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NEVER-LAND

XIAOYAN DONG

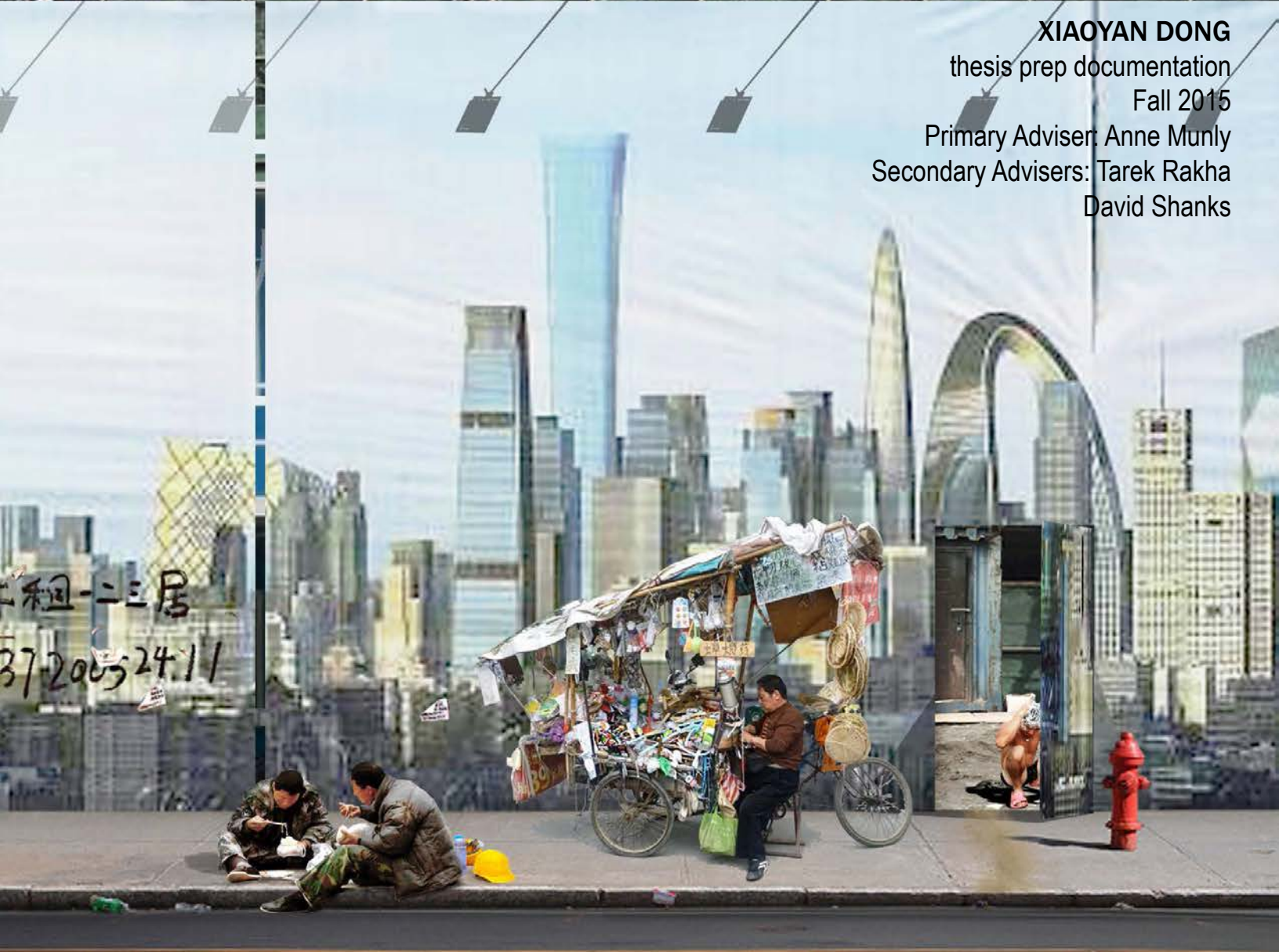
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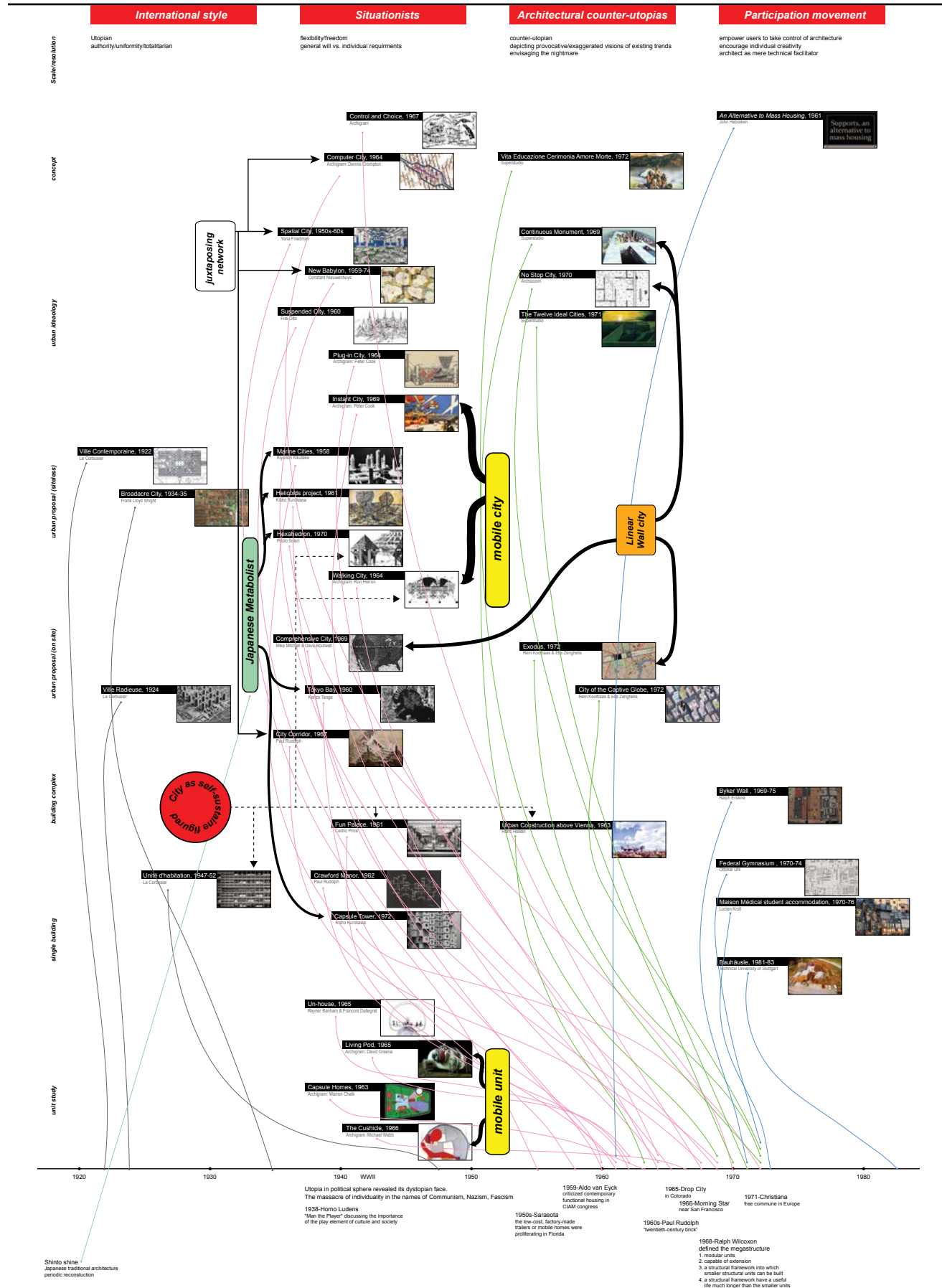
Fall 2015

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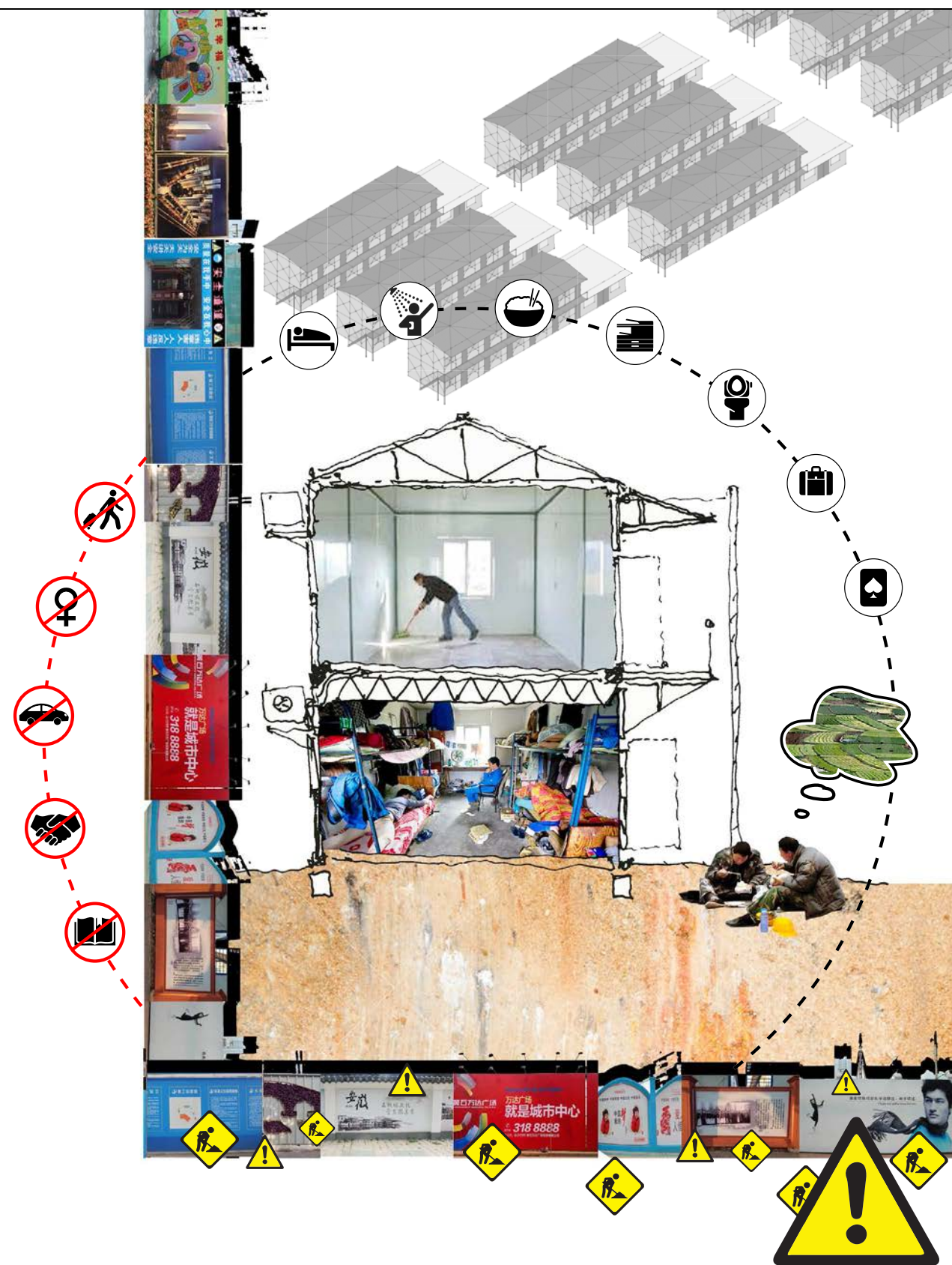


Ever since 1960s, European situationist and Japanese metabolist architects constantly reject the uniformity and totalitarian of modern architecture/urban design, seeking parasitic and dynamic approaches to post-war urbanization. Projects such as the Plug-In City and the Tokyo Bay dream of alternative urban scenarios by reversing traditional perceptions of infrastructure's role in the city, combining architecture, technology and society together. However, these megastructure projects not only neglect the existing urban context but also lack political and economic driving force. As a result, they are considered utopian by many contemporary critics.

Fifty years later in China, fast urbanization process creates problems for both cities and people live in them. On one hand, massive construction sites create urban voids, disrupting the city's identity. On the other hand, migrant workers get excluded from city's social life, living a dystopian lifestyle. However, China's centralized government and booming construction market provide strong political and economic support for a revolutionary urban experimentation, while the omnipresent construction sites and migrant workers offer appropriate location, labor and social requirement for an alternative architectural implementation. It is time to have a retrospective view at the idea of parasitic urbanism back in the 60s, readjusting it and applying it to current situation in China.

Contention:

“By utilizing construction site as a catalyst, the urbanization process in China can be a parasitic and accumulative progress. Thus, the growth of a city and the citizenization of its migrant workers can happen simultaneously.”



Title:

Neverland-a parasitic and accumulative approach to urbanization in China

Statement:

The thesis re-imagines the operation and impact of construction sites under fast urbanization in China, by studying the live + work practices of migrant construction workers. The thesis criticizes the existing introverted “Wall + Hut” construction paradigm, proposing an adaptable architectural structure around construction sites, which provides spatially an alternative urban nomad lifestyle for Chinese construction workers, and in return reconstruct the urban experience in China based on the increasing demand for migrant-dwellings and omnipresent construction sites.

Problem:

Current operation on urban construction sites in China is problematic. On one hand, the “walled-in” construction mechanism constraints the living and working activities of migrant workers, isolating them from the rest of the city. Thus, physical isolation intensifies social segregation. On the other hand, the dismantlable temporary hut provides constant low-quality dwelling experience. Workers’ capital accumulation never result in physical improvement. Thus, migrant workers have no sense of ownership/citizenship.

Opportunity:

The omnipresent construction sites have positive impacts on the city. On one hand, workers’ living needs stimulate spontaneous business actions next to the fencing walls, which result in a diverse vernacular streetscape. On the other hand, workers create an invisible network based on recreational programs and existing infrastructures, which potentially can link migrant workers to the larger plurality of a city’s social life.

Architectural Claim:

Fencing walls around construction sites should be inhabitable to both maximize workers’ interaction with the city and preserve the diverse vernacular streetscape. Workers’ dwelling should be adaptable so that migrant workers’ citizenization can be a parasitic and accumulative process.

Strategic proposal:

A pre-fabricated structure is assembled on site where the fencing wall originally locates. Then, modulated dwelling units can be plugged-in to the structure. The units are owned by migrant workers either individually or collectively. After construction, the structure remains on the site for future social housing plug-ins while the units can be transported to new construction sites. Units are mass customized so that they can be accumulated and reconfigured according to the wealth and needs of their owners.

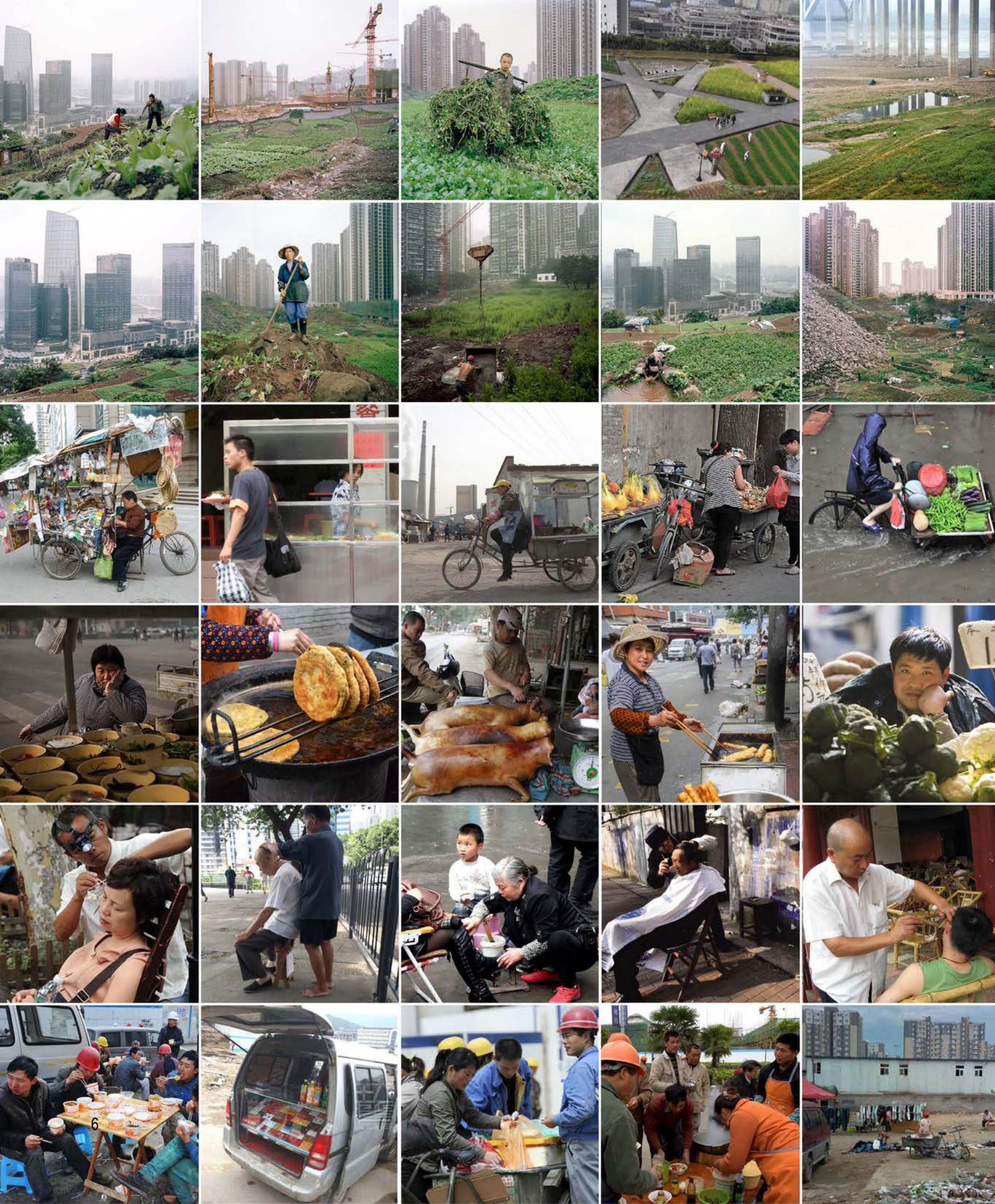


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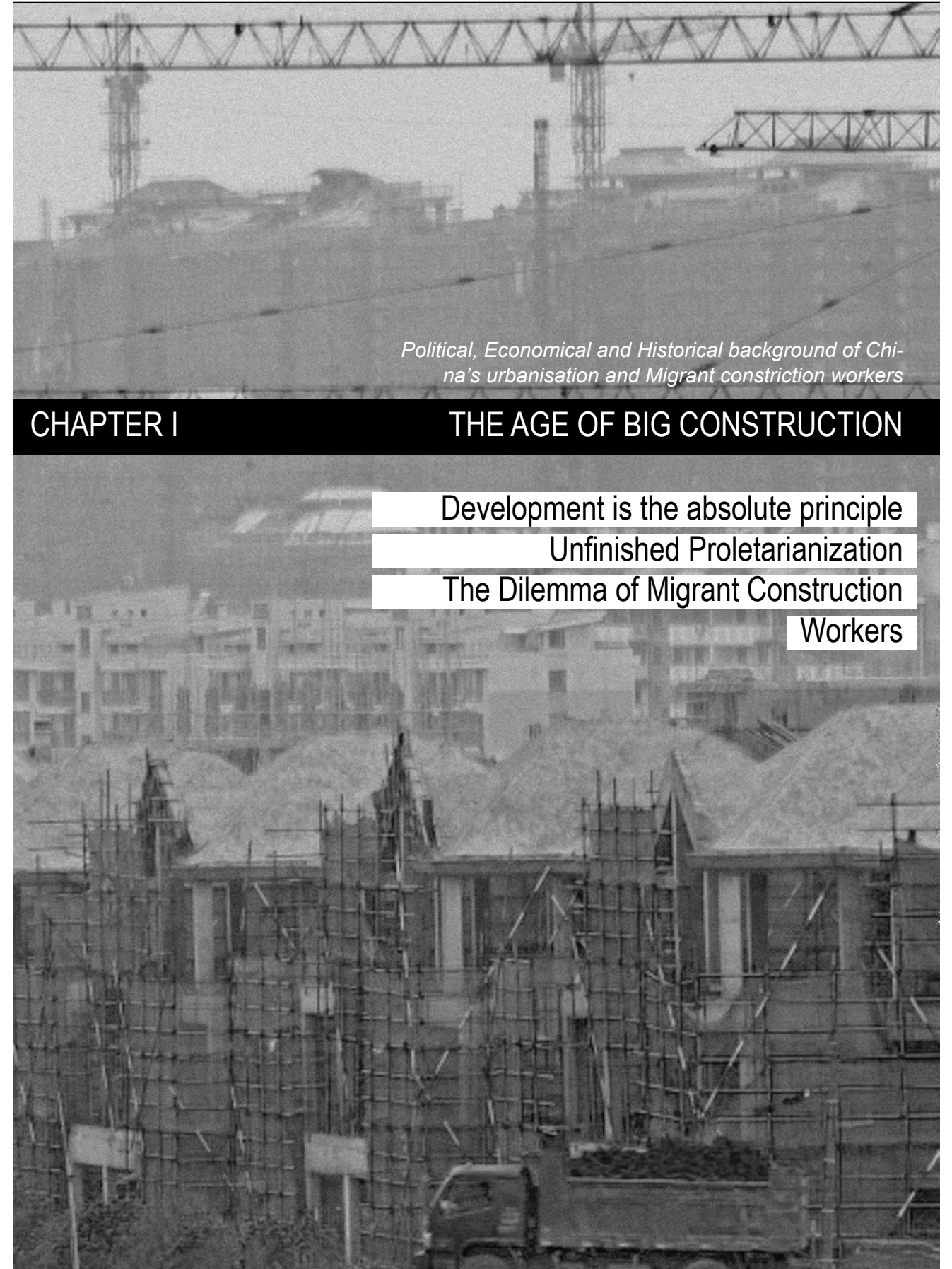
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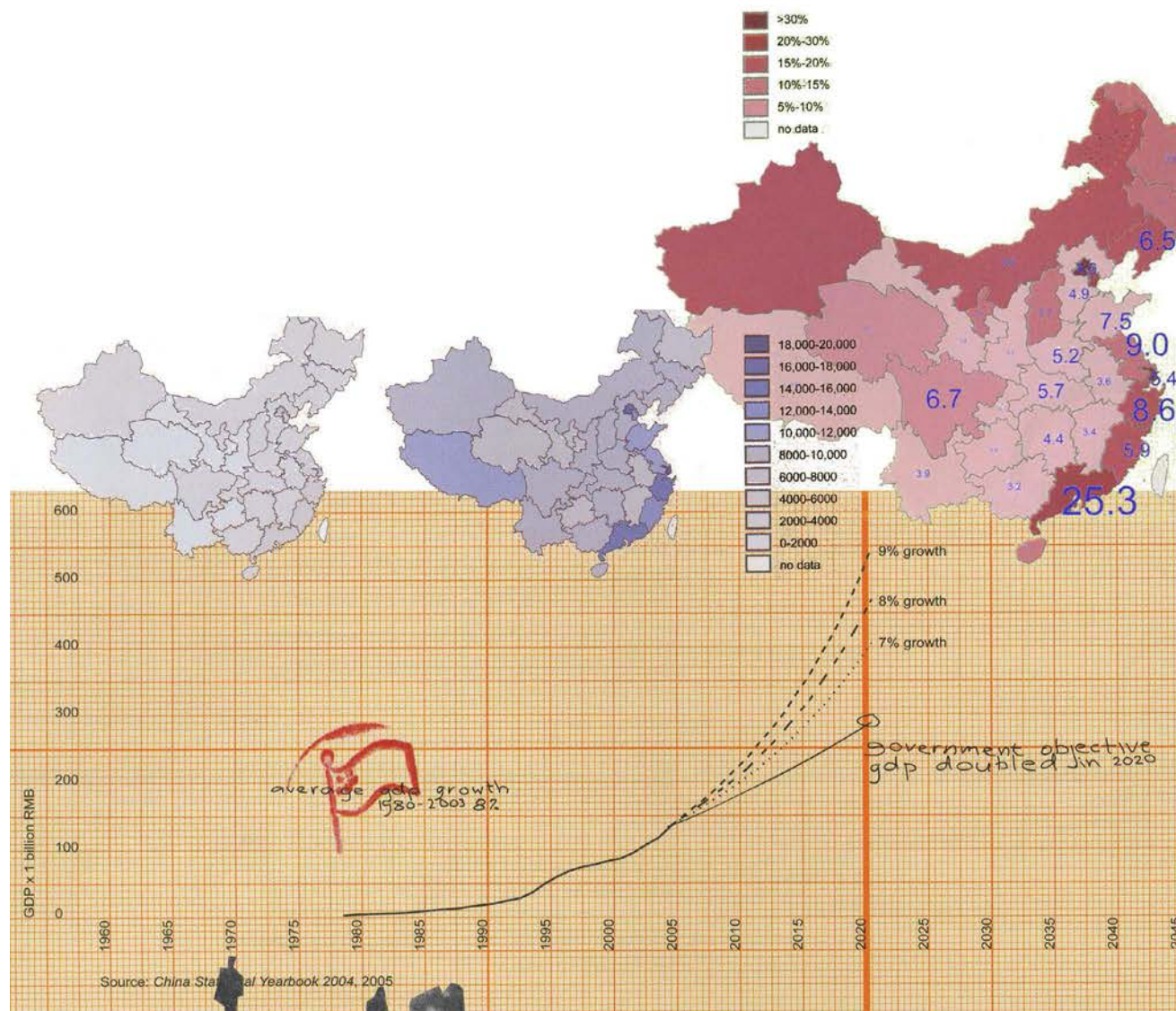
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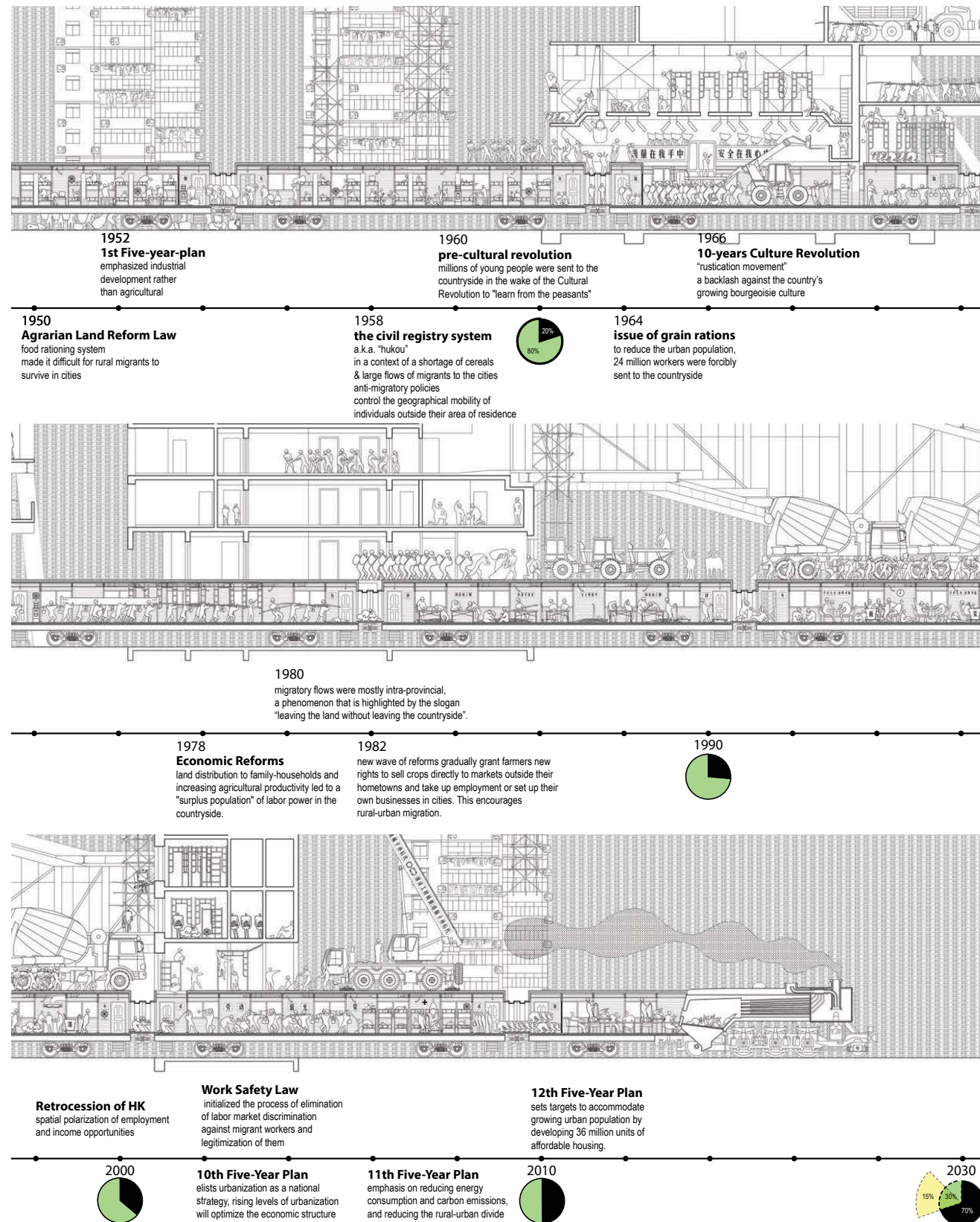
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The journey from farm to city is the story of China's transformation from a poor under developed country to an economic superpower. The driving force behind the biggest migration in history is economic: workers who migrate to the city earn far more than those who stay on the farm. The twin processes of urbanization and industrialization also bring huge productivity gains for the national economy—moving hundreds of millions of people out of economically insignificant jobs on the land, and into factories and onto building sites in the city, produces enormous economic growth. Mass migration to the cities makes sense both for individual farmers and for the country as a whole. Historical experience, economic logic and government policy all point to the same conclusion: **by 2030, one billion (70%) Chinese will live in cities.**

Urbanization has brought enormous wealth, but the millions of rural migrants who work on building sites, serve in restaurants and rub flesh in massage parlors remain poor. Many new arrivals from the rural counties that surround the metropolis struggle to scratch a living.



Since 1978's economic reformations, China abandons its previous "planned economics system" and regards the concept of public and centralized ownership as "far left" and problematic during the age of "great leap". Therefore a brand new economic system is desired. The state government seeks help from contemporary neoliberalism in the US, considering "market economy" as the final cure.

The economic reformation starts from the countryside. Former "people's communes" are disbanded, instead "household contract responsibility system" is created to stimulate agricultural production. Within a few years, living quality in rural areas improved significantly. However, agricultural productivity based on small family business can no longer sustain the growing demand of peasant workers. As a result, a large number of "surplus labor forces" moves into cities, seeking for work and better living quality.

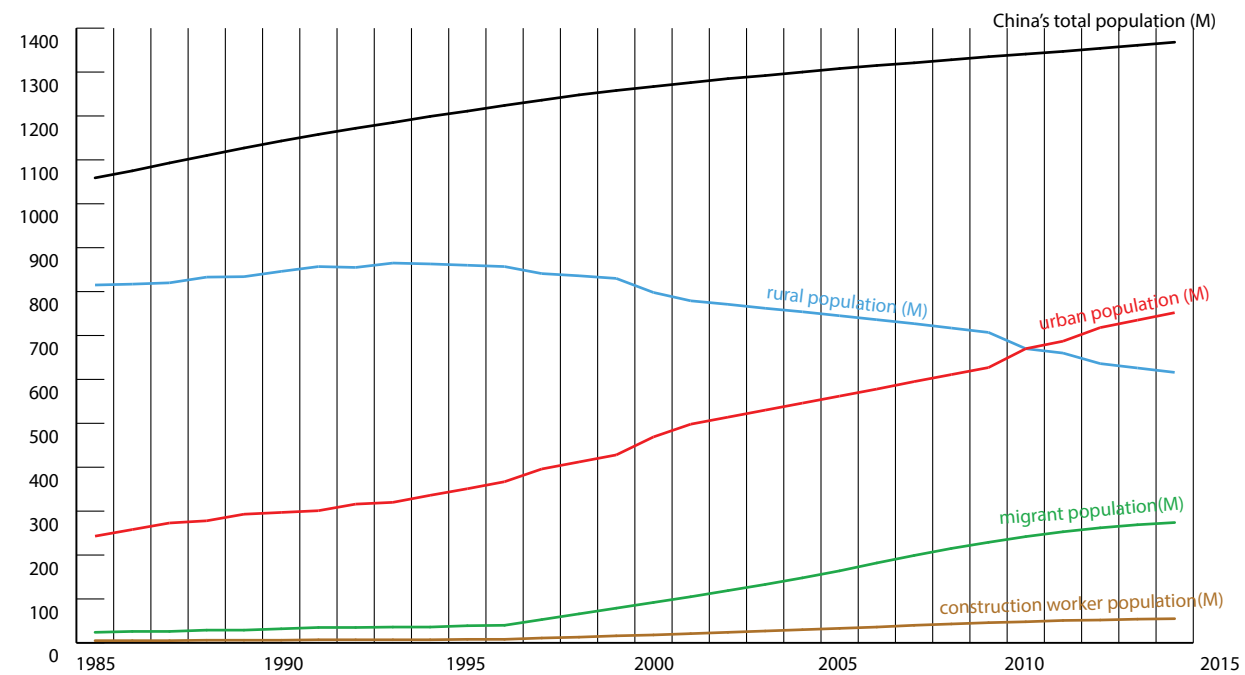
Since early 1980s, the focus of economic reforms shifts gradually into the city. Subcontracting system is encouraged in industrial and constructional productions. While private-owned companies are supported by the provincial government. The policy shift results in great lay-off for workers in state-owned enterprises, booming of private enterprises and flooding of peasant workers into the city.

The difference in rural and urban economic reforms results in greater gap between the two areas. On one hand, more and more peasant workers are forced into cities to find more profitable jobs, becoming the majority of city labor market. On the other hand, the state government sticks to the old civil registry system to control the geographical mobility of individual, creating a dilemma for the "migrant workers".

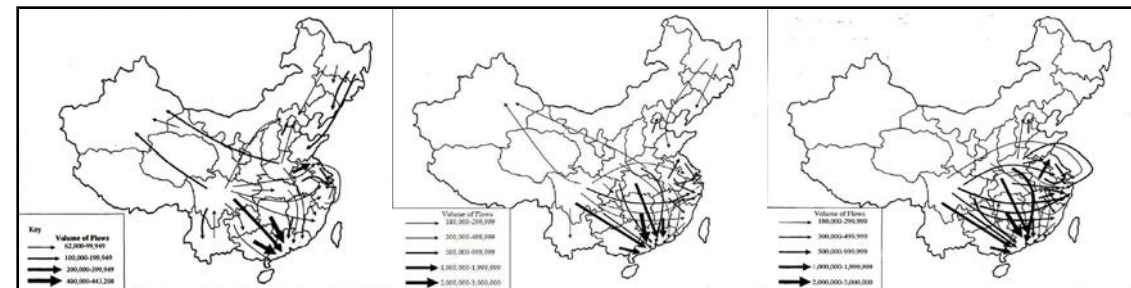


Television Advertisement in China in the 90s.
Urban lifestyle is sold as a whole package, where the industrial product acts as only the messenger.

In today's consumer society, the desire of individual is inspired like never before. Neoliberalism economists rationalize it by the concept of consumerism and economic growth. As Deng Xiaoping once claimed "development is the absolute principle", the action of consuming is no longer only a matter of individual, but "encouraging consumerism" becomes a national policy. Therefore City, as the most visual expression of consumerism, is no longer a place, but a symbol of a civilized world, an idea of a better lifestyle, a dream by every migrant workers. City-centered consumerism is not only the impetus of neoliberalism ideology, but also the Zeitgeist that marks the beginning of 21th Century. Mass media projects the vision of the consumer society onto every part of an individual's life. Through newspaper, magazine, television, films, etc., the lifestyle of urban bourgeoisie becomes an ideal thing for the peasants. It is not only imaginable, physical, but also desirable and reachable.



China's total population, rural/urban population, migrant/construction worker population change since 1985
Data source: National Bureau of Statistics of the PRC, 2014



The 30 largest inter-provincial migration flows in China: 1990-1995, 1995-2000, 2000-2005



Household register, a.k.a. "hukou" booklet, indicates each individual's social status, whether s/he's a peasant or citizen.

From Marxist point of view, the phenomenon of great rural-urban migration is an indication of the proletarianization process, where people move from being either an employer, unemployed or self-employed, to being employed as wage labor by an employer. In Marxist theory, proletarianisation is often seen as the most important form of downward social mobility. Labors migrate from rural areas to cities, settling down gradually and creating new communities. Meanwhile, their social nature transforms from peasant to citizen.

As a result of proletarianization, the life of migrant workers solely depends on capital accumulation and commercialization of their labor force. The migrant workers have zero ownership/control over the material, tool or final product of their production, which is fundamentally different from their experience as peasants in the rural area.

What is special in China's proletarianization process is that while a large number of rural labors flow into the urban labor market, adapting themselves into the new surroundings, they are already alienated because of their "peasant" status in the civil registry system (a.k.a. "hukou" system, since 1958). To be more specific, on one hand, the state government allows the peasants to maintain their land for agricultural production, which, however, cannot sustain their living in cities today. On the other hand, it is extremely hard for the migrant workers to gain the "citizen" status, thus they are prevented from the welfare as citizens, making them illegal and unaffordable to live in cities.

As a result of economic needs and historical issues combined, proletarianization of China's migrant workers becomes struggling and endless. Migrant workers are turned into the "floating population". According to the most recent nationwide census (2010) by the National Bureau of Statistics, there are more than 260 million migrant workers "floating" between rural and urban areas. A lot of them have lived and worked in cities for more than ten years, and seldom do any agricultural production. Even though agriculture occupies a tiny portion of their total income, they still cannot get rid of their "peasant" status and find a home in the cities. They are abandoned by both city and country.



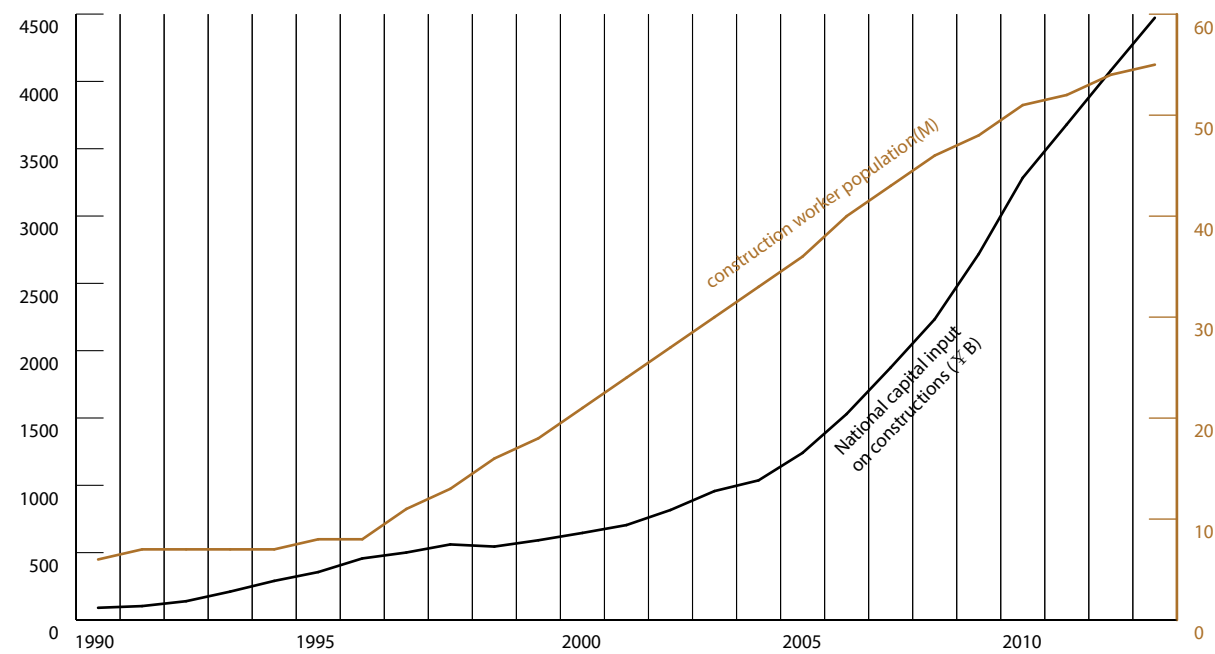
In Europe, compact urban growth took place in the nineteenth century, stretching through the twentieth century. As a result, a city-country continuum emerged, both urban and rural, but neither simply the one nor the other. Thomas Sieverts proposed “Zwischenstadt (the city inbetween)” for characterizing this spatial phenomenon.

While in the US, Americans developed the archetype of suburban houses, which is low in density, with generous lot sizes and detached single-family homes.

However, China’s urban development generates high density neighborhoods (“superblock”, Campanella 2008) that pushes the city borders towards the outside, into the agrarian landscape. Instead of a smooth adaptation in the suburb, Chinese migrant workers are forced into the heart of metropolis.

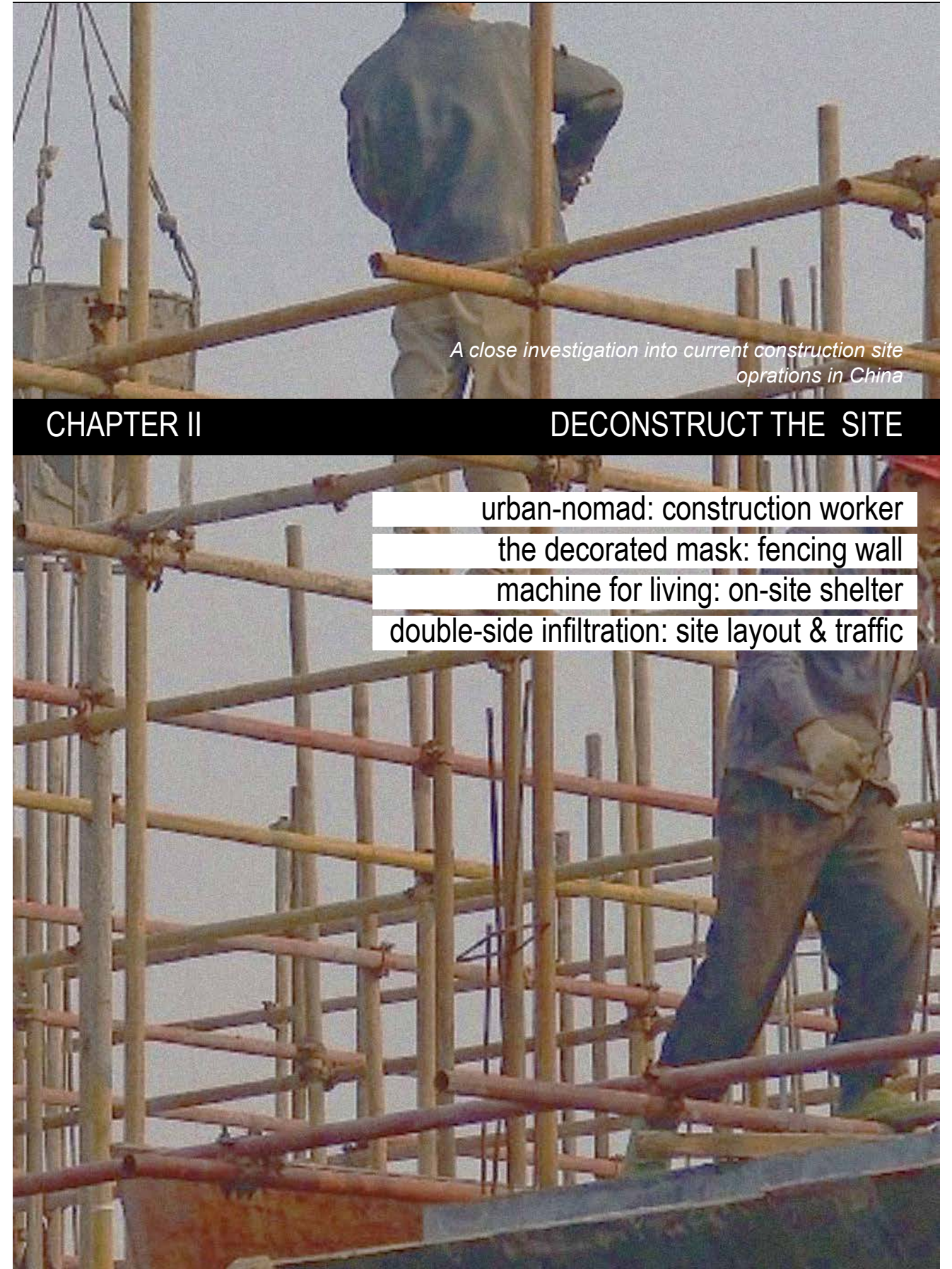
The abrupt context shift causes huge social maladjustment. Peasant migrants who cannot adapt into urban lifestyle immediately continue their routine of rural life. As a result the improvisational and spontaneous behavior of peasant migrants create urban-retrogression.

Among all the migrants, construction workers, located at the frontline of urbanization, is the most extreme yet easily forgotten ones. On one hand, being “walled-in” by construction sites, peasant-workers have nearly zero social interaction with the surrounding context, thus have little opportunity for adaptation. On the other hand, abundant in number (53 million, 20% among total migrant), they stimulate great spontaneous business reactions from the city, which, informal and unregulated, degrades the environment around the site.



China's migrant construction worker population and construction capital input change since 1990
 Data source: National Bureau of Statistics of the PRC, 1990-2014

However, the goal of this thesis is not to simply identify the omnipresent active construction sites and workers as the cause of city degradation and then to cure them, but to use those situations as the projective context for a proactive rather than reactive alternative way of city-making, where individual migrant workers are encouraged to create their own community and integrate into the social life of the city. The situation of omnipresent urban construction sites and migrant workers will not go away. Both numbers of migrant construction workers and national capital input on constructions are increasing year by year. The existing paradigm of “fencing wall + temporary shelter” isolates, both physically and socially, the migrant workers from each other and the rest of the city. However, the event of constructing and common needs for living let them congregate together to form a community, while stimulating business reactions from the city. So the question is how can the design of such a site-based community reverse the paradigm and turn the introverted dystopia into a welcoming place of interaction.



A close investigation into current construction site operations in China

CHAPTER II

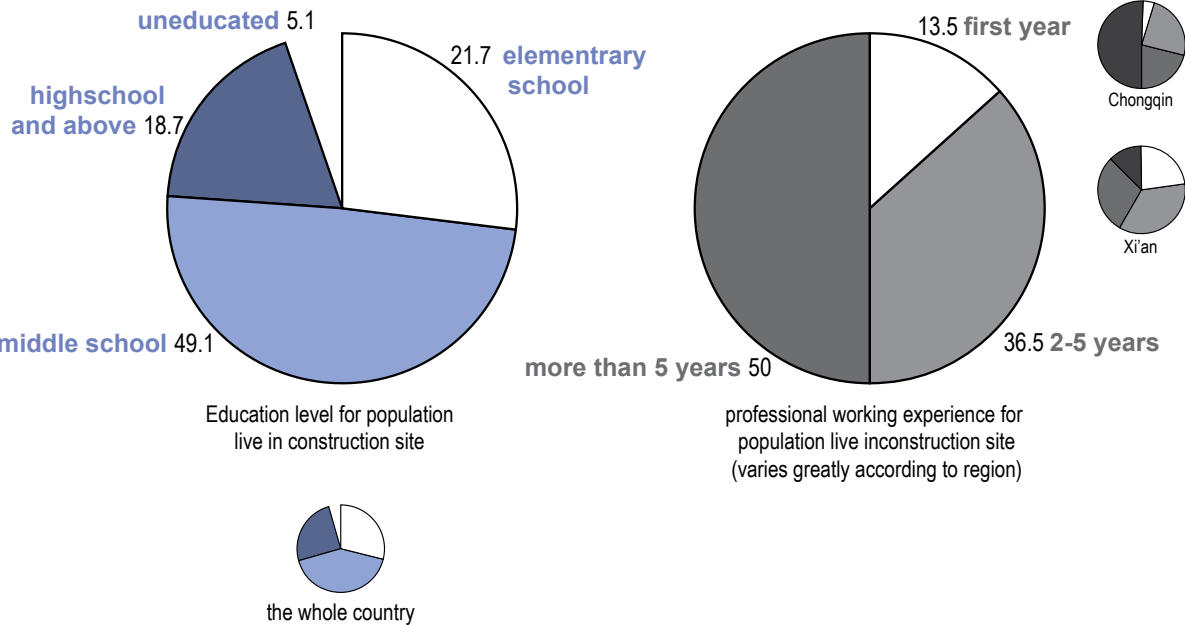
DECONSTRUCT THE SITE

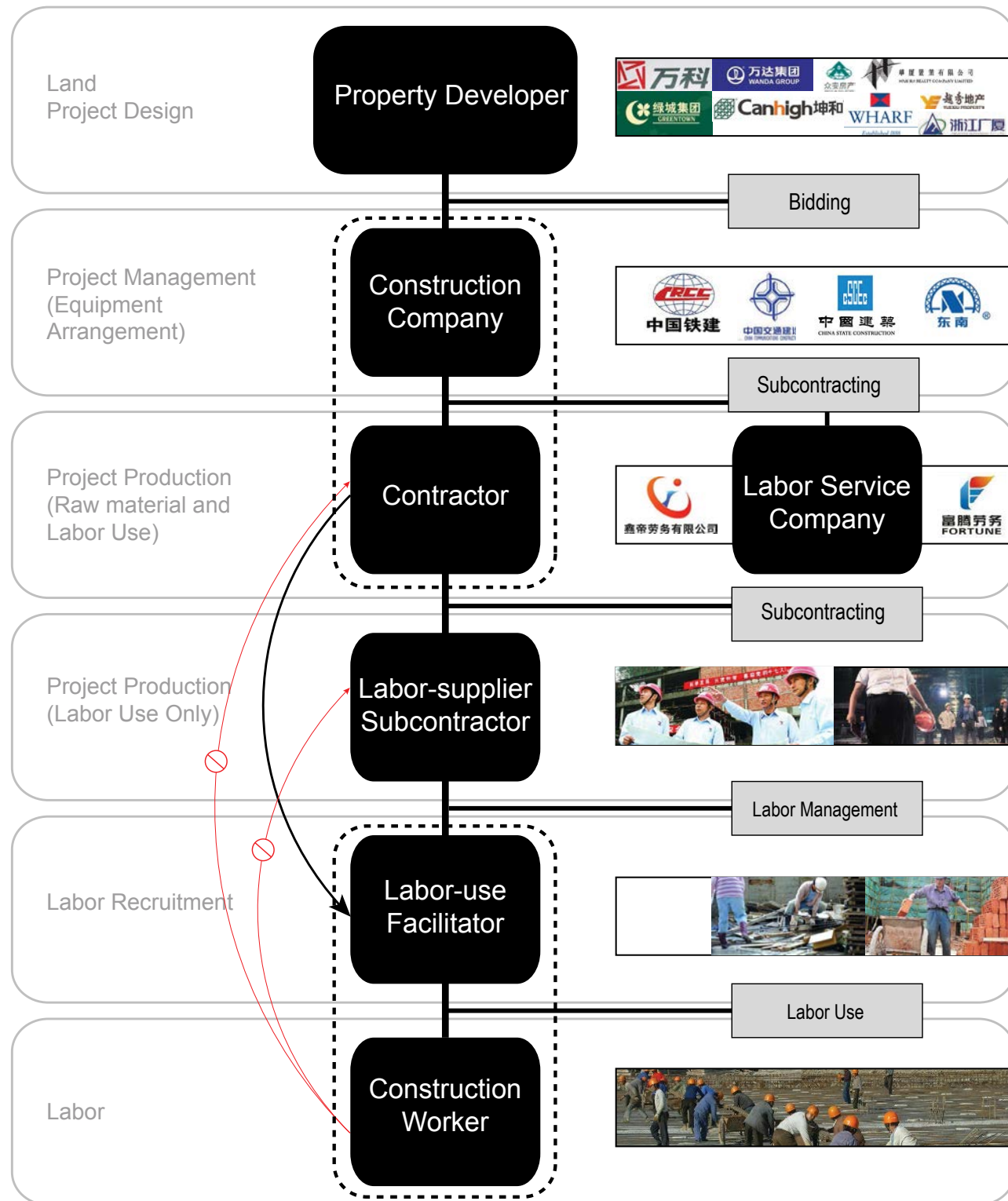
- urban-nomad: construction worker
- the decorated mask: fencing wall
- machine for living: on-site shelter
- double-side infiltration: site layout & traffic



Demographic analysis

The demographic analysis reveals an abnormal social structure within Chinese walled-in construction sites. In these self-contained “urban islands”, more than 90% of the population are males. Among them, 80% are male adults aged from 21 to 50. More than half of the population are professional construction workers with more than 5 years’ experience on site. However, such a group of people are poorly educated, with only 18.7% of the population graduating from high school.





Labor Subcontracting System

Starting from 1984, the State Council issued regulations, "Separation of Management from Field Operations", encouraging general contractors or contracting companies to employ labor subcontractors instead of recruiting construction workers directly as a way to increase efficiency and productivity. These regulations gave birth to a multi-tier labor subcontracting system, characterized by de-linkage of capital from industry, and of management from labor.

The Labor Subcontracting System operates as follows. Property developers (mostly state-owned) plan and finance projects. Top-tier contractors control construction projects through bidding or through their relationships with property developers. Then the top-tier contractors outsource their work to subcontractors. Subcontractors then disperse their work to low-tier labor-supplier subcontractors. Finally low-tier subcontractors recruit construction workers (or sometimes through labor-use facilitators).

Through this linear production chain, top-tier contractors transfer investment risks and labor recruitment to their subcontractors. However, this labor subcontracting system results in huge disconnection in terms of hierarchy. Communication bypassing the immediate leadership is almost impossible. Therefore, labors' voice can't reach far.

		Mediated employment	Embedded employment	Individual employment
Construction workers	number of workers		23.5%	3%
	average working experience	2.5 Years	4 Years	2 Months
	living condition			
Employment	contract	Yes	Yes / No	No
	group size			
	payment	<i>*regulated by large contractors and contracted-labour system</i> <i>*paid by time (Total - upfront cost)</i>	<i>*embedded in and regulated by social networks</i> <i>*paid per job</i>	<i>*individually subordinated to market</i> <i>*paid per piece/end of job</i>
	group bond	<i>*weak, depend on contract</i>	<i>*strong, based on hometown and kinship</i>	<i>*weakest.</i>
	Control mechanism	<i>*limited mobility</i> <i>*fining</i> <i>*in-site hierarchy</i>	<i>*enforceable trust</i> <i>*kinship obligation</i>	<i>*violence</i>
	Labor market	<i>*rural labor market</i>	<i>*rural and urban labor market</i>	
State	Migratory pattern	<i>*permanent temporariness</i>	<i>*sojourner to settler</i>	<i>*floaters</i>
	Vulnerability	<i>*"invisible" to state</i> <i>*vulnerable in relation to employer</i>	<i>*vulnerable via state</i>	<i>*extramly vulnerable</i>

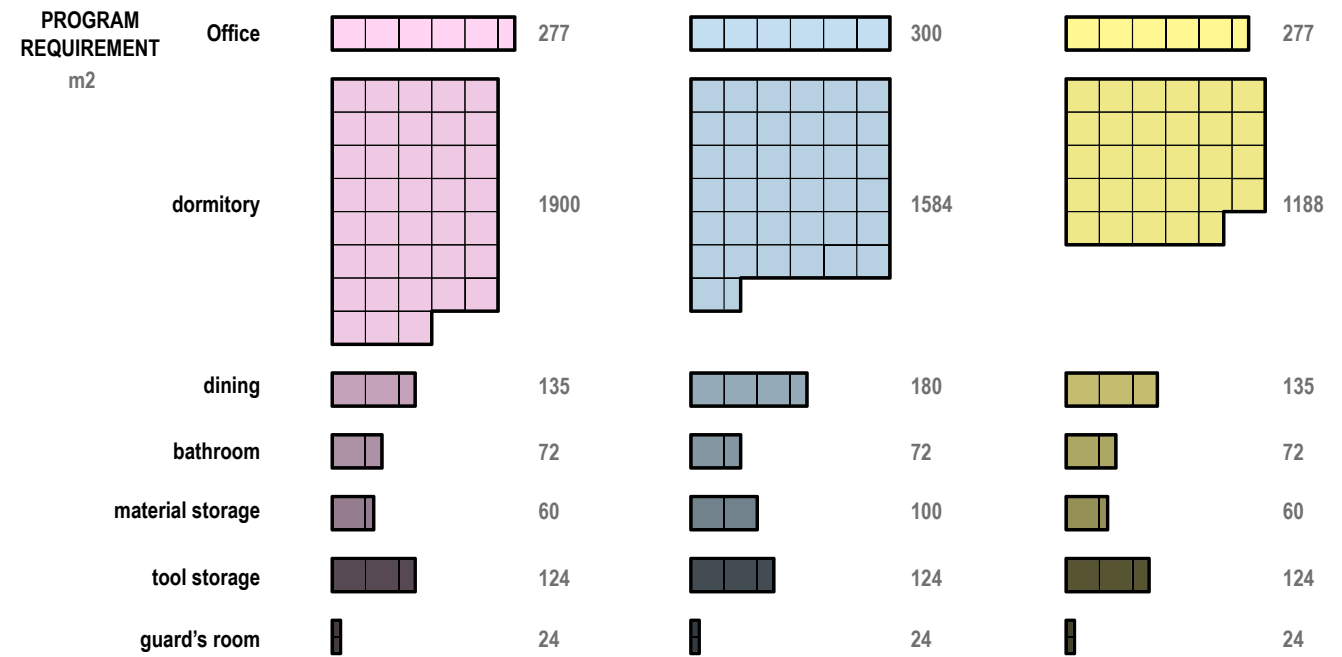
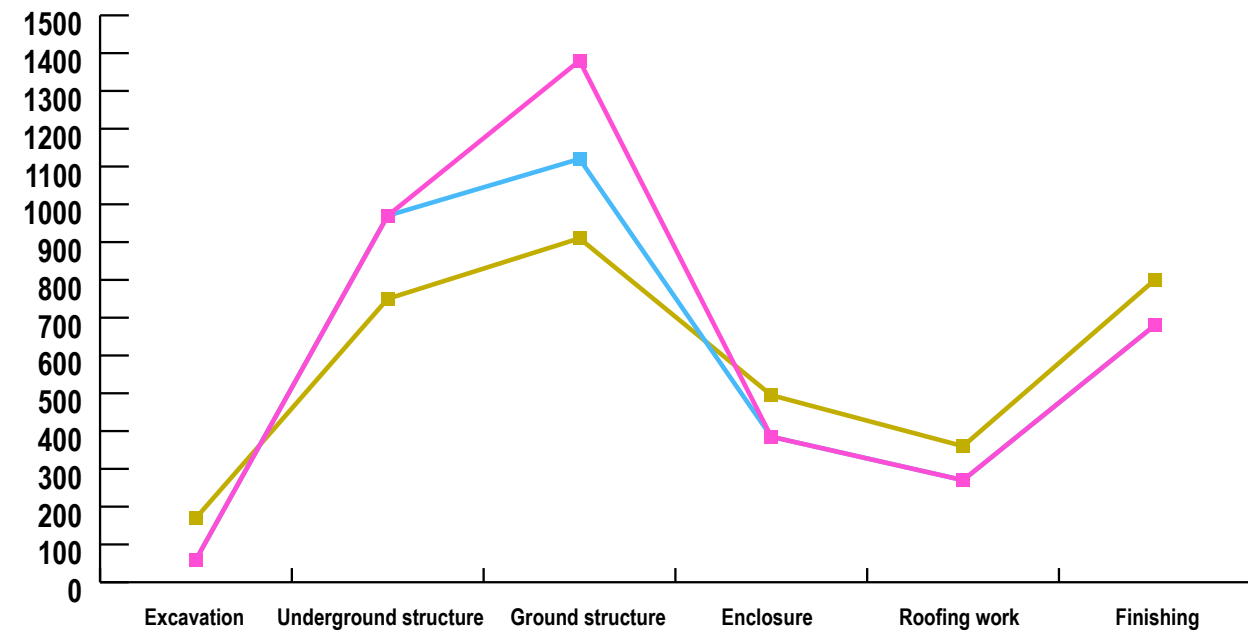
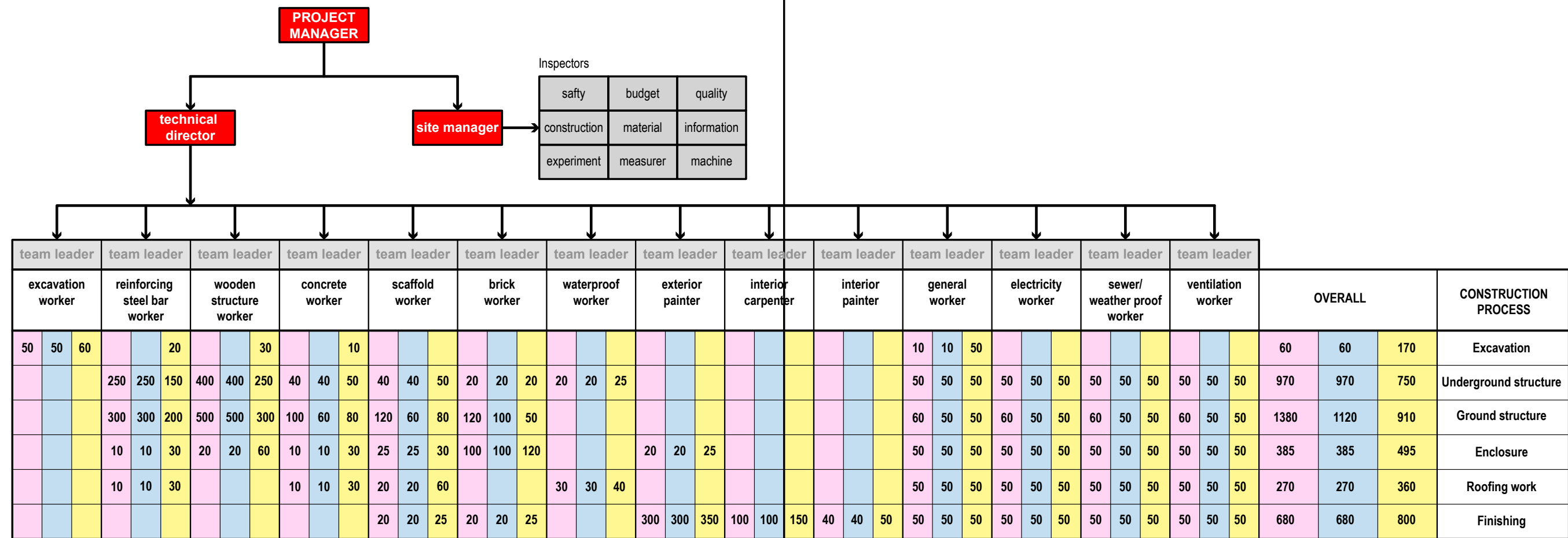
Employment Configurations

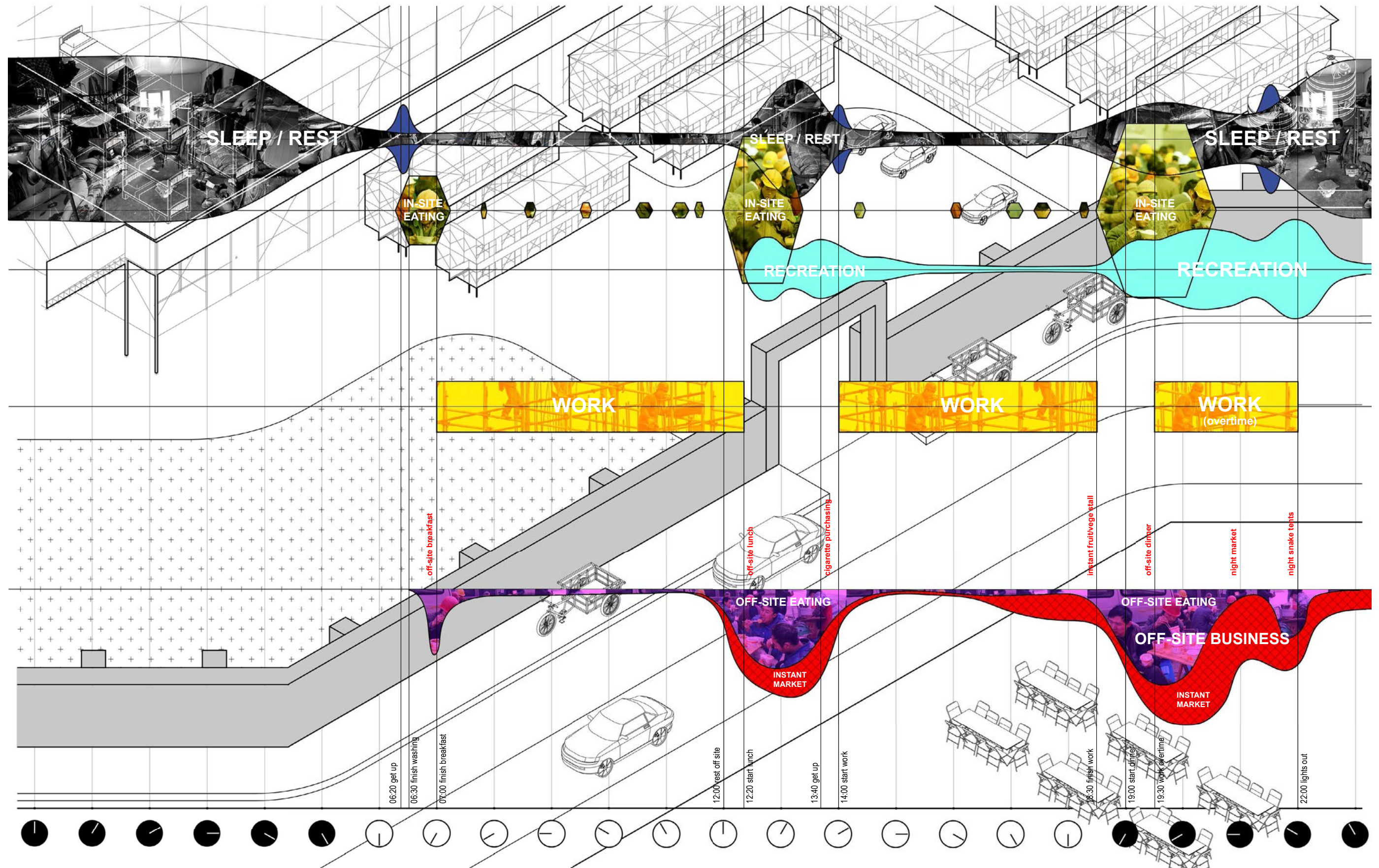
There are three major employment configurations among migrant workers in construction jobs: mediated; embedded and individualized. Each employment configuration embodies a specific type of relationship between workers, employers and the state.

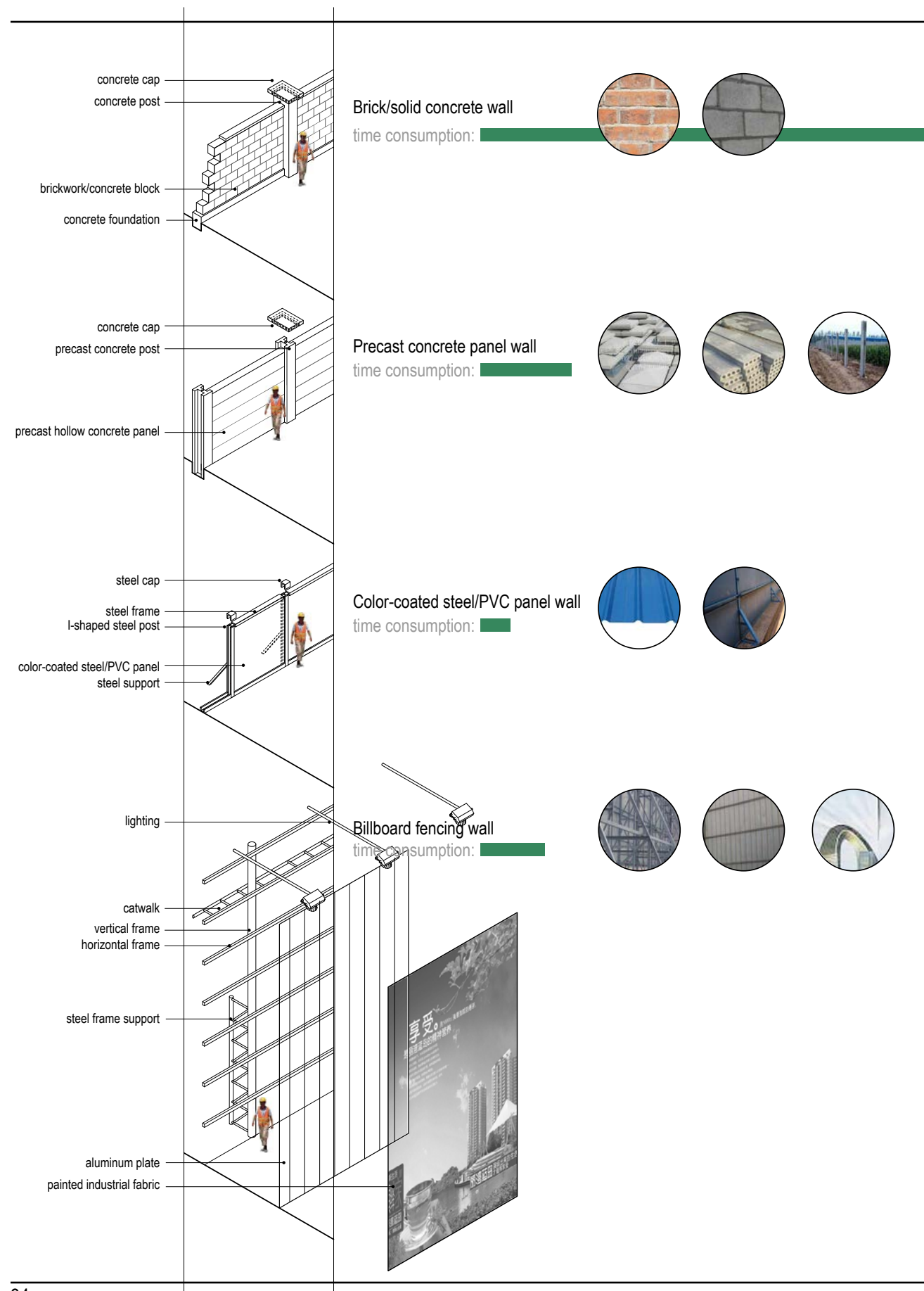
Mediated employment is the most typical of all three configurations. Construction workers sign a year-long contract with their employers (labor-contractor) and stay in the city alone, leaving their family for 11 months. The employers provide workers with shelters (and sometimes food) inside construction sites. Also, the employers pay upfront costs of migration to workers, which will be subtracted from their salary at the end of the year. Workers are "invisible" behind the walls that surround their jobsite, away from citizens and the government.

Embedded employment includes construction workers living in the thick dense migrant communities outside construction sites together with other migrants. In this case, contractors are part of the migrant communities. Based on kinship, they use their social networks to find workers. The groups of workers under embedded employment are usually smaller (5-12), but have stronger bonds because there is less social distance between contractors and workers. The group get paid as a whole, and the contractor distributes the money on a monthly basis. But these workers are vulnerable in relation to the state because of their informal and ever-growing housing communities.

Individualized employment is the least regulated configuration type. There is no legal contract involved in the employment. Construction workers are hired directly on job-sites or on street spot markets (usually underneath bridges). Power relations are extremely unequal. Workers get the lowest wage and have highest risk of not getting paid.







Fencing Wall

Fencing walls around urban construction site have two major functions. On one hand, they enclose and define the construction site area, separating the site activities from the rest of the city. On the other hand, they act together as a mask, concealing the true identity of the construction site, while presenting the city with a designed/manipulated appearance.

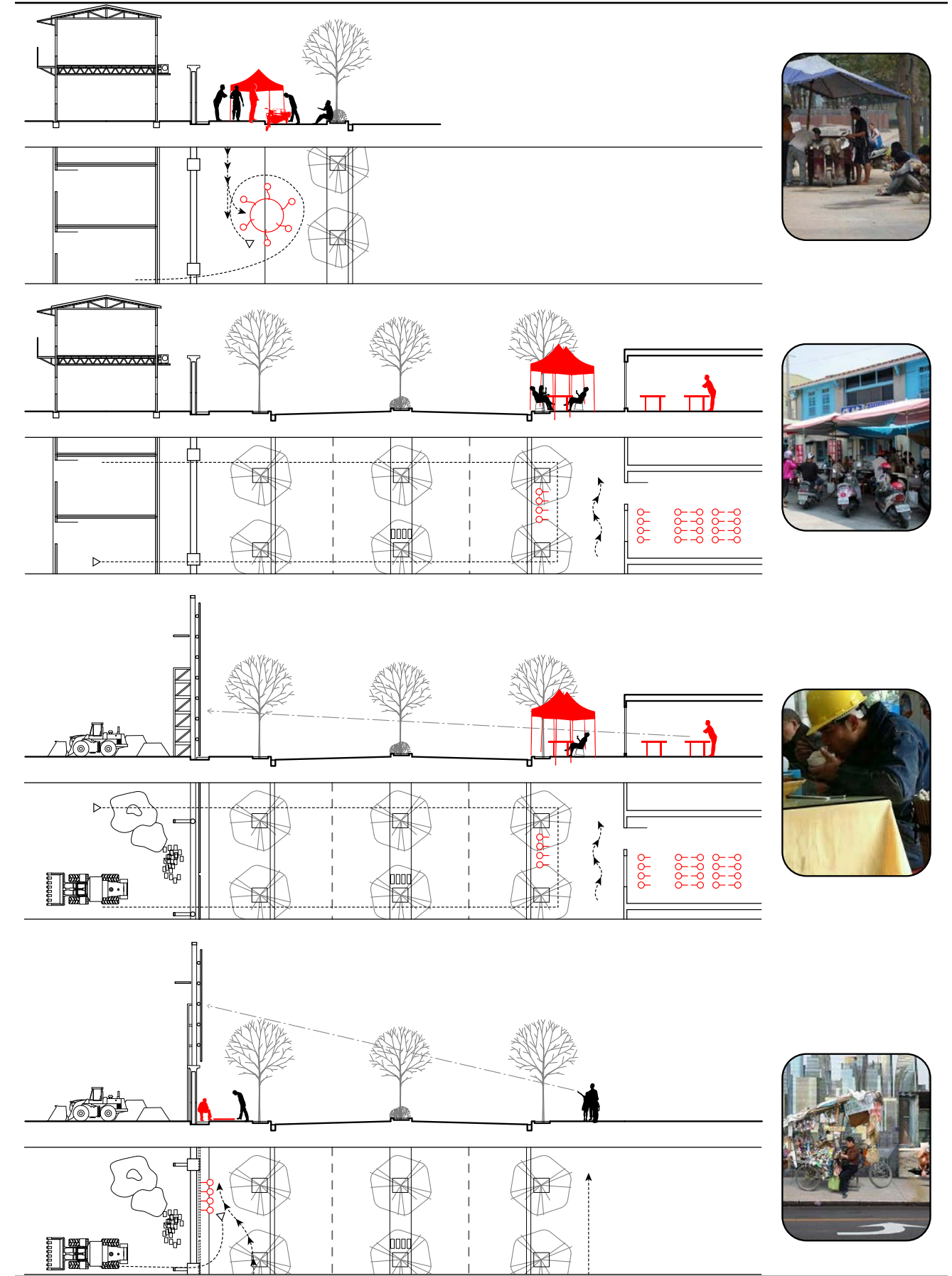
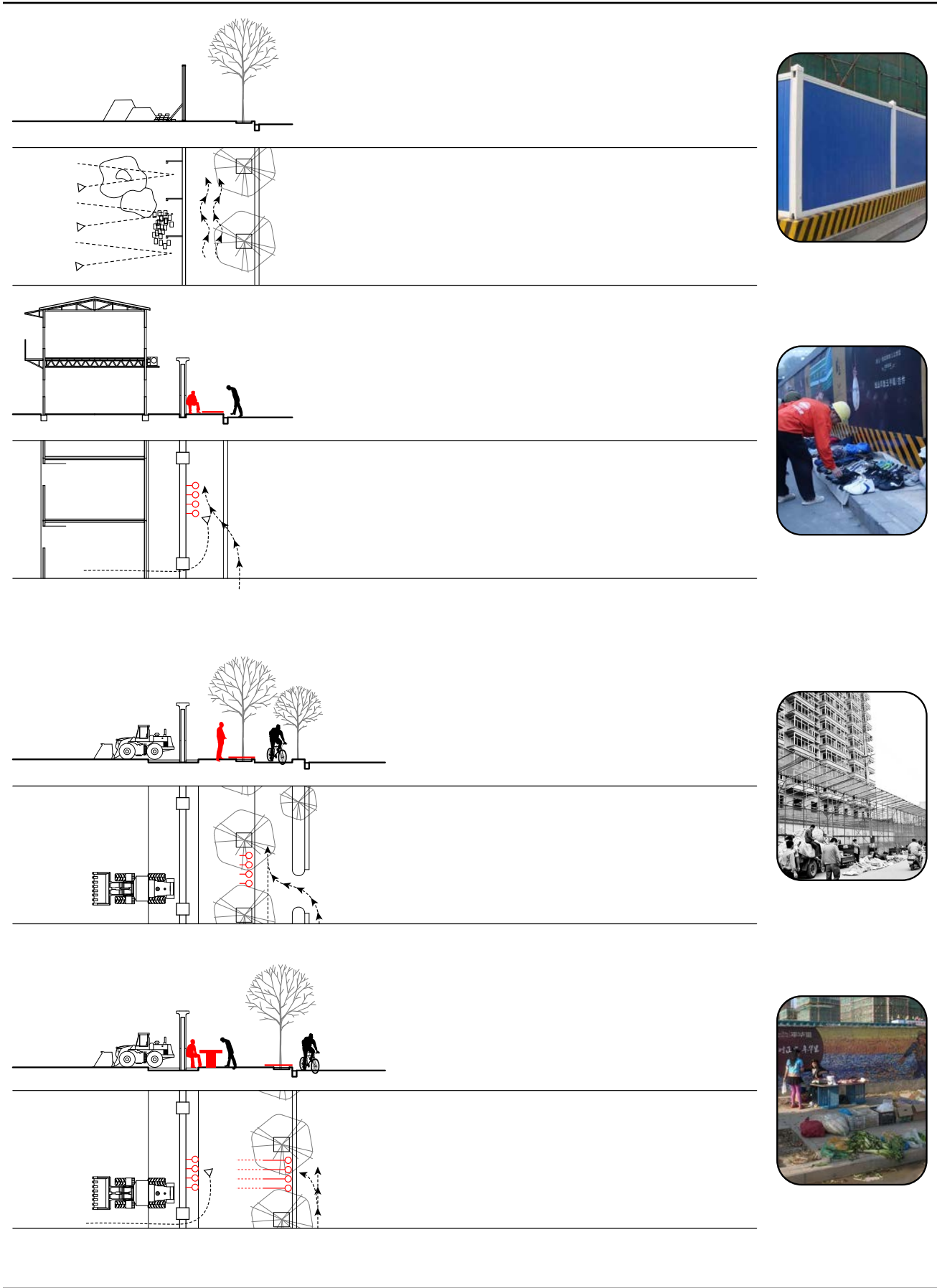
The fencing walls vary greatly from site to site in terms of height, materiality, production process, and information, resulting in different spatial experiences next to them.

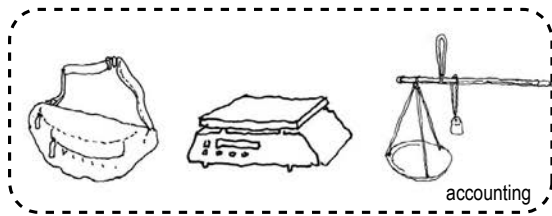
Brick/solid concrete wall is the most traditional and common type of fencing wall around urban construction site. The production process of this kind of wall is long and laboursome, and usually consists of five steps: foundation construction setting out, foundation excavation, C15 concrete base building, brickwork (concrete brick) layout, and surface finishing. The process requires high professional skills and creates a lot of material waste. Also, this kind of fencing wall is unrecyclable.

Precast concrete panel wall is a more advanced type. By using modularized concrete posts and hollow concrete panels, this type of fencing wall is easy to assemble and takes only 1/5 the time to construct. Once the construction project is finished, precast concrete panel can be recycled and rebuilt on another site.

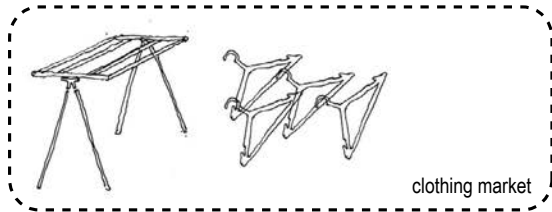
Color-coated steel/PVC panel wall is a type that is easy to transport and quick to assemble. With modularized steel panels (PVC panels) and I-shaped frames, this kind of wall requires no on-site material manufacturing. However, due to its light weight, the wall is weak in terms of stability.

Billboard fencing wall uses billboard as wall to enclose the construction site. With steel skeleton and painted industrial fabric, this kind of wall is usually 8 meter or higher. Since the painted fabric is detachable, the billboard fencing wall contains advertisement or propaganda information frequently changing over time.





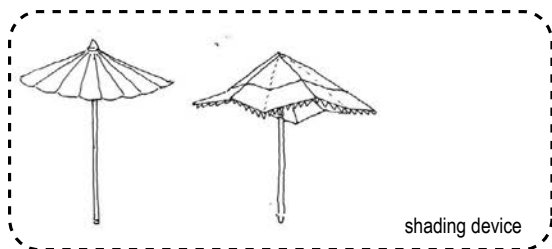
accounting



clothing market



food vendor/market



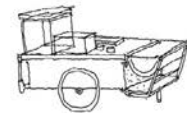
shading device



shoulder pole



bicycle box lunch vendor



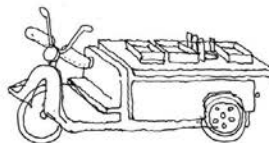
trolley BBQ vendor



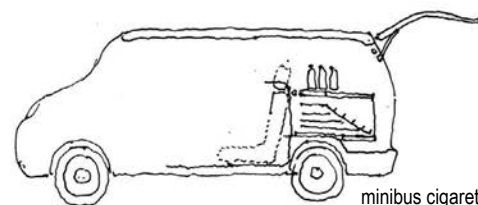
tricycle fruit/vege seller



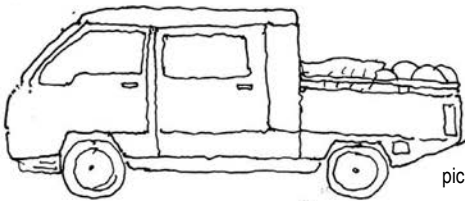
tricycle food vendor



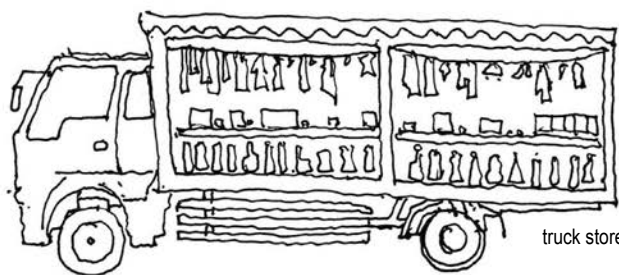
disabled-vehicle food vendor



minibus cigarette/beverage seller



pickup truck vege seller



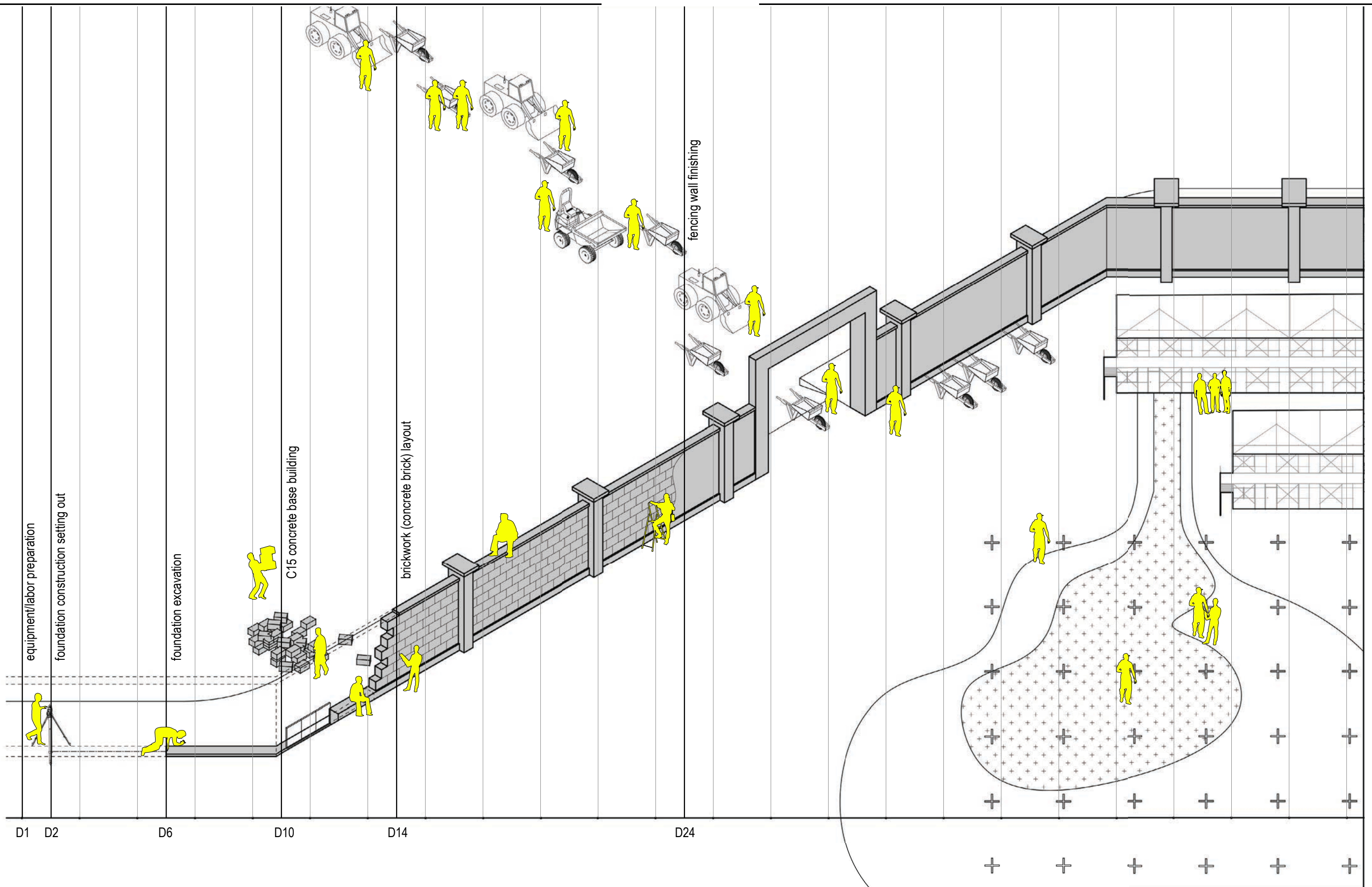
truck store

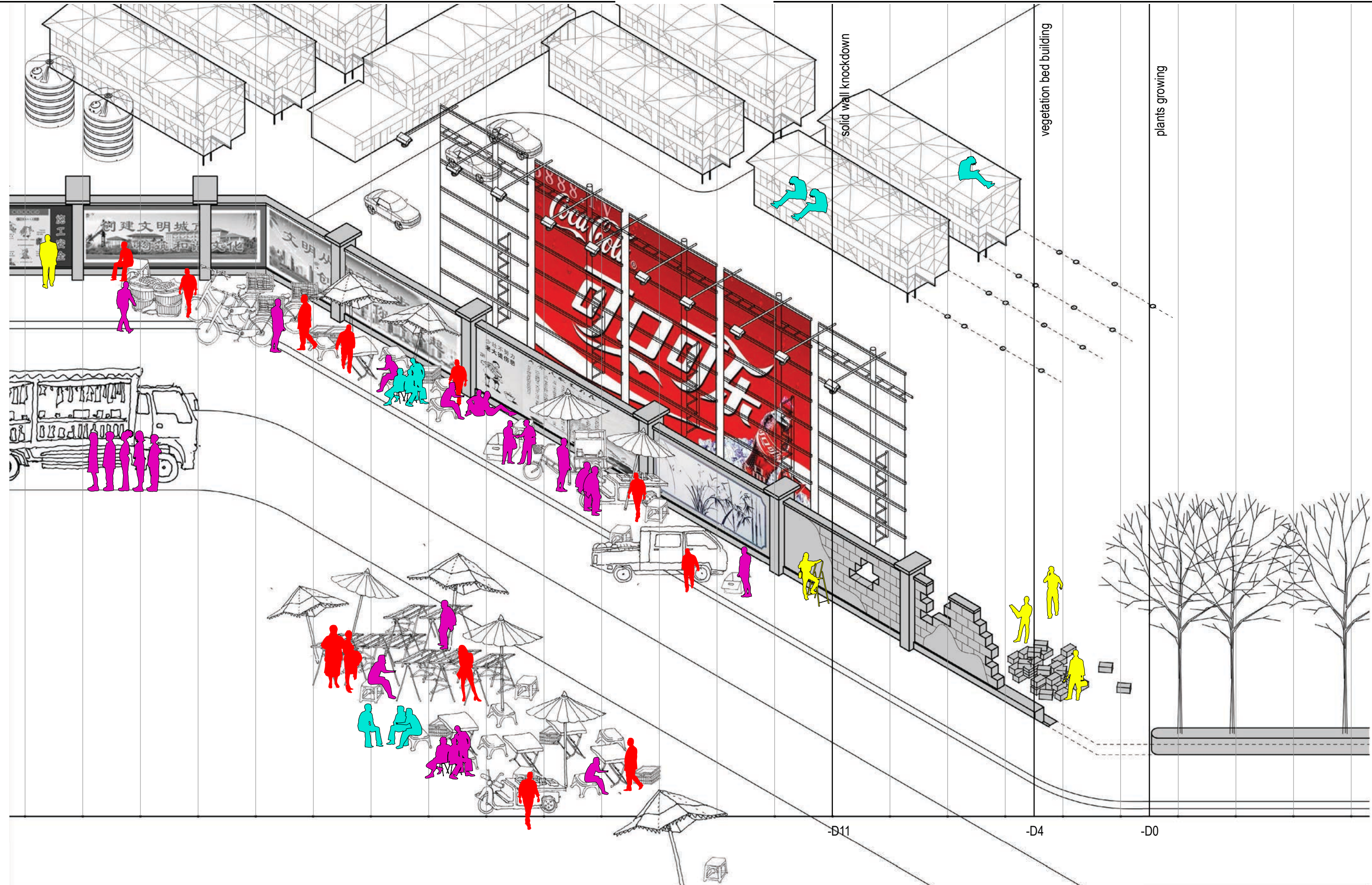
Different variations of fencing walls, combined with different pedestrian/street configurations, together create diverse spatial experiences around construction sites. As a result, different in-site and off-site activities are generated spontaneously.



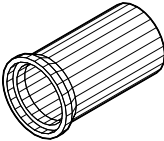
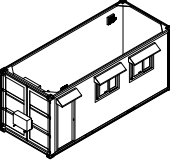
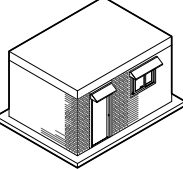
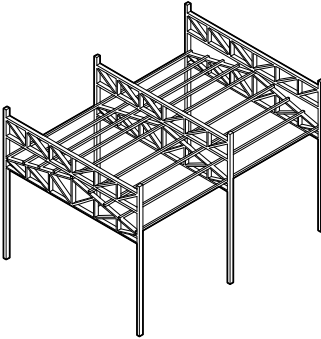
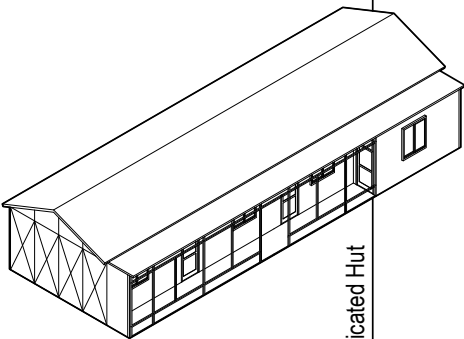
In the construction site, the spatial condition near the site boundary is greatly influenced by the height of the fencing wall. Workers' temporary huts are usually placed next to the 9-foot-tall brick/concrete walls, leaving an unaccessible narrow gap between the two. This narrow and dark gap acts as the backdrop of workers living area, orienting the workers towards the center of the construction site. For fencing walls taller than 25 feet (usually steel-framed billboards), a wide portion of ground is partitioned next to them as material-piling zone. Workers move constantly back and forth between the fencing wall and the working zone.

The spatial experience on the other side of the fencing wall varies greatly according to street configurations. A sectional and circulatory study of off-site business shows the diversity of how improvised merchants and construction workers can occupy and activate the space outside the fencing walls. According to their temporality, the off-site business structures share the same character of flexibility and mobility.

A collection of fragmented artifacts reveals the inner relationships between the business structures. Through combination and reorganization, these artifacts have the potential to generate multiple configurations, highly customized with great adaptability.





	variations/dimensions	ownership/ cost	capacity	application
Safety Helmet		company provide/ \$3	1 person icon	on-site working
				
Improvised shelter		construction material company owned/ reused	3 person icons	temporary rest/ sleeping
	$R=1.6' L=10'$ $R=1.6' L=20'$ $R=2' L=10'$			
Portable Unit / Container		company owned or collective rent/ \$1900-buy/ \$1 per day-rent	8 person icons	guards' office toilet on-site temporary meeting dormitory for rent
	$8' * 7.7' * 6'$ $8' * 7.7' * 40'$			
	$8' * 7.7' * 20'$ $9' * 7.7' * 40'$			
		company owned/ \$700-1200	8 person icons	material storage bathroom shower
Fast Built Shelter	$9' * 15' * 20'$ $9' * 15' * 40'$			
		company owned/ \$15-200	8 person icons	on-site resting on-site material cutting on-site safety shelter
Prefabricated Hut	$12' * 18' * 25'$ $20' * 30' * 40'$ $30' * 30' * 40'$			
		company owned resused/ \$200/m2	16 person icons	workers' dorm meeting room dining room equipment storage offices
	$10' * 25' * 3n'$ $20' * 25' * 3n'$ $30' * 25' * 3n'$ $20' * 20' * 3n'$			



On-site shelter plays a significant role in shaping the working and living experiences in the construction site. Shelters not only protect the workers from weather and construction hazards, but also provide enclosed spaces to meet all program needs of on-site living activities.

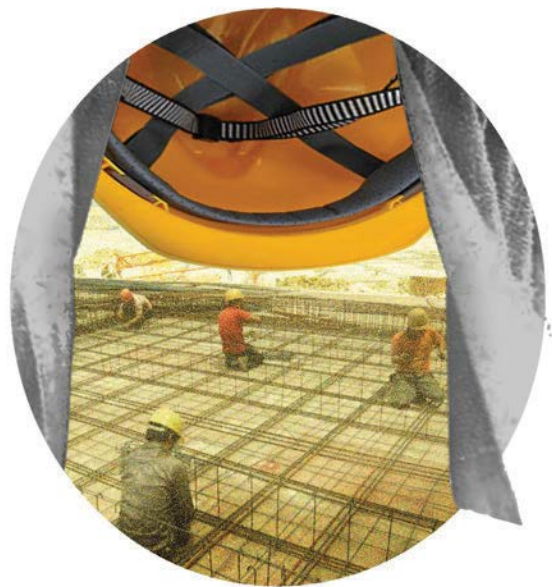
Safety helmet is the immediate shelter for an on-site construction worker. Uniform in size and color, safety helmet kills the personality of each individual worker.

Improvised shelter refers to shelter space found/built from construction materials by workers. This type of shelter is not regulated and accompanied by high safety risks.

Container hut is one of the most common structures for workers' dormitory. Cheap in price and easy to transport, this kind of shelter is usually provided by subcontracting companies. A typical container hut is 3m in width, 10m in length and 2m in height, containing 4 double beds for 8 workers, with electric access on two long sides of wall.

Fast built huts and work sheds are usually placed in the working zone, providing roofed spaces for material storage and processing.

Prefabricated hut is generally accepted as shelter structure in construction site. Fast to assemble and easy to add on, this modularized shelter is able to meet various program needs, from dormitory, mess hall, to office, bathroom, storage.



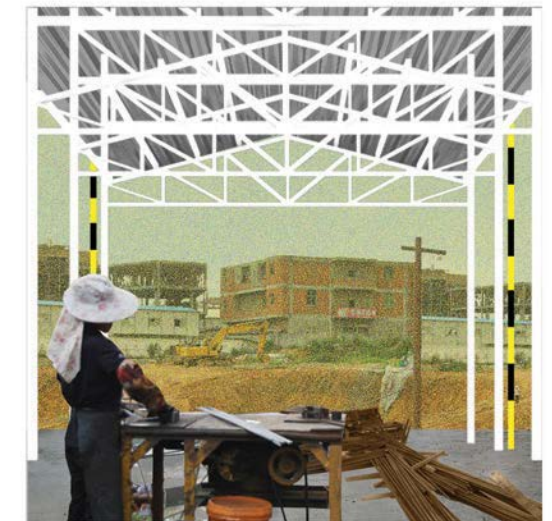
01. on-site working



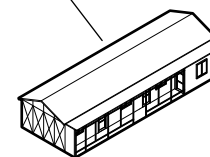
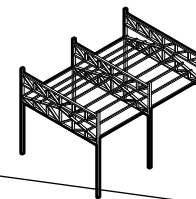
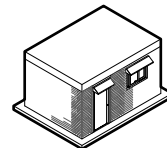
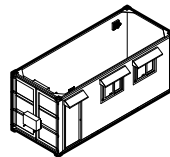
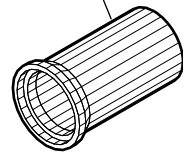
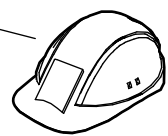
02. improvised sleeping



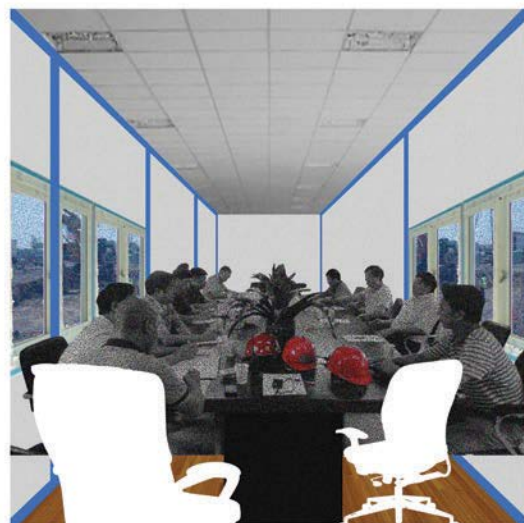
03. dining



04. on-site shelter



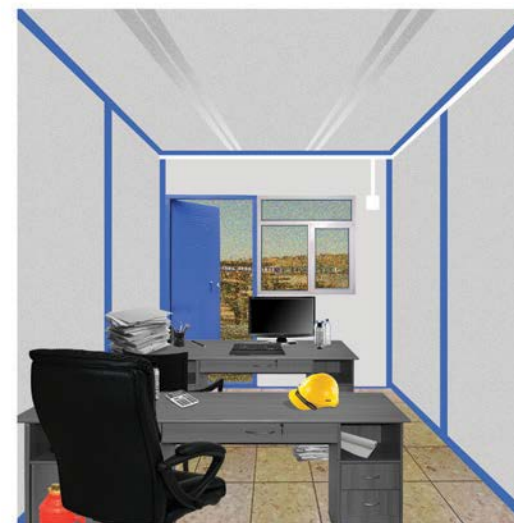
05. meeting room



06. workers' dormitory

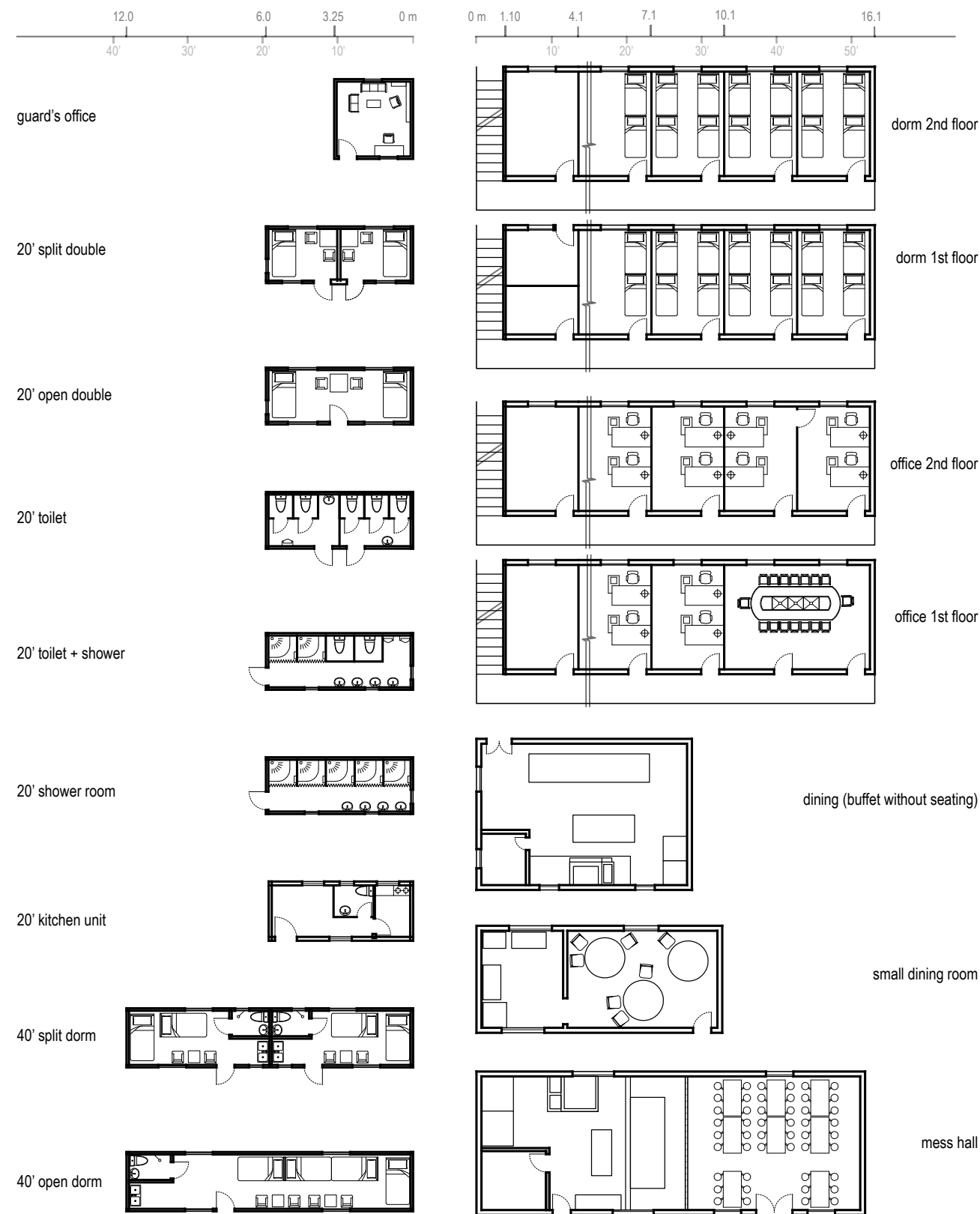


07. office room



08. toilet



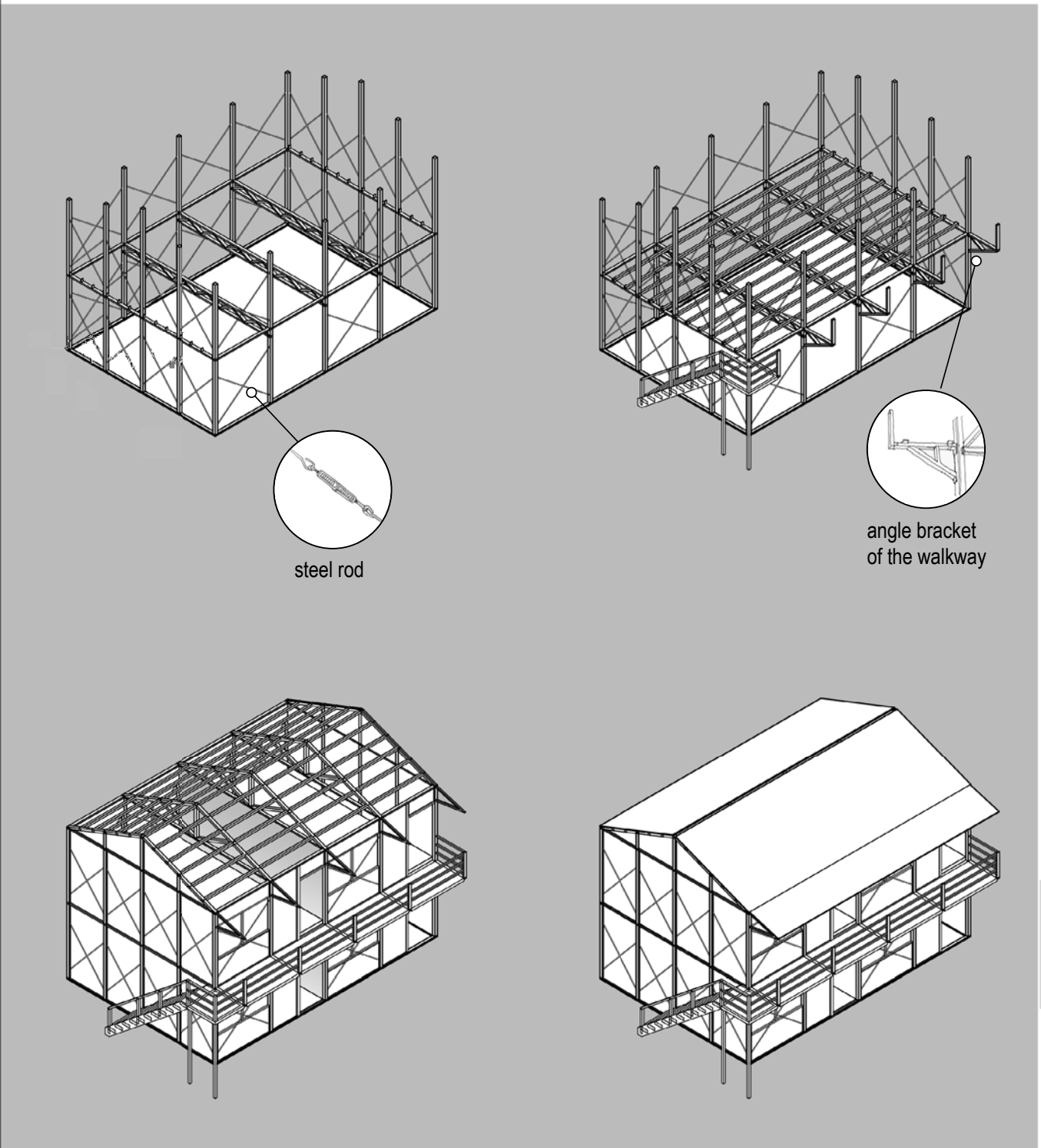
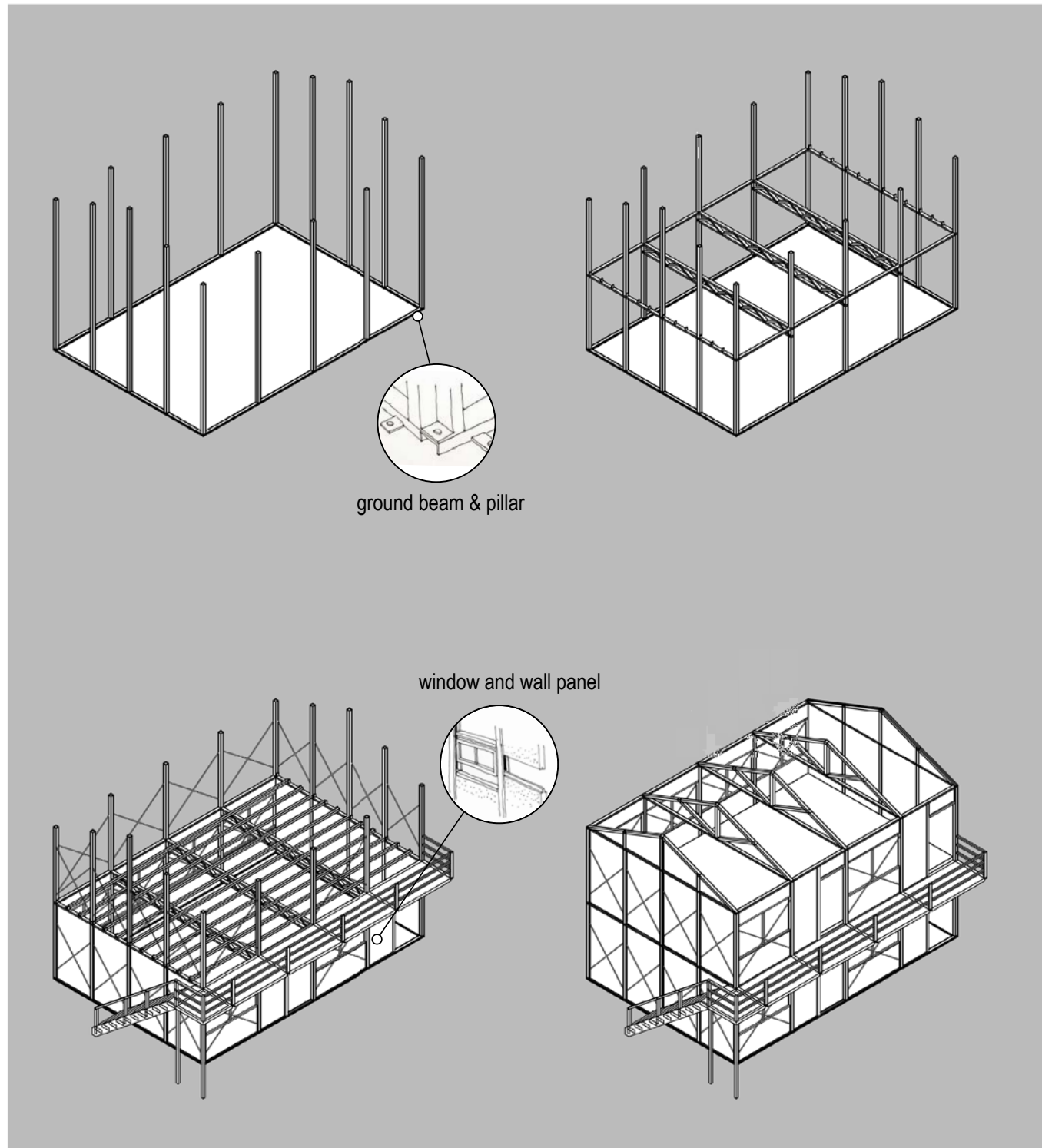


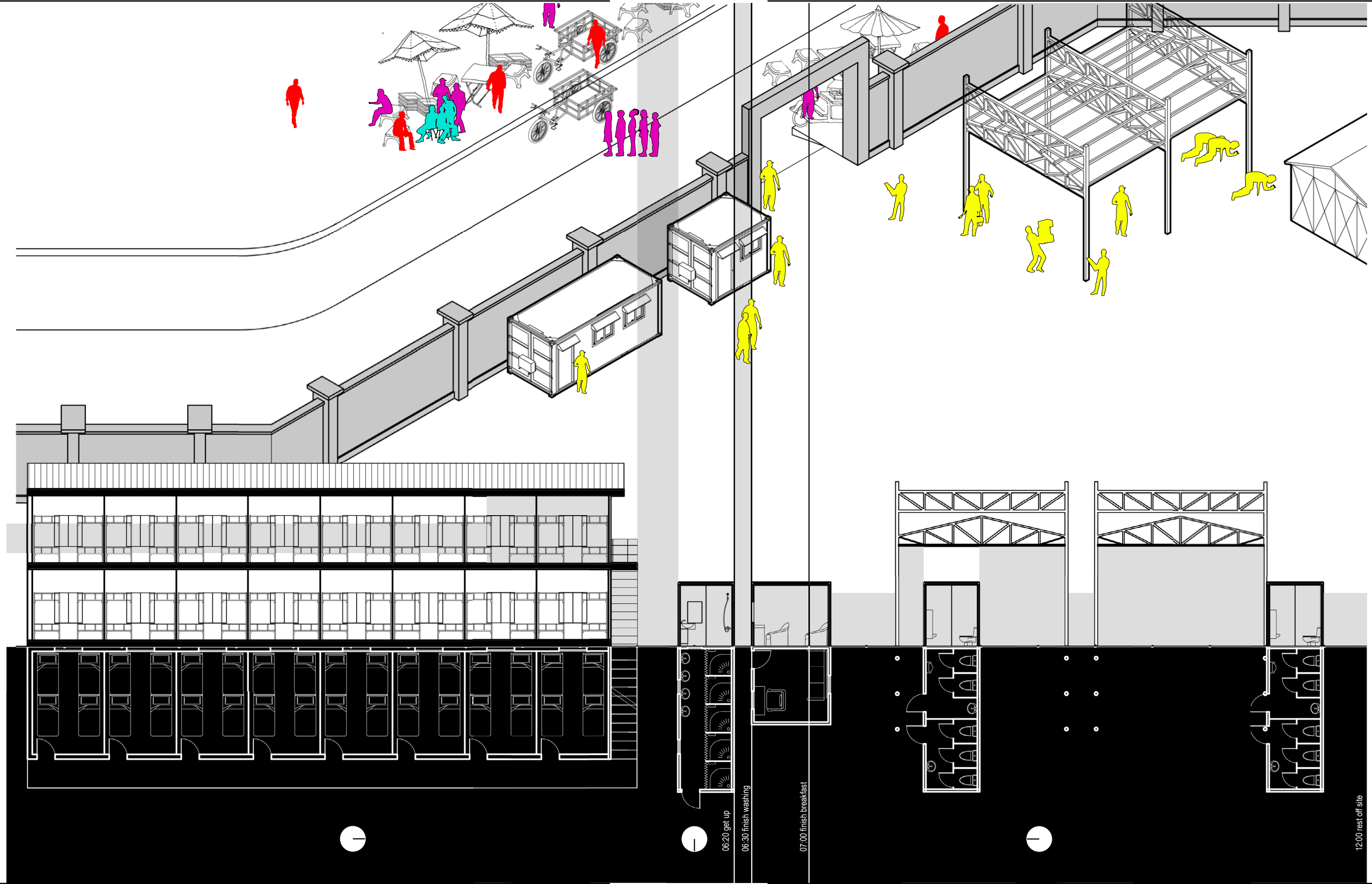
Although the on-site shelters vary greatly in terms of size, materiality and function, they share some identical features. In pursuit of high efficiency, uniformity, and program capacity, the shelters are designed as pure enclosure or simple spatial framework with nearly zero spatial identity. The concept of envelop, structure and enclosure are identical to each other in this circumstance. Therefore, high program capacity is achieved, not through architectural flexibility/adaptability, but instead by the most generic spatial condition.

The occupation process of a typical on-site shelter is an introverted procedure. After providing an enclosed trunk of empty space, the construction company uses prefabricated wall panels to subdivide it into several zones according to its program requirement; then the company purchases and adds furniture from mass industrial production; after that, each individual worker picks his own spot and occupies it with his belongings.

As a result of this introverted "user adaptation" process, the concept of plan designing/ composition is often neglected. Therefore, the interior of shelters can be easily turned into living chaos by intemperate individual creativities.

The bland uniformity and generic appearance of the exterior with the chaotic explosion of individuality in the interior, this is the double dilemma of on-site shelters.









Ningbo University Library



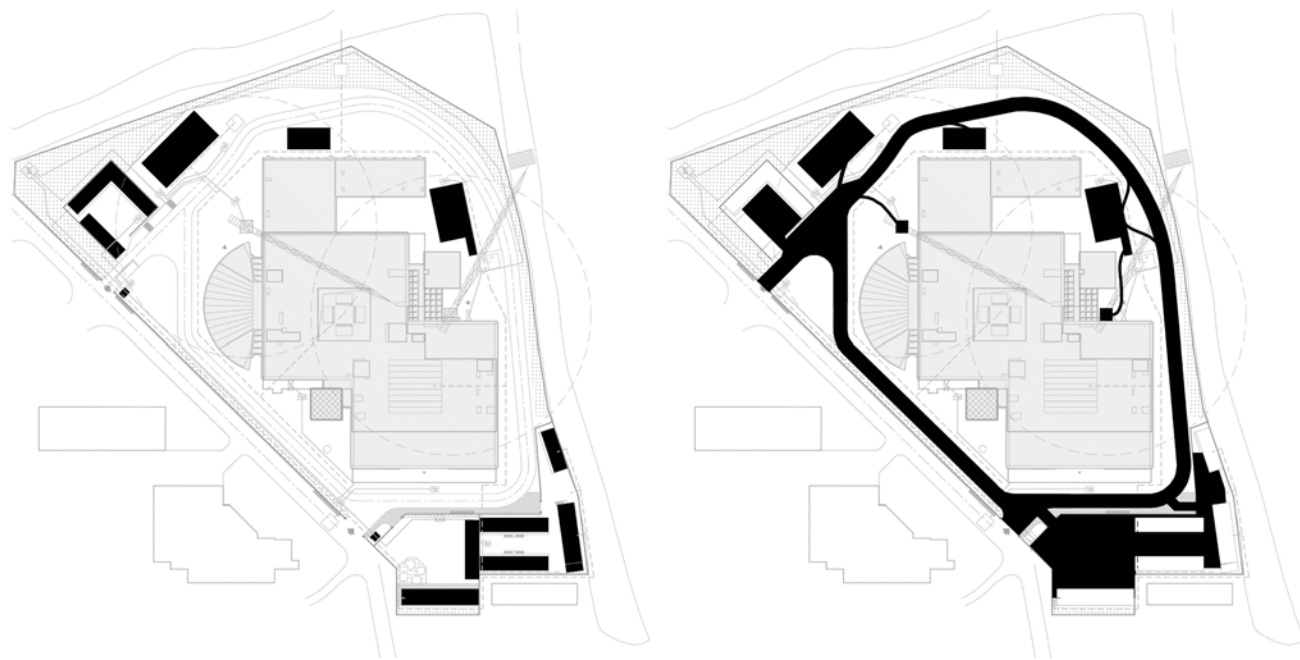
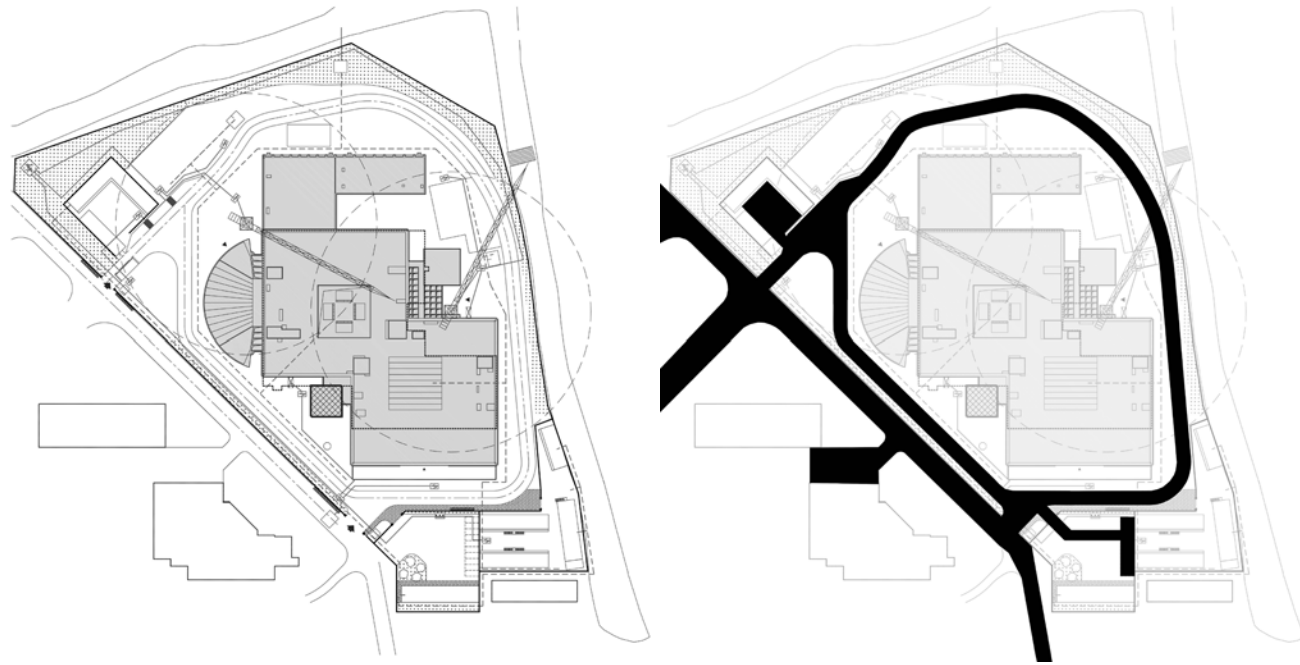
Huangyan Transportation Center



Residential Compound

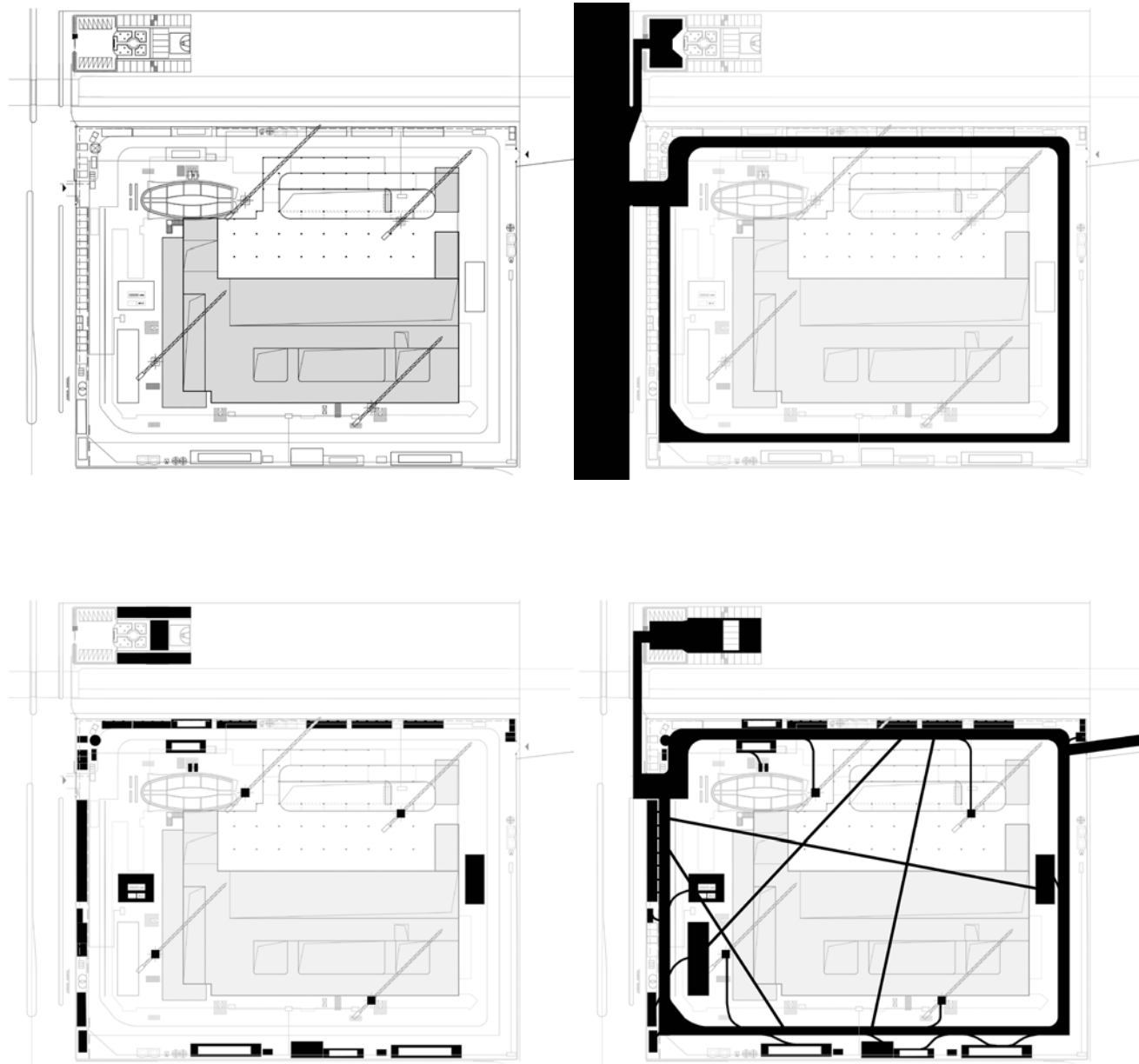
On-site shelters are reconfigured according to the location, shape and program efficiency of the site, which influences the vehicular traffic and pedestrian circulation in and around the construction site. Three typical site layouts are studied here through construction practice examples to show the impact of layout on the spatial condition and workers' action.

The three construction examples are: Ningbo University Library, Transportation Center in Huangyan, and Residential compound in Hangzhou. Due to its location in the university campus, the construction site of Ningbo University Library is characterized by its **"in-site living zone"** layout; while in the case of Huangyan Transportation Center, on-site shelters are laid out as **"Linear perimeter"** due to the limitation of land area; whereas in the construction site of Hangzhou's residential compound, a **"separated living zone"** is desired due to the massive size of the project.



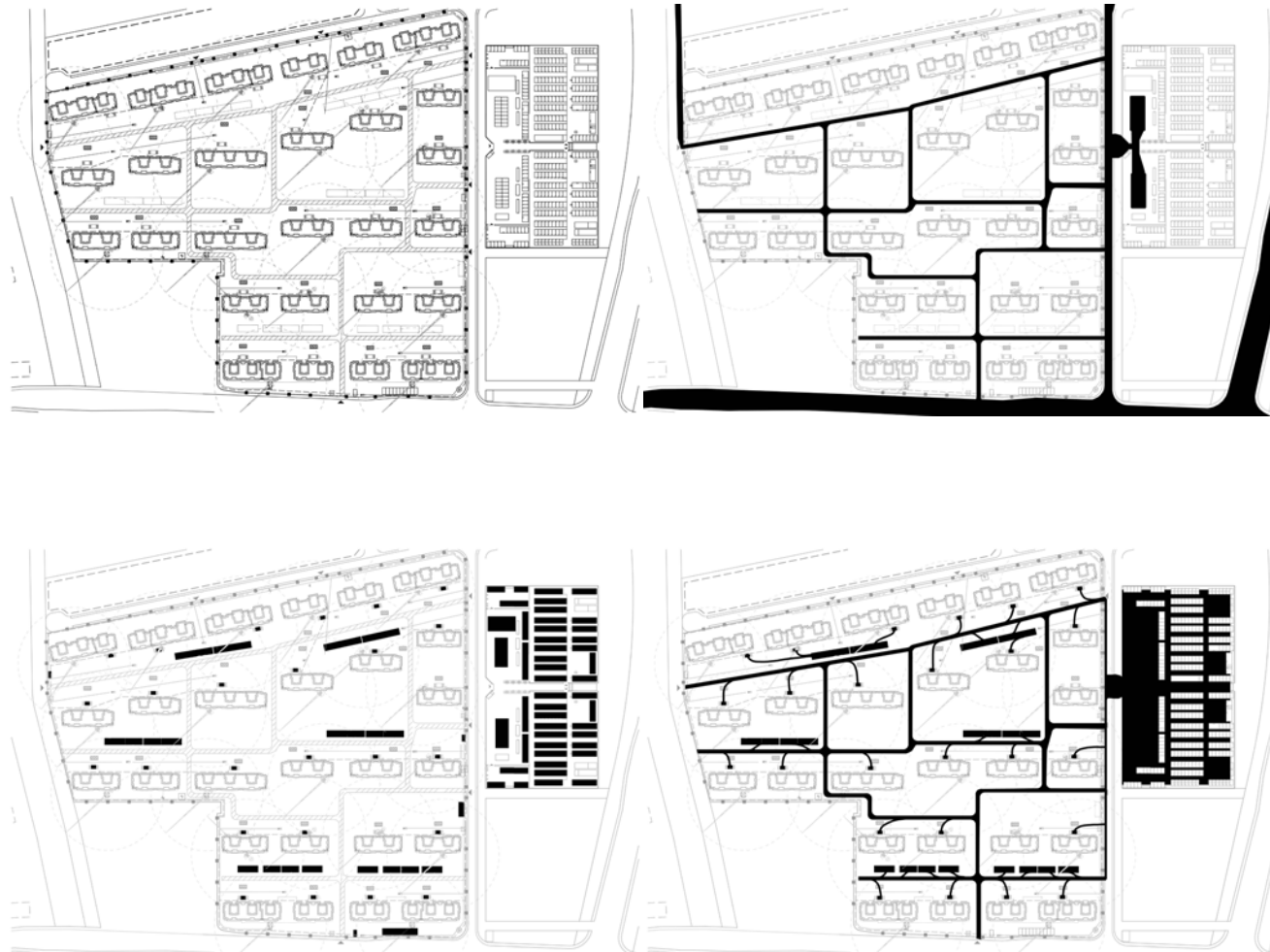
In-site Living Zone

The site of Ningbo University's new library was originally an abandoned playground located in the university campus. It was not until 2014 that the university decided to convert this piece of land into a 430000 sqf library. The construction started on May 8 2015 and is expected to finish in 450 days. Due to its massive scale and central location in the university campus, the construction site is totally enclosed by fencing walls. A portion of land is divided into an "in-site living zone" for accommodating the workers. Therefore, most of workers' living activities are taking place at the southeast corner of the site. The pathway of construction vehicles forms a loop around the library building, while fast-built working shelters, for material processing, are placed on both sides of it. In this case, construction vehicular traffic and pedestrian circulation are mostly overlapping with each other, while the major interaction happens at the entrance of in-site living zone.



Linear perimeter

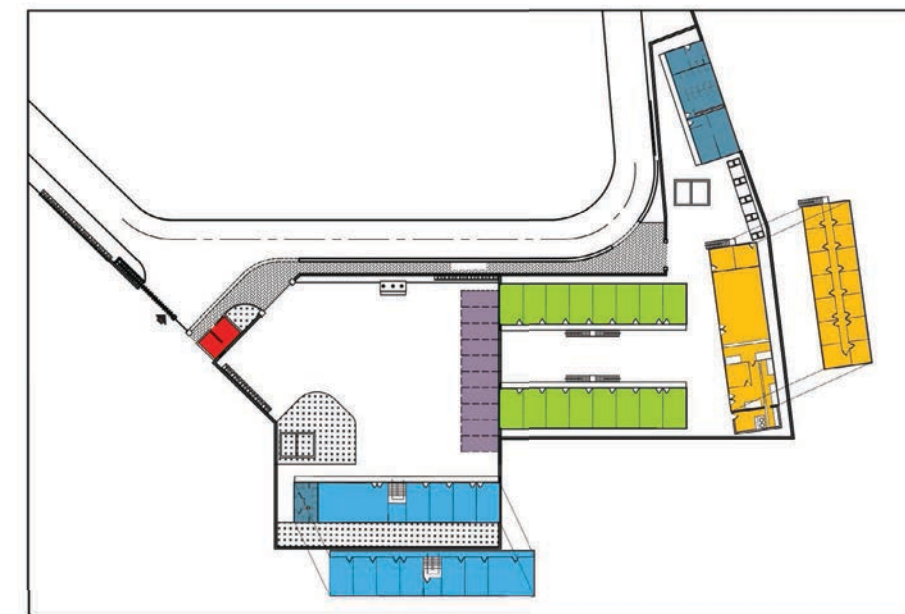
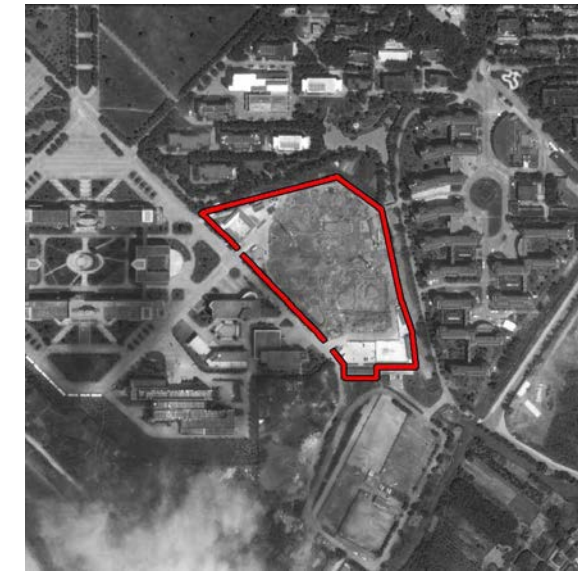
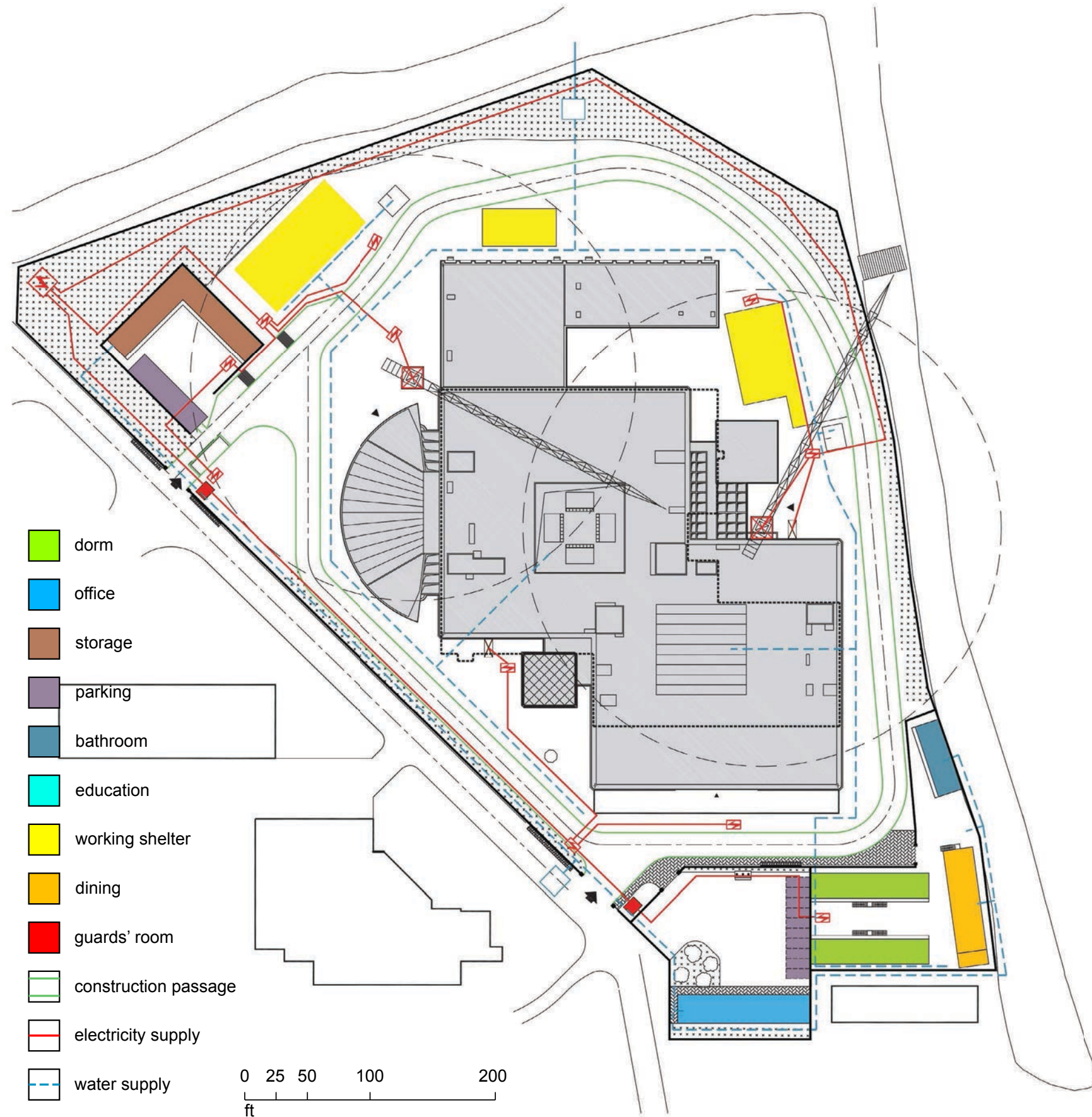
The on-site shelters for the construction of Huangyan Transportation Center is arranged in a linear way along the perimeter of the site, as a result of the very limited land area. There is no separated living zone for the workers in this case. Instead, the workers dormitories, office rooms, toilets, together with all the working shelters are pushed and placed adjacent to the fencing walls just in order to make room for construction activities. Vehicular traffic route creates a loop between on-site shelters and the construction working area. Because of that, the intersection between foot traffic and vehicular traffic becomes very frequent and unavoidable. Also, because on-site shelters are placed far away from each other, workers tend to create short cuts across the working area.

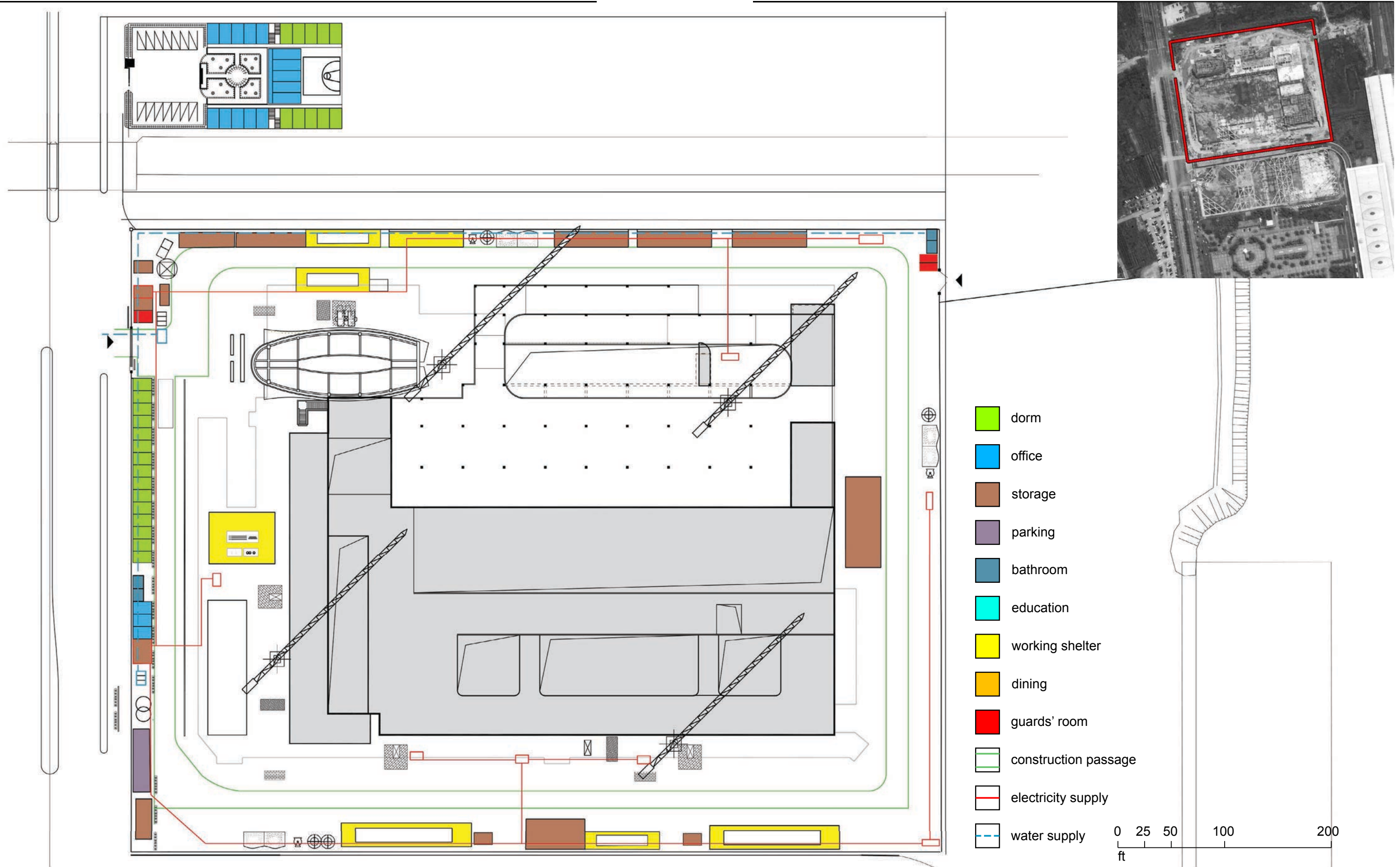


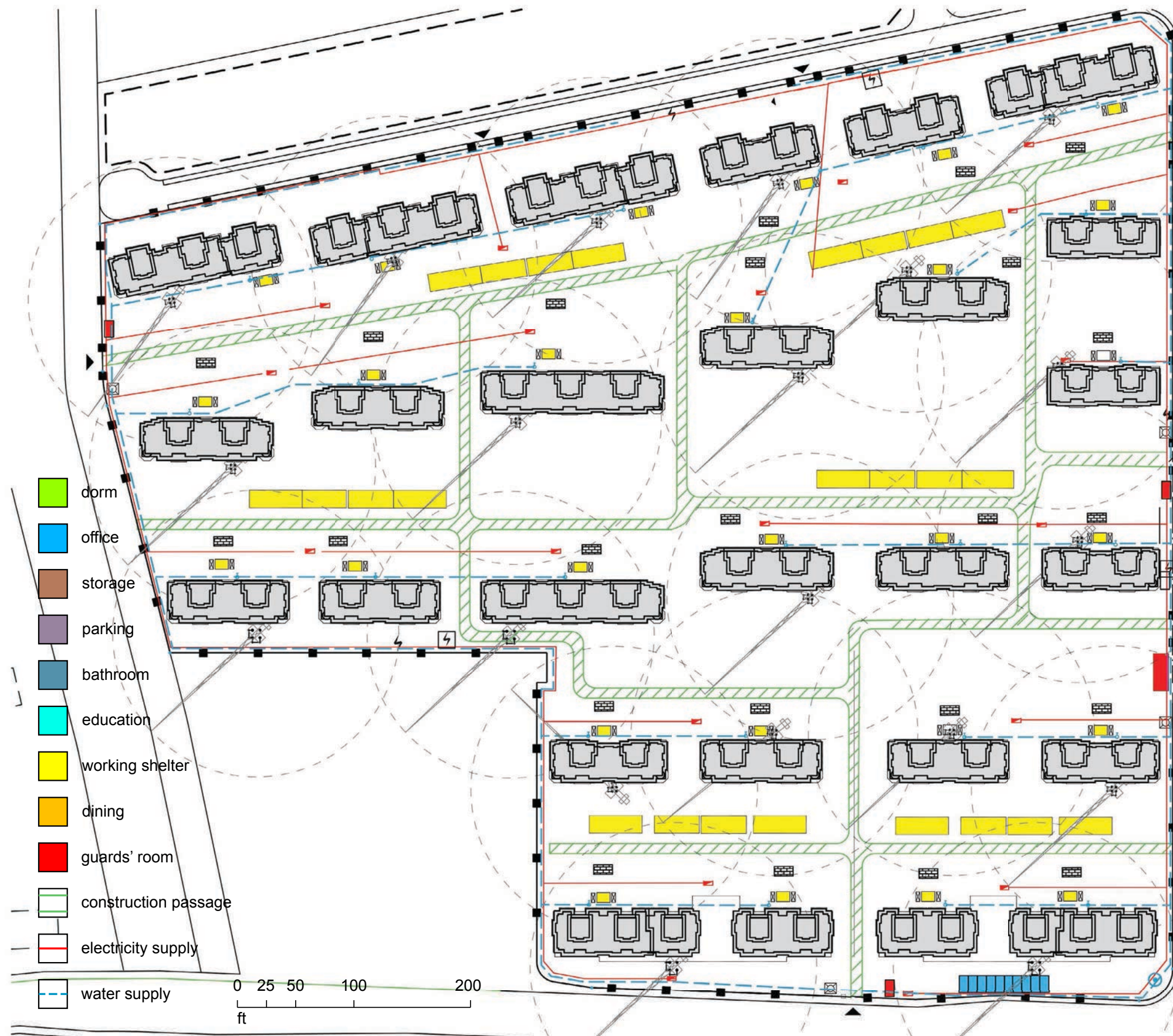
Separated Living Zone

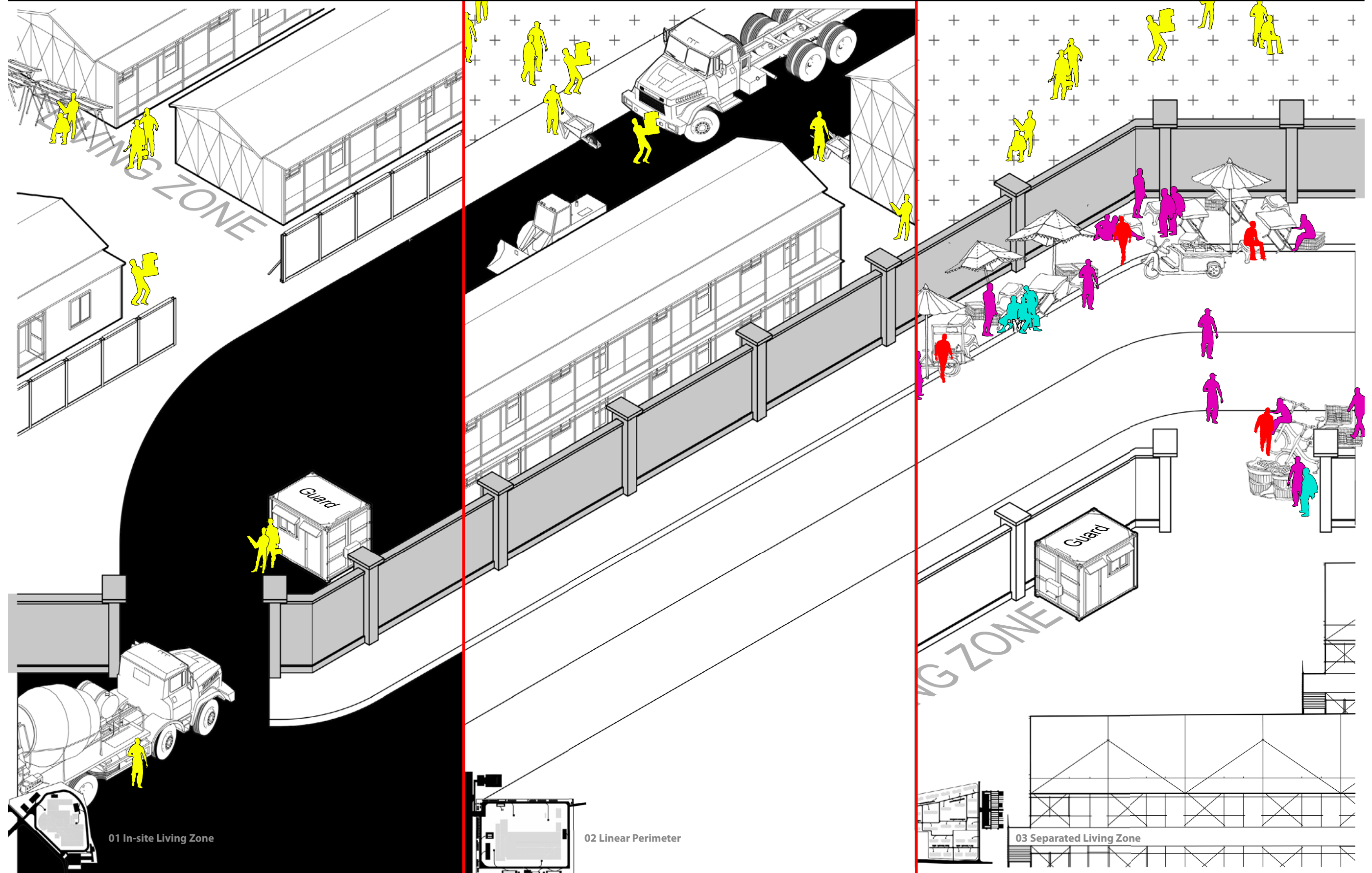
The residential compound in Hangzhou is a social housing project issued by the provincial government. Consisting of 27 housing towers, 15 to 24 stories each, the massive project requires a separate zone for accommodating its workers outside the site area. The separated living zone is enclosed by fencing walls as well and placed across the street, facing the construction site. Within the living zone, shelters are arranged in an extremely hierarchical way. Offices and meeting rooms are placed in the middle front; dormitories for construction leaders, bigger in size with separated dining halls and bathrooms, are placed on the sides of the front row; dormitories for contracted workers occupy the middle part of the living zone; mess halls, toilets, and dormitories for temporary workers set as the backdrop of the living area.

In this case, vehicular traffic and pedestrian circulation create a network in the construction site, dividing the total site area into several smaller working zones. Each of them is associated with its own working shelters respectively. Moreover, the separation of living zone from the construction site area facilitates improvised business actions on the street between the two.





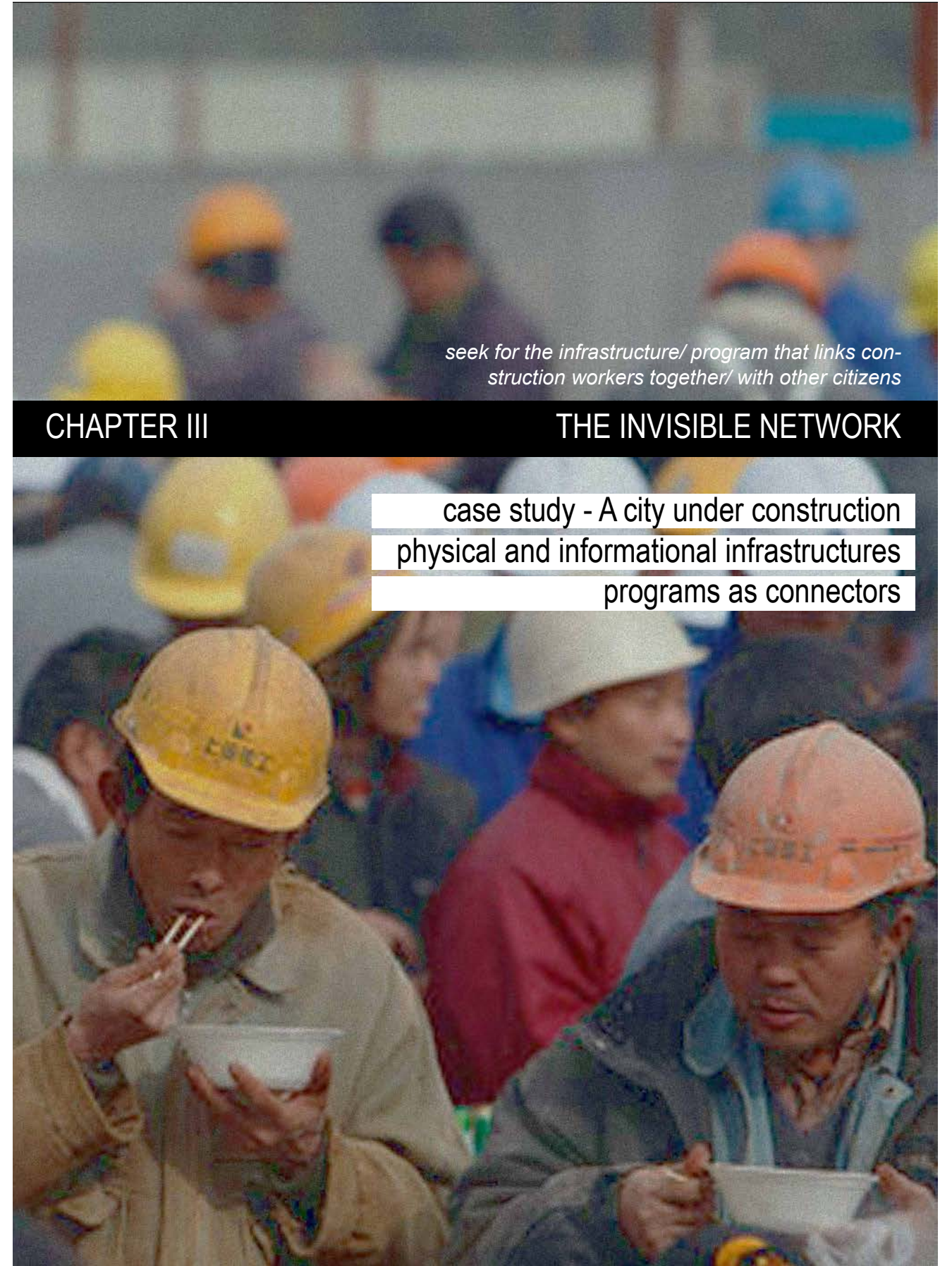
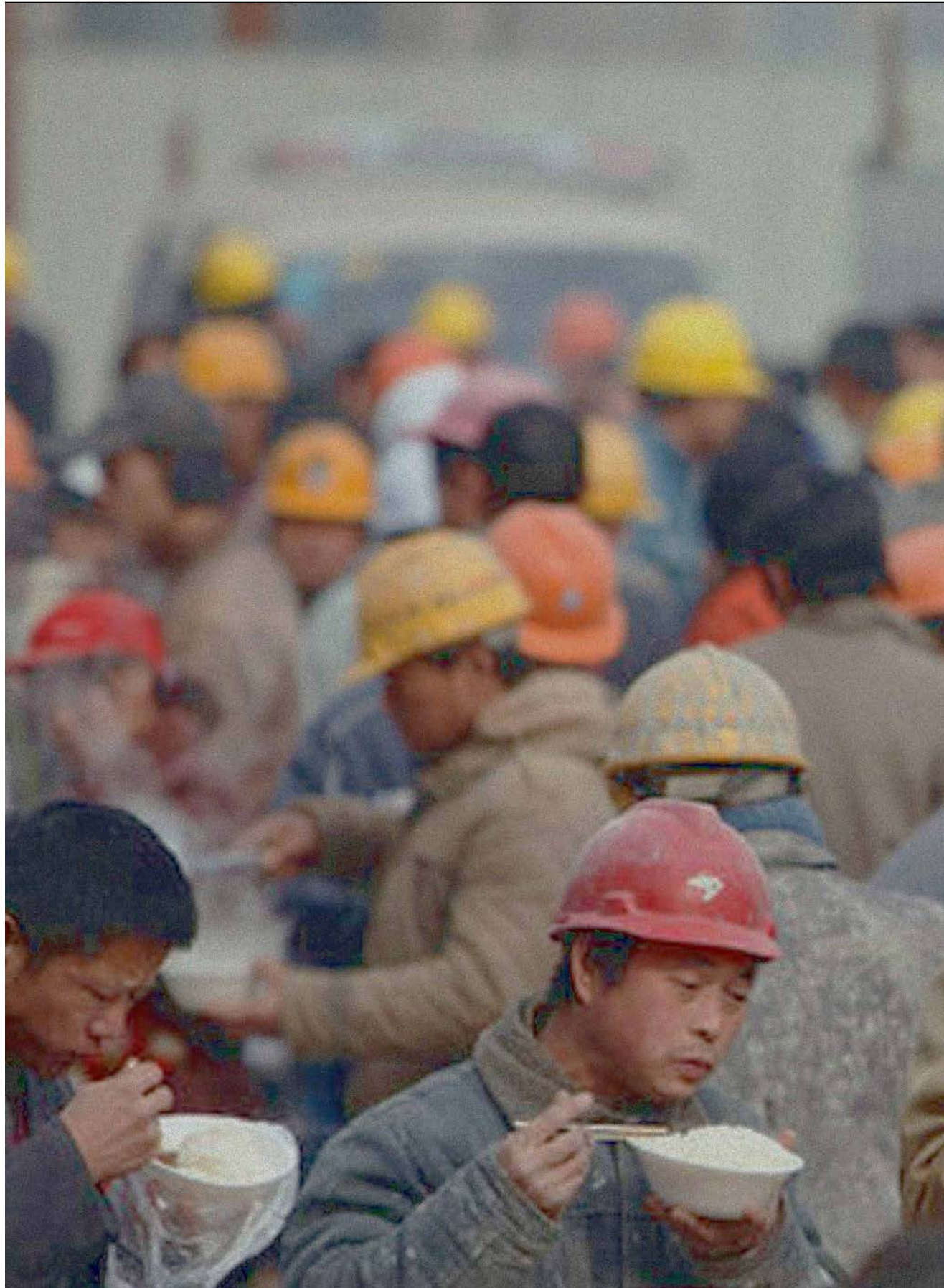




01 In-site Living Zone

02 Linear Perimeter

03 Separated Living Zone

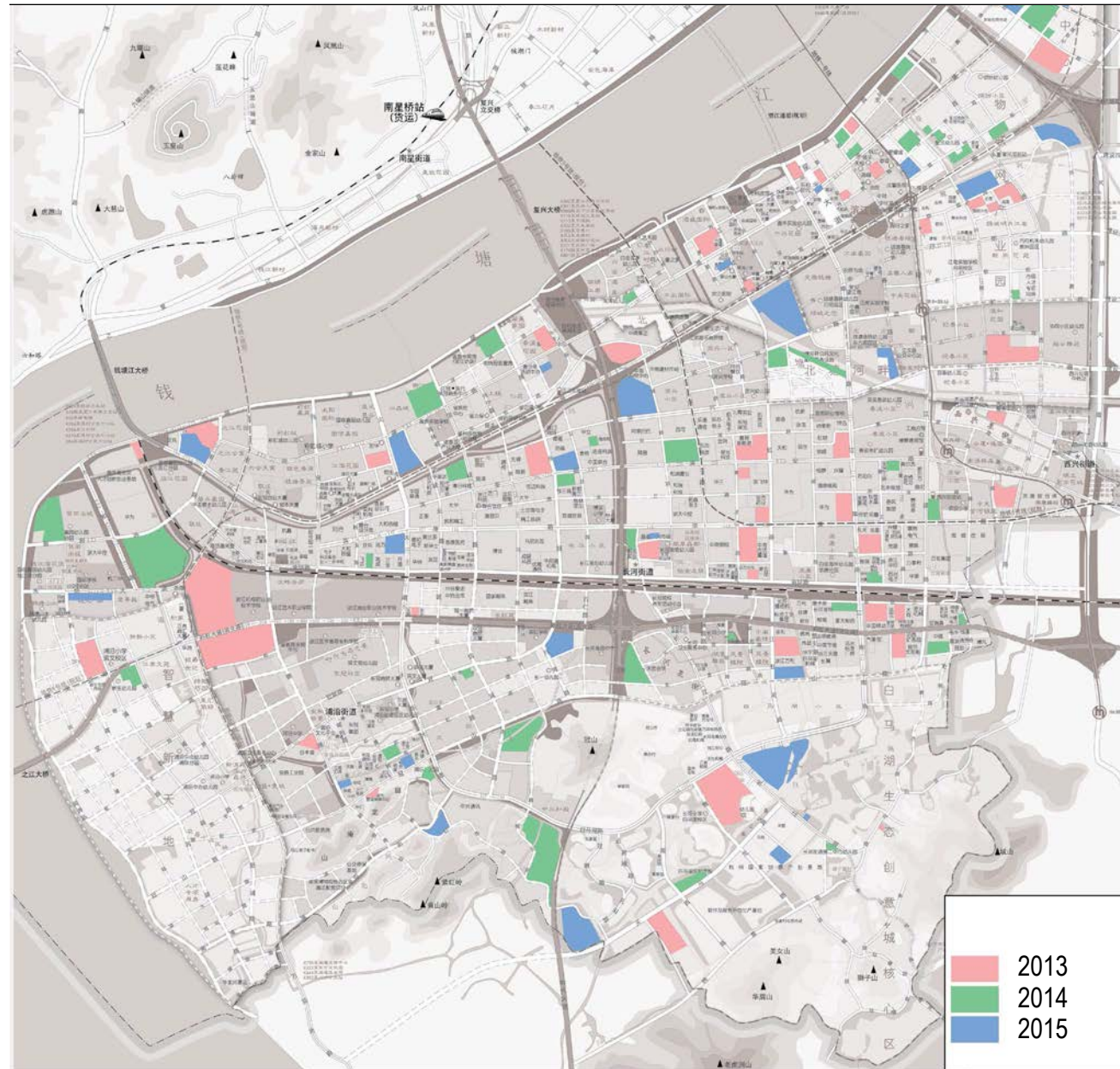


seek for the infrastructure/ program that links construction workers together/ with other citizens

CHAPTER III

THE INVISIBLE NETWORK

case study - A city under construction
physical and informational infrastructures
programs as connectors

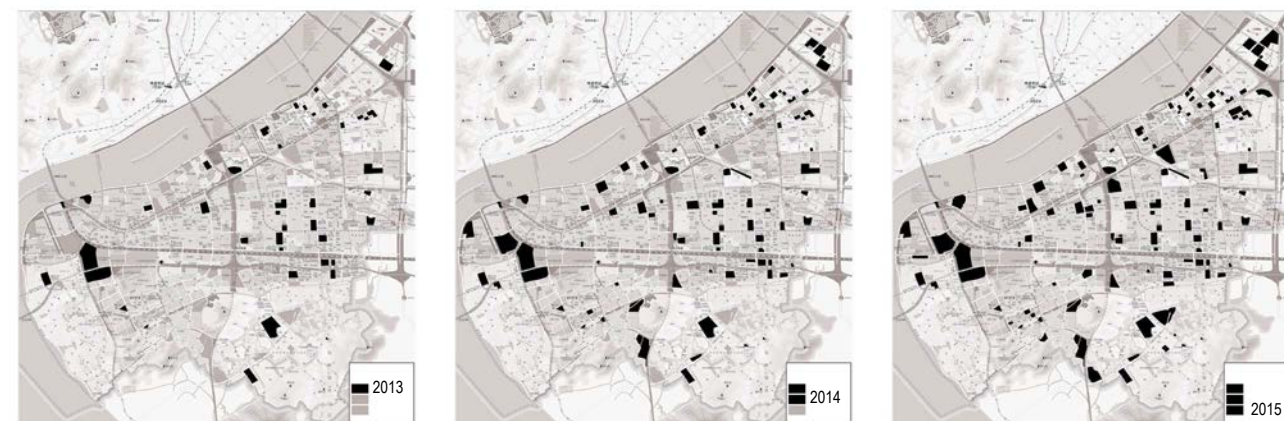


Construction projects in Xiaoshan development zone within three years (from 2013 to 2015)

Vast land is converted into construction sites, which act as the “incubator” of a new city.

Although the majority of working and living activities of migrant construction workers happen in the construction sites isolated from the rest of the city, we should not regard each construction site as separated individual object. As a result of their extremely big scale and density, construction sites together create an invisible network, a second layer of urban fabric, superimposed on the existing city context. Existing urban identities are driven away by the overwhelming scaffolds and fencing walls. There’s no old city or young city; there’s no busy city or quiet city. There is only city under construction.

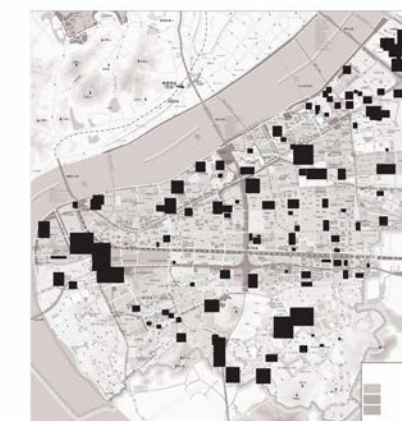
In this chapter, the networks (both infrastructure and program) between multiple construction sites are studied through the case of Xiaoshan development zone. Xiaoshan is an emerging city located at the east coast of China with more than 15% of its land converted into construction sites today. As a typical city-making process, the construction of Xiaoshan brings a great number of migrant construction workers into the development zone, meanwhile triggering small business reactions around its construction sites. By studying the physical and implied connections between the sites, I am trying to find the infrastructure as well as program that can potentially link migrant construction workers together or even with other citizens.



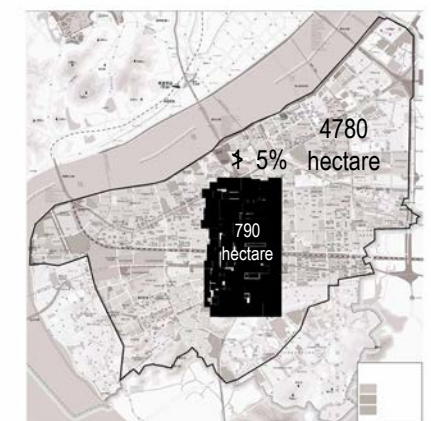
active construction sites



approximate land area for construction related activities



combined land area for construction related activities (over 15%)



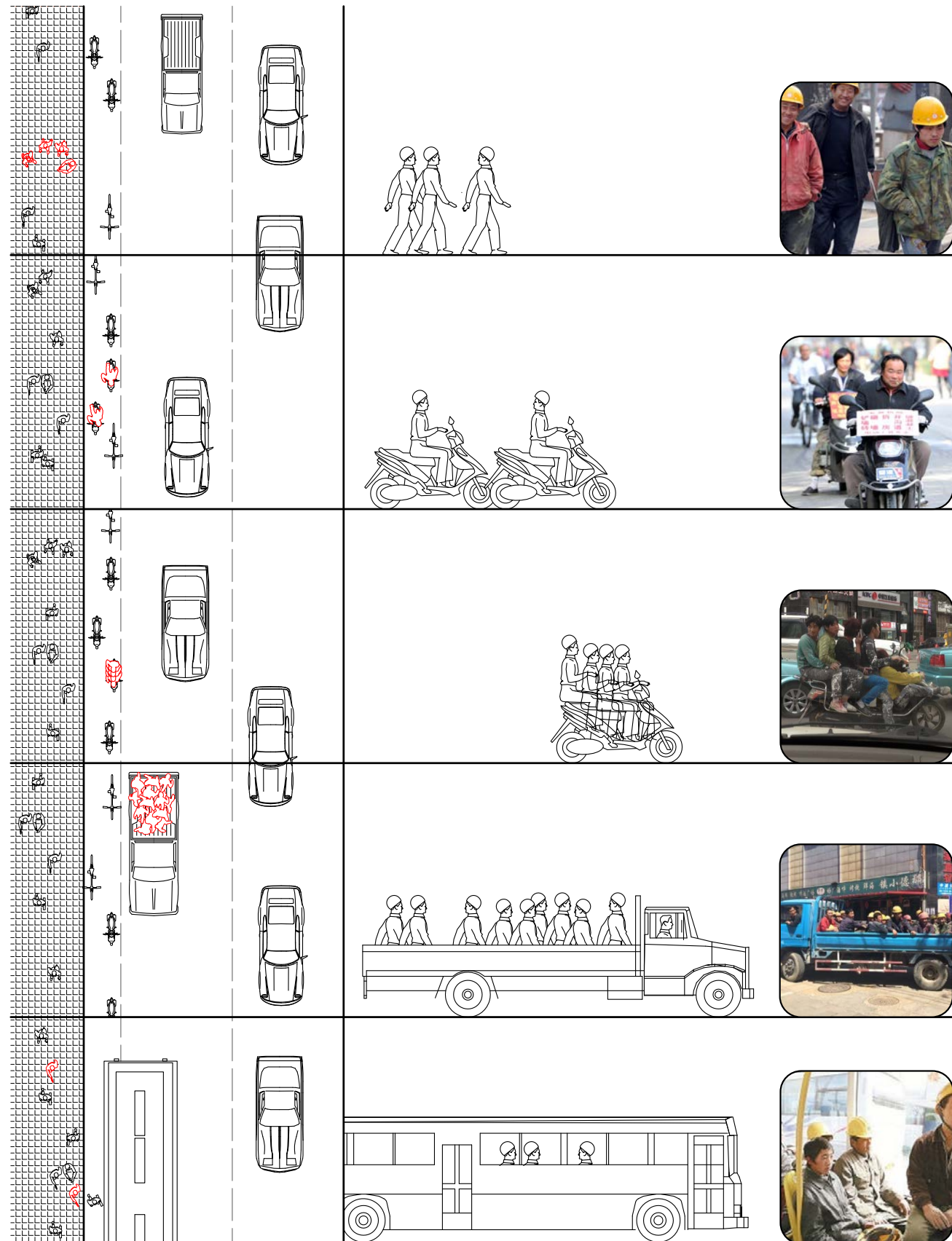


Roads as the existing infrastructure before the “city making” process



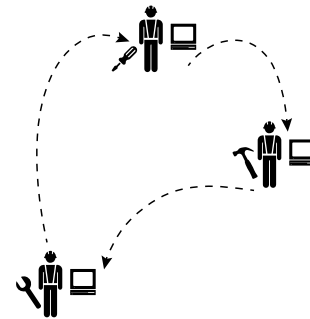
Various construction sites are physically linked by the roads. However, each of them is segregated by its own fencing walls.

Road is an infrastructure that physically links construction sites together. A close look at the north section of Xiaoshan development zone (riverfront) reveals the hierarchical and sequential arrangement of its road infrastructure system. Shidai Ave (1). runs North-South across the riverfront area in the middle, connecting the city of Hangzhou to the north and S30 express way to the south. It is the main road through which construction vehicles and trucks first bring raw material and prefabricated building parts to the site. After exiting from Zhongxing Motorway Exchange (2), the construction traffic runs East-West into Binsheng Rd. (3). Then through a series of small roads pointing north towards river, the construction traffic turns into Wentao Rd. (4). Through Wentao Rd. (4) construction vehicles and trucks finally arrive at their respective site destinations.

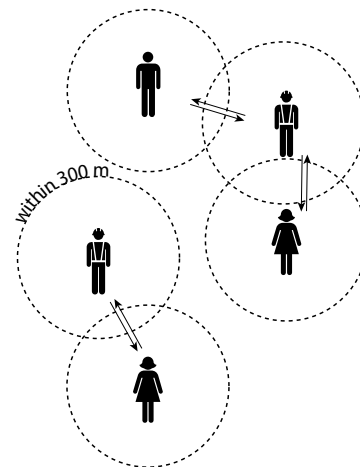


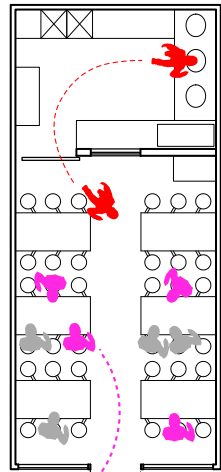
Construction sites are relatively isolated to each other and have little material exchange, because they usually belong to different construction companies with different contractors and subcontractors. However, inter-site labor exchange often happens between these construction sites. Once a construction site is short of hands, its labor-use facilitator will borrow construction workers from sites nearby. Thus, the road in between become the conductor of labor flow.

There is no particular vehicle or road system designated for inter-site labor transportation. Construction workers often travel by foot or on their electrical bicycle. Sometimes workers are seated at the back of a pickup truck when they are traveling together. The overlapping of construction vehicular traffic and local traffic makes it dangerous and problematic for both parties.



Apart from physical infrastructures, there are informational infrastructures that play the role of connectors between migrant construction workers and the rest of the city. Online organizations, such as construction of the home and construction industry council, provide platforms for professional information exchange. Construction workers from different area can help each other find job opportunities, learn construction skills and consult legal issues. Social networking Apps, such as QQ or Wechat, allow migrant workers make friends to each other (sometimes even to local citizens). With friend-seeking extensions, such as “shake it” and “people nearby”, these cellphone-based apps can detect individuals using the same application within a certain perimeter (300m). From total strangers to acquaintances, hundreds and thousands of migrant construction workers build up their invisible network based on the informational infrastructures.





snack bar

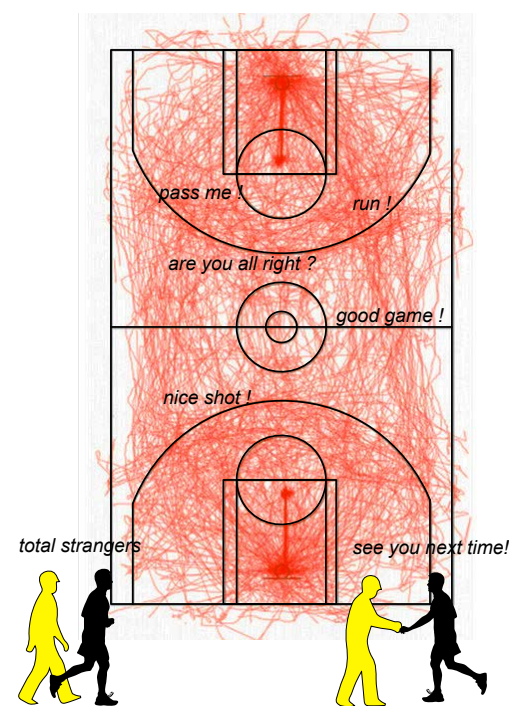
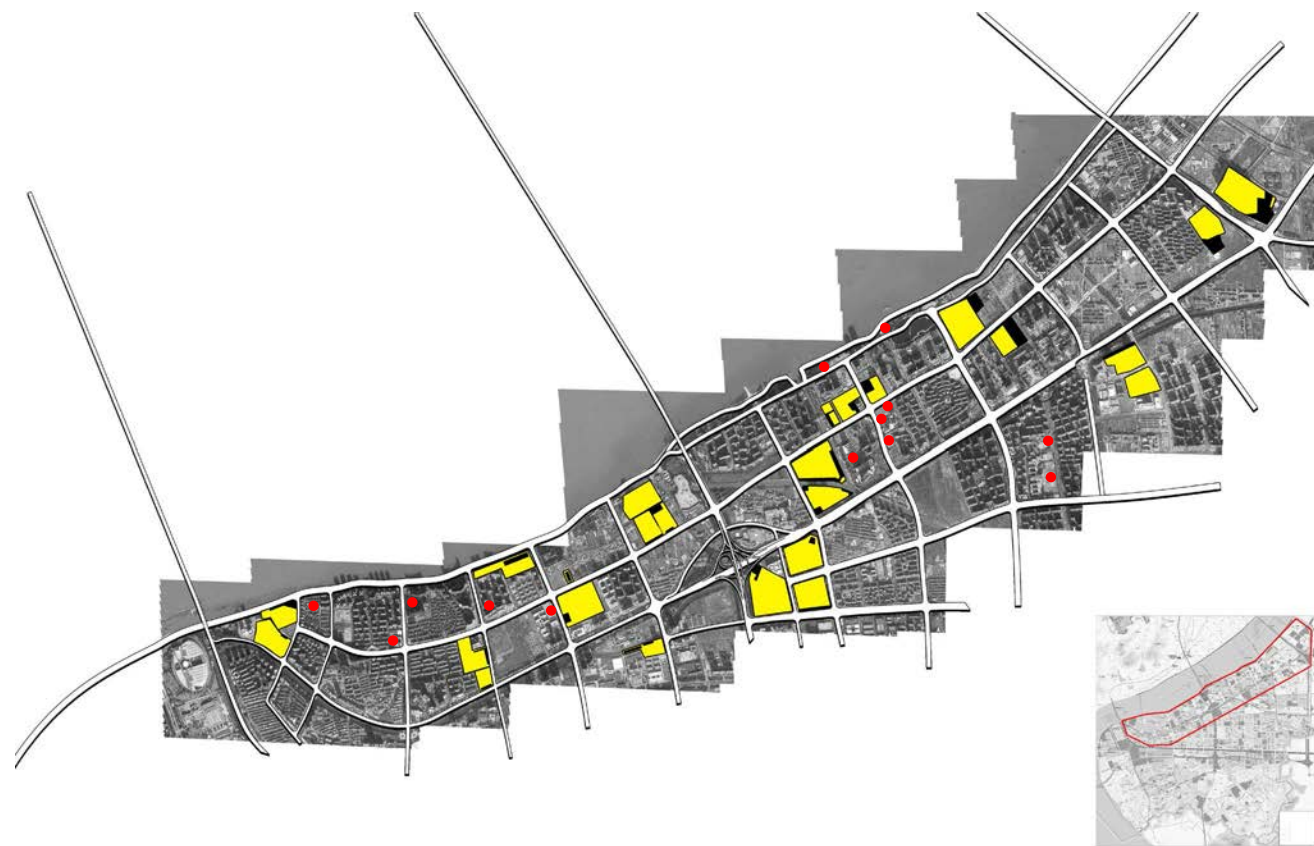


food vendor



night food market

The common need for food (or better food) brings construction workers from different sites out of their respective fencing walls, gathering them around food vendors, snack bars or night markets. Through the event of eating, migrant workers and citizens congregate and communicate with each other. Usually, this kind of connection based on eating creates a linear pattern along the road, enriching the streetscape between construction sites.



basketball

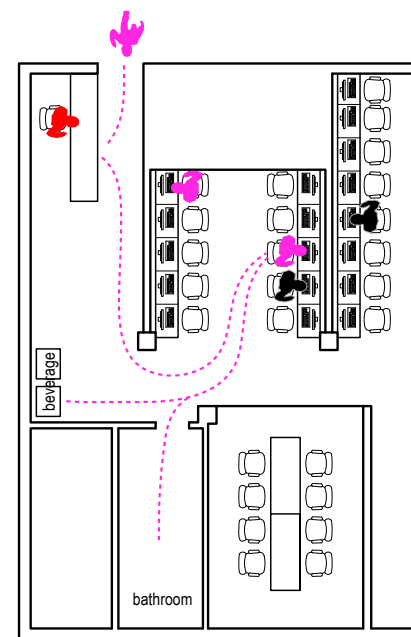


ping pong



football

Sport is another program that links construction workers to the city. The most popular sports among them are basketball, pingpong and football. After finishing their jobs for the day, the workers go to public playgrounds in schools, hospitals, or parks nearby and seek for game matches. Often after several games, total strangers become friends to each other. However, not all playgrounds are available for migrant construction workers. Some sport fields in local high schools and companies require identification check.



online games

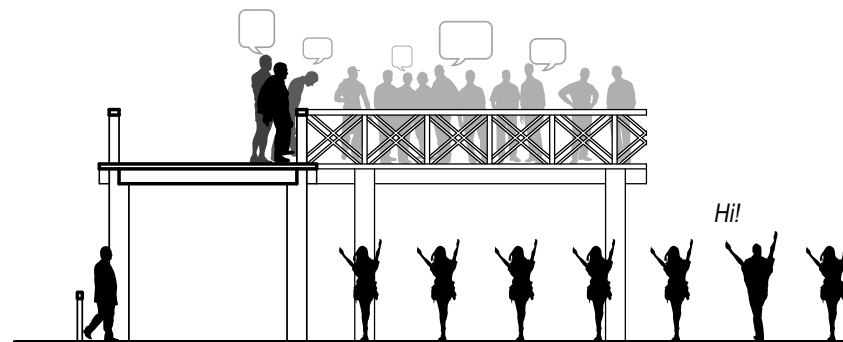


vedio chat with family



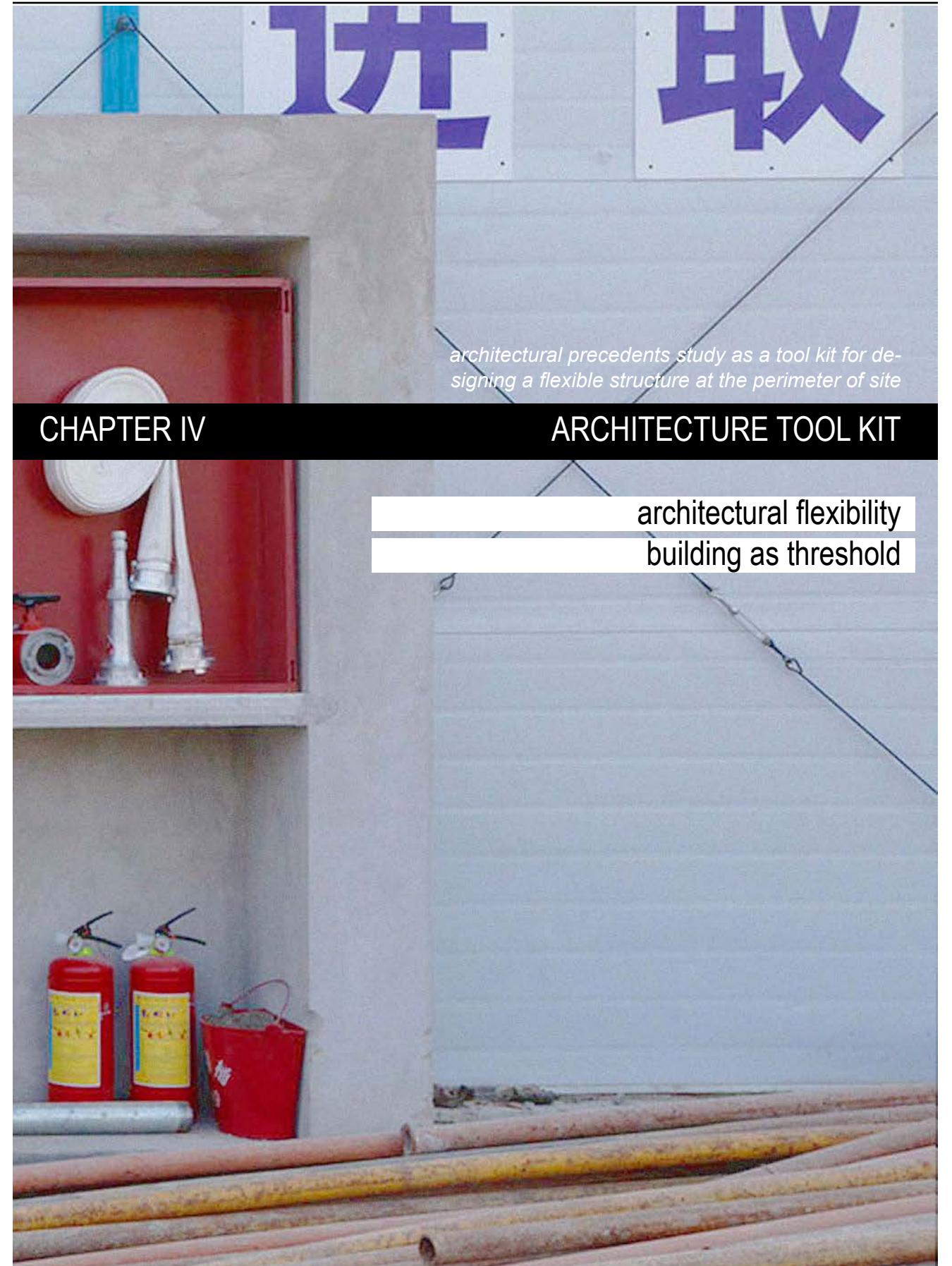
news/learning

Since Internet is not provided in construction sites and cellphone charges are relatively expensive, many construction workers go to Internet bar for relaxation and entertainment. Through online game playing, video chatting and website visiting, the workers get connected with people far away. However, they have nearly zero communication with people sitting next to them. Usually, this kind of congregation based on Internet bars creates a scattered pattern. Internet bars act as islands while workers travel a distance to get connected.



The majority (90% of the migrant construction worker population is male. So there is a very strong need for communication and interaction with people from the opposite sex. After work, some construction workers will seek for prostitution in the city, which is illegal in China, while others will go to public squares/parks and meet women there. Square Dance is one kind of popular event that gets women in squares and parks. It gains its popularity among females with an average age of 45. Since square dance normally happens between 7:00-9:00 p.m., most male construction workers can watch or even participate in the event. Such event acts as a catalyst that stimulates social interactions between males and females, migrants and citizens. The conversation topic is not necessarily limited to woman though. Migrant workers, with similar social and cultural background, from all the surrounding construction sites congregate there, discussing living experiences, job opportunities, working skills, anecdotes, etc.





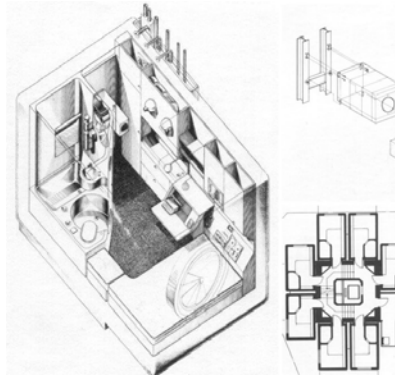
architectural precedents study as a tool kit for designing a flexible structure at the perimeter of site

CHAPTER IV

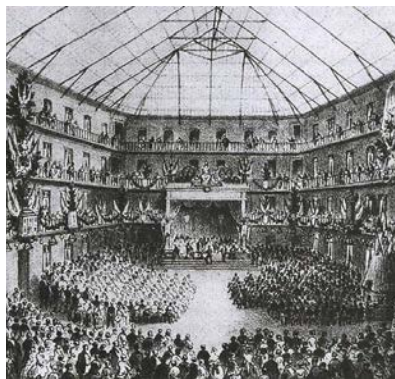
ARCHITECTURE TOOL KIT

architectural flexibility
building as threshold

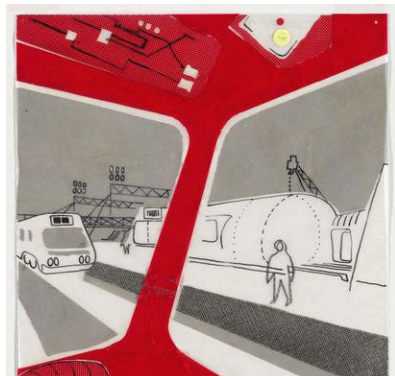
FLEXIBILITY



Capsule Tower. Kisho Kurokawa

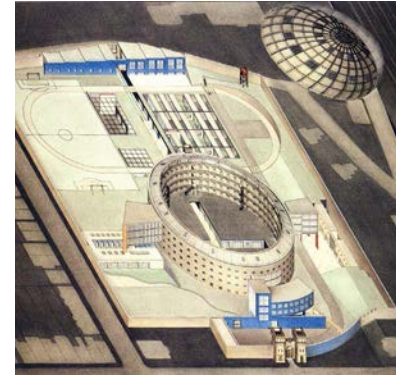


Familistère. Jean-Baptiste André Godin

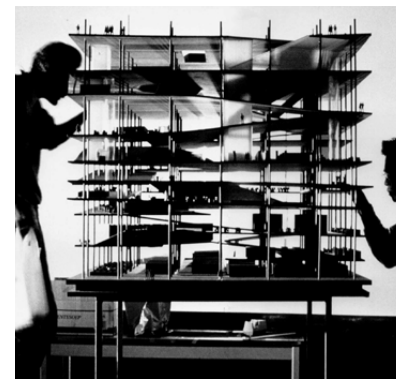


Pottegies Thinkbelt. Cedric Price

THRESHOLD



Koepel Panopticon Prison. OMA



2 Bibliothèques Jussieu. OMA



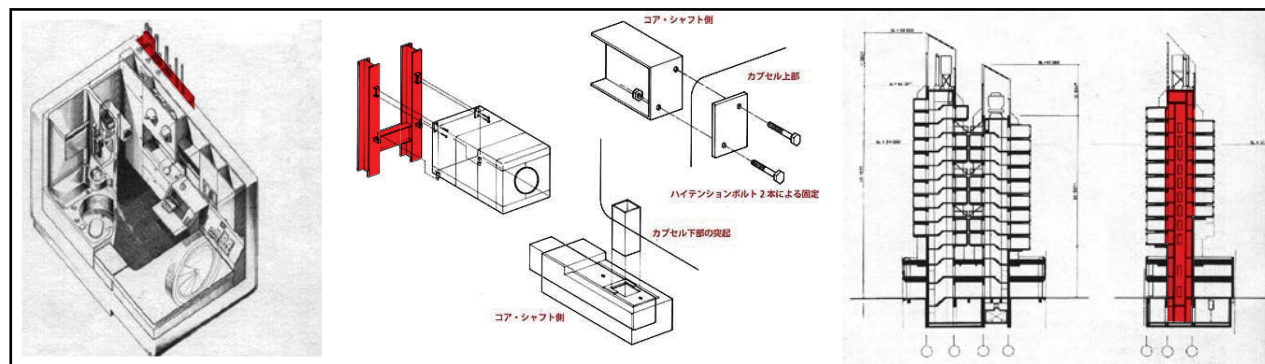
Administration-school. Lucien Kroll/
Barbican Centre. CPB

In order to anticipate the future migrant workers' dwellings as parasitic structures, preserving and improving the invisible networks around construction sites, two architectural principles should be put into consideration: architectural flexibility and building as threshold. On one hand, as a prototype, the proposed worker's dwelling structure should be reconfigurable according to its live/work program requirements and adaptable according to its site context. On the other hand, because of its special location at the perimeter of a construction site, the structure should act as a threshold that mediates between the public vernacular streetscape and the inner community of migrant workers.

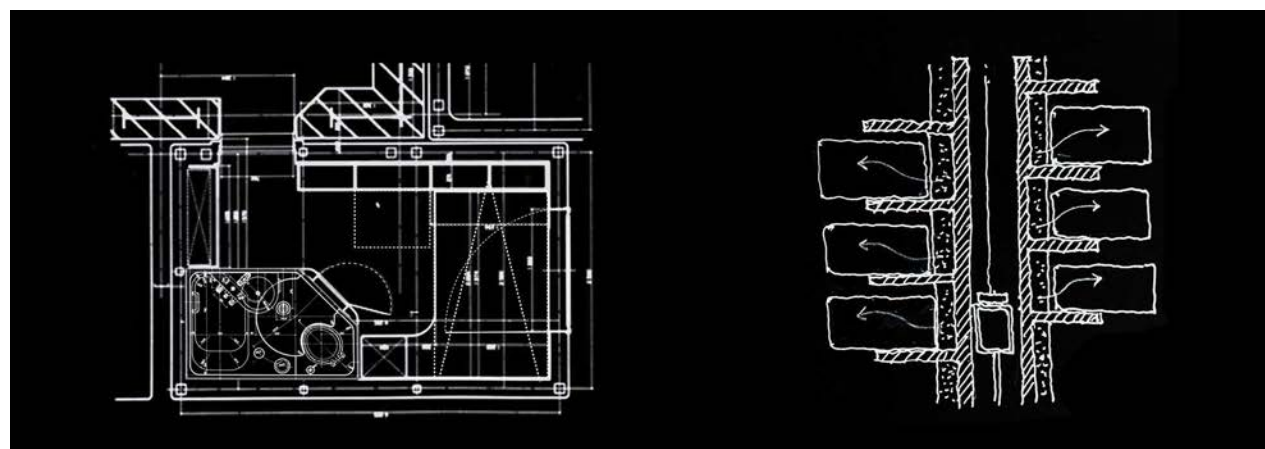
In this chapter, several architectural precedents are studied here as spatial devices in order to see how the concept of architectural flexibility and building as threshold can be applied to migrant construction workers' dwelling situation in China. The precedents regarding architectural flexibility are: Capsule Tower by Kisho Kurokawa, Familistère by Jean-Baptiste André Godin, and Pottegies Thinkbelt by Cedric Price. The precedents on architecture as threshold are: Koepel Panopticon Prison by OMA, 2 Bibliothèques Jussieu by OMA, Administration-school by Lucien Kroll and Barbican Centre by CPB.



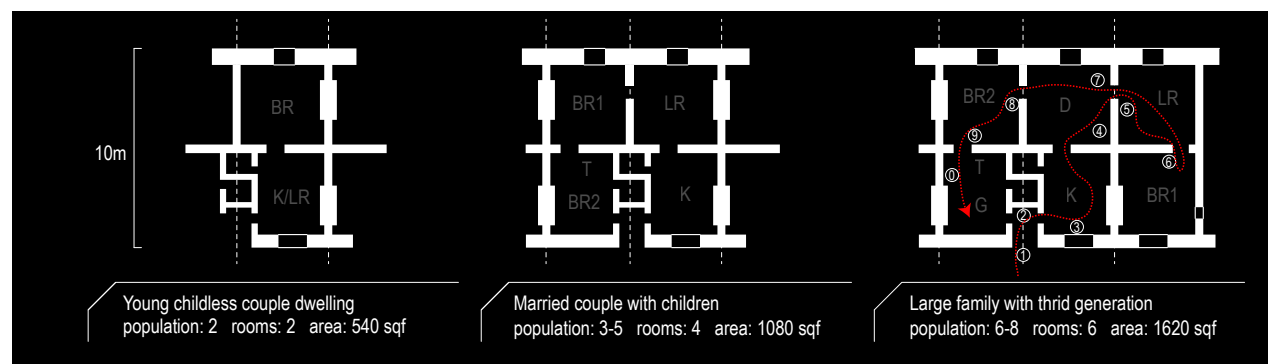
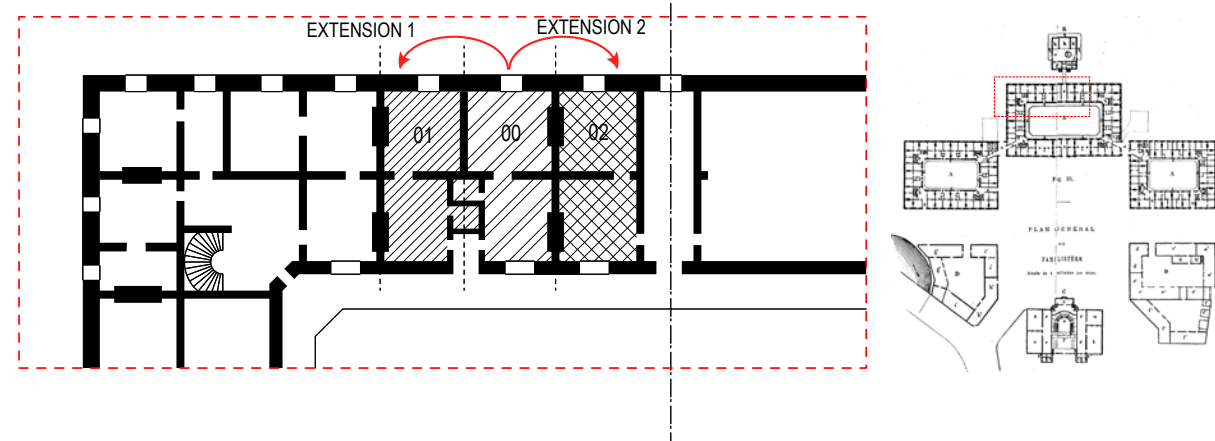
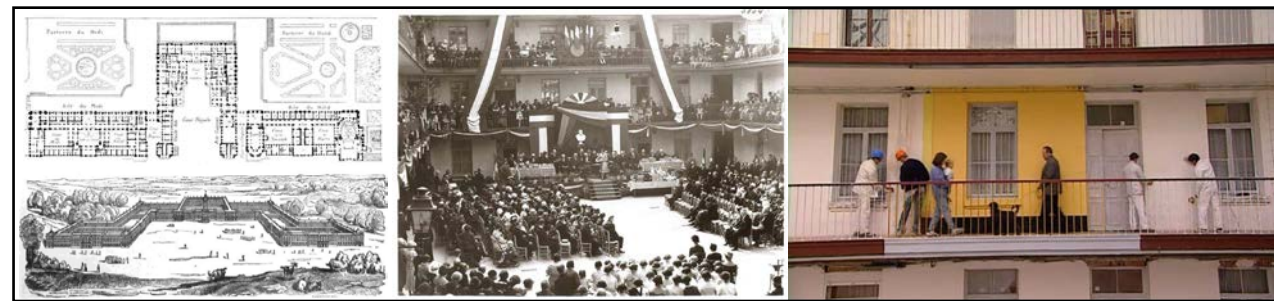
Each unit in Kurokawa's Capsule Tower is designed with great spatial efficiency. Inside each highly compact unit, with only 10 square meters' floor area, nearly all the living requirements, such as sleeping, bathing, studying, and news-watching, are satisfied by its carefully designed utility walls. Its transformable enclosure components with built-in furnitures enable program overlapping within the limited space. For example, the lower part of the book shelf can be pulled down and function as a desktop for working; the washbasin in the bathroom serves as a faucet for the bathtub on its side.



The flexibility of Capsule Tower depends greatly on its centralized core design. The central core not only functions as a means of vertical circulation, provides structural support for capsule units, but also embeds building systems such as HVAC, water supply/drainage, and electricity. Such idea of "structure + modulated units" can be found in many 1960s situationist projects as well as metabolist ones.



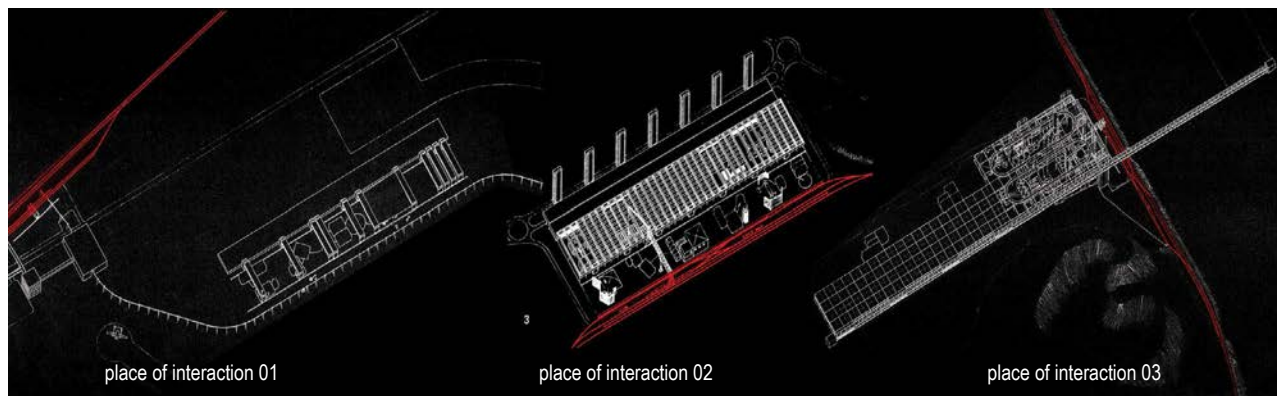
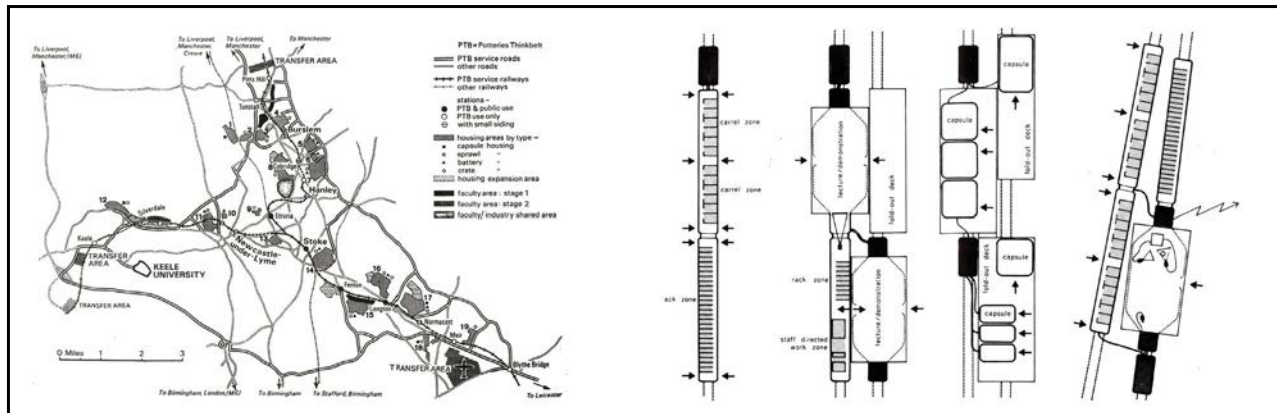
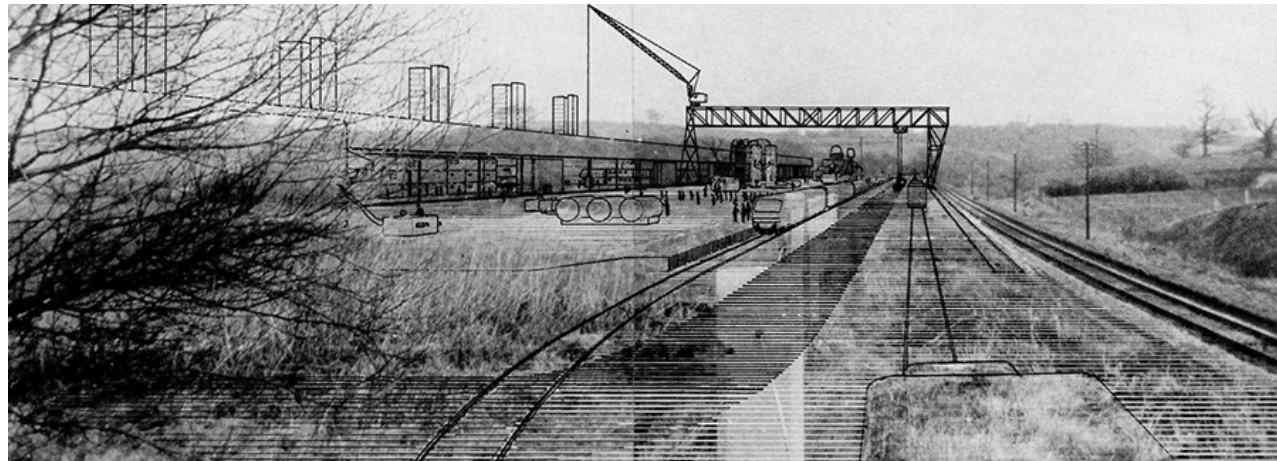
Transformable enclosure components enable program overlapping within a limited space. Built-in furniture maximizes spatial efficiency. Central core not only acts as vertical circulation but also provides building systems as well as structural support for dwelling units.



Housing units in Familistère are extendable. As the size of a family grows or reduces, the spatial condition can be adjusted accordingly without the constrain of its physical boundary. Capital and populational variations can be revealed implicitly by unit sizes. Some utilities are imbeded in party walls, making it convenient for unit extension.

Familistère by Jean-Baptiste André Godin is a social palace designed for industrial workers. The concept of Familistère is inspired by Charles Fourier's Phalanstère. As an architectural manifestation of the Utopian Socialist Movement, Familistère proposes a new social order whose founding unit is a small community of people who live and work in the same building. There is no social hierachy. Workers, engineers and factory owner lives together in this social palace. Familistère was a self-sustainable city with covered courtyard space served as village piazza.

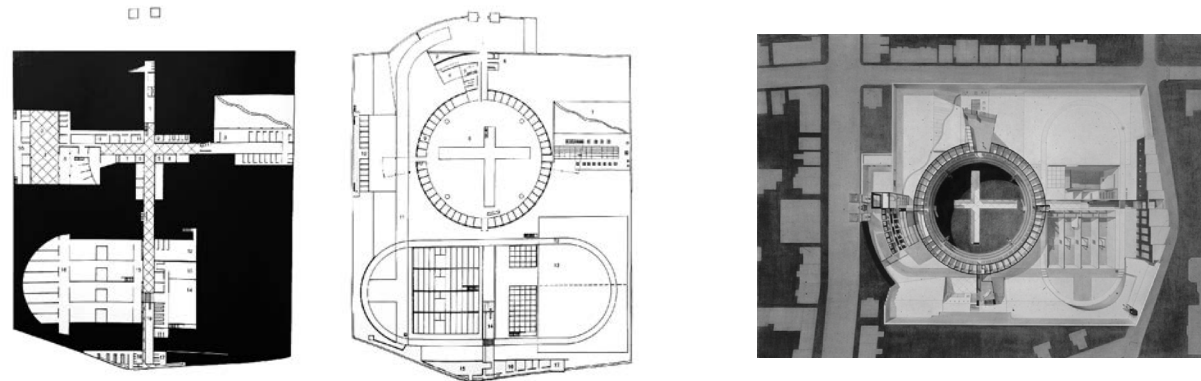
Although Familistère is a relatively static building, constructed by brick structure, architec-tural flexibility is achieved by its modulized dwelling units. Housing units in Familistère are extendable. As the size of a family grows or reduces, the spatial condition can be adjusted accordingly without the constrain of its physical boundary. Capital and populational variations can be revealed implicitly by unit sizes. Some utilities are imbeded in party walls, making it convenient for unit extension. This idea of unit extension and progressive accumulation has the potential to be applied to the dwelling condition of Chinese migrant workers.



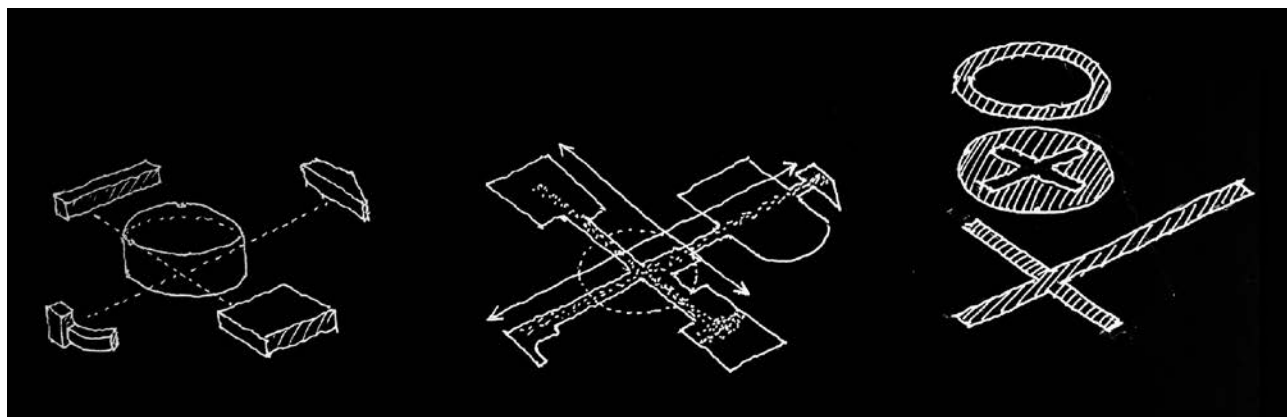
In the Potteries Thinkbelt project, Cedric Price brings the concept of architectural flexibility to an urban scale. The Thinkbelt is an infrastructure/university project designed for 20,000 students, but with provision for 40,000 residential units that were flexible in form and adaptable to possible relocation and aggregation. By utilizing existing infrastructures (railroad, trainstation, airport, etc.), architectural adaptability is suggested through a parasitic development process. Through stacking, insertion, combination, and re-configuration, modulated units create places of interaction on specific spots along the railway, linking old infrastructure back to the city.

This kind of strategic implementation should be applicable in Chinese construction sites, since various construction areas can provide not only land but also labor and funds for the structure. With the incorporation of local structures such as transportation centers, markets or parks, the new structure can link migrant workers to the larger plurality of a city's social life.

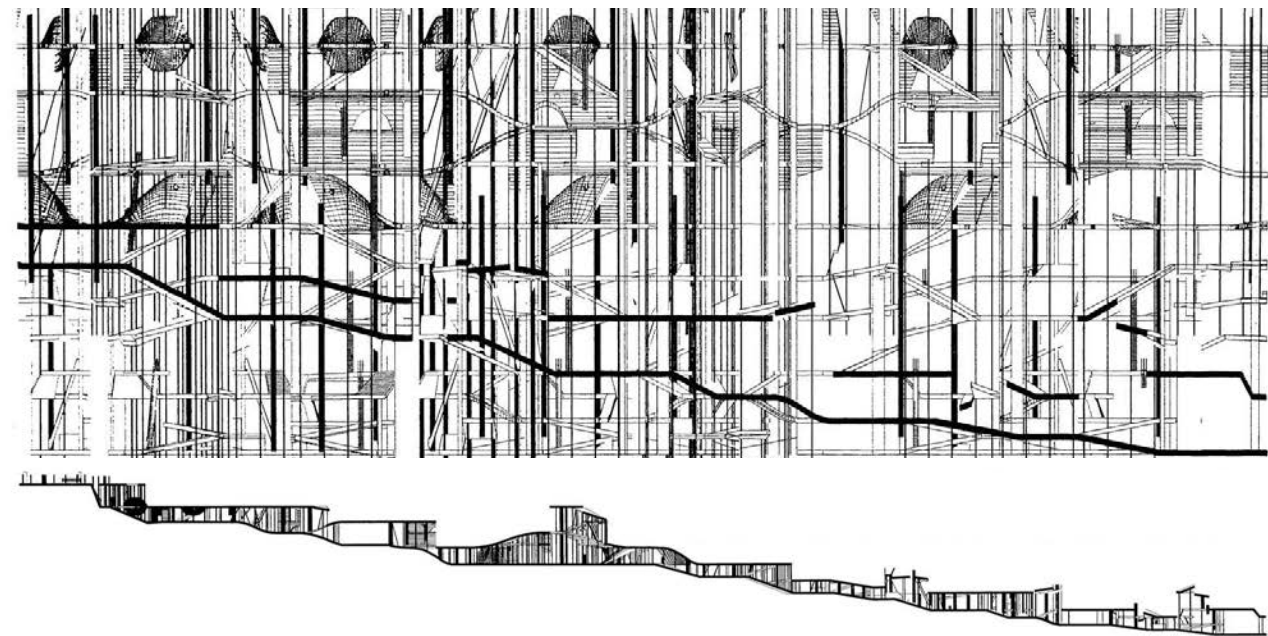
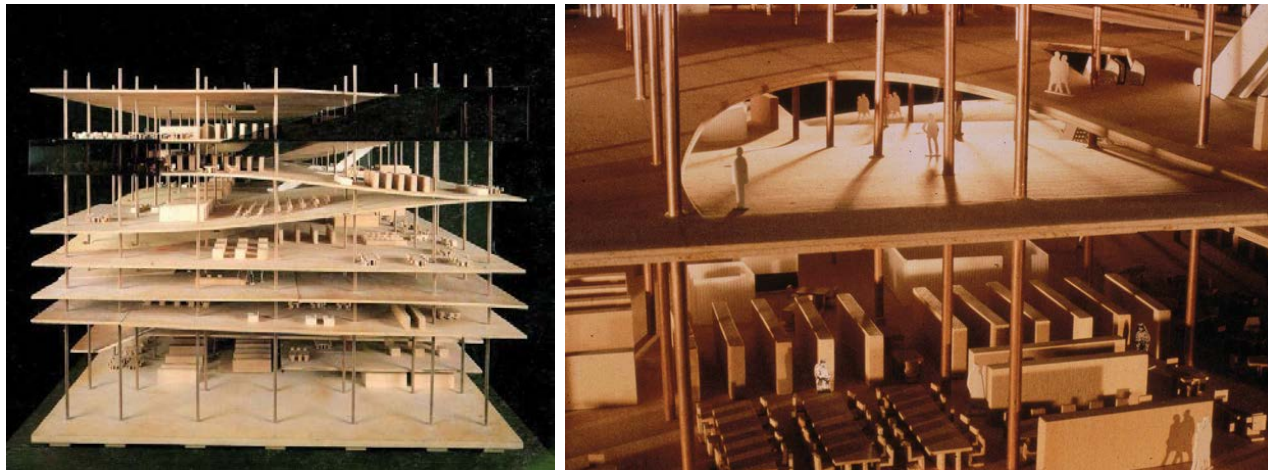
Architectural adaptability is suggested through a parasitic development process, utilizing existing infrastructures. Through stacking, insertion, combination, and re-configuration, basic units create places of interaction on specific spots along the railway, linking old infrastructure back to the city.



In Koepel Panopticon Prison project, OMA explores the concept of limited publicness through the device of threshold. Linear passages, as thresholds with great emphasis on directionality, not only link isolated building objects to each other, but also act as separators between areas with different publicness. Sense of enclosure and destination prevent distraction and chaos. Thus, under this spatial device, the seemingly contradictory demands, freedom and discipline, are satisfied.



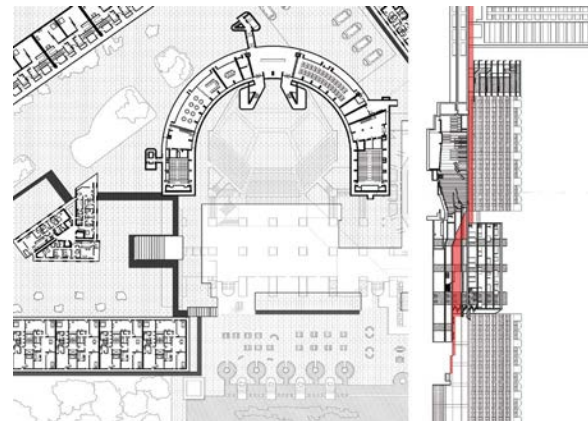
Linear passages, as thresholds with great emphasis on directionality, not only link building objects to each other, but also act as separators between areas with different publicness. Sense of enclosure and destination prevent distraction and chaos.



The spatial division between different programs are blurred by abandoning vertical walls, although each program is still well defined by sloped floor plates. The concept of threshold is redefined by incorporating programs to the passage, making vertical movement a continuous experience.

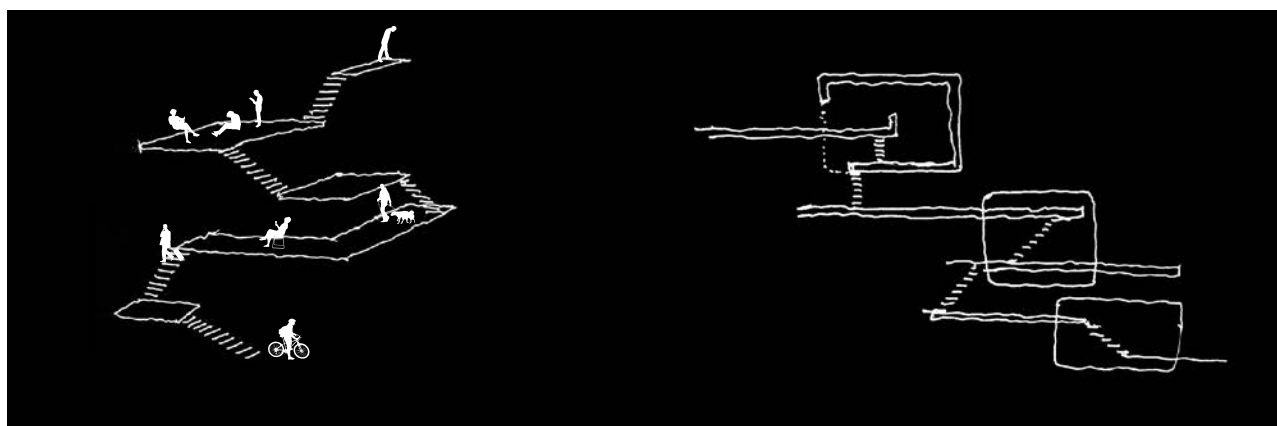
The circulation paths in 2 Bibliotheques Jussieu by OMA are densely programmed. The spatial division between different programs are blurred by abandoning vertical walls, while each individual program is still well defined by sloped floor plates. The concept of threshold is redefined by incorporating programs to the passage, making vertical movement a continuous experience. And in return, dynamic movement facilitates the static programs.

In the case of a Chinese construction site, the threshold between the inner world of construction and its surroundings can be thickened and programmed with activities anticipate participation from both sides.

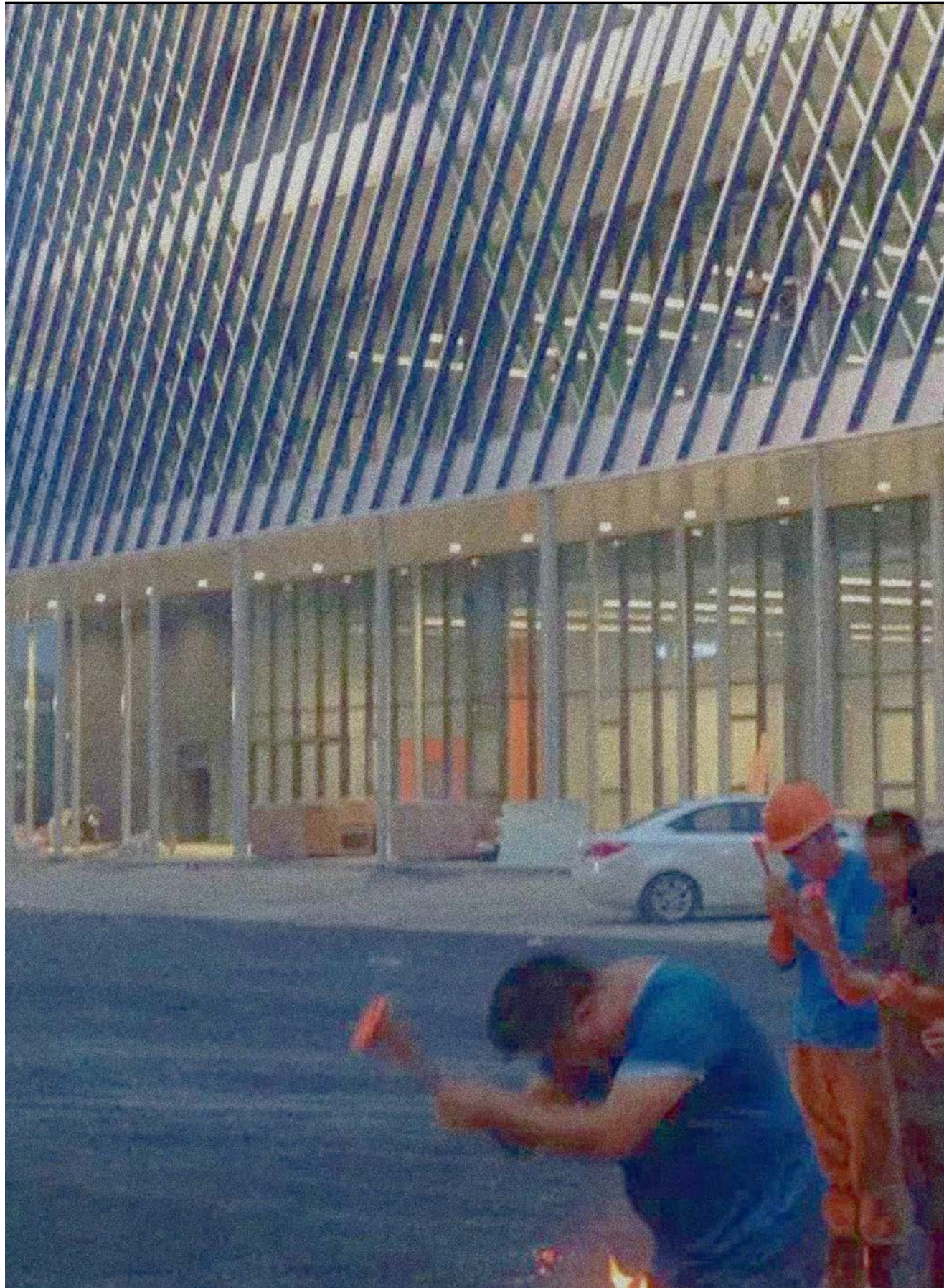


In both Lucien Kroll's Administration-school project and the Barbican Centre by CPB, the concept of "platform" is represented elegantly. Horizontal floor plates on different levels act as "platforms", which holds various civic events. In the Administration-school project, the logic of continuous flow is revealed by its secondary circulation paths (i.e. fire stairs) on the roof and facades. These stairs act as direct link between platforms. With such a network of passages, people can come from anywhere, from the cellars to the attics and terrace staircases, from the walkways, etc. Shared platforms and passages offers stage for empathy to emerge and the space for mutual understanding to develop.

While in the Barbican Center project by CPB, building blocks creates threshold which mediates between different levels. In this case, the transition parts between levels are not exposed but instead hidden inside building blocks. As a result, the idea of platform overpowers passage; the concept of programmatic diversity overpowers the logic of continuous circulation flow.



Horizontal floor plates on different levels act as "platforms", holding various civic events. In the Administration-school project by Lucien Kroll, secondary circulation paths (i.e. fire stairs) act as direct link between platforms. While in the Barbican Center project by CPB, building blocks creates threshold which mediates between different levels.

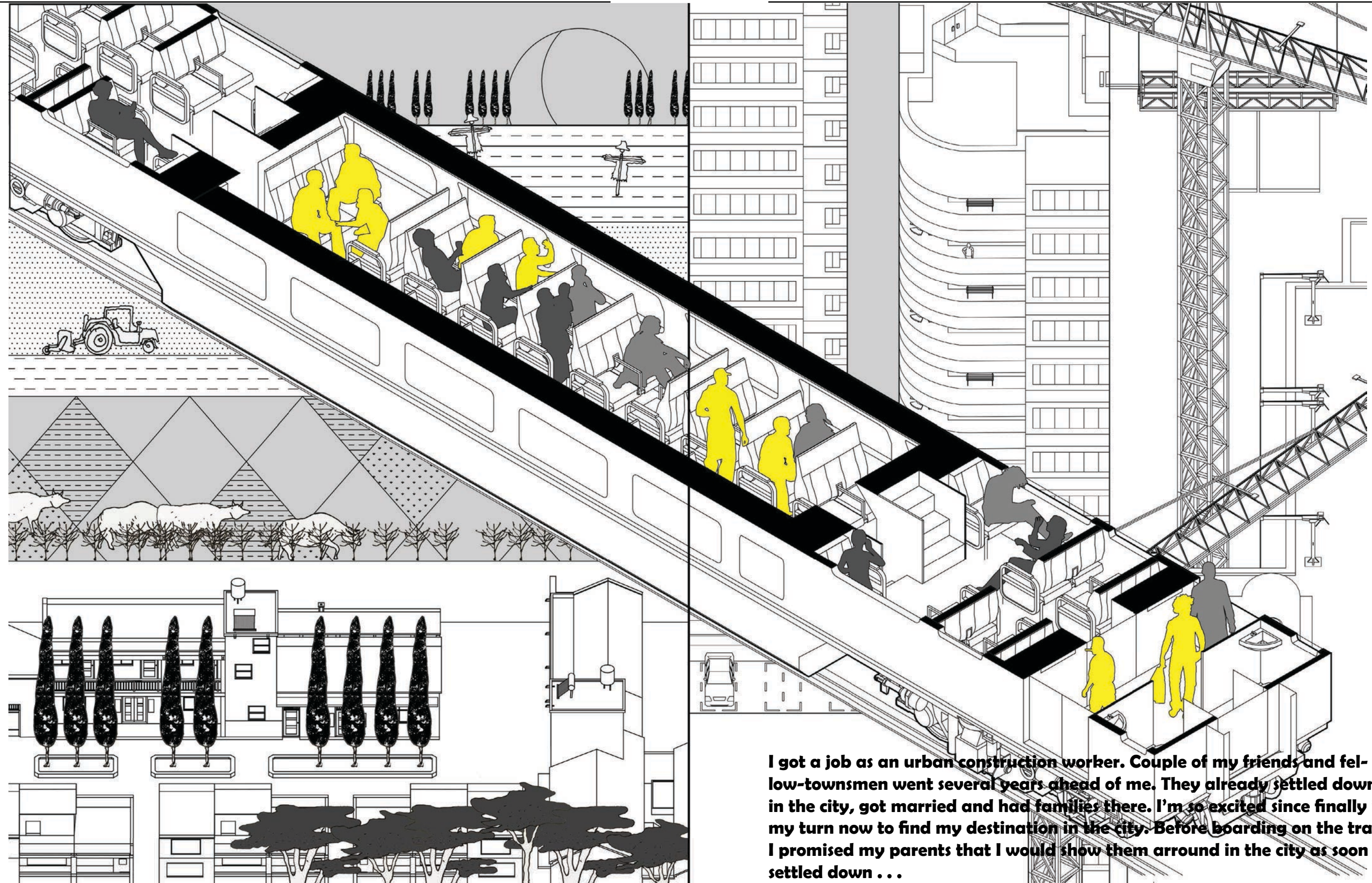


propose a parasitic structure around construction sites to operate as a threshold between migrant construction workers and a city's social life

CHAPTER V

STRATEGIC PROPOSAL

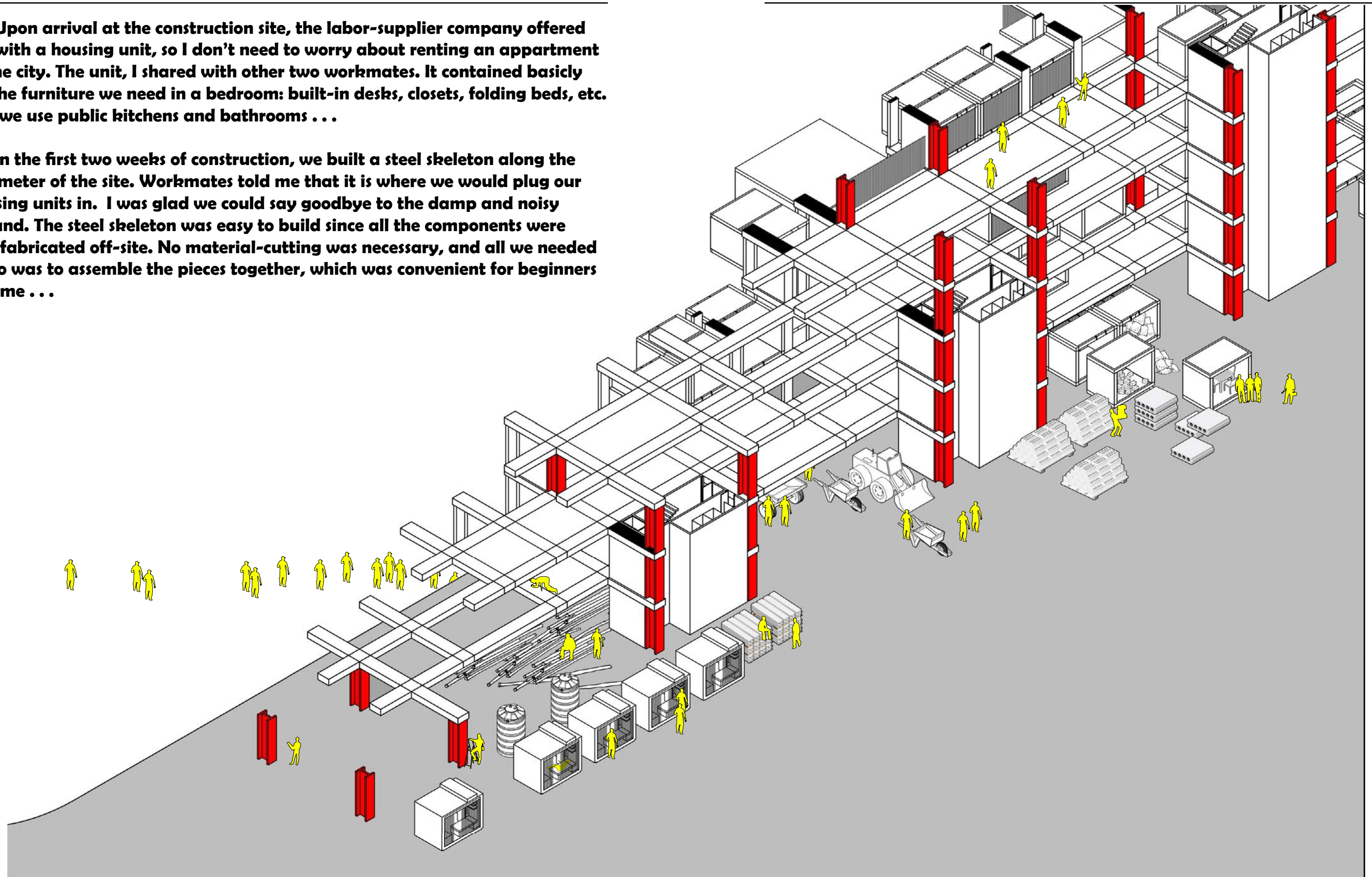
from the countryside to the city
from the skeleton to plug-in units
programmed threshold
reconstruct the invisible network
parasitic lifestyle
from workers' dorm to migrant community

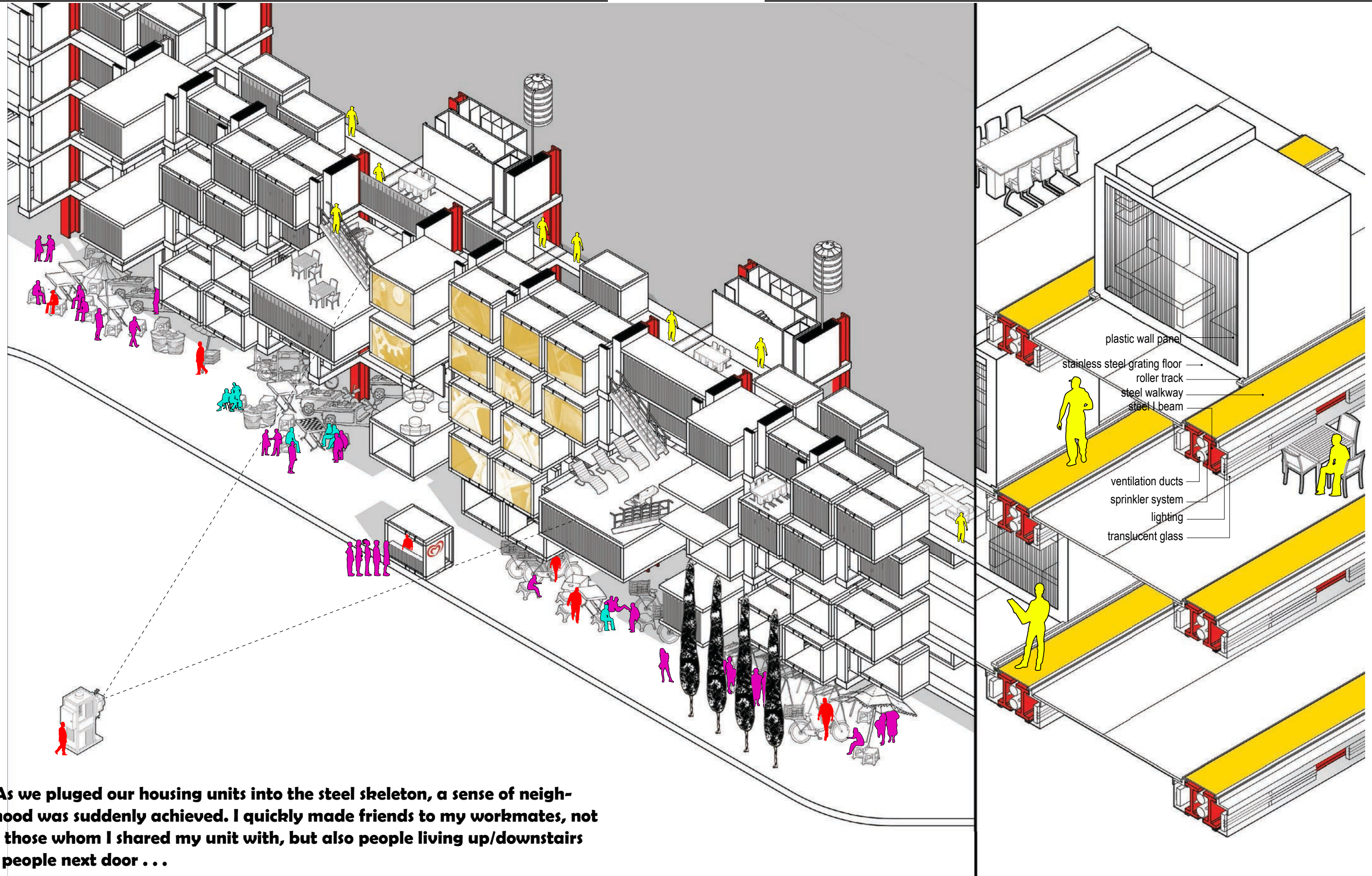


I got a job as an urban construction worker. Couple of my friends and fellow-townsmen went several years ahead of me. They already settled down in the city, got married and had families there. I'm so excited since finally it's my turn now to find my destination in the city. Before boarding on the train, I promised my parents that I would show them around in the city as soon as I settled down . . .

... Upon arrival at the construction site, the labor-supplier company offered me with a housing unit, so I don't need to worry about renting an apartment in the city. The unit, I shared with other two workmates. It contained basically all the furniture we need in a bedroom: built-in desks, closets, folding beds, etc. But we use public kitchens and bathrooms ...

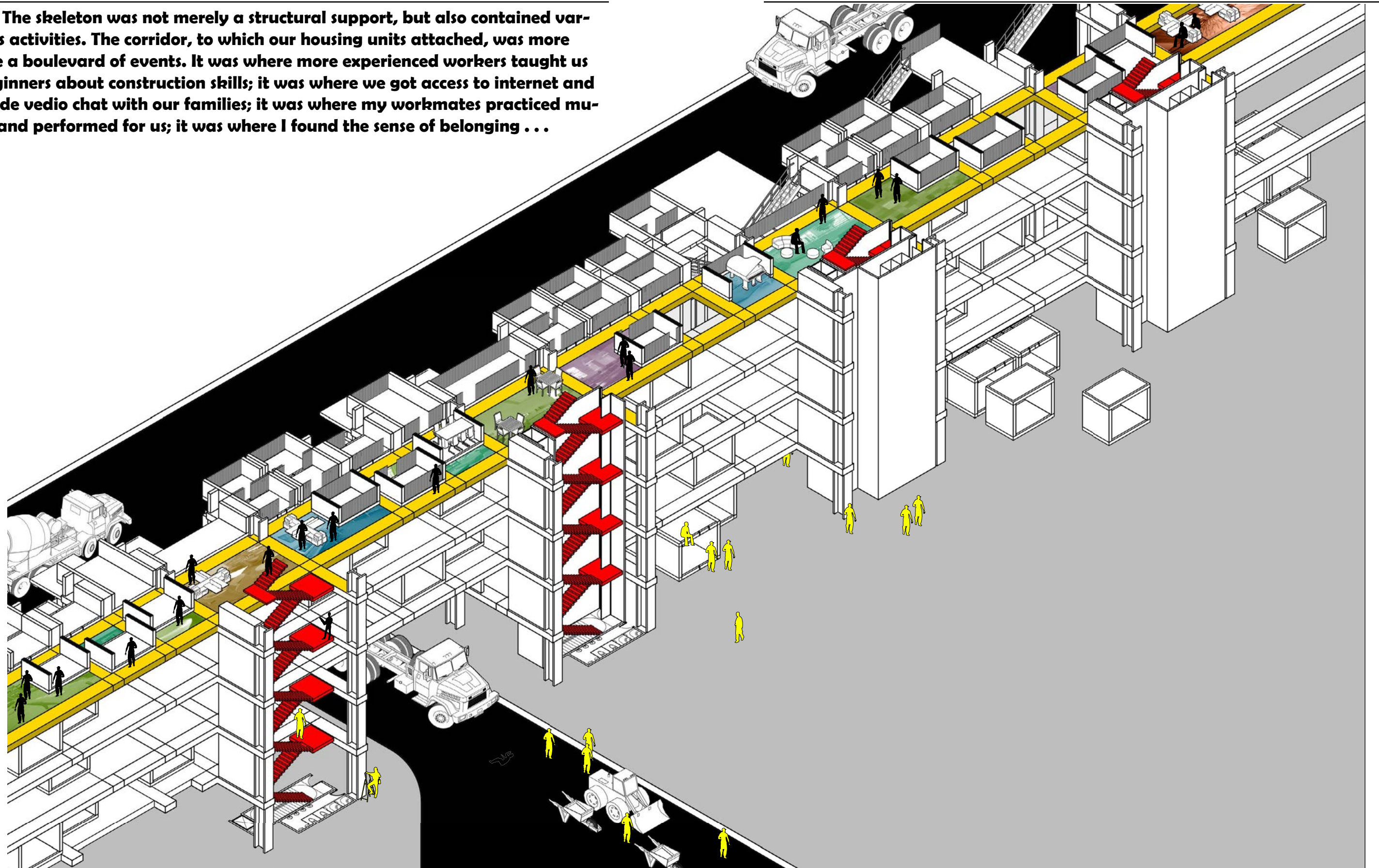
... in the first two weeks of construction, we built a steel skeleton along the perimeter of the site. Workmates told me that it is where we would plug our housing units in. I was glad we could say goodbye to the damp and noisy ground. The steel skeleton was easy to build since all the components were pre-fabricated off-site. No material-cutting was necessary, and all we needed to do was to assemble the pieces together, which was convenient for beginners like me ...



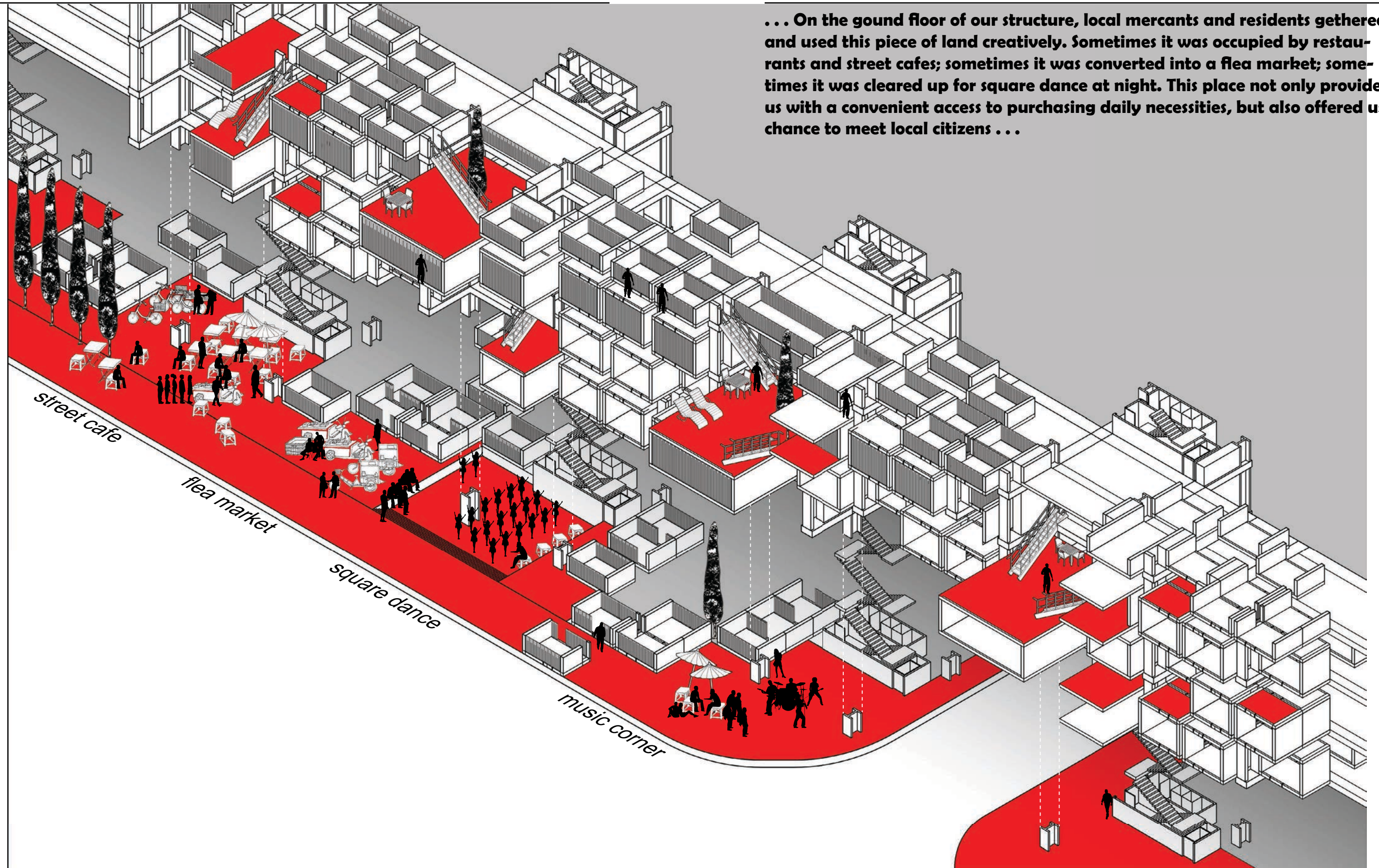


... As we plugged our housing units into the steel skeleton, a sense of neighborhood was suddenly achieved. I quickly made friends to my workmates, not only those whom I shared my unit with, but also people living up/downstairs and people next door ...

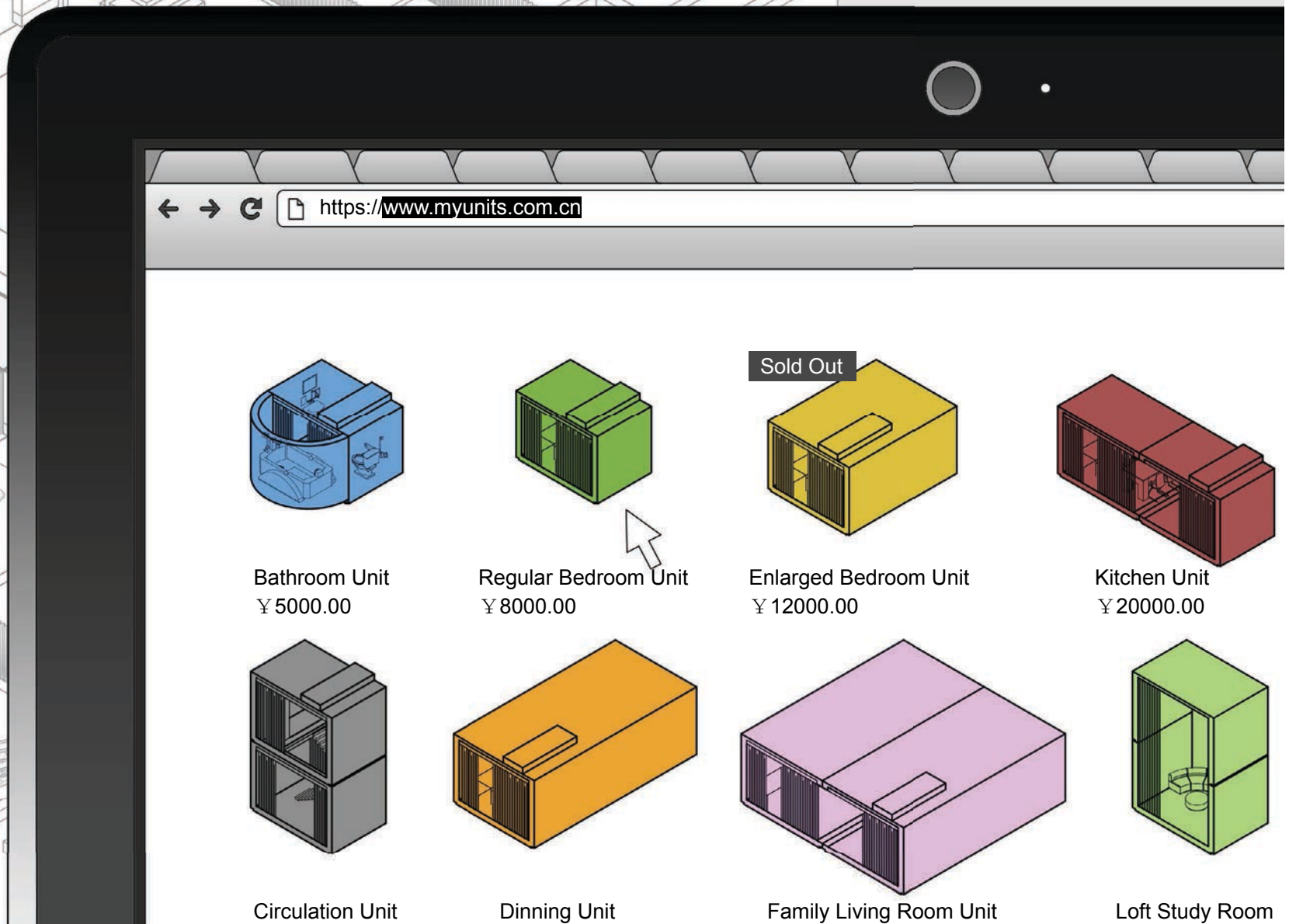
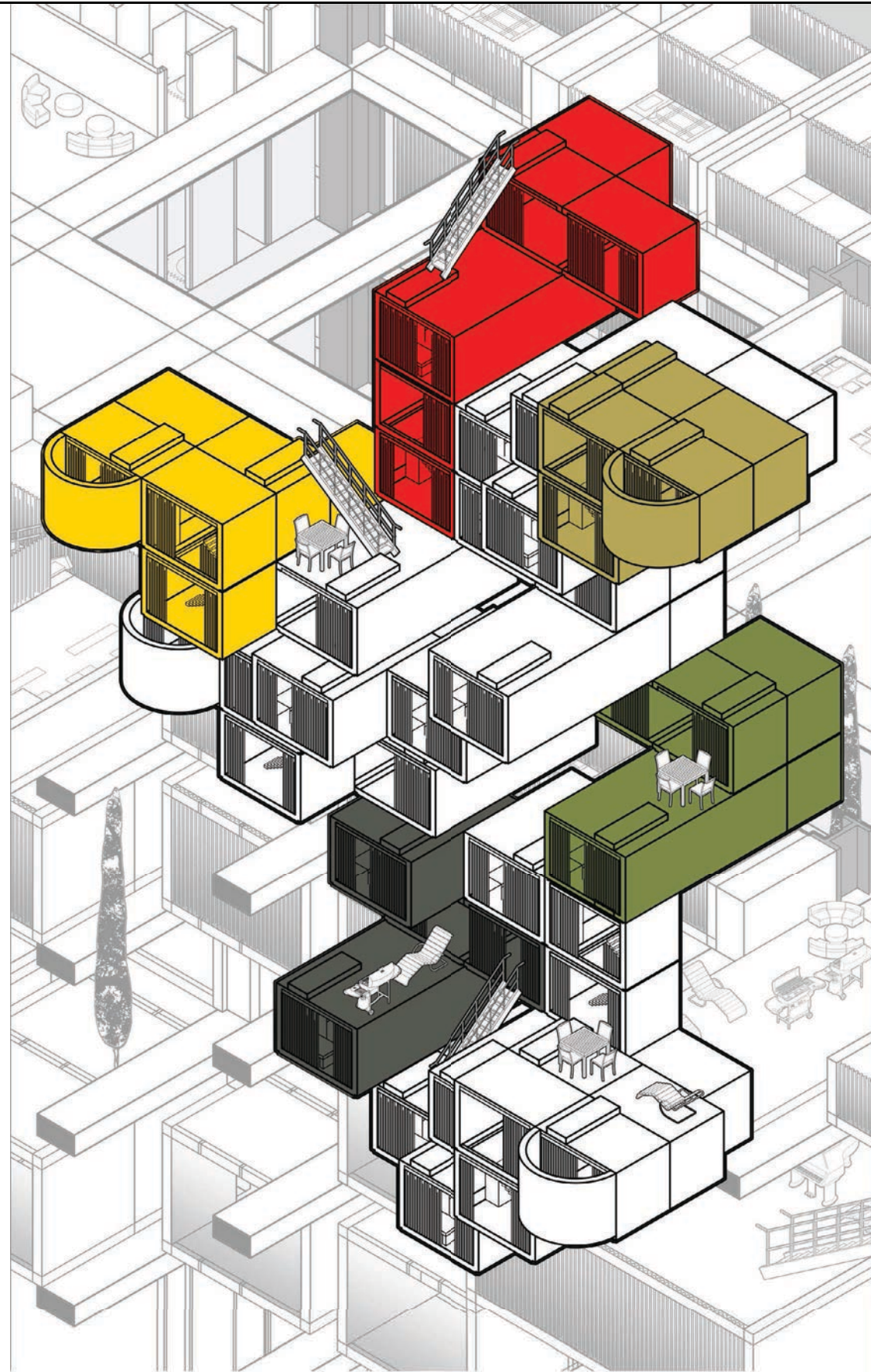
... The skeleton was not merely a structural support, but also contained various activities. The corridor, to which our housing units attached, was more like a boulevard of events. It was where more experienced workers taught us beginners about construction skills; it was where we got access to internet and made video chat with our families; it was where my workmates practiced music and performed for us; it was where I found the sense of belonging ...

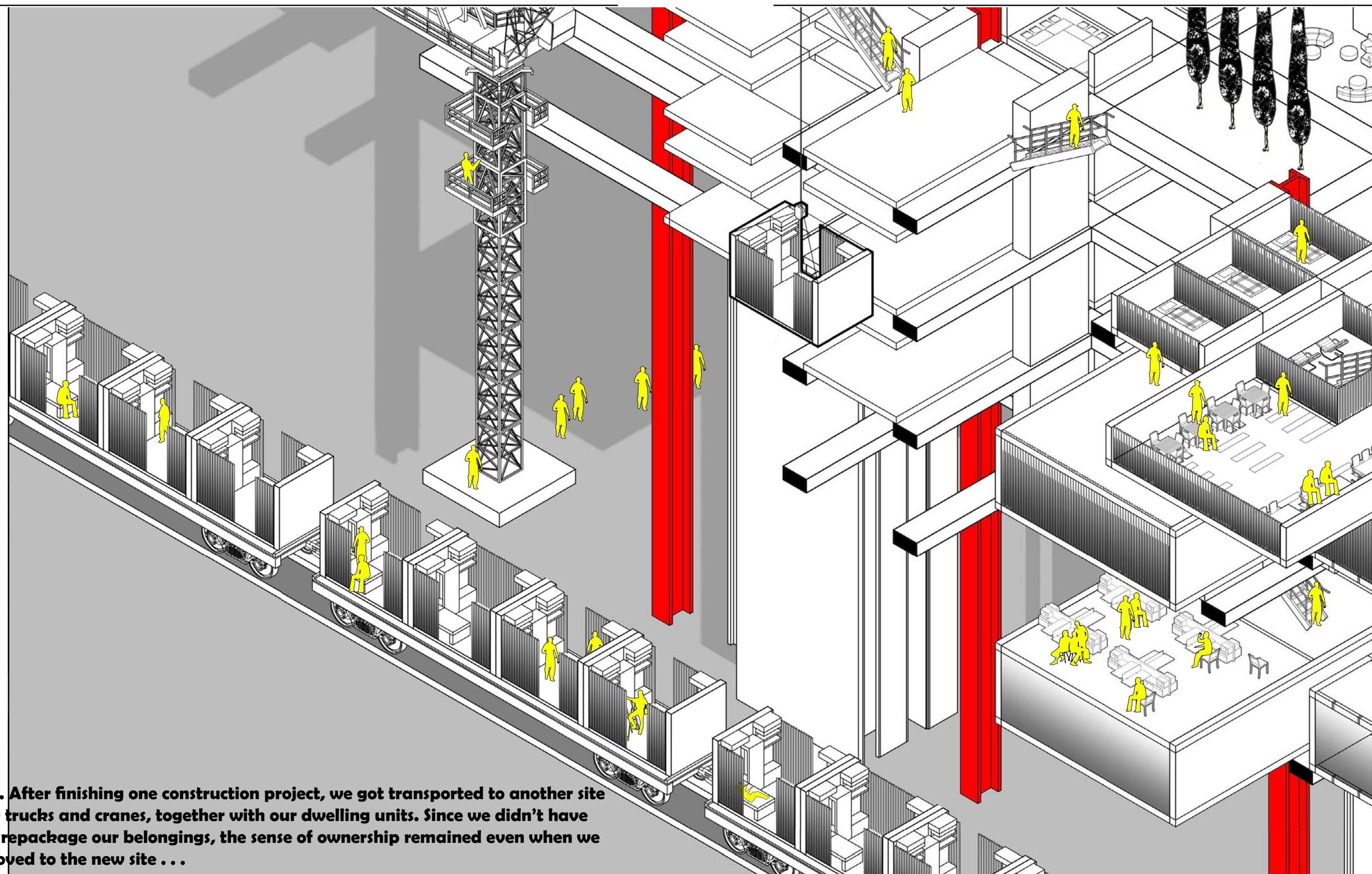


... On the ground floor of our structure, local merchants and residents gathered and used this piece of land creatively. Sometimes it was occupied by restaurants and street cafes; sometimes it was converted into a flea market; sometimes it was cleared up for square dance at night. This place not only provided us with a convenient access to purchasing daily necessities, but also offered us a chance to meet local citizens ...



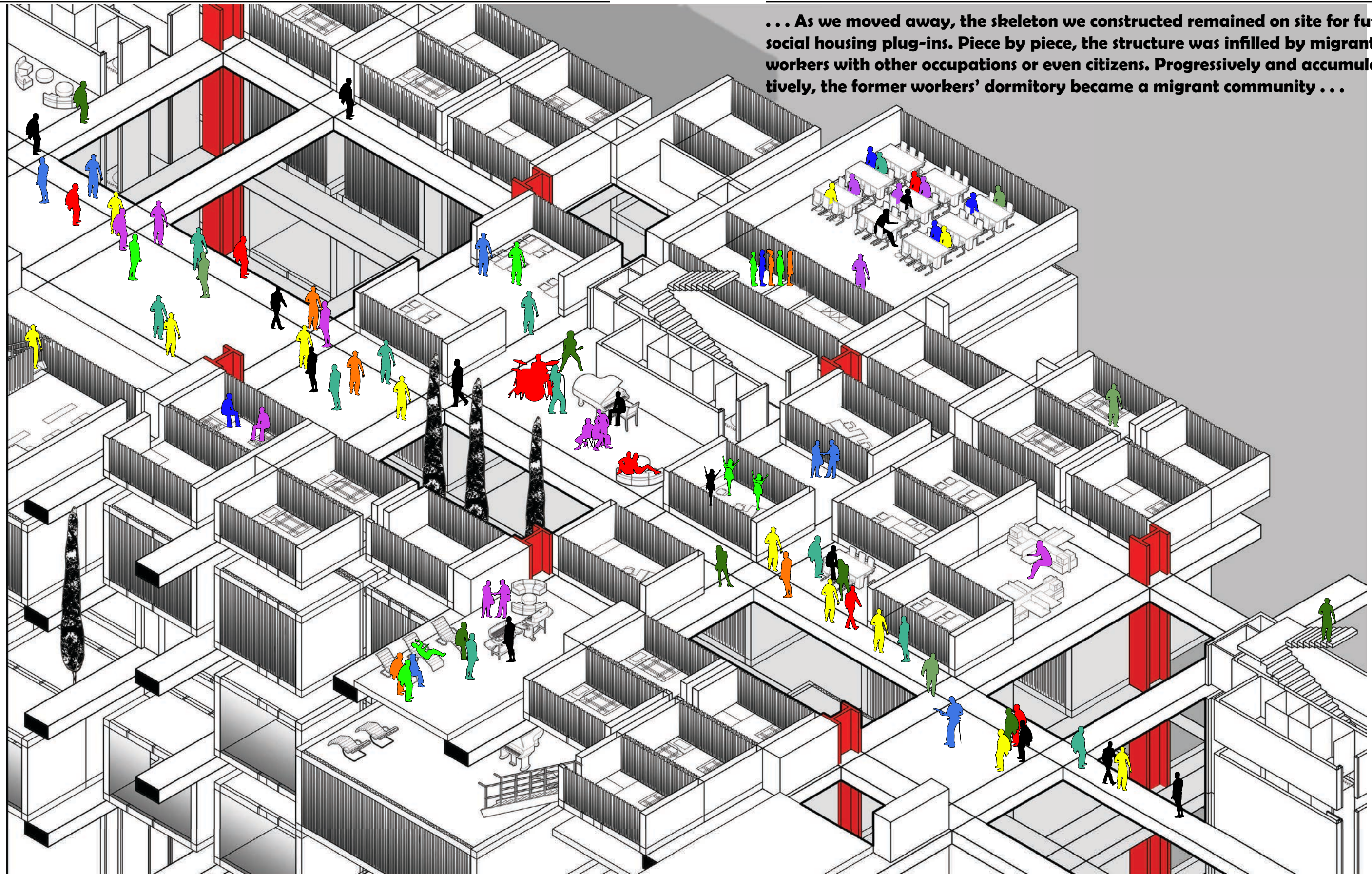
... Various kinds of housing units could be purchased from the Labor-supplier Company or other manufactories online. As we spent more time on construction, we would gain more money, thus we could buy more/larger housing units. Piece by piece, we were constructing our own houses while building the city. I believed one day I would have a house big enough to support my family ...

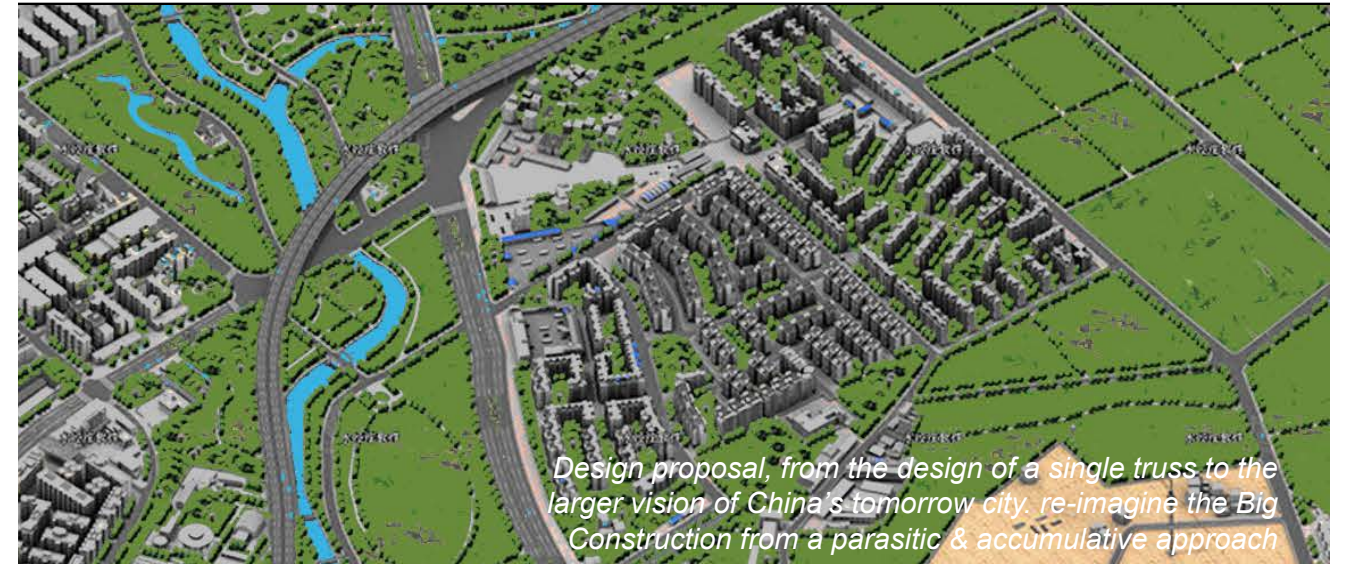




... After finishing one construction project, we got transported to another site by trucks and cranes, together with our dwelling units. Since we didn't have to repackage our belongings, the sense of ownership remained even when we moved to the new site ...

... As we moved away, the skeleton we constructed remained on site for future social housing plug-ins. Piece by piece, the structure was infilled by migrant workers with other occupations or even citizens. Progressively and accumulatively, the former workers' dormitory became a migrant community ...



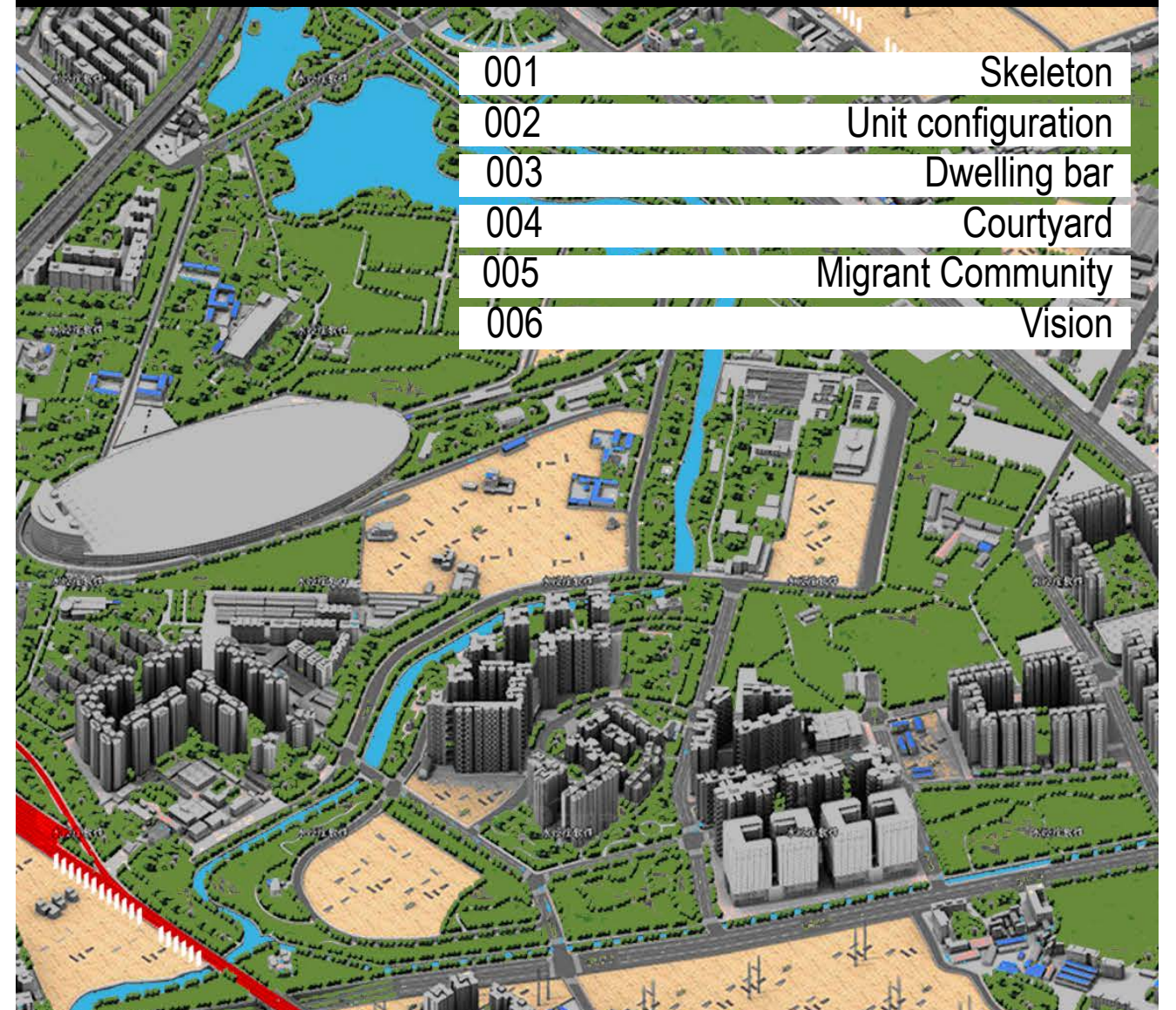


Design proposal, from the design of a single truss to the larger vision of China's tomorrow city. re-imagine the Big Construction from a parasitic & accumulative approach

CHAPTER VI

DESIGN PROPOSAL

001	Skeleton
002	Unit configuration
003	Dwelling bar
004	Courtyard
005	Migrant Community
006	Vision



SUSPENSION CABLE

minimize the landuse at ground floor on construction site by hanging the floor plates at one end

STEEL ARM LOCKER

lock the steel suspension arm inplace, adjust rotation angle according to use, fast to unfold on site

ANGLE STEEL BEAM

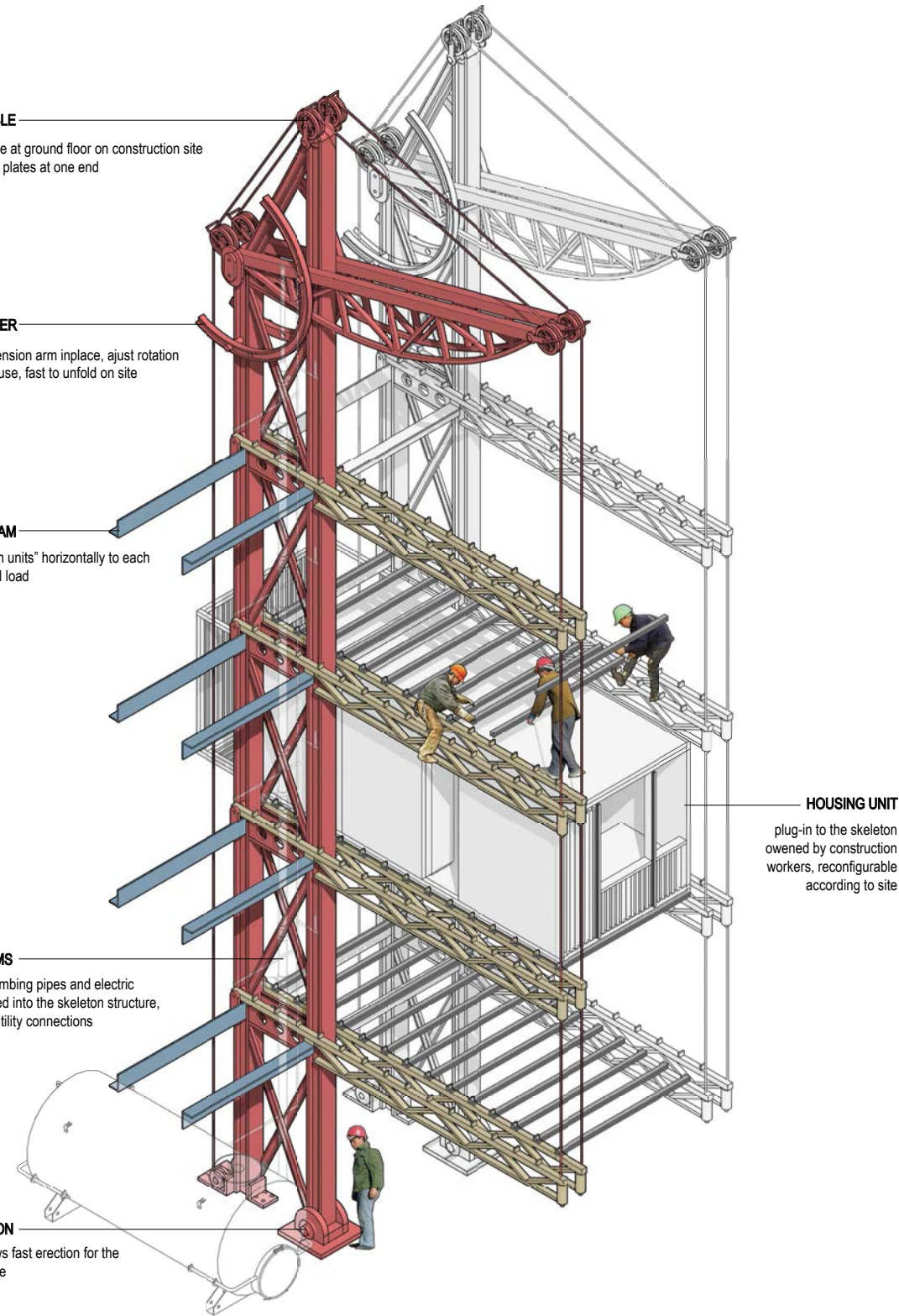
connecting "skeleton units" horizontally to each other, against lateral load

BUILD-IN SYSTEMS

water-supply & plumbing pipes and electric cables are embeded into the skeleton structure, ready for exterior utility connections

PIN FOUNDATION

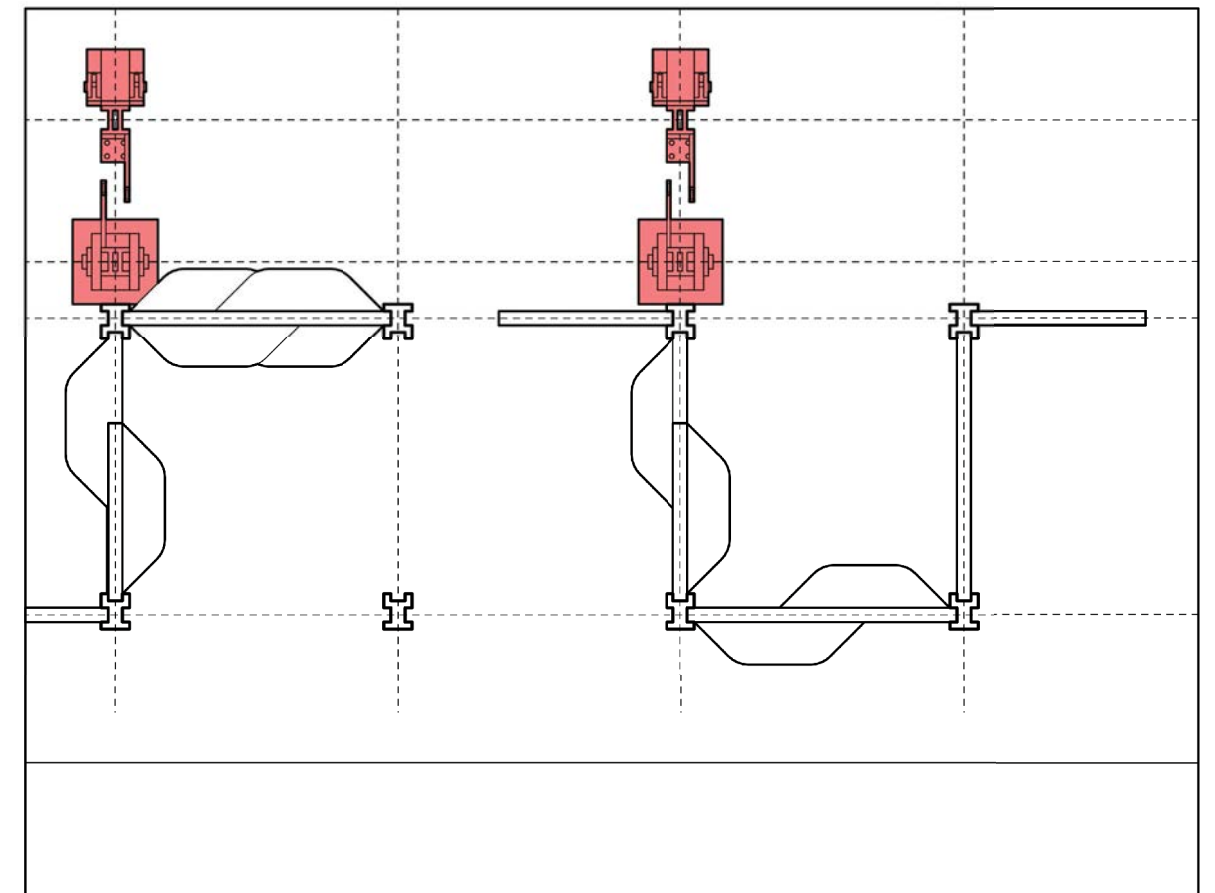
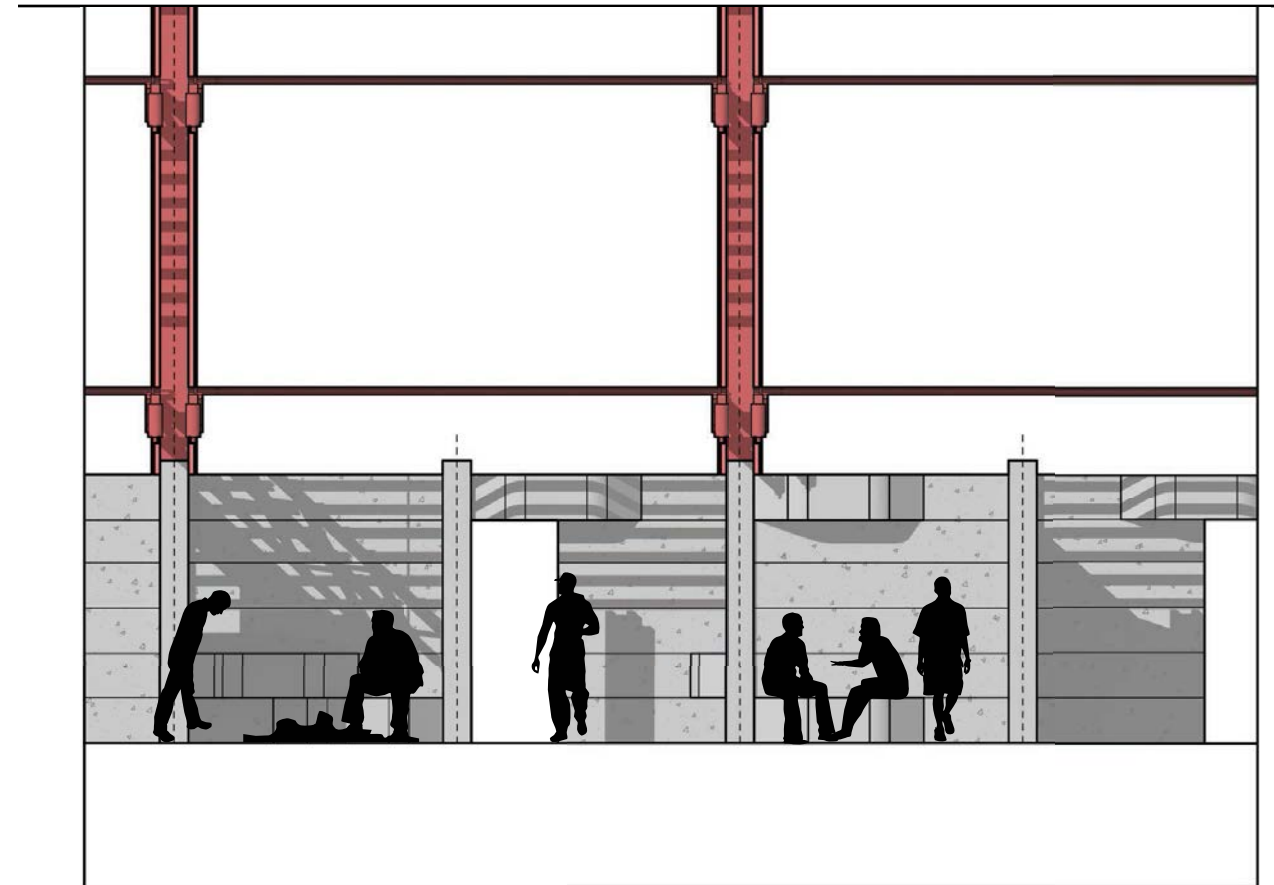
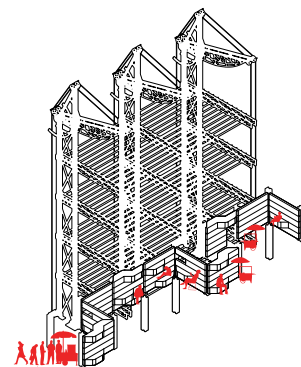
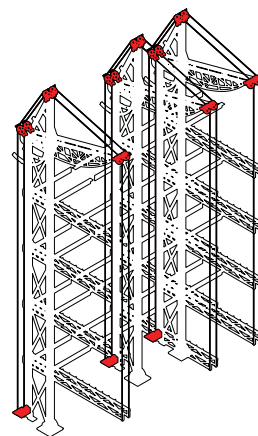
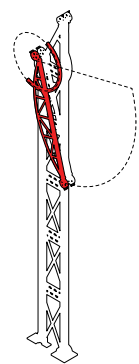
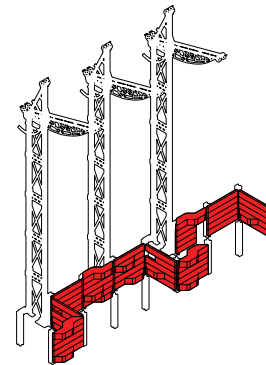
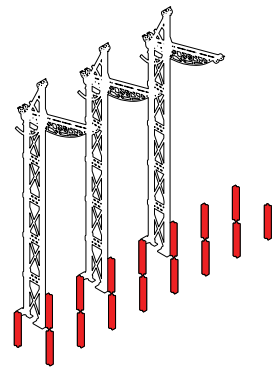
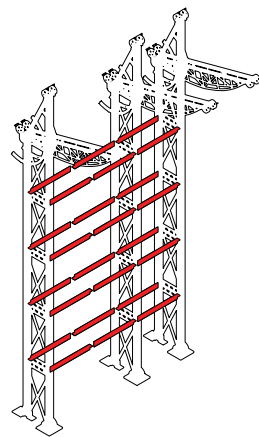
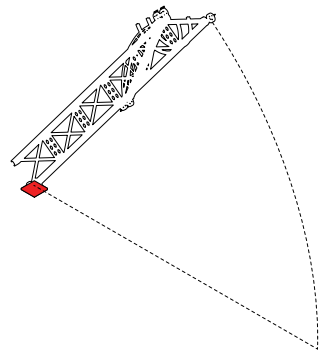
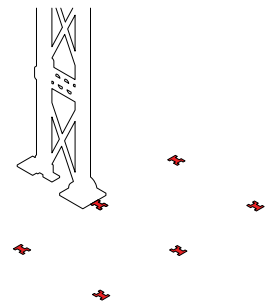
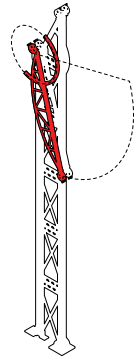
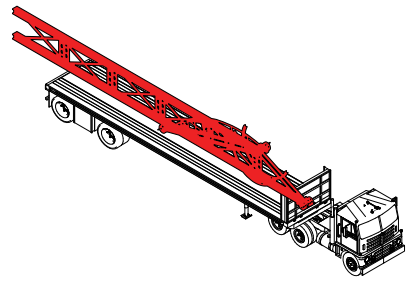
the rotation allows fast erection for the skeleton structure



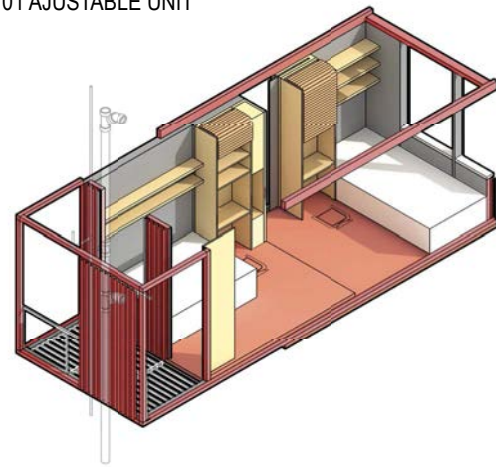
HOUSING UNIT
plug-in to the skeleton
owned by construction
workers, reconfigurable
according to site

The thesis proposes an alternative approach to urban construction site and its afterlife.

Firstly, a pre-fabricated "skeleton" structure is assembled on site where the fencing wall originally locates. Then, modulated dwelling units can be plugged-in to the "skeleton" structure. The units are owned by migrant workers either individually or collectively. After construction, the skeleton can be disassembled and reassembled for other construction events or future social housing plug-ins, while the units remain at the hands of migrant workers as their permanent asset. Units are mass customized so that they can be accumulated and reconfigured according to the wealth and needs of their individual owners.



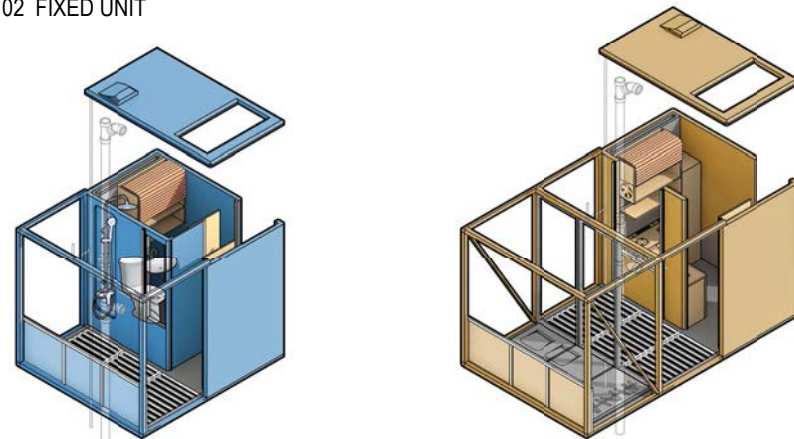
01 AJUSTABLE UNIT



Ajustable unit such as sleeping unit is equipped with certain fixed furniture, like desks and shelves. While some parts, like beds and chairs, are adjustable according to the needs and taste of the user.



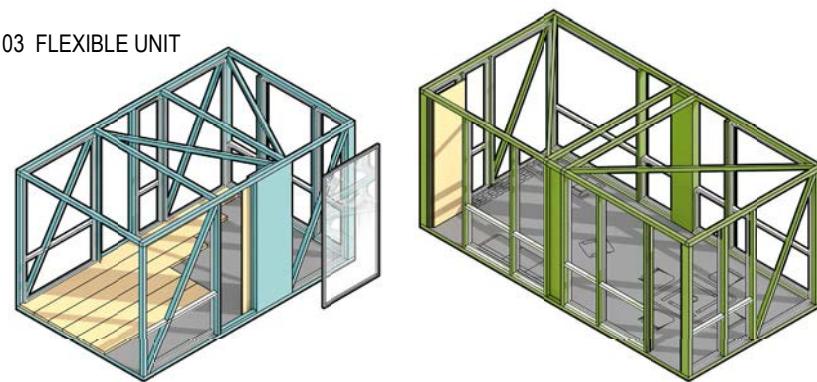
02 FIXED UNIT



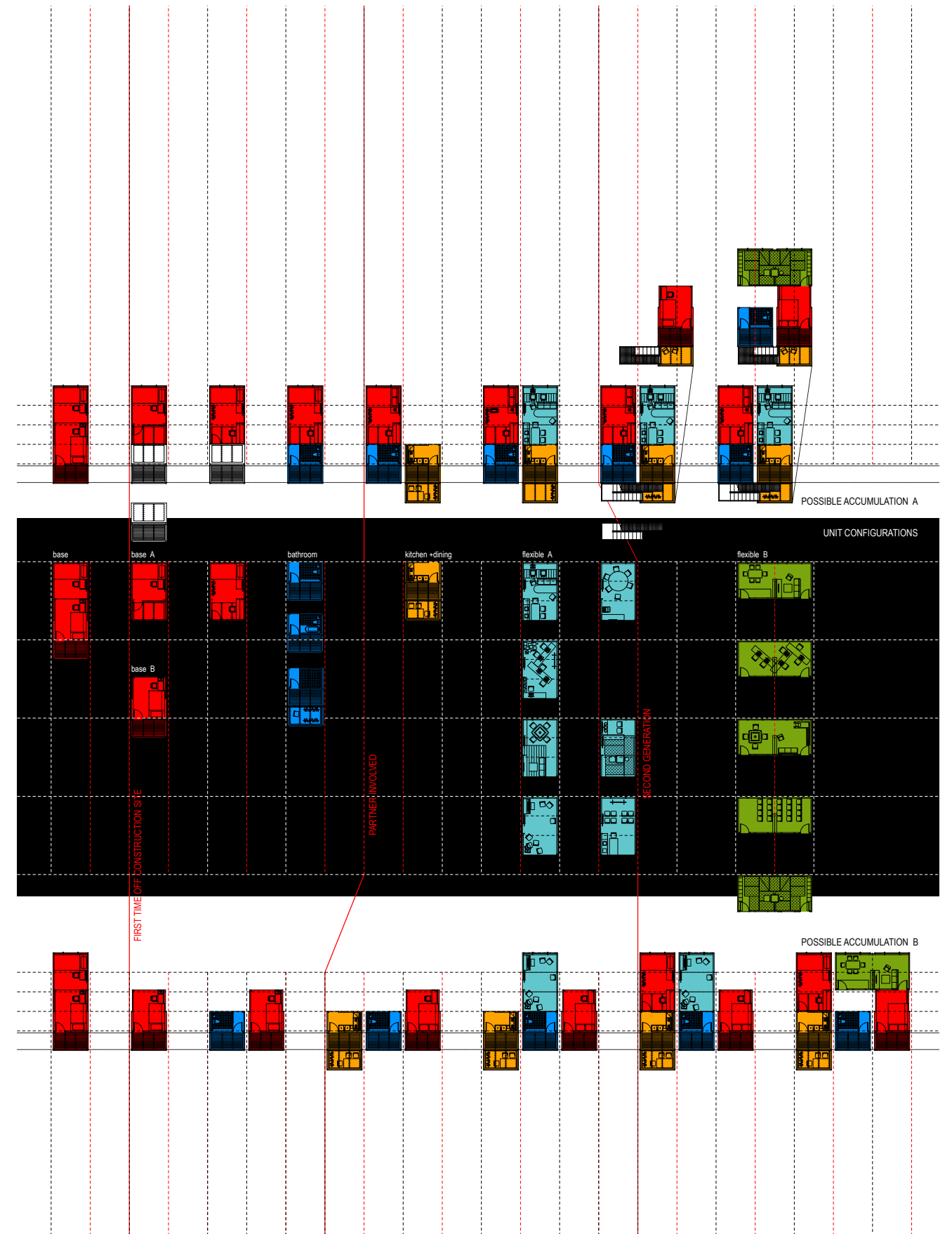
Fixed units, such as bath unit and kitchen unit, come with bulid-in utilities. The user purchases them as whole packages, and attaches them to the skeleton structure.

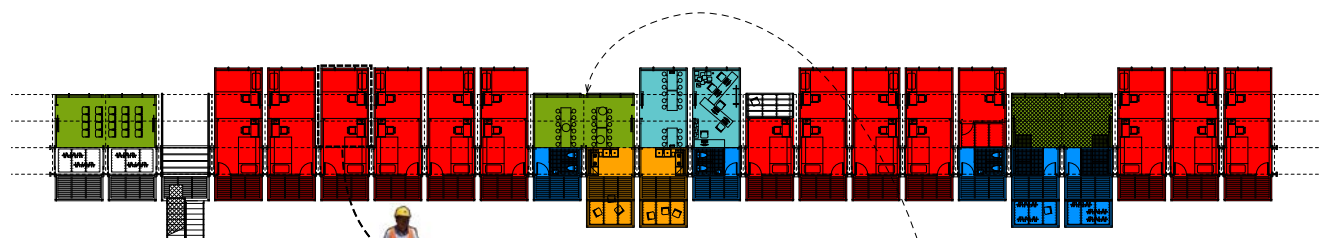


03 FLEXIBLE UNIT



Flexible units (10'x15' / 10'x20') provide only the enclosure of space, their floor and wall material can be reconfigured according to the program. The units can be easily converted into rooms with different events, mess hall/recreation/entertainment /education, by the indication of furniture.





CONFIGURATION 01: construction site

OWNED: none
SHARED: bedroom
PUBLIC: kitchen / bath / mesh hall / recreation / corridor

PURCHASE



CONFIGURATION 02: single-worker dormitory

OWNED: bedroom /
SHARED: none
PUBLIC: kitchen / bath / cafe / recreation / corridor

PURCHASE

SHARE

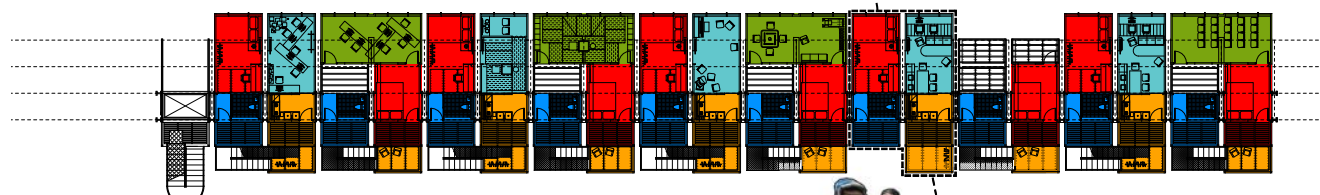
SELL BACK



CONFIGURATION 03: couple dormitory

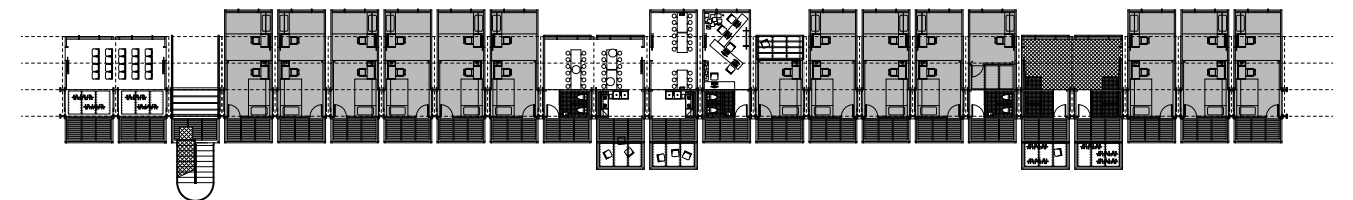
OWNED: bedroom / kitchen / dining / bath
SHARED: recreation
PUBLIC: corridor / dining balcony

PURCHASE

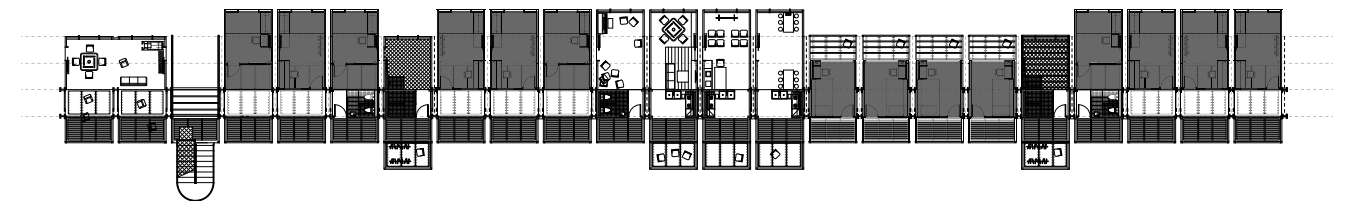


CONFIGURATION 04: housing with second generation

OWNED: bedroom / kitchen / dining / bath / recreation
SHARED: none
PUBLIC: corridor / dining balcony



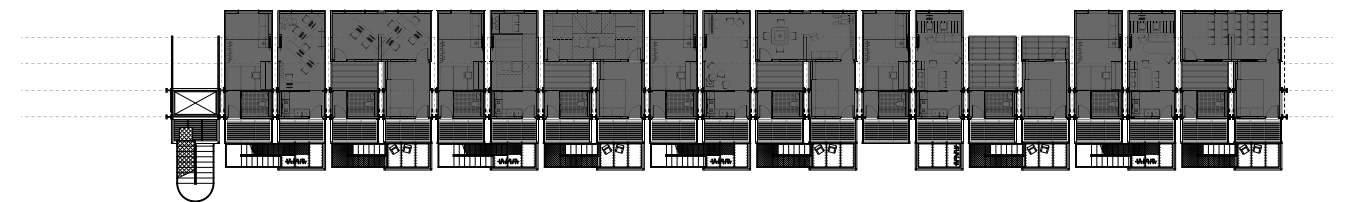
CONFIGURATION 01: construction site



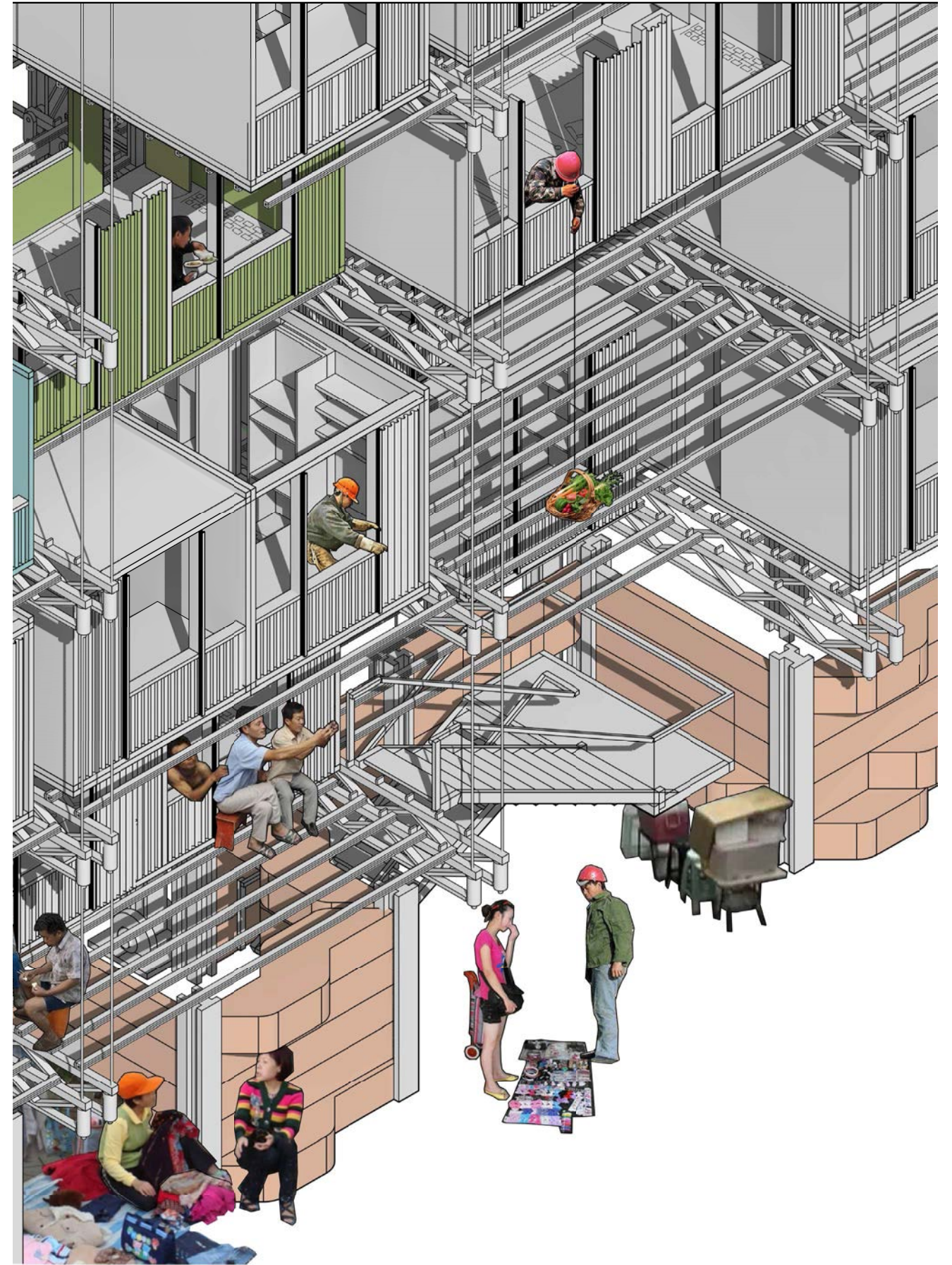
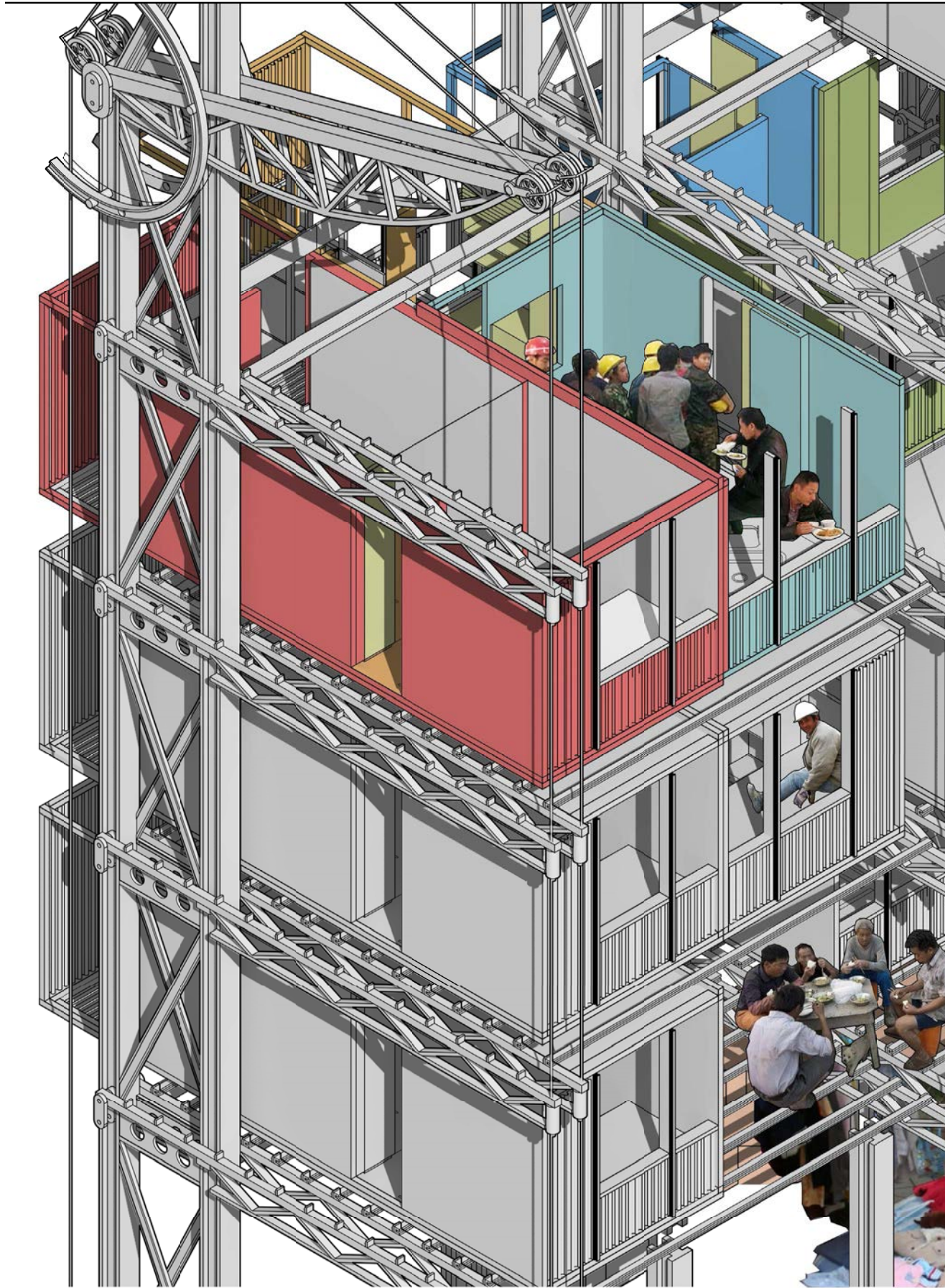
CONFIGURATION 02: single-worker dormitory

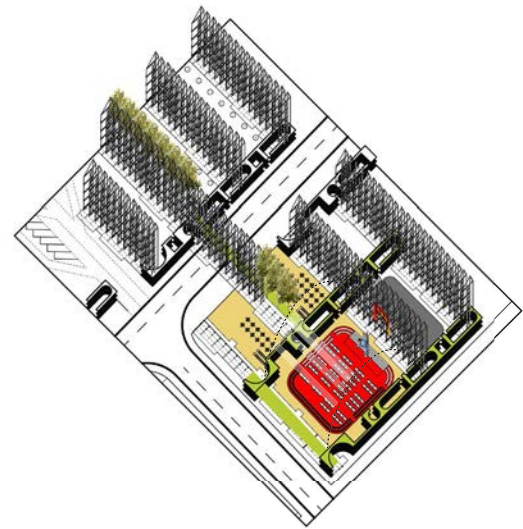
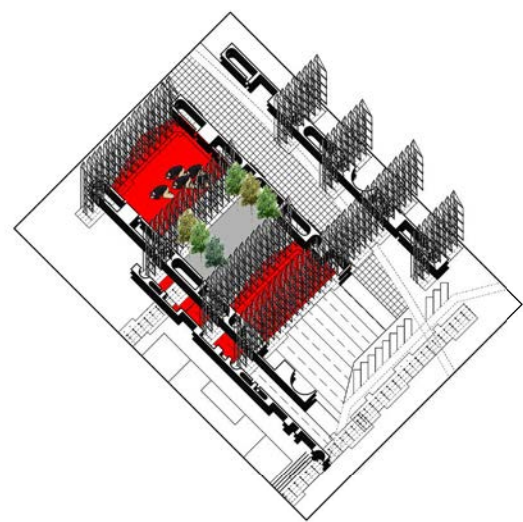
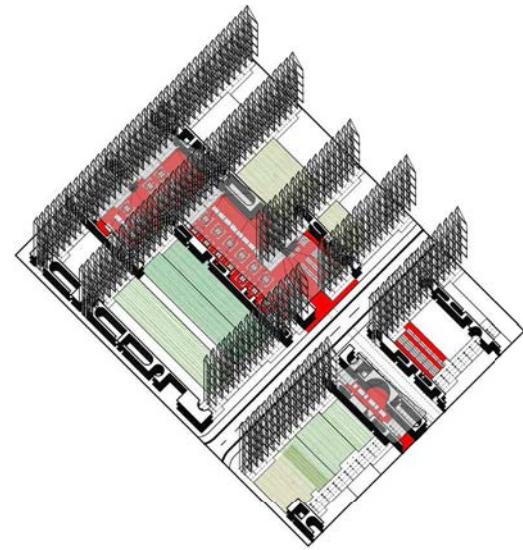
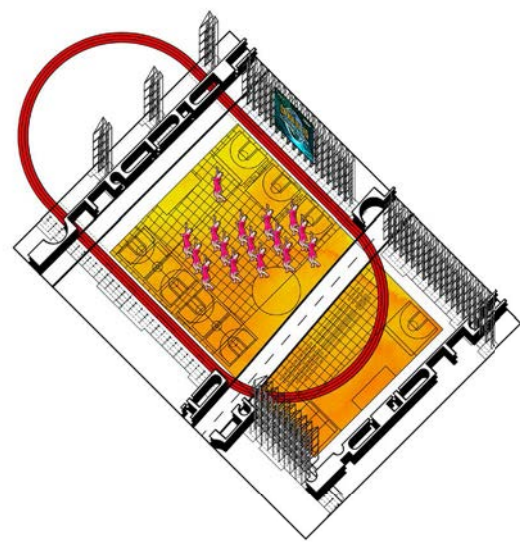


CONFIGURATION 03: couple dormitory

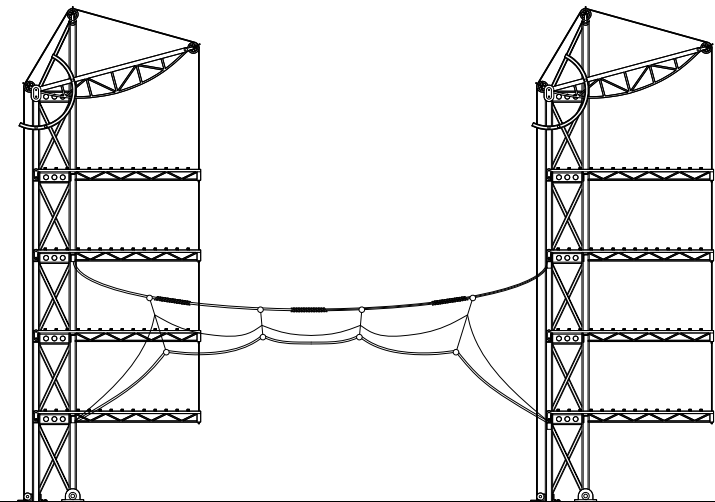


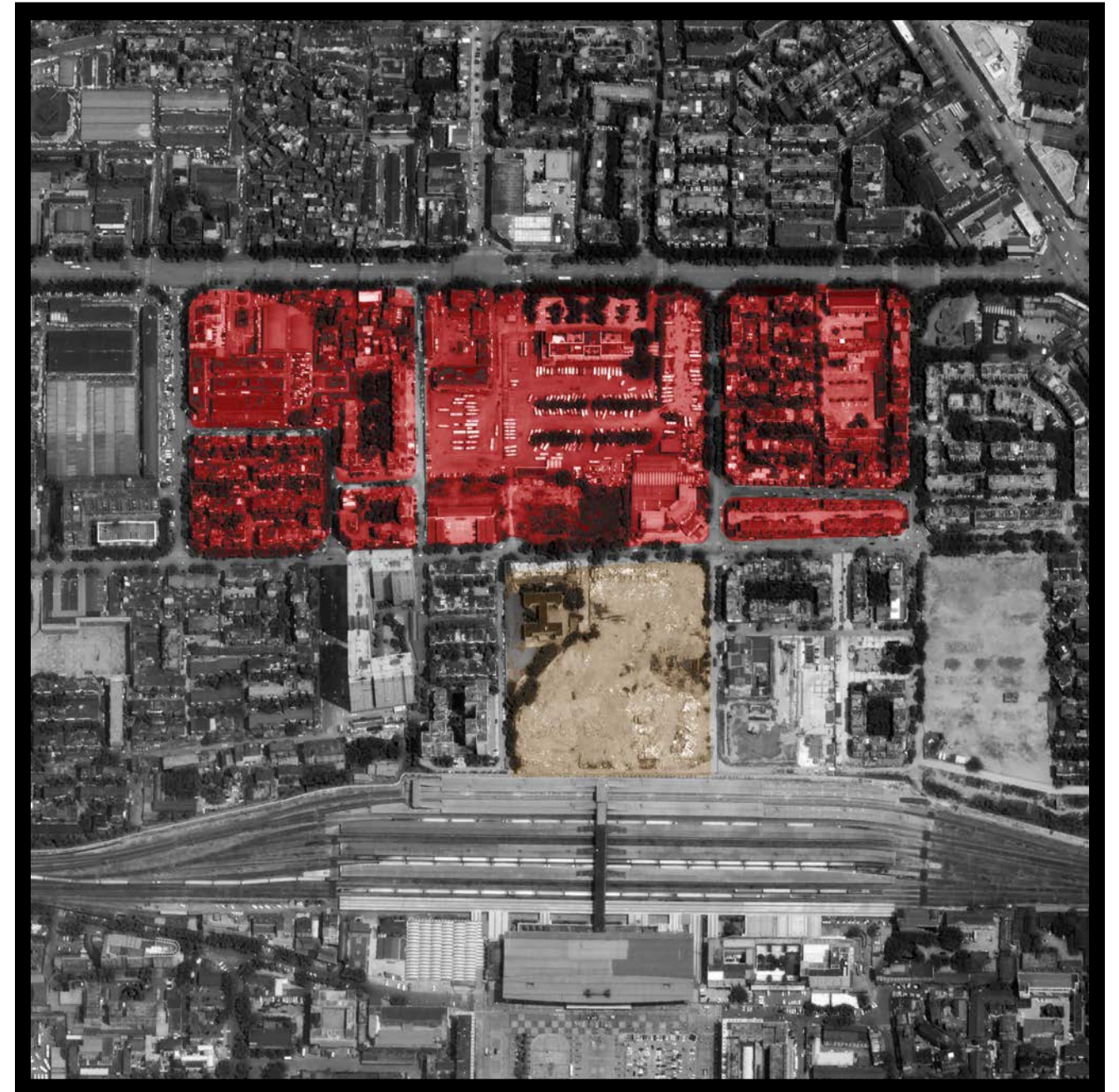
CONFIGURATION 04: housing with second generation





With the expansion of city and its migrant population, the event of construction and common needs for living lead to the congregation of migrant workers. Accordingly, the “skeletons” and “units” can be accumulated and give birth to migrant communities, where individual workers are encouraged to create their own family and integrate into the social life of the city.

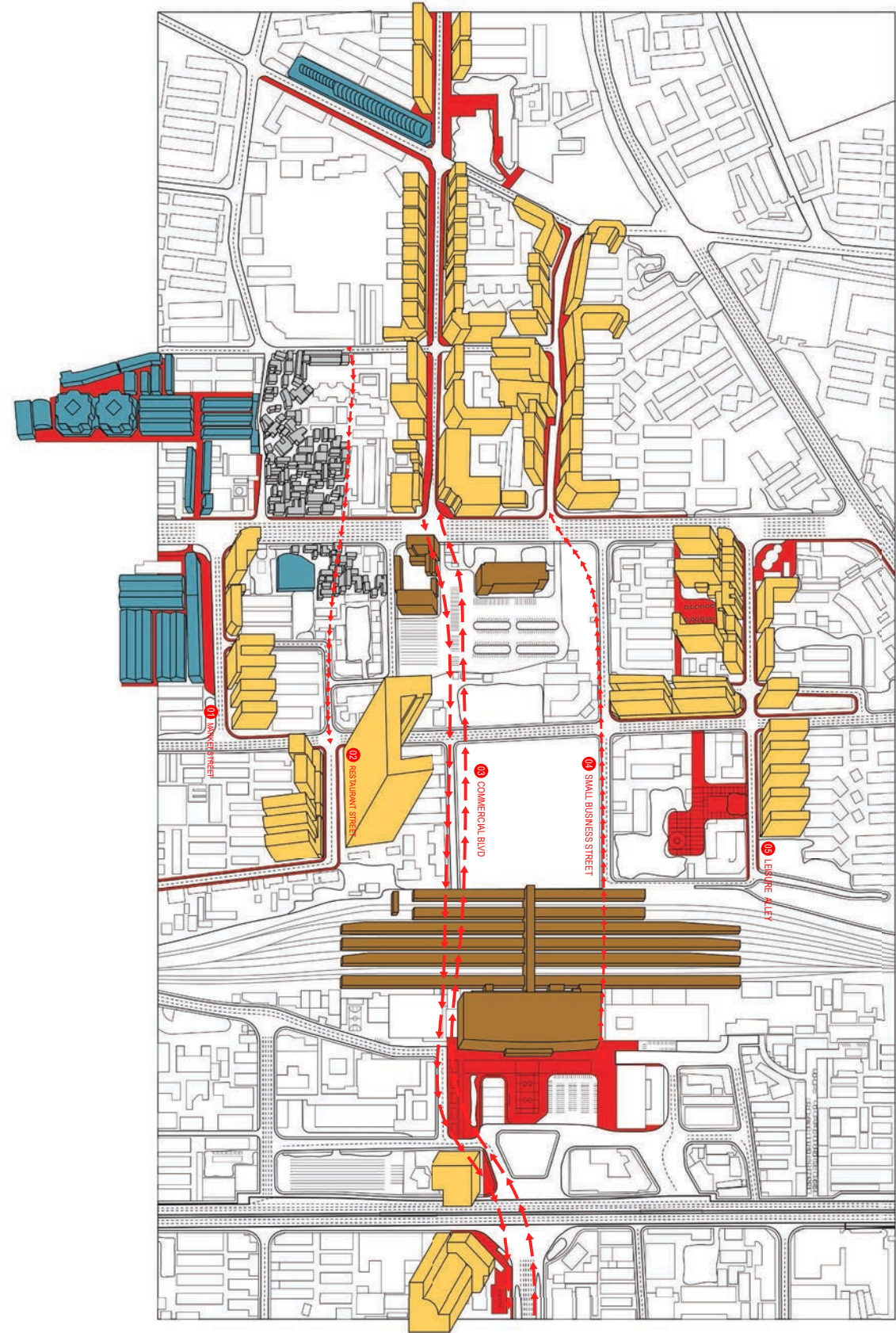


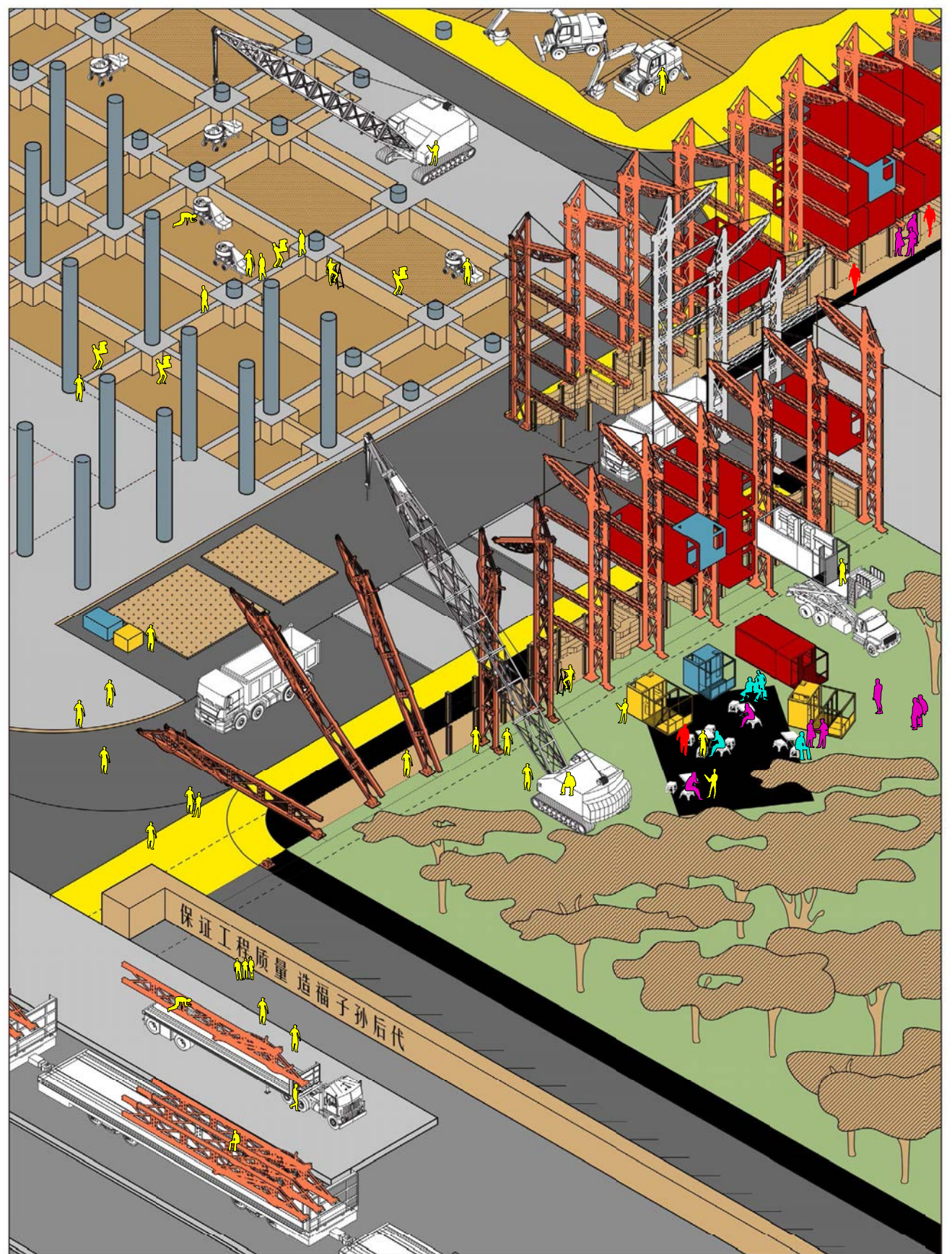


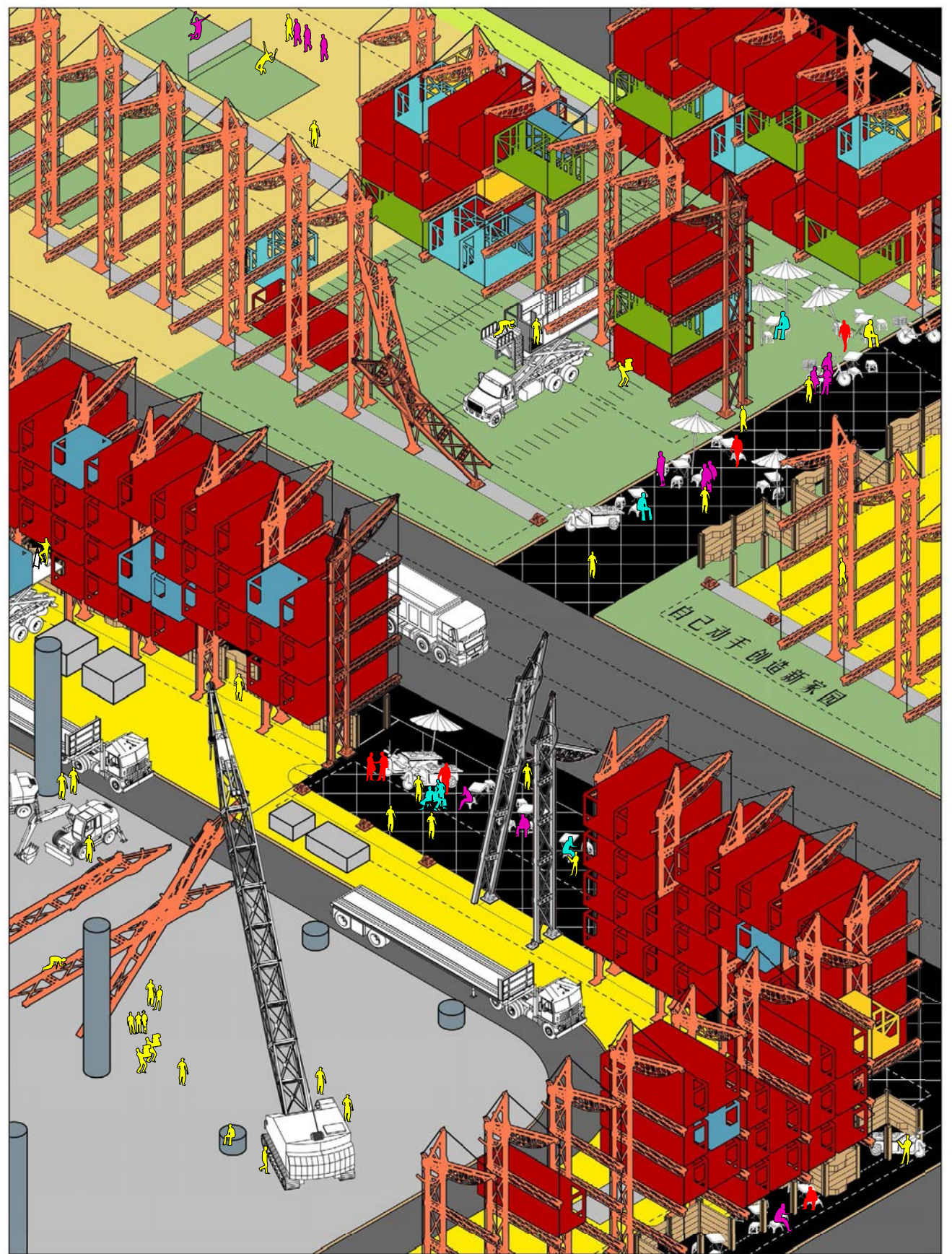
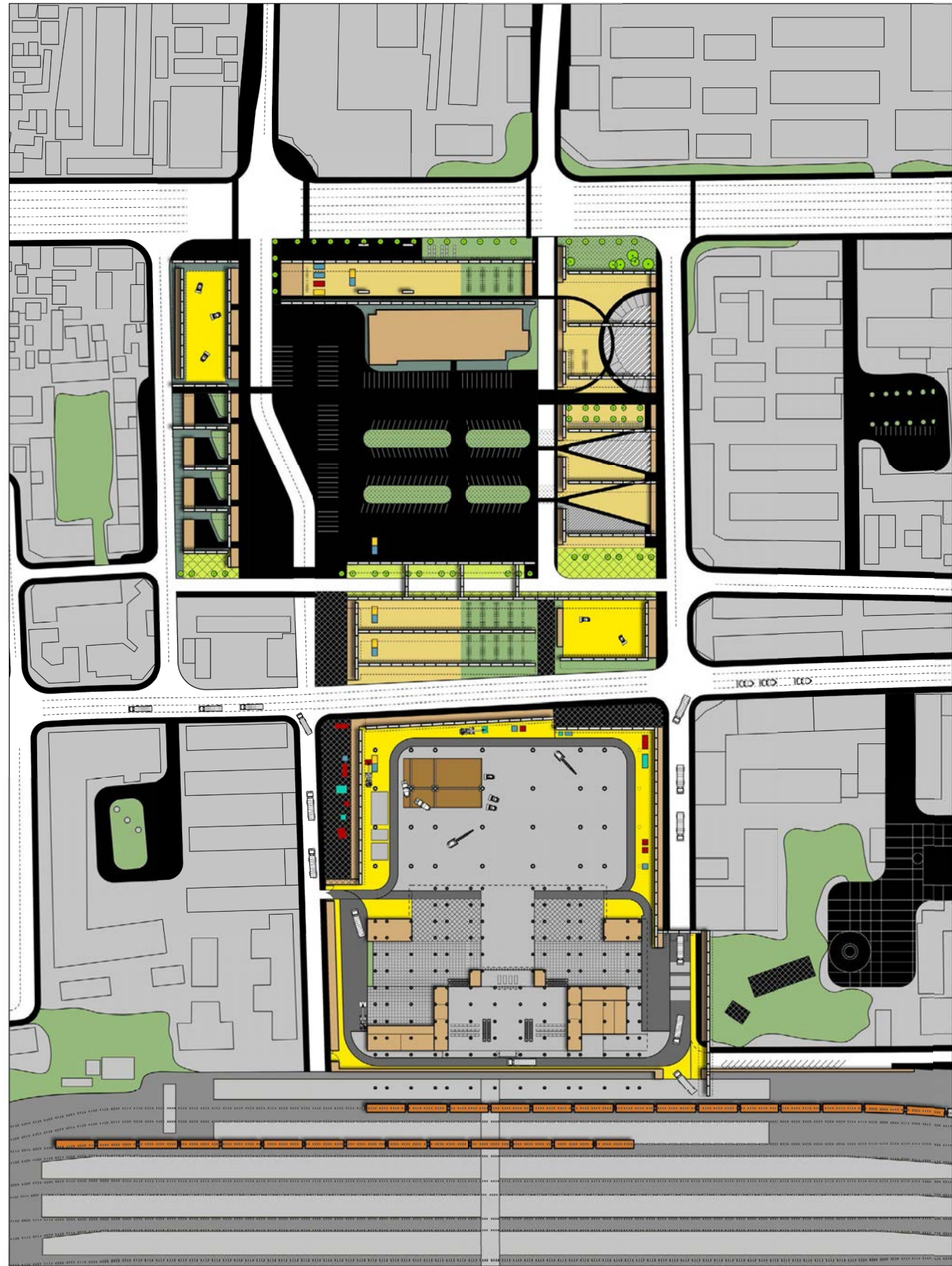
The project utilizes the city of Chengdu as a testground for the proposed intervention. Chengdu is a developing city in the west part of China, facing with multiple problems caused by fast urbanization: massive construction sites, shortage of social housing for migrant workers, etc.

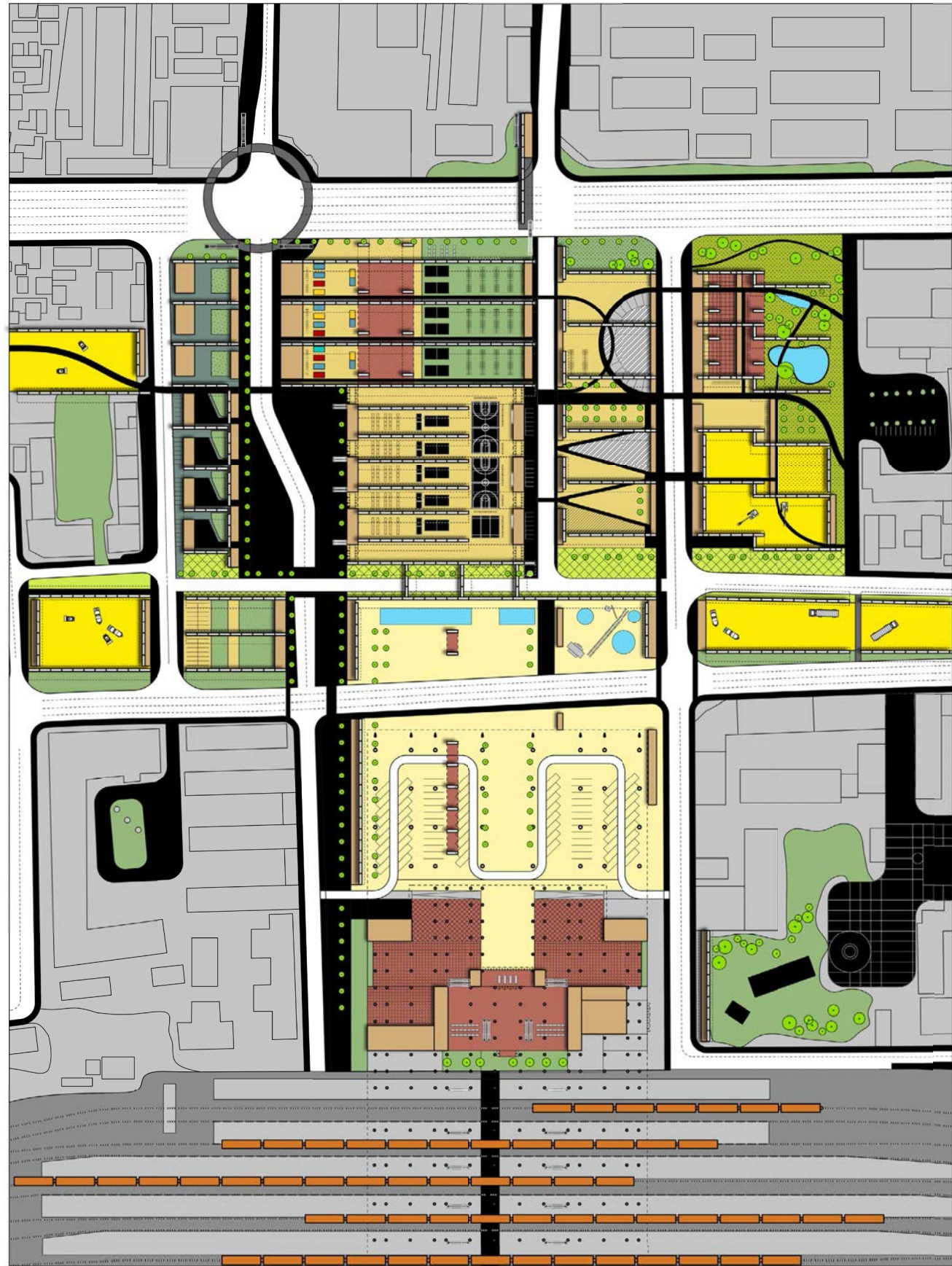
Currently, the state government invests tremendous money/labor into an enclosed apartment block-housing typology called: indemnificatory housing, which is characterized for its highly introverted & isolated layout and universally fixed unit condition, not an ideal design for migrant workers for different background.

Thus, the thesis captures a piece of land (next to Chengdu's north train station) as one starting point for an alternative parasitic approach to constructing the imaginative community for migrant workers, NEVER-LAND.









As a critique to the existing apartment block-housing paradigm, the proposed migrant community tries to open up to its surroundings by breaking the boundary of individual blocks.

So, instead of erecting fencing walls/building bars around each urban block, the project introduces the neighboring streetscapes into the designed community complex. Vehicular roads and pedestrian streets continue passing through the complex without interruption.

Perpendicular to the streets that running north to south, designed housing bars are placed parallel to each other, together creating “courtyard” conditions inbetween. Each individual “courtyard” or covered outdoor space is programmed according to the needs of tenants living around it.

Parks and greenaries fill in the gap between courtyards and streets, overlapping with each other, creating another infrastructure layer to the complex.

Like a surgery, the community stitches the surrounding urban fabric together, enhancing the “invisible network” created by the migrant workers.

