Figure 1 (opposite). Process+Product housing model

“To work for each and every living human
being is the mission of the Architect”
- Shigeru Ban

Abstract

The low-income housing situation in Bangkok, Thailand, is similar to that faced in many developing cities throughout the world. The housing opportunities afforded to residents classed as low-income dwellers, are minimal, unsuitable and inconsiderate of their complex social, cultural and spiritual requirements, often leading to the formation of slums, and squatter settlements.

The close proximity of living experienced in informal settlements results in a community-focused style of living, where neighbours rely on each other to survive. This is translated not only into the social fabric of the informal settlement, but also into the architectural style of these vernacular communities. The process of helping construct your neighbour's home, builds social and cultural ties; these traits are often lost when outside parties attempt to ‘improve’ the low-income living situation.

The idea of housing design as a process not just a product, also referred to as ‘cooked’ architecture, is widely promoted through the writings, research and design methodologies focused towards low-income

housing endeavors (Rapoport, 1988; Sinha, 2012; Yap, 1990). Despite this, effective involvement of residents in developing and building their own homes is something rarely practiced or achieved within architecture, yet the benefits of including residents, who are the focus of a complex social and architectural situation, in the design process seems clear.

There is little question that communities that work through this process become stronger, both socially and economically, however, the quality of housing and architectural output is still at a very low level, despite obvious improvements from the previous low-cost conditions. To address this, an architectural outcome has been developed utilizing a critical design approach. The implementation of ethnographic and participatory design research, as well as multiple design iterations, based on current and traditional modes, has resulted in an architecture that is culturally responsive, impacts the existing context lightly, and primarily provides a positive social scenario to encourage community betterment through collective construction and living.

Process+*Product*

The condition of low-cost housing in Bangkok, Thailand

by **Samuel Peter Brown**

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Chapter One

Introduction

1.1

The Bangkok Slum Condition

Bangkok, the capital city of Thailand, is the main destination for rural-urban migrants (see Figure 3, 4). As the country’s economic center, it is a place to find work and to forge a future. The rural influx to Bangkok over the years has led to a trend common in many rapidly developing cities, a disparity between affordable minimal quality housing options and rising employment opportunities. The difficulty in finding a place to live has resulted in the generation of informal settlements or ‘slum’ (*salams* (Yap, 1989)) communities (see Figure 5).

The Bangkok Metropolitan Area (BMA) has a population of around six million inhabitants. Of these, 1.1 million are considered to be informal-settlement dwellers (Pornchokchai, 2003). The BMA defines informal settlements as, ‘overcrowded, dilapidated and densely-built communities with a minimum of 15 housing units per 1600m² (Archer, 2012), while UN-HABITAT (2003) sets five criteria: insecure residential status, poor structural quality of housing (see Figure 6), inadequate access to clean water, sanitation and other infrastructure, and overcrowding (see Figure 7).

Figure 3. Thailand migration map,

Figure 4. Current rural housing style and conditions

Figure 5 (opposite). Location of Bangkok slums

Figure 6 (top). Bangkok slum housing quality

Figure 7 (bottom). Overcrowding in Klong Toey slum

There is a clear disparity between some supposedly authoritative opinions on the lack of housing availability or quality, in Bangkok, and observational evidence when visiting key problem areas, such as Klong Toey and Klong Bang Bua. Dr. Sapon Pornchokchai (2003), President of the Agency for Real Estate Affairs Company Limited (AREA), an independent property consultant, states that there are few street dwellers, homeless, or illegal squatters in Bangkok. Furthermore, he claims that there is affordable housing for rural-urban migrants available through formal channels on the open

“The increase in real income has made it possible for a growing proportion of Bangkok’s population to find accommodation in the formal housing market. But the increase in land prices has made it more difficult for the lowest-income groups to find affordable land and housing in the city.”

(Yap, 1989. p. 29)

Figure 8. Low-income housing situation in Bangkok

market (Pornchokchai, 2003). However, discussion with the Department of Housing, representatives from, Chulalongkorn University indicate that these channels are often ignored by the low-income sector, due to the inappropriateness of the housing outputs. On-site observation casts doubt on Dr. Pornchokchai claims, as it is clearly apparent that there is a serious shortfall in appropriate housing opportunities for the low-income sector (see Figure 8).

The average number of household inhabitants in informal settlements varies from source to source. Pornchokchai’s (2003) research places the number at an average of 8.0 inhabitants per household, while on-site research places the average at 5.2 inhabitants per household in central Bangkok, based on observations at Wat Baromniwat, Trok Salukhin and Klong Toey communities. Both these figures far exceed the official Bangkok Metropolitan Area average of 2.99 inhabitants per household (Pornchokchai, 2003) and

Figure 9. Average occupancy of dwellings in Bangkok

illustrate the threat of inaccurate statistical data obscuring the everyday realities faced by a significant sector of the urban population (see Figure 9). The housing style and quality in informal settlements varies from community to community, depending on the proximity to materials, pre-conditions on site and wealth. The poor physical conditions of these settlements are due largely to insecure land tenure, which has resulted in quickly erected, cheap and poor-quality housing (Usavagovitwong & Posriprasert, 2006). However, despite their haphazard appearance, these settlements mirror the needs and wants of rural-to-urban migrants. They are

adaptable dwellings, familiar in style to the inhabitants, unlike the conditions experienced in high-rise apartments and row houses. Pornchokchai (2003, p. 14) supports this in saying that:

“If a slum house appeared in a village, it would be a rural house. If these houses were clustered together and surrounded by an urban environment, the cluster could be considered a slum (see Figure 10).”

An obsession with meeting the Western ideal of what a modern city and modern housing should look like has resulted in a loss of connection with the traditional

Figure 10. Slum dwellings in rural vs. urban settings

Figure 11. Low-income housing land inhabitation percentages in Bangkok

forms and functions of Thai housing, a style that is presented within low-income communities, but lacks acknowledgement due to the negative perception of these areas. The focus given to westernised housing has resulted in awkward spatial arrangements throughout Bangkok, as the traditional and modern styles of architecture present conflicting forms and functions.

Bangkok's growth is considered unplanned (Yap, 1989). Many plots of land are unable to be developed due to inaccessibility or lack of financial backing. It is these vacant areas that are inhabited by the low-income sector of society (Yap, 1989) (see Figure 11). The main solution for tolerated settlement is to arrange an oral or written agreement with the landowner, providing the community with 'legal land right' (Usavagovitwong, 2010), where they pay a nominal rent in order to 'legally' reside, commonly known as 'legal land renting'. This is an agreement that landowners are happy to be party to as they view low-income inhabitants, living on the street, as an embarrassment (Senanuch, 2004). Despite this agreement, landowners are

within their rights to evict residents at any point, with one-months notice. Such insecurity in tenure results in the poor housing quality outlined above. This is further emphasised in an open discussion with Mr. Weerawat (2013), a community leader from the Wat Baromniwat Community, where he stated:

"We try not to have any housing ambitions as we know this is too hard to achieve... because of our low-income and the restrictions of the law... we have been relocated before, what is to stop it happening again?"

Although this negative perception is evident in other communities (Patcharee, 2013), many have existed in a state of 'eviction' for several decades.

The government response to low-income housing has generally been reactive rather than pro-active. It has set up several committees and programs, namely the Community Organization Development Institute (CODI), and the National Housing Association's (NHA) *Baan Mankong* ("secure housing") and *Baan Ua*

Arthorn ("we-care housing") program. These have been met with varying results and responses that will be further discussed below. In short, the housing situation in Bangkok, despite being less dire than in other major developing cities, needs to be reevaluated and acted upon in a positive and forward thinking manner.

The line of inquiry throughout this thesis focuses on the development of a housing delivery strategy; a system that will result in an architecture that positively contributes to, and supports, the complex needs and living situation of the low-income sector of Bangkok, specifically addressing the densely populated urban centre and acknowledging the wealth that strength in community brings to these citizens. A participatory approach, as well as ethnographic and other investigatory means, is to be employed in order to determine the scope of design. It is from these considerations that a relevant architecture is to be developed, ideally addressing the poor quality, low-income housing situation, initially in Bangkok, but with aspirations of a more global effect.

2.2

Structure of Thesis

Chapter Two

Literature Review and Case Studies

1.1

A Question of Community, Involvement and the Existing Situation

The design conditions and requirements of low-income communities are foreign to many Western designers. The specific needs, wants and requirements of the people differ from those we encounter as designers for the middle and upper classes of the Western world. It is this cultural and lifestyle misunderstanding that has led to many failed low-income housing projects, specifically in Bangkok, Thailand. There is a desire to help reform, relocate or renew squatter, informal or, as Rapoport (1988) terms them, 'spontaneous' settlements; the issue lies in the execution of development projects and the desire to follow, or mimic, Western design principles, development agencies feeling this will add to the social standing of the community as a collective. These projects are rejected, neglected and detrimental to the communities living within them. These professionally designed environments fail to communicate with the users in the way traditional or spontaneous settlements do (Amos Rapoport, 1987). The failure of policy makers to take into account the variable needs and tight design conditions when designing low-income housing is an issue

that permeates all projects, including those in Bangkok (Kellett & Garnham, 1995). Kellett and Dayaratne (2008) outline five criteria/desires they believe settlers strive for in order to improve their social and economic standing in the process of building a home: acquisition and ownership of a piece of ground; acquisition and conformity to popular images and conventions; social acceptance, social respect and personal dignity; the orchestration of space to fulfill household needs; and ultimately the formation a community. On-site observation confirms these points are a valid indication of the desires of low-income settlers in Bangkok. However, there are three that are the most prevalent.

Firstly, there is a strong desire for social acceptance among low-income settlers, and the generally held derogative perception of them, by established Bangkok society, has led to a physiological suppression that only adds to their sense of impoverishment (Dayaratne & Kellett, 2008).

Secondly, the formation of a community is the most coveted desire. Settlements are

the closest thing we have to vernacular architecture today (Amos Rapoport, 1988), and it is within these spontaneous settlements that the sense of community is greatest. Peter Kellett (2008, p. 62–63) writes:

“The desire to form coherent communities is a powerful force in the low-income sector of society, this is due to the fact that their lifestyle, survival and opportunities are highly dependent on sharing.”

This idea is shared by many (Amos Rapoport, 2000; Turner, 2013; Viratkapan & Perera, 2006), and is implemented in the Baan Mankong housing scheme (Archer, 2012). There is no argument that developmental programmes aim to promote a sense of community; the argument lies in the product. This researcher sees the final housing outcome, and its appropriateness to the community in question, as an afterthought.

Finally, the desire to orchestrate space to fulfill household needs is a reflection of power. In being able to orchestrate their living environment, there is a sense of

control that is otherwise non-existent in the low-income sector. This promotes a positive outlook that inhabitants may build on to better their social standing.

Peter Kellett supports these criteria in his views on the house as an influential device, both on its inhabitants and the built environment around it. He sees the house as a place of sustenance – production and reproduction; an expression of moral order; an expression of respectability and conventionality; an expression of individuality and status; and as a symbol of independence and achievement (Kellett, 2002). Amos Rapoport (1976) believes that all man-made environments embody the choices and decisions made by their designer. Therefore, it seems reasonable that residents be given the opportunity to help design and shape their own housing environment.

There is little question that the architectural output of low-cost housing schemes is poor. This is due to a lack of understanding, when considering the inhabitants cultural, historical and financial needs. The three theorists above outline what a house needs in order to be

Figure 12. A diagrammatic representation of the process of home-making

successful, and what an inhabitant needs to do to make it his/her own (see Figure 12). The current trend of outsiders (government agencies, NGO's, aid-organisations etc.) providing for the low-income sector has been unsatisfactory.

This work proposes to involve the inhabitants in a participatory design approach, which has the potential to invoke a forward thinking attitude, through being linked with the project from start to finish. Ultimately and ideally, it is the occupants hard work and determination that sees the project through to fruition. The memories involved with the process are not nostalgic, but instead represent their achievements and offer strength and hope for the future (Kellett, 2002). Residents of informal settlements have the capability but lack the resources to generate a quality living environment. All of these facets (involvement, community formation, quality output, inclusion of key needs and wants) need to be addressed if a positive and successful solution is to be devised.

In considering informal-settlements, Amos Rapoport contends one must learn from these environments and apply the information gathered to form

a more positive and culturally responsive architectural outcome (1988). A shift needs to be made from designing for people to designing with the people. The idea presented by Peter Blundell Jones, Doina Petrescu and Jeremy Till (2005), where they define the architect as the 'possessor of knowledge', therefore able to facilitate and guide the design process, is key to the success of participatory design. Hans Harms (1972), Peter Kellett (2002), Amos Rapoport (1988) and John F. Turner (2013) support the need for this participatory system, however, in practice, few designers have successfully implemented this participatory process. Too often designers will attempt to acknowledge the inputs of the participants, only to override them with over-educated, misguided and economically focused views.

The emphasis placed on community and community involvement in low-cost housing development strategies in Bangkok to date, although beneficial in some situations, is, in this researcher's opinion, misguided. The approach to incorporating the input of the inhabitants is not architectural, or even focused on the built environment. Boonyabancha (2001) mentions a lack of understanding

of the lives of the urban poor, and that complex, time-consuming and costly procedures ultimately lead to corruption or misdirection in application. It is important to accept the idea that housing is not just a product devised by outsiders and accepted by anticipated inhabitants,

but a process, addressing all necessary facets — inhabitant involvement, community focus and formation, quality output, and the inclusion of key needs and wants (see Figure 13) — that will result in a positive living environment for the low-income sector of urban Bangkok.

SAFE HAVEN LIBRARY - TYIN TEGNESTUE - THAILAND

HANDMADE SCHOOL - METI - BANGLADESH

Figure 13. Successful participatory design projects

2.2

Community vs. NGO vs. Government Development Case Studies

Three main parties seek to improve the livelihoods and living conditions of the low-income sector of Bangkok -- the communities themselves, non-governmental organisations (NGO's) and the government. The following three case studies outline the varying success of these groups, and their respective inputs, in improving low-income housing, in architectural and social terms, within Bangkok. The delivery strategies, methods of inquiry and perceived positive or negative outcomes of these projects will help to shape a cohesive and comprehensive understanding of the low-income housing improvement situation.

2.2.1. Doing it for Themselves
Wat Baromniwat Community, Hua Lamphong, Bangkok
Community driven project

Figure 14. Wat Baromniwat Community

The inhabitants of the Wat Baromniwat community (see Figure 14) were evicted from a previous site, for development purposes, and relocated to a nearby strip of canal-side land (see Figure 15). Their new community is hard to define. They “legally” are not allowed to inhabit the area they are in, and are one of the few “squatter” settlements in Bangkok. However, it is an established and complex community (see Figure 16, 17) that the government feels is too difficult to deal with at present. It is in the Thai nature to avoid or ignore conflict, or the potential for conflict, so many situations, such as this, are simply tolerated (Daniere & Takahashi, 1997).

The inhabitants, the majority of whom are rural-urban migrants from Thailand's northeastern provinces, are not legitimate tenants; instead they pay a 400 *baht* fee

to the government to be registered as citizens of Bangkok (Weerawat, 2013), providing them with a postal address, voting rights and census involvement. The registration also enables landowners to keep track of the inhabitants and reserves for them the right to evict without notice. Indebtedness and fear of eviction have a negative impact on community advancement.

The development of this community is unusual in that the inhabitants have built all their houses without outside assistance. The community, over time, has formed a committee, a group of highly regarded residents who must be consulted over changes within the settlement. Despite the difficulties mentioned above, this system of organisation (see Figure 18) has lead to a cohesive community, not just in social terms but also with regard

Figure 15. Relocation of Wat Baromniwat Community

Figure 16 (top). Figure-ground of Wat Baromniwat Community - Scale: 1:1000 @ A4

Figure 17 (bottom). Average occupancy of Wat Baromniwat dwelling

to architectural aesthetics. In an open discussion, one committee member, Mr. Weerawat (2013), stated:

“We consider ourselves self-sufficient, we do not require assistance from outside of the community... our housing condition is okay... if we were ever forced to move again we would fight to stay.”

This strong sense of independence and clear community-focused living is what the majority of informal settlements display. The issue lies with the housing condition. Although Mr. Weerawat (2013) states their condition to be ‘okay’, from an architectural perspective there is much to improve on. Wat Baromniwat indicates that an arrangement that allows the community to develop and improve its own situation through self-actualisation would be more readily accepted and successful than one initiated by outsiders.

Figure 18. Community organisation diagram

2.2.2 The Effectiveness of Collaboration
Samakkee Ruamjai, Klong Bang Bua, Bangkok
Non Government Organisation driven project

Figure 19 (below). Klong Bang Bua

Figure 20 (opposite). Diagrammatic description of the upgrade strategy

The banks of the canals (*klongs*) in Bangkok are the location of the most notorious illegal settlements. Samakkee Ruamjai is located along the banks of the Bangbua canal, in north Bangkok (see Figure 19). The two-kilometer-long informal settlement consists of nine communities and 2,881 households (Usavagovitwong & Posriprasert, 2006). A decision to formalise their inhabitance, forced by requirements for infrastructure development, was supported by two main parties – The Community Organisation Development Institute (CODI), a government organisation,

and a local NGO, the Chumthonthai Foundation. Through community discussions and open forums, it was decided the community would partake in a land-sharing agreement with the current landowner, the Crown Property Bureau (CPB), a government department (see Figure 20). This system of land sharing was developed by NGOs as an alternative to forced evictions, allowing the community to remain in a current location while offering provision for the landowner to develop an area of their site (Yap & De Wandeler, 2010). Paul Rabe’s (2010) pre-conditions for land-sharing

agreements provide a solid framework for development:

1. A booming property market
2. Well established communities
3. Community organisation and consensus
4. Third party intermediation
5. Physical/technical feasibility
6. Financial feasibility

The community leaders decided they would rebuild the entire community, rather than re-blocking, a process where the existing houses are relocated to the new, formally arranged land-sharing plot, as was done in the adjacent Roykrong

community (Usavagovitwong, 2010). The intention was that the community would be rebuilt with visual and social cohesiveness, thus improving the inhabitant's perception of their social standing (see Figure 21). The NGO helped facilitate the decision-making process, working with the inhabitants, the architects (a group of professionals from Sripatum University), and the government to ensure the embodiment of permanency and quality in the architectural outcome.

To effectively achieve a coherent redesign plan, the community formed small "cells", groups of 15-30 inhabitants with family, friendship or employment ties (Usavagovitwong & Posriprasert, 2006). These groups worked with the architects

Figure 21 (left). Visualisation of proposed development

Figure 22 (right). Community development workshop

to determine a reconstruction model, and develop a master plan for the settlement (see Figure 22). This process was repeated several times before a detailed plan, incorporating housing design, infrastructure planning, materiality, open space arrangement, landscaping and common facilities, was developed. The final design was handed to the "cells", so that they might construct their community themselves, with financial assistance from the NGO, thus generating neighbourliness and a positive sense of community (Usavagovitwong, 2010).

The success of this project in promoting community growth, improving housing quality and securing land tenure has had

a positive effect on other communities along the Bangbua canal, with three more (Chai-Klong Bangbua, Bangbua Langkongkarnpap and Kaona) adopting this system of collaborative upgrading. Although this project can be seen as relatively successful, issues still lie with the appropriateness of housing and community layout. Despite the strong input of the community, the final outcome is still a gridded settlement of two-to-three story row houses (see Figure 23), an organisational and architectural style foreign to many low-income inhabitants. This inappropriateness is seen as being due to the overriding influence of the architect, and the subtle involvement of CODI.

Figure 23. Figure ground of existing community and proposed community - Scale: 1:2000 @ A4

2.2.3 The Baan Mankong Effect
Sang Sun Phatana, Klong Toey, Bangkok
Government driven project

Figure 24 (below). Sang Sun Phatana, post Baan Mankong project

Figure 25 (opposite). Baan Mankong delivery strategy

The idea of *Baan Mankong* (see Figure 24) is to integrate informal-settlement inhabitants into society through a “horizontal power” delivery system (see Figure 25), creating linkages between peer groups to form one cohesive community (Archer, 2012). The programme does not impose solutions on the inhabitants but encourages the community to develop a solution, tailored to their needs, priorities and possibilities (Yap & De Wandeler, 2010). Although this idea has the potential to be beneficial, the social, economic and housing suppression the inhabitants have lived under for so long has negatively influenced their optimism and their views on the architectural potential. The fear that the programme will result in inappropriate housing exists, even though the inhabitants are led to believe, through propaganda and media, that the governments prescribed style of housing is right for them. This issue can be seen in Sang Sun Phatana, a development scheme deemed successful from the point-of-view of CODI and the NHA.

The incongruous nature of Sang Sun Phatana, a development site within the informal-settlement environment in Klong Toey, has led to an issue that *Baan Mankong* attempted to avoid, that of isolation (see Figure 26). All residents in Sang Sun Phatana have taken out loans to repay CODI for its assistance with the housing scheme (Phromphorchunboon, 2013). This financial burden has led to a decrease in community collaboration, as all members of the community have had to gain full-time employment in order to repay the loans. CODI provided the structural shell of the house but no roof, staircase, windows or internal rooms (see Figure 29), leaving the inhabitants to finalise the construction of their homes to the best of their ability (see Figure 27, 28). Although this style of incremental housing upgrading is a positive initiative, in terms of allowing loose and appropriate programming, it is an added cost that the inhabitants cannot afford on top of their loan repayments and the 150–190 BHT/month land rental fee (Phromphorchunboon, 2013).

Sang Sun Phatana, 2002

Sang Sun Phatana, 2013

Figure 26 . Figure-ground of Sang Sun Phatana, before and after Baan Mankong upgrade

The gridded housing layout (see Figure 26) and financial burden have produced a community that is inwardly focused. On-site observations confirm this, as there was little social interaction between houses, on the streets and in the “communal” spaces (see Figure 30). The usual bustling and energetic feeling of low-income communities was missing or hidden behind closed facades.

Although the *Baan Mankong* project offers an opportunity for better living conditions, and actively promotes community collaboration, in practice it fails in providing a suitable housing solution (see Figure 31). There are positive attributes to the initiative, such as the adaptability of dwelling's interiors and the removal from poor living conditions. However, the excessive financial burden, the lack of social understanding in regards to the built fabric, and the failure to acknowledge the vernacular style of informal settlements, suggest there is room to improve the current low-cost housing delivery strategy.

Figure 27 (top). Baan Mankong housing unit bathroom

Figure 28 (bottom). Baan Mankong housing unit sleeping space

Figure 29. Standard Baan Mankong housing Plans and Section A-A

Figure 30 (left). Street side living allows for little social interaction

Figure 31 (right). Garbage build up indicates a lack of care in the community

Much can be learned from both the current living conditions within the low-cost housing sector and the informal or tolerated settlements, and the current solutions. Versatility, organisational skills and adaptability are all traits that offer a solid platform on which to design a more understanding and appropriate housing solution. It is an issue that the programmes in place fail to acknowledge these features and instead place all their attention on “improving” what already exists, the spirit of community, or neighbourliness.

Both the Baan Mankong scheme and the improvement of Samakkee Ruamjai, are positive initiatives that promote community interaction through the phases of housing development. Both are run by outside organisations, governmental or NGO, and local housing analysts deem both a success (Angel & Boonyabancha, 1988; Archer, 2012; Boonyabancha, 2005, 2008; CODI, 2005; DiNino, Garabedian, Ossa, & Smith, 2006; Noppaladorom, 2004; Savant-Mohit, 2004; Usavagovitwong & Posriprasert, 2006; Usavagovitwong, 2010; Viratkapan, Perera, & Watanabe, 2004; Viratkapan

& Perera, 2006; Yap & De Wandeler, 2010). Yet both under-deliver in terms of architectural outcome and community planning. This raises the question as to why low-cost housing initiatives continue to feature the same systems that produce negative architectural results.

To develop an appropriate and quality housing solution for the low-income sector of Bangkok, all aspects of the sector's living conditions need to be addressed. In the above cases, community involvement, while laudable, has overshadowed architectural output. For a development scheme to be successful, equal measure should be given to both the inhabitants' involvement in the design process and the architectural outcome itself.

Several architectural precedents have been investigated, each identifying key architectural requirements of low-income inhabitants. These studies are an addition to the information and ideas gained from the above case studies. However, they address the issue of housing at an aesthetic, form and function level rather than at a delivery and participation level.

2.3

The Influence of the Existing Architectural Precedent Studies

As outlined by Kellett and Dayaratne (2008), low-income settlers strive to achieve certain criteria, both physically and mentally, through housing. Similar desires can be identified in projects throughout the world, between various social scales. The key themes and traits exhibited by the following projects have been identified based on their relevance to the above project delivery strategies of the people whom the buildings have been designed for. The focus is on not only the built forms and construction techniques, but also the traditional and cultural themes expressed. It is this combination that leads to successfully implemented and accepted design, a critical objective of this research.

2.3.1

The Traditional Thai House
Location- Thailand
Architect- N/A

Figure 32. Traditional Isaan house

Other than being the familiar vernacular of many Thai people, the traditional Thai house has many significant features that should be considered in modern low-income housing. The materiality and craftsmanship exemplified in these stilt-raised, breathable, simply-constructed dwellings are qualities that can be built upon and molded for more modern designs.

The Thai house responds to its environment, offering protection, shelter and shade from the stifling heat of Southeast Asia and the sporadic climatic conditions of the monsoon. Transportability, prefabrication and community-focused construction make it one of the most versatile and easily erected architectural styles.

Figure 33. Traditional Thai house

■ Traditional Thai House Characteristics

Figure 34. Airflow

Figure 35. Sloped walls

Figure 38. Opening facade

Figure 39. Floor level separation

Figure 36. Indoor/outdoor separation

Figure 37. Adjoining kitchen

Figure 40. Transportable

Figure 41. Simple post and beam construction

Figure 42. Keret House external visualisation

Tight site confines, a strict budget and a lack of rentable land led to the generation of the world's smallest house. These issues are prevalent in many large cities throughout the world but few opportunities have been taken to manipulate and inhabit interstitial space.

For a dwelling of this scale to be successful several architectural qualities need to be addressed: the clever use of materials and construction methods; careful programmatic planning for space maximisation; and livability. The Keret house exemplifies these traits and acknowledges a changing world where spatial confinement, environmental conflict and economic downturn are becoming the norm.

Figure 43 (top). Keret House section perspective

Figure 44 (bottom). Internal photograph of the Keret House

■ Keret House Characteristics

Figure 45. Fits to confines of the site

Figure 46. Simple steel construction

Figure 49. Micro-scale

Figure 50. Varying levels of inhabitation

Figure 47. Screened facade

Figure 48. Space saving stair options

Figure 51. Inhabitable space below

Figure 52. Utilises interstitial space

2.3.3 Paper Log House
Location- Kobe, Japan
Architect- Shigeru Ban

Figure 53. Paper Log House

Many developing societies have been affected by natural disaster in recent history. The Paper Log house has been a readily available and economically viable option for low-income societies in the wake of a disaster. With no reference to any particular vernacular, this design could be considered the solution of an “ivory-tower” architect. However, it is more accurately a carefully considered solution that will cause no conflicting interest or views.

Applying simple stacking construction methods, with readily available and recyclable materials, the Paper Log house addresses both educational and monetary concerns within the low-income sector. Aesthetically and technically available to all people, this expandable design strives to promote community and positivity.

Figure 54. Construction of Paper Log House

■ Paper Log House Characteristics

Figure 55. Community focused construction

Figure 56. Utilises recycled materials

Figure 59. Design of a multipurpose unit

Figure 60. Roof stacked on top of structure

Figure 57. Simple pinning techniques used

Figure 58. Post and beam/stacking construction

Figure 61. Can be multiplied to form a community

Figure 62. Utilises cardboard tubes

2.3.4
Community Lantern
Location- Bangkok, Thailand
Architect- TYIN Tegnestue

Figure 63. Community Lantern social use at night

Consideration and understanding of a community's needs is essential in designing for the low-income sector. Site surveys, questionnaires, workshops and environment embodiment are key factors in helping to generate an architecture that relates to its proposed user. Simplicity of construction and visual connectivity to the existing environment is also imperative in ensuring success in a low-cost design project.

The Community Lantern embodies and reflects the desires of the people of Klong Toey, the largest informal settlement in Bangkok, and actively promotes positivity within the community. The sense of achievement in being involved in a design project through development, construction and utilisation phases is key to the advancement of low-income communities.

Figure 64 (left). Children at play in the Community Lantern

Figure 65 (right). Helping to construct the Community Lantern

■ Community Lantern Characteristics

Figure 66. Utilises recycled materials

Figure 67. Varying levels of inhabitation

Figure 70. Simple construction

Figure 71. Multi-use floor/sitting/play space

Figure 68. Community focused construction

Figure 69. Separation of indoor/outdoor space

Figure 72. Verandah aesthetic

Figure 73. Stacking style of construction

2.3.5

Soe Ker Tie Housing
Location- Tak, Thailand
Architect- TYIN Tegnestue

Figure 74. Soe Ker Tie Housing complex

The Soe Ker Tie Housing scheme combines local craftsmanship and traditional style, as well as the architectural knowledge of an international firm. This collaboration has produced an architecture that not only embraces the inhabitants, orphaned

children of the Burmese conflict, but also acknowledges key themes, such as bracing, material economisation and moisture prevention, in providing a low-cost solution that can be constructed and maintained with ease.

Figure 75 (left). Design quality presented through variations in bamboo construction

Figure 76 (right). Weaving the bamboo panels

■ Soe Ker Tie Housing Characteristics

Figure 77. Screen like facade

Figure 78. Provision for water collection

Figure 81. Single unit multiplied to form a community

Figure 82. Community focused construction

Figure 79. Vernacular and locally sourced materials

Figure 80. Small sleeping platforms

Figure 83. Simple traditional style of construction

Figure 84. Small-scale

Tower Machiya

Location- Tokyo, Japan

Architect- Atelier Bow-Wow

Figure 85. Tower Machiya front facade

It is important that as the world advances and Western influences in architecture become the most promoted and exemplified, traditional styles are not forgotten. The design of Tower Machiya illustrates the benefits in keeping a sense of traditional style, whilst portraying a contemporary visage.

An understanding of cultural activities, necessities and norms is paramount in generating a design that provokes comment, be it positive or negative, in being past-focused yet present-functional. This 'yin and yang' like conflict, and the willingness to experiment is what promotes new developments in the architectural field.

Figure 86 (top). Sectional model of Tower Machiya

Figure 87 (bottom). Simple internal programming of Tower Machiya

■ Tower Machiya Characteristics

Figure 88. Utilises interstitial space

Figure 89. Simple moment frame construction

Figure 92. Allows for traditional and cultural activities

Figure 93. Separation of indoor/outdoor spaces

Figure 90. Application of traditional screen to facade

Figure 91. Introduces nature into the home

Figure 94. Varying levels of inhabitation

Figure 95. Egress path interacts with all internal spaces

2.3.7
Quinta Monroy Housing
Location- Iquique, Chile
Architect- ELEMENTAL

Figure 96. Quinta Monroy Housing complex

Social housing is generally seen as a solution for low-income families or communities. These properties often lack the potential to be seen as an investment, and have been likened, by the architects at ELEMENTAL, to buying a car; they only decrease in value. Revisiting this concept not only provides the low-income strata with a viable housing solution but a potential investment in the future.

The Quinta Monroy Housing initiative provides a simply constructed and programmed housing option, employing the simple 'core-house' idea, where the key areas of the house are provided by NGO's and built upon by the inhabitants. This idea actively promotes expansion, addition, customisation and ultimately investment, allowing the inhabitants to take pride and ownership in their dwelling and providing them with the opportunity to improve their financial situation.

Figure 97 (left). Interior view of Quinta Monroy

Figure 98 (right). Community development/design workshop

■ Quinta Monroy Housing Characteristics

Figure 99. Vertical living opposed to sprawl

Figure 100. Provision to add to 'core' house

Figure 103. Simple prefabricated concrete structure

Figure 104. Small-scale

Figure 101. Investment opportunity

Figure 102. Can be multiplied to form a community

Figure 105. Buildings promote community growth and interaction

Figure 106. Two levels of mix-use spaces

The precedent studies above have presented six key themes, each addressing the housing requirements of the low-income strata at an architectural level, rather than at a social or developmental level. They are as follows:

1. Simple construction
2. Ability to expand
3. Vernacular, cheap, locally-sourced materials
4. Traditional themes in form and function
5. Collective/community construction
6. Small scale

It is these themes that will form the basis for development when considering architectural form and function.

The way to improve the low-income housing situation in Bangkok is to adopt the positive attributes of the previously discussed housing developments; that of participatory design; security of land tenure through sharing; and critical understanding of the inhabitants historical, financial and physical needs. The six themes identified in the precedent studies will form the architectural basis for the proposed housing solution, and are the framework for a housing delivery strategy that seeks to reinvent the low-cost housing situation in Bangkok, positively responding to the five informal-settlement criteria outlined by UN-HABITAT (2003):

1. Insecure residential status
2. Poor structural quality of housing
3. Inadequate access to safe water
4. Sanitation and other infrastructure
5. Overcrowding

The design must also take into consideration the people, not just their sense of community, but also their perception of social standing and their desire for self-sufficiency. The ability to positively direct and influence the future of the inhabitants through the built environment, both at an individual dwelling scale and a community scale, would accomplish what previously implemented programmes have failed to achieve.

Chapter Three

Site Considerations

3.1

Reviving a District

The extent of informal settlements in Bangkok is vast (see Figure 5). It is intended that the developed building will be site ambiguous, able to be implemented throughout Bangkok, with ease and aesthetic cohesiveness (see Figure 107). For the purposes of this research, a single site has been selected as a test location. The site embodies traits applicable to a multitude of similar sites and design scenarios throughout the city, and helps to visually place the design in an environment in which it is likely to be positioned. The site dimensions, appearance and proximity to key employment and transport areas are traits exhibited at many sites, similar to the selected test site, within the Bangkok urban center.

Figure 107. Implementation of design throughout the district

The Bang Rak district (*khet*) in central Bangkok is one of 50 districts that form the Bangkok Metropolitan Area (BMA) (see Figure 108). Bang Rak was the first district in Bangkok to accommodate foreign communities and was a centre for trade. As a result, the district developed quickly, with many trading companies, banks, warehouses and factories being constructed (Lim, 2005).

The site lies along *Thanon Si Phraya* (Si Phraya Road) (see Figure 109). Situated in the northern part of the district, this area was once a bustling trading ground,

with strong links to the Chao Phraya River and the more commercialised Si Lom area (see Figure 109). Many failed building projects (see Figure 110), a result of the 1997 financial crisis, and the introduction of the intrusive and dominating Sirat Expressway (see Figure 111) have all contributed to the degradation of the area in terms of activity and development potential. A conglomeration of street dwellers, squatters and informal settlements has replaced the once prevalent population of foreign inhabitants.

Figure 108 (opposite). Bangkok Metropolitan Area map

Figure 109 (above). Notable areas and notable informal settlements in close proximity to proposed design site

Figure 110 (top). Abandoned building projects from the 1997 financial crisis

Figure 111 (bottom). Impact of the Sirat Expressway

The chosen site (see Figure 112) incorporates all of the negative traits of the area. Situated alongside and behind a derelict apartment building (see Figure 113, 114), this now rubbish dump offers an opportunity to demonstrate the potential for development within the area and much of greater Bangkok. The site is addressed in two parts (see Figure 115), the first acting as a testing ground, gauging the response of the surrounding environment, and presenting the greatest

level of limitations the design might face. The second acts as a development area for a community cluster of the design, the results of which will determine whether the design is applicable to the surrounding area and similar abandoned and underutilised sites.

The design intention, in relation to site, is to revive the area, providing an infrastructure and opportunity for low-income community living.

Figure 112. Site location along Si Phraya Road

Figure 113. View through abandoned building to the rear of the site

Figure 114. View of the pilot site from Si Phraya Road

Figure 115. Site division and dimensions

Chapter Four

The Process

4.1

Finding Form

The development stage of this thesis employs several design methodologies and strategies, each reflected in the final architectural outcome. The Thai people strongly believe in the idea of 'cooked' architecture, where rigorous design processes are carried out thoughtfully and accurately. This process focuses on two main areas; the development of a piece of architecture; and the responses, feedback and input, through participation and critique from a variety of external parties. The final product is then judged, not only on its architectural and social merits, but also on the effectiveness of the process, initialising the idea: Thai Housing = Process + Product

4.4.1 40x12 Design Series

Figure 116. Slide box and slides of 40 design concepts

The design development stage began by addressing the six architectural criteria outlined above (see Figure 117). The assessment of these, and the limitations presented through the identification and analysis of the *Si Phraya* testing site, resulted in 40 design iterations (see Figure 118), simple building masses that could be interpreted and built upon to generate a functioning house.

These designs were developed in order to understand the spatial qualities of the site and test the limitations of the potential building form. The 12-metre by 9 metre by 1.8-metre site dimensions were employed to generate a simple four-by-three grid. This grid was manipulated to generate 40 unique designs, aimed at stimulating the initial design process.

Figure 117. Initial sketch design

In acknowledging the influence of the researcher's personal perception, and that it might limit the potential for a wider range of viable solutions or options, seven designs were selected (see Figure 119) based on their potential for habitation and their relationship to or

acknowledgement of the six criteria identified in the precedent studies. These designs were then presented for programmatic and aesthetic testing with an external audience in order to externally determine their legitimacy as potential options.

Figure 118 (opposite). 40 concept design based around the 1.8x9x12 metre grid

Figure 119 (above). Designs selected for further development

4.1.2 *First Order of Participation*
Victoria University of Wellington

Figure 120. Victoria University of Wellington students participating in the design workshop

The methods used successfully in the Baan Mankong and Samakkee Ruamjai programmes, where a design was given to a focus group to analyse and personalise, was then trialed with a focus group of Victoria University of Wellington architecture students (see Figure 120). Students were asked to programme the given spaces within the confines of a brief (see Appendix, A.1). In approaching the focus group three key characteristics were considered -- their consent to participate, their ability to understand simple architectural forms and their willingness to provide a design that was uninfluenced by outside parties. The brief gave them full control over prescribed spaces, and allowed for

expressiveness in design. To ensure that the designs were individualistic and to minimise the impact of the researcher, the task was carried out independently and in the participants' own time.

The outcomes (see Figure 121-127) were expressive of their (New Zealand, 2nd year architecture students) living requirements and provided a clear indication of their positioning within society. A Westernised stance was evident, displaying a need for larger living spaces, a luxury many low-income citizens in Bangkok cannot afford. The outcomes of the workshop offered programmatic solutions that were previously unexplored by the researcher. These programmatic

Figure 121. Student's response to concept number 2

Figure 122 (top). Student's response to concept number 15

Figure 123 (bottom). Student's response to concept number 17

Figure 124 (top). Student's response to concept number 29

Figure 125 (bottom). Student's response to concept number 33

Figure 126 (top). Student's response to concept number 35

Figure 127 (bottom). Student's response to concept number 37

ideas were analysed and critiqued by the researcher, whose judgement of the ideas presented was influenced by a pre-conditioned understanding of what the design should be. Design 37 (see Figure 128) was identified as having the greatest potential (being selected the most by the participants for programming) for further development by the researcher.

The outcomes of this workshop highlighted the importance of the participants' contribution, as it elicited programmatic ideas and form interpretation previously unexplored.

The workshop also identified where the designer, in the development or interpretation of the participants design inputs, took certain liberties. The potential issue of pseudo participation (Sinha, 2012); a situation where the architect, acting as a facilitator, ingratiates themselves with the community yet applies their own design regardless of the communities' requirements or design suggestions, became evident. This was an important lesson and strategies for avoidance were developed to mitigate the occurrence of this issue in future research tasks.

Figure 128. Design 37

4.1.3 Pre-Thailand Development

Figure 129. Model of design in immediate context

Further design testing, primarily focused on form, was conducted in order to produce what can only be described as provocative architecture (see Figure 130-135). The final outcome was a slightly more informed low-cost housing option (see Figure 136), due to the influence of the above workshop and a closer examination of the six criteria highlighted by the precedent studies. With an acknowledgement to traditional Thai forms, through the sloping walls, roof and tall appearance, the design remained in a state of external form development only (see Figure 137, 138). It was recognised that a lack of understanding, in regards to internal programme, was limiting the further development and critical analysis of the housing unit.

Figure 130 (top). Form development sketch

Figure 131 (bottom left). Form development sketch

Figure 132 (bottom right). Form development sketch

Figure 133 (top). Form development sketch

Figure 134 (middle). Roof development sketch

Figure 135 (bottom). Developed form

- COOKING/CLEANING/FOOD-PREP
- SLEEPING/PRIVATE
- TOILETS/LAUNDRY/SHOWERS
- COMMUNAL/SOCIAL/PUBLIC

- WATER COLLECTION
- COOLING TOWERS
- SUN/HEAT SHADING
- SAFETY ZONE/BUFFER
- FLOODING
- SURVEILLANCE

Figure 136. Breakdown of design attributes

It was decided the developed design should be taken to Thailand to be critiqued and modified by the proposed inhabitants in Bangkok, with the aspiration that the involvement of the community, in connection with ethnographic research, would result in the successful production of a community focused, thoughtful and

appropriate housing solution. It was at this stage that the development and social strategies identified in the above sections *A Question of Community, Involvement and the Existing Situation (2.1)* and *Community vs. NGO vs. Government (2.2)*, were to be employed, alongside the architectural outcome.

Figure 137. Developed design concept, single unit

Figure 138. Developed design concept, double unit

4.1.4 *Reality of Participation*
Bangkok, Thailand

Figure 139. Model workshop with students from Khon Kaen Vitaes Suksa, Thailand

A month-long research period was conducted in Bangkok (see Appendix A.2 for Ethical Approval), the aim being to more accurately inform the design, through cultural and community immersion. With assistance from Chulalongkorn University, Faculty of Architecture, Department of Housing, several community visits, workshops (see Figure 139) and interviews were arranged with the proposed occupants of the scheme. Two key research methods — ethnographic observation and community design participation — were employed to take full advantage of the arranged visits, and gain an accurate understanding of the living requirements of low-income residents.

Ethnographic Observation

The method of cultural immersion and observation, known as ethnography (Crouch & Pearce, 2012), was exercised. This close association with the proposed design occupants allowed for a greater understanding of their lifestyle, actions and norms. In eating with them, following their customs and joining in their discussions, the cultural impact of the researcher's presence was softened. This allowed for an easy flow of information and the opportunity to observe the low-income sector at a peer-to-peer level.

A considerate examination of everyday behavior, language, housing quality and existing living conditions provided an opportunity to develop a cultural understanding of the low-income sector. Crouch and Pearce (2012) identify that this understanding is the preliminary approach of ethnographic research and should be appended to other forms of observational research. Observational readings were recorded through sketching (see Figure 140), note taking and photography (see Figure 141).

Figure 140 (top). Community site sketch

Figure 141 (bottom). Low-income community, Bangkok

Open discussions were held, through a student translator (provided by the Department of Housing, Chulalongkorn University) implementing Robert Chambers (2012), 'democracy of ground' technique. The simple action of positioning oneself at the same level as the participants (see Figure 142, 143) helps remove any sense of domination by one party over another (Sinha, 2012). These discussions were not focused on the specific design but on an improved living

situation where the researcher asked what would be desired if the low-income inhabitants were free to live under more preferable conditions. This provided insight into their housing aspirations without first influencing them with an already developed design. It is from this investigation that an understanding of design limitations, in regards to buildability, materials and availability became a primary design factor.

Figure 142 (left). Application of 'democracy of ground' technique

Figure 143 (right). Casual interaction with community member

Community Participation

Occupant participation in the design process allows for accuracy in design outcomes, as well as empowering the participants, giving them a strong sense of ownership over the finished product. Sumita Sinha (2012) sees this process as being complex and slow, however, if the appropriate tools and methods are in place, the outcomes are unquestionably enriching. Two key techniques, questionnaires and model workshops, were employed, addressing the five P's of participatory design; people, place, project, politics/power, and participation (Sinha, 2012).

Questionnaires focused on lifestyle and housing conditions (see Appendix, A.5-A.12), while the models provided an opportunity for the inhabitants to programme a predefined house (see Figure 144). This gave them an opportunity to consider their living situation and programme their house accordingly. One aim of these workshops was to generate fun, irreverence, frankness and surprise, all through interaction with the design tool (see Figure 145), the

Figure 144. Diagrammatic breakdown of the model workshop process

Figure 145(top). Programmable model used for the model workshops

Figure 146 (bottom left). Model workshop at Khon Kaen Vithas Suksa

Figure 147 (bottom right). Model workshop at Khon Kaen Vithas Suksa

researcher, and the participants (Sinha, 2012). This 'loose' atmosphere (see Figure 146, 147), removes the participants from the standard, dreary, political situation of government or client-designer talks, where the client, in this case the low-income sector, can feel heavily influenced by the dominant character in discussions.

Although the role of the architect, in this case the researcher, as a facilitator (Sinha, 2012) was required, the idea that the architect as the possessor of knowledge was challenged, as the design outcomes generated and discussed far exceeded the prescribed, and clearly restricted, predetermined design scope.

The research methodologies employed during the time in Bangkok identified several key failings in the proposed design, mainly due to the complexity of construction and the lack of acknowledgement of cultural programmatic requirements. The participatory workshops and interviews with the proposed inhabitants highlighted the need for a dwelling that met the requirement for an improved living condition, but did not take away

from, or alter, their current style of living. Without this research process, these themes would never have been realised, as current literature on low-income housing developments typically focuses on the strategy and outcome rather than the actual built and living environment.

Through the implementation of these design processes, methods and stages, schematic information was accumulated (see Figure 148-150). These diagrams, photos and questionnaire results (see Appendix A.13-A.17) formed the basis of both the physical/aesthetic and project delivery developments. It became apparent that a reworking of the current design was required, to one that responded to the information gathered.

Figure 148. Diagrammatic outcomes from the model workshops

Figure 149 (top). Breakdown of areas based on application within the housing unit

Figure 150 (bottom). Idealised programmatic diagram of housing unit

Figure 151. Questionnaire session and model workshop with inhabitants from Sang Sun Phatana, Klong Toey, Bangkok

4.1.5 Post-Thailand Design Development

Figure 152. Design sketches

Through iterative design processes developed from the information gathered in Thailand, along with the design solutions previously considered, design propositions were rigorously tested, manipulated, critiqued and analysed (see Figure 154–157). The primary method of design was through physical three-dimensional modeling, a medium that is easily recognisable and is able to be understood by all education levels and social groups. It was considered to be the most successful means for the design development to be understood by the proposed inhabitants, if and when they were consulted again.

These iterations took into consideration the scale required by the inhabitants, as well as their need for simple forms of construction. Several designs were given considerable thought, however discussions with local and international architectural and construction experts during a formal design critique identified one iteration as having the greatest potential to fulfill the requirements of the design research (see Figure 157). It is this design (see Figure 158) that was further developed through computer modeling, programmatic, structural and feasibility studies.

Figure 153 (top). Card model iterations with annotation

Figure 154 (bottom). Card model iterations with annotation

Figure 155 (top). Card model iterations with annotation

Figure 156 (bottom). Card model iterations with annotation

Figure 157. Card model iterations

Figure 158. Development and design considerations of chosen design

Chapter Five

The Product

5.1

The Response of the People

The final 'Product', referred to here as the '*The Response of the People*', is a design that has employed a customised process — a dwelling that is a manifestation of ideas from both the proposed inhabitants and the designer. This solution to informal housing conditions in Bangkok is seen as a response to the complex needs and requirements of the low-income sector. The design addresses their conditions on two scales:

Firstly, the individual housing unit where the design actively addresses the ideas of simple construction; the ability to expand; the use of vernacular, inexpensive and locally sourced materials; the embodiment of traditional themes in form and function; implementation of collective-community construction and the understanding of small scale.

Secondly, the community cluster (settlement) where the design attempts to alleviate the negative living conditions of the low-income sector, by providing a healthy, neighbourly and positive living environment.

In applying the theories and design considerations outlined in *Chapter Two - Literature Review and Case Studies*, the design seeks to inspire the inhabitants, offering them the opportunity to build for themselves and take pride in their accomplishments. The design is as much about the process as the final product. It is seen as an opportunity for the inhabitants to stake ownership over the scheme, providing them with the tools to actively promote the design as a viable low-income housing solution.

Figure 159 (previous left). Process+Product Unit visualisation

Figure 160 (previous right). Scale model of Process+Product Unit

Figure 161 (above). Ground Floor Plan

Figure 162. First Floor Plan

Figure 163. Second Floor Plan

SECTION B-B (ORIGINAL 1:10 @ A0)

Figure 167 (previous right). Model of Process+Product Unit

Figure 168 (previous left). Night visualisation

Figure 169 (above). Internal visualisation

Figure 170. External visualisation

Chapter Six

Design Discussion

6.1

The Modular System

Process+Product not only deals with modularity as a physical entity, such as an architectural element or a finalised design solution, it recognises that modularity can exist within society, and attempts to utilise this realisation to form coherent, thriving communities. The style of construction, materials used, and the form and function of the building all acknowledge modularity and use this systemised method of design and construction to draw people within the low-income sector together.

The individual building unit was designed as a stand-alone structure - a single-family house. However, this was not the final intention for this architecture. The primary goal was to create a unit that could be clustered, added to, manipulated and expanded to meet the ever-changing requirements of an informal settlement. Families or groups within the community, through the assistance of community savings groups, would be presented with a 'start-up kit'. This kit, which utilises a traditional lego-style instruction manual for ease of understanding, encompasses the essential components and the instructions to begin the construction of individual houses.

Figure 171 (above). Structural grid

Figure 172 (opposite). Breakdown of building components

The overall design is modular, constructed in two bays, based around a 600mm grid (see Figure 171). This systematic style of design is highly relatable to the Thai people, as the rural style of architecture uses similar standardised systems to construct building components that are interchangeable with any other house (Sthapitanond & Mertens, 2006). Componentry is also a predominant feature of the house, as similar, modular components are multiplied throughout the design to form the final product. These include the floor panels, the wall and roof panels and the I-section steel

frame (discussed further in the section “*It’s what we Know*” – *Materiality*, 6.4) (see Figure 172).

The Thai word *prung*, meaning, to assemble (Brown, 2011), is well appropriated in the construction method employed. Simple bolted pin joints are used to erect the steel frame (see Figure 173) while an easy, traditional method of bamboo construction, pinning, splitting and weaving, is used to form the floor, roof and wall panels (see Figure 174). Like traditional Thai construction, all components are constructed separately

Figure 173 (above left). Steel pin-jointing technique

Figure 174 (above right). Bamboo construction technique

Figure 175 (opposite). Exploded drawing of Process+Product Unit - 1:200

STAGE1
Completed Dwelling

STAGE2
First phase of deconstruction.
Roof, angled steel frame and
upper walls are removed

STAGE3
Second phase of deconstruction.
Upper floor panels, steel T-sections
and first floor walls are removed.

STAGE4
Third phase of deconstruction.
First floor panels, steel T
and L-sections are removed,
along with the bathroom walls.

STAGE5
Final phase of deconstruction.
Remaining steel structure is removed,
as well as the bathroom fittings and deck.
Only the concrete pad remains.

Figure 176. Deconstruction of housing unit displaying stacking style of construction

before being brought together to form the final building (Jotisalikorn, Phumathon, & Di Crocco, 2002) (see Figure 175). This idea of connecting the elements in a stacking manner not only enables the homeowner to erect the house with little construction knowledge, but also allows for easy deconstruction (see Figure 176). This anticipates that the house may have to be moved due to insecure land-tenure. Despite the seeming temporary nature of the design, the permanency of the steel structure aims to verify the dwellings legitimacy, with relocation, while possible, a last resort (see Figure 177).

Seen as the 'core-house', an advancement on current low-income housing initiatives (Panitchapkd, 2008), the unit allows for expansion and addition, via "expansion-kits", additional steel structural members (see Figure 178) that can connect with the existing structure to generate more space (see Figure 179, 180). Expansion to an already elegant formalised structure will externally and internally demonstrate the social and economic improvement of the community.

Figure 177 (above). Simple relocation of Process+Product Unit

Figure 178 (opposite). Steel expansion members

Figure 179 (top). Comparison of Starter unit vs. Expansion unit

Figure 180 (bottom). Expansion Unit

Figure 181 (opposite). Visualisation of Expansion Unit

As a finished individual unit (see Figure 181), the house is now considered a social module for community growth. Each unit, constructed by the community, designed with the communities critical input and funded by community saving initiatives, is constructed as part of a cluster; a social group of housing units that when viewed as a collective can be seen as a more formalised settlement. Neighbourliness, elevated through the process of formation, strengthens the community spirit of the people.

Theorised as a catalyst initiative, it is hoped that the knowledge and skills, associated with the construction of the individual units and the beginning of the community, can be implemented in further developments (see Figure 182). If successful, the knowledge gained from this enterprise can become a viable employment option for members of the community, allowing them the opportunity to encourage and teach other informal settlements to implement the same architectural and development strategies embodied in their community. This design can then be considered a module in the formalising of informal settlements throughout Bangkok.

Figure 182. Desired roll-on effect of the Process+Product modularity

6.2

Division Through Provision
Socioeconomic standing

The Process+Product development scheme seeks to avoid issues of suppression and degradation of the low-income group. It seeks to empower the people, providing them with an opportunity to improve their socio-economic standing and be recognised as essential members of Bangkok’s urban society.

Both Yap Kioe Sheng (1990) and Nattawut Usavagovitwong (2010) identify Sherry Arnstein’s (1969) ladder of citizen participation as the most effective way to deliver community-focused architectural projects (see Figure 183). This delivery

strategy flattens the hierarchical standing between architect and inhabitant, allowing cross cultivation of knowledge and empowering the inhabitant through the process of design. The final architectural outcome, being of the inhabitants’ creation, mirrors a newfound sense of ownership and expresses their ability to contribute positively to the aesthetic of the surrounding area.

Despite being contemporary in form, the design clearly exhibits traditional Thai architectural ideals (see Figure 184), and in doing so, the house, inadvertently, is likely to raise the socio-economic regard

Figure 183. Sherry Arnstein's Ladder of Citizen Control

Figure 184. Traditional Thai housing traits portrayed in the Process+Product Unit

of established Thai society for the low-income group. There is an underlying desire in many Thai people to reside in a traditional-style house. This design, not only offers that opportunity through meeting the desires of low-income citizens, but by additionally fulfilling architectural dreams of the middle and upper classes.

The savings, construction and development groups formed in regard to this scheme lend themselves to future employment opportunities for

the community. In open discussions with several low-income community leaders in Bangkok (Patcharee, 2013; Phromphorchunboon, 2013; Weerawat, 2013), it was discovered that current employment opportunities for low-income citizens included petty trade, laboring, factory work or taxi/*tuk-tuk* driving (see Figure 185). Although a living can be made from these jobs, there is little to no empowerment in employment. The Process+Product programme provides the opportunity for the community to initiate a property

Figure 185. Common employment opportunities for the low-income sector

investment or development group, as the initial process provides them with the systems with which to generate self-employment opportunities.

The newfound strength and independence of the community can also lead to several problems. Without successful or experienced leadership, financial saving programmes, and conflict resolution groups, a community may find itself returning to the chaotic, slum-like conditions it had begun to escape from. Usavagovitwong (2010) identifies that a community's mechanisms to ensure self-control and management over its new settlement are key in ensuring a successful transition from poor-quality informal living to a formalised architectural setting. The way this architectural scheme has been generated seeks to address these issues by ensuring that these groups are formed during the development and construction phases. With these groups in place, the community organisation will be like a 'fortress', exercising a set of community living regulations and ensuring that the community progresses as a collective, rather than as individuals exploiting the system (Usavagovitwong, 2010).

It is through these mechanisms, promoted and embodied in the design, as well as in the construction and maintenance strategies of the Process+Product architecture, that the community will be able to advance its socio-economic standing. Although developed incrementally, the housing unit, and ultimately the community cluster, will provide equal opportunities to all community members, ensuring that the community develops as a collective, further strengthening its social ties through architecture (see Figure 186).

Figure 186. Process+Product employment scheme

6.3

Healthy Living Environments

The National Housing Authority of Thailand (NHA) describes an informal settlement as “a dirty, damp, swampy or unhealthy area with overcrowded buildings which can be harmful for health or lives” (Pornchokchai, 2003, p. 13). A key objective of the Process+Product unit is to mitigate these issues through passive and programmatic means. Four issues, air quality, flooding and water quality, overcrowding/sprawl and cleanliness have been addressed at both the individual unit level and on a community scale, in order to improve the living conditions of the proposed inhabitants. These issues were identified, through on-site observation, as being the most damaging or pressing environmental issues within existing low-income communities.

■ 6.3.1 - Air Quality

The hot and humid climatic conditions of South East Asia, coupled with heavy pollution issues in Bangkok, have a severe negative impact on air quality. Many potential development sites in Bangkok are located in close proximity to major roadways or polluted canal systems. In discussions with Ms. Patcharee (2013), a resident from Trok Salukhin, she acknowledged that there were, 'big respiratory issues from the pollution generated by the expressway'. This is supported in the findings of Jinsart et al. (2002), that airborne fine particles in Bangkok exceed the National Ambient Air Quality Standards (NAAQS), with automobile exhaust fumes being the major contributor. The Process+Product unit seeks to attenuate the air quality issue through several means, including filtration (see Figure 188), passive airflow (see Figure 189-191) and avoidance of volatile organic compounds (VOC's) in construction materials (see Figure 187). These systems target both personal and environmental air concerns.

Figure 187. Bamboo wall panel

Figure 188. Breathability of the wall panels

Figure 189. Implementation of 'Wet Areas' for cooling

Figure 190. Facade effects on airflow

Figure 191. Airflow and filtration stimulated by a community cluster

6.3.2 - Flooding and Water Quality

Due to their low-lying nature and close proximity to waterways, informal settlements are prone to devastation through monsoon-driven flooding (see Figure 192, 193). However, flooding is not the only water concern of the settlements; stagnant water from bathing pots, canals and septic ponds promotes a multitude of diseases and pest infestations. It is the objective of this design to alleviate these water-related issues through

methods involving water collection (see Figure 194), active grey and black water filtration (see Figure 195), similar to the system used in the Samut Songkram eco-community, and flood avoidance (see Figure 196). These systems are considered 'off-the-grid', as the design strives to empower the inhabitants by avoiding external reliance, and result in minimal impact on the inhabited site.

Figure 192 (above). Children playing in flood waters
Figure 193 (opposite). Bangkok waterway and flood map

Figure 194. Rain water collection and implementation

Figure 195. Black water disposal and input into living environment

Figure 196. Flood avoidance through raised living

6.3.3 - Overcrowding/Sprawl

Overcrowding, both of inhabitants per dwelling and dwellings per land area, is identified as a serious environmental issue within informal settlements (Archer, 2012; UN-HABITAT, 2003) (see Figure 197). The competition to survive in a slum community brought about by the close proximity to one another is known to cause serious mental health concerns (Somrongthong, Wongchalee, & Laosee, 2012). The Process+Product design exhibits a sense of permeability, through the woven bamboo panels and the adaptable nature of the facades, and this permeability seeks to attenuate the perception that one is living in a tightly-programmed settlement. The ability to expand the housing unit allows for greater floor area per house, given the ability to acquire further land, providing for growth in community population,

whilst avoiding the common issue of overcrowding.

The low-lying, sprawling nature of many informal settlements generates a claustrophobic and compressing environment that is further emphasised by the solidity of materials used and the inward-focused composition of dwelling facades. Process+Product seeks to reduce this sprawling nature by providing a more vertically-focused style of living (see Figure 198). Although the individual housing unit floor area is comparable to the current informal settlement scale (see Figure 200), the adaptability and permeable nature (see Figure 199) of the dwelling generates a sense of openness and perceived expansion, allowing for densification by avoiding the negative connotations.

Figure 197. Overcrowding in Klong Toey, Bangkok

Figure 198. Verticality of the Process+Product Unit compared to the existing situation

— 100

100

Figure 200. Floor area and inhabitation zones

6.3.4 - Cleanliness

Ajarn Duang Prateep, founder of the DuangPrateep Foundation (who famously focused on improving the livelihood of slum dwellers in Klong Toey, Bangkok), believes that cleanliness issues within the low-income communities are due to their lack of respect of place, generated by their illegal status (Prateep, 2013) (see Figure 201). This lack of respect can also be attributed to the detachment many inhabitants have had in the decision-making process or the generation of community through construction and

development. The participation of the community in the design, construction and development stages of the Process+Product programme results in a sense of ownership and pride. This wellbeing, together with a strong sense of community and a more positive, appropriate housing aesthetic, is expected to result in care for personal and communal space, and ultimately the minimisation and eradication of unsanitary conditions within the community.

Figure 201. Current condition of the Si Phraya design site

6.4

“It’s what we know” - Materiality

As outlined above, the majority of low-income houses in Bangkok are constructed using crude brick and mortar or recycled timber and iron. The resulting haphazard and dilapidated appearance is not only detrimental to the aesthetic value of the housing but is also a serious structural risk. As previously mentioned, many of the informal settlement inhabitants are rural-to-urban migrants, coming from areas where traditional craft and construction techniques are still widely employed. Therefore, it seems logical that a housing development proposal directed at meeting the requirements of these people would attempt to incorporate the construction

and craft knowledge that has long been an integral part of their culture and community. Unfortunately, the majority of housing development programmes are government or officially driven, which has resulted in the, almost, exclusive use of concrete as a building material. The reason for this is that concrete is perceived to be the most permanent material available for low-income housing. However, this is not necessarily the case. The Process+Product unit, instead, integrates two primary materials, readily available in Bangkok. Steel forms the structural skeleton, while the flooring, walls and roof use various forms of crafted bamboo.

6.4.1 - Steel

In traditional Thai architecture, houses were referred to as *ruen khrueng pook* or *ruen mai bua*, both meaning to assemble by binding (Sthapitanond & Mertens, 2006). It was the intention that this house design would attempt to embody this theme of binding through construction, but in more permanent and contemporary manner. The decision to use steel as the primary structural material was influenced by its durability, adaptability and strength, and that it allows for a binding-type construction method. The choice was further supported by the fact that only permanent materials such as concrete and steel can be used for the structure of buildings within the Bangkok Metropolitan Area (BMA) (Panitchapdi, 2008).

The solidity and perceived permanency of the steel frame gives the structure architectural legitimacy, something current low-cost houses lack, and it is hoped that this perception will result in the gradual acceptance of these housing interventions into the urban fabric of Bangkok.

Figure 202 (above). Four people required for construction

Figure 203 (opposite). Steel components required to construct the structural frame

Bearing in mind that a minimum of four people would be required to construct the house (see Figure 202), strategic steel structural and joining techniques were an important consideration, as was the maximum span and weight of the steel members (see Figure 203). The assembly of the frame attempts to acknowledge the traditional Thai method of neighbour assistance in construction, where the community bands together to help build a home in exchange for assistance with crop cultivation or further construction projects (Baker & Phongpaichit, 2009).

Angled down section = **44.7kg**

Angled up section = **28kg**

Custom T-section (short) = **66.4kg**

Custom L-section = **52.4kg**

Custom T-section (long) = **68.8kg**

Custom U-section = **84.3kg**

2550mm - 150UB = **35.7kg**

3750mm - 150UB = **52.5kg**

12 x 2550 x 150 - Sheet Steel = **36kg**

12 x 3750 x 150 - Sheet Steel = **53kg**

950mm - 150UB = **13.3kg**

12 x 6450 x 105 - Sheet Steel = **63.8kg**

6.4.2 - Bamboo

Bamboo houses have long been considered the primary form of traditional Thai house (Sthapitanond & Mertens, 2006), and are still built by rural families in provincial Thailand (see Figure 204). Bamboo is an essential feature of the traditional Thai system of preassembling housing components before drawing them together during construction (see Figure 205-207). This style of assembly has been implemented in the design of the Process+Product unit, where members of the community form prefabricated bamboo modular components. Not only does this promote community interaction and neighbourliness, but also rejuvenates traditional craft methods that are generally lost to urban residents.

Figure 204 (above). Current day rural Thai house.

Figure 205 (opposite). Bamboo modular components

In addition to the link to traditional, vernacular architectural methods, bamboo also has impressive economic and durable qualities. With an average 10-year (untreated) design life, bamboo is considered highly durable for an organic unmodified material. Its strength, adaptability, flexibility and diversity in terms of use, shape and composition allows for a broad magnitude of aesthetic design options (see Figure 208). The benefit of constructing modular bamboo panels is, when one is required to be repaired or replaced it can easily be removed from the overall structure and reapplied with minimal effort (see Figure 209).

Figure 206 (opposite). Bamboo modular components

Figure 207 (above). Construction of floor component

The use of an organic, untreated material eradicates the potential for harm via volatile organic compounds (VOC's), commonly found in treated timbers, that are prevalent in many recycled low-cost houses. Waterproofing and breathability, along with the aesthetic value, are also positive attributes. In short, the association with Thai culture and traditional architectural styles and construction make bamboo a necessary material when considering appropriate low-cost housing.

Research suggests that this new view of low-cost housing materials will resonate with the proposed residents, by acknowledging and encouraging their traditional construction and craft

beliefs. The decision to use steel as the primary construction material, rather than bamboo, was made on the basis of permanency. The Process+Product unit is seen as a housing solution rather than as an alternative to an existing situation. The use of steel acknowledges the potential involvement and assistance of established groups, such as the government or NGO's, as the likelihood of monetary assistance or subsidies is enhanced.

It is through the act of building, and the emphasis placed on community interaction and cooperation, that pride and care are generated, both in regards to each individual housing unit and the community as a whole.

Figure 208. Alternative weaving aesthetics

Figure 209. Repair and replacement of bamboo wall components

6.5

Cultural Considerations

To design in a foreign cultural context, one must employ several strategies to ensure accuracy in meeting the specific and complex requirements of the proposed inhabitants. As outlined in *Chapter Four - The Process*, model workshops, interviews, questionnaires and observation techniques were implemented in order to gauge the direction and scope of design.

6.5.1 - Internal programming

The main feature of traditional Thai houses, and many houses within informal settlements, is a large, open mixed-use space that is divided through level changes rather than internal partitions (Panitchapkd, 2008) (see Figure 210). It was intended from the outset that the Process+Product unit would embody the same design feature. However, a more accurate understanding of housing needs was required to provide enough adequate space and opportunity for inhabitants to live comfortably. A series of moveable floor panels was proposed, allowing the inhabitants to constantly modify their internal space, providing options for storage, social gathering, sleeping, cooking, laundry and prayer (see Figure 211, 212). This 'looseness', in regards to the floor levels within the house, and in composition, with adaptable sliding wall panels, results in a playful building, one that is a clear reflection of the owner's specific living style.

Despite this 'unprogrammed' layout, some areas have been carefully considered for cultural and traditional

reasons. Discussions with local Thai identified several key considerations when designing the internal layout of a Thai house: the prayer space is the most important area of the house, it needs to be at the highest point; the bathroom cannot be beside the prayer area as this is considered culturally inappropriate, and must also be privately located away from the front of the house, and; the kitchen must be positioned outside or close to a large opening, as the strong smell associated with Thai cooking can pollute the house. These key areas are fixed in their location within the house (see Figure 213).

Figure 210. Site sketch of Trok Salakin house

Figure 211. Internal programming option

Figure 212. Internal programming option

1. PRAYER SPACE AT TOP OF BUILDING FOR PRIVACY, QUIET AND RELIGIOUS/CULTURAL REASONS
2. COOKING SPACE OUTDOORS OR IN AN AREA OF VENTILATION TO AVOID STRONG SMELLS
3. WET SPACE/BATHROOM LOCATED AT THE REAR AND CLOSED OFF FOR PRIVACY

Figure 213. Fixed programme areas within the Process+Product Unit

6.5.2 - External Programming

Thai life revolves around communal areas, where interaction promotes the transfer of knowledge (Panitchapadi, 2008) and helps build community spirit (see Appendix, A.18-A.25). The provision of a communal space below each housing unit allows for this interaction. Whether these spaces are used as workshop spaces or eateries, or for television watching, drinking or general conversation, a constant flow of community activity accentuates the positivity within (see Figure 214).

As individual units, the provided raised platforms could be considered rather

small, however, it is the orientation to ones neighbour and the 'collection' spaces between units that provide the greatest opportunities for activity. Several community formation options have been explored, each offering alternatives, in terms of the spaces between buildings and the potential use of the spaces (see Figure 215). With the addition of gardens or joint community ventures, such as weaving, the ground floor areas can be transformed into market spaces, not only providing cross-community interaction, but also providing a self-sustaining source of income for the community (see Figure 216).

Figure 214. Community cluster showing use of external spaces

Figure 215. Figure ground of potential community layout

■ 6.5.3 - *Safety/security*

For people who live in close proximity to one another, safety and security are serious issues, and the outlook of the housing unit is integral in addressing them. The permeability of the woven bamboo panels allows inhabitants to look out at the community (see Figure 199), and reverberations through the steel frames and wooden floors allows people

in the communal space below, or in other units, to be aware of activity within neighbouring houses. This constant awareness of one another's living patterns or location within the community helps alleviate the potential for theft or more serious crime, an issue that is prevalent in many informal settlements.

Due to a limited understanding of the low-income lifestyle in Thailand, the programming of the form and function of the building was directly influenced and critiqued by low-income groups in Bangkok. Critical feedback from these groups through every stage of the design has resulted in a building that fits the needs and requirements of the low-income strata of society, while challenging existing low-cost architectural styles.

Figure 216. *Process+Product community living*

Figure 217. Rooftops of the Process+Product community from the Sirat Expressway

Conclusion

Progression of Participation

A major issue with many informal settlements is the inhabitants' inability to look past their current situation, or what has already been done to try and improve their standard of living. Also, their absence of voice, a result of their status as second rate citizens, has a negative impact on their ability to lobby for support and make changes. Unfortunately, the efforts of NGO's, government organisations and the communities themselves, with their immediate focus on pragmatism, fall short on architectural quality. Current development architectural outputs are basic, uninteresting and unsuitable; essentially housing that fails to inspire belief. Process+Product reassesses low-income housing strategies, providing a positive architectural design that embodies community participation and growth, as well as a positive and thought-provoking architectural outcome, something low-income groups are in dire need of.

The outcome of this thesis is both a building and a social tool, a piece of architecture developed to manipulate and redefine a specific societal condition. The first chapter outlined the many conditions

specific to the needs of the low-income group, in relation to their living situations, be they slum, informal or tolerated settlements. The architecture developed addresses these issues at several levels, the individual, the collective/settlement and the city-macro level. It addresses the definition of "slum" conditions in a positive way, presenting a secure and high-quality housing unit that meets infrastructural and societal problems through community development and cooperation.

The views of Peter Kellett and Amos Rapoport are embodied in the development process, design, construction and maintenance, as well as the architecture itself. As an influential device, the house presents positive traits, highly relevant to the low-income sector -- sustenance and production, respectability and conventionality, individuality and status as well as independence, and, most importantly, achievement. As an outcome that embodies the choices, ideals, desires and needs of inhabitants, the Process+Product unit is seen as a design of the people, as much as a result of this researcher's line of investigation.

The level of inhabitant participation, and the sensitivity and appropriateness of the design, is part of what sets this architecture apart from current low-cost housing schemes. The methodologies employed, ethnographic observation and participation, questionnaires and model workshops, as well as rigorous critical design testing, has resulted in a housing unit that meets, contributes to and supports the complex needs and situation of the low-income group within Bangkok.

In addressing the current conditions of low-income communities, and acknowledging their traditional beliefs, crafts and construction techniques, and architectural styles, the design generates a contemporary vernacular architecture for a city and culture confused and suppressed in its architectural direction and ambition. The proposed design will not only provide a better quality of housing, but will also stimulate positivity and neighbourliness, thus identifying the potential for this scheme to be realistically implemented.

While this design has been tested in terms of its desirability and suitability for its proposed inhabitants, it has yet

to be reviewed, in monetary terms and with Bangkok's housing authorities. In addition, for the design to accurately reflect active community participation, the final architectural outcome, as presented above, would require physical testing with the proposed inhabitants. Verbal, even written and implied endorsement, are still not deemed adequate in designing for people with such distinct requirements. It is only through actual, successful habitation that projects such as this can be deemed a success.

Given the opportunity, this 'final' design would have been further tested with the proposed inhabitants in order to identify and address any areas of concern. Unfortunately, given the scale and scope of investigation, this was not possible. Instead, experts in the field of low-income housing critiqued the design at design reviews and development meetings. Their support, in regard to the legitimacy and consideration of the project, strengthened the belief that this housing solution could be successful if constructed.

Ideally, the next phase of the design research would be to construct the dwelling at a scale of 1:1, thus allowing

for a realistic understanding of the liveability, construction constraints and issues that could potentially arise if the project was to become a realistic solution to low-income housing concerns in developing countries.

The implemented phases of design all have individual merits, however, it was not until the cultural immersion stage that clarity in design direction was recognised. The input from the proposed inhabitants, as well as a thorough understanding of their culture, customs and requirements, informed the design in a way that would have been otherwise unobtainable. Therefore, it is clear that to design for a people with requirements foreign to the designer, their active participation must be pursued.

The knowledge and developmental systems presented in this thesis, and the accompanying research, offer an opportunity for further exploration of this architectural outcome. Designed as a site-ambiguous architecture, it has been proposed that this development programme can be initialised beyond the Bang Rak district, throughout Bangkok. In acknowledging this, the ambitions of the project have a wider

international scope. Thailand is not the only country that faces low-income housing issues. Much of Asia, the Middle East, Africa and South America face similar issues in relation to the housing conditions of the low-income groups. It is also acknowledged that this style of community-focused, participatory design could be implemented in developed countries where housing issues related to spatial allowance or affordability are common. Although this architecture has been designed with traditional Thai ideals in mind, the contemporary form of the dwelling, coupled with the adaptability of the steel frame, can allow for a multitude of design solutions. The modular fabrication and application of the floors, walls and roofs can be modified to better suit the vernacular of specific design locales. It has been mentioned that this design is a catalyst for low-income housing solutions within Bangkok, but with further development, and ambition, the architecture generated through this line of research can become a solution to housing issues throughout the world.

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Archer, D. (2012). *Baan Mankong participatory slum upgrading in Bangkok, Thailand: Community perceptions of outcomes and security of tenure. Habitat International*, 36(1), 178–184.

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Ban, S. (1995). *Paper Loghouse* [photograph]. Retieved January 8, 2014, from <http://a396.idata.over-blog.com/3/76/91/76/BANQUE-IMAGES/espace/BAN-Shigeru/BAN-paper-loghouse-02.jpg>

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TYIN Tegnestue Architects. (2011). [Untitled photograph of the Community Lantern construction]. Retrieved January 8, 2014, from <http://www.dezeen.com/2012/03/18/klong-toey-community-lantern-bytyin-tegnestue/>

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Appendix

MICRO-SCALE DESIGN INTENSIVE

The following design intensive is to be completed within the shortest amount of time (10-60 minutes). Accuracy and legitimacy of design, in terms of function and form are irrelevant. This exercise is to help you quickly engage with design and generate thought provoking and “off-the-cuff”, iterations that can quickly influence and accelerate the design process.

Form – The form given is indicative of the actual form, feel free to manipulate, alter or eradicate any portion of the given form.

Internal programme – Try to design within the assigned scope, however, if you see the opportunity to expand on the proposed functions then feel free to do so.

Scope – keep in mind the micro-scale of the dwelling, be experimental with design and forget building conventions such as stair treads and ceiling heights.

Factors to consider for design:

1. Inhabitation for 4-12 people
2. Age of target inhabitants 15-30 years
3. Five key spaces to be considered –
 - a. Living/communal area
 - b. Sleeping
 - c. Kitchen
 - d. Wet/bathing area
 - e. Garden
4. Utilisation of space

Below is an example of how to utilise micro-space, using a similar form as to the one you have been given. This design was completed in a morning so keep in mind the shorter time frame you have been given.

A.1 – Micro scale design intensive brief

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Email Allison.kirkman@vuw.ac.nz

MEMORANDUM

TO	Samuel Brown
COPY TO	Shenuka de Sylva
FROM	Dr Allison Kirkman, Convener, Human Ethics Committee
DATE	17 June 2013
PAGES	1
SUBJECT	Ethics Approval: 19952 'Closing the Gap' - Safe and Secure Housing For Rural Migrant Youth in Bangkok, Thailand

Thank you for your application for ethical approval, which has now been considered by the Standing Committee of the Human Ethics Committee.

Your application has been approved from the above date and this approval continues until 18 February 2014. If your data collection is not completed by this date you should apply to the Human Ethics Committee for an extension to this approval.

Best wishes with the research.

Allison Kirkman
Human Ethics Committee

A.2 – Ethical Approval

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CONSENT TO PARTICIPATE IN RESEARCH

Samuel Brown – Master’s Thesis in Architecture

Closing the Gap - target design group research in Bangkok, Thailand

I have been given and have understood an explanation of this research project. I have had an opportunity to ask questions and have them answered to my satisfaction. I understand that I may withdraw myself (or any information I have provided) from this project (by the 27th of June, 2013) without having to give reason.

I understand that any information I provide will be kept confidential to the researcher, the supervisor and the translator who assists with our questionnaire.

I understand the published results will not use my name, and that no opinions will be attributed to me in any way that will identify me.

I understand that any form of identification will be removed from photographs.

I understand that the questionnaire sheets and photographs will only be accessible through the published thesis.

I understand that no audiotapes will be made of the research.

- ☐ I consent to photos to be taken of model iterations
- ☐ I agree to take part in this research
- ☐ I agree that any drawings I produce can be used to inform architectural design

Signed: _____ Date: _____
Name of participant
(Please print clearly) _____

A.3 – Research Consent form (english)

SCHOOL OF ARCHITECTURE Te Kura Waihanga
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แบบฟอร์มยินยอมเข้าร่วมในงานวิจัย

แซมเบรียล บราวน์ - วิทยานิพนธ์ (ปริญญาโท) - ภาควิชาสถาปัตยกรรม

ข้าพเจ้าได้ทำความเข้าใจในรายละเอียดและจุดประสงค์ของงานวิจัยนี้โดยได้มีโอกาสพูดคุยและสอบถามรายละเอียดเป็นที่เรียบร้อย
ข้าพเจ้ารับทราบว่าข้าพเจ้าสามารถที่จะถอนตัวหรือข้อมูลที่ได้นำไว้ออกจากงานวิจัยนี้โดยไม่ต้องให้เหตุผลหรือมีส่วนรับผิดชอบใดๆทั้งสิ้น หากแต่ต้องดำเนินการก่อนที่การเก็บและวิเคราะห์ข้อมูลจะเป็นที่สิ้นสุด

ข้าพเจ้ารับทราบว่าผู้ที่มีส่วนเกี่ยวข้องในการทำงานวิจัยนี้ซึ่งรวมถึง นักวิจัยงาน ผู้ดูแลงาน และผู้ทำการแปลภาษาสำหรับแบบฟอร์มการสอบถามเท่านั้นที่จะสามารถเข้าถึงข้อมูลที่ข้าพเจ้าให้โดยที่ข้อมูลเหล่านั้นจะไม่ถูกเปิดเผยต่อสาธารณะชนโดยเด็ดขาด

ข้าพเจ้ารับทราบว่าการศึกษาตีพิมพ์และเผยแพร่ต่อสาธารณะชนของข้อมูลที่ข้าพเจ้าให้นั้นจะไม่สามารถถูกเชื่อมโยงมายังตัวของข้าพเจ้าได้แต่อย่างใด

ข้าพเจ้ารับทราบว่าข้อมูลที่สามารถแสดงถึงตัวตนของข้าพเจ้าในทุกรูปแบบจะไม่ถูกเผยแพร่

ข้าพเจ้ารับทราบว่าแบบฟอร์มการสอบถามและภาพถ่ายจะสามารถถูกเข้าถึงได้เฉพาะในวิทยานิพนธ์เล่มที่ตีพิมพ์แล้วเท่านั้น

- ☐ ข้าพเจ้ายินยอมมอบสิทธิของข้าพเจ้าให้แก่ช่างภาพที่จะทำการถ่ายภาพที่พิกอาศัยของข้าพเจ้า
- ☐ ข้าพเจ้ายินยอมที่จะมีส่วนร่วมในงานวิจัยนี้
- ☐ ข้าพเจ้ายินยอมให้ภาพถ่ายที่ข้าพเจ้าได้ทำขึ้นถูกนำไปใช้เพื่อแนะนำสถานปึกเพื่อที่จะอ้างอิงหรือวาดแปลนต่อไป

เซ็นชื่อ: _____ ชื่อ: _____

วันที่ (ว/ด/ป): _____

A.4 – Research Consent form (thai)

แบบสอบถามกลุ่มตัวอย่าง (Target Design Group Questionnaire)

งานวิจัยนี้ดำเนินการโดยความยินยอมของผู้เข้าร่วมตอบแบบสอบถามเป็นลายลักษณ์อักษร
(To be conducted with the written consent of the participant)

วันที่ (Date):

สถานที่ (Location):

การตอบรับของผู้เข้าร่วมตอบแบบสอบถาม (Participant Response)

กรุณาตอบคำถาม ทำเครื่องหมายถูกต้อง หรือ วงกลม คำตอบที่ถูกต้องมากที่สุด
(คุณสามารถวงกลมมากกว่าหนึ่ง) - Please comment on, tick or circle as many questions as you wish

ชื่อ (Name):

อายุ (Age):

อาชีพ (Occupation):

1. คุณมาจากภาคไหนของประเทศไทย? (What region of Thailand are you from?)

2. ปัจจุบันคุณพักอาศัยอยู่ที่ไหน? (Where do you currently live?)

3. คุณอยู่ที่นั่นมานานเท่าไร? (How long have you lived there?)

4. คุณอาศัยอยู่ที่ไหนก่อนจะย้ายมาอยู่ที่นี่? (Where did you live before you moved?)

5. ทำไมคุณถึงย้าย? (Why did you move?)

- a. กังวลเกี่ยวกับอาชญากรรม (Concern about Crime/criminal activity)
- b. กังวลเกี่ยวกับคุณภาพน้ำ (Concern about Water quality)
- c. ต้องการที่พักอาศัยที่ใหญ่กว่าและสะดวกกว่า (Desire for a Bigger/better dwelling)
- d. ใกล้ที่ทำงาน (Closer to job/work opportunities)
- e. อื่นๆ (Other)

6. อะไรคือปัจจัยที่มีคุณภาพดีที่สุดในที่ที่คุณอยู่ปัจจุบัน? (What are the best qualities of where you currently live?)

7. อะไรคือปัจจัยที่มีคุณภาพแย่ที่สุดในที่ที่คุณอยู่ปัจจุบัน? (What are the worst qualities of where you live?)

8. คุณมีทางเลือกเกี่ยวกับที่อยู่อาศัยหรือไม่? (Is there another option of housing for you?)

- a. มี (Yes)
 - i. คืออะไร? (What is it?)
 - ii. ทำไมไม่เลือก? (Why have you not accepted it?)

b. ไม่มี (No)

9. มีคนพักอาศัยอยู่กับคุณกี่คน? (How many people live with you?)

10. กลุ่มคนที่คุณพักอยู่ด้วยกันคือ: (Are the people that live with you:)

- a. ครอบครัว (Family)
- b. เพื่อน (Friends)
- c. อื่นๆ (Others)

11. คุณนอนห้องร่วมกับคนอื่นหรือไม่? (Do you share a bedroom?)

- a. ใช่ (Yes)
 - i. ถ้ามี, มีกี่คน? (If so, with how many people?)

- b. ไม่ (No)

12. ห้องครัวของคุณใช้เป็นแบบ: (Are your cooking/cleaning areas:)

- a. ส่วนรวม (Public)
- b. ส่วนตัว (Private)

13. ห้องน้ำของคุณใช้เป็นแบบ: (Are your bathing areas:)

- a. ส่วนรวม (Public)
- b. ส่วนตัว (Private)

14. คุณชอบอะไรมากกว่าระหว่างห้องครัวแบบ: (Do you prefer the cooking/cleaning areas to be:)

- a. ที่อยู่ในตัวบ้าน (Indoors)
- b. ที่แยกออกมาจากตัวบ้าน (Outdoors)

15. คุณชอบอะไรมากกว่าระหว่างห้องน้ำแบบ: (Do you prefer the bathing areas to be:)

- a. ที่อยู่ในตัวบ้าน (Indoors)
- b. ที่แยกออกมาจากตัวบ้าน (Outdoors)

16. ถ้าคุณสามารถย้ายไปอยู่ในบ้านที่ดีกว่า คุณจะย้ายหรือไม่? (If you could live in a better house would you move location?)

- a. ย้าย (Yes)
- b. ไม่ย้าย (No)
 - i. ถ้าไม่ย้าย ทำไมคุณถึงคิดว่าจะไม่ย้าย? (Why do you wish to stay?)

17. คุณอยากอยู่ใกล้ที่ทำงานหรือไม่? (Would you like to live closer to your job?)

- a. อยาก (Yes)
- b. ไม่อยาก (No)

18. ที่อยู่อาศัยของคุณเป็นชุมชนหรือไม่? (Is there a sense of community where you live?)
- a. ใช่ (Yes)
 - i. ถ้าใช่ คุณชอบหรือไม่? (If so, do you like this?)

 - b. ไม่ใช่ (No)
 - i. ถ้าไม่ใช่ คุณชอบหรือไม่? (If so, do you like this?)

19. คุณพักอาศัยในกรุงเทพฯอย่างถาวรหรือไม่? (Do you live permanently in Bangkok?)
- a. ใช่ (Yes)

 - b. ไม่ใช่ (No)
 - i. คุณไปไหนถ้าไม่อยู่ในกรุงเทพฯ (Where do you go when you are not in Bangkok?)

20. คุณย้ายบ้านบ่อยหรือไม่? (Do you move dwellings often?)
- a. บ่อย (Yes)
 - i. ทำไมถึงย้าย? (Why do you move?)

 - b. ไม่บ่อย (No)

21. ถ้าเป็นไปได้ คุณอยากปลูกผักในบริเวณที่พักอาศัยของคุณหรือไม่? (If possible would you like the opportunity to grow your own produce close to where you live?)
- a. อยาก (Yes)

 - b. ไม่อยาก (No)

22. ถ้าเป็นไปได้ คุณอยากปลูกผักในบ้านของคุณหรือไม่? (If possible would you like the opportunity to grow your own produce in your own house?)
- a. อยาก (Yes)

 - b. ไม่อยาก (No)

23. อะไรคือปัญหาใหญ่ที่คุณต้องเผชิญในที่ที่คุณอยู่ ณ ปัจจุบัน? (What is the biggest problem faced where you live today?)
- a. คุณภาพน้ำ (Water quality)
 - i. ดื่ม/อาหาร (Drinking/Cooking)
 - ii. ซัก/ล้าง (Washing/Bathing)
 - b. อาชญากรรม/ความปลอดภัย (Crime/Security)
 - i. ยาเสพติด (Drugs)
 - ii. การลอบทำร้าย (Assault)
 - iii. โจร (Theft)
 - c. ขนาดของที่อยู่อาศัย (Dwelling size)
 - d. แมลงรบกวนและยุง (Pests and mosquitos)
 - e. ค่าเช่าและค่าดูแลรักษา (Cost of rent/maintenance)
 - f. ระยะทางจากที่ทำงาน (Distance from work)

24. บริเวณใดสำคัญที่สุดของบ้านคุณ? (What is the most important area of your house?)
- a. ห้องนอน (Bedroom)
 - b. ห้องน้ำ (Bathroom)
 - c. ห้องนั่งเล่น (Living/social area)
 - d. ห้องครัว (Cooking area)
 - e. อื่นๆ (Other)
25. พื้นที่สวดมนต์มีความสำคัญแค่ไหนในอยู่ของคุณ? (How important is a space in your dwelling for religious practice?)
26. ลักษณะใดของบ้านไทยโบราณมีความสำคัญต่อคุณ? (What aspects of traditional Thai housing are important to you?)
27. คุณมีข้อเสนอแนะอะไรที่คุณอยากให้เกี่ยวกับบ้าน? (Is there any advice or recommendations that you would like to give about housing?)

28. วาดรูปที่พักอาศัยของคุณ (จะวาดหรือไม่ก็ได้) (If you wish could you please draw a picture of your current dwelling?)

Is there another option of housing for you?

Why did you move?

Are your bathing areas?

A.13 - Questionnaire results

Do you prefer the bathing areas to be?

What is the biggest problem faced where you live today?

Would you like to live closer to your job?

A.14 - Questionnaire results

Is there a sense of community where you live?

If possible would you like the opportunity to grow produce where you live?

If possible would you like the opportunity to grow produce close to where you live?

A.15 - Questionnaire results

Do you live permanently in Bangkok?

Are the people that live with you?

If you could live in a better house would you move location?

A.16 - Questionnaire results

A.17 - Questionnaire results

A.18 (top) - Current example of rural community layout - Semi structured

A.19 (bottom) - Traditional example of rural community layout - Un-structured

Community driven external programming

Community driven external programming

A.20 (top) - *Soi Sri Nam Ngern community, Bangkok - Semi-structured*

A.21 (bottom) - *Ban Mananghasila community, Bangkok - Un-structured*

Government driven external programming

NGO driven external programming

A.22 (top) - *New Town community project, Thailand - Structured*

A.23 (bottom) - *Baan Mankong Project, Bangkok - Structured*

Student driven external programming

Student driven external programming

A.24 (top) - *Klong Toey community, Bangkok - Hybrid*

A.25 (bottom) - *Pupoh community, Bangkok - Structured*