

No More Tower Deserts: Toward a New Urbanism of Mat-organization

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Fields of relentlessly arrayed high-rise residential towers constitute much of the (sub)urbanized landscape in China. An expanse of orderly housing bars unfolds within largely un-manipulated voids which embody the new Chinese urban tower desert. Fueled by massive urban growth, the urge for modernization, and the transition to the privatization of housing, this new form of urbanism has emerged only within the past three decades. As traditional low and mid-rise communities fail to survive and adapt to the cultural shift and economic forces, tower deserts have become the new status quo for contemporary Chinese cities. In their wake those new urban typologies have created vast urban wastelands - anonymous and hostile places devoid of street life and in complete neglect of the qualities of everything heretofore. Examining this extreme proliferation of residential tower compounds in Chinese cities as a form of remote territorial landscape with far-reaching cultural and spatial consequences, the research explores mat-urbanism as an alternate form of urban housing system by investigating both traditional typologies and speculative housing systems.

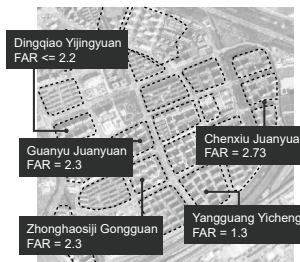
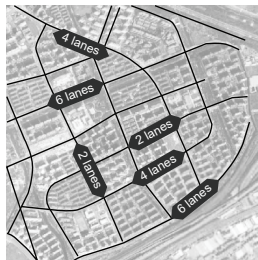
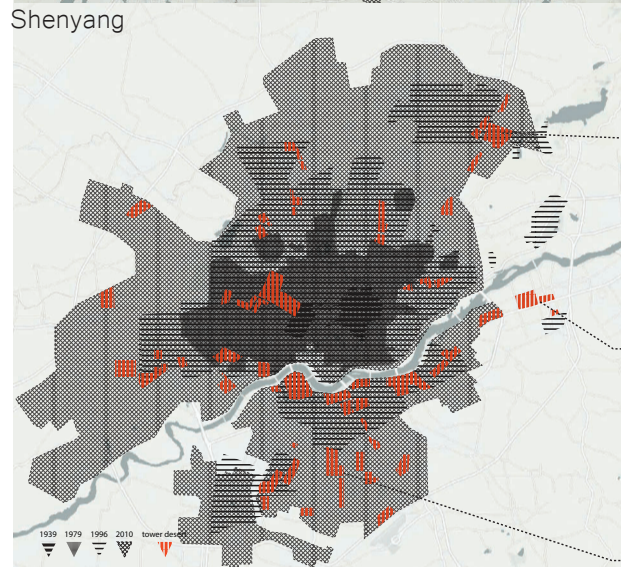
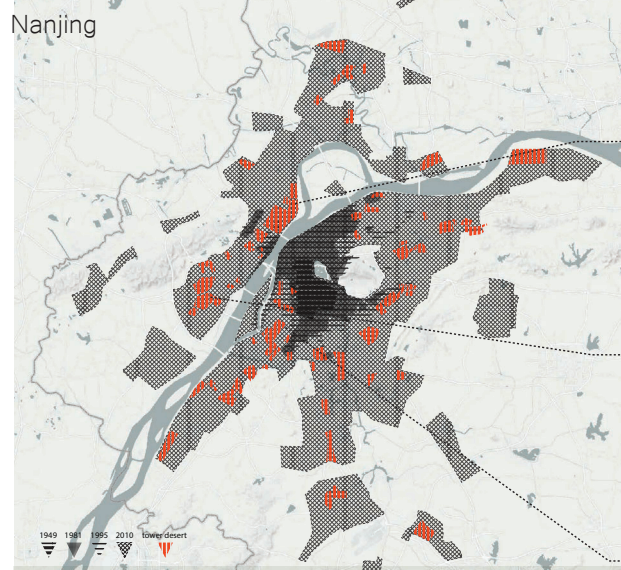
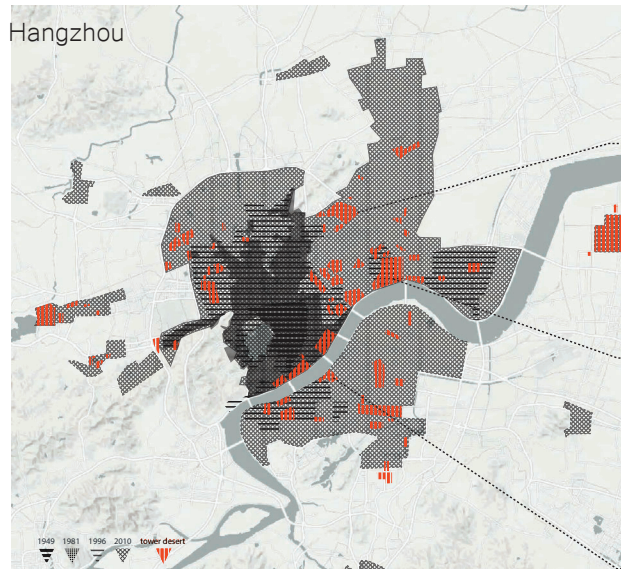
PRIVATIZATION OF HOUSING

Largely due to a series of land and housing reforms initiated in 1978, as well as the reintroduction of land prices in 1987, housing policy shifted to stimulate the commodification of residential real estate in the 90s¹. Instilled with socialism ideals, the pre-reform era housing was regulated by the state through public housing provision between 1949 and 1978. Public rental housing was allocated by the state to danwei work units, and then housing assignments were distributed from the danwei to individual household². A danwei is a social and spatial organization which provided work and housing to workers and their families. In 1980s, when the burden of housing construction was transferred from the central government to work

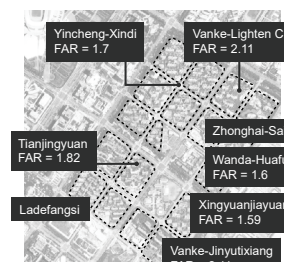
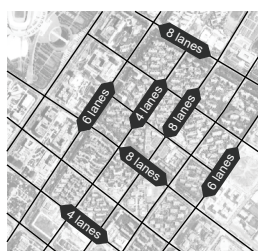
unit, this led to a rapid increase in the development of mid-rise housing clusters known as Tongzhi Lou or “modified soviet-style walk-up apartments in gated work-unit compounds”³. It is important to note that by organizing workplace and housing as a spatial unit, an individual’s identity, social, and cultural network are centered on the danwei⁴. Thus, within both the pre-1980s and post-1980s systems, the culture of housing was engrained with a sense of spatial and social proximity. In 1991, the Second National Housing Reform’s initiatives of encouraging apartment purchase and increasing housing stock contributed to the prevalence of mortgages. In tangent with the reintroduction of land prices which intensified the growth of the real estate industry, the various reform efforts begot the incessant urbanization and suburbanization, thereby altering the public housing provision to a privatized housing market.

EMERGENCE OF TOWER DESERTS AS URBAN FABRIC

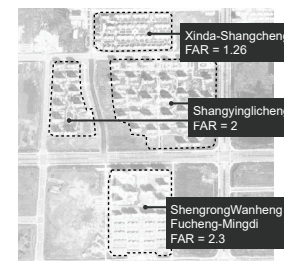
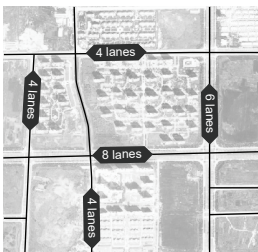
The familiar tower typology traces its lineage to modernist city ideas from CIAM’s “Functional City” to Le Corbusier’s “Ville Radieuse” with principles of organizing high-density housing, transportation, and public space. The residential tower is transplanted and transformed as an urban expansion movement emulating the model and culture of the modernist urban ideals⁵. This transition from state-own public housing to a contemporary culture of private housing ushered in a converted form of tower landscape of its own kind at an unprecedented scale beginning in the late 1990s and 2000s. It is pseudo urban and pseudo desert with an array of high-rise towers organized as a gated community. The emergence of high-rise tower primarily started in urban fringes due to the increased land prices in the city centers and the demand for high-density housing. The paper studied three cities, Hangzhou, Nanjing, and Shenyang, all of which were 2nd tier cities just promoted to 1st tier cities in 2017⁶. Shown in Figure 1, majority of the residential tower developments proliferated in the suburb outside the city boundary in 1995. In the 2000s, the city centers grew rapidly to absorb the fringe. In the 2010 city boundaries of Hangzhou, Nanjing, and Shenyang, the fringes became part of the city proper. The suburban tower compounds are acquired as part of city center fabric.



• Dinglan Area



• Hexinxincheng



Hunnanxinqu Area

Figure 1: Tower deserts mapping of 3 cities, sample tower compounds satellite photos, FAR and road analysis, street views. (Drawings by Leslie Lok and Yichen Jia).

FAR:2
Apartment Amounts: 5004
Greenspace Rate: 25%(30%)
Built Area Rate: 7%*
Leftover Area: 68%*

Plot Area: 275,450sqm*
 Building Footprint: 19,000sqm*
 Gross Floor Area: 550,900sqm

Distance to Facilities:
 Light Rail(Chengfumingdi Station): 0.45km
 Xingshunfu Supermarket: 1.35km
 Community Hospital : 0.62km
 Xinmao Pharmacy: 1.75km
 Wanjiqidi Kindergarten: 0.67km

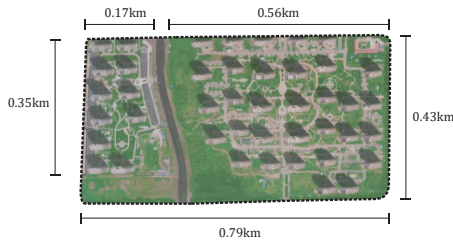


Figure 2: Sample residential tower compound in Shenyang, Hunan New District. (Drawings by Leslie Lok and Yichen Jia).

PRIVATIZATION OF OPEN SPACE

Due to lax regulations in the suburb in comparison to the city center and the sales pattern of large land parcels, these compounds typically covered several square kilometers, separated only by multi-lane roads that are too wide to encourage pedestrian activities. In the satellite photos, the tower fields are comprised of individual gated compounds with private amenities like open and green spaces, playgrounds, and underground parking. The taller the towers, the larger the open spaces are between them to fulfill stringent residential day lighting requirements. The dangerous urban and social implication of this housing model brought upon is the privatization of open space. Beyond the property line, this leaves only marginal commercial activities and the multi-lane roads that separate each from its anonymous neighboring compound. Seen in Figure 1, the paper surveyed several tower compounds where the road systems have an average of four to eight lanes for residential neighborhoods. Along with adjacent compounds, they easily stretch from half to several kilometers, like urban deserts, streets are usually void of pedestrian activities, basic amenities such as subway station and major markets range from 0.5 to 2 kilometer walk (Figure 2). A typically benign 20 minute walk is a startling distance to amenities within the context of large city centers and does not support an active public realm.

THE STORY OF FLOOR AREA RATIO (FAR) FOR TOWER DESERTS

Often the fundamental cause for residential tower is the quality of high density and the ability to generate high floor area ratio (FAR). Due to regulations such as day lighting requirement and the initial fringe context, tower compounds alike reach only an average Floor Area Ratio of 2.0, versus typical FAR of 6-10 for high-rise buildings in urban districts⁷. Among the tower compound samples in Hangzhou, the FAR range from 1.3 to 3 with an average FAR of 2.65, samples in Nanjing range from FAR 1.4 to 3 with an average of 1.97, and samples in Shenyang range from FAR 1.38 to 2.3 with an average of 1.8 (Figure 1). The resulting density of high-rise residential compounds is astoundingly low comparing to the common assumption of

high-density towers. These low density tower compounds should be re-considered as a productive model of housing development in urban districts.

An urban fabric which consists of parcels of privatized open space within a territorial scale of tower landscape has considerable cultural and spatial consequences on its urban population. For Chinese cities, the concepts of social proximity and physical proximity are integral to both familial structure oriented housing model and danwei oriented housing system. As uniform tower replications take over the urban fringe and replace traditional low rise close-knit housing fabric, they also erase the proximate relationship between the spatial organization and the social construct in Chinese cities. In response to this, the research seeks to experiment with forms of mat-urbanism in two different strategies.

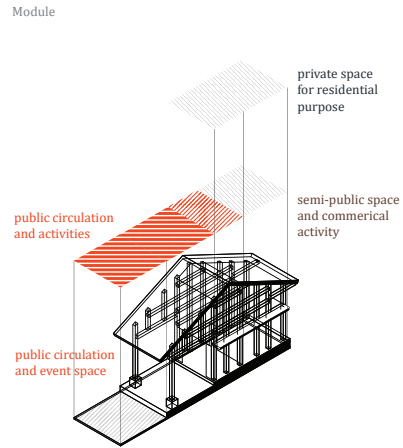
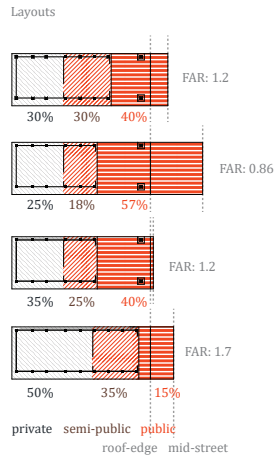
LEARNING FROM LOCAL TYPOLOGIES

The first strategy is to revisit vernacular housing typologies and their associated urban fabrics which privilege the horizontal organization, in order to discover spatial qualities that produce a culture of social proximity. The first traditional system is the Yanlang, similar to the arcade, it is a covered walkway used in both housing and commercial settings (Figure 3). The covered circulation, alley, or corridor mediates public and private spaces to produce semi-public and event spaces. The continuous Yanlang condition is connected by a series of discrete buildings, this allows the street and Yanlang to expand and contract in width to hold various activities. Figure 3 shows three conditions of the semi-public Yanlang width, it could range from 4.5m with only a sliver of 0.5 meter of opening to a 9.5m wide uncovered street area for public gatherings.

Similar to the Yanglang, the second typology Jiangnan Courtyard House (Figure 3) maintains a gradient of private, semi-private, and public space in its layout. It is meant to aggregate in clusters to produce a greater network of semi-public and semi-private spaces. The figure-ground of the courtyard organization suggests a dense and primarily private housing fabric. The fabric actually maintains

Yanlang 檐廊

Yanlang refers to the transition space between the exterior and interior. It's covered by the roof of each private houses yet allowing public circulation and encouraging commercial and public activities.



Jiangnan Courtyard House 江南井干民居

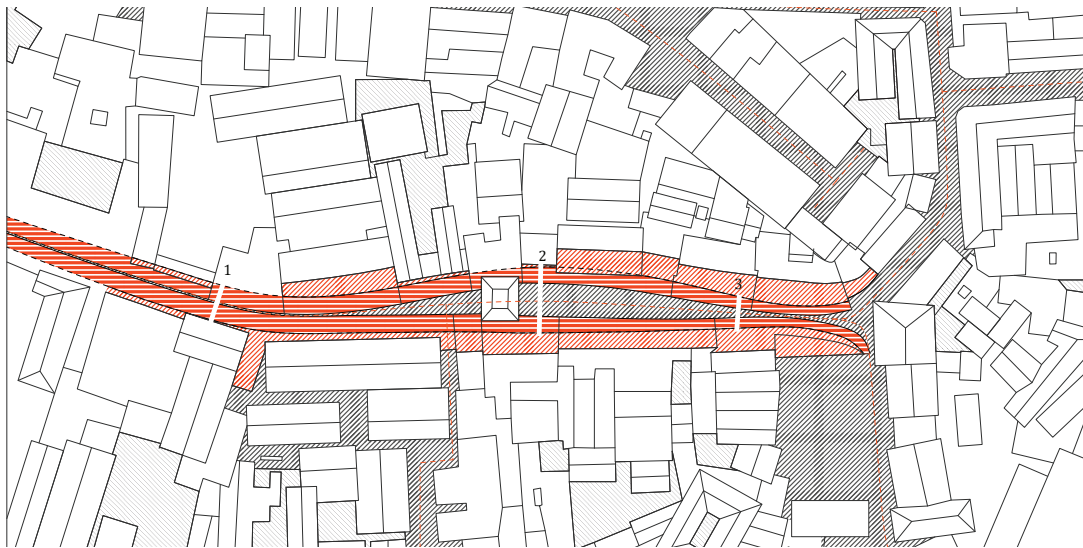
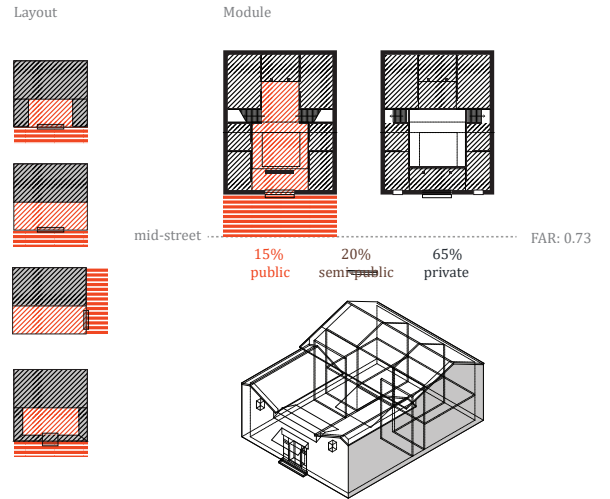


Figure 3: Traditional typologies of Yanlang and Courtyard House, Yanlang analysis, Courtyard House figure-ground and semi-public space analysis. (Drawings by Leslie Lok and Yichen Jia).

FAR = 2.0 - 2.3

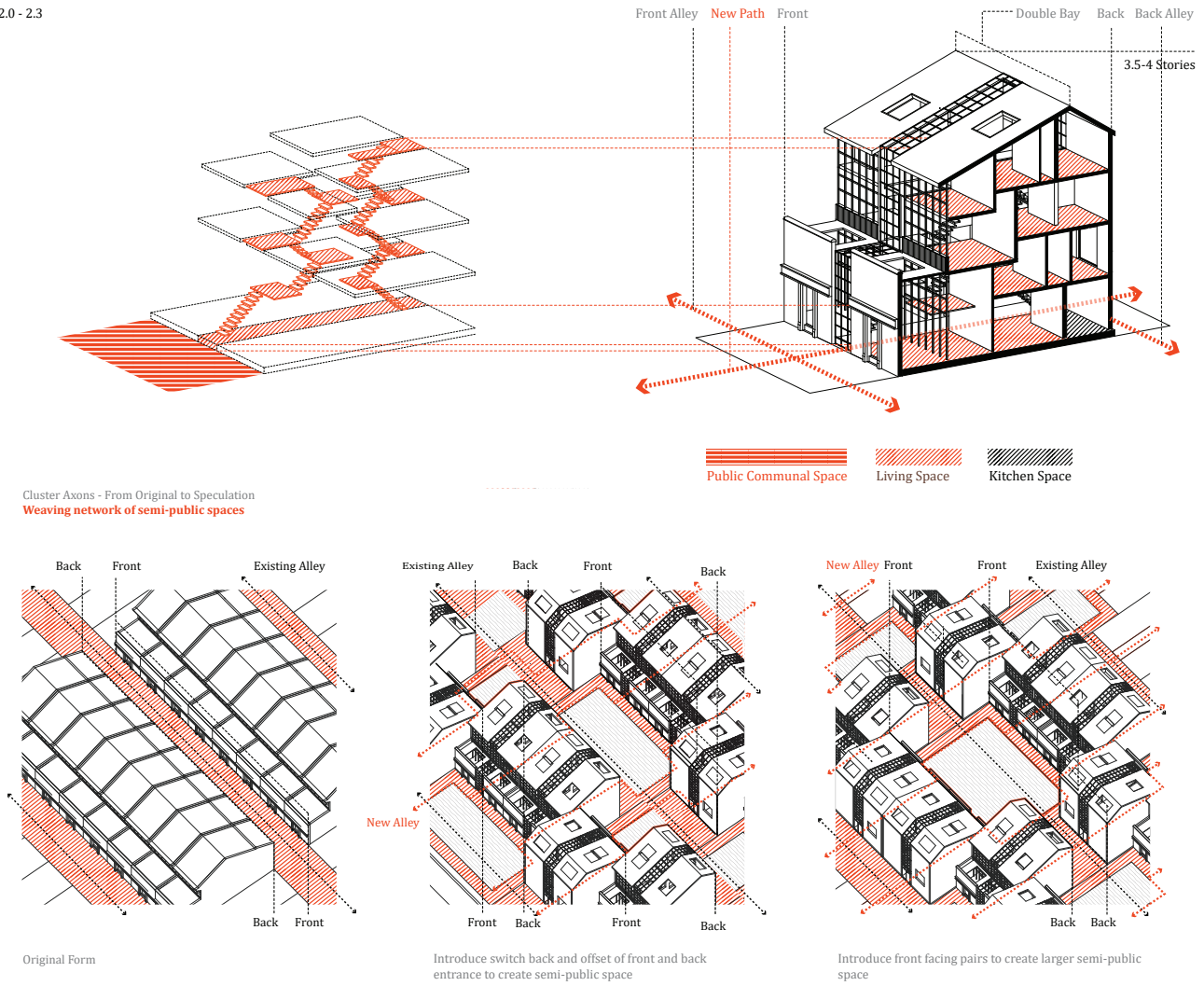


Figure 4: Proposed Lilong modification with new stair core and a weaving circulatory network. (Drawings by Leslie Lok and Yichen Jia).

a dense field of semi-private courtyards, semi-public courtyards produced by the residual spaces between houses, and the larger public space in the village (Figure 3).

The third typology is a comparatively “modern” example to the previous two types. The Lilong is a hybridized configuration of English Row house and Chinese typologies; it retains both the linearity of the Yanlang and the open space of the Courtyard house. Originally designed as single-family house in the 1840s, the house consisted of a front alley as the main entrance and a back alley as service space. Through the process of densification, the post-1940s Lilongs were appropriated as social housing and transformed into a multi-family housing typology with both front and back alleys as semi-public spaces. While the English row house formed a street facade, the Lilong is configured as a fish-bone organization with a primary circulation spine connecting a series of secondary alleys. This gives great significance to the Lilong as it also behaves as an urban block and an urban fabric pattern. Within the Lilong, the alleys

are semi-public space filled with domestic and social events. The post-1940s version has a series of modifications which altered the circulatory pattern and intensified the use of semi-public spaces. It has an average FAR of 1.5, the courtyard space is removed and capped to produce another private room which blocked the access of the main entrance facing the front alley. The ground level room on the back alley side is opened up to serve as a semi-private communal kitchen, this switched the main access to the back alley entrance for all residences. The change in access activated both the front and back alley as equally important semi-public spaces. Due to limited individual private space, residences’ daily rituals and social activities largely took place in the alleys producing a strong and vibrant social network.

SPECULATION: LILONG AS A FORM OF MAT-URBANISM

The research looks at the Lilong as one potential form of mat-urbanism and proposes a redesign of the Lilong both at the



Figure 5: Fabric Urbanism Studio work: site model, fabric system studies, and student work by Jessica Jiang and Evan Rawn.

typological scale and at the urban scale (Figure 4). The design combined two single bay modules into a double bay module by inserting a common stair core. This allows the removal of the two original staircases to increase private living space. A new semi-private circulation is introduced to connect the front and back alleys with public access on both ends of the building. Additional floors are added to create a 3.5 to 4-story building. Including the alley space, the proposed design can achieve a FAR of 2-2.3 that is comparable to the residential towers. In section, the new stair case also serves as an interior alley in the vertical space, augmenting the social and semi-private space above ground.

Apart from the typological transformation, the design proposes to re-configure the block organization by alternating the front to back orientation and offsetting the façade alignment (Figure 4), this re-introduces the courtyard as a semi-public space at the front of the building. Furthermore, a third operation introduces the pairing of front facing buildings together to create larger semi-public courtyard spaces that are of a different scale to the alleys. Along with the added semi-private access in the stair core, the original spine organization of linear semi-public space is transformed into a weaving network of semi-public alleys and courtyard spaces.

SPECULATION: INVENTING FABRIC PATTERN

Instead of re-configuring existing fabric systems, the second strategy speculates and constructs alternate modes of housing system through the invention of new urban fabric pattern. Developed as part of an advanced research studio, *Fabric Urbanism*, in Fall 2016 at Cornell University, the projects designed new, high-density, mixed-use, mid-rise housing models in the city of Hangzhou, China (Figure 5). In her seminal essay “How to Recognize and Read Mat-Building” from 1974, Alison Smithson described mat-buildings as “close-knit patterns of neutral collectives open to growth and changes”⁸ analogous to urban formations characterized by an interplay of horizontal part to whole relationships in an ever malleable city fabric. The studio re-visited fabric as an architectural and urban strategy to introduced cultural and spatial proximity in close-knit mat housing systems.

The studio was executed in three related phases: Part 1 Mat system, an introductory phase of exploring the organizational complexities of mat building to develop urban fabric pattern. Part 2 Construction System, with concrete as the default material for urbanization in the case of concrete towers, projects expanded upon current large-scale automated and semi-automated fabrication processes for constructing complex mat-buildings at an urban scale. Part 3 Constructing Urbanism focused on the in-depth integration of site parameters and program in dialogue with mat fabric, as well as

further clarification of the construction strategies through detailed representation and large scale models.

Students speculated ten housing systems as forms of mat-urbanism with various fabrication methods such as CNC-milling wood frame structure, customizable precast concrete, and 3D-printing with soil among others. Apart from construction systems, the projects achieved high-density housing with an average FAR of 3.5 to 5 which exceeded the typical residential tower compounds. By providing a gradient of public and semi-public spaces to semi-private and private spaces, each system is capable of fostering and maintaining a level of social proximity that was integral to the Chinese housing culture. Both the research in traditional typologies and speculative housing design suggest that there are much more viable methods and models to rethink the construction of urban housing as forms of mat-urbanism in Chinese cities.

ENDNOTES

1. Fleischer, Friederike. *Suburban Beijing : Housing and Consumption in Contemporary China*. (Minneapolis, US: University of Minnesota Press, 2010. ProQuest ebrary. Web. 30 April 2017.) 30.
2. Yang, Zan, and Jie Chen. *Housing Affordability and Housing Policy in Urban China*. (Springer, 2014.) 15.
3. Li, Pengfei, "Making the Gigantic Suburban Residential Complex in Beijing: Political Economy Processes and Everyday Life in the 2010s" (CUNY Academic Works, 2017) https://academicworks.cuny.edu/gc_etds/2063.
4. Bray, David. *Social Space and Governance in Urban China. The Danwei System from Origins to Reform*. (Stanford. Stanford University Press, 2005.)
5. Li, Pengfei, "Making the Gigantic Suburban Residential Complex in Beijing: Political Economy Processes and Everyday Life in the 2010s" (CUNY Academic Works, 2017) https://academicworks.cuny.edu/gc_etds/2063.
6. Song, Jingli. "Top 15 'new first-Tier' cities in China." *Chinadaily.Com.cn*, www.chinadaily.com.cn/business/2017top10/2017-05/15/content_29343927_2.htm.
7. Sito, Peggy. "Hong Kong government considers plan to cram in more people." *South China Morning Post*, 18 Feb. 2014, www.scmp.com/property/hong-kong-china/article/1430455/hong-kong-government-considers-plan-cram-more-people
8. Smithson, Alison, "How to recognize and read MAT-BUILDING. Mainstream architecture as it developed towards the mat-building." *Architectural Design*, No.9, 1974, pp573-590.