditions of each constituent production program in response to a typological reconfiguration.

Thesis Supervisor: William O'Brien Jr. Title: Assistant Professor of Architecture

abstract

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My sincerest gratitude to those whose support made this thesis possible:

my advisor William O'Brien for your insightful critiques and patience for the project.

my reader Ingeborg Rocker, for your incisive feedback which made important pivotal points in my project.

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my reader Ashley Schafer, for your intensive critiques.

acknowledgement

my family for their unconditional love and support throughout my architectural education and my 2.5 years at MIT.

August Liau for helping me with the final model.

Mavis Yip and Otto Ng for your last minute help at the most stressful times.

Teachers and friends who truly enkindled my times at MIT.

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architecture after 30 years of Open Door Policy

"World factory is a phrase used with more and more frequency in our age of globalization dominated by the so-called free market economy. One of the most remarkable tendencies in the current Western Economy is the outsourcing of the manufacturing industry to the developing world. Many so-called "Third World countries" are now becoming the sites of production for consumer goods sold in the "First World market". These sites of production imply intensive and low cost labor which in turn creates a transformation of the social and urban structures in the developing world." Hou Hanru, Artist

China as the world factory in the past two decades has brought about new implications for space for production, one which is largely determined by foreign capital investment. The impact of these new spaces for production is multi-folds: urban structuring of the cities, energy consumption and social relation under the production of capital.

Under the Open Door Policy introduced by Deng Xiaoping, four Special Economic Zones in Guangdong Province were set up as a testing ground for accelerated economic development. The SEZs were quickly equipped with transportation infrastructure, and they provided preferential tax rates, lower land price, and other economic incentives for foreign capital investment. As centers for outsourcing low skill, labor intensive industrial activities, the policy quickly brought in a large number of foreign investors to set up manufacturing estates in these cities.

introduction

In thirty years under Open Door Policy, Dongguan has grown into one of the biggest manufacturing base in Guangdong Province. Nonetheless, one should not look at the prosperity of the city independently. The three decades of rapid economical advancement has also brought along an instantaneous urbanization of the peripheral-urban basin surrounding the city. The outskirt of Dongguan exemplifies a type of industrial landscape generated by a complex orchestration of haphazard implementation of land transaction policy, immigration policy and infrastructural investment, a fabric much different from one driven by zoning strategies. It produces instances where highway infrastructure, industrial estate and existing housing village are incidentally interlocking with one another. The incoordination of these systems produces numerous ambiguous zones that are either economical functional nor contribute creating beginnings of urbanity in these densely populated area.

the generic industrial estate

The industrial estate, is a **generic building typology** that this large stretch of peri urban landscape is largely comprised of. Designed for maximum efficiency and temporal lifespan of industrial production, these industrial blocks describe the grey area zones of develop where previous rice fields are converted into a dense city inhabiting 12 million. Apart from manufacturing zones for daytime work, they are also a self sufficient living unit with workers' dormitories collocated on site. The industrial estate is an essential building type that supports the industrial economy. Nonetheless, this architectural typology has not been contributing to the progression of the level of development to the general fabric in the region. Its programmatic condition has been solely driven by a short term economic interest, capacitated only by local land leasing system and influx of temporary labor. Its organizational logic is purely determined pragmatically. This thesis posits that future economical conditions can be initiated by change in the built environment. The recent shrinkage of industrial economy provides calls for a new type of production facility that is more capable of damping the effect of economic downturn, and in turn contribute to the development of a public realm in the region.

peri-urban conditions of Dongguan

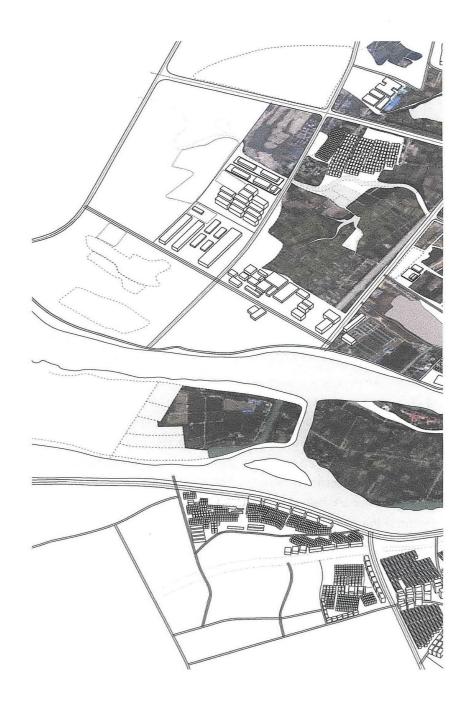
The rate of industrial expansion and its economical consequence is significant to the Pearl River Delta region. Quantitatively by the year 2000 enterprises engaged in the IT industries were producing over 40 percent of the world's computer cases and computer magnetic heads, 30 percent of computer disk drivers, 20 percent of scanners and mini motors, 16 percent of keyboards and 15 percent of computer motherboards. Industrial land use has drastically increased and accounted for 11 percent of the total land area, which supersedes most Chinese Cities.

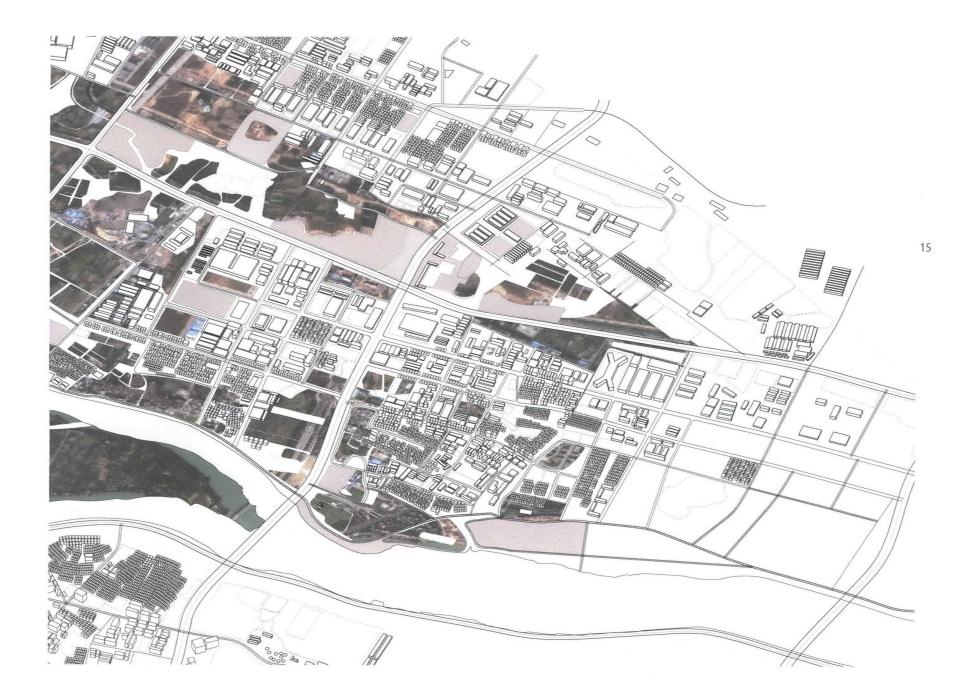
One of the distinctive characters of these urban processes that take place in Dongguan is its inseparable relationship with the rural edge of the city. In terms setting off desirable land and labor conditions, industrialization has been primarily taking place at the village level. Processes such as village industrial cooperative, rural recycling industries are examples showing that an increasing population is engaging in industrial and urban activities within rural area without having to leave the rural districts nor changing their status as a rural resident. While migration into cities, especially large cities is increasing restricted by the central government, the states' control over rural to town migration has relatively been relaxed. Situated between the two larger metropolitan cities, Guangzhou and Shenzhen, the outskirt of Dongguan consequentially began to accommodate an increasing number of rural residents migrating to look for better prospect in engaging in short term urban economic activities.



figure 1

This type of industrial expansion relies largely on exploiting the forty year land use right for short term economic drive. The lack of regulation in converting land for industrial use has led industries to continuous peripheries. The mono function industrial landscape is vulnerable to the hit of economic downturn. When millions of migrant start to return home during economic possession, the question of what the role of agriculture can be in this fast moving economy is being brought up again. Currently factories are moving out of the area and the consequence of increasing cost and economic recession are surfacing. Dongguan rural resource is still extensive and rural citizenship status of its population remains consistent. Can a production facility perform a role of resolving economic and resource conflicts that the industry itself induce? This thesis looks into a new type of production facility which **addresses the conflict of rural land resources rapid industrialization**. Programmatically it provides the necessary infrastructure for a constantly changing rural urban economic model. It is invested in creating an urbanity out of this unique economy without necessarily abiding to the conventional zoning model.





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2 | urban processes

_bottom-up urban processes

zoning

Zoning, or rather, the absence of zoning outside of the central city district contributes to the rapid expansion of industrial landscape in the peri urban basin. The Prefectural level city is structured by a dense city center with protected agricultural land pushed to the periphery of the city. As seen in figure two large area of dongguan comprises of rural construction land which has no specific use designated by the municipal government. The land in between is subjected to the land transaction policy opened up to guangdong in the 80s where farmers have the right to transfer land use rights to industrialists for a definite period. It enables an industrialization of the countryside at a village level, rather than based on a designated urban center. This underlying mechanism has extended itself to multiple rural processes which become the key catalyst in the creation of urban fabric. These underlying processes produces rather differentiated urban fabric and immediate adjacency of the rural and the urban.

As industrial area begins to urbanize and land price rises, new lands is leased by the government further to the outskirts of the city out of economic incentive leaving behind skeletons of an industrial regions, whose fabric is neither urban nor rural. Even though factory building is known to have a certain life span due to the temporal nature of industry, the constant peripheralization and sprawl of industrial built up is a radical case of turnover of factory buildings. Government policies also support expansion of factory infrastructure into the urban fringe. Cities offer land cheaply to developers, sometimes even free of charge and compete with each other for foreign in-

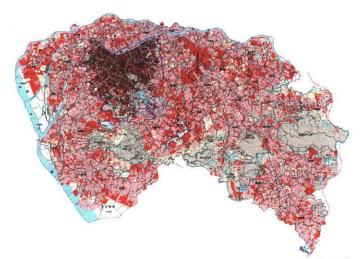


figure 2

vestment. This mode of land selling manifests itself as mortgaging the present on the future. Changsha, Zhuzhou and Xiangtan cooperate with each other on some projects but also compete with each other at the same time . It is important for the city for find a niche market for this type of land investment and it is yet uncertain how the planning process of city facilitates it. Factory continuously move toward the urban fringe, expanding a peripheral urban area which was previously rural hinterland. The spread of industrial sector has contributed to the encroachment of valuable agricultural land. As Pearl River delta undergoes rapid urbanization, it also demonstrates the consequence of excessive land conversion and urban sprawl. As a result of property boom in Hong Kong and the Pearl River delta, rapid land development and agricultural land losses are taking place in Dongguan where 23.7 percent of the total area has undergone changes between 1988 and 1993.

land reform

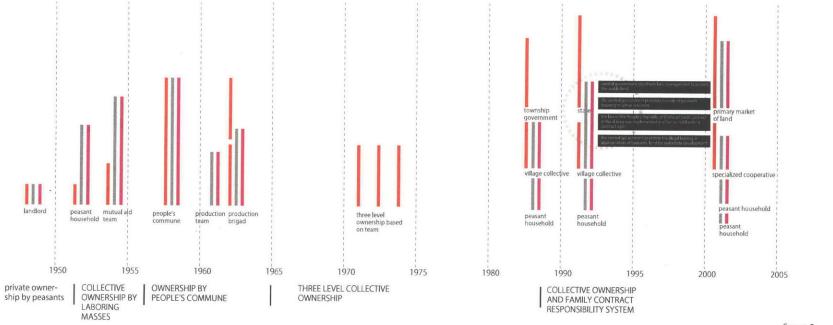
The land reform in China has undergone different stages between 1987 to 2001. The central government strategically alter the farmers' land use right and the way it is traded to allow capital inflow as a way of collecting capital for future investment in urban construction. It began with allowing the conversion collectively owned farmland to rural cooperative entities. These cooperatives can then start up business with outside investors with relatively more degree of freedom.

Several types of land transactions contribute to the conversion of rural land for urban purposes and each has specific use and time constraints attached. The most common type, which put rural land largely under the influence of market forces, is the trading of land-use rights of collectively owned land between collective and developers. It stipulates that collectives can trade rural construction land with any individual or parties for land development other than commodity housing projects.

ambiguous landscape

As the use of land and the period of use is now largely determined by individual transaction the process of conversion of rural construction land has become increasing diverse. The manner at which land development are not incoordination with one another is increasing surfacing. The ambiguous landscape of Dongguan is largely composed of this autonomous mechanism of private transaction.

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source

figure 3

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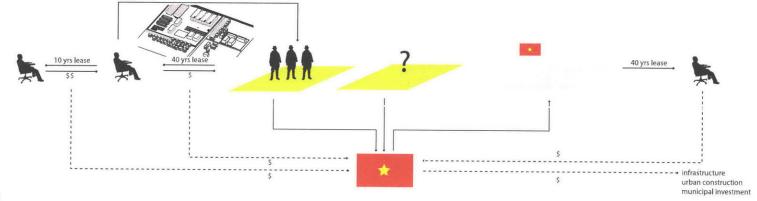


figure 4

land capital and rural economy

The move has profound implication where rural collectives has essentially become legal sellers of rural construction land. The rural land in this way directly enters the market without having its actual ownership changed. A portion of the income is contributed to farmers' welfare and back into investment into developing the rural economy. Land lease is typically forty years for industrial use and the land use rights can be transferred to other developers before or after the end of the lease. However, the policy leaves an ambiguous part to the ownership of the actual construction on this collective land, and the aftermath of the land after the lease is due. As industrialization continuous and with Dongguan being hit by economical downturns, the question as in how the land can continue to sustain the rural economy becomes pertinent.

The map above shows the rapid expansion of urban area in the Pearl River Delta in the past thirty years (1970-2000). The expansion is neither purely

figure 5

directional along infrastructural corridor or in orderly patch regulated by zoning. The multiple underlying urban processes is essential for the architectural project in **how architectural conditions can initiate change within these underlying, given logics.**



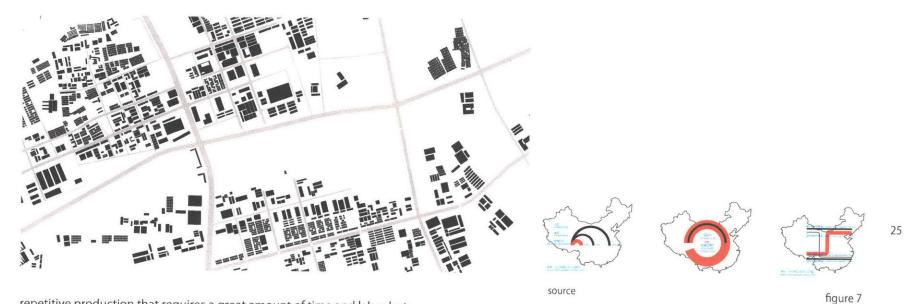






labor

The economic reform in the 1970s also brought about a movement of surplus rural labors from the countryside. Currently, the number of migrant workers in Dongguan outnumbers the local population by a huge margin and they play substantial role in supporting the local economy. The employment of this additional yet temporary population has largely been absorbed by the export-led industrialization, especially those rapidly relocating industrial firms from Hong Kong, Taiwan and other counties. An observation in he movement patterns of labor, their citizen status, and their livelihood would reveal how industrialization has primarily taken place at the village level. The fact that the rural labor force and agricultural population are pursuing industrial and urban activities without leaving the rural areas is in part a consequence of the partial relaxation of state control over rural to urban migration. In Dongguan, about one third of the local labor force is employed in industrial sector. While migration into cities, especially large cities, is highly restricted, the state's control over rural to towns migration has been relaxed. In this sense, Dongguan plays an important role in accommodating large number of migrating population and relief the burden of housing and employment of Guangzhou and Shenzhen, the two metropolitan cities next to Dongguan. Statistics also shows that in the past 10 years the most rapid urbanization process occur mostly in peri urban region typified by Dongguan, rather than large metropolitan cities. Since most of the industrial firms start up with technologically unsophisticated tasks within the production chain, implying a labor intensive progress, most of the export processing industries established in Dongguan involve simple



repetitive production that requires a great amount of time and labor but little knowledge and skills.

an urbanity in rural condition

The density of rural population Dongguan is comparable to a typical suburb in the US, yet the economic condition has not allowed the rise of service industries as the public realm. The temporary population and its expansion has inverted the notion of rural as the low density outskirts of the city. Industrialization of the rural area has created a **particular case where density and urbanity can be discussed with reference to what is economically vital in a quasi urban condition**. The project looks at opportunities in creating economically beneficial conditions for rural residents as a cutting point into the programmatic enquiry of architecture. Because of the stringency in the economic condition of the area, this new type of production facility must programmatically provide sufficient economic incentives and as the primary access for users.



figure 8

_top down infrastructural development

transportation infrastructure

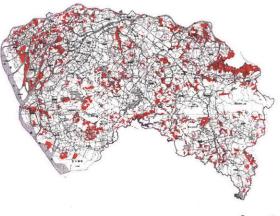
The Pearl River Delta is heavily invested in infrastructure to facilitate transport of materials and goods across to allow fastest reach of raw materials and parts to producers. By 1996 the Pearl River Delta had 350 kilometers of state highways. The privately funded Guangzhou-Shenzhen-Zhuhai superhighway is the largest scale highway connecting cities on the east side of the Delta, channelling more than 50,000 vehicles per day. The extension of 40 kilometer highway linking Zhuhai, Hong Kong and Macau is also undergoing planning in construction.

In opening industrial and development zones along highways, there is an observable pattern of linear development along the highway axes. Highway is determining in the how the industrial estates are located. Large scale industrial estate are essentially an extension knot attached to the transportation corridor. Given the autonomous urban processes described earlier, it is clear that infrastructure imposes an entirely different logic to this already ambiguous landscape. Dwelling units rise between the factory studded corridor and the small scale existing villages. **Infrastructural and local**



processes are two drivers behind the form of the generic industrial block.

On one hand it complies with logistical requirement of goods distribution and on the other hand, it adjoins the densely packed residential fabric. The 28adjacency of these conditions are self driven but are not utilized architecturally. These interlocking conditions are unique in this context. The two logics are conflicting but it is possible for architecture to offer a unified logic as a new way of understanding this specific fabric.

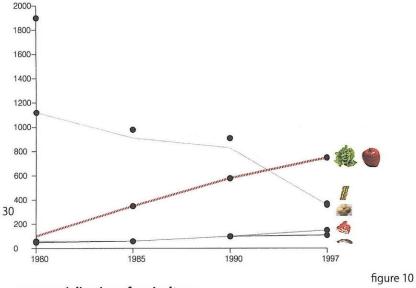


_shrinking economy of Dongguan

figure 9

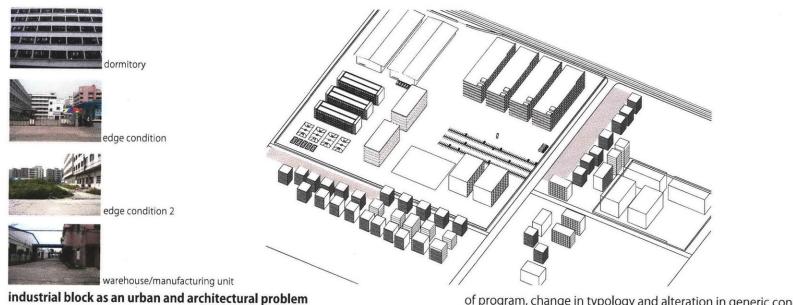
vulnerability to economic hardship

The hit of economic crisis in October 2008 has driven a large number of temporary migrant workers home. The question of the long term sustainability of this rural and urban relationship surfaced amidst economic hardship. In response to it the central government has increased the agricultural subsidies for rural residents in the year 2008 and 2009 in effort to encourage rural residents who were involved in urban activities to return to the agricultural sector. New land laws have also been enacted over the years also sorts to inhibit illegal conversion of farmland into real estate development Dongguan government has last year set out the agricultural protection zones for reinstate the role of agriculture in the economy of the city. **Dongguan is not infrastructurally equipped for returning agricultural employment**.



commercialization of agriculture

The process of industrialization has large impact of traditional agricultural sectors - they are being transformed into highly commercialized industries. The inflow of capital and technology that comes along with industrialization has largely benefited commercial agriculture and contribute to the increase in productivity in fruit growing, fish and livestock rearing. As the figure about shows, the production of fruit and vegetable product has increases while other primary grain production steadily shrink, reflecting industrialization has contributed to the rise of a niche of certain range of agricultural products. Furthermore, industrialization has brought in research such as genetic alteration or fertilizer improvement. With food processing facilities provided to farmers, the extensive farmland in Dongguan has a larger chance to be reclaimed and utilized as a viable economic model



Concluded from the above, this thesis address the industrial block: 1. a building that calls for a sustainable ownership of rural construction land

2. as an entity that complies with the dual logic of road infrastructure and dwelling pattern.

3. as a new food processing facility in enabling the return of agricultural employment of rural residents

The simultaneous happenings of various rural processes and the implementation of infrastructural development has given two entirely different edge of most built forms in the region. The conflicts of multiple urban processes call for a production facility that is more socially responsible and economically sustaining. The new given condition calls for a production facility that functions radically different than a generic manufacturing plant. The hybrid of program, change in typology and alteration in generic conditions will allow the building to address on an urban scale, small scale interstitial space between buildings.

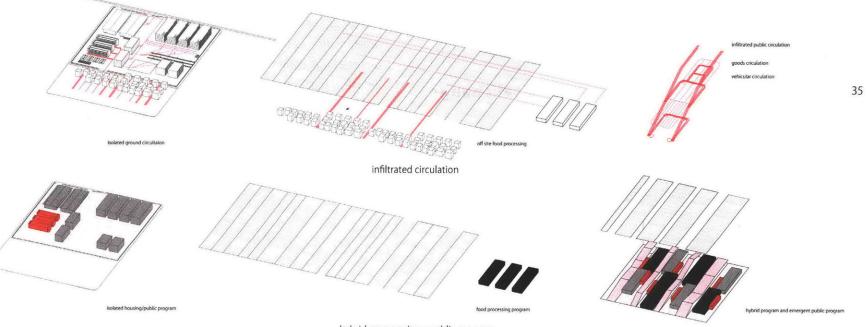
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4 | the design problem

economic change initiated by architectural condition

Industrial infrastructure can facilitate small scale farming and export of extra food product as a form of emancipation of farmers. Farming program can distribute across the industrial estate and alter the working environment of a factory. The hybrid model involves larger logistic and farming landscape with discrete scales of program sandwiched in between. More public programs are created as different circulation and programs are brought into a closer relationship.

_hybrid production program

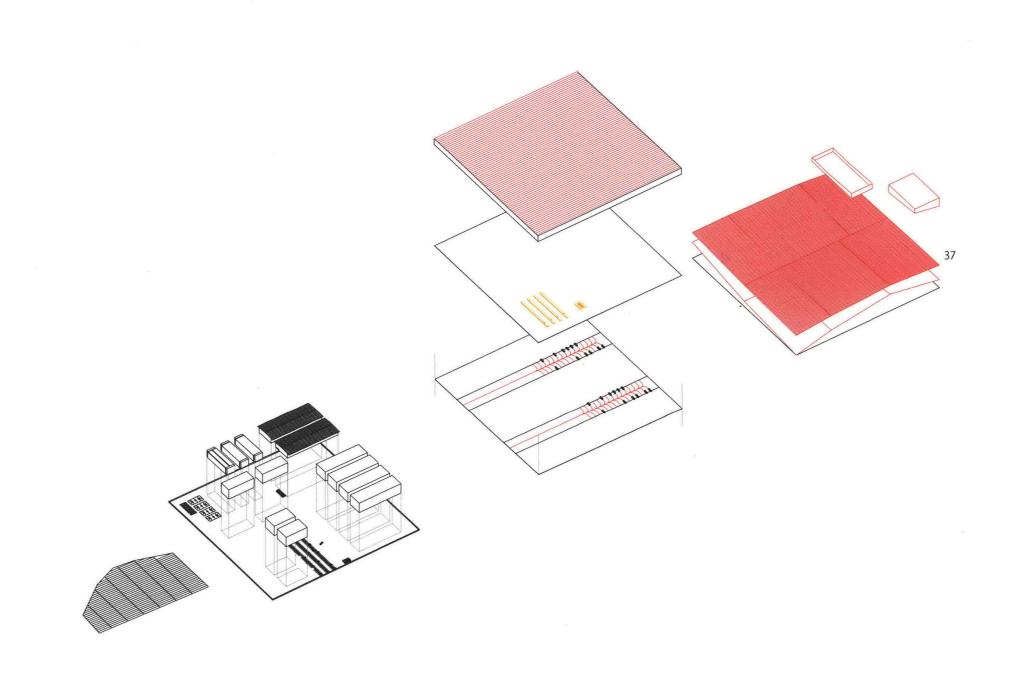


hybrid program/new public program

a typological change

The programmatic requirement of a hybrid production facility is radically different. Rather than autonomous blocks on a gated ground, agriculture requires a large continuous surface which would potentially the way in which industrial blocks operate. In return, segmentation of a continuous farm surface may be brought about by the way in which manufacturing operates.

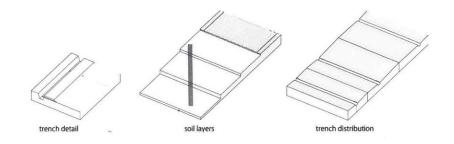
_a typological change

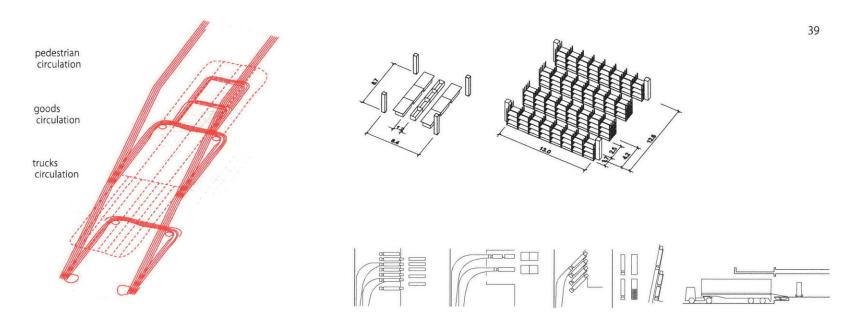


designing architectural generics

The form of industrial blocks are determined by the stringent requirement of machine placement and organization of production line. They can be strategically combined and a new unifying logic can be defined for a hybrid production program.

_designing architectural generics





5 | proposal

_designing architectural generics

the urban generics

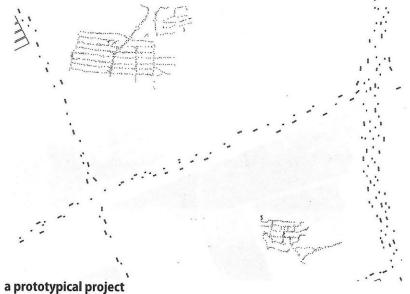
The unique conditions of spatial adjacency between industry, housing and agriculture and created by specific urban processes. Industrial estates has a generic condition in its relation to the surrounding. The industrial estates are enclosed cells in which are aggregation of small blocks, with a common ground as a continuous extension of the transportation corridor. On the other edge it is in adjacency to dwelling patterns which contains program associated with everyday living. The distinct organizational difference of these systems results in numerous undefined and under utilized interstitial space.

The conflict of these two distinct organizational difference can be mediate through manipulating the inherent logics and bring adjacencies between them. An industrial estate is an architectural typology that lies within an overlapping zones of these two systems. The principal organization of these systems are determined by stringent logic of how trucks gets around and deliver materials, how materials move along the production line and how people circulate around in workspace as well as collective program has drastically different logics. They are conditions that a standard production process is subscribed to, and often dominated by a call for efficiency. A response to this critical urban problem is altering these inherit logics and the relationship between several sets of logics. Access of agricultural products to the site where food manufacturing facilities are located, access of trucks and pedestrian are reconfigured and formalized.

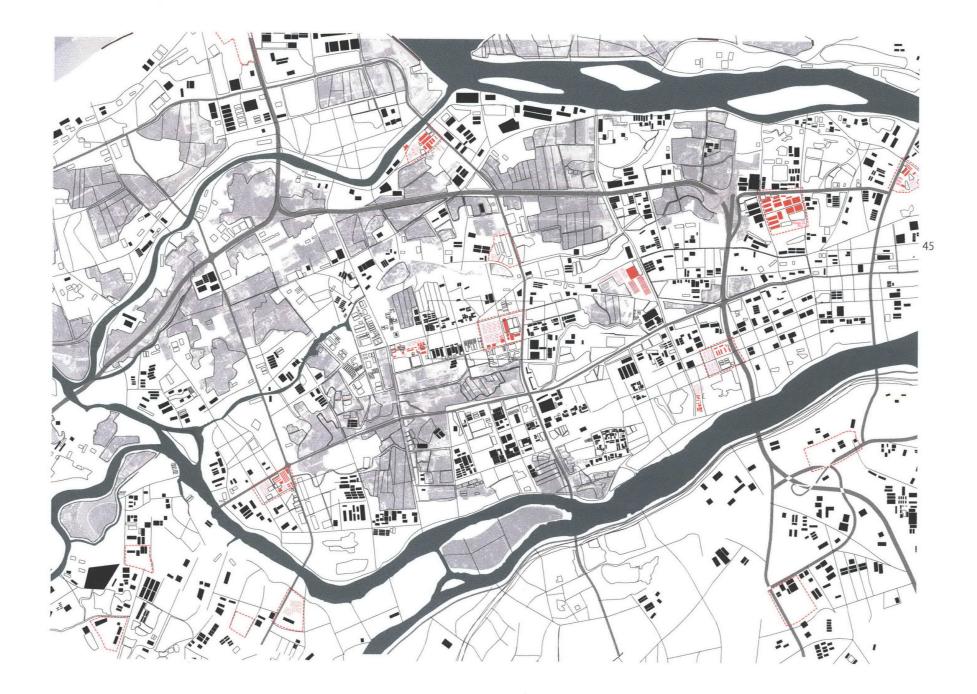


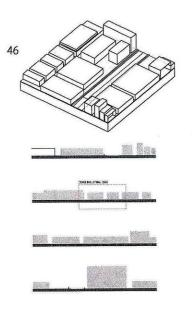


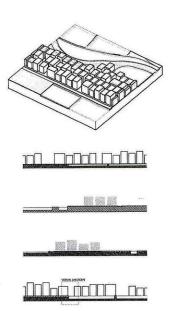




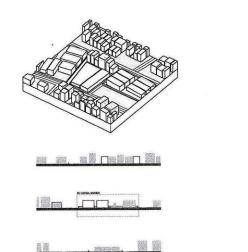
The manner in which the underlying logics of an urban environment can be implemented in similar conditions across the site as a prototypical project.



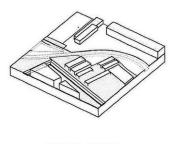


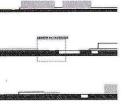


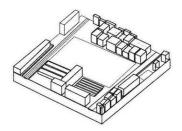
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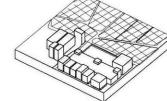
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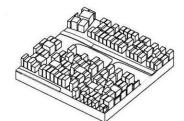
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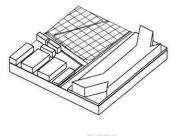
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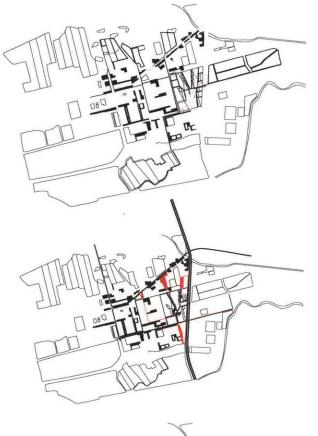


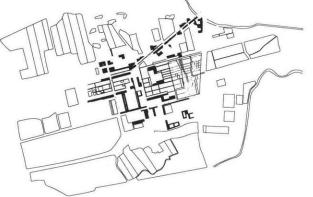
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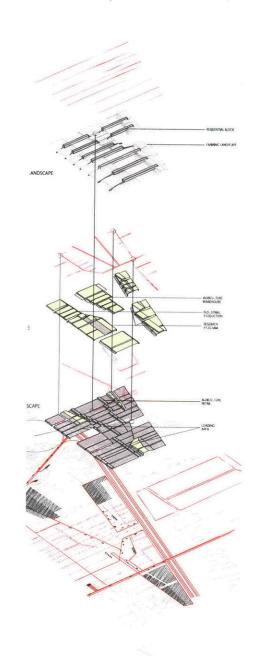


design test 1: altering organizational logics

Adjacency of circulatory systems while maintaining the distinct conditions of each one.









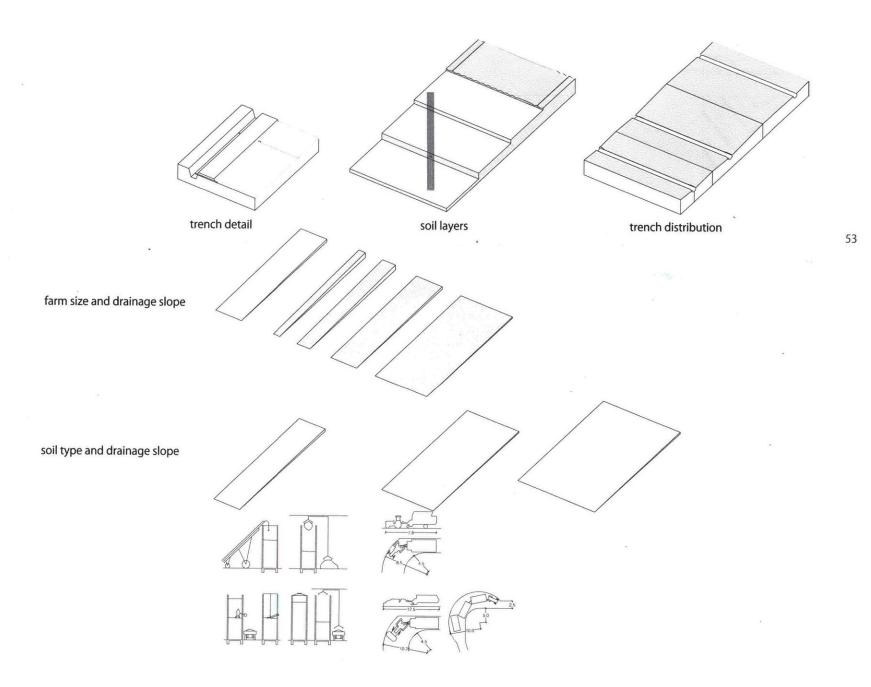


design parameters.

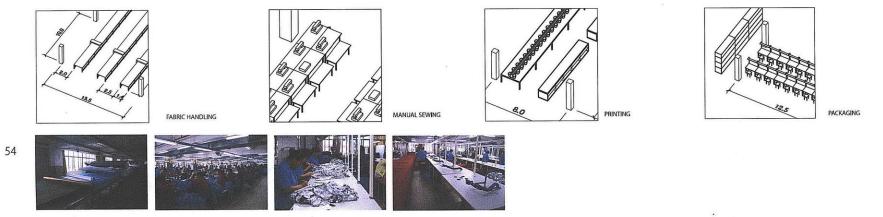
farming parameter

Drainage, soil content, grain storage and farming vehicles are taken as

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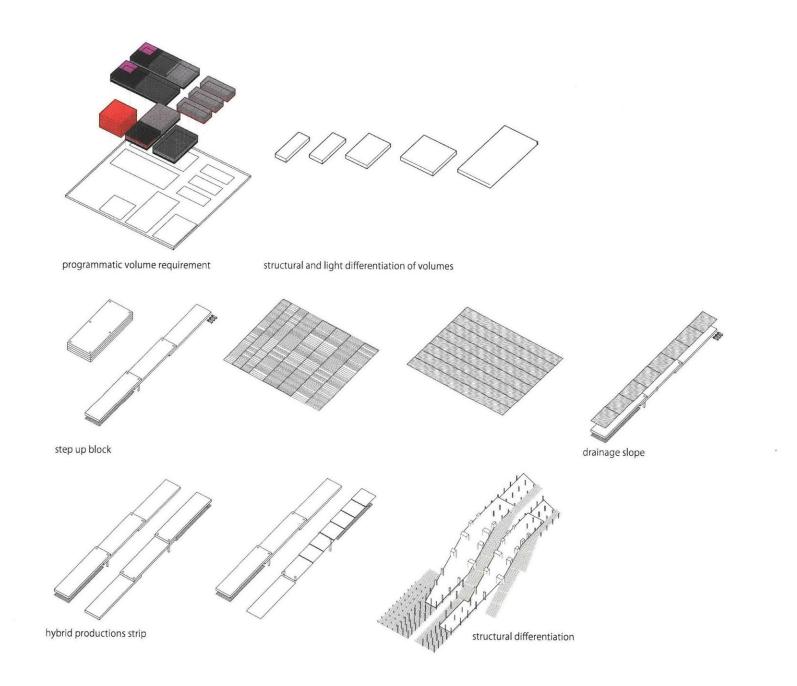


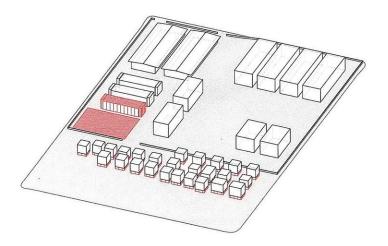
programmatic generics/ manufacturing components and process



programmatic parameter

Instead of combining blocks purely based on programmatic volume, the structure and lighting requirement of each program are differentiated and redistributed. The large surface requirement of farmland alter the block form of a factory drastically, though keeping possible vertical goods circulation. It is a dense packing of two distint production cycles.

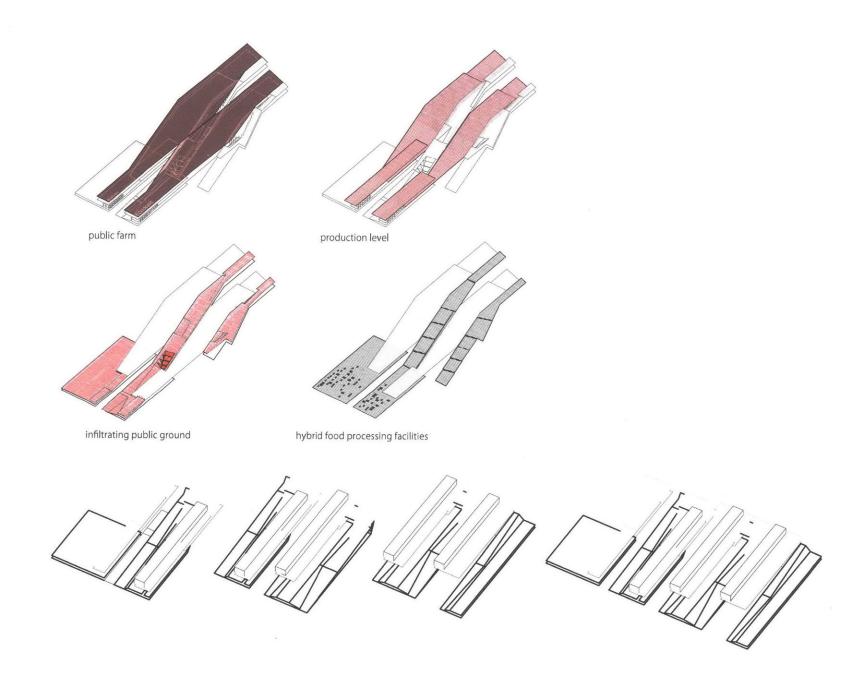


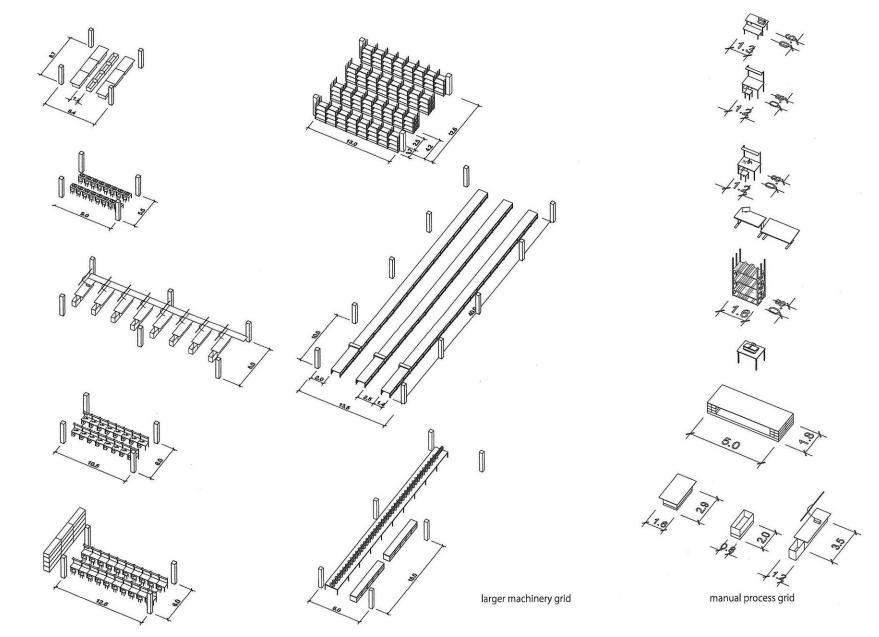


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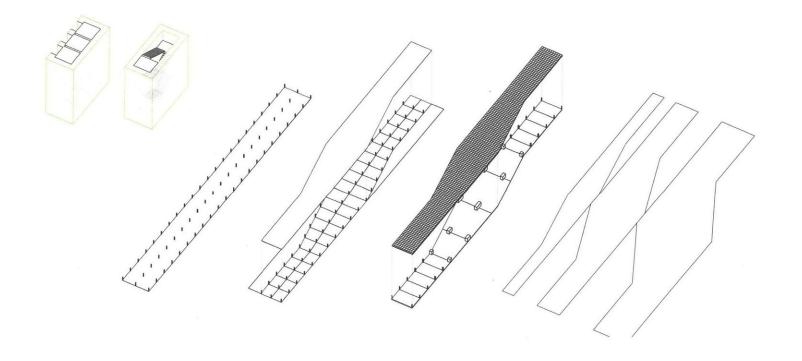
Originally concentrated on the ground floor of the street and within the dormitory and community building within an industrial complex, public program are brought in at where different programs overlap and intersect.

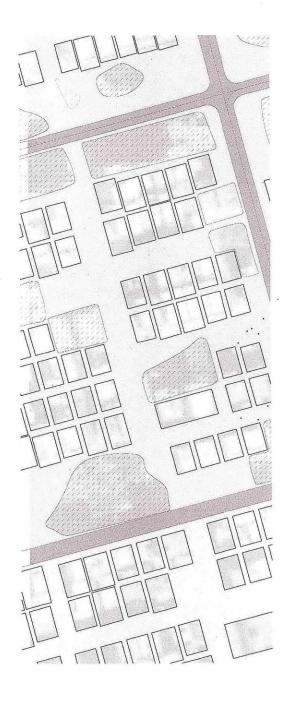
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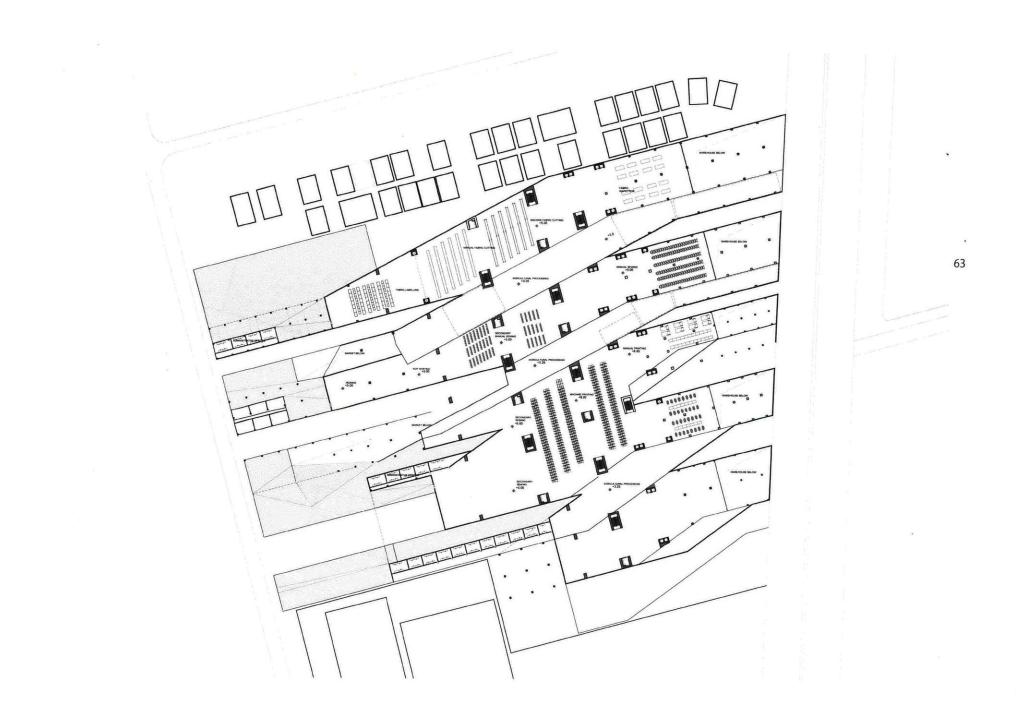
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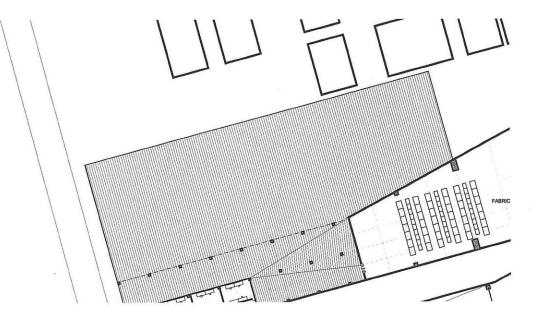
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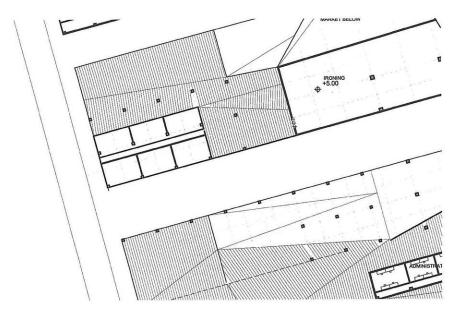
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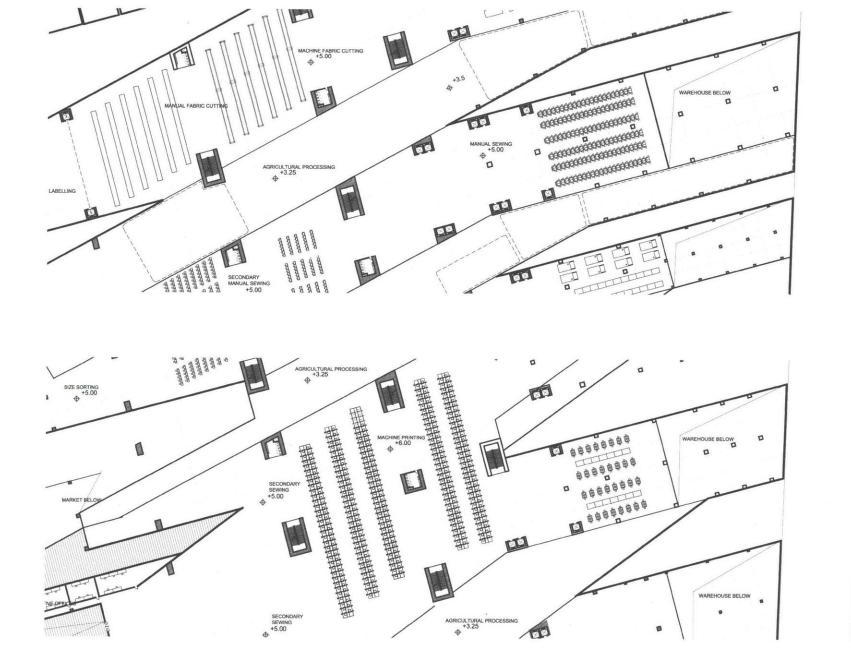
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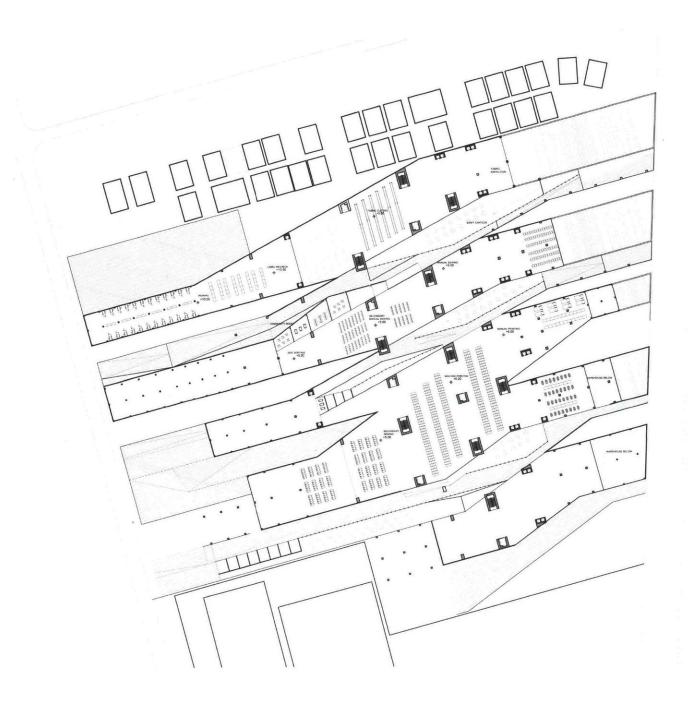


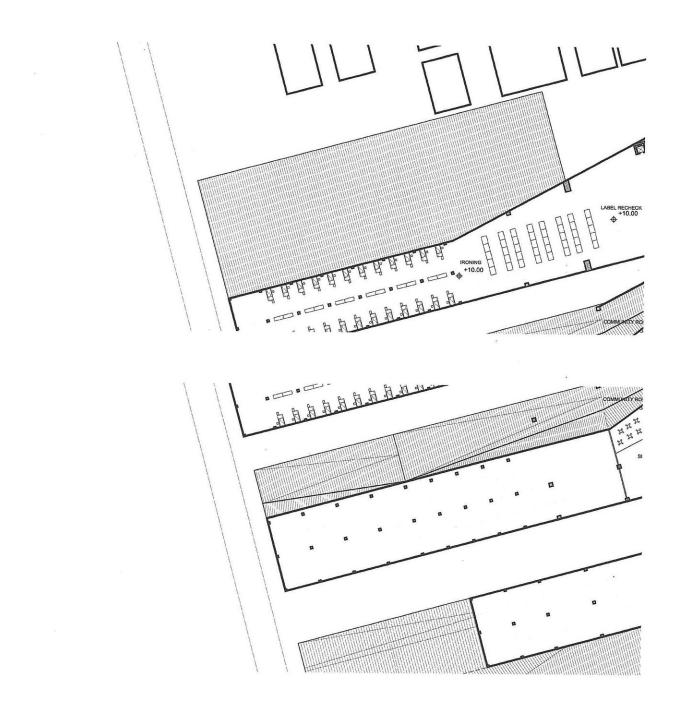




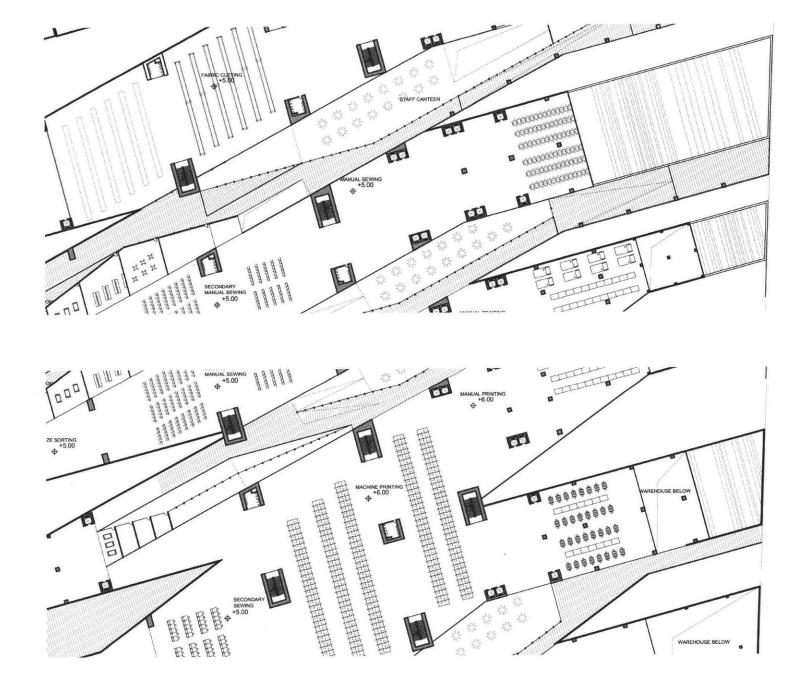


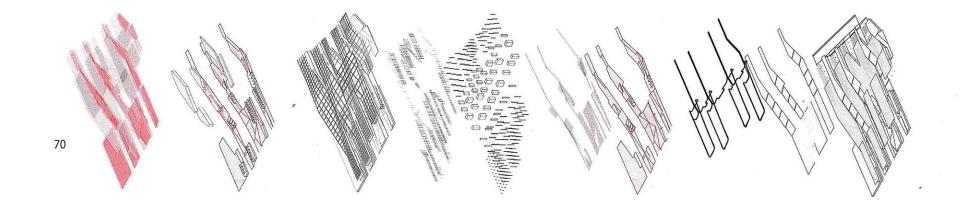




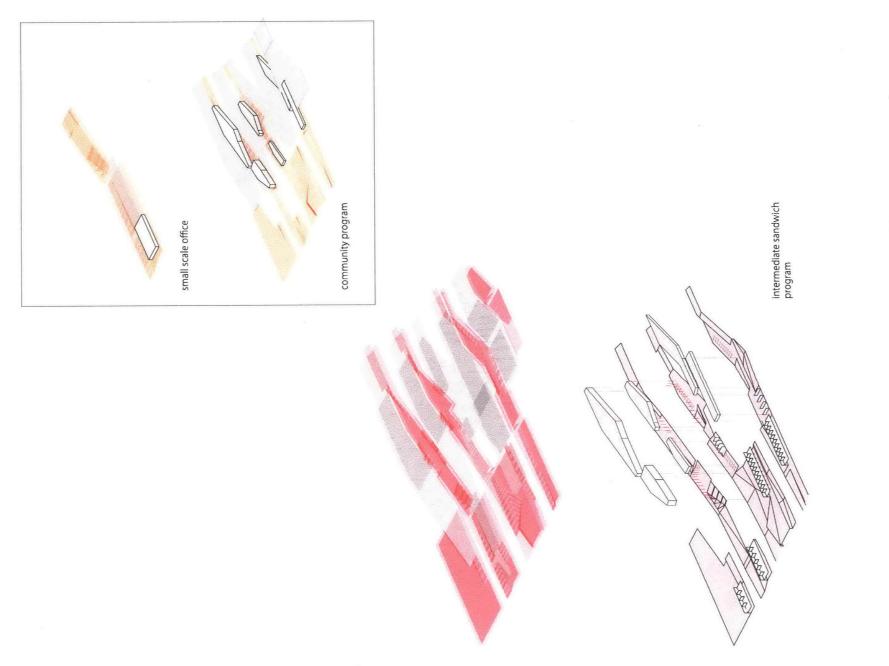


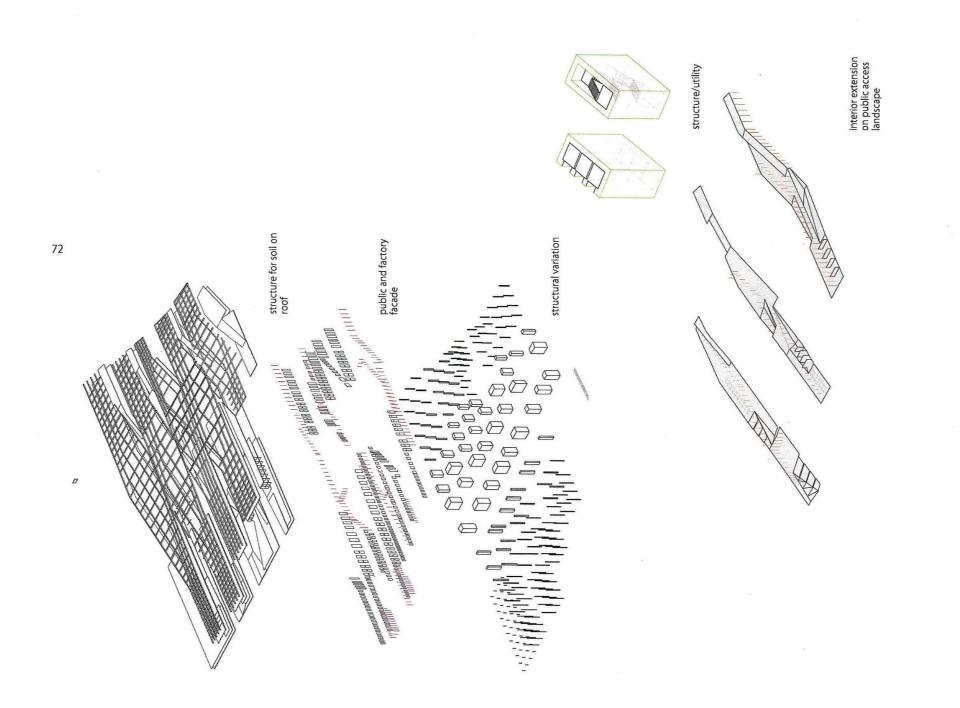
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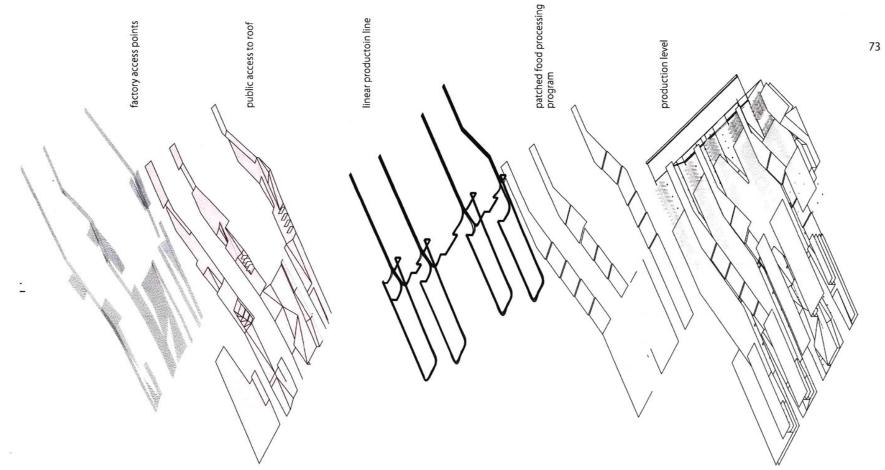




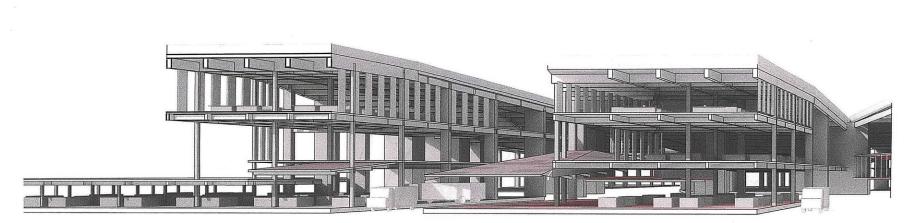
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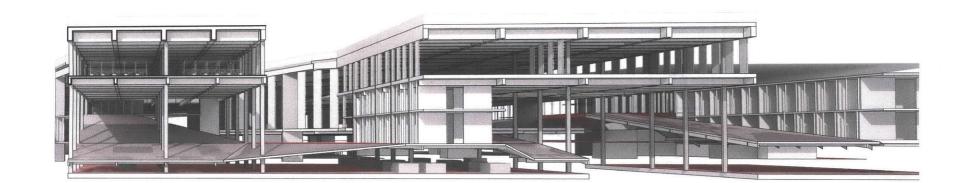


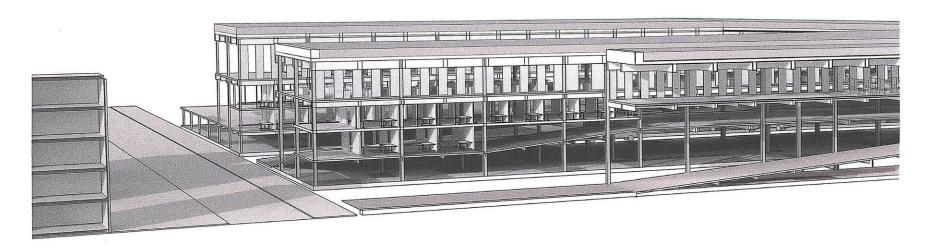


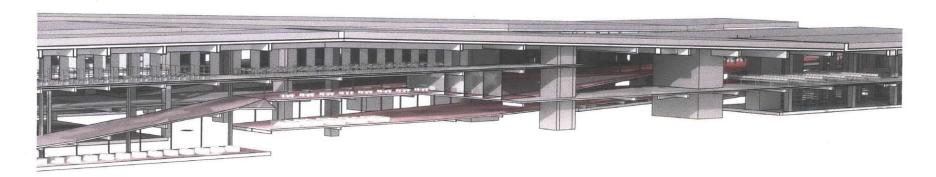


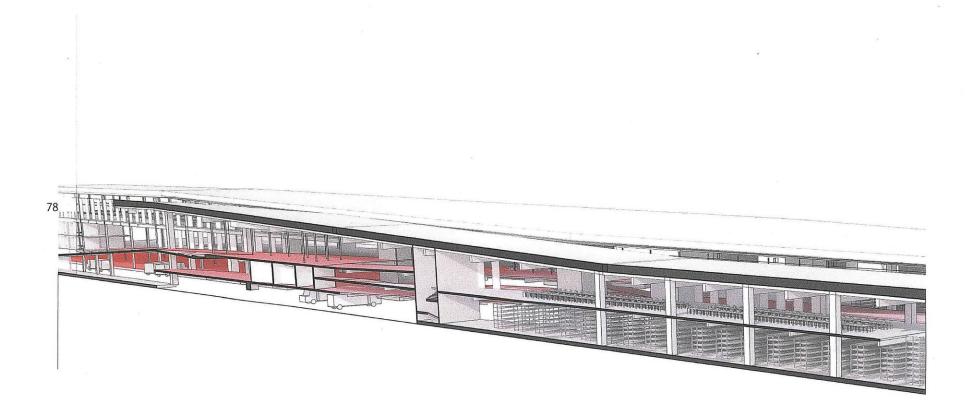
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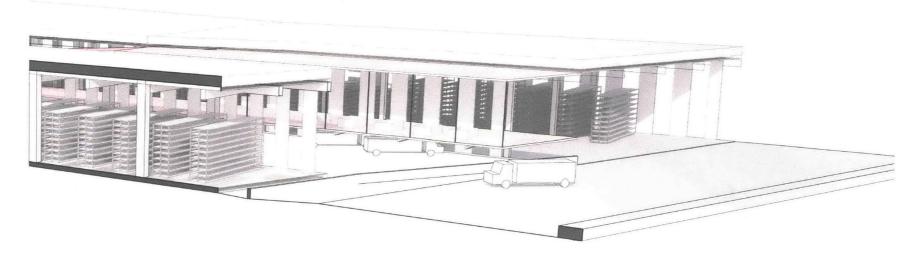


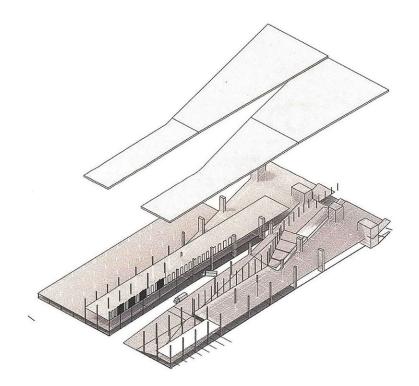


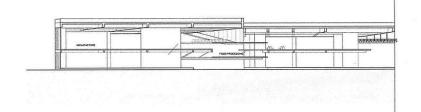


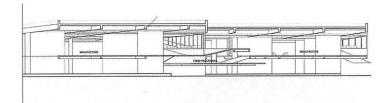


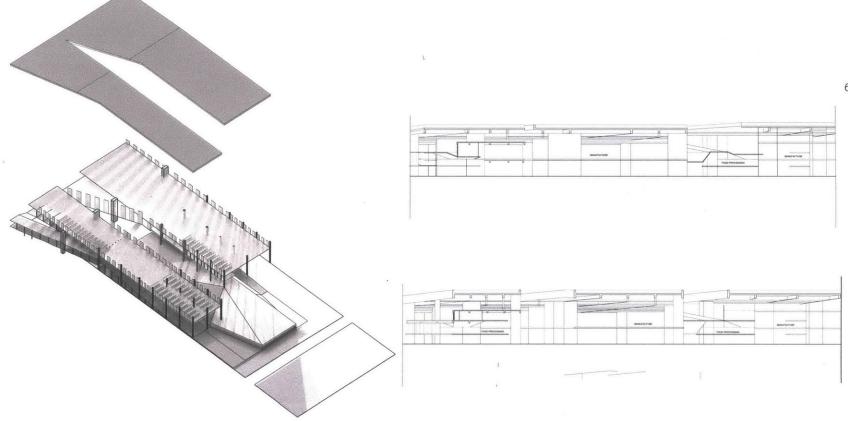












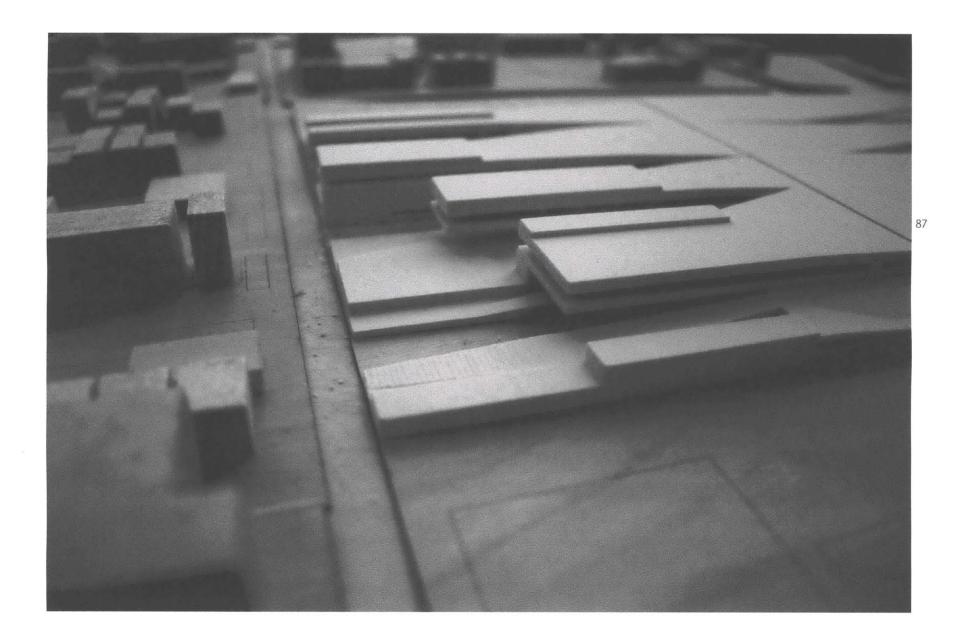


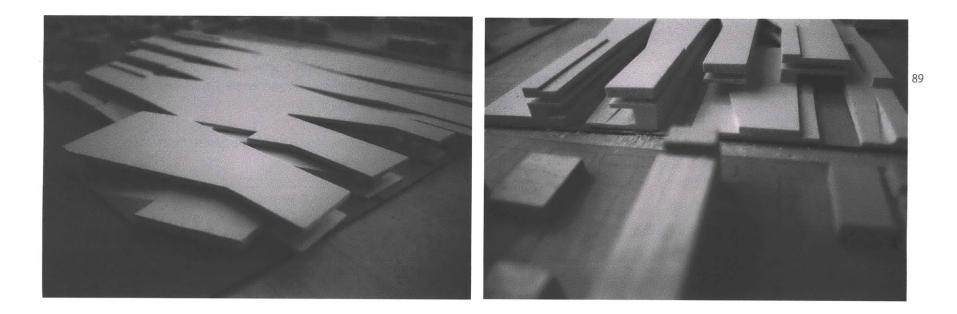












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