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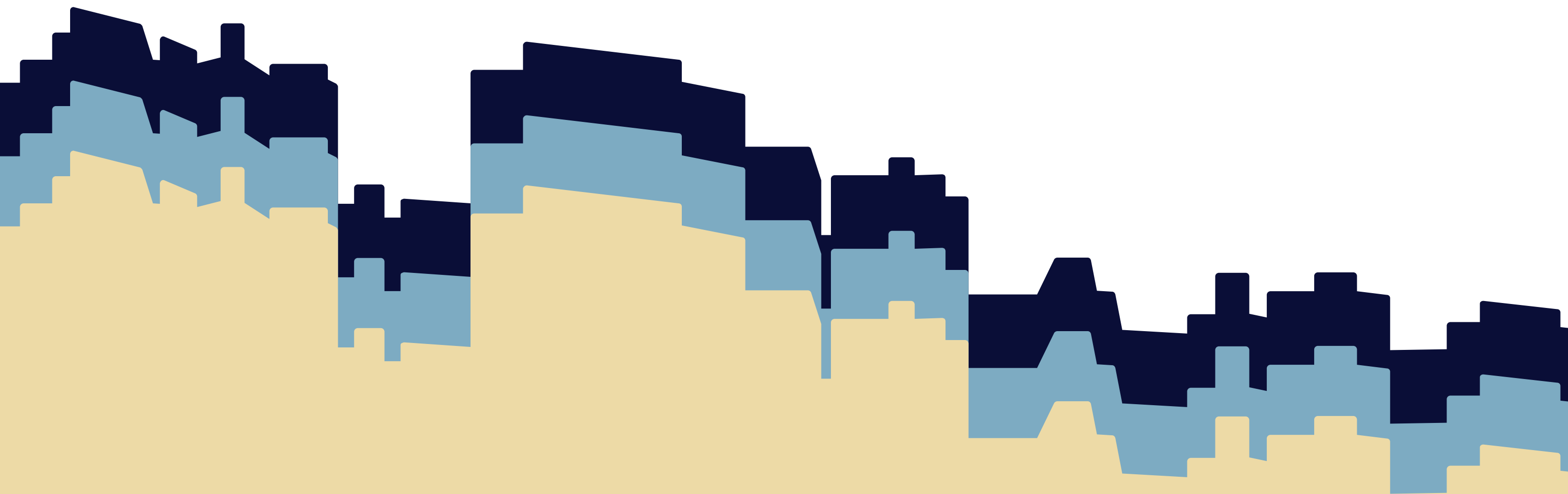

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THE COMMUNITY ARCHITECTS CHALLENGES IN URBAN POOR AREA

ASSOC.PROF. SEIJI TERAKAWA

KEYNOTE SPEAKER

The Community Architects' Challenges in Urban Poor Area

Day laborers /Homeless Town
KAMAGASAKI

The Community Architects' Challenges in Urban Poor Area

Day laborers /Homeless Town
KAMAGASAKI

Community Architects for Shelter and Environment is a group of Thai architects formed in 1997 with central interests in alternate dwelling visions.
We joined in 1998. Known as **CASE**, its major concern lies in the relationship between dwelling and physical, cultural as well as socio-economic contexts.
Both the physical environment and the human elements of the place are considered vital to **CASE**'s working mentality.

1998, CASE-Japan :CEO
Community Architects for shelter and Environment
Community development planning & Architectural Design office
2011～ KINDAI Univ.
Faculty of Architecture

AN APPROACH TO DEVELOP AND ADAPT BANGKOK URBAN INFRASTRUCTURE FOR FLOODING FUTURE

THANAKORN SUTHIAPA
KANJANEE BUDTHIMEDHEE

AN APPROACH TO DEVELOP AND ADAPT BANGKOK URBAN INFRASTRUCTURE FOR FLOODING FUTURE.

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INTRODUCTION

There are various effects of the global warming that causes troubles to humanity eg. Extreme events include storm surges, worse tropical storms, more rain, etc. Bangkok is one of the cities that will face extreme events and will later submerge soon while the existing infrastructure system cannot handle the changing of the new global climate. More and more parts of the city continue to submerge because the city infrastructure such as the city canal network is blocked by the water gate system. Each of it section by section, is barricaded whereas the urban drainage system cannot handle the mass of water. Together with the result of less urban green area and other factors, it is necessary to adapt Bangkok infrastructure into a flood resilient city. To adapt to the new global climate, urban planning, building regulation need to update those new factors into the new design guidelines.

This research was produced to study the urban strategies for future development to adapt to new factors such as seawater rise and, extreme weather events through the change of human habitat lifestyle from the existing condition.

Keyword: flood resilient, green infrastructure, extreme events, sea level rises, guideline, regulation.

Thesis question

- what kind of system can be implemented and adapted to the upcoming flooding eras of urban planning to prevent damages from more severe natural disasters such as floods and storm surges?
- how can we implement a new system into building block and/or urban planning with the least effect on the community?
- what is a possible guideline that scan offer beneficial suggestions to the recent problem?

MATERIALS AND METHODS

We have researched related case studies based on World flood prevention urban design and management to study the adaptation of design into each area. Some examples are coastal and urban development areas in the US as well as Thailand. It was proposed on green infrastructure basis on green spaces in city center and linking to other areas by bioswales.

In this research, we used methodological procedures as follows: Step 1: Develop a conceptual framework, practicing and theories. Step 2: Explore case studies. Step 3: Select sites and focus areas for practicing on research. Step 4: Propose and investigate information and comments from the focused group. Step 5: Synthesize information into knowledge to propose guideline/regulations.

Focus area

In this research, the focus areas are selected based on 2 area with different climates. The first is the developmental urban area on river line protection (Khlongsan), and the second is the Coastal area (Bangkhuntien) for the study of coastal extreme event prevention.

From JISTDA, flood frequently interactive map presents the annual flood area in each zone. Sites are set in 3 conditions including Low flood level (30 cm), moderate flood level (50 cm), and high flood (1 meter) for criteria of proposal design.

Each condition is set followed by historical flood height. Start from deep flood followed 2011 Historical flood, average height is around 1 meter, we set as the worst-case scenario for adaptation. The lower flood condition we suggest as frequently flood in each area by divided into 2 scenarios of the low flood (30 cm), medium flood (50cm).

Figure 1. Khlong San area frequently flood map from GISTDA

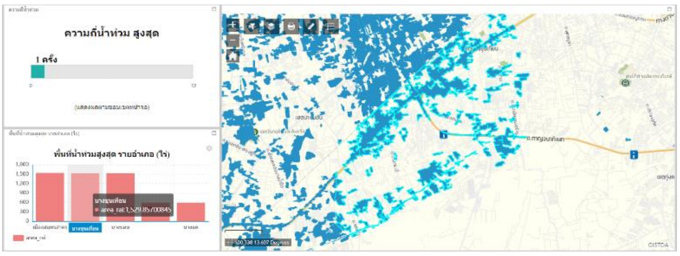

Figure 2. Bangkhuntien area frequently flood map from GISTDA

RESULTS AND DISCUSSION

Urban area (Khlong San)

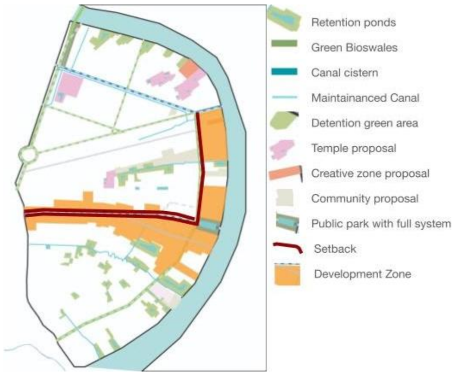

Figure 3. Khlong san area proposal map

Its urban area is divided into 3 levels based on 3 cases of flood level.

Level 1 includes all main roads improved as Bioswales and cisterns that store and provide better surface drainage with permeable surfaces from soft and hardscapes. From the proposal design calculation, the depths of all Bioswales of 3 meters and cisterns are at least 2.5 meters. The result calculates from the length and width of Bioswales and cistern are 484,300 cubic meters which is reach 101% of a low flood situation (462,720 cubic meters). Level 1 (484,300 cubic meters) consists of all empty green areas and public park capacity (438524.5 x 0.5 depth = 219,262.25 cubic meters) with its result is 703,562.25 cubic meters which already reach 91% of a moderate flood (771,200 cubic meters).

Level 2 includes all open space community zones and public zones together with residential areas (585474.5 x 0.3 = 175,642.35 cubic meter). The results combined with level 1 are 879,204.6 cubic meters which are 114% of a moderate flood.

Level 3 includes all development zone setbacks (10 meters width*3 meters deep) combines together with all level results are 1,017,504.6 cubic meters which are reaching 66 % of deep flood capacity (1,542,400 cubic meters). To reach 100 percent, all buildings are required to include a green roof covered the building footprint.

Coastal area (Bangkhuntien)

Figure 4. Bangkhuntien area proposal map

The coastal area is divided into 2 levels.

Level 1 comprises infrastructure including main road from Rama II road connected to Bangkhuntien-Chai Thalae road. All main roads improved as Bioswales that store and provide better surface drainage with permeable surface from soft and hardscape, draining the excess water mass to the ocean by passing the preserved mangrove forest. The capacity from Rama II roads (10 meters width * 3 meters deep) together with Bangkhuntien road (5 meters width*3 meters deep) the results is 1,957,620 cubic meters already reaches 80% capacity of high flood (2,448,000 cubic meter).

Level 2 extends the green infrastructure into residential areas and public building facilities and links to the main green infrastructure.

Level 3 maximum extend green infrastructure into residential growing areas and including existing shop houses and factories to support each other with the main green infrastructure network.

The coastal area needs maintenance on green area which is mangrove forest that helps absorb storm surges from extreme events that occur more frequently.

CONCLUSION

Guideline

Guidelines have been developed from the design proposal on 2 sites arranged into design guidelines for infrastructure in flood eras to prevent damages from climate change.

Urban area

Level 1: infrastructure

All footpaths are necessary to integrate Bioswales, cisterns, and inside water storage, Permeable materials are required in hardscape which work together with vegetation to let water pass into water feeder under the pavement. To work as the main green infrastructure system and connect each green area as a green infrastructure network. Each Bioswale and cistern capacity requires at least 3 meters high for water storage spaces and water feeding water mass to canal and river. All existing green areas and empty land are necessary to be improved as a green supporting area for absorbing rainwater and working as a detention zone to evaporate, delay water mass speed and absorb the rainwater to reduce floods that occurs in the surrounding area by adding perforated pipes and feeder system to send flood water to the public Bioswale.

Public parks can be rearranged to support the main flood support system and detention ponds can be added for water storage in the dry season. Specification of flood supporting green area units is required at least 0.3 times in the green area for the adequate volume.

Green area volume = area x 0.3(at least)

The natural barriers (Mangrove Forest) coastal area require maintenance and extend their width to stop the tidal waves and storm surges from extreme events on land and above, including residential, and other urban facilities.

Level 2: Community and culture zone

Community infrastructure. Hardscape and walkway inside community zone are required to rearrange by adding underground water storage inside feed to public Bioswales and link with green area inside community.

Art and culture zone, Rearranging hardscape inside the area can be done by adding underground retention system together with green area for supporting rainwater feed to green infrastructure grid.

Level 3: Development zone

Low rises building zone requires 2 parts. (1) Architecture scale green infrastructure, and (2) green roof for absorbing rainwater and being fed to storage on ground floor space as well as to public green infrastructure network. Setback and hardscape are required underground bio-retention and permeable hardscape on top for supporting rainwater to link with green area around the zone. High rise Building with large plot of landscape. Existing green space in the area requires implanting the feeders to drain absorbed rainwater into main green infrastructure to drain to river. High rise buildings require green roofs and storage tanks for supporting and recycling rainwater for use in the buildings. The drainage is fed directly into public Bioswales.

Coastal area

Level 1: infrastructure

All main road footpaths are necessary to integrate Bioswales, cisterns, and water storage inside. Permeable materials are required in hardscape and working together with vegetation to let water pass into water feeder under pavement. To working as main green infrastructure system and connect each green area together as network of green infrastructure, each Bioswales and cisterns capacities need at least 3 meters high for water storage spaces and water feeding water mass to river and ocean.

Green area volume = area x 0.3(at least)

The natural barriers (Mangrove Forest) require maintenance and extend their width to stop the tidal waves and storm surges from extreme events on land and above, including residential, and other urban facilities.

Level 2: Community and Facilities

Community infrastructure: land around each community and villages require underground bio-retention for supporting the rainwater and feed to public Bioswales Green area volume = area x 0.3(at least).

Level 3: Development zone

Factory buildings and shophouses can be divided into 2 parts in the following. Architecture scale green infrastructure for absorbing rainwater and feed to storage on ground floor space covered with permeable and feed to public green infrastructure network. Setback and hardscape around require underground bio retention and permeable hardscape on top to support rainwater.

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