III Encontro da Associação Nacional de Pesquisa e Pós-graduação em Arquitetura e Urbanismo
arquitetura, cidade e projeto: uma construção coletiva
São Paulo, 2014

EIXO TEMÁTICO:

( ) Ambiente e Sustentabilidade ( ) Crítica, Documentação e Reflexão ( ) Espaço Público e Cidadania
(X) Habitação e Direito à Cidade ( ) Infraestrutura e Mobilidade ( ) Novos processos e novas tecnologias
( ) Patrimônio, Cultura e Identidade

Housing as Infrastructure

Habitação como Infraestrutura

Vivienda como Infraestructura

MEDINA, Diana S. B. (1)

(1) Master in Architecture, The Architectural Association (AA), Housing & Urbanism, London, United Kingdom; email: sanroman-baeta-m@aaschool.ac.uk

This work has been adapted from its original format to be published by the III ENANPARQ. To see the full research please contact the author

Housing as Infrastructure

Habitação como Infraestrutura

Vivienda como Infraestructura

ABSTRACT
This study starts from the assumption that questions related to mobility issues are essential to the understanding of contemporary urban development. Decisions and impacts surrounding the theme reflect political, economic and social realities.
This research explores the requalification of productive spaces by testing new potentials for infrastructure. Having identified mobility infrastructure as a way forward, this work aims to reposition it as a key element of social and economic progress, while also addressing its physical realities.
Using key design tools, the projects addresses the question of housing as a tool of infrastructure, while embracing the difficulty of merging new urban fabric with older industries by exploiting existing conditions. Each intervention is contextual and attempts to elaborate on existing morphologies.
With Bangkok as a testing ground, the **[morphological interventions]** occur in residential contexts and target the water as a key mobility system. While developing new urban housing systems, it also reclaims the water's navigability through them, by stitching existing networks back into land-based mobility systems. These interventions seek to maintain the inherent productive capacity of the area and be deeply embedded in Thai cultural practices.
KEY-WORDS: infrastructure, housing, morphology, mobility

RESUMO
Este estudo parte do pressuposto de que questões relacionadas à mobilidade são essenciais ao entendimento do desenvolvimento urbano contemporâneo. Decisões e impactos que cercam o tema refletem realidades políticas, econômicas e sociais. Explora-se a requalificação de espaços produtivos testando novos potenciais para a infraestrutura. Ao identificar infraestrutura de mobilidade como tema de pesquisa, o objetivo é a sua adaptação como elemento estratégico de mudança social e econômica, enquanto busca-se opções para a sua realidade física.
Os projetos tratam de questões de habitação social como ferramenta de infraestrutura, explorando condições existentes através das dificuldades em se incorporar o novo tecido urbano com antigas indústrias. Cada intervenção é contextual e elabora-se sobre a morfologia existente.
*As **[intervenções morfológicas]** usam Bangkok como área de teste; ocorrem em contextos residenciais e focam recuperar a água como principal sistema chave de mobilidade. Ao se desenvolver novos tipos de habitações sociais, propõe-se a reativação da navegabilidade da água através das mesmas, ligando as redes existentes aos meios de mobilidade terrestres. Busca-se manter a capacidade produtiva própria das áreas e inerente às práticas culturais tailandesas.*
***PALAVRAS-CHAVE**: infraestrutura, habitação, morfologia, mobilidade*

RESUMEN
Este estudio asume que interrogantes asociadas a temas de movilidad son básicas para entender el desarrollo urbano contemporáneo. Las decisiones y secuelas al respecto reflejan realidades políticas, económicas y sociales. Se explora renovar espacios productivos probando nuevos potenciales para infraestructura. Habiendo identificado la infraestructura para la movilidad como la manera a proceder, el objetivo es cambiar su posición como elemento vital de progreso social y económico, y a la vez hacer frente a sus realidades físicas.
Con herramientas claves de diseño, se aborda el tema de vivienda como un instrumento de infraestructura, acogiendo la dificultad de incorporar nuevo tejido urbano con las antiguas industrias mediante la explotación de las condiciones existentes. Cada intervención es contextual e intenta emplear

la morfología existente.
*En Bangkok, las **[intervenciones morfológicas]** ocurren en contextos residenciales y se enfocan en el agua como sistema de movilidad clave. Al desarrollar nuevos sistemas de vivienda urbana, se recupera navegabilidad a través de éstos por medio de la costura de redes existentes a los sistemas de movilidad terrestres. Se procura mantener la capacidad de producción inherente de la zona y arraigarse en las prácticas culturales tailandesas.*
***PALABRAS-CLAVE:** infraestructura, vivienda, morfología, movilidad*

1 INTRODUCTION

In 2013, UN-Habitat published 'Planning and Design for Sustainable Urban Mobility', a paper that offers a strategic vision for urban mobility, which involves economic, political and social arrangements. A view that does not limit mobility to the physical ability of connecting A to B. According to the document: "Mobility flows have become a key dynamic of urbanization, with the associated infrastructure invariably constituting the backbone of urban form." (UN-Habitat, 2013. p.01)

> Sustainable mobility extends beyond technicalities of increasing speed and improving the effectiveness and efficiency of transport systems […]. It suggests that the prevailing challenges of urban mobility are consequences of the preoccupation with the means of mobility rather than its end – which is the realization of accessibility. (UN-Habitat, 2013. p.01)

On the issue of accessibility as a reason for mobility, it establishes that while promoting accessibility, human and spatial dimensions arise in the first picture[1].

> It establishes a link between urban form (in terms of shape, structure, function as well as demographics) and urban transportation systems. Particular attention is given to the urban form's potential to support the increased proximity of places and functions, thus minimizing the need for extended movement. […]
>
> The accessibility focus for sustainable mobility also entails paying due consideration to the built form of the city, particularly the optimization of urban density and the fostering of a sense of place. The combination of high-density settlements, strong sense of place and mixed-used functions not only minimize the need for extended movement, but also enhance economies of agglomeration and encourage non-motorized mobility. (UN-Habitat, 2013.P.02)
>
> Recognizing mobility as an entitlement – i.e. to access destinations, functions or services – implies a focus on people, and underscores the need to pay attention to the obstacles that prevent them from reaching destinations. Consequently, mobility is not only a matter of developing transport infrastructure and services, but also of overcoming the social, economic, political and physical constraints to movement. (UN-Habitat, 2013.P.03)

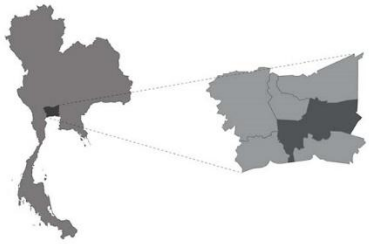
Taking into account the UN-Habitat document, this research agrees that mobility infrastructure is a system of relationships of different actors; but disagrees with its description of how to reach it. Inclusive urban design for mobility infrastructure is not based on definitions of land use and occupation, but instead, is the outcome of **an understanding of local needs and realities**, where accessibility can take different shapes. Therefore, it is not about creating a general definition of what is understood as a pure optimization of productivity, but the promotion of a productive territory, without a pre-set formula. In this sense, the debate that this document seeks to draw goes from social, economic and political strategies not as a purely sectorial and/or static diagram. It is about conceiving strategic spaces which functionality responds to local and immediate needs, whilst encompassing urban territories for sustainable growth.

[1] UN-Habitat, 2013. P.02

2 URBAN MORPHOLOGY

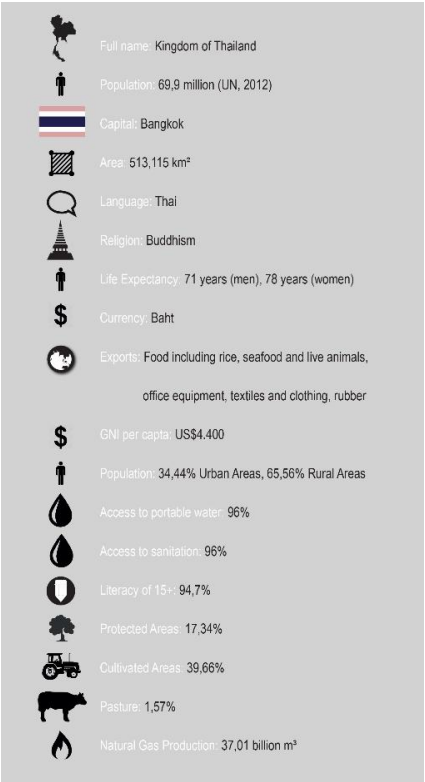
In a scenario of contradictions, morphological studies on urban development explain spatial hyper-realities, and further the understanding of decision making processes. A megacity perpetually in flux and hyperphysical in its climate, much like others in the developing world, faces major problems in managing its growth and urban infrastructure. Bangkok, capital of the Kingdom of Thailand, home of to 7.5 million inhabitants[2] lies on the banks of Chao Phraya River. Without any significant influence of urban planning, it has expanded. Instead, the drivers have been accessibility [public sector] and land development [private sector]. It is thus commercialized to a degree that is extreme even by comparison with other mega cities.

Figure 3: Thailand – Bangkok's Metropolitan Region



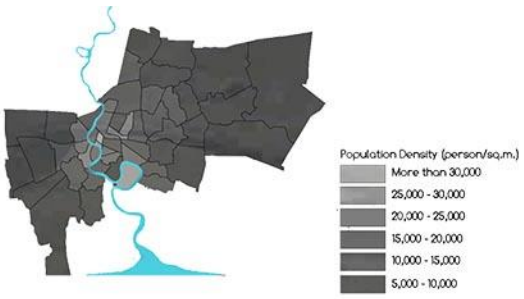
Font: Diana S B Medina, 2014.

Figure 2: Bangkok's Profile



Font: Diana S B Medina from IBGE@ Countries, Thailand, 2014.

Figure 1: Bangkok Metropolitan Region Population's Density



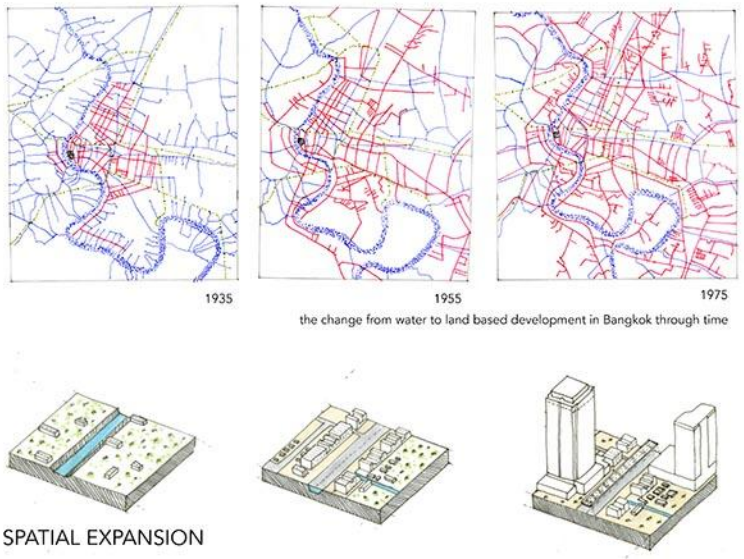
Font: Nitisha Popat, 2014.

[2] Eyewitness Travel, 2012. p.72.

Bangkok's current conditions are a portrait of its historic development. More than just a matter of reference, history, culture, society and economy are the key 'actors' responsible for the current picture[3]. While the city's growth in the international commodity economy, many of its people lived by supplying the domestic demands of urban dwellers. There is a multiplicity of livelihoods sustained by the various social and economic subsystems of the city[4]. If life and livelihood are both pursued at the household level, its needs to commute are the informal movement of the city.

URBAN EXPANSION

Figure 4: Spatial Expansion of mobility systems



Font: Nitisha Popat, 2013.

While in 1860's mobility infrastructure dominated the city's view, concurrently by water and land investments; by 1890's "road construction in the capital accelerated." (ASKEW, Marc, 2002. p.31). In Bangkok land ownership gives the owner the right from 'hell to heaven'. Because of that, by the time of the kingdom's modernization, the free land for transport investment was the already existing mobility paths. This led to a superimposition of paths, and the beginnings of the multi-layered current landscape.

There was a slow process of urbanization after that, and around 1960s Bangkok had another leap of urban growth, with post-war investments. At this time, the city was already mainly relying on the road system, "a large number of both minor and major canals had already been filled in and roads constructed in their place" (ASKEW, Marc, 2002. p.54), leaving the canal-based infrastructure to rot.

Nowadays, "the city of traditional experience has arguably been sacrificed to an abstraction of macro-economic planning." (BELL, B., 2003, p.11) Global investments such as the shift of the port activities, road links between neighbouring countries, increase airport activity, etc., cut the city topographically; whereas the old Bangkok can still be seen over the ground level and

[3] ASKEW, Marc, 2002. p.15.
[4] ASKEW, Marc, 2002. p.41.

far from the city centre. The maintenance of the 'traditional' urban morphology that was superimposed by new investments on fast modes of transportation, such as BTS and MRT, happens mainly due to the peculiar urban layout of the canal system and the Soi system.[5]

Figure 5: Sukhumvit Road Crossing

Font: Diana S B Medina, 2013.

Figure 6: Expressways crossing over existing lake

Font: Barry Bell, 2003.

THE *SOI* SYSTEM

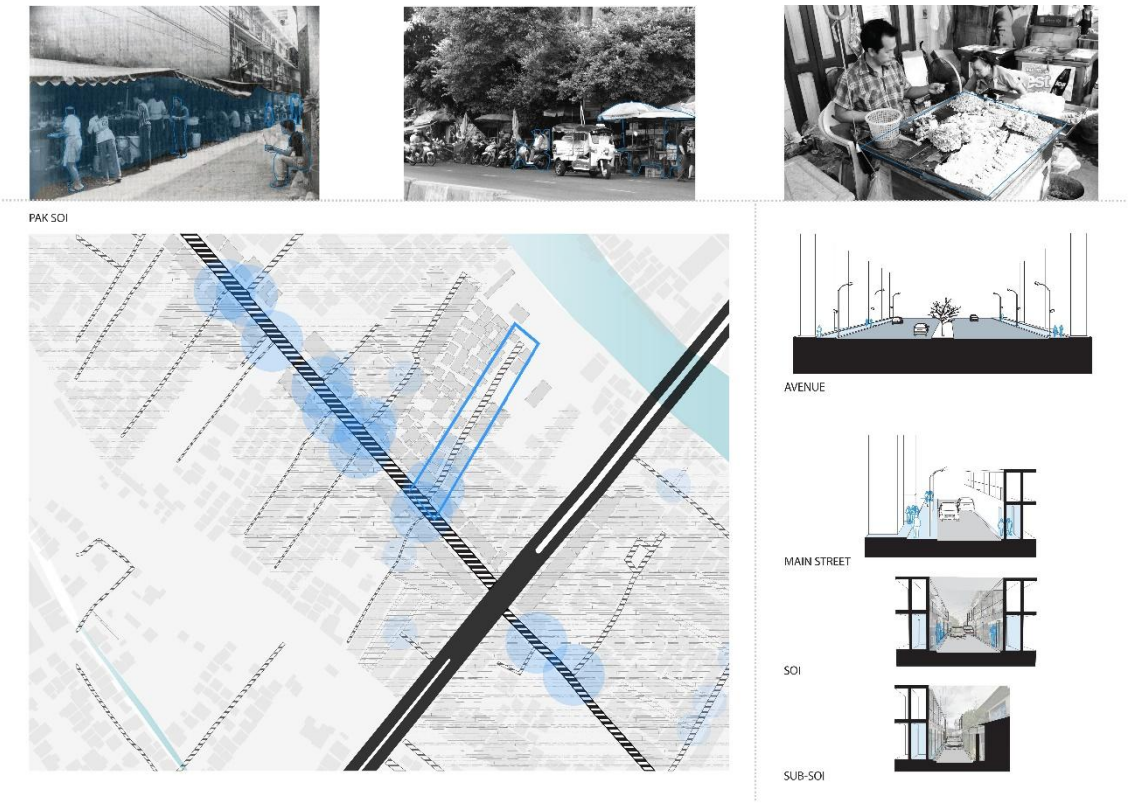
The *Soi* system – a specific morphological characteristic of Bangkok – is a sequence of paths, whose shape resembles a fishbone spine. Shaped by historic development, *Sois* hold the soul of the informal subsystems of the city.

In the early period of urbanization, the land at the water's banks were occupied by agricultural and rural production, or abandoned, as its ownership was dubious or belonging to the nation. Its first occupations were made by poor and informal dwellings. Concomitantly, it was installed the road system, which would make the transition between water to land networks; and the new ways were established equidistant and parallel to the existing canals.

Soi is a "small street branching off a main road" (ALLISON, 1978. p.223). The system brought densification and was the second stage of the road system's deployment. It is a sequence of parallel paths usually disconnected with each other, dependent on the main streets, with dead-ends towards the canals. While the main streets present six, or more lanes "broad, straight, well-constructed and well-lit and drained" (COHEN, Erik, 1981. p.3), "*sois* are generally much narrower, at most two or three lanes wide, and often irregular and poorly constructed, lit and drained." (COHEN, Erik, 1981. p.3). They are generally "short and quiet, less dense and functionally homogeneous, mainly residential" (COHEN, Erik, 1981. p.3) areas.

[5] "It was much easier for governments to promote these large and expensive road projects than to tackle the inadequacy of land-use planning and the sovereignty of property speculation which lay at the heart of Bangkok's traffic and infrastructure problems." (ASKEW, Marc, 2002, p.84)

Figure 7: Soi System



Font: Marc Askew, 2002; Diana S B Medina, 2013.

As an addition to the system's elements, there are the *Sub-Sois*. They are paths dependent on the *Sois* that also followed its design parameters – dead-ends and parallel to each other – and are closer to the canals. "The *sub-sois* tend to be more purely residential, although they may harbour some workshops, small factories and other businesses, which are not dependent on the immediate access to passing pedestrians and vehicles." (COHEN, Erik, 1981. p.4)

The system clearly divides the territory by period of urbanization, among rural, semi-urban, pre-urban and mature urbanity[6]. The first was the rural one; the semi-urban one arose with the influx of immigrants from the Second World War, when *Sois* housed this population[7]. The new residents worked in the vicinities or in the *Soi* itself, and a large number of products and services were consumed by local inhabitants[8]. The pre-urban one had its greatest impact in the 70s and 80s, when the *Soi* became a mature stage of urban development. Precarious and temporary houses were substituted by other means of formal construction, and shophouses dominated the most connected points[9]. The last stage, which spread in 1984, changed the appearance and function of the *Sois*[10], and precisely defined each of its parts following the demands of the real estate market.

Nowadays, with the housing market booming, it is easy to see the difference in scale between

[6] COHEN, Erik, 1981. p.6.
[7] COHEN, Erik, 1981. p.7.
[8] COHEN, Erik, 1981. p.11.
[9] Ibid.
[10] COHEN, Erik, 1981. p.18.

each of the parts of its composition. *Sois* still play the role of secondary or tertiary paths, maintain a pattern of narrow streets poorly built, and continue with its economic activities on the joints with main streets – known as *Pak Soi*. *Sub-Sois*, when not resulting in dead-ends, give origin to *sub-sub-sois*, and are home to a large number of housing projects.

This system is part of the urban development of the whole city and represents a local trend of decision making towards infrastructure. The option of urbanizing the areas on the edge of the roads, while leaving the edge of the canals as last stages of urbanization, is the strongest physical outcome of the shift between water to land city. The fact that its implementation follows no regular project or strategy also reflects the ways in which mobility is physically implemented in Bangkok.

NAGA: WATER CITY

> From what has been said, it can be seen that the intellectual conditioning of the water-based civilization arose from an environment of flux and flow, constantly requiring great flexibility and relentless adaptability. (JUMSAI, Sumet, 1998. p.72)

Professor Sumet Jumsai wrote a book to address all the cultural, religious, social meanings and symbols that water has over Thai culture. Apart from the current coexistence between water and land-based mobility systems, there was a shift, especially in investments from one to another. That shift, more than purely economic, means a change of character in the Thai society.

From the first inhabitants of Southeast Asia, aquatic communities were formed. *Naga*, one of the symbols of water-based life, is present in all royal and popular ceremonials, and represents the nation's prosperity. Traditionally, the relationship between people and water was so intense that it was believed that their boats had soul, and events related to tides and agricultural productions were attributed to the Gods[11].

The first traces of life in the region are of stilt houses. Practical for their ability to aggregate mobility with living, they were the pillars of the Thai civilization. After that, once the civilization started exploring the land, came the rock houses representing the land-based civilization. In the modern times, the majority of settlements became amphibious civilizations.[12]

From the modern urban expansion briefly mentioned before, it is important to reinforce the fact that Bangkok began as a water-based city. The society that valued water modes of transportation left its cultural roots behind. From this time, what used to be a city in the water banks became left houses and empty spaces; and many slums and informal housing settlements occupied these spaces for its lack of construction potential[13].

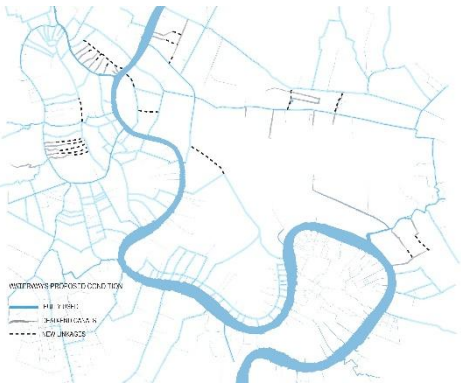
CLAIMING THE WATER

Water has been the core of Thai society since its creation; but with the modernization process,

[11] JUMSAI, Sumet, 1998. p.52.
[12] "Known as Bang Li, […] it owes its particular character to two built levels: wooden shops and markets all have upper malls which are linked together, as well as arcades on the ground level. During the dry season, cars roam about the streets and the scene is like any other town in the region. As the flood season approaches, the inhabitants make preparations. Suddenly, […] they all move their belongings and goods on to the second level, and invariably the flood arrives soon after. Cars disappear discreetly overnight giving way to a tumultuous boat traffic as business continues as usual." (JUMSAI, Sumet, 1998. p.156)
[13] ASKEW, Marc, 2002, p.60.

the urban knowledge gained through thousands of years was left behind and its values inverted. The issues of flooding are just one of the outcomes of this inversion, and like others, its answer lies in a reality-based urban design that holds cohesion and contemporaneity. Instead of fighting against floods, road traffic and so on, it is time for the city to turn their eyes back to the existing possibilities of water.

Figure 8: Waterways Proposed Conditions



Font: Diana S B Medina, 2014.

Figure 9: Between Water and Land Systems

Font: Diana S B Medina, 2013.

The identification of forgotten potentials of water is the primary condition of negotiation. Apart from the Chao Phraya River and its heavy transit, Bangkok has a sequence of canals that:

- present the dead-end structure like the *soi* system;
- are linked with the system but are physically blocked, partially covered or with some barrier;
- lie in a strategic location but are underutilized;
- are fully used.

Some of these routes have acquabuses and touristic boats, but they are far from their maximum potential.

The core idea of this research is to enact key points of the city to articulate and regain the water as a full-system of mobility. Water-based systems should be combined with land-based ones, where dead-ends and underutilized canals have the potential to form a connected loop, giving mobility another layer of opportunity of reestablishment.

3 SHARED PLATTERS

Erik Cohen defined as interstitial spaces the areas between canals and road systems that were slowly urbanized[14]. As explained over the *Soi* diagram, Bangkok used to have a significant ratio of land unoccupied or with rural and agricultural productions. With the deployment of *Sois* and *Sub-sois*, this piece of land became smaller, sometimes even extinct as in some central areas. This work considers these spaces that do not form blocks, where property's ownership is

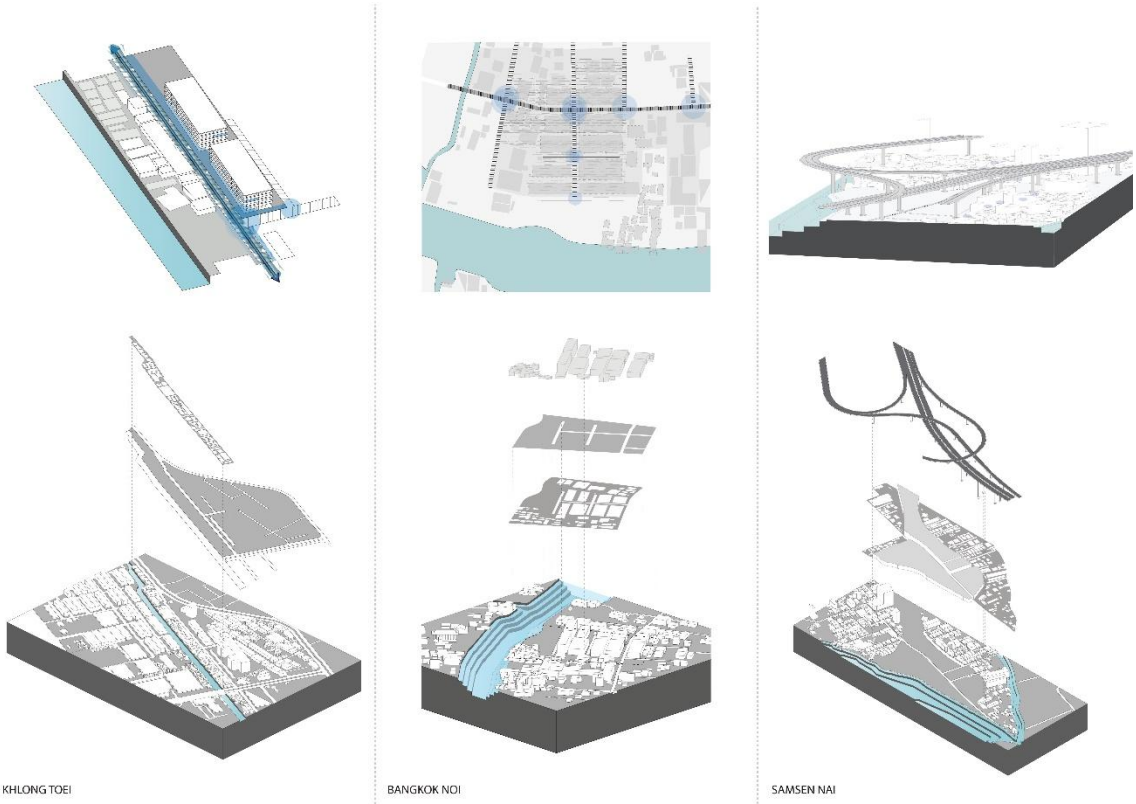
[14] COHEN, Erik, 1981. p.2.

usually undefined and represent the last stage of the urbanization process; as a fundamental part of an urban design that intends to reactivate the water mobility, while increasing the efficiency of the road network.

These spaces between canals and the end of the *Sois* are special for the maintenance of the city's life while informally bringing people together, for social and economic interaction. They exist, but they are not given a name or shape; therefore, they are not public spaces, nor common spaces. They will be called here **Shared Platters**[15].

The Shared Platters are a byproduct of the architecture of Bangkok, and starting by its design is a strategy for thinking small spaces that form part of the metabolism of the existing city. The question is, with these spaces distributed throughout the city, how to create principles for new urban phenomena. Doing this while making a proposal for a single building may have a wider-effect. All these special spaces of Bangkok cannot be controlled, and they shouldn't; but identifying their existence and context is the basis for the housing proposals as mobility infrastructure[16].

Figure 10: Different Spatial Conditions and Types of Shared Platters



Font: Diana S B Medina & Sigen Palis, 2014.

[15] For the full explanation about the concept please look for the extended version of this thesis.
[16] Based on the ideas of KAIJIMA, M. & TSUKAMOTO, Y., 2006. p.85.

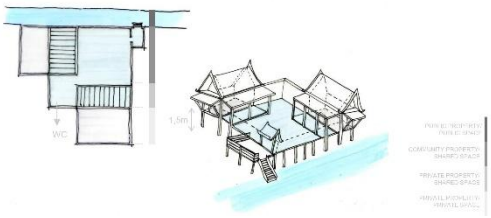
4 HOUSING

Although housing is a theme per se, here it is used as a tool to reach infrastructure. Therefore, there is an urge to understand its physical and political qualities in terms of what each proposition can deliver. Four types were selected to investigate: the traditional housing by the waterfront, the Baan Mankong Housing Programme, the Baan Eua-Arthorn Housing Programme and the common street houses. This publication won't go deep into street house types.

Traditional Thai houses are less and less visible on Bangkok's landscape. They have:

> Stilts and the typical space underneath the house for domestic activities as well as for storing the production, and during the flood season, for mooring boats;
>
> Extendable bay units, from one to six bays or more, and then doubling-up on the end elevation;
>
> High gable ends to provide room height for heat convection and long projecting eaves to protect the house from heavy tropical down pours;
>
> Diaphragm walls which slope inwards on all sides along with the structural member, permeable walls and floors for ventilation, especially in the kitchen;
>
> A large veranda or *chan-ban*, parts of which are under cover, averaging 60% of the total floor area.
>
> (JUMSAI, Sumet, 1998. p.87)

Figure 12: Traditional House Distribution

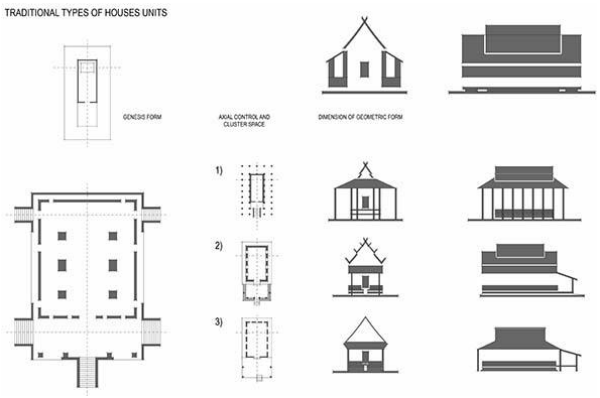


Fonte: Diana S B Medina, 2013; based on Onsiri Panin, 2008.

This kind of living was developed for the needs of the water-based community. Lifted at least 1,50m from the ground, they used to house from 2 to 4 families sharing the same property. Spaces were differentiated through small height gaps and the presence of eaves. Within the property boundaries, half, or at least a third of each house space was destined for the shared living within a group of families. There was one toilet per community, and activities of cooking and small production of goods happened throughout the open veranda.[17]

Apart from its physical elements, the traditional house was a pure combination of living, sharing and mobility. The houses were established on water banks for the idea of promoting its amphibious character, and environmental and mobility issues were part of the design premises. Dwellers shared the small production of goods and services within the housing unit; and communal living and ownership made the household system.

Figure 11: Traditional Types of Houses



Font: Diana S B Medina, 2014; from Chansaka, Chomphunich & Veera, 2010.

The next housing type worth mentioning is the *Baan Mankong*. In 2003, through CODI (Community Organizations

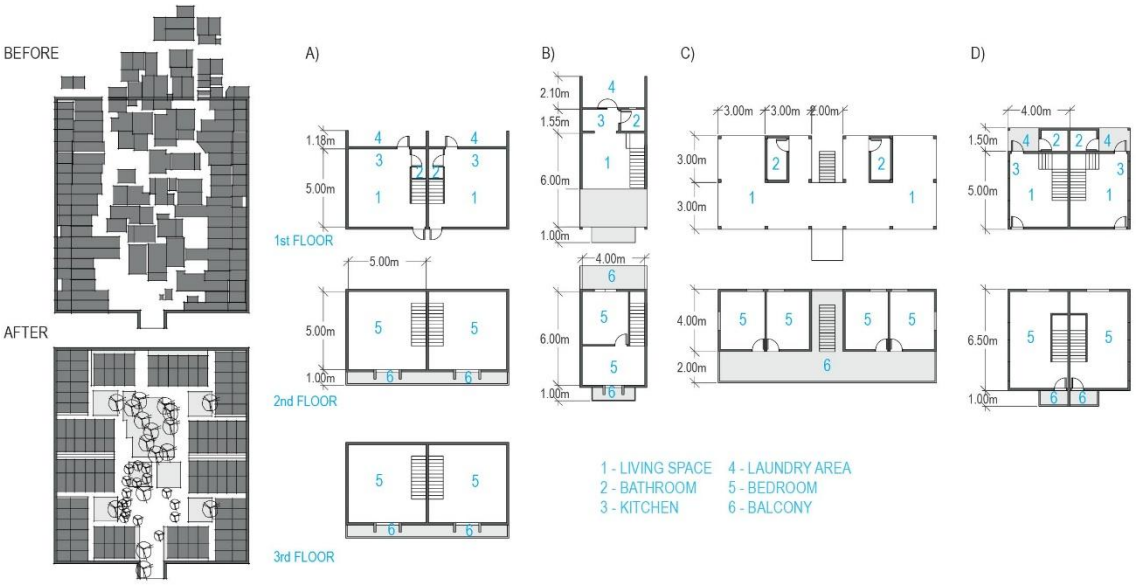
[17] PANIN, Onsiri, 2008. p.34.

Development Institute) the Thai government initiated the *Baan Mankong* Housing Programme. Its concept is not to tackle each slum's problem individually but to look at collective community problems on a city-wide scale. Each slum community will collectively plan and carry out housing improvements by their own efforts within allocated budgets. Once these city-wide plans are finalized and upgrading projects are selected, CODI channels infrastructure subsidies and housing loans directly to the communities through the legally established cooperatives or savings groups. Since its inception, the *Baan Mankong* Housing Programme has been carried out in more than 1,000 communities in 69 of the country's 76 provinces, benefiting more than 54,000 households.[18]

The successful tools of engagement of the programme are mainly its ability to allocate residents in their current ground[19], and empowering them by creating a sense of community among dwellers. The collective pool must be organized and managed by the community itself, which brings a sense of responsibility and involvement in the planning process. Its flaws are the consuming time for the deployment of each project, the lack of urbanity within the design and its total lack of consideration for the traditional architecture and living habits.

Baan Mankong's proposed modes of land tenure show, for the first time, a sense of involvement with the questions of land ownership in Thailand. As one of the main issues for the lack of cohesive urban and infrastructural planning, the provision of a collectively owned tenure gives way to different interpretations and projects for fragile territories.

Figure 13: Baan Mankong Housing Types



Font: Diana S B Medina, 2014; from CODI, 2011.

The *Baan Eua-Arthorn* Housing Programme – last to be mentioned - reflects the international influence over Thailand's urban development and the failure of speculative and market-driven housing policies.

CODI, as previously explained, is a community based and driven policy. The National Housing

[18] KRITAYANAVAJ, Ballobh, 2012. p.33-34.
[19] CODI, 2011. Types of Development.

Authority (NHA) is a state enterprise established in 1973 that promotes affordable homeownership to the Thai people. Until 2003, the NHA had developed a total of 430,000 housing units countrywide, through the *Baan Eua-Arthorn* Housing Programme. Its spatial solution lies in doing the common western stereotyped social housing: small individual units, 5-6 store high buildings, no space for communal or productive living.

While it does promote numbers of units more efficiently, faster and with individual ownership; it also fosters an environment of little sense of appropriation by the dwellers, denies the city around its walls and doesn't engage in multiuse functions. Its international design portraits the road-based city, whereas very often its ground floor is lifted for parking. In a city-wide scale, these projects occupy superblocks without any porosity of movement through its boundaries, reinforcing the simplistic and sectorial vision over urban planning.

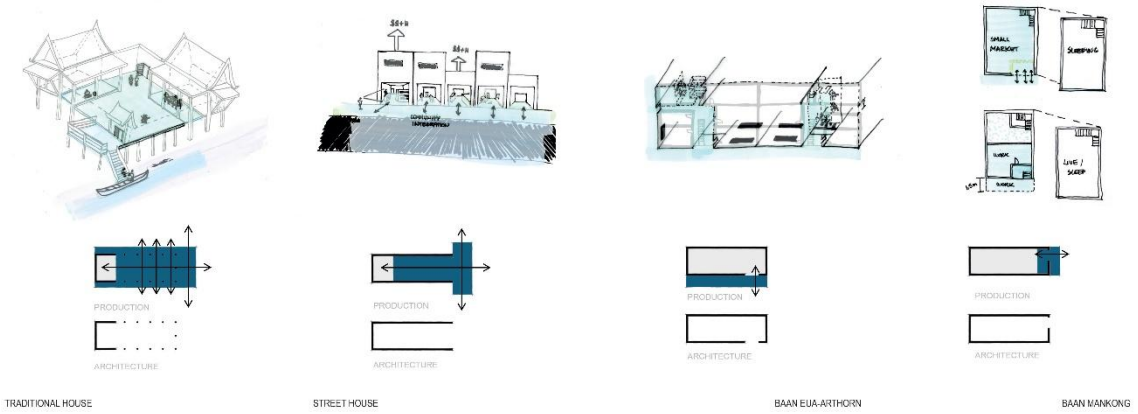
DESIGN & POLICY

From an analysis of the appropriation of common spaces in each type, it is clear that governmental programs usually get stuck in the legal framework of property boundaries, and do not embrace the concept of communal living inherent in the Thai society. Despite the chosen typology, cultural manners of shared living and productive spaces within the house are in the heart of low-income dwellers. While in the traditional house people share the property - and therefore a part of their private environment - with the neighbours to develop economic and social activities; in *Baan Eua-Arthorn* this cultural attribution has no space for development, which ends up spreading on the corridors and immediate surroundings, when people don't give up on half of their tiny unit to retail, services and so on. The same happens in the street houses in the countryside, where they are usually open, and that may be for profit, or just for cultural manners. In *Baan Mankong*, the idea of community living is stronger, but nonetheless its resulting design is about houses that only give a small portion of its architecture for communal living.

In the case of housing policies, the *Baan Mankong* program has been very successful in treating slum upgrading through empowering the communities. Although its time frame is very slow, the outcomes tend to please the dwellers creating long-term living environments. From the first projects to the present day a lot has been added, and that shows how housing programs have the chance of exploration in Thailand. The first communities serve as an example for the new ones, at the same time as the government creates a framework of land tenure and loans for the dwellers. With this knowledge, the programme starts to explore new ways for its design and is trying to make tools for a faster process of deployment.

In all housing projects, dwellers find a way of maintaining its local economy within the given architecture. From what has been observed, the ideal project would combine the architecture of traditional houses - all the needed elements for a coexistence between mankind and natural environment – to be implemented as the *Baan Mankong* Programme - promoting cohesive social policy equations and securing long-term development.

Figure 14: Housing Comparison



Font: Diana S B Medina, 2014.

5 HOUSING AS INFRASTRUCTURE

From what has been observed about the understanding and deployment of mobility infrastructure, factors such as historical urban development, economy, politics, social and cultural trends all lean over the same territory and have equal weight on its outcomes.

Concerning the projects that will follow, during the morphological explanation the core idea of this thesis of retrieving the water's potential was described. In this case, three locations on the margins of important canals were chosen; the first in *Phra Nakhorn*, continuation of the *Khlong Toei* canal; the second over *Samsen Nai*, on the brink of *Makkassan* and central to the East-West water connection; and the last in *Bangkok Noi*, a regular *Soi* system encounter. For this publication the *Bangkok Noi* test won't be presented.

The chosen sites are key strategic points in regards to the water mobility system, and should serve as a base for how land and water systems could be merged back into an amphibious civilization. The choice of testing in multiple locations within Bangkok gives rise to two conditions. The first is the exploitation of different characteristics of the special spaces mentioned before, in order to understand their role in the activation of the water system. The second is the possible comparison of different outcomes for similar tools of design.

> The inductive method is guided by the composition of principles and conditions that give rise to a number of phenomena, and the deductive method is to insert the principles so obtained into new conditions, alter the composition of conditions, and produce a distinct phenomenon. (KAIJIMA, M. & TSUKAMOTO, Y., 2006. P.9)

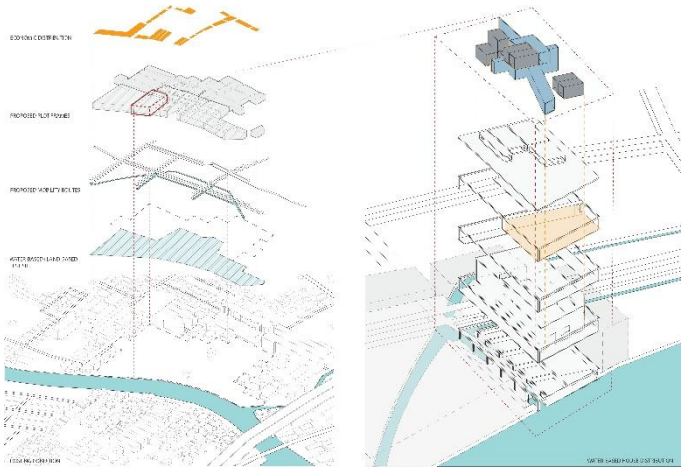
Hence, the first projects [inductive method] will address more clearly the architectural qualities derived from the housing studies while the latter [deductive method] will explore the possibilities of challenging housing policies in larger communities.

PROJECT 1

The area that is currently the gardens of a temple is chosen to implement a community-based social housing project. The first step was the observation of the existing informal movement within the area. These routes are the soul of the city's sub-systems, and regulate the activities within these spaces.

From the definition of key economic spines and routes necessary to maintain an adequate volume of movement, the area is divided between water and land-based housing types. The plots' definition follows the tertiary infrastructural framework that provides multi-layered interactions. New water routes are proposed parallel to the framework of paths, and the possibility of traditional uses for the lower levels of the 'water-houses' combine the necessary economic efficiency.

Figure 15: Urban Design for Project 1



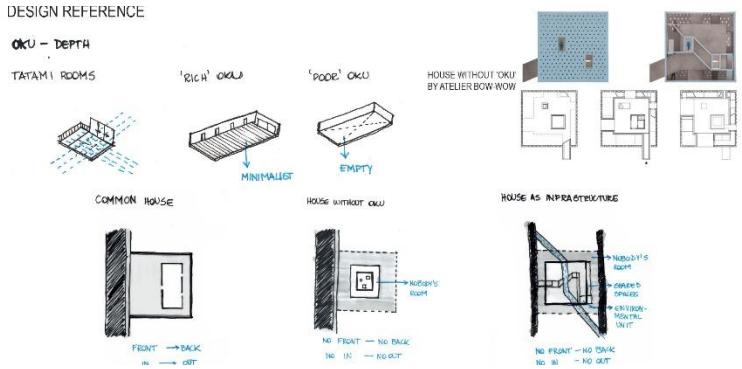
Font: Diana S B Medina, 2014.

The possibilities of a playful design that encourages movement brought this research to study houses that could pursue mobility within themselves. "Why is it that a public building cannot be designed more like a villa or a private house?" (KAIJIMA, M. & TSUKAMOTO, Y. & KURODA, J., 2012. p.8) Reinforcing the idea developed in the beginning of this thesis, mobility only matters once seen through the eyes of accessibility. That involves the question of reason for accessibility as well as the social relations that permeate the movement itself. The idea of starting from the flows inside the dwelling promotes the understanding of human relationships, whose values are likely to permeate the urban design.

Atelier Bow-wow has interesting references on housing projects in Japan. From their own definition, they began to play with the idea of the static housing diagram, in order to challenge the social relationships between dwellers and city.[20]

[20] "First of all, the phenomenon of OKU [depth] as a characteristic of place was comprehended as the superimposition of multiple explanatory variables, such as the topological relationships and connections of rooms, as well as apertures making connections with outside. […] So shallow/deep and interior/exterior, as characteristics of place, became relative, undergoing various inversions depending on your location. The number of explanatory variables used to distinguish between "inside and outside" and "part and whole" gradually increases based on social transformations, thereby becoming increasingly complex; but even so, I feel that there is an opportunity to dismantle OKU by questioning whether only architectural space can provide the ongoing production of constantly stable relationships between "inside and outside" and between "part and whole". […] By perceiving the wide variety of compositional elements in architecture as "articulation", and the relationships between those elements as "integration", superficial differences may be transcended, and various buildings compared, giving identical elements but different relationships, or different elements but identical relationships." (KAIJIMA, M. & TSUKAMOTO, Y., 2006. p.13)

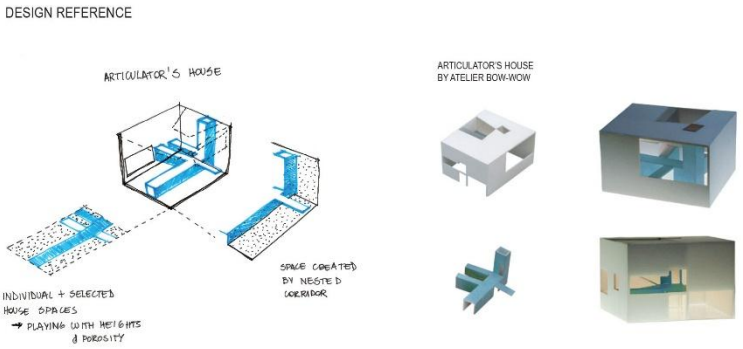
Figure 16: Design References



Font: Diana S B Medina, 2014; from Atelier Bow-wow, 2001.

Their first attempt of breaking the common depth of the house, was called House without 'OKU', and was an interesting drawing of a different perception of social relationships.[21] The provocative design made a house using two nested cubes, whereas the idea of environmental units would be defined by its 'nesting elements'. From this point, they managed to lose the clear definition of outside/inside and the spaces between the cubes are "nobody's room".

Figure 17: Articulator's House by Atelier Bow-wow



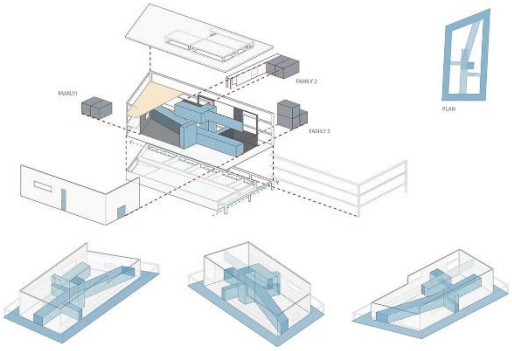
Font: Diana S B Medina 2014; from Atelier Bow-wow, 2001.

Taking these design principles forward, it is proposed that the nested structure be combined within a shared living, where 2-4 families will inhabit the same 3-dimensional frame space. The 'plot' sides define the outer cube of Atelier Bow-wow, and movement from different levels of public spaces are spread around the nested design. The structure created by the multiple corridors defines the spaces surrounding between totally private, semi-private (shared within the house unit, shared within the housing community unit), productive spaces for social and economic appropriation and simply public spheres. It is a topological spatial composition that differs from method to connect unit spaces or to divide a space into rooms. One of the

[21] "By making oppositional relationships between interior and exterior elements that straddle the profile of the building, the overflowing orientations are regulated, and at the same time, the outside context and the inside context are organically synchronized. […] spaces are determined as units of place. This does not require separate rooms. These are called environmental units, or niches. Looked at in this way, the attributes of front or back in a given place will also come to be perceived fluidly." (KAIJIMA, M. & TSUKAMOTO, Y., 2006. p.85)

intentions of this is to leave clearance or odd space without a pre-set purpose between individual boxes. The corridor-tube connects outside and articulates the space inside the outer shell. The rooms divided by the closed corridor are a part of the inside of the outer shell connecting to each other above the tube. The physical movement of the inhabitants in or on the tube drive the space definition.

Figure 18: Design 1 – Exploded House



Font: Diana S B Medina, 2014.

As in the traditional living, they would have complete individual units, family spaces with no boundaries with the rest of the dwelling, shared spaces between the occupants for collective and productive use, such as storage, kitchen and working frames; and last an external totally public set of verandas that connect straight to the multilayer tertiary system and permeates public flow within the house boundaries.

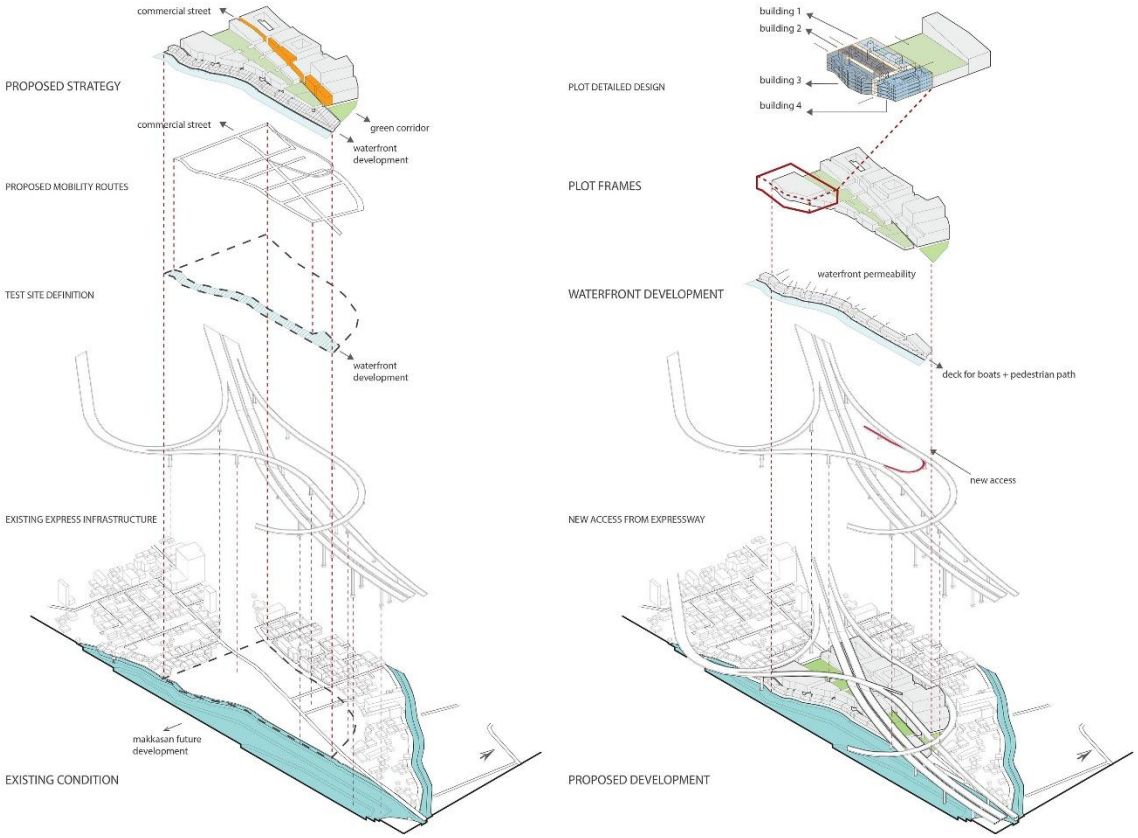
Lastly, following the principles of the *Baan Mankong* program, the idea is to provide urban houses for communities, where a group of dwellings raise the money to buy the land collectively with the help of the CODI organization. In this case, the difference is that the community will collectively own the land, but also a shared-family trust will own the plot, instead of the current condition of one family per house.

PROJECT 2

While the first project lies under the definition of an inductive method, this second tries the deductive test - as an attempt of scaling up the challenges. Therefore, it inserts the principles previously obtained into new conditions by altering its composition of conditions, and produces a distinct outcome.

On the edge of the *Samsen Nai* canal, the site is in between the major East-West water connection and at the other side of *Makkasan* - a huge area with plans to be redeveloped by the private market. Apart from global and local forces, it lies also in between one of the biggest roads' junction of Bangkok.It is in a broader space between *Soi* and canal with massive infrastructure flying over

Figure 19: Urban Design Project 2



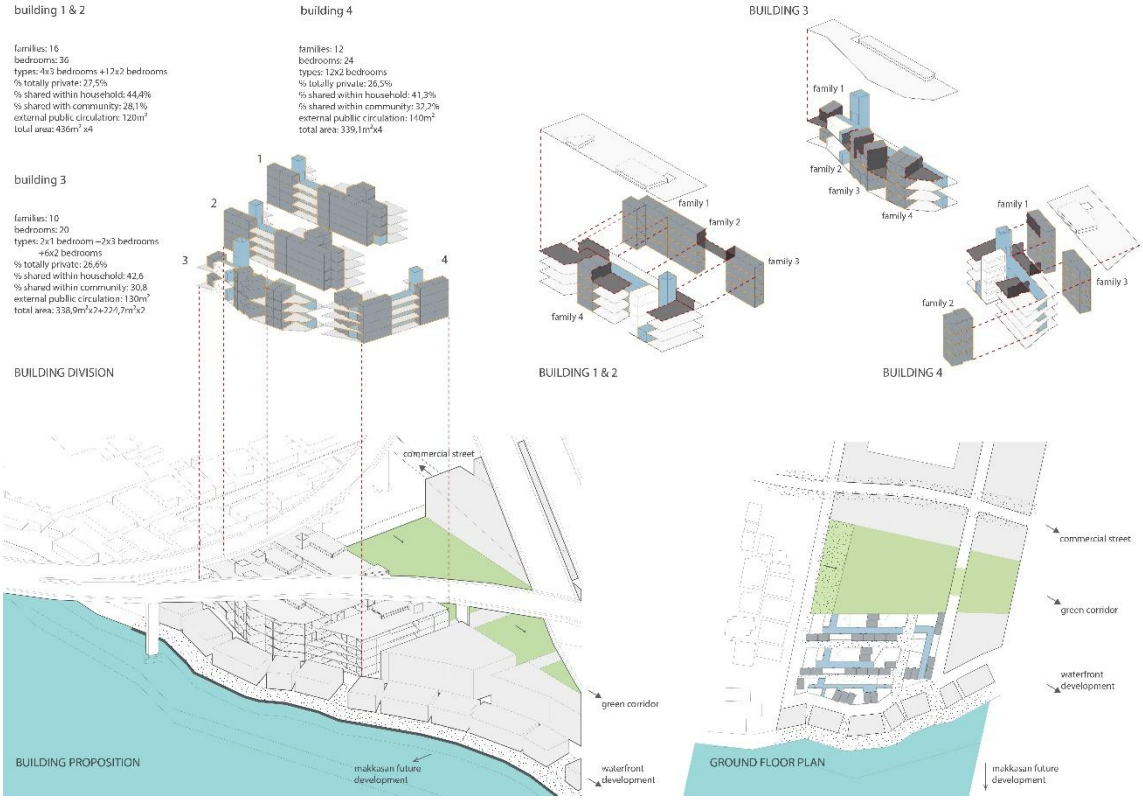
Font: Diana S B Medina, 2014.

The project follows the same design principles of the previous one. After the plot's frame definition, three key strategies are defined for the whole area: a waterfront development to respond to Makkasan's connection and economic potentials; a green corridor to ease the hard impacts of the expressways above; and a commercial spine to drive the local economic forces.

In order to manage movement and bring accessibility for the area, it is proposed a new access from the expressways to land the road flow more easily. Over the new waterfront, the idea is for an economic exploration, whereas shops, restaurants and a large deck for boat's transit are part of the most attractive side of the plan.

Finally, the large grain proposed is a framework to accommodate a community per piece, as exemplified in the detail. The idea is to deal with hyper conditions but trying to follow the same strategies as the first test. Instead of having a spread community, the collective ownership would be within the plot-frame. The second layer of negotiation is to have the family's trust owning the entire piece of building between 10 families or 3-4 families own collectively the floor. It is an attempt of taking the previous ideas vertically at the same time as keeping its design principles.

Figure 20: Exploded Housing Types – Design 2



Font: Diana S B Medina, 2014.

6 CONCLUSION

CITY'S FLOW THROUGH HOUSING

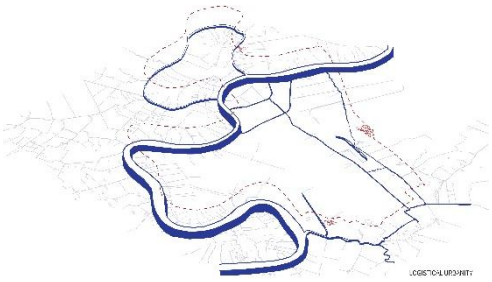
This research proposes to rescue the traditional urban knowledge. What was proved is that there is an evolutionary reason for a civilization and a city character, and cohesive growth relies on merging past and future. In the case of Bangkok, the water culture is the key driving force for its historical and actual relevance in the city's scene.

In times of global change, there is something about the sense of place that is worth being rescued. The idea of a historical and morphological approach over a place holds the hope to understand that, imposition and excessive promotion hides the natural process of living knowledge. Instead of being romantic about what is a sense of place, contemporary discourse shows that history is a living attribute, but it is not the only one. Global forces impacts are wanted over territories, for their promise of economic prosperity, and the local organization has the duty of managing flows and harmonizing past and future.

The idea of regaining traditional social behaviour through the deployment of houses that are ultimately urban, is also an attempt of recognition of the strength of a morphological approach. If it can be established that urban morphology results from historic, political, economic and social attitudes, it is also true that the reinforcement of its strength lies in the same actors.

The projects aim at enacting key points of the city to articulate and regain the water as a full-system of mobility, at the same time as individually take advantage of architectural potentials to make a productive territory. To recreate the water potential, the propositions are located on the banks of the canals and simulate reactivating small pieces at a time. At the end, the goal is to re-establish a physical loop of connections that permeate the whole central city, and reinforce the existing small economies.[22]

Figure 21: Logistical Urbanity



Font: Diana S B Medina, 2014.

They do not work as one, but the implementation of each would promote specific change to the urban growth pattern, and therefore address the current infrastructural development. Ultimately, it is expected that once projects start to coexist between land and water networks, the city will turn its eyes back to the water, and the whole ecology of the system will be retrieved.

CHALLENGING HOUSING AS AN INFRASTRUCTURAL TOOL

The encounter with Bangkok's reality brought to light the challenges of megacities on the threshold of massive transformation. The idea of looking to a city from its neglected spaces promotes the understanding of its hidden synergies.[23] This research looked for the reasons behind the existing infrastructural conditions, and found many answers on its morphological development for present-day problems.

The morphological approach to urban design establishes a dependency on local behaviour and uses inherent knowledge as a fundamental tool of design. To believe in locality is to believe in the human capacity of collective social learning. By choosing this path it is understood that the territory is composed by history, present and future, whereas global trends must be studied in order to predict forthcoming events.

After discovering an urban ground that represented stages of development and the maintenance of the city's sub-systems, this research proposed the use of housing as infrastructure. In this scenario, the idea is to explore the social conditions embedded in any housing project, to drive attention to different perspectives on the question of mobility. By addressing urbanity within the household, it is possible to address all the issues of the city.

The choice of housing as a tool comes from the recognition of its potential as a small urban object. The notion of body lies on the idea of a sharing body, shaped by the architectural environment of residential and urban spaces, by cultural and habitual factors. According to Atelier Bow-wow, the lacking foundation of an abstract community or society, even a nation,

[22] "These individual buildings can never become monuments. The reason is that they are all dispersed throughout [the city], each forming just one part of the circulation system and only all together making up what we can call a logistical urbanity."(KAIJIMA, M. & TSUKAMOTO, Y. & KURODA, J., 2012. p.15)

[23] "Moreover, it is really such a contradictory place, because it is in fact these [characteristics] which most clearly reflect its quality of urban space, whereas the translation of issues of place through history and design seem like a fabrication" (KAIJIMA, M. & TSUKAMOTO, Y. & KURODA, J., 2012. p.15)

has brought to the individual the reason for making public buildings[24]. In this global scenario, it seems that the best way to produce urbanity is to understand individuals (bodies), and the best way to understand individuals is by examining their houses.

Mobility infrastructure and its understandings go beyond the simple idea of what it needs to connect. However, its physicality interferes with the urban form and represents the quality of the city. By studying the small human behaviour and learning lessons from the past, this work tries to capture a strategic view about what the city could foster. Apart from physical connections, accessibility and the right of movement are the core goals of a sustainable design for mobility infrastructure.

The study of human relations translated in space is as important as studying the space itself. In this sense, the creation of urban houses prioritizes equal development, whereas inequality is fought by provoking the existing living behaviour. The same argument, shifting scales, serves the city. The use of housing as infrastructure is mainly to provoke the concept of infrastructure itself. The lack of complex and integrated comprehension over the forces that shape cities is what leads to singular projects. And ultimately, this is what this work is trying to go against.

REFERENCES

ALLISON, G. H., 1978, *Jumbo English – Thai Dictionary*, 3rd Ed., Thailand.

ASKEW, Marc, 2002, *Bangkok – Place, practice and representation*, Asia's Global Cities, Routledge Taylor & Francis Group,United Kingdom.

BELL, Barry, 2003, *Angelic Allusions*, United Kingdom.

CHANSAKA, S. & CHOMPHUNICH, T. & VEERA, R., 2010, *Poom Panya Chow Bann…Su Ngarn Satapattayakam Puen Thin*, The Association of Siamese Architecture Under Royal Patronage, Thailand.

CODI, 2011, *Baan Mankong Collective Housing,* Thailand, found in http://www.codi.or.th/, last visited on 11/02/2014 at 13h40.

COHEN, Erik, 1981, *A Soi in Bangkok – the dynamics of Lateral Urban Expansion*, in *Bangkok under a grant* from the Harry S. Truman Research Institute for the Advancement of Peace at the Hebrew University of Jerusalem, Department of Sociology and Social Anthropology at The Hebrew University of Jerusalem, Israel.

CORNWEL-SMITH, P. & GOSS, J., 2013, *Very Thai – Everyday Popular Culture,* 2nd Edition, River Books, Thailand.

Eyewitness Travel, 2012, *Thailand*, DK, United Kingdom, USA, Australia, Germany and India.

IBGE, 2013, *Thailand – History,* Países@, found in http://www.ibge.gov.br/paisesat/, last visited on 05/02/2014 at 23h30.

JUMSAI, Sumet, 1998, *Naga: Cultural Origins in Siam and the West Pacific*, Oxford University Press, Singapore, United Kingdom and USA.

KAIJIMA, M. & TSUKAMOTO, Y., 2006, *Bow-Wow from Post Bubble City*, INAX Publishing, Japan.

KAIJIMA, M. & TSUKAMOTO, Y. & KURODA, J., 2012, *Made in Tokyo*, Japan.

KRITAYANAVAJ, Ballobh, 2012, *Affordable housing in Thailand*, Housing Finance, Asia-Pacific Housing Journal, Thailand.

PANIN, Onsiri, 2008, *Ruen Puen Thin Thai – Tai,* Faculty of Architecture at Silpakorn University, Thailand.

UN-Habitat, 2013, *Planning and Design for Sustainable Urban Mobility – Global Report on Human Settlements 2013*, United Nations Human Settlements Programme, USA and Canada.

[24] KAIJIMA, M. & TSUKAMOTO, Y., 2006. p.8.