WATER YOU KNOW?
Water You Know?

An architectural research project exploring how cultural and spiritual values attached to water can be used to bring attention to water management. The water scarcity situation in the rural Thai village, Ban Thang Khwang, is the test case.

Master Research Explanatory Document
Supervisor: Kerry Francis


APHIWAT PENGPALA
STUDENT I.D. NUMBER: 1382840
donpengpala@gmail.com
Abstract

This research focuses on bringing attention to the importance of water and its management to my village, Ban Thang Khwang, in northeast Thailand. On a trip home in 2014 I noticed a huge contrast between the poor condition of the village water, its outdated infrastructure and the less-vital, yet popular, technologies of smart phones, computers, and televisions with satellite receivers that were seen everywhere.

This flat and arid region relies heavily on agricultural production, yet there is a major shortage of water. Ban Thang Khwang’s existing sources include a community pond and roof collection, but the water is not safe for human consumption, which means the villagers must rely on bottled water for drinking. In the past, governmental parties have proposed large-scale water projects full of good intentions for the northeast region. However, many of these never materialised and those, which did, often had damaging ecological consequences.

The Thai people’s relationship with water goes beyond being a vital resource. It is fundamental to our cultural, traditional, social, and spiritual beliefs. Water-related festivals ask for rain, pay respect to one another, give thanks for water, and even include rituals, which apologise for polluting it. Yet, during and after the festivals, we continue to pollute and waste our most precious resource. Needless to say plentiful clean water would benefit Ban Thang Khwang’s health and economy.

During my research Thai water-related festivals and the daily activities of general village family members were analysed through the concepts of Bernard Tschumi’s “No architecture without an event” and Lawrence Halprin’s “Motation” recording method. This analysis of the village was overlaid with a natural and mechanical water treatment process. These physical and metaphorical intersections determined the location and program of a series of architectural interventions to bring attention to water.

At the village’s two major intersections, medium-scaled building designs were developed. A house for the family that maintains the school and the adjacent community water treatment facility, used cultural values and water cleanliness hierarchy to determine the spatial configuration. The second building, an internet café was located at the intersection of a festival route and a frequently travelled route by young people through the village. The ritual path overlaid with the contemporary programs of the internet café brings together the ‘everyday’ with a suggestive and performative architecture that values and heightens the significance of water to Thai culture.

This project uses Thai culture, values and village custom to determine the nature and location of the architectural interventions with modern techniques to improve water supply. The architecture seeks to embed the critical significance of water in the everyday life of the Ban Thang Khwang village.
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I dedicate this project to my home village, Ban Thang Khwang.
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1.0 INTRODUCTION
1.1 Research Question
How can architecture bring attention to the importance of water management in my home village in Thailand?

1.2 Background
Life on Earth relies on water; it is responsible for development and growth of humans, animals and plants. Water is a fundamental basic need for sustaining human and economic activities. As the world’s population increases, the quantity of water stays the same, resulting in the need to manage the usage and quality of water efficiently. Thailand’s relationship with water goes beyond just being a resource. It is connected to their cultural, traditional, social and spiritual beliefs. Thailand’s water quality is affected by the growth in population, urbanisation and agricultural and industrial expansion. There is a major shortage of water in the northeast rural region of Thailand which relies heavily on agricultural production. Farmers are unable to produce enough income to support their families due to the lack of resources, in particular water, as a result of droughts. Young Isan villagers often migrate to work abroad to support their families financially.

Climate change is another big contributor to the water crisis in Thailand, causing floods and droughts, with droughts mainly affecting Ban Thang Kwang village. Human activities accelerate climate change by causing greenhouse gases. The resulting floods during the rainy season destroy crops, and droughts in the hot and dry season result in a lack of water. Many farmers in Isan ignore warnings about the predicted droughts and continue planting without knowing where to source water. Sufficient education and management of water could give people the option to stay in their homeland and continue their way of life.

Water is a necessity; we cannot survive without it yet we are polluting our most important resource. There is a sufficient amount of it in the atmosphere but not all of it can be used now due to its quality. It is impossible and unfair to blame anyone for the Isan’s situation, but something still has to be done. The people of Ban Thang Khiaw need to be educated about water management and treatment to sustain their living conditions.

"Thailand is able to provide even some of the most remote areas of the nation with electricity, but water distribution does not come easily in a nation with shortages such as Thailand" - Michael Sutherland

"...we must realize the importance of water. We need it to drink, for daily use and agriculture. Where there is water, there is life. If there is water, we can survive. If there is no electricity, we can still survive. However, if there is no water but there is electricity, we will perish..." – His Majesty King Bhumibol in a speech delivered at Chitralada Palace, March 17, 1986.


Figure 1.2 King Bhumibol Adulyadej visiting the rural region of Thailand.
1.3 Project Outline
The project is located in the rural area of northeast Thailand, Isaan, in my home village, Ban Thang Kwang (which translates to ‘house in the way of the road’). The purpose is to bring attention to water management through the use of architectural devices. A series of water-related architectural interventions will be designed for places of public ritual and ceremonial gathering, a communal water treatment facility, the operator’s family home, an internet café, and pavilions at each entry to the village.

1.4 Aims and Objective
The main aim is to harness Thai cultural and spiritual values attached to water and use them to bring attention to the necessity of water management through architectural inventions which will be used daily. Secondary to the main aim, the project will also offer a concept for large scale water treatment and storage. Thai cultural and spiritual values will be analysed and extracted using theories based on rituals and events. The conclusion of the research will determine the possible interventions. Precedents of architectural projects and devices which bring attention to water will be examined on how they operate. To carry out the project, a basic understanding of water and water treatment systems will be necessary.

1.5 Scope and Limitation
The northeast of Thailand is prone to floods and droughts, but Ban Thang Kwang has not had flooding in a decade. This research accepts this and focuses on droughts and their related issues. With the project being located in Thailand, it becomes difficult to navigate through the physical site context. My time spent on regular family visits, plus information from family members still living in Ban Thang Khwang has given me experience and knowledge about the topic. It is understood that a project like this would have the best result carried out on site, in cooperation with the community. The design outcome does not focus on being technically accurate; further development would require collaboration with a qualified person who has knowledge regarding water treatment systems. However, this project provides a starting point and architecturalises cultural aspects which can contribute to the issues and construct a more holistic approach to bring awareness about water to the village of Ban Thang Khwang.

1.6 Methodology
Water physically, cycles and treatment systems are studied to gain an understanding of water’s issues and solutions to carry out the project. They are assessed regarding the pros and cons and what purpose they serve. The understanding of cultural and spiritual values is mainly from personal knowledge and experience. Other methods for gaining further insight were through speaking to family members in the village, and reading literature about Thai culture and folklore, and articles on Thai water festivals and rituals. Theories based on rituals, enlightenment and events were analysed and used to extract information from traditional rituals, ceremonies and everyday life activities. Symbols were drawn and used to represent people and objects to record the rituals and everyday life activities. These recordings were analysed and architecturalised by 3D modelling. Material, cultural understanding and event recordings were combined to form a hierarchy of understanding, water cleanliness, privacy, cultural values and natural environmental elements (sun, wind, and rain). Architectural precedents were analysed in terms of devices used to bring attention to water; these devices are compiled and grouped to make a water engagement chart. Models and drawings were conducted to explore tectonic connections and forms. Multiple iterations of models from each concept were made to support the activities occurring within them.

Figure 1.3 Water Treatment Concept Sketch
2.0 CONTEXT OF ISAAN
2.1 Physical Context

Thailand is positioned in the northern hemisphere, in Southeast Asia and shares a border with Myanmar, Cambodia, Laos and Malaysia. The area of Thailand is 514,000 square kilometers; 511,770 square kilometers is occupied by land and 2230 square kilometers is water. There are five regions, north, northeast, central, east and south. The northeast region, also known as Isaan, is where the project is located. Isaan contains one third of the entire country’s land and population.

The northeast region sits on the Krorat Plateau, which is cut off from the rest of the country by two low escarpments; Petchabun in the west and Phanom Dong Rak to the south. The land is an area of low hills and shallow lakes. Isaan is mainly drained by the Mekong River through the Mae Nam Mun and Lam Nam Chao Phraya. Thailand’s weather consists of a tropical and monsoon climate. Thailand has three seasons; summer, from March to June; rainy, from July to October; and winter, from November to February. For Isaan the temperature in the summer is 25-35°C; rainy, 44-46°C; and winter, 26-32°C.

The prevailing wind (average speed of 3.6 kilometers per hour) is normally from the southeast but during the monsoon season, it comes from the northeast. The angle of the sun is normally very high during summer, at about 80 degrees, while in December the sun angle is 50 degrees. Drought and sandy soil in Isaan are the main ecological and agricultural problems. The flat terrain of the plateau is often flooded in the rainy season. The effects of soil erosion are vast affecting the land’s fertility, damaging plants and resulting in a low water-holding ability. In the northeast, agriculture, mainly rice is the dominant sector of the economy. Sticky rice, also known as gluttonous rice, occupies 60 percent of the cultivated land.

6 "Weathers.

Figure 2.2 Context of Thailand
2.2 Water Context

2.2.1 Physicality of Water

State of water
Water is made up of two hydrogen atoms and one oxygen atom; $\text{H}_2\text{O}$. It has three main states; liquid, solid, and gas, and takes different forms according to the temperature or pressure.\(^9\) It changes state but never quantity.

Water cycle
In the process of precipitation water is evaporated by heat from the earth’s surface into the atmosphere, where it cools and condenses into clouds, rain, and snow. It then falls again onto the earth’s surface and is captured by the lakes, ponds, rivers and sea. The water gets evaporated again and the precipitation process continues.\(^10\)

Living things such as plants, organisms, animals and humans consume and use water to survive, and for other various activities. Water, when consumed, passes through the organisms’ bodies, which is then drained back to the environment; back into the rivers, lakes, ponds, sea and earth.

The amount of water stays the same. It does not increase or decrease and it is neither in a different place or in a different state or quality. If we relocate water from its source it will create an imbalance in the cycle. The organisms and environment which relied on that source will suffer because the amount of water which sustains their lives is gone. To maintain a balanced ecosystem, it is important to balance the water use between humans and nature.

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Water Contamination and Appearance

Water, in its purest form, has no colour and is positively charged; it attracts other substances and attaches to them. Water is contaminated by substances it comes in contact with; this determines the quality, appearance, taste, and odour. The substances can be harmful to human consumption and engagement. Water quality is based on what it is used for.

Man-made or natural occurrences can contaminate water. Organisms such as pathogens (bacteria), viruses and parasites (worms and microscopic protozoa) affect water quality which can be passed on by human and animal waste. Byproducts from industry and agriculture can also affect the water quality; it may contain chemicals (fertiliser and insecticides) and heavy metals (e.g. mercury). The natural processes of decomposing plants and toxins from metal arsenic can also affect water.

It would require a professional with water treatment knowledge to test samples to reveal the quality. However based on the colour of the water we can estimate the contaminant and quality.

Foam: foam in water can indicate the decaying of various things such as organic matter (animals) and plants. These substances allow water to mix with air, causing bubbles.

Orange or brown slime: this is usually from bacteria in iron rich water, such as springs. Decaying of animals and plants can also contribute.

Green: this colour ranges from olive, to lime, to turquoise, and to blue green. The colours indicate varying amounts and types of algae. Green water is also described as being rich in nutrients.

Red, Brown: this is the result of pigments from plants and organic matter staining the water: it is difficult to separate these from water.

Milk white and cloudy green: this occurs in an area where fresh water and sea water mix, it becomes discoloured because of decomposing sea algae.

Oily Sheen: there is harmless iron or "manganese-loving" bacteria in the water. Decomposing animals and plants may also contribute. Natural oil sheen has no petroleum odour.

Yellow Scum: Due to large amount of tree pollen in the water.

The colour diagram indicates that the pond in Ban Thang Kwang is high in nutrients with large amounts of algae. The roof and water storage tanks in the village may also be contaminated.

Figure 2.5 Water Colours

Figure 2.6 Village Water Colour
Simple method of disinfection

**Boiling**

Boiling is very effective to terminate pathogens and viruses. It uses a lot of power and can cost a lot over time.

**Solar disinfection**

The sun’s ultra-violet rays terminates pathogens in water, this required a clear container to be effective.

**Coconut fiber/burnt rice husk filter**

Water passes through two stages; coconut fiber and burnt rice husk. This process is only intended for a polishing stage to remove residual and suspended solids. Material can be locally available and cheap to construct. It is not sufficient in removing bacteria and the material should be changed often to prevent bacteria growth.

**Rapid sand filter**

Clay, metal or plastic containers may be used. It is filled with layers of sand and gravel. Water is forced through the filter to remove sediment and solids. It is cheap and easy to construct but needs to be cleaned often and does not remove pathogens.

**Charcoal**

Water passes through layer of charcoal, sand, and packed gravel. Charcoal available in the area could be used, but if the filter is not regularly changed and used, harmful bacteria can start to grow.

**Pond system**

The system is a naturally occurring process which ecologically treats itself in several different stages. It is environmentally friendly and requires a large area of land to carry out the procedure. These systems help to reduce harmful bacteria but they do not remove germs completely, to remove organisms or pathogens a disinfection process is required.

**Distillation**

Distillation uses heat to evaporate water, separating it from contaminants and heavy solids. The water needs to reach a high boiling point to take away harmful chemicals (if it’s contaminated with them) which require a lot of power. Water output is less than water input. It removes bacteria, viruses, heavy metal (lead, arsenic, and mercury) and it removes natural nutrients in water.

**Reverse osmosis**

Reverse osmosis is the process of pushing water through membrane material to separate water from the contaminants. It is mainly used to treat raw or surface water and it is recommended to pre-treat the water before it enters the system. It removes organic matter, bacteria, and pathogens, chemical. Pesticides and chloride are smaller than water, they still pass through the membrane. It also removes natural occurring minerals in water.

From understanding these treatment process it is clear that individual systems do not solve all the contaminant issues. It is dependent on the sources and quality of the water to determine the treatment methods needed. If we are to treat the water in Ban Thang Khow, multiple systems are needed to collectively bring water to drinking standards.

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**Mechanical**

**UV**

Ultra-violet system uses the process of light passing through water to terminate contaminants such as bacteria and viruses. The process does not require harmful chemical to treat the water, if the harmful bacteria or viruses is not detected by the light it is skipped.

From understanding these treatment process it is clear that individual systems do not solve all the contaminant issues. It is dependent on the sources and quality of the water to determine the treatment methods needed. If we are to treat the water in Ban Thang Khow, multiple systems are needed to collectively bring water to drinking standards.
2.2.3 Context of water in Isaan

In Thailand the water quality is affected by urbanisation, industrial expansion, increasing population, human activities and agriculture. Severe drought in the dry season and flooding in the rainy season are the main issues affecting the people and agriculture in Isaan. Drinking water in Thailand is mainly from surface and ground water sources with one third of the surface water being poor quality due to the amount of untreated domestic sewage and solid hazardous and industrial wastes. Accessible ground water is affected by agriculture run off, sewage and aquaculture. The policy for ground water extraction is unclear, and large amounts of water are being abused due to over extraction. Twenty There is technically enough water for everyone from rain fall and surface water but due to pollution, it is unusable.

"...forty percent of water is unusable to human consumption indefinitely. None of Thailand’s water is considered to be suitable for consumption after regular treatment, which consists of boiling or basic filtration." - Michael Sutherland

Rice

Thailand is one of the main exporters of rice in the world but severe droughts impact farmers across the country. With rice production being the main economic income for the region, 70% of the country’s water is used by the agriculture sector. Some farmers plant crops outside of the designated irrigation zones, and do not conserve water or plan for water efficiently.

22 The demand for increased agricultural productivity has led to the use of more chemical fertilisers and pesticides, which seep into the waterways and systems during monsoon rainfall.


25 Sutherland, “Thailand water Quality and Sanitation,” 7.


2.2.4 Politics regarding water

This year, 2015, the drought has caused a major water shortage in Thailand and the country is still waiting for overdue rain. It is said to be one of the worst droughts in a decade. In an attempt to conserve water the Thai government has instructed farmers to put on hold planting rice since October 2014. Twenty This is not the first time the government has warned the people about water shortage. In 1994, a drought meant farmers had to use less water and were banned from planting second rice crops. The government is considering a tax on water use.

"This opportunity puts Thailand in a position to be a forerunner in creating a sustainable infrastructure for the precious resource that is water." - Michael Sutherland

"Water scarcity is set to hit Thailand hard by 2025. The country must develop a long term plan to manage these challenges." - Sahisna Suwal

22 "WATER IN CRISIS – THAILAND."
The Green Isaan project
From 1981 to 1986 the Green Isaan project was the first government-run study that searched for water solutions in northeastern Thailand. Initially, the scheme was to use an inter-basin transfer, storing 5 billion cubic meters of water to supply 288,000 hectares of land. The army commander, Chief General Chavalit Yongchaiyudh, had intentions to become prime minister and presented the King with The Green Isaan scheme. Yongchaiyudh diverted 80 million baht from the government to prepare for the project but it never materialised.30

The Khong-Chi-Mun
Between 1988 and 2000 The Khong-Chi-Mun scheme, explored by the National Energy Administration, proposed a pump irrigation system and a reservoir to store water during floods in the affected areas. This was to supply water for an area of 796,800 hectare in 15 provinces. Part of the scheme was constructed, including weirs in the Chi and Mun floodplains, large and small pumping stations, the Rasi Dalai Dam and the Huana Dam.31 The Rasi Salai Dam caused major problems. It affected the ecological balance by flooding the villagers’ agriculture and wetland, who protested for lost and damaged land. The government withdrew the scheme, instead encouraging private investors to build dams in the neighboring countries and supply water for Thailand32 leading to the rest of the project being incomplete.

Government proposals
In the past, Thai governments have proposed various schemes to solve the water issues in the northeast, Isaan, region of Thailand. These projects included; The Green Isaan, The Khong-Chi-Mun, The Water Grid, and The Transfer from Lao-PDR projects. These projects were large in scale and all promised to supply plentiful amounts of water for the arid plains of Isaan. Most of these projects never materialised and the projects that began development caused some issues. Because Isaan makes up a large portion of Thailand, Thai politicians realise there is great opportunity in gaining support from the Isaan population to benefit their electoral parties.37 By offering policy proposals regarding the water quantity, often unrealistic and never implemented, at the aim region, means the parties gains more votes.38

Earlier projects
From 1975 to 1976 the government made funding available for small scale infrastructure (compared to other schemes), constructing several thousand village ponds and weirs in Isaan. They still exist today and are the solution for water scarcity in Ban Thang Khwang.

“Once one ventures from the nations beauty and its past, one can see that its growth and journey into the modern world has created a problem with the water supply that is fast approaching” — Michael Sutherland39

The Water Grid
In 2003, the Thaksin government pursued a scheme called the Water grid which promised to irrigate a 209,600 hectare area. The project was to utilise sets of interconnecting reservoirs and basins to move water to places that were lacking water. Isaan gained the most benefit. The plan included transferring water from the Kok-Ing-Nan, Salween-Ping, Cambodia and three Lao rivers. The project was dismissed in question of its cost effectiveness and feasibility in terms of engineering.33

The Transfer from Lao-PDR (Lao Peoples Democratic Republic) projects.
In 2007, another mega project was on the rise. The Transfer from Lao-PDR project was intended to tap into Laos’s side of the Mekong River. The plan included diverting water from the Mekong, through underground tunnels, to a reservoir located in Thailand. These storage facilities would then transfer water through pipes to other provinces during a drought.34

These mega projects had good intentions for the northeast, Isaan region. However the example of the Rasi Salai Dam indicates that moving large amounts of water from one place to another could affect the ecosystem. In the case of Ban Thang Kiang, the solution led to using the water they already had.

Figure 2.20 Large water projects

Figure 2.21 Free the river
Nearby villages and towns
Looking briefly into the nearby towns and cities reveals that the water sources of these places are still being treated poorly. The pollution and damaging of the waterways occurs within these locations. If this is to be the future of Ban Thang Khwang then something has to be applied to avoid the same outcome. These locations show advance in other aspects of life but the water infrastructure is still a few developments behind.
Existing water sources and solutions in the village

In Ban Thang Khwang these are the main types of water sources; the roof collection mainly used for washing and sometimes consumption, the shared community pond mainly used for washing, animals, and plants, farm ponds owned by individuals for their agriculture and bottled water for consumption.

The roof is mainly used for washing and consumption but this can cause major health issues as the water maybe contaminated due to the roof surface being unclean. Also the water storage tank, if not cleaned often can also cause contamination. The community and the farmer’s individual pond may at times not be enough to last through the dry season. The bottled water maybe too expensive for some of the villagers. Some of the private suppliers of water are small organisations within the region and it is unsure whether they are following the procedures required to supply safe quality of water.
2.3 Culture Context

There are various theories about the origin of Thai people, but the most influential groups are the Mon and the Khmer. These two groups established kingdoms within areas which are now part of Thailand. From the ninth century, the Mon people, believed to have come from China, occupied central and western areas of Thailand and Myanmar. During the period 802 AD to 1431 AD the Khmer people occupied Thailand, Cambodia, Laos, and Vietnam. Their culture was heavily influenced by India. Their main religions were Hinduism, Buddhism, and Animist. The surrounding countries such as India, China, Myanmar, Cambodia, Laos and Vietnam are all contributors to Thailand’s religious, social and cultural identity.

The population of Thailand is 68 million, 95 percent of which are Theravada Buddhist, which affects Thai people’s daily lives. Buddhism is the main influence for culture, philosophy, art, morality and many folkways and festivals. The wat temple plays a major role. From a young age, most Thai children in the rural areas are brought up playing on these grounds. When children grow up they attend many rituals, celebrations, fairs and performances held in the temple. Due to the influence from Buddhism and Animist beliefs, Thai people are very superstitious and religious. They believe all natural things have a spirit or soul and are highly respectful of others, especially those who are older, or have a higher status. These influences are reflected in the way Thai people treat their body hierarchy and how greetings, giving thanks, and apologies are conducted towards one another.

Thai people are family orientated with several generations living together in one house. The oldest male is considered the head of the family. The grandparents are generally the ones who will raise the grandchildren as it is common for both parents to work abroad, or in the major cities. The children are very respectful of their parents and grandparents, and will obey them, even as adults. Parents give and provide everything for their children. It is expected that the children, once grown, are to give back and support their parents.

In the northeast villages, Thai people are community orientated and members of the village are very thoughtful and friendly towards each other. During the festive seasons and ceremonies the community will come together to help run the event. If some farmers need help with rice harvesting, their peers are more than willing to support. In Ban Thang Khwang, people have come together in the past to build the existing water system. This process demonstrated that when there is need for improvement which benefits the community, people are willing to be involved. By being included, villagers feel they are influencing the project which gives them a sense of pride and ownership.

25
Festivals and Rituals

Festivals and rituals are important to the Thai community as this is the time when everyone comes together to celebrate. These gatherings are normally held in public areas, in Ban Thang Khwang village, the school and temple are the designated locations. There are three festivals which relate to water: Songkran (Thai New Year), Bun Bang Fai (rocket festival), and Loy Krathong (raft floating).

Songkran

Songkran marks Thailand’s New Year. In the Indian language of Sanskrit, used by Buddhist Monks, Songkran means movement and is symbolic to the Thai astrological belief of the sun moving to Aries. Water is important in Songkran and relates to the folktale of how a young man, Dhammapala Kumara, outsmarted the god, Kapila Brahma, by solving his riddle. As a consequence of being outsmarted, the god cut off his own head and it is believed that wherever his head fell would result in a particular disaster. If his head touched the earth, the planet would burn; if it fell through the air, there would be a drought; and if it touched the ocean, all the water would dry up. The god’s seven daughters stored his head in a cave to prevent these disasters, and it is removed annually for worship; this is the day of Songkran.

Today, Songkran is celebrated over three days from 13 to 15 April, which is also during the hot season. The Thai people use this time to perform rites to show respect for their families. This includes the younger generation paying respect to older family members by sprinkling water on their hands. This is a formal ritual, which the community comes together to celebrate. Parades of decorated floats, along with performances are all part of the ceremony. There is also a less formal event where people throw and splash water at each other.

Bun Bang Fai

Bun Bang Fai, the rocket festival, is a plea to the god for rain and a celebration of fertility. It relates to the folktale of Phya Thaen, the rain god and his jealousy of Phya Khankhaak, the toad king, who was respected by many creatures. This jealousy meant the rain god refused for the Naga (serpent) to continue playing in a heavenly lake, preventing the rain to fall to earth. A fight broke out between the rain god and the toad king and in the end, the battle was won by the toad king. As a result, the rain god promised he would allow the Naga to continue playing in the heavenly lake, and to send rockets up from earth as a reminder annually; this is the day of Bun Bang Fai.44

Bun Bang Fai occurs in May and it is traditionally performed by Laos and northeastern Thai people. The ritual consists of a parade carrying the rocket around the community to arrive at the rocket launching location. Following the rocket carriers, are drunken band members playing musical instruments. Once they arrive at the destination the village crowds around to watch the rocket being sent up as a signal for rain.

Loy Krathong

Loy Krathong, the raft floating festival, is to give thanks to Mae Khongkha, the water goddess (Thai form of Ganga, the Hindu goddess of the Ganges River in India)45 for giving us water to use, and at the same time apologise for polluting it. This celebration occurs in November, when the weather is cool and the water level is high after the monsoon season. The ritual consists of Thai people floating small rafts, Krathong, originally made from banana trunks and decorated with flowers and a candle, in a large body of water.46 A ceremony with parades of floats and performances is held during the day and at night the rafts are released, followed by performances and music for people to enjoy.

Conclusion

It is great that these rituals are still practised today, but when participants are performing the rituals is it uncertain whether they are aware of the real issues. During Songkran, even though a dry period with water shortage, people continue throwing water. The rocket festival implies the god is relied on to give rain for a good harvesting season. And the Loy Krathong festival is to give thanks and at the same time apologise for polluting, yet large amounts of rafts are released all around the country blocking water ways, polluting the environment and harming aquatic life.47

These rituals have become institutionalised and it is normal to carry out their actions, regardless of the consequence. However, we cannot take tradition away from culture and these rituals and celebrations are part of the Thai people. So the question then becomes;

how can we utilise these opportunities to bring attention to the importance of water issues?

44 Prasong Saihong et al, Telling Tales From Southeast Asian and Korea: Teachers' Guide (Bangkok: SEAMEO, 2010), 93.
47 “What the River Knows: Ping River”
3.0 STATE OF KNOWLEDGE
3.1 Culture and Tradition

The Oxford Dictionary describes culture as:

“The art and other manifestations of human intellectual achievement regarded collectively. The ideas, customs, and social behavior of a particular people or society. The attitudes and behavior characteristics of a particular social group.”

The Oxford Dictionary’s description of tradition is:

“The transmission of customs or beliefs from generation to generation, or the fact of being passed on this way.”

The definition suggests culture is a group of people who share the same ideas and social behavior. Tradition is the passing on of knowledge, customs or beliefs from generation to generation. In Ban Thang Khwang, these traditions can be seen through the water related rituals (Sonkran, Bun Bang Fai, and Loy Krathong) which are still practised and celebrated today.

“Traditions are sustained if they have meaning; they must be practical or they may be symbolic, but they are frequently of fundamental significance for cultures concern.” – Paul Oliver

Paul Oliver suggests tradition is retained if it has meaning, and is significantly practical or symbolic to the culture. In terms of architecture, ‘culture and spaces’ are related; we are all members of a culture who inhabit the same territory, which influence our values and behavior. Oliver believes culture defines the buildings and spaces to accommodate people’s needs; that culture evolves through time; and that the next generation learns from tradition, and adjusts it to the changing environment.

“Over time, culture have determined the buildings that will accommodate their needs, subsequent generations drawing upon their traditions and tempering them as changing circumstances warrant.” – Paul Oliver

The water-related traditions should be retained, as they are important and symbolic to the Buddhism religion and Thai culture. We can offer additional devices to help the celebration become more practical at the same time. These festivals are ideal places to bring attention to water as they already embody cultural and spiritual values. The festivals bring people together, making it a good place to create community engagement. Along with cultural and spiritual knowledge, we can also introduce a physical understanding of water to create a more holistic view and bring awareness to its related issues. Pollution to water, during and after these festivals, can be helped by educating people.

It seems once people go back and continue their normal daily lives that the rituals’ intentions are forgotten. Having architectural interventions in or near the rituals’ locations, may influence people’s values and behavior. We should draw on ideas from tradition and evolve them to the changing situation. They may give clues as to where, and what kind of interventions could be needed to bring awareness.

“Traditions are sustained if they have meaning; they must be practical or they may be symbolic, but they are frequently of fundamental significance for cultures concern.” – Paul Oliver


3.2 Rituals and Events

Public rituals and ceremonies are seen as important social devices, which help a group of people to unite and strengthen their social relationship. The rituals are valued by the people and are a symbol of tradition. Ceremonies are reoccurring, and are usually performed in the same place and time. To achieve the religious and social goals, rituals perform repetitive actions in a physical place, and the location of these activities is important.\(^{53}\)

Archaeological studies show that rituals are often turned to in times when something cannot be explained.\(^{54}\)

Ceremonies can be on public display to expose the rituals and gain attention. Rituals may consist of praying, ideal movement and certain gestures according to their routine. These rituals normally involve objects which bring attention to the purpose of the ceremony, and can be in the architecture or equipment.\(^{55}\) For example in the Loy Krathong ceremony, the small rafts are used as the symbolic physical object to give thanks to Mae Khongka, the water goddess.

Rituals and Events

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Tea Ceremony

Lucy Block discusses how architecture and landscape are used in the Japanese tea ceremony to achieve enlightenment. Increasing the consciousness regarding one’s actions allows for the spiritual transformation of normal daily activities. The participants of the tea ceremony go through sequences of actions and gestures to experience the transformation.

Symbolic elements are strategically placed within the environment, affecting the participant’s body as they transition through the landscape. This journey’s purpose is to increase the participant’s awareness of each action they perform. Thresholds and aesthetics are used as forms of connection and act as the barrier between the sacred spaces and the profane. The pathways are designed purposely to slow people down to experience spaces longer. This is done by widening of the path or breaks in the stepping stones allowing people to slow their movement and become more conscious of each step.

The sensory experience is another vital part of the ritual. Senses are amplified to focus on mundane acts; smelling the garden, listening to the water boiling, tasting the tea, and touching the utensils. Block implies that the journey cannot be experienced in a simple movement, but it is made up of multiple components, where the participant’s route is “orchestrated.”\(^{56}\)

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\(^{55}\) Renfrew, The Ancient Mind, 47 - 54.


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No event, no architecture and Motation

Bernard Tschumi argues that there is no architecture without an event. The events are the activities which occur inside the building; they can be referred to as use, function, or programme. This proposition has no architecture without everyday life, movement, and action.

Tschumi explains the relationship between spaces and the events that occur within them as an act of violence. This suggests that when human bodies move through a building they are intruding and carving the space. This is his metaphor for the dynamic relationship between people and their surroundings. The violence, or action of movement, is not always occurring but it is always implied by the spaces. Architectural spaces imply, or suggest, that they want to be intruded upon, or used by the occupants. For example the doorway suggests movements through it. Architectural spaces imply, or suggest, that they want to be intruded upon, or used by the occupants. For example the doorway suggests movements through it. Architectural spaces imply, or suggest, that they want to be intruded upon, or used by the occupants. For example the doorway suggests movements through it. Architectural spaces imply, or suggest, that they want to be intruded upon, or used by the occupants. 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Architectural spaces imply, or suggest, that they want to be intruded upon, or used by the occupants. For example the doorway suggests movements through it. Architec
Projects which share the idea of bringing attention to water were analysed. The purpose was to look at how and what architectural devices are applied in the design to achieve water engagement. The analysis is organised in three different scales; small (human scale), medium (at a building scale), and large (urban scale).

### Small

**WarkaWater2, Architecture and Vision, 2014, Conceived for Ethiopia**

This concept was originally for a community in a rural area with a lack of water. It is a structure which collects rainwater, dew and fog. The design has the intention to be able to be built and assembled by local villagers. With a special fabric skin, the tower is estimated to collect 100 litres of water per day.62

**Elements used for engagement:**
- Structure itself brings visual attention to water
- Shade created brings people together
- Fabric is used to collect water and is visually exposed to observers
- Container is used to store water and also provides the point of contact


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**Glaciarium, Future Cities Lab, 2008, Van Alen Institute, New York**

Glaciarium is an interactive instrument which engages with individual users. An ice cylinder is located in an enclosed package which slowly melts and is collected in a container. The user is being made aware through the ice melting and listening to water drops being collected.63

**Elements used for engagement:**
- The intervention, as an object, brings attention
- A hole focuses the viewer’s attention to the process of ice melting
- The container below collects the water drops, creating attention by amplifying the sound
- A stand is used to elevate and bring the installation to eye level


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**Osaka folly, Peter Cook and Christine Hawley, 1990, Osaka, Japan**

This project was constructed as part of the International Garden and Greenery exhibition in Kazuhiro Ando. It is an interactive design for the public to engage with water and brings attention to a nearby lake. Every two minutes, the water discharges from the folly and moves the yellow wand across a steel façade. To figure out the phenomena, people enter the folly to take part in the interactive process; participants become part of the event.64

**Elements used for engagement:**
- Narrow corridor is used to bring participant closer to the water screen
- Large glass screen is used for water to run down and visually connect with people and expose them to the lake
- Transparent walkway is used to allow a water collection underneath
- Container of water collects a large body of water and every two minutes tips the water through the façade to create the phenomena
- Enclosure protects and provides a calm space in a hectic experience

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![Figure 3.8 Warka Water Structure](image1.jpg)

![Figure 3.9 Glaciarium Installation](image2.jpg)

![Figure 3.10 Osaka folly](image3.jpg)
Medium


Based in London, the factory is an exemplar of a rainwater harvesting infrastructure which treats water and cools the building. Water is collected through the site including a man-made lake, carpark building surface and roof. These systems become the design features, exposing the process of water collection and the treatment process. The sounds from the systems gain the occupants attention.65

Elements used for engagement:
> Program is brought to the body of water to create engagement
> Roof is used to collect water and transferred to lake
> Pool of water is visible to visitors and occupants
> Treatment trays are exposed to demonstrate the process
> Mechanical systems are exposed and become features of the design


Brooklyn Botanic Garden, Weiss Manfredi, 2013, Brooklyn, USA

This Visitor Centre is located in Brooklyn and it’s a self-sufficient water collection, storage and management system for the garden. Water is treated and transferred across the site and the building wraps around ponds to connect users to water. The design is the threshold to the site. The route into the building allows people to move through from the street and engage with the landscape and water catchment areas.66

Elements used for engagement:
> Pathway to create the journey and circulation network
> Seats bring people lower to the water
> Roof of pathway for viewing
> Shelter shades people from the elements and pauses people to view the site
> Threshold used when passing through significant point to focus on water
> Terraces to provide a stage as a viewing platform
> Program is brought to the water to create engagement
> Roof is used to collect water and is accessible for people


Teshima Art Museum, Ryue Nishizawa and Rei Naito, 2010, Takamatsu, Japan

Located on the Teshima Island, formed like a droplet of water, this project is an art museum and installation in itself. Drawing attention to the surrounding and natural elements, it allows various phenomena to occur. The enclosure amplifies these natural elements to bring more attention to them. Pools of water build up on the floor creating sounds as it freely moves in the direction of the breeze. The ambient quality changes throughout the day according to the sun’s position. The sound from the sea echoes through the space.67

Elements used for engagement:
> Shell, enclosure is used to amplify and bring attention to water
> Floor surface is used for water to travel and glide across

Large Water Square Benthemplein, De Urbanisten, 2013, Rotterdam, Netherlands
This Water Square is located in Rotterdam and is a public recreational space which exposes water storage in case of a flood for the surrounding area. It is aimed to improve the surrounding environment and create a central place for the community. Most of the time it is used for recreational activities, only when it floods water takes up the space.^{68}
Elements used for engagement:
> Pathway to create the journey and circulation network
> Seats bring people lower and appreciate the site
> Widening of pathway for dwelling
> Terraces to provide a stage as a viewing platform
> Steps are used to bring users down to water levels
> Floating platform allows people to engage with the rising of water level
> Pools for full submerged water contact and storage
> Program is brought to the water to create engagement

Harbour Bath, BIG and JDS Architects, 2003, Copenhagen, Denmark
This project is located in Copenhagen and is an industrial harbour turned into a recreational public bathing area which also provides cleaner water. Social interaction is encouraged and people are able to relax and play to increase quality of life.^{69}
Elements used for engagement:
> Pathway to create the journey and circulation network
> Seats bring people lower to appreciate the site
> Widening of pathway for dwelling
> Terraces to provide a stage as a viewing platform
> Projection to bring users closer to the water
> Steps are used to bring users down to water levels
> Floating platform allows people to engage with the rising of water level
> Pools for full submerged water contact
> Ramp leading people into the water
> Program is brought to the water to create engagement

Houtan Park, Turenscape, 2010, Shanghai, China
Houtan Park is located at the river front of Shanghai's Huangpu River, and is built on industrial reclaimed land. It is a constructed wetland which treats the polluted river water using natural treatment and management systems. The site is a large public pace which includes agriculture for food production.^{70}
Elements used for engagement:
> Pathway to create the journey and circulation network
> Seats bring people lower to appreciate the site
> Widening of pathway for dwelling
> Shelter shades people from the elements and pauses people to view the site
> Threshold used when passing through significant point to focus on water
> Terraces to provide a stage as a viewing platform
> Projection to bring users closer to the water
> Pockets of intimate spaces to allow a group of people to engage with each other and the surroundings
> Steps are used to bring users down to water levels
> Bridges are used to elevate pedestrians and also cross path with water
> Elevated platform/lower to allow for the whole site exposure

[^69]: Zoe Ryan, Building with Water (Berlin: Birkhauser GmbH Basel, 2010), 110.
[^70]: Meeks, and Wiener, Design in the Terrain of Water, 64.
4.0 DESIGN PROCESS
4.1 Site Analysis

Reliable drinking water distance from Ban Thang Khwang

This shows the distance to trusted bottled water suppliers from Ban Thang Khwang; the water is delivered or can be picked from these locations and is sold at the local shops in the villages.

Ban Thang Khwang’s water colours

The water’s colours (refer to water colour chart) suggests it is high in nutrients and has large amounts of algae growth. In the case of the village running out of collected rain water, the pond is the next available source. To treat the pond water for consumption it will have to be treated with a mechanical system (refer to water in Thailand is unsafe to drink section) so it is safe to drink. However, we can increase the water quality by having an integrated natural treatment process, to reduce the amount of mechanical treatment needed.
Main roads

Shown are the main roads of Ban Thang Kwang which connect to the wider context. This shows the accessibility and possibility for intervention placement to engage with visitors.

Zones

The orange section is the living area; yellow is the public area; and the rest is farmland. The diagram reveals the public zone; we can assume the next public project maybe placed within this outer ring.

Figure 4.4 Main Roads of Ban Thang Khwang

Figure 4.5 Ban Thang Khwang Zones
Initial Concept

The first concept of the waste pond treatment system uses the body’s hierarchy as the driver. As the participant transitions through the system, their head height changes level, becoming more aware of the treatment process and different spatial qualities.

Illustrated is a moment in the water treatment process; allowing the participants to experience the transition from dark to light, reflecting the process of water being purified by the sunlight.

This was not developed further as this moment in the process produces harmful gases. However, the ideas of transitioning and hierarchy is pursued in the next stages.

Figure 4.6 A Moment in Water Treatment Process

Figure 4.7 Waste Water Treatment Concept
To understand what happens during the water related festivals symbols are drawn to represent participants and objects to record their activities.
Figure 4.9 Festival Journey

Journey of the festivals were recorded to reveal their path and location of each activity.
Songkran
Recording of the parade, the recording of the festivals are done by using the symbols drawn earlier.

>Public ritual; to show respect to the elderly, young people gather to pour water on their hands. This event normally occur at the school grounds in Ban Thang Khwang.

>Public ritual; people gather around at the temple to pour water on Buddhist relic.

>Performances; people gather around to enjoy the performance, some continue to splash water at one another.

>Merit making; people are releasing aquatic animals into the water.

>Gathering water; people gather water during the Songkran festival, some wait for other people who arrive to splash water at them.
Isolation of activities

The parade ritual occur at the same time, but an example of isolated activities are separated to show the individual movement of different participants.

The parade activities overlap to show the movement occurring together.

Public parade; floats, and performance. People are allowed splash water on to each other.

Figure 4.11 Festival Recording 2
Rhythm analysis

- Line; represents the stop rhythm
- Grey; represents the engagement with water and between people
- Magenta; represents stationary points of people

From the analysis we can see where people are stopping to engage with each other, revealing an opportunity to place an architectural intervention. These are explored further to try and architecturalise the findings.

Note:
The recording set is only illustrated in this document for Songkran to demonstrate the process. For the full recording of the Loykratong and Bun Bang Fai festivals, refer to in the appendix.
Carving space
The previous analysis allowed the exploration of spaces to occur. This iterations carve out the movements of the events taking place during the festivals. Movement, stationary points, and engagement actions are architectualised by applying elements to them. The exploration is intended to extract possible spaces or elements to inform the design.

Songkran
Movement carved out of a solid; path
way
Wrapping the space; wall
Extruding the stationary points; column
Surface element above; roof/ceiling/shelter
Surface element below; floor/ground
Combination to show how they can work together

Figure 4.13 Festival Carving Space
Element analysis

The movement carved out suggests a path way.

These exploration revealed what kind of elements could house the activities. The stationary points (column) allowed point of interaction and reference.

The wrapping of space (wall) separated the different activities.

The surfaces above (roof) created a shelter.

The surfaces below (floor) created a platform.

From the process conducted we learn that different elements are able to be placed to house the activities. However, one cannot imagine or record every movement of a participant, this is only a general assumption. We don’t have to wrap the spaces to house the activities; the stationary point (column), surface above (roof), and surface below (platform) allow individual to freely move, but as they filter through these devices may catch their attention. The wrapping and carved out movement (path way) is still a valid device, as they suggest the intended movement. We can use these devices to guide participants through the journey.
Earlier in the document, (refer to festival descriptions) it suggested that after participating in the rituals people forget its intention. This led to the question of how and where we could use architectural devices, to bring attention to water, in people’s daily activities.

These diagrams represent the general daily route of each individual family member. For the purpose of this research, hypothetical family members are analysed: grandfather, grandmother, father, mother, son (young adult/teenager), daughter (child).

From the journey analysis we are able to determine possible locations and program which cross paths with the daily activities to create water engagement.
Conclusion

The analysis informed the following program:

School for water treatment facility, to provide education for the children attending school. The facility requires maintenance therefore a house will be designed to accommodate the maintenance person and their family (in the village there is an existing maintenance family’s house located in the school, however for the purpose of exploring water engagement a new house is proposed)

Internet café to create engagement with the young adults/teenagers (there is an existing internet café, however for the purpose of exploring water engagement a new internet café is proposed)

Temple water engagement platform

Entrance pavilion; sala; for people to stop and rest (there is an existing pavilion, however for the purpose of exploring water engagement a new pavilion is proposed)
Family daily activities

Figure 4.19 Family Daily Activities

The maintenance house is used as an opportunity to incorporate water engagement devices; adding another layer and awareness in the everyday activities.

To inform the design we must look at the various activities which occur within a generalised villager’s home. They are analysed to locate possible intervention opportunities, determine which spaces are needed to accommodate the activities, and what activities are performed.

The recordings are generalised, there are several activities which occur in family homes that are not considered in this exploration.
Family activities grouping

Representation of individual family member’s activities from the grouping means we are able to recognise what kind of spaces the house may require and what activities are performed by who. This allowed the assumption of which activities are the most popular within the family, and then we are able to locate the best places to influence as many family members as possible.

Compatible activities

The activities are grouped according to their similarity and compatibility.
The program groupings are arranged according to the hierarchy: water cleanliness, cultural values, and privacy. The diagrams are then able to inform the layout of the programs and how they can be valued within the house hierarchy. Water awareness is the main goal for the project and everything else is considered secondary. The hierarchy values will be tested in the maintenance house.

**Hierarchy**

**First row; water cleanliness**
- Water storage is very important and should be kept clean before being used for various activities. Water filters down the activities according to the cleanliness and water requirement.
- Sleeping, less movement and equipment than other activities
- Living, not as clean as sleeping due to movement causing sweat
- Making and fixing, materials and objects being used may contaminate the water
- Rice, may affect the water or affected by water making it mould
- Washing and cooking, chemicals and waste from human could affect the water
- Plants, could benefit from the recycled water from the above activities
- Animals, waste and odours affect water
- Vehicle, waste and fumes affect water

**Second row; cultural values**
- Rice and water, due to the respect of rice and water gods they are in the higher status
- Sleeping, rest is required to perform other activities the next day
- Living and cooking, cooking and food is a major part of villager’s lives, this is where the family spend most of their time together
- Making and fixing, creativity and ingenuity is an important skill to have for the villagers
- Washing and bathing, important to maintain our well being
- Vehicles and animals, asset in village activities

**Third row; privacy**
- Sleeping, requires the most privacy
- Rice and water, each family collects and grows their own
- Vehicle and animals, owned by the family
- Cooking and washing, private activities is kept from the public’s sight
- Living, guests are welcomed here first
- Making and fixing, a social activity which is exposed to other villagers

Figure 4.21 Family Activity Hierarchy
Environmental Hierarchy

The environment hierarchy diagram forms a guide to refer to when planning activities within the maintenance house.

Wind hierarchy

The diagram indicates the activities which require wind and ventilation the most.

Sleeping and living are the most important to make it comfortable for the occupants. Cooking and washing is pushed further back so the smoke and odour is blown away from the living area. Vehicles and animals, due their odour, are the last to receive wind.

Sun hierarchy

The diagram shows activities which require sun and which require the most shade.

The living and sleeping require the most shade, sleeping is placed facing in the sunrise to help the villagers wake up for their daily activities. Machinery and vehicles are less important for shading. Cooking and washing can benefit from sunlight, washing to dry clothes and cooking in the early morning.

Figure 4.22 Wind Hierarchy

Figure 4.23 Sun Hierarchy
Rain hierarchy

The diagram shows the activities which require to be the most protected from rain.

Living and sleeping are the most important activities to stay dry. Secondary is washing and cooking. Animals and vehicles are the least important to be kept dry, but in the village houses are normally kept under the living area or the rice house to be protected from the elements, so do require shelter but are of less importance.

Figure 4.24 Rain Hierarchy

Figure 4.25 Cooking lady
Family Activities Carved

The profile of the activities are extruded to show the spaces they require.

Carving out activities from solid revealed the left over spaces which are not required for the activities to be carried out.

Wrapping a surface around the spaces demonstrated how we could house the activities.

This exploration gave clues as to how the spaces can be wrapped (house), what spaces are required for the activities, and those that are not required. The spaces that are not required become the point of interest and further exploration is carried out for potential placement of architectural devices.

Figure 4.26 Family Activity Space Required

Figure 4.27 Washing dishes
Leftover Spaces Analysis

1. Uncarved solid
2. Carved solid to reveal leftover spaces, available space to position the architectural devices
3. Possible options for placements, arrow shows the activities that will be affected
4. Transition between activities, possible devices along these axis or journey
5. Boundaries between activities, possible placement along the defined boundaries
6. Threshold/opening between activities, possible placements within these openings

Leftover space analysis gave options as to where the architectural devices can be applied, bringing attention to water without interrupting the everyday activities. However this does not determine the final form, it is only an exercise in understanding the activities and the affect on space. Only the idea of possible placement is taken from this, we cannot determine every movement of the occupants but we can suggest a space for the activities to occur.

Figure 4.28 Family Activity Leftover Space

Figure 4.29 Bucket of water
4.5 Brief

Through analysing the site and water conditions, it lead to the conclusion to have the following programs:

- Community mechanical water facility to collect and treat rain water for consumption.
- The existing communal water catchment pond as the secondary source for consumption, a natural water treatment process is applied to lower the contamination before it reaches the mechanical treatment facility.
- Maintenance house to be designed for a family. Water tower, the existing water supply from the communal pond is kept to serve the village, the tower will stay to serve its purpose.

Derived from the festival analysis are the following interventions:

- Festival pavilions
- Performance shelter
- Water engagement platform

From the family analysis derived the following interventions:

- Entrance pavilion
- Internet café

These programs became the interventions which will be designed and explore in the following stages to test the architectural devices. The main goal is to bring water awareness to the community at different scale.

Figure 4.30 BTK street sketch
### 4.6 Interventions

**Overall scheme masterplan**

Waste water distance and prevailing wind requirement:

- For waste water treatment ponds are to be placed at least 150-300 meters away from the living area.
- The ponds should be placed downwind with the longest side parallel to the direction of the prevailing wind.
- The ponds should be placed lower than the living area.\(^{71}\)


Figure 4.31 Recommended Waste Water Pond Placement

Figure 4.32 Master plan sketch

A conceptual drawing of the overall layout of the interventions.
villagers family daily route

villagers festivals route

proposed water treatment process layout

overlay of all programs

Figure 4.33 Overlapping layout

Master plan concept
Overlaying the different programs to reveal their intersects, at the major intersection architecture intervention were developed.
Figure 4.34 Site Axonometric

The layout of the site with intervention implemented, showing the entire system working together. By overlaying the water treatment process, festival, and villagers daily activity.
A diagram was constructed to reflect the water cleanliness hierarchy diagrams. The floor plates were added and arranged according to the environmental hierarchy. The model showed the general idea but lacked detail, a more detailed model was required to explore the concept even further.

**Model is made from the water cleanliness hierarchy.**

**Level 6**
Raw water storage and viewing platform

**Level 5**
Water filter process

**Level 4**
Sleeping

**Level 3**
Living area

**Level 2**
Making and fixing

**Level 1**
Wash, bath, cooking

**Ground floor**
Vehicle, animals

A more detailed model was made to explore the structure and tectonic connections.
Floor plates were added according to the hierarchy of water values, cultural values, and environmental elements. Connectivity and transition between the levels are only allowed through the central vertical circulation, this lead to the next exploration of transition paths to suggest movement throughout the structure.

Paths are added to suggest movement through the structure. The journey is choreographed to engage with water storage and the treatment process. The path guides the viewer through the journey, at certain parts it pulls the viewer away from the water treatment system, allowing them to see it as a whole and then brings them closer to examine individual components. Further explanations and exploration was done through drawing sections and plans of each level. Sections and plans were produced to position the water collection, storage and treatment system within the design.

A further study of what is learnt from the ‘leftover space’ analysis needs to be carried out to determine the final placement of the water devices.
Figure 4.41 Maintenance House Section

Figure 4.42 Maintenance House Plans
Internet café
A diagram was constructed to represent the program in the internet café, using the environment hierarchy diagrams. The internet café is brought right into the swimming pond to allow the occupants to engage with the water.
A diagram to represents the intended movement. A path of the festival and the path from the internet intersect each other to provide interaction between the two activities. Where they cross proved a point where participants are able to change their journey.
A further exploration through the section drawing was conducted to implement the water engagement devices, it was placed along the journey towards the swimming pond to create a threshold.
A further structural exploration was done through a model. The structure supports the building, holds the water storage and treatment containers. As people transition, they filter through the threshold of the water collection process.

Figure 4.43 Internet Café Structure Model
Figure 4.44 IC Concept
Figure 4.45 Internet Café Section
Water tower
Models were made to explore the possible forms to enclose the water, exposing people to the water treatment process. Further exploration using what is learnt from the precedential study should be carried out in the next stage to develop the concept.

Entrance pavilion
Models were built to explore the possible forms of the entrance pavilions to encourage people to stop and engage with the water. Further exploration using what is learnt from the precedential study should be carried out in the next stage to develop the concept.

Festival pavilions
Models were constructed to explore the possible forms of the festival pavilions to encourage people to stop and engage with the water. Further exploration using what is learnt from the precedential study should be carried out in the next stage to develop the concept.
5.0 CONCLUSION

Figure 5.1 Village Children
This project offers a cultural, spiritual, and social approach to the various political and environmental issues surrounding the issues of water scarcity in Thailand. Cultural and tradition values were the major factors in the project; resulting in the outcome regarding water management and storage in Ban Thang Khwang.

From the understanding of the water cycle and the affect humans have on the environment, the project reflects the importance to balance water between human consumption and nature process. Water physicality and treatment method were studied to help inform design decisions so architectural applications could be carried out. The cultural, spiritual, and social aspects were analysed and explored, and overlaid with water physicality and treatment process. Allowing culture to be incorporated with the water treatment process; would enhance everyday activities, and the interventions would bring attention to water.

Through analysing the festivals and family daily activities, resulting in the programs and intervention position to create water awareness. Carving the spaces with the activity’s movement offered architectural elements to house the events. It also resulted in the discovery of the ‘leftover space’ that could be used to locate the architectural devices without interrupting the activities. However the design process it did not reach this stage and further exploration is needed to formulate final outcomes.

The water issues in Isaan are exploited by the government to benefit their electoral parties. The proposed mega projects affected the environment and people in the area, and are often left uncompleted, leaving Isaan dry. The culture contributes to water awareness. Through the analysis of ritual events and cultural values it revealed that the project needed to consider these values. These factors directed the projects application at various scales, which bring awareness to the larger issues regarding water as well as the simple and everyday acts that contribute to a larger whole.
6.0 BIBLIOGRAPHY
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Unless referenced otherwise:
All images are the author’s own
All maps and satellite images are: from Google Maps edited by the author not to scale orieted with North at the top of the page

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8.0 FINAL PRESENTATION
The author was one of the twelve architecture student finalists in the NZIA Graphisoft Student Design Awards 2015. The following drawings and the photographs were presented at that exhibition.

The following photographs were taken by Simon Wilson at the Student Design Awards 2015.
9.0 POSTSCRIPT
9.1 Village Visit

In 2015, after the completion of my research and final year at Unitec I took a group of 13 classmates and friends to visit the Ban Thang Khwang village. We stayed at my family home, interacted with the locals, went to the markets, visited my old school, and gathered food from my grandparent’s farm. Even with limited time my friends got to experience the village life and were exposed to the reality regarding the critical issues of water supply. There is great interest from the Ban Thang Khwang primary school to setup another visit and a possible project to engage with the children. I hope to stay in contact with the school and look forward to future trips.

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