ALLEYWAYS AND ADD-ONS Housing Incremental Change Through Multi-Generations in Bali, Taiwan

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Abstract

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Housing is a critical issue in Asian countries that are industrializing and growing their populations. Trends in developer driven construction point to a Western model that favors a coarse urban fabric of high-rise towers and large blocks in order to efficiently house as many people as possible. New towns are built rapidly in the span of three to five years that dramatically alter the urban fabric. Many of these new towns are significantly out of scale with the surrounding existing urban fabric.

In contrast to the developer driven high-rise nature of the Taiwan housing market, this housing strategy takes cues from existing conditions of urban alleyways and architectural add-ons to foster the close-knit interactions of traditional dense urban communities. As a result, this low-rise, high-density proposal allows for a diversity of streetscapes.

The flexible framework that this thesis proposes hinges on the inevitable change of multigenerational family needs. The basic needs of the core house are determined by looking at the spatial needs of a nuclear family. The expansion and add-on to the core house is determined by projecting the needs of an extended family. The regularity and uniformity of the narrow lots allow for combinations of properties that can accommodate combinations of families. Through this lens of multigenerational housing, the project proposes a spatially diverse and socially dynamic community as an alternative to the government plan of towers and super blocks.

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Thanks to my thesis committee for all their dedication and feedback: Mike Pyatok, chair, Jeff Hou and Ken Oshima.

Thanks to my family for traveling with me to Taiwan and helping me understand the beauty and value in every place and landscape.

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1 PREFACE

I became interested in the idea of housing while taking Mike Pyatok's Affordable Housing seminar in Fall 2011. In the class, we discussed the topic of "coziness" which is a metric that describes dwellings per acre, bedrooms per acre and ultimately gets at the heart of density, which is number of people per acre. We studied housing examples of varying density in the U.S., including Seattle, Phoenix, and the Bay Area. The projects ranged from single family detached townhomes to multifamily townhomes to four and five story multifamily mid-rises. In each case, the homes were designed thinking primarily about the user needs, which encompassed the spatial needs of the very young (e.g. daycare facilities) to the elderly (e.g. accessibility concerns).

Throughout the class, I was impressed with the idea that housing should be looked at as an integral part of the urban context. Whether single family detached home or high rise housing, the responsibility of the designer is to ensure that the residential community fit within the logic of the surrounding urban fabric. Housing communities should allow residents to feel a sense of investment and ownership in their homes. Through this sense of ownership, entire neighborhoods can grow and sustain themselves over time.

Fig 1.1 Examples of urban fabric context for several of Pyatok Architects projects.
Above, Redmond WA.
Below, Rancho Cucamonga, Los Angelos CA.

From travels to Taiwan and Japan, I realized that this sense of sustainable neighborhoods has been part of the urban fabric for centuries. It is amazing to see how rich and diverse “unplanned” communities can be. Without the tinkering of an architect or planner, varied facades sidle up next to each other, families become acquainted through generations of owning adjoining businesses and whole communities organically grow over centuries. Of course, as East Asian cities grow more and more dense, regulations must be passed to maintain life safety and quality of life issues. In Tokyo, for example, complex ordinances are passed to maintain adequate levels of daylighting for residences. The result is roof planes that slope drastically to allow the sun to penetrate deep into rooms that would otherwise be dark. But inherent in these growing cities is an excitement and intimate quality that is lacking in most American cities. It is this quality of closeness, of spatial surprise that excites me when traveling throughout Asia. And it is a hard to replicate organic quality that is often missing in the rapid pace of development in these cities. Large moves can wipe out the delicate balance of intimacy and privacy that brings character to successful residential developments. Small moves may not have the financial payback that

Fig 1.2 Above:
Edo era housing model, at the Edo-Tokyo Museum

Fig 1.3 Left:
Mixed Use market and temple intermingled in a dense commercial district in Asakusa Temple, Tokyo

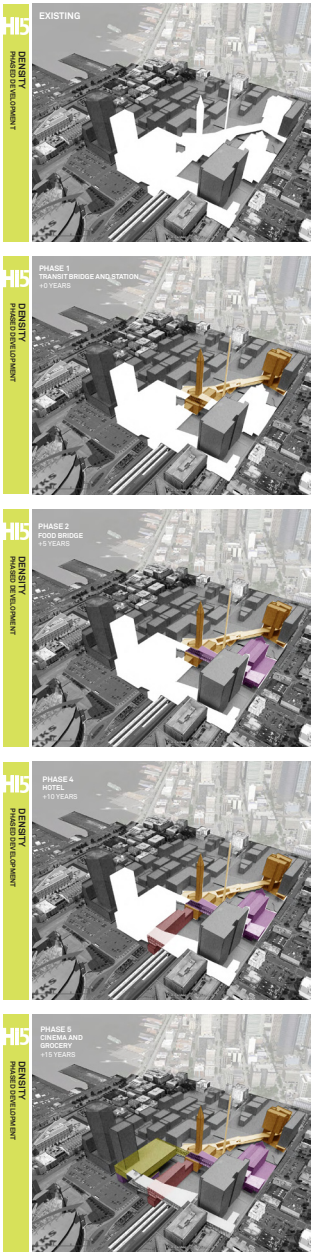
is required of projects to be economically viable. How can a designer satisfy the interests of the developer, government officials, current residents, and potential long-term residents?

I was able to explore some of the issues of design predictability and organic growth in taking the Metabolic Urbanism Japan Studio in Spring 2013, led by Ken Oshima. Our studio traveled to Japan to study the evolution of transit infrastructure in Tokyo, Kyoto, Kobe, Osaka and Yokohama. Throughout the 10-day trip, we sketched, photographed and diagrammed many of the intricate transit systems that hold together some of the busiest places in the world. One of the takeaways of this trip was the understanding that urban design and architecture live on far beyond the last day of construction. The city is constantly re-inventing itself. Kyoto Station, for example, was a product of a design competition that intensely mixed commercial, tourism and utilitarian interests into one megabuilding. In doing so, the project created a new node within the city, one that has generated as much interest as the ancient temples that the city is known for. Yet, no one could have predicted the outcome of the huge project in its initial stage of design.

Fig 1.4 Kyoto Station

The outcome of the Japan studio was an understanding that whatever is proposed and built in a city can take on a life of its own. Upon our return to Seattle, we strove to address this unpredictability within our design project. Our group project, titled “HI-5, City without A Ground,” was predicated on the idea that buildings are catalysts. Our proposal of three bridges was, in effect, three catalysts that could push development within the economically suppressed International District in downtown Seattle. We provided a framework for how the site could evolve and take on new businesses. Rather than see buildings as static additions, we hoped that each building could bring along with it more activity, in the form of hotels, restaurants or residential towers that befit the neighborhood. In doing so, we proposed a vision for the downtown that went beyond just the design for each individual bridge.

Finally, this thesis was also influenced by my time as a participant at the Meiji University International Urban Design and Architecture summer program in August 2013. The program brought together students from Thailand, Malaysia, Indonesia, Japan, Italy, Brussels and the U.S. to study the Nakano neighborhood in Tokyo. Working in groups of five, we proposed an urban design strategy that



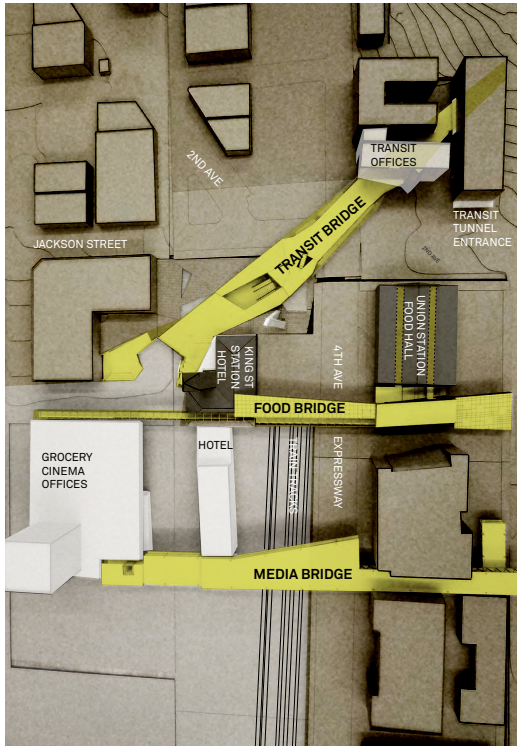


Fig 1.5 Above:
Site plan of HI-5 City without A Ground studio project

Fig 1.6 Left:
Phases of development

could address some of the diverse neighborhoods in the site. As I walked around Nakano in the early mornings, I was impressed by the quality of the residential spaces. They were narrow yet inviting, private yet accessible. These one and two-story homes had small alleys that gave them a feeling of porosity. The homes were compact, allowing many of them to exist side by side along the street. They had existed in the neighborhood for at least 50 years, the product of a loose urban plan that relegated many of the commercial uses to a separate part of the site. I was inspired by the quality of these residential spaces and wondered how they could be replicated in another country, on another site.

Overall, many different threads have come together to mold "Alleyways and Add-Ons." From a practical introduction into the principles of socially sustainable housing to experiencing first-hand the diverse spatial qualities of low-rise dense housing, I hope to incorporate many issues into this thesis. These issues are: change over time and flexibility in the creation of socially diverse and sustainable housing communities.

Fig 1.7 Residential spaces in Nakano, Japan

2 INTRODUCTION

Development in Asia

Urban development in Asia differs greatly from the processes of growth and development in America. There is acknowledgment that local economies are intrinsically linked, and that there is the weakening of the nation state as a source of identity, especially as migration across countries and across borders increases.

The so called "tiger economy" countries of Singapore, Korea, Hong Kong and Taiwan are part of a larger financial and cultural ecosystem, many of whom have had a colonial history or had post colonial-identities assigned to them. In trying to establish their own economic strengths to parallel the strength of cultural traditions, these countries have undergone massive makeovers to their national identity in the past 50 years: Hong Kong as a financial hub, Singapore as an innovator not only in technology but also in social standards, Seoul as a tech hub, and Shanghai as the center of the Asian market. This leaves Taipei somewhere in the mix, not as a global powerhouse like Hong Kong or Shanghai, but as a second tier city with aspirations and variable success to be a key player in the Asian market. The fluidity of boundaries in the East Asian sphere, underscored more by the ease of travel between nations, (e.g. across the strait between Taiwan and China) emphasizes the weakness of the nation state as a source of identity. [1]

Because of this newfound fluidity, a regions' comparative advantage in attracting industry is paramount. Countries can no longer rely only on natural resource endowment or the availability of large pools of labor to attract business. Almost any nation or region can construct the basic infrastructure or offer the obligatory tax incentives to support industry. But the distinction between places can be made in the cultural amenities and socioeconomic environments that offer a stimulating or pleasant ambiance for daily living. Regions can no longer promote themselves as mechanisms for manufacturing as they did a half century ago. Instead of visions of industrial landscapes, these countries began to offer clean environments and diverse lifestyle opportunities, such as natural scenery, parks, and cultural attractions, as their comparative advantage. [2]

So with this understanding of the shift from plainly industrial to using culture as a marketing tool to advance national image—how does Taiwan fare? How has it historically grown in grooming its technology and industrial sectors along with its social agenda?

[1] Mike Douglass and Won Bae Kim, "Culture and Urban Future in East Asia," in Won Bae Kim, Mike Douglass, Sang-Chuel Choe and Kong Chong Ho (eds). *Culture and the City in East Asia*. (Oxford: Claredon Press, 1997), 234-238.
[2] Douglass, 240-243.

Hong Kong

Singapore

Seoul

Shanghai

Fig 2.1

Economic and Spatial Development in Taiwan

Japanese occupation of Taiwan ended in 1945. In the vacuum of governance, the nationalist Kuomingtang (KMT) administration took over as they had fled from the mainland after the Communists occupied China. The KMT agenda was fairly simple; they wanted to prompt a rapid economic development and they were successful in comparison to other nations. The change from a mainly agricultural society to a manufacturing society was rapidly completed in less than 40 years. The government sponsored an export led strategy, where incentives were provided to attract foreign and private investment. The state also had a heavy hand in the construction of infrastructure needs such as electricity, communication, transport and food industries. [1]

Unique to Taiwan's growth was its emphasis on growing not the state-owned conglomerates but a wide array of small to medium enterprises (SME) in labor intensive industries such as plastics, textiles, foods and footwear. However, the massive growth of manufacturing created a divide between the urban and the rural. Migration between the two increased the polarization effect across the island. The government took note and prompted industrialization to spread to the rural areas, forming an urban-rural network of production that is distinct from other countries. The countryside began to contain a mixture of agricultural and manufacturing activities. [2]

KMT control eventually weakened as a strong democratization movement took hold in the country in the mid 1980s. This led to a neoliberal and privatization policy that was very pro business. This was good news for many of the SME's that were established in the 70's and 80's. From the point of view of GDP growth, these businesses and the growing tech industry contributed to the success story of Taiwan's tiger economy (up until the bubble crashed in 1997). However, the theme of privatization and liberalization did not extend necessarily into social benefits. Millions of dollars were invested in infrastructure, but only if it was seen to directly benefit industry, such as schools, roads and telecom infrastructure. Housing was an element of the social agenda that was not perceived to be part of a larger business agenda. Hence the source of affordable multifamily housing in Taipei is quite limited. [3]

[1] William D. H. Li, *Housing in Taiwan: Agency and Structure.* (London: Ashgate, 1998), 33-36.
[2] Jinn-Yuh Hsu, "The Evolution of Economic Base: From Industrial City, Post-Industrial City to Interface City." in Reginald Kwok (ed), *Globalizing Taipei.* (New York: Routledge, 2005), 18-19.
[3] Li-Ling Huang, "Urban Politics and Spatial Development: The Emergence of Participatory Planning." in Reginald Kwok (ed), *Globalizing Taipei.* (New York: Routledge, 2005), 82-83.

Housing in Taiwan

It is especially necessary to provide an overview of the housing situation in Taiwan, as it differs from the American norm and even among Asian countries it is unique. Taiwan has an unusually high home ownership rate, about 80% in 2000, much higher than in the U.S. [1] This is due to several reasons. One, the policies on privatization and deregulation, which were instituted by the process of democratization in the mid-1980s, greatly benefited developers. For example, in 1999 the government unveiled a NT$150 billion mortgage plan which provided homebuyers with very attractive loans at low interest rates. The motive was to uphold the housing market and the financial system. Its overall effect was to create high housing demand that artificially raised home prices and also eliminated those with lower incomes who were thus left out of the housing market. During this time, all public housing projects were suspended as well. [2]

Culturally, there is a high value placed on home ownership, especially as a part of middle income values. Home ownership is thought to be a safe investment, a smart long term strategy in place of short term gains or losses. Fluctations in the market are accepted as part of the reality and are easily tolerated as a necessary evil.

Investment in housing is a mechanism to hedge against inflation and a way to safeguard value of money. As the middle class is the largest segment of society and also the class that wields the most political power, middle class virtues trump all others—these values are social order, city aesthetics and efficiency as main urban goals. Middle class values are less concerned about the issue of social justice or lower economic class needs. [3]

The importance on housing, reflected in the high ownership rates, has been under scrutiny lately due to skyrocketing housing prices. Housing prices doubled from NT$3.3 mill to NT$ 8.2 million in under ten years (1986 – 1992). The housing boom that began in the mid-1980s caused serious problems of housing affordability in the mid-1990s. Adding to this problem is the low property tax rate, which allows owners to own several homes without renting them out and leaving them vacant. As housing prices increase, so the proportion of disposable income families use towards mortgages also increase. Monthly payments for mortgages, for example, can take up a majority of a paycheck. [4]

[1] Yi-Ling Chen, "Provision for Collective Consumption: Housing Production under Neoliberalism." in Reginald Kwok (ed), *Globalizing Taipei*. (New York: Routledge, 2005), 109.
[2] Chen, 114-115.
[3] Chen, 110-112.
[4] Chen, 111.

Given this situation, it is clear that historically, housing was always seen from a pro business perspective, not as an issue that deserved social equality. The laser focus on tending to Taiwan's economic strength took priority over all other issues and arguably still overshadows other needs in contemporary current events and elections. Viewing Taiwan as it views itself—as a competitive yet struggling economy in a sea of several other powerhouses and part of a much larger economic ecosystem—one can understand how a dominant economic strategy of liberalization and privatization benefits the country as a whole and promotes its national image. However, as mentioned earlier, post industrial nations require more than business to attract business. Cultural amenities, standard of living issues, social implications play an increasingly important role in differentiating Asian cities from one another as well as attracting business.

Developing an alternative housing model that counters the developer led model (which does not distinguish between cultural context but rather uses a template building and "copy and pastes" buildings onto sites) is an important task for Taiwan. The crushing financial burden of housing placed on middle class shoulders, especially in Taipei, needs to be alleviated in order to free up financial resources for other forms of investment that could also benefit the country. The need for an affordable and sustainable housing solution is imminent and its architectural potential is quite vast.

Changing Demographics

Shifting demographics also affect the housing market in Taiwan. Traditionally, children live with their parents until marriage. Even after marriage, many children continue to live with their parents or in-laws, as it is natural for the younger generation to act as caretakers for the older generation. This is a large difference than the Western model, where it is rare that more than two generations live under the same roof. The majority of families in Taiwan are multi-generational families who may require special spatial needs relating to privacy and accessibility to make this housing arrangement work.

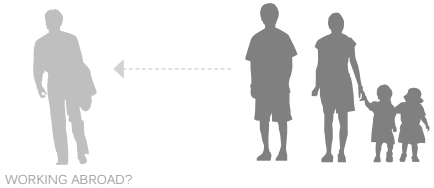
However, with more and more families opting to have fewer children than 50 years ago, the number of seniors compared to the rest of the population is growing. Any housing proposal that seeks to address a diverse resident population should also factor in this growing demographic.

MULTI-GENERATIONAL FAMILIES

Families are the primary caretakers for older people in Taiwan. In 2010, 52.2 per cent of people over 65 years old lived with their children.[1]

SENIORS

The number of people, aged 65 or older, who live alone more than doubled between 1990 and 2010.[2]



NUCLEAR FAMILIES

Nuclear families compose 54% of families in Taiwan; this can include multi-generational families.[3]

Fig 2.2

[1] Yi-Ling Chen and Herng-Dar Bih. Forthcoming. "The Pro-Market Housing System and Demographic Change in Taiwan," in John Doling and Richard Ronald (eds.), *Housing in East Asia*. Palgrave MacMillan, refereed, 11 (in article).
[2] Ibid.
[3] Ibid.

3 METHODOLOGY

Thesis Goals and Objectives

The main goal of this thesis is to provide a framework upon which to design a low-rise, high-density neighborhood that can be as economically feasible as the default block housing that is currently being planned and constructed. Methods to achieve this will be to describe the current plan and buildings, using as much available data as well as extrapolating what would exist based on contextual examples of recent building in suburban Taipei. This analysis will require a cursory economic comparison between the planned and official project and the proposed design. This will be done by comparing planned number of units (based on the given average square meter of Taipei apartment) to proposed number of units.

A secondary objective is also to propose an incremental strategy of building for multi-generational families. This will be done by studying precedents that have successfully proposed alternative strategies to ready-built housing. These precedents include Aranya Housing Project by Balkrishna V. Doshi and Quinta Monroy, by Elemental. Both projects are explicit in pursuing a "half-done" design solution that will evolve in organic and unpredictable ways, adding to the richness of the proposed residential community. Japanese metabolism also provides design inspiration through its understanding of how architecture evolves as the city around it changes. These precedents have been completed at least most 25 years ago therefore post-occupancy studies reveal what the project excelled at and what could have been improved.

Part of the goal of creating a vibrant residential community is the inclusion of a variety of outdoor spaces that can accommodate large-scale activities and also smaller intimate gatherings. This is especially important given the use of alleys and smaller neighborhood spaces for traditional Asian festivals and ceremonies. Understanding the needs of a multi-generational program will provide direction to the creation of a spectrum of outdoor spaces.

Finally, the objective for the project as a whole is to define the principles of creating a sustainable, socially and economically diverse residential community. This is done on an urban scale, a neighborhood scale and an individual unit scale. The scope of this project limits design exploration to the neighborhood and individual unit scale. The project defines parameters at the urban scale to create a viable scenario that addresses planning issues such as parking and commercial corridors. By drawing on

precedents, site observations and a review of issues pertinent to current Asian development, the thesis is invested in proposing a housing community that is focused on the long-term growth of neighborhoods.

Site Selection Criteria

The site was chosen for its rapid transition from an agricultural and forested landscape to an urbanized one. Like many recently developed Asian nations, there are few laws preserving the landscape from development, as building is generally seen as an unquestionable improvement over existing conditions. However, one of the goals of this project is to critique the unmitigated takeover of land for construction. In this case, the town of Bali is one of the last urbanized regions within Taipei County. Its location at the northern tip of Taiwan Island places it between the Pacific Ocean to the north and a mountain range to the south. The city, therefore, is constrained to grow within a narrow strip of land about 1 km wide between the ocean and the mountains. These limitations create a somewhat predictable rhythm of East-West streets that have been the dominant circulation patterns for existing streets. This provides a logic for understanding how future development should proceed.

Another criteria for selecting the site is that the area is already targeted for massive development. The vision plan for Bali Township is a drastic change from the narrow streets and small shops that characterize the area. With new construction that will double the size of the Port of Taipei, which anchors the site on the northern side, the Bali government is hopeful that the area will see much new development that can support the increase in shipping industries, the cruise industry and other ancillary tourism businesses. The mass construction of the Port of Taipei is the impetus for much of the housing towers here, as the expectation is that many of the workers and their families will live close to the port. The Harbor is a contentious project and has been the subject of a lot of local controversy.

In a way, this controversy symbolizes much of the problems facing peri-urban development in Taiwan and similar nations. The local economy is overshadowed by government subsidized plans to bring in heavy industry. The desire to improve quality of life and overall economy is admirable. However, at what cost? In this case, the local economy of fishing and farming has quickly given over

to the large scale shipping traffic that has overwhelmed the bay. Local news and media have covered the trials of the fishermen and farmers. However, as in many of these David and Goliath stories, the outcome is a zero sum game where one wins at tremendous cost to the other. Picking this site was symbolic as it has been the focus of much attention from both government and local agencies. The thesis proposal of an incremental multi-generational housing strategy on this site addresses some of the concerns of the indigenous agricultural population while also understanding that development must occur on the site to address its rising land value.

Design Methods

At the urban scale, the project will analyze streets in existing urban sites in Taipei to determine comparable appropriate street scales for different residential scales in the new site (e.g., alleys vs traffic thoroughfares). The widths of existing street systems will be noted, along with the heights and uses of buildings fronting those streets. The goal is to determine which activities are fit for streets of different sizes. Proposed streets will also take design inspiration from residential scale streets observed in Nakano, Tokyo as well as other neighborhoods in Taipei.

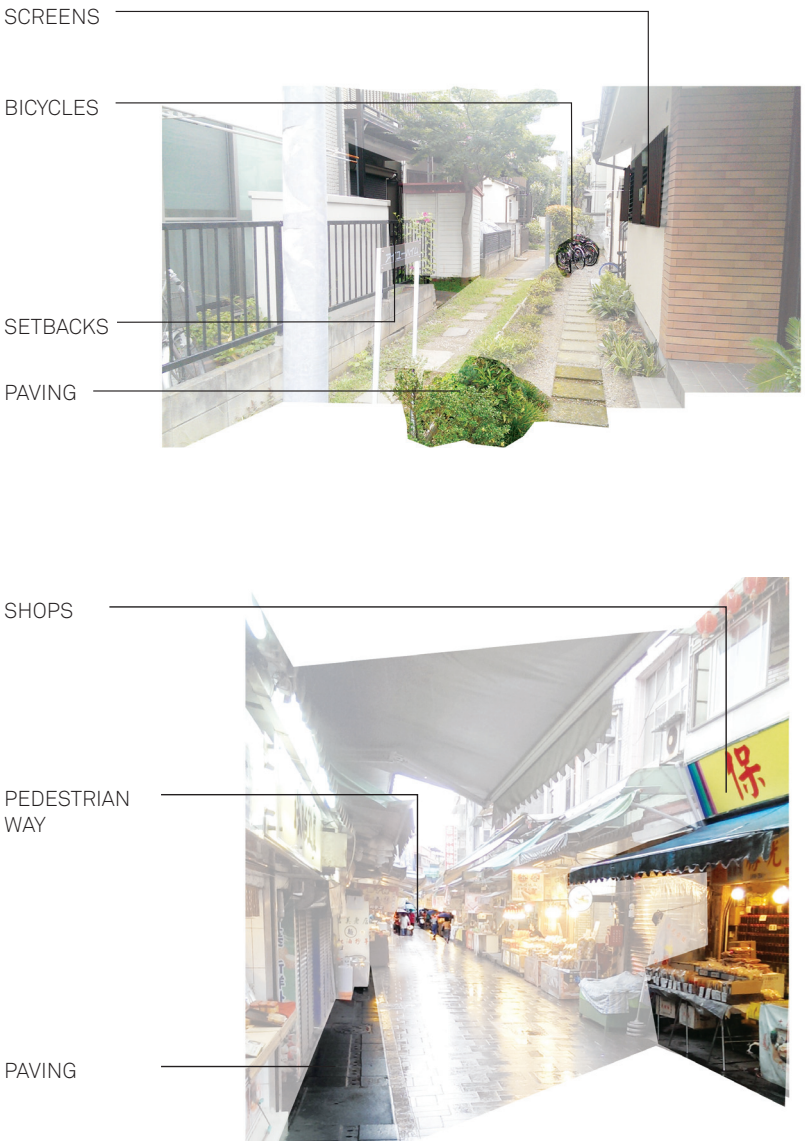


Fig 3.1 Example of alleyway studies in Tokyo and Taiwan

To simulate the stages of a family's growth across generations, the thesis will involve a game to test out different scenarios. Classmates are enlisted to be different characters with different family traits. As 5 year increments pass, each character will be faced with a choice on how to grow or shrink their spatial arrangements to best fit their family size. The purpose of the game is to randomize both generational changes and how different people respond to those changes. The results guide some of the design choices.

Finally, time lapse renderings will show how incremental growth can possibly occur on the site. The renderings show a variety of options for the units to both expand and to shrink. They will show how the site eventually becomes fully occupied over time. The final result should demonstrate an overview on how the site could develop.

Fig 3.2 Classmates participating in generational simulation game

Fig 3.3 Time lapse photos of spatial preferences every 5 years in game simulation

4 PRECEDENTS

Aranya Community Housing, Indore India
Total Site Area: 210 acres / 6,500 units
Architect: Vastu-Shilpa Foundation / Balkrishna V. Doshi
Completed: 1983

The Aranya Community Housing project was conceived as an incremental housing scheme. It was designed as a joint project between the NGO research organization, the Vastu-Shilpa Foundation and modernist Indian architect Balkrishna V. Doshi. Before this project, the Indian government's approach to solving low-income urban housing was to supply ready-built homes. The problems of this approach, however, were that it took too long to build and that each home's price was too high to suit a majority of the people it meant to serve. Alternative approaches included slum upgrading or providing serviced sites for new construction. In the latter approach, funds could be stretched further, therefore providing more homes at the same cost. [1]

The Aranya Housing project in Indore was sited in a commercial center which suffered from housing and infrastructure shortages as well as a large income disparity in its residential population. The project goal was to create a master plan that could develop into an economically integrated community. The final master plan evolved around a complex street network that would create a variety of spaces that would house not just large neighborhood parks but also included smaller pocket parks. These smaller spaces were vital, especially in lower-income neighborhoods that often used these outdoor spaces as small temple, festival or gathering areas. The plan was designed around a central spine that was bisected by series of these varied linear spaces. The entire plan was split into six sectors, each with populations of between 7,000-12,000. These divided into clusters of 20 homes, which shared electricity, water and a septic tank. These were further split into ten homes each which shared a back courtyard. There was a range of options for different economic groups, for example the poorest lived closer to the middle while the better off lived near the periphery. [2]

Most income groups could only buy one housing plot. Each plot came with a concrete plinth, service core and a room. These single room homes could be improved using whatever materials were available locally, including concrete, brick and stone. In initial stages of development, people used inexpensive materials to quickly construct newer rooms. Later development included more solid and

[1] Aga Khan Award for Architecture. "Aranya Community Housing." http://www.akdn.org/architecture/project.asp?id=1242 (Dec. 20, 2013).
[2] "Aranya- Low Cost Housing, Indore." http://web.mit.edu/incrementalhousing/articlesPhotographs/pdfs/aranya-3-Details1146.pdf (Dec. 20, 2013).

permanent construction using reinforced concrete and brick. The project did not require residents to conform to an aesthetic standard, which allowed for a very flexible and quick building process.

The project's strength is that the design is conceived as an entire urban network, which utilizes street systems and infrastructure as an important organization device around which to build clusters of neighborhoods. In this process, the actual buildings are not necessarily the end result, especially as the buildings are continually changing and growing. Indeed, when designing for a wide economic range, the needs of each neighborhood are drastically different. This project designs for the least common denominator, i.e. providing the most basic necessities within the core house and its accompanying infrastructure. More than twenty years later, post-occupancy studies observe the way people have adapted the bare palette and customized their homes through additional construction. The diversity of spaces that exist now, a quarter decade after its completion, could not have been anticipated when the master plan and its minimum construction was completed in 1983. [1]

[1] McGill School of Architecture, Minimum Cost Housing Group. "Post-occupancy study of Aranya Housing Project." https://www.mcgill.ca/mchg/pastproject/aranya#TOP (Dec. 20, 2013).

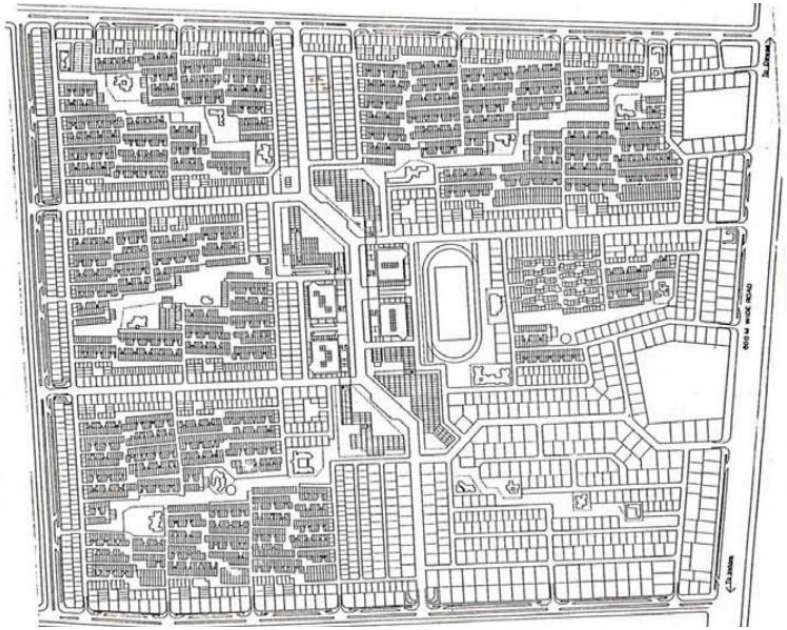


Fig 4.1 Aranya Township Master Plan

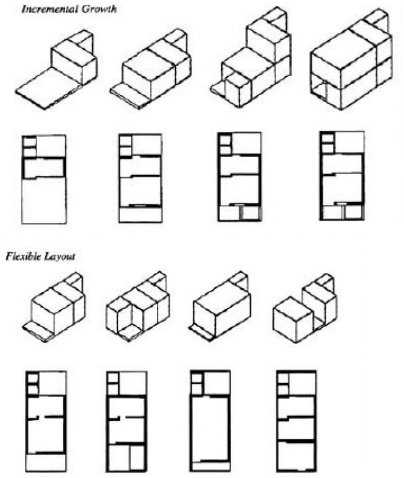


Fig 4.2

Fig 4.3

Sakaide Artificial Ground, Sakaide, Japan
Total Site Area: 3.3 Acres / 100 units
Architect: Masato Otaka
Client: Sakaide Public Housing Authority
Completed: 1986

By the mid-1980s, Japanese metabolist architecture had reached maturity, a movement that aimed to solve many urban problems through an organic approach to infrastructure and megastructures. Many of these projects were realized, most notably Arata Isozaki's Capsule Tower or Kenzo Tange's Shizuoka Press and Broadcasting Tower. Prominent metabolist Masato Otaka had experimented with the idea of an artificial ground that could accommodate several layers of neighborhood facilities on top of each other. An artificial ground could solve problems of the dense urban and seismically fragile nature of development in Japanese cities. Otaka reasoned that "Artificial ground is a means to create an artificial nature, using reinforced concrete. If carefully applied, reinforced concrete can last for more than 200 years which allows us to use it just like natural ground. Artificial ground... is an alternative means of creating new land without reclaiming the sea." [1]

The 3.3 acre site was located near a train station which housed tenement homes for salt farm workers. The design proposed a 6 to 9 meter high "artificial ground" upon which more than 100 housing units were sited. Below the concrete ground was retail, parking and storage below along with other commercial amenities such as a public auditorium and an office complex. The top is accessible by a car ramp. Large skylights (aka round holes) punctuate the elevated ground to allow natural light and ventilation to reach the bottom floor. Trees planted on the actual ground floor could grow above the artificial floor through these punctures. [2]

The success of this project lies in the conception of the neighborhood as more than the housing units themselves. The design's inclusion of a retail and commercial base that holds the residential units allows the complex to thrive in an economically sensitive site. The artificial ground's varying heights, which allows for a diversity of outdoor spaces that include both public and private spaces (including verandas and decks) that altogether create a rich living space and a feeling of a unified community.

[1] "Sakaide Artifical Ground." http://itwonlast.tumblr.com/post/48079137766/madamecuriewasmymother-ground-artificial-ground (Dec. 20, 2013).
[2] Mori Bijutsukan, International Union of Architects, World Congress, and Nihon Keizai Shinbunsha. *Metabolism, The City of the Future: Dreams and Visions of Reconstruction in Postwar and Present-Day Japan*. (Tokyo: Mori Art Museum, 2011), 275.

Fig 4.4 Aerial View

Fig 4.5 Aerial View showing elevated ground plane

Fig 4.6 Residential alleyway

Quinta Monroy, Iquique Chile
Total Site Area: 3500m^2 / 0.864 acres / 100 units
Architect: Alejandro Aravena, Elemental
Client: Gobierno regional de Tarapaca / Programa Chile-Barrio del Gobierno de Chile
Completed: 2004

The goal of this project was to find a way to resettle the 100 families of Quinta Monroy that had been squatting in the center of Iquique, a city in the Chilean desert. Elemental tested different methods of resettlement. The obvious solution of one plot to one house to one family would only have enough capacity for 30 families. Shrinking the plots to accommodate rowhouses still only allowed for double that capacity. Building high-rises would have been efficient but would have prevented expansions. Much like the design and development team in the Aranya Housing project, Elemental architects determined that the best approach was not a traditional ready-built solution. They also realized that the money left over from buying the land would only allow them to build half a house for the 100 families. The solution, therefore, was to concentrate on building only half a house that would contain the essentials.

A major challenge was how to provide buildings that would allow for future expansion. Elemental provided a framework that had a ground and a top floor; future residents could fill in the "missing holes" as they wanted. The full expected build-out was to be 72 meters. The basic 30 square meter home was actually designed with kitchens, stairs and partition walls as if it they were part of a 72 meter home. The budget for each core house was USD$7,500. Families were able to double the size of their homes for only USD$1,000 each. Five years after completion, any of the homes in the Iquique project now is worth over USD$20,000. [1]

Elemental's approach was to change the mindset of social housing from a public expense to a public investment. This was done by conceiving the project as an incremental design; the site would change over time as families moved in and added on to the basic units. They would gain in value with the additions and the minimal design would be enlivened though occupation and use. Much like the Aranya project, the evolving nature of the homes means that even after almost a decade of use, the project has financially appreciated. The design also has been enriched by the diversity of build forms and uses that its residents have imbued into each of their homes. [2]

[1] ArchDaily.com. "Quinta Monroy/ELEMENTAL." http://www.archdaily.com/10775/quinta-monroy-elemental/ (Dec. 20, 2013).
[2] Alejandro Aravena. "Obras/Works." http://alejandroaravena.com/obras/vivienda-housing/elemental/ (Dec. 20, 2013).

Fig 4.7 Incremental growth

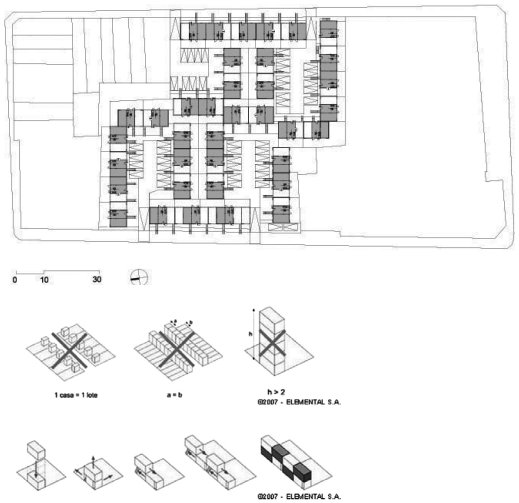


Fig 4.8 Diagrams of infill growth

Fig 4.9 Facade additions

5 PRELIMINARY FINDINGS

Urban Scale

Bali is a growing township 30km from Taipei City Center. It is located on the northern tip of the Taiwan Island, providing it with direct access to mainland Chinese ports. For example, the major city of Fuzhou is 200 km across the Taiwan Strait from Bali. Access to Bali has historically been difficult as the site's location betwen the Danshui River towards the East and the GuanYin mountains towards the South has limited transit options. There is no metro link from Bali town center to Taipei. Commuters may travel by ferry across the Danshui River to Danshui, and catch the metro service to Taipei, which can take over an hour. Another option is to take a bus south, which travels via elevated highway to another town closer to Taipei, to catch the metro service into Taipei.

It is this limited access that has historically cut off Bali from the commercial business of Taipei. It is one of the last urbanized regions in New Taipei Country and prior to the recent spate in developement from the early 2000's onwards, it has existed on a local economy of agricultural, fishing and tourism. However, its proximity to the Taoyuan International Airport (20 minutes to the West) and also its growing harbor industries place it at the center of attention for much development.

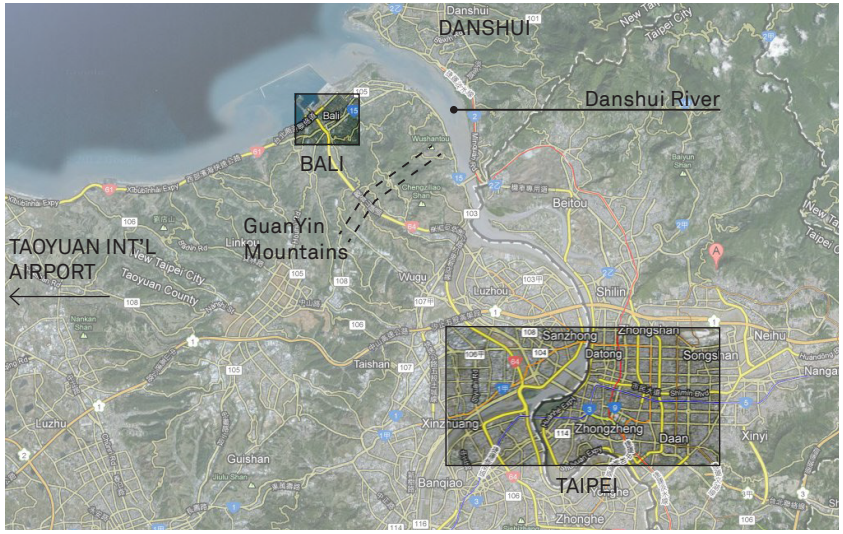


Fig 5.1 Bali in relation to Taipei

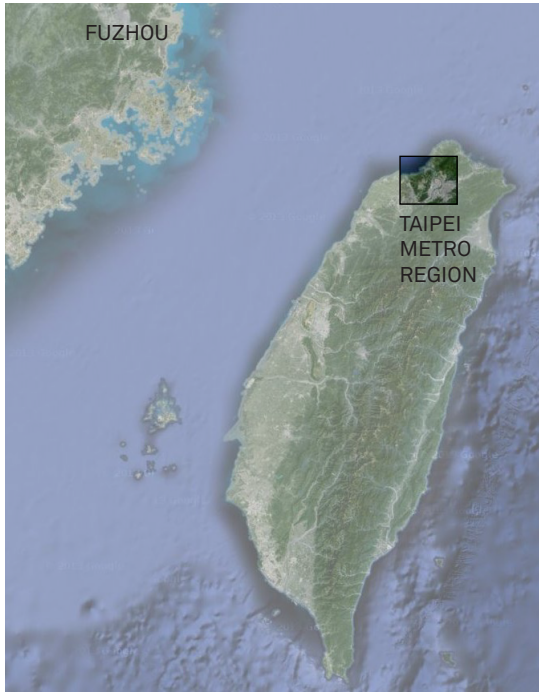


Fig 5.2 Taiwan's proximity to China

The character of Bali has been shaped primarily by its unique geography. Its reputation as a tourism site is bolstered by its natural features, including the Wazhiwei Natural preserve and a 5km coastal bike path that meanders through mangrove forests. One of the prime attractions of the area is the Shihsanhang Museum of Archeology, which has carefully preserved the ancient remains of the area, including exhibits that document the prehistoric people who occupied the land between 1800 and 500 years ago. Visitors to the area make a distinction between the natural offerings of Bali and the carnival-like atmopshere of neighboring town Danshui, located a ferry away. There are few commercial entertainment options, with the exception of a water theme park and spa complex towards the western edge of Bali. [1]

Along with the tourism, new industries have also found a home in Bali. As mentioned earlier, the Port of Taipei has become a major employer in the area, with government plans to double its size and take advantage of its cross-strait proximity to China. The construction takes advantage of the Free Trade Port Zone policy, enacted in September 2005, which provides tax and customs relief for international shipping conducted at the harbor. [2]

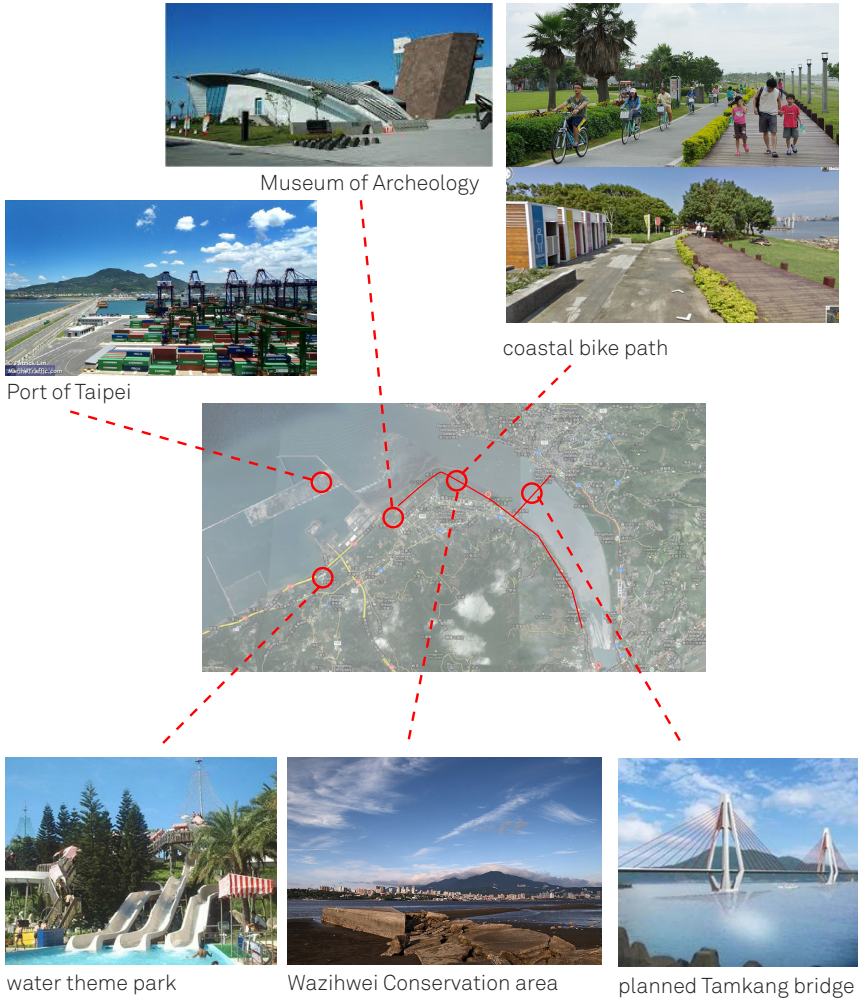


Fig 5.3 Attractions and features in Bali

[1] American Chamber of Commerce in Taipei. "Quiet Charms of Bali." http://www.amcham.com.tw/index2.php?option=com_content&do_pdf=1&id=860 (Dec. 22, 2013).
[2] American Chamber of Commerce in Taipei. "Taiwan Business: Taipei Gets a Big New Port." http://www.amcham.com.tw/index2.php?option=com_content&do_pdf=1&id=1086 (Dec. 22, 2013).

The 9.13 acre site is bounded on the north by the elevated coastal highway 61 which divides the site from the Port of Taipei. The site is bounded on the south by the old town of Bali, which stretches from East to West, following the contours of the land. Further south, about 1 km inland, is the GuanYin mountain range that constrict development. Directly east of the site are formerly agricultural lands that have been bulldozed. As the images show, the land up until recently was a lush lowland of grasses and bush. The fertile nature of the soil allowed for a flourishing agriculture. Young bamboo shoots are a specialty crop for the area. Even now, residents still use empty plots of land for gardening; it is not uncommon to see rice fields side by side with mid and high rise development.

The change from a green landscape to a high density residential zone has been a contentious one. The government has used eminent domain to slowly buy out long-time residents in the hopes of turning the city into a bustling commercial center. In the independent documentary "A Life in Bali," filmmaker Sophie Seeeing (herself a resident of Danshui, which has also seen rampant development) asks whether the construction comes at a cost too high. She interviews residents and professionals alike to get their

Fig 5.4 Looking east across the site

Fig 5.5 Looking north to Port of Taipei

Fig 5.6 Looking west across the site

Fig 5.7 Rice fields adjacent to high-rise development near Bali city center

Fig 5.8 Lush green fields east of the site

opinion on the government vision for Bali. Some excerpts include:

> "Why can't we stay here? We should keep it lush and grassy. We have been planting for years to support the land. But [the government] said it must be used for the public. We therefore cannot preserve the land."
> - Resident

> "This house was the home of my extended family members, my daughters, my daughters-in-law, in total there were seven of us. But are we supposed to dwell in different places now?"
> -Resident

> "Each part of a city should play a part of its own spatial arrangement. We ought not to let all places in the city be only speculative real estate."
> -Huang Rui-Mo, City Planning professional [1]

There is a tangible despair at the lack of imagination provided by the city in terms of how to treat the land. While at first, the residents' anger at the change of life seems reactionary, their reluctance to embrace the changes are nuanced and varied. There is a genuine sense of loss at the change in the landscape from a fertile agricultural lowland to a speculative tower community. Additionally, many of the traditional ways of life, including multi-generational housing, will be changed significantly by the construction of high-rise residential towers. And lastly, there is a question of need. Since the development is speculative, residents wonder whether the economic

Fig 5.9 Government released rendering for the site, including the expanded Port of Taipei

Fig 5.10 Similar planned high-rise housing development in Danshui, with towers and large plazas as the contribution to the urban fabric

[1] Seeing Image. "A Life in Bali, Taiwan: About City Development." http://www.filmsforaction.org/watch/a_life_in_bali_taiwan_about_city_development/ (May 5, 2013).

calculations are correct in identifiying an urgent housing need. Across the water, in Danshui, many units in the recently built towers sit empty, a testament to the bust in the housing bubble of the mid 2000s.[1]

Nevertheless, residents' protests have not had much impact against the construction plans and as the most recent photos of the site show, the area has already been bulldozed and ready for construction for mid-rise housing blocks. The map to the upper right shows the existing conditions and street systems. The map to the lower right shows the new streets that will divide up the land into larger blocks that are about twice the size of the current Bali city blocks. These new street sytems run primarily East-West and feed into main North-South arterials that deposit traffic to either the Coastal Highway 61 or to the Inland Route 15.

As the map shows clearly, however, the site bridges between a dense existing street fabric and the larger and taller building blocks of the Port expansion to the north. Its location is symbolic of housing that could potentially link older traditional ways of life with the inevitable expansion of the Port.

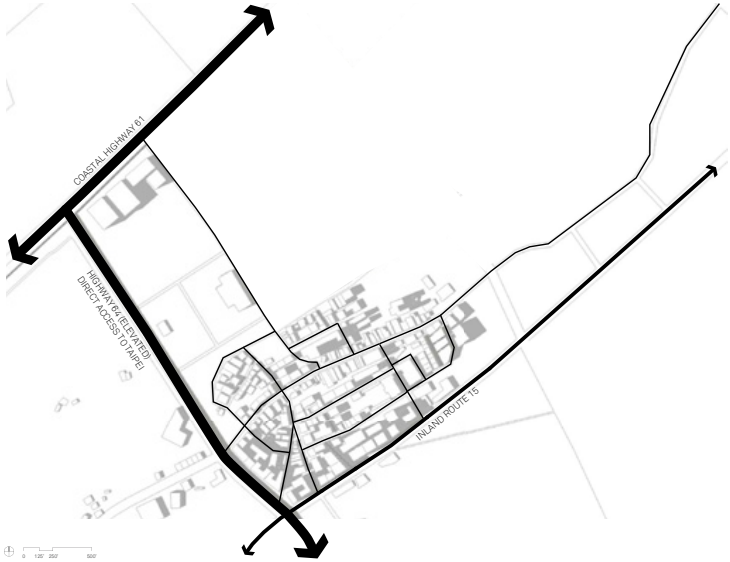


Fig 5.11 Existing Conditions

Fig 5.12 Proposed Conditions

[1] Seeing Image. "A Life in Bali, Taiwan: About City Development." http://www.filmsforaction.org/watch/a_life_in_bali_taiwan_about_city_development/ (May 5, 2013).

Street Scale in Taipei

To further understand what scale is appropriate for the residential buildings on the site, the thesis analyzed the streetscapes of major thoroughfares, streets and smaller alleys in both Taipei and Bali to understand which residential building characters fit which type of street. High-rise development of 10-12 stories that lined the major thoroughfares typically created a very uniform streetwall, with a recessed retail and commercial space on the ground floor. Mid-rise development of 6-8 stories also had a commercial ground floor though they were more likely to be family-owned small businesses. Finally, the interior lanes and roads between the arterials were marked with low-rise development of 4-6 story apartment buildings. The streets narrowed to the width of two cars, but parking usually took up one side of the residential interior road. Garages and entry occupied the first floor of these buildings. Often, there were no sidewalks. The space between entry door and street could be as narrow as a foot or two. Most notably in these residential streets, the street walls tended to be more varied and three dimensional to catch as much daylighting as possible through balconies and facade additions.

Fig 5.13 High-Rise Development: Xinyi Road, Daan District, Taipei

Fig 5.14 Mid-Rise Development: Dongfeng Street, Daan District, Taipei

Fig 5.13 Low-Rise Development: Siwei Road, Daan District, Taipei

Street Scale in Bali

Within Bali, only several blocks have been built up to match the density of the 10+ story high rise towers. The majority of the buildings within the city area are of 6-8 story midrises, though there is an increasing trends towards bigger and taller buildings.

In contrast to the extruded volume high-rise developments sprouting up in Bali, there are consciously low-rise developments being built along the edge of the center city. These 3-4 story townhomes are gated communities, with one main entrance (usually unlocked; no guard). These townhomes are of concrete construction with tiled exterior typically in earthy brown and gray tones. These are much newer construction, built within the last five years. Balconies provide variety along the public streetwall. The buildings are usually split up into single-family townhomes arranged around a central courtyardIt is expected that each family own at least one car, so garages on interior of the first floor are provided. Areas for vegetation are provided, bringing in some of the lush tropical landscape of the natural surroundings.

These developments follow a consciously suburban aesthetic with the drive-in entry and legible differentiation of units along the facade through color striping. It seems the driving force behind these was a response to the high rise residential towers being advertised in Bali center city. However, the inward facing units with the unbroken facade still remains a missed opportunity. There must be an alternative option between high rise extruded towers and introverted suburban development.

Fig 5.16 Mid-Rise Development: Xuntung Road, Bali District

Fig 5.17 Low-Rise Development: Xianyi Road, Bali District

Streetscapes and Add-Ons

A unique condition to Taiwan streetscapes is the facade treatment of add-ons to residential buildings. Residents habitually expand their facade through the addition of these bolt-on metal cages, often prefabricated. They add several square meters to a unit, and are generally used for utilitarian functions, such as clothes drying or storage. Often, plants and other greenery make their home in these add-ons as well. The completely unplanned nature of these additions can make the urban streetscape chaotic. Planners may say that they also detract from the public way, limiting daylight from reaching the ground plane. However, these organic additions can also enliven alleys and streets by adding dimensionality and variety to the facade. They also speak to a need that residents have-- a desire for customizing individual units and also increasing the access to the outdoors.

They are small moves; at most they add a couple square meters to an apartment, but collectively they make a solid concrete building facade distinguishable from the next. They also provide an architectural cue of how to define the streetscape and also how to organize interior spaces.

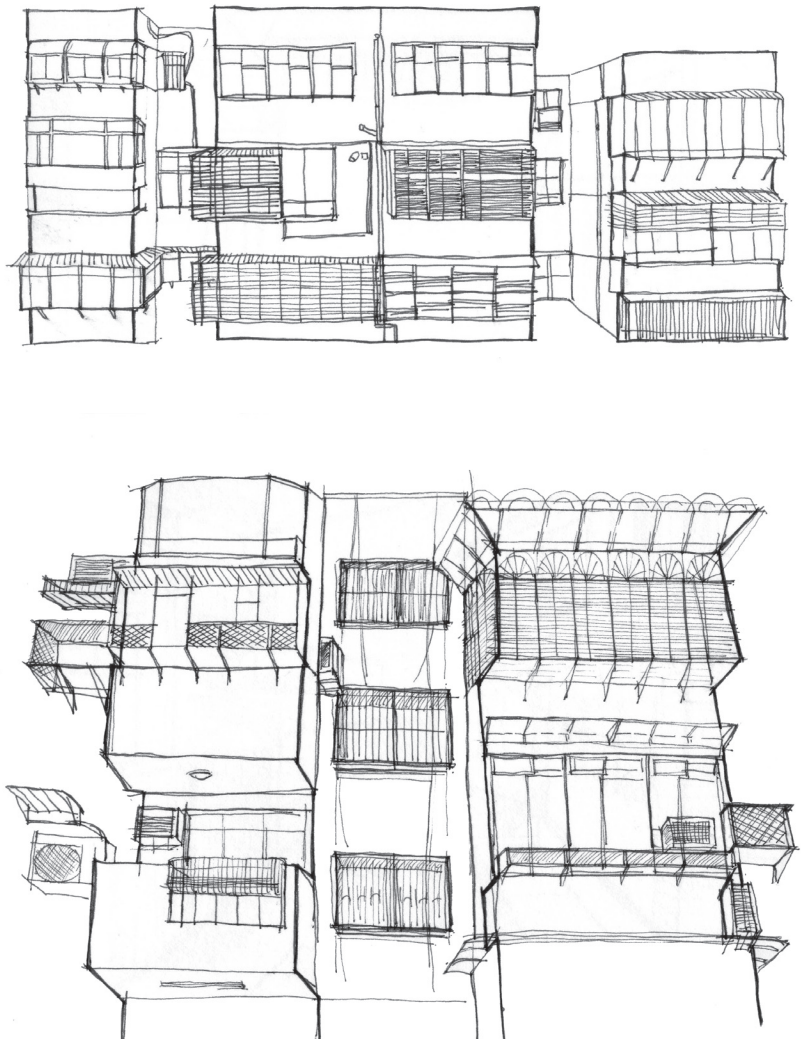


Fig 5.18 Sketches of add-on facades in Daan district Taipei

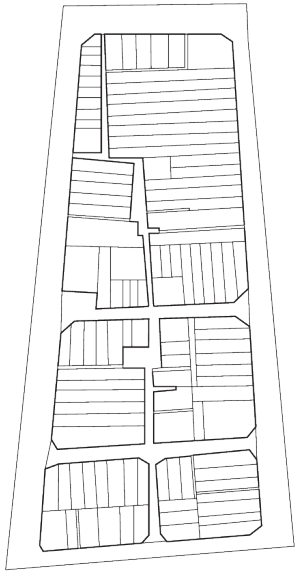
6 FINDINGS

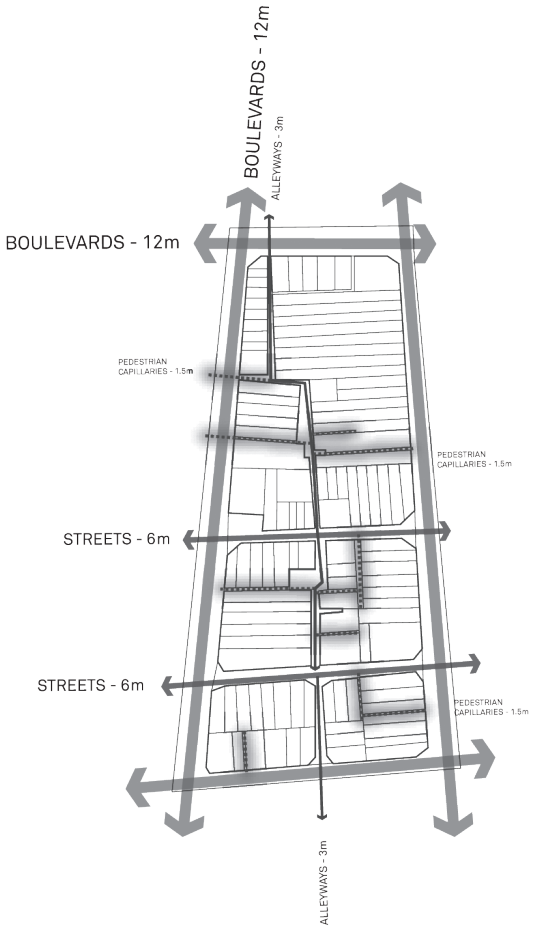
In organizing the master plan at a neighborhood scale, the thesis began with observing street systems in center city Taipei, in a busy commercial and residential neighborhood that is centered around Dihua Street. This historic street is typical of many of the narrow and multi-use alleys in Taipei. The street was diagrammed from an aerial view, which revealed the variety of streets that compose the neighborhood. In doing so, it became clear that there are four types of streets that intersect the neighborhood. Defining the neighborhood were the major traffic thoroughfares, or arterials. These were about 12m (39 feet) wide, divided into four lanes of traffic that supported all manner of vehicles, such as trucks, cars, scooters and bicycles. Some of these arterials also supported parallel parking along the curb.

Dividing the neighborhood further into three main blocks were streets that ran East-West. These 6m (20 feet) wide streets were divided into two lanes of traffic that could also support trucks, cars, scooters and bicycles. Alleyways were oriented North-South and ran perpendicular from the streets, bisecting the blocks into East-West sections. These 3m (10 feet) alleyways typically were one lane only, and could only fit scooters, bikes and pedestrians. On extreme occasions, a compact car could fit into these narrow lanes but only if absolutely necessary as one car would block accessibility to all others, including pedestrians. These small lanes ran continuously from block to block and it was possible to travel through the entire neighborhood via the alleway.

Even more narrow than these alleys were 1.5m (5 feet) paths that could only accommodate pedestrians and bicyclists. These pathways acted as pedestrian capillaries, branching off in an East-West direction from the alleyways towards the arterials. They were typically half the width of a block and could abruptly end at the backside of a private narrow lot.

This exercise was useful in understanding the nuanced street systems that can help organize a neighborhood. Similar to veins in the human circulation system, these three blocks contain a hierarchy of arterials that provide access to every property. In addition to the major 12m and 6m streets, the majority of property lots had access to at least one alleyway or pedestrian capillary. In planning out the street systems for the site, it was important to ensure each property lot would be accessed by an appropriate circulation path, be it a main traffic arterial, street, alleyway, or pedestrian lane.





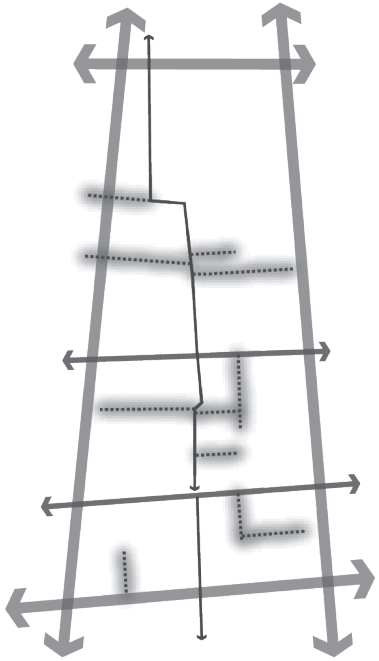


Fig 6.1 Systems Of Movement In A Typical Taipei Block- Dihua Street

Arterials	12M	4 lanes for trucks, cars, scooters, bikes, pedestrians
Streets	6M	2 lanes for trucks, cars, scooters, bikes, pedestrians
Alleys	3M	1 lane for scooters, bikes, pedestrians
Ped. Capillaries	1.5M	Path for bikes, pedestrians

The 19 acre site sits directly north of the old town of Bali, with its meandering lanes and non-orthagonal street grid. An interesting thing to note is a system of mid-block streets that traverse the town (in blue in map on right). The streets break up the long East-West blocks and create an efficient way to travel North-West to the coastal highway. Taking cue from the stepped logic of these midblock streets, the master plan for the new site also incorporates a main stepped North-West street that will widen become a greenway. One benefit of this is to also break up the angled site into two orthagonal portions, allowing the properties to line up with the streets at right angles.

Surrounding the site, except the northernmost arterial, are the 12m main traffic arterials that support four lanes of traffic. They connect to the existing main traffic arterials as well as the proposed ones that are currently being graded. The site is bisected by a 6M street to allow for two lanes of motorized traffic.

The secondary circulation system are the 2m alleys that run East/West across the site. Pedestrian capillaries, also 2m wide, run parallel to these alleys. Both the alleys and pedestrian capillaries intersect with the main North-South street and greenway. Altogether, these four street types combine to form a circulation system that organizes the placement of the residential units.

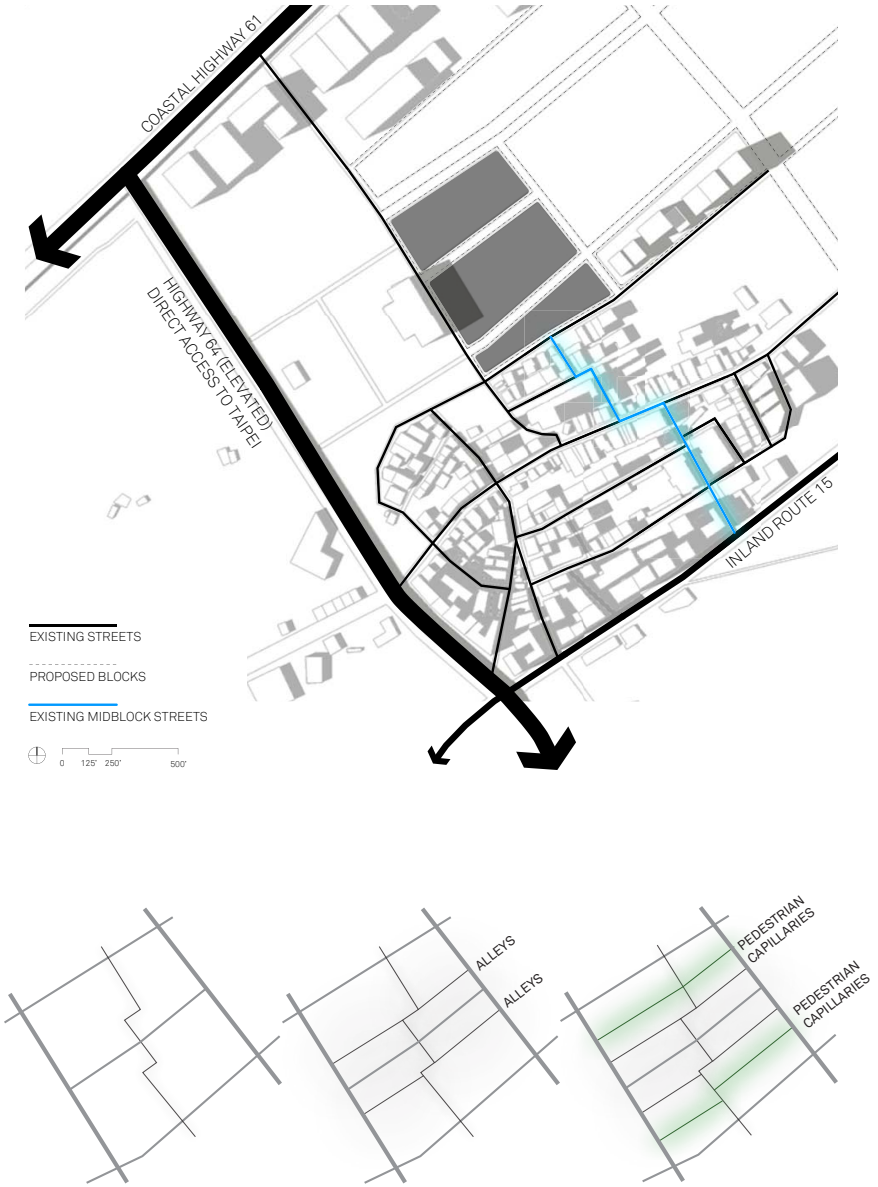


Fig 6.2 Hierarchy of street systems in new site

Fig 6.3 Master Plan

Once the street hierarchy was organized, it was important to place the taller and larger buildings along the wider streets. In order to create a diverse economic housing community, point towers were placed on the edges of the site. Towards the south, closer to the existing fabric of the old town, the towers are 8-9 stories, in keeping with the existing buildings. The towers to the north are taller at 15 stories to match the planned heights of the new development of the Port. The ground floor of each of these towers will be leased for commercial purposes, most likely larger stores including grocery functions. These point towers will house singles and young couples and those who prefer living in taller typical apartment style complexes. Unlike many of the current housing towers in Taipei, which come complete with hotel-like amenities such as gyms and media rooms, these towers will not be gated communities. Instead, the goal is to encourage all residents to utilize the community functions that are threaded through the site.

Another important function for these point towers is to serve as neighborhood parking reservoirs, as none of the homes will have dedicated garages. Since these towers are located at each corner, residents in homes will be able to park their cars in the garage and walk a short distance to their homes.

Between the point towers along the East and West boundaries of the site will be residential units with ground floor retail. Instead of the larger commercial uses that will be located on the ground floor of the point towers, however, these ground floor commercial uses will be family run and smaller outfits. Therefore, the majority of buildings fronting the large 12m traffic arterials will have ground floor retail.

Running North-South through the entire site is the stepped street system that widens to accommodate a common greenspace that breaks up the strict grid system of the entire site. Pathways within the greenspace can accommodate pedestrians and bicyclists while an adjacent street can accommodate a single lane of traffic for compact cars and scooters. The greenspace is important, not only to provide smaller pocket parks for residents (in contrast to the larger parks available in the larger Bali township) but also because community facilities including daycare, gymnasium and library can be placed within the site. These community amenities allow the residents of the different residential types, i.e. the point towers, those living above the smaller retail stores and those living in the main portion of the incremental housing, to interact.

The majority of the site will be dedicated to incremental multi-generational housing. These residences are located within the site, bounded by the point towers and the ground floor commercial edge housing. The narrow lots, each 22m (72feet) by 6m (20feet) are modeled after the traditional urban narrow storefront properties in Taipei. The front of these homes will face the 2m paved alleway that can support one lane of motorized traffic. The back of the homes will all have individual plots for garden spaces that average 8m by 6m. The 2m pedestrian capillaries that run parallel to the paved 2m alleys are placed between the back gardens of these residences. Therefore, the fronts of the residences should face the paved alleys while the back gardens are traversed by the softscape pedestrian capillary. The rows of housing are mirrored in their orientation.

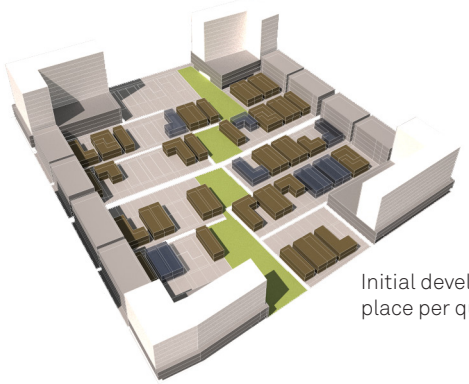
The benefit of this is that rather than have individual homes that all share a large open space, each home has its own garden plot. Therefore, the maintenance of the greenspace is largely placed back to the homeowners. The rich agricultural legacy of the land can also be maintained through these garden plots. In addition, since the buildings do not take up the entire land footprint, daylighting is plentiful without being blocked by towers.

Fig 6.4 Detail of residences to show rhythm of paved alleys and softscape pedestrian lanes

The incremental growth of these residences will take place over several generations. The most feasible scenario for this to happen is for a developer to purchase the site and then to first build the initial core house piece of each property. In this way, the buildings will have the uniformity of construction that can provide a framework for the rest of the construction. In addition, this allows for adequately thick party walls to be built between units. Residents then purchase the core house unit and the property from the developer.

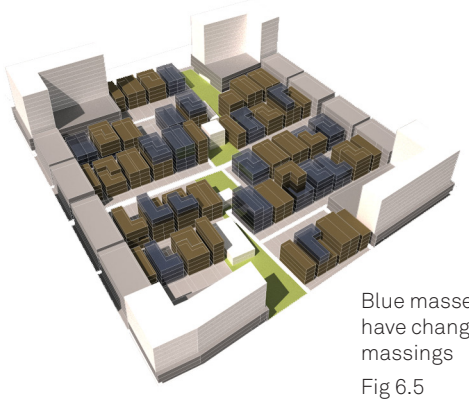
The site is naturally divided into quadrants, anchored on each corner by the point towers and bisected by the North-South greenway. Development can occur via quadrant, rather than all at once. Construction can occur after the commercial point towers and ground floor retail units have been established.

Over time, residents can build up their property according to basic guidelines that restrict building to 2/3 of the site to preserve daylight and ventilation. Owners can purchase more than one lot to consolidate them into one larger unit depending on growing family needs. Likewise, families can also rent out portions of their lot to make additional income if their family size shrinks. In this way, the property grid is not a permanent pattern but can change as residents' needs change over time.



Initial development takes place per quadrant

Infill over time



Blue masses show units that have changed from their initial massings

Fig 6.5

Fig 6.6 Rendering showing one quadrant's fully formed development with varying heights as buildings get added on over time.

Each 132m^2 lot (22m x 6m) is divided into three equal sections of about 40m^2 each. The two-story concrete core house, provided by the developer, is situated along the paved alleyway side. The middle portion of each lot is left open as a courtyard that provides additional ventilation and daylighting for the buildings. Families themselves have the option of adding to their lot through construction of the back third into another two story building. Future building can occur by building atop the core house to add another two story unit. Buildings can also be added to the back addition. A short 6m bridge is then required to allow residents to access the back addition. The idea is that as families grow in size, their spatial needs will increase. This flexible framework of growth accommodates these varying spatial needs.

Also, acknowledging the use of varying facade add-ons within urban contexts, the project assumes that residents will customize their units. These facade add-ons may add several square meters of area to the upper units. The facade elements can be made of metal or wood and serve as screens for vegetation or extra space for utilitarian needs such as clothes drying or storage. The units themselves can be seen as additions to the provided core house townhome. The facade add-ons also function as additions, but at a smaller scale.

Fig 6.7 Sample facade add-ons

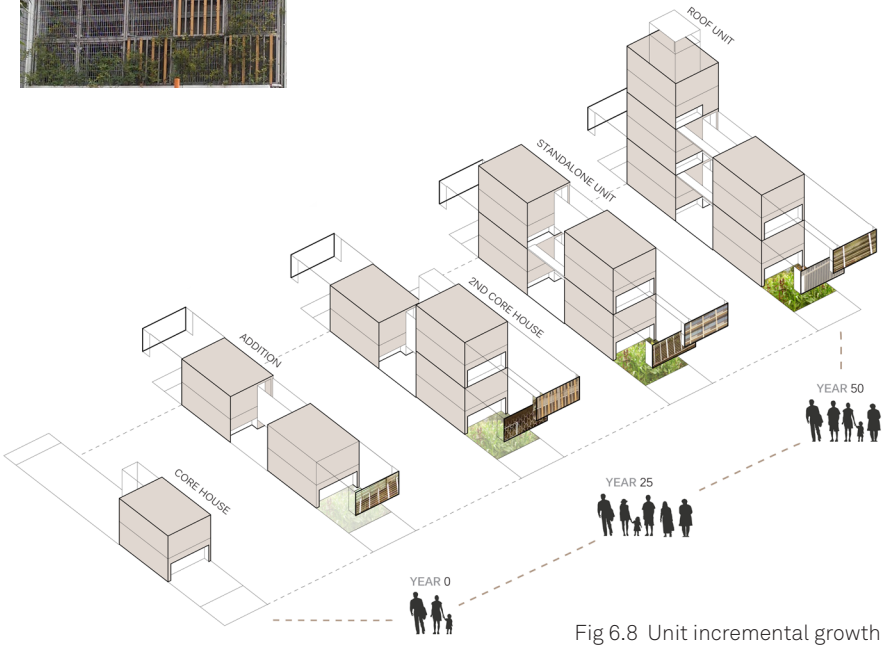
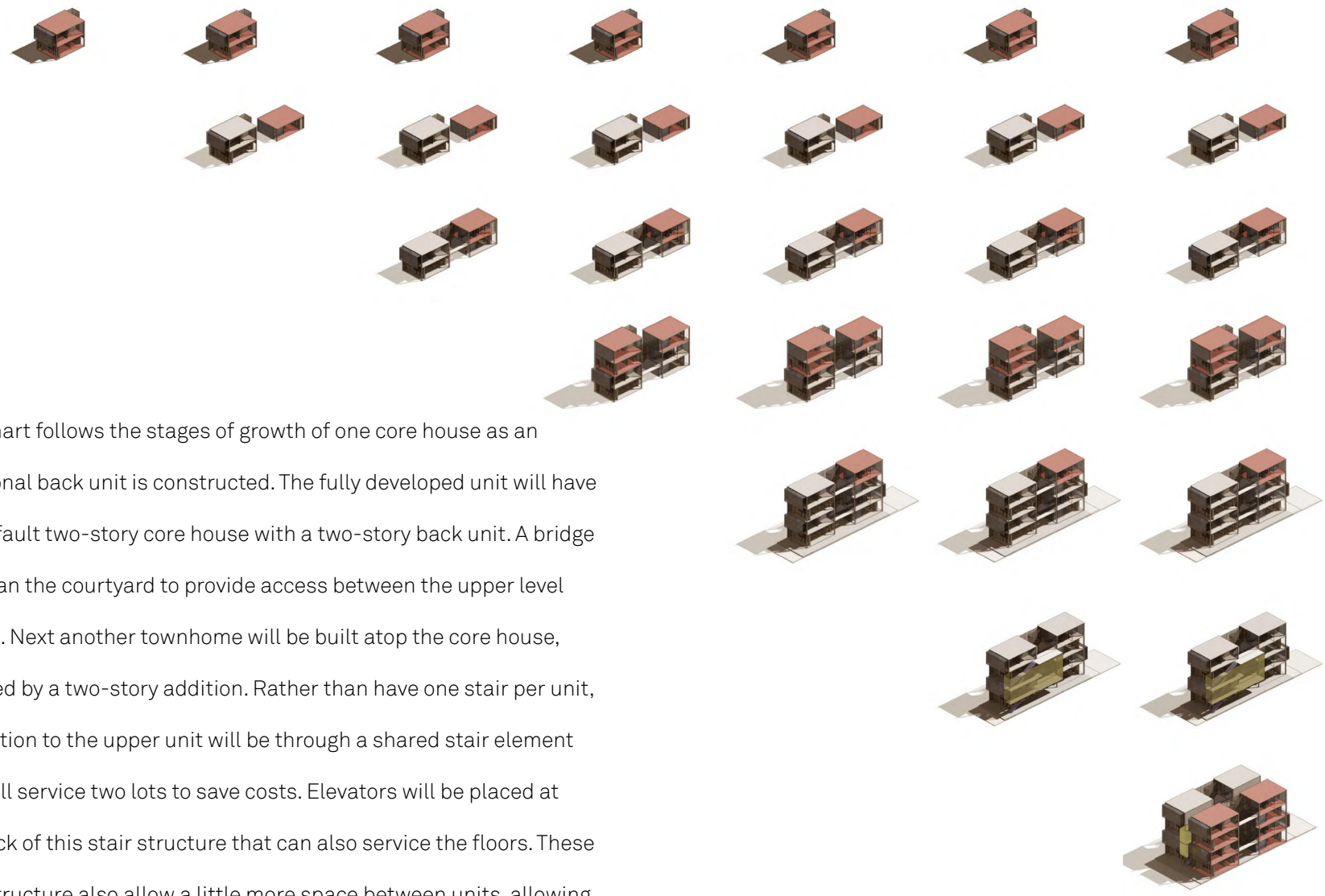


Fig 6.8 Unit incremental growth

Year 0 — Year 25 — Year 50

Fig. 6.9 Core House - Initial Phase

Full Build Out



This chart follows the stages of growth of one core house as an additional back unit is constructed. The fully developed unit will have the default two-story core house with a two-story back unit. A bridge will span the courtyard to provide access between the upper level stories. Next another townhome will be built atop the core house, followed by a two-story addition. Rather than have one stair per unit, circulation to the upper unit will be through a shared stair element that will service two lots to save costs. Elevators will be placed at the back of this stair structure that can also service the floors. These stair structure also allow a little more space between units, allowing for more privacy for residents.

The site section that is developed through this incremental housing shows variation in heights due to additions occuring over time at different rates. However, the constants of having the middle section always remain an interior courtyard means that all buildings have access to daylight. To preserve the daylight, the bridges that link the front and back parts of the homes are designed with transparent screens that protect residents but also provide views outward.

The section also demonstrates the rhythm of streets that define the orientation of the homes. The paved alleyways alternate with the softscape of the pedestrian capillaries, providing an intimate and more private experience through garden spaces compared to the relatively public alleways. Both pathways are publicly accessible and are the same width at 2m but lend the neighborhood a diversity of streetscapes.

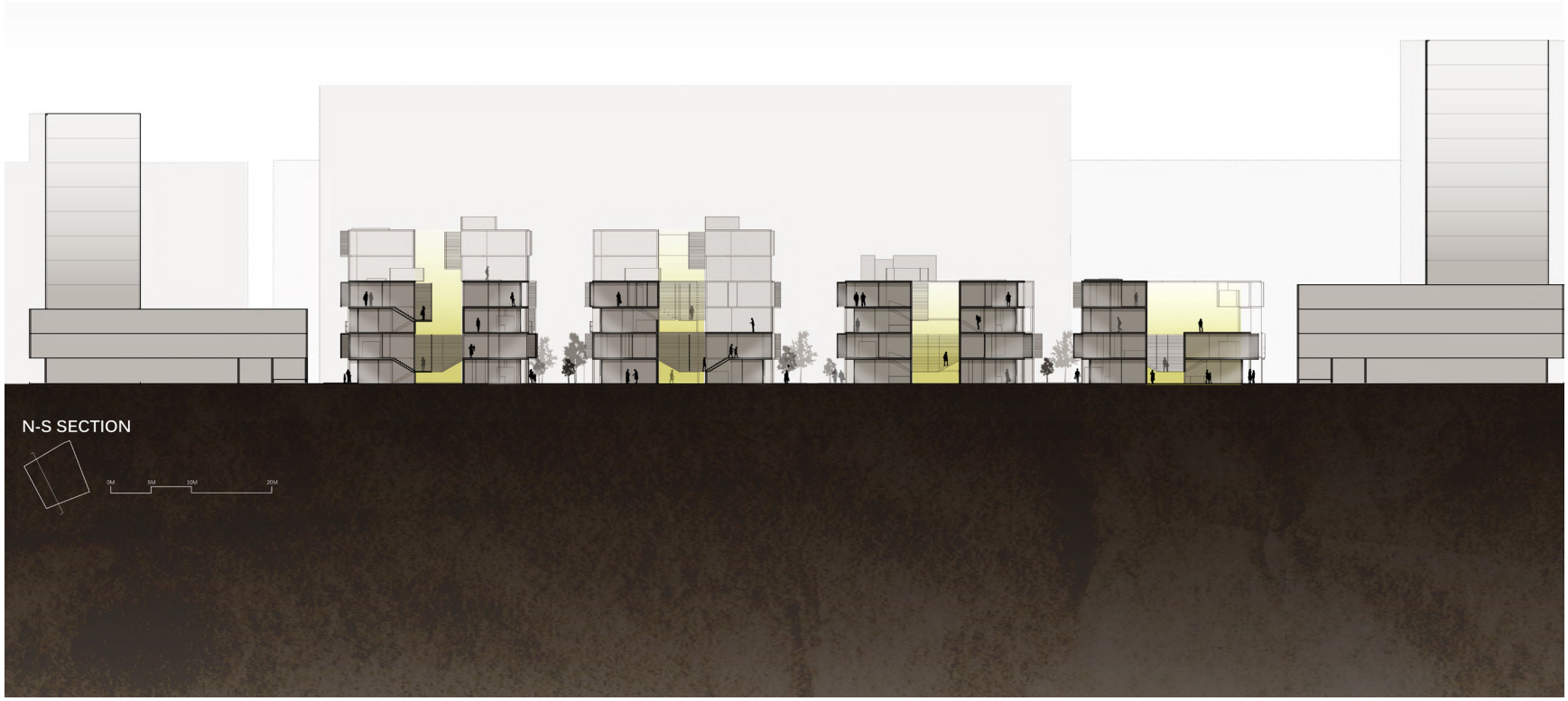


Fig 6.10

Part of this incremental strategy is predicting spatial needs for growing families. The two story core house at 80m^2 (860 sf) is slightly smaller than the average Taipei apartment, which is around 110 m^2 (1050 sf). However, the interior courtyard and back garden greatly add to the quality of space. The core house supports living and dining space on the first floor, with two bedrooms on the second floor. Because of its compact living space, it is fitting for a small family of three or four. When expanding the family to include in-laws or additional children, the ground floor ground unit serves as a separate 40m^2 standalone unit. A later phase of development, which adds another level to the back unit, brings the total area of the property to 1600m^2. This is about equal to 1.5 times the size of the average Taipei apartment, but allows for a separation of spaces between generations. Grandparents, who may have limited accessibility, may best be fit on the ground unit in the back, with a separate entry and direct access to the back garden. Older children or guests may best be on the second story of the back unit, as the unit is separated by the interior courtyard but still shares an entry with the main core house. Prior to the construction of the second story of the back unit, the rooftop is also accessible for further uses, such as a roof garden.

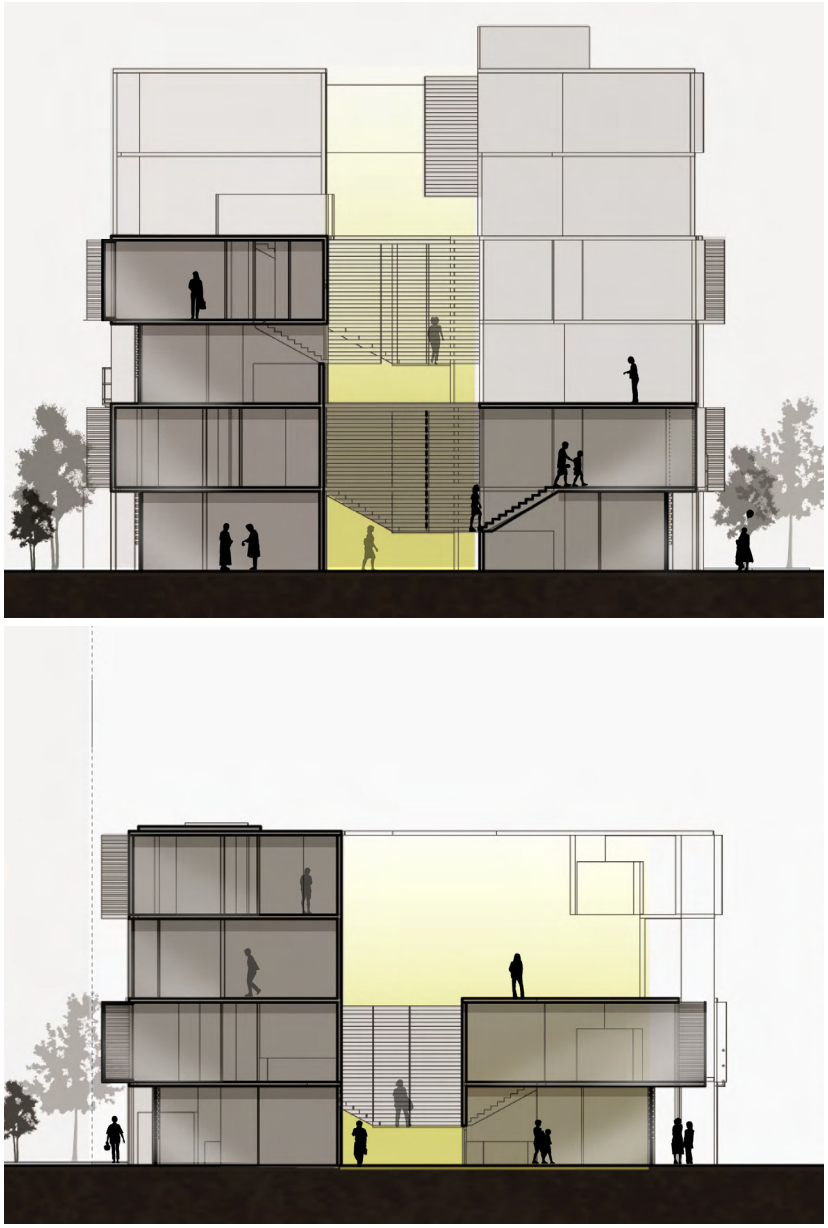
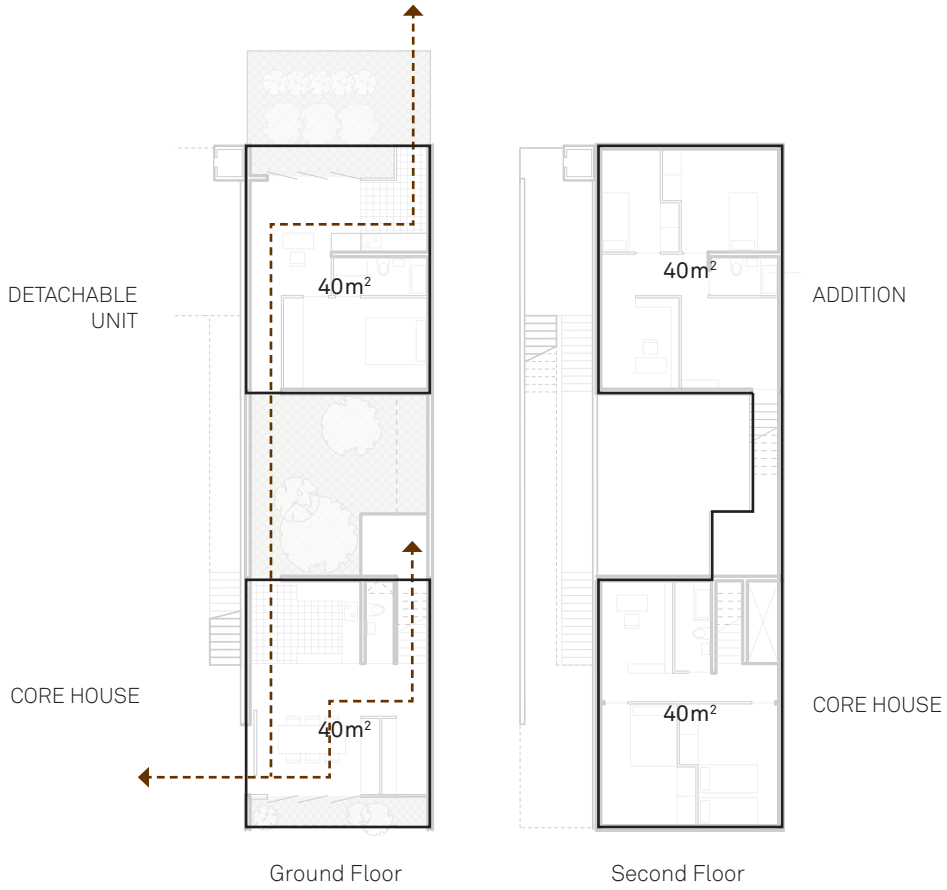


Fig 6.11 Residential unit N/S sections



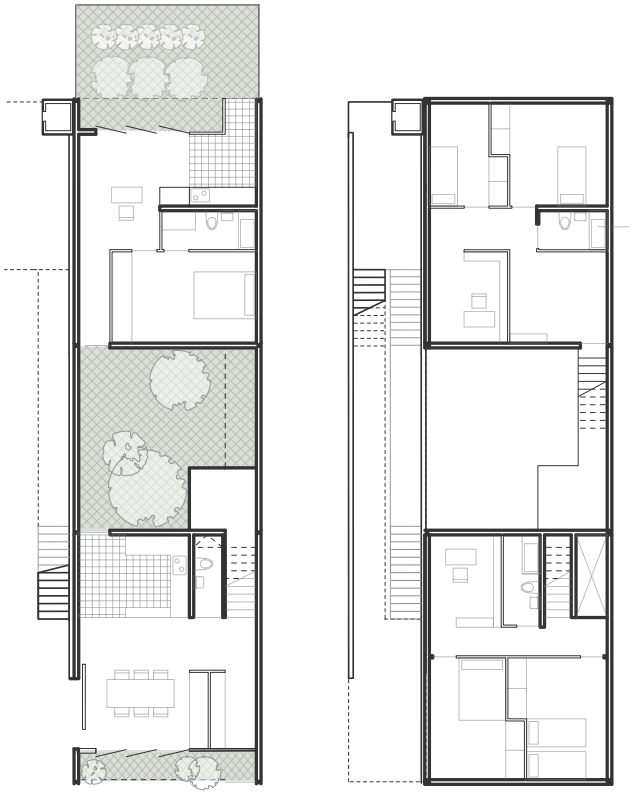


Fig 6.12 Diagram of spatial arrangement of core house

SAMPLE STACKED UNITS
6 STORIES / MAX 10 SEPARATE UNITS / MIN 5 LINKED UNITS

Fig 6.13

The master plan grid defines each lot as a narrow rectangle of 6m by 24m. However, there are variations that can break up or combine the strict geometry to form new configurations that can suit different spatial needs. The variations on the narrow bar (type A), the long L (type B) and the short L (type C), were the most popular ones from the generational game that was played by classmates. Type B combines the two back lots, allowing the new unit to have a double garden space. Type C combines the two front core houses but relinquishes the back lot. The breaking up of the narrow low allows standalone units to be rented out for additional income or to combine units for a larger family room, for a home office or for other uses. These new variations allow more diversity to seep into the master plan and could potentially occur many years after the initial phase of development constructs the core homes.

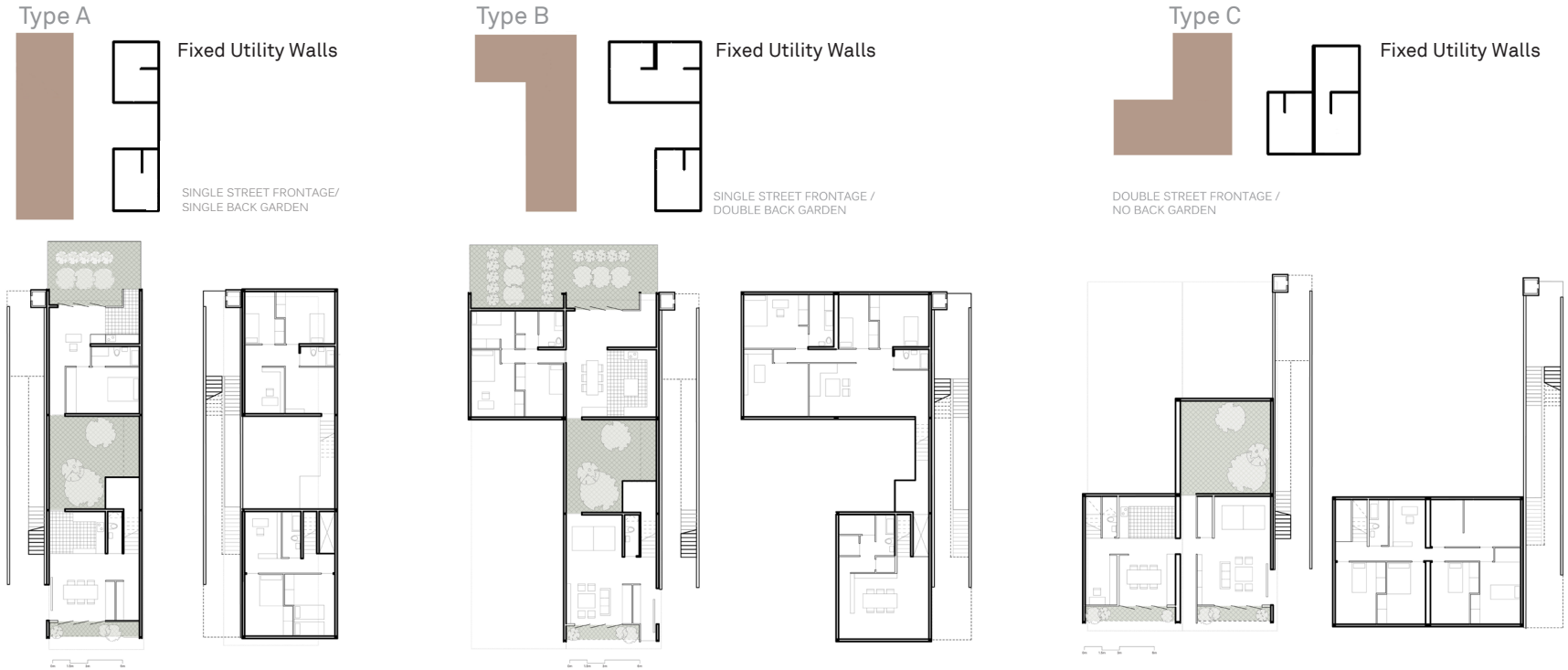


Fig 6.14 Variation in plan types

The process of using street systems to determine the master plan was useful in breaking up the irregular site into manageable portions and also to organize the orientation of the residences. Dividing up the narrow lots into three sections, with the interior section left open for a courtyard, was determined by ventilation and daylight needs. Ultimately though, one of the main objectives of the project was to replicate a diversity and intimacy of streetscapes that are found in the fine-grain urban fabric of the traditional urban contexts of Taiwan and other Asian precedents, such as Tokyo. The most important streets in this project to demonstrate this point are the softscape pedestrian capillaries and the paved alleyways. Both are 2m wide, just enough for a car and a scooter to pass by comfortably. However, the need to create two types of streets, rather than just two paved alleyways, is meant to serve different purposes.

The paved alleyway (rendering on the following page) allows for deliveries and service vehicles to access homes. The hardscape is suitable for cars and scooters, although there is no parking in any of the homes due to the neighborhood receptacle parking in the garages of the point towers. The narrowness of the street allows for an interactive busy street.

The softscape pedestrian capillary, on the other hand, is a more private pathway, though both are publicly accessible. Meandering through the gardens of the lots, the pathway offers seating, greenery and allows for a slower rhythm of circulation. The back addition units also have their main entry onto this pathway. Given the varied age of the expected residents, offering these two types of street experiences seems appropriate. If more eldery residents live in the rear ground floor unit, they are able to take advantage of the proximity to the greenery.

Lastly, the North-South greenway stitches together the entire site through its common spaces. Since all the alleyways and pedestrian capillaries feed into this greenway, it is the most efficient way of traveling North-South on foot or bike. The nodes of community spaces along the greenway also offer necessary services for a diverse residential community, especially those of daycare and exercise facilities, such as a pool or gymnasium. In this Asian context, many smaller communal areas are necessary for neighborhood festivities or rites that are performed publicly. Taken together, the streets are able to define the character of the neighborhood and give it a framework to grow and change over time.

Fig 6.15 Perspective of 2m paved alleway

Fig 6.16 Perspective of 2m pedestrian capillary between gardens

7 CONCLUSIONS

The concluding design proposal of this thesis is a direct response to the trends in developer driven housing in Taiwan, which features high-rise residential towers that create a course urban grain that contrasts the traditional dense urban fabric. Several problems arise from the ubiquitous construction of these high-rise residential towers. This approach, due partly to a lack of urban design review in developing areas in Taiwan, contradicts the principles of sustainable community growth when treated as singular objects placed on a site. The traditional dense lively streetlife inherent in many Taiwanese cities is replaced by large boulevards and impenetrable building facades. And the static nature of these built towers forces the city to grow in leaps and bounds regardless of specific demographic changes, unlike an incremental housing approach which is more closely aligned to user needs.

Current proposals typically feature high-rises that have little connection to the ground plane, many isolated from a sense of greater community. What is often lacking from these complexes is a more integrated site approach. These high-rises are often gated or are set apart from neighboring buildings through large plazas. Unlike the fine grain of the dense urban centers, which have carved out a hierarchy of open spaces, these plazas are sterile and serve more to

Fig 7.1 Recent high-rise construction in New Taipei City

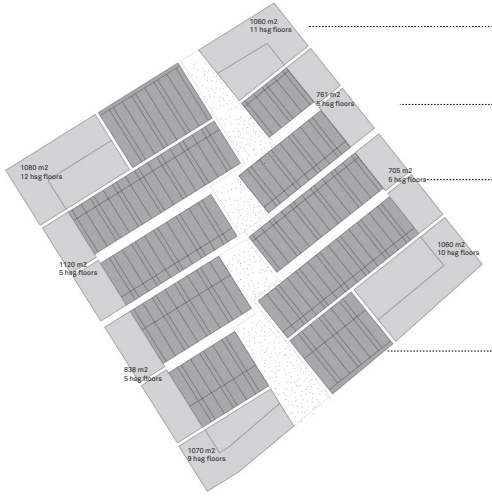
separate buildings than to provide defined programmatic uses. The Aranya Housing precedent mentioned earlier, in its post-occupancy studies, provides a useful lesson here. There, the large undefined open spaces often were unused and sat vacant in favor of the smaller intimate gathering spots used for traditional cultural festivities and celebrations. The lesson learned here is that a design that treats the open space and landscape with equal importance as the buildings will ultimately match user needs more than setting aside large tracts of the ground plane as undefined leftover space.

Another issue is the inability to predict the housing market when the moves are as big as 100 unit high-rises. Much of New Taipei City, where Bali is located, has experienced a boom in this high-rise speculative housing construction in the early 2000's. However, many of those units remain unoccupied today, with some estimates reaching as high as a 40% vacancy rate.[1] Reining in the desire to build tall and fast is difficult in a country where tangible evidence of economic growth is paramount to most other social concerns. However, allowing for smaller increments of growth in terms of a low-rise high-density housing proposal could prevent some of the housing market excesses.

average height: 10 storys
block area total: 70,840 m2
(-10% commercial, -30% circulation)
block residential area total: 42,505 m2
total units: 369

average height: 7 storys
block area total: 59,510 m2
(-10% commercial, -30% circulation)
block residential area total: 35,706 m2
total units: 310

average height: 4 storys
block area total: 15,465 m2
(-10% commercial, -30% circulation)
block residential area total: 9,279 m2
total units: 80



4 point towers
over 3-story receptacle garages
(-10% commercial, -30% circulation)
total floor area: 13,356 m2
average size of Taipei apartment: 115 m2
proposed housing units in towers:
233 units

4 edge housing lots (max 5 stories)
total floor area: 7330
(-10% com, -30% circ): 4398
avg size of Taipei apt: 115 m2
proposed edge hsg units:
89 units

85 narrow housing lots (max 4 stories) of 160m2 each
total floor area: 54,400
(-30% circulation): 38, 080
average size of Taipei apartment: 115 m2
proposed comparative housing units in lots:
346 units

Fig 7.2 Official vs. proposed housing plans

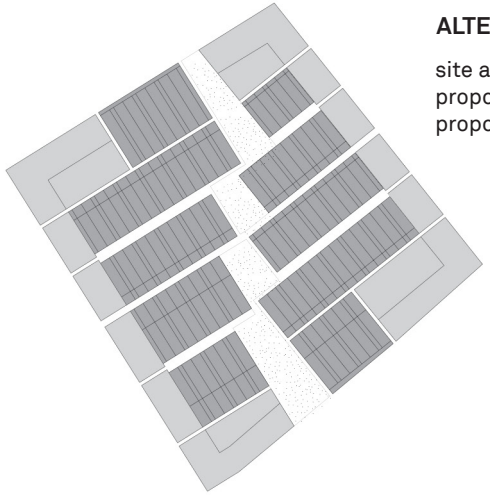
[1] Chuang Meng-Han. "Interview: Time to ReThink Housing Policy." Taipei Times. http://www.taipeitimes.com/News/biz/archives/2011/07/25/2003509049/2 (Dec. 20, 2013).

In addressing these concerns, this thesis proposes an alternative housing community composed of a mix of housing types. A combination of low-rise and high-rise buildings work together to create a neighborhood that is built around the idea of a community growing in population over time, with diverse generational needs. By using street systems early on in the project as an organizing strategy, the site plan integrates a spectrum of open spaces that can accommodate uses such as large community festivals or small family-oriented gatherings. Unlike the empty ground plane plazas of the proposed towers, the majority of the open space is given over to individual owners as garden plots. Not only does this encourage residents to take an active interest in maintaining the land, this approach also retains some of the rich agricultural heritage of the site.

This thesis incorporates a diverse mix of housing units to demonstrate that the economic feasibility of housing development does not solely have to rely on a towers-in-the-park model. In sum total, the same number of units can be achieved through a varied housing mix than a monolithic plan of high-rises and superblocks. The focus of this project, an incremental multi-generational

OFFICIAL PROPOSED HOUSING PLAN

site area total: 87,490 m2 (21.6 acres)
proposed housing units on site: 760 units
proposed density: 35 units/acres



ALTERNATIVE HOUSING PLAN

site area total: 78,595 m2 (19.4 acres)
proposed housing units on site: 668 units
proposed density: 34 units/acres

Fig 7.3 Official vs. proposed housing densities

housing approach, allows the new site to develop a traditional fine grain urban fabric that supports tighter-knit communities. Like a telescope that can shrink and grow, the basic structure of this housing also anticipates family expansion and contraction. Units are added on or rented out; lots are occupied or sold to neighbors and the city can adapt to a changing demographic as each generation comes and goes.

8 BIBLIOGRAPHY

BOOKS

Allen, Joseph R. *Taipei: City of Displacements*. University Of Washington Press: Seattle, 2012.

Atelier Bow-Wow. *Post Bubble City*. INAX Publishing: Tokyo, 2006.

Bay, Joo-Hwa and Boon-Lay Ong. *Tropical Sustainable Architecture.* Architectural Press: London, 2006.

Bijutsukan, Mori et. al. *Metabolism, The City of the Future: Dreams and Visions of Reconstruction in Postwar and Present-Day Japan.* Tokyo: Mori Art Museum, 2011.

Berry, James and Stanley McGreal. *Cities in the Pacific Rim.* E&FN Spon: London, 1999.

Chi, Jr-Gang, ed. *Heterogenous Taipei.* Garden City Publishers: Taipei, 2013.

Chen, Yi-Ling and Herng-Dar Bih. Forthcoming. "The pro-market housing system and demographic change in Taiwan," in John Doling and Richard Ronald (eds.), *Housing in East Asia.* Palgrave MacMillan, refereed.

Douglass, Mike et. al. *Culture and the City in East Asia*. Claredon Press: Oxford, 1997.

Douglass, Mike and John Friedmann, eds. *Cities for Citizens*. Wiley and Sons: Chichester, England, 1998.

Kwok, Reginald Yin-Wang, ed. *Globalizing Taipei: The Political Economy of Spatial Development.* Routledge: New York, 2005.

Laquian, Aprodicio A. *Beyond Metropolis*. Johns Hopkins University Press: Baltimore, 2005.

Li, William D.H. *Housing in Taiwan, Agency and Structure*. Ashgate: London, 1998.

Meyer, Uli. *Architectural Guide: Taiwan.* DOM Publishers: Berlin, 2012.

Rowe, Peter G. *East Asia Modern*. Reaktion Books: London, 2005.

ONLINE SOURCES FOR PRECEDENT STUDIES

The Aga Khan Award for Architecture. “Aranya Community Housing, Indore India.”
http://www.akdn.org/architecture/pdf/1242_Ind.pdf 20 December 2013.

ArchDaily.com. “Quinta Monroy.”
http://www.archdaily.com/10775/quinta-monroy-elemental/ 20 December 2013.

Alejandro Aravena. “Obras.”
http://alejandroaravena.com/obras/vivienda-housing/elemental/ 20 December 2013.

“Sakaide Artifical Ground.”
http://itwonlast.tumblr.com/post/48079137766/madamecuriewasmymother-ground-artificial-ground 20 December 2013.

McGill School of Architecture, Minimum Cost Housing Group. “Post-occupancy study of Aranya Housing Project.”
https://www.mcgill.ca/mchg/pastproject/aranya#TOP 20 December 2013.

Graham Foundation. “Grantee Projects.”
http://grahamfoundation.org/grantees/5007-digested-metabolism-artificial-land-in-japan-19542202 20 December 2013.

ONLINE SOURCES

Chuang Meng-Han, Taipei Times. “Interview: Time to ReThink Housing Policy.” Taipei Times. 20 December 2013.
http://www.taipeitimes.com/News/biz/archives/2011/07/25/2003509049/2

Lui, Wan-Yu. “The Resettlement of the Lane 359, Taiwan.”
http://wanyuliu.blogspot.com/2009/05/case-study-traditional-housing-types.html 20 December 2013.

Hannon, Brent. “The Quiet Charms of Bali.”
http://www.amcham.com.tw/index2.php?option=com_content&do_pdf=1&id=860 20 December 2013.

Lin, Mei-Chun. “Taiwan Business: Taipei Gets a Big New Port.”
http://www.amcham.com.tw/index2.php?option=com_content&do_pdf=1&id=1086 20 December 2013.

VIDEO

Seeing Image. “A Life in Bali, Taiwan: About City Development.” 54min, 2012, Taiwan. posted 13 August 2012.
http://www.filmsforaction.org/watch/a_life_in_bali_taiwan_about_city_development/ 5 May 2013.