Material is Language: Evaluating the Correlation Between Building Materials and Affordances in the Tropical Environment

Crisostomo Miguel T. Ordoño[1], Chynx Efrheim T. Bilaw[1], Christian Jeru D. De Guzman[1], Maria Paula M. Diaz[1], Quennee Aira M. Rivera[1]
ctordonoiii@up.edu.ph | ctbilaw@up.edu.ph | cddeguzman2@up.edu.ph | mmdiaz5@up.edu.ph | qmrivera@up.edu.ph

David Xander T. Lacson[2]
dxtlacson@up.edu.ph

Abstract

In tropical design, the selection and application of building materials are important in enhancing spatial function and adaptation to the climate. Building materials, as a language, communicate the intended use of space to its users through its properties. For example, steel railing may evoke confidence among users due to its durability, whereas glass railings may evoke caution prompting its users to behave differently. This phenomenon reinforces the theory of affordance. In design, affordances are defined as the possible actions of a user on an object's qualities, such as shape, texture, and form. The purpose of this study is to investigate the correlation of materials and affordances in the tropical context and discuss this through the case studies of three different community centers: The Commons Thonglor and The Commons Saladaeng both in Bangkok, and the Corner House in San Juan, Metro Manila. Through ocular inspections and archival studies, the researchers analyze the affordances of materials in these cases by categorizing them to visual, tactile, spatial, and behavioral aspects. This analysis is used in the cross-case synthesis to determine whether the theory of affordances can effectively aid in creating functional and flexible community spaces in the tropical urban context. The findings of this study demonstrate that the correlation between materials and their affordances involves leveraging their physical/chemical properties and functional capabilities into architectural design. Furthermore, this study proves how materiality influences the creation of spaces in order to adapt to the tropical climate while optimizing user function through spatial interactions.

Keywords: Affordance, Materiality, Tropical Design, Adaptability, Space Utilization

I. Introduction

A. Background of the Study

Architecture in tropical climates is shaped by the need to address heat, humidity, and natural surroundings. In the Philippines, despite being historically heavily influenced by foreign cultures, the architecture shares a common theme - adapting to the tropical climate. The Bahay Kubo, the Bahay-na-Bato, and the Gabaldon all exhibit design features that respond to tropical climate such as cross-ventilation, wide windows, and high ceilings (Lico, 2021). In comparison, the architecture of Thailand has evolved in response to the tropical climate. Traditional Thai architecture employs steep, multi-tiered roofs to deflect rain, as well as elevated floors to protect against flooding. These traditional design practices have evolved over time through Western influence. In the contemporary age, Thai architecture incorporates the use of modern materials and technologies to adapt to the changing tropical climate.

One of the firms that is guided by the principles of modern tropical design is the Department of Architecture. One project - The Commons Thonglor, a community mall that features an expanded metal facade to maximize natural ventilation. Another project, The Commons Saladaeng was built featuring the use of corrugated sheets as a homage to the site's history (Archdaily, 2024). The Department of Architecture later on collaborated with Filipino firm, BAAD Studio to design the Corner House in San Juan. This community mall features white finishes and glass to allow more natural light inside the building. All three buildings highlight how materiality interacts with individuals through the built environment, a phenomenon known as "affordance". According to Gibson (1977), affordance is an opportunity of what a space offers to an individual and how they perceive their environment directly through simple and clear interpretation. In architectural design, affordances can be experienced through the materials to guide how users interact with the space. This theory is important to understand how materials and design strategies influence spatial function.

B. Statement of the Problem

The need for buildings to adapt and respond to the tropical setting is essential in order for buildings to withstand the potential effects of climate while optimizing user function. Hence, the general problem for this study is the resistance of applying adaptable building materials in

[1] Crisostomo Miguel T. Ordoño, [1] Chynx Efreim T. Bilaw, [1] Christian Jeru D. De Guzman, [1] Maria Paula M. Diaz, [1] Quennee Aira M. Rivera are all Architects and pursuing Master of Architecture at the University of the Philippines Diliman

[2] David Xander Lacson is an assistant professor in the Architecture Program of the University of the Philippines Diliman.

community spaces within the tropical environment. This will be explained through a macro-to-micro approach ranging from community to materiality.

1. ***The Need for Community Spaces***

With the rapid population growth in developing Asian countries due to urbanization, the scarcity of land has become a challenge. In Manila, for example, where the population density is as high as 42,857 people per square kilometer (Rao, 2024), the density is driven by its role as the capital city and a central financial and commercial hub. Given its compact area of 38.55 square kilometers, the city is one of the densest cities in the world (Homer, 2024).

This dense urban environment further exacerbates the challenge of horizontal growth, which puts pressure on available land, which could have negative implications for the environment (National Geographic, 2009), as the remaining available spaces for landscapes are limited. On the other hand, the challenges associated with vertical development include high congestion, limited accessibility, and greater infrastructure demands. Although vertical development is an effective solution for providing additional space in areas with limited horizontal expansion (Zambon et al., 2019), it is primarily driven by profit and tends to be more accessible to specific demographic groups.

As this rapid urbanization continues, there is also an increasing demand for accessible and multifunctional community spaces that promote social interaction, mental well-being, and recreation. Unfortunately, this need is often overlooked, resulting in inadequate design solutions that fail to optimize available land's spatial and social potential. Many urban areas, therefore, miss opportunities to enhance social cohesion and activity in these spaces, which could otherwise serve various communal functions.

2. ***The Underutilization of Spaces***

Urban designers, architects, city authorities, and planners in many cities today face the challenge of creating cohesive environments within urban cores, particularly when developing frameworks for new or redeveloped spaces (Krier, 1979). However, urban development often treats buildings as isolated entities rather than integrating them into the broader urban network of streets, parks, and open spaces (Carmona, 2010; Loukaitou-Sideris, 1996). As a result, public spaces are often poorly designed, turning into decorative fixes for areas that were never meant to be used by the public in the first place (Khalid, 2020). Khalid (2020) also stated that the mismatch between buildings and their surroundings creates what is called "antispace," an urban area that feels disorganized and lacks a sense of unity. Khalid (2020) discusses the challenge of creating cohesive urban environments in city centers, where poorly planned, disconnected spaces, or "lost spaces," arise unintentionally during planning. These isolated, underutilized areas often fail to serve their intended purpose (Khalid, 2020). According to Trancik (1991), the concept of "lost space" refers to these residual areas that are inadequately integrated into the urban structure, leading to a sense of disconnection and a lack of coherence in the overall city design. These spaces are left without assigned functions and are located adjacent to spaces with fixed, well-defined uses (Franck, 2006). Tibbalds (2012) argues that lost spaces negatively impact the urban experience, contributing to undesirable conditions such as trash accumulation, graffiti, illegal activities, pollution, and general neglect. Khalid (2020) emphasizes that these spaces often become psychological and physical barriers, disconnecting new and old urban developments, buildings, and activities.

3. ***The Resistance Towards the Application of Adaptable Materials in Designing Spaces that are Multi-Functional***

Despite the benefits of using sustainable materials, several key barriers affect the transition towards adoption. Among these challenges are technical, economic, and regulatory hindrances that often delay the adoption pace (Taylo, 2024). These challenges include the persistence of traditional practices, limited awareness of material options, and a need to understand sustainable construction principles (Mahame et al., 2024). Selection and application of sustainable materials significantly affect their practical use in designing urban multi-functional spaces.

Understanding these barriers enables designers to devise strategies for alleviating their impacts and proactively facilitate the adoption of sustainable practices and the utilization of adaptable materials. By overcoming these barriers, architects can create more resilient buildings, reduce environmental impact, and help establish sustainable practices as the standard for future generations.

C. Research Aim & Objectives

The study aims to evaluate how the use of materials shapes the visual, tactile, spatial, and behavioral aspects of architectural affordances in the tropical context. This will be accomplished through the case studies of The Commons in Thonglor and in Saladaeng and the Corner House. The objectives for this research are formulated in progressive manner (See Section III).

(1) To identify how materials are applied in the building design strategies.

(2) To analyze the architectural affordance for each building.

(3) To evaluate if these architectural affordances address the three problems presented in this study.

By the conclusion of this study, the researchers aim to uncover key insights into the role of materiality in developing functional, climate-responsive architecture suited to tropical environments.

D. Scope & Limitations

The scope of this research will focus on materials and architectural affordance. The extent of materials will encompass form-givers (exposed structural components) and general finishes. Specialty materials used in shops, concealed materials like insulation, are excluded from this study. Likewise, utility components such as lighting fixtures, plumbing, HVAC, and fire suppression systems are also excluded. In terms of spatial aspects, this study will only discuss publicly accessible customer areas, such as dining, lounging or general circulation spaces. Areas

like utility rooms, private offices, service zones, and parking facilities are not included. The theory for this research will be grounded in the definition of Don Norman as opposed to J.J. Gibson (see II. Literature Review).

The main limitations of this study are defined by time and logistical constraints. The researchers were provided with a four-month time frame, which includes a single three-day visit to Thailand. During this visit, the team allocated four to five hours each at The Commons Saladaeng and The Commons Thonglor. Access to architectural plans and material specifications was limited, restricting the researchers to site observations.

II. Literature Review

A. Materials and Construction in Tropical Design

The selection of materials in tropical climates is important to address the unique environmental challenges such as heavy rainfall and extreme heat. The effective design and construction in such environments require a detailed understanding of material properties and techniques that can adapt to these conditions.

In order to adapt to the tropical environment materials must exhibit thermal performance, moisture resistance, sustainability, and low maintenance. Houben and Guillard (1994) cite various materials with significant thermal mass such as adobe, rammed earth, and concrete, which regulate indoor temperature by storing heat during the day and releasing it at night. According to Bay and Ong (2006) moisture-resistant materials, including treated timber, bamboo, and composites, are critical for withstanding high humidity and frequent rain, as they effectively resist mold and water damage. Surfaces such as light-colored or reflective materials can further reduce heat absorption, minimizing cooling demand.

Construction strategies should emphasize passive design, elevated structures, natural ventilation and lighting. According to Riley, Cotgrave, and Farragher (2017) passive design approaches, such as incorporating overhangs, verandas, and louvered windows, mitigate the impact of direct sunlight and heavy rain. Elevated structures, prevent flooding, improve air circulation, and reduce heat transfer from the ground. Building orientation and design features like high ceilings and wide openings maximize natural airflow, minimizing use of artificial cooling systems. The use of highly glazed facades in buildings has long been criticized for thermal discomfort and increased energy consumption. Despite these issues, many buildings in warm and humid climates continue to use ordinary laminated glass with inadequate thermal properties (Riley, Cotgrave, & Farragher, 2017).

B. Tropical Design Strategies

Tropical climates present significant challenges such as high temperatures, high humidity, heavy rainfall, and intense solar radiation. The design strategies that will be discussed aim to create comfortable, energy-efficient buildings that respond to the natural environment.

Fernandez (n.d) discusses the importance of maximizing natural ventilation. It is through this strategy that aspects such as proper wind flow and air circulation are harnessed inside the building through openings such as windows and doors. In design, more openings, especially on both sides, provide cross-ventilation as air enters and exits through the building. This strategy relieves the discomfort caused by still air, high humidity, and the lack of evaporative cooling from sweat. (Fernandez III, n.d.).

Another design strategy is the protection of the building envelope from solar radiation. This involves designing materials and forms that shield interiors from excessive heat. Reflective or insulating materials are used to reduce heat gain, while overhangs, louvers, and other shading devices provide additional barriers against direct sunlight (Fernandez III, n.d.). Vegetation is also a key strategy as a natural modifier of climate; strategically placed trees and plants can shade buildings and cool the surrounding environment.

Adaptable building forms and materials that react to local climate conditions should be applied. For example, lightweight materials that release heat quickly are often more suitable than dense materials that retain heat. Additionally, buildings should be designed to handle the challenges of moisture, which can lead to mold, rust, and material degradation (Na and Park, 2009). Durable and moisture-resistant materials are recommended, particularly in regions prone to termites and fungal growth.

These strategies are important for providing comfortable living conditions, especially in countries where reliance on mechanical systems is not economically feasible for most people. By designing with the climate, architects can design buildings that are both functional and environmentally responsive.

C. Theory of Affordances

In Gibson's book "The Ecological Approach to Visual Perception" (1979) he defines affordances as the action possibilities offered by the environment which are directly perceived through interaction between users and objects. This theory emphasizes that the actions are done without the need for complex interpretations of an object (Gibson, 1979). This psychological definition was aligned with the aspect of design by Norman (1988). According to Norman, the qualities of an object such as its shape, texture, and structure suggest its function. These affordances not only offer possible actions but also aid in the behavior of how individuals use a space (Norman, 1988).

As described by Norman (1988) this suggestion of action may stem from a variety of factors. (1) Visual affordances refer to the qualities of an object that are immediately recognizable through sight. An example would be the use of color that may influence the depth perception of a room. (2) Tactile affordance refers to the qualities of an object that are perceived through the sense of touch (Frankel, 2023). Take for example, a rough road on which motorists tend to drive slower compared to smooth roads because of the material texture. (3) Spatial affordance refers to how the physical dimensions (height, width,

depth) of architectural elements enable or constrain spatial use. For instance, the space underneath an escalator can be used as a retail space. (4) Behavioral affordances refer to forms or configurations that suggest a specific task. In an example mentioned by Norman (1988), the furniture arrangement can guide how people interact based on their proximity and navigating throughout the space.

Based on the examples, Norman (1988) shows why affordances are important in design because they guide designers to simplify the interaction between users and objects. In tropical design, affordances can be used to adapt to the climate while optimizing user function through simplified spatial interactions.

III. Research Design & Methodology

A. Research Design

The approach for this study is purely qualitative and descriptive, as this study relies on the affordance theories based on the definition of Norman (1988). According to Creswell (2014), a theoretical model can be used to analyze behavioral or spatial patterns. In this way, the interpretation of the user's interaction with the space remains objective.

The study is based on the case studies of The Commons Thonglor, The Commons Saladaeng, and the Corner House because of their typology as community malls in a tropical country. These buildings were chosen due to their accessibility and their consistent design approach, as they were designed by the Department of Architecture.

B. Methodology

For the primary source, the researchers will conduct site visits and observe how materials are applied to the architectural design and to examine user interactions within these spaces. The secondary data collection methods will include archival research and theoretical analysis given the qualitative nature of this study. The data obtained from archival research shall validate the researchers observed data from site visits. Interviews with architects and builders will be conducted in order to gain insights about the design intent, material selection, and construction experiences.

For the data analysis techniques, the researchers will use various visualization methods such as material mapping, tabulation and diagramming to identify associated affordances. The methods discussed will aid the researchers in understanding the materials, affordances and their impact on user experience in tropical design.

C. Research Framework

This study stems from the three problems identified in the introduction: the need for community spaces, the underutilization of space, and the resistance to adaptable materials for multifunctional designs. To address these problems, the research aim is formulated, which further leads to three objectives. The first objective focuses on identifying the materials used in the design strategies of each building through material mapping and material tabulation. The second objective analyzes the architectural affordances of each building by categorizing them into visual, tactile, spatial, and behavioral aspects. The third and last objective involves evaluating the affordances through a cross-case synthesis between all buildings. To deduce a conclusion, the three problems are compared with the analyzed affordances. This holistic evaluation provides insights into the effectiveness of materials in

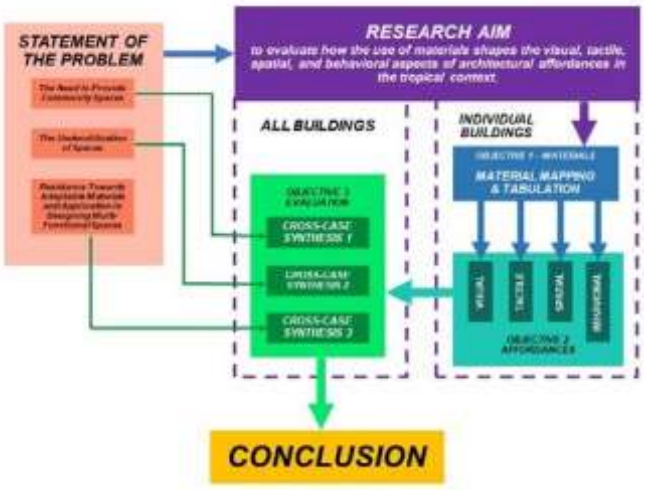

Figure 1. Research Framework
Source: Researcher's own process

IV. Overview of the Buildings

A. The Commons Thonglor

In 2015, The Commons Thonglor was built to respond to the increasing need for community spaces that cater to the lifestyle of its users. It is located in the neighborhood of Thonglor, which has a reputation for being a cosmopolitan neighborhood with upscale dining options, boutique shops, art centers, and a vibrant nightlife (Archdaily, 2016). The site has an approximate area of 1,800 square meters and is surrounded by mid to low-rise residential blocks and a few high-rise buildings. The community mall is accessible via Soi Akkhara Phatsadu, a two-way road.

According to ArchDaily (2016), the building's design concept is to create a vertical open-air public space that seamlessly integrates with its tropical surroundings. The structure comprises four floors, with circulation spaces being outdoor while shops , restaurants and activity centers are indoors. The zoning of the structure can be distinguished from high to low commercial activity: the first two floors house dining and retail establishments. The third floor is dedicated for leisure activities such as yoga, a gymnasium, and a children's playhouse; and the fourth floor features more passive

Figure 2. (left) Location Map of The Commons Thonglor (upper-right) Exterior view of The Commons Thonglor (lower- right) Photo of communal space

Source: Google maps and enhanced by researchers, Architizer,

B. The Commons Saladaeng

The Commons Saladaeng opened in February 2020, five years after Thonglor was established. According to Shelby (2022), both the Commons Thonglor and Saladaeng aim to bring back urban space for the community. This approach aligns with the second statement of the problem where there is a need for accessible public spaces in urban areas like the building's location in the Silom-Saladaeng neighborhood. The site of the Commons Saladaeng is approximately 1,500 square meters and is easily accessible via Soi Saladaeng.

According to the architect, the architectural concept of the building pays homage to the area's historical railway station through the use of red gable roofs, while parts of the building include open-air communal areas (A. Luphaiboon, personal communication, October 26, 2024). The building has three floors that can be accessed through terraced outdoor spaces. Unlike the one in Thong Lor, The Commons Saladaeng offers a more limited range of commercial activities, primarily focused on food and beverage. However, the establishment also organizes community activities such as yoga classes, cooking workshops, and monthly jogging events.

Figure 3. (left) Location Map of The Commons Saladaeng (upper-right) View of the outdoor area (lower- right) Exterior Perspective

Source: Google maps and enhanced by researchers, City nomads, Architizer

B. The Corner House

The Corner House opened in 2023 where construction took place during the pandemic (Concengco, 2024). The architect first visited San Juan in 2016 to study the local conditions and ensure the building would thoughtfully respond not only to Manila's predominantly warm climate but also to its often-challenging wet seasons (A. Luphaiboon, personal communication, October 26, 2024). The San Juan area is surrounded by smaller commercial establishments and upscale subdivisions, creating a unique establishment within the area. The structure is situated on a sloping site and occupies a 2,000-square-meter lot.

Figure 4. (left) Location Map of The Corner House (upper-right) Exterior perspective (lower- right) Common Area at the ground floor

Source: Google maps and enhanced by researchers, SpotPH, Kanto

The architect envisioned an alternative to traditional shopping malls—a space where children can play, people can reflect and socialize, and residents can jog (Kasingking, 2024). The Corner House features two floors of parking, four levels of leasable commercial spaces, and a rooftop designed to host special events. On weekends, the building's lobby transforms into a pop-up market selling handcrafted souvenirs and pre-loved clothes, which are particularly popular among young adults.

V. Analysis of Materials & Affordances

A. Visual Affordances

A.1 Visual Permeability in The Commons Thonglor

The application of concrete in The Commons Thonglor affects visual perception because of how light behaves towards the material finish. An example would be the polished concrete which reflects more light due to its smooth texture. This is applied mostly on the walls facing the outdoor areas. On the other hand, the bare concrete ceiling at the ground floor has lighting poles pointing towards the overhead surface thereby illuminating the surface at night. This provision of additional light enhances the brightness of the space by the diffused light from the ceiling surface (*Figure 5*). Besides the use of concrete, other visual affordances are found in materials like the steel angle bar railing and expanded metal facade. The slenderness of the angle bar and the permeability of

the expanded metal increase the visibility of the building vistas while securing the boundaries of the area. The application of glazing materials such as tempered glass for the shops provides transparency between indoor and outdoor spaces. Likewise, the application of acrylic sheets beneath the louvers and industrial fans diffuses natural light (*Figure 6*).

In a tropical context, both the steel and glazing materials allow natural light to pass through the entire building and enhance the view from inside the structure. The materials discussed show how physical properties such as transparency, reflectivity, and permeability provide visual affordance.

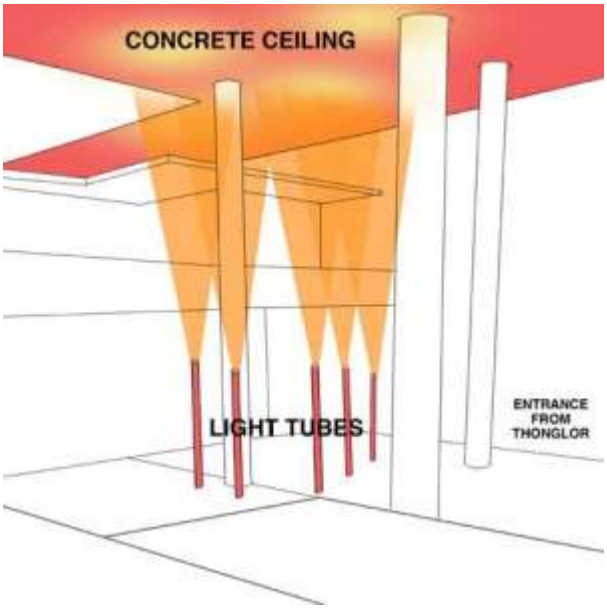

Figure 5. (upper) Diagram of the light tubes illuminating the ceiling (lower) Full Illustration of the view at the communal area
Source: Drawn by the researchers

Figure 6. (left) Photo of the third and fourth floor (right) Photo of the ceiling featuring louvers and industrial fans illuminated by a skylight
Source: Archdaily

A.2 Color and Transparency in The Commons Saladaeng

The Commons Saladaeng applies the corrugated sheet for its walls and ceiling because it has historical associations with the community, where Saladaeng used to have the Paknam Railway station characterized by the same material. In the aspect of affordances, this material goes beyond its historical value.

Its color serves as a signifier of different purposes between indoor and outdoor areas. As shown in *Figures 7 and 8*, the red is applied in outdoor spaces, whereas white is applied indoors. Some sections of the building applied transparent corrugated sheets for the walls and the skylight. This material provides visual affordance by providing more natural light to the building. Besides the transparent corrugated sheet, the use of glass also provides the same visual affordance of providing natural light, but it also maximizes the views from the facade.

The materials used in the Commons Saladaeng also aid in adapting to the tropical climate. The corrugated sheet material is typically made of polycarbonate or acrylic, both of which are highly durable and resistant to UV radiation and weathering (Tjandraatmadja et al., 1999). The transparent materials, besides allowing natural light, contributes to making the building energy efficient by reducing the need for artificial lighting. The visual affordances for The Commons Saladaeng emphasizes that color and transparency can enhance functionality, light distribution, and spatial experience.

Figure 7. Photo of white corrugated material for the interiors.
Source: Photo by researchers

Figure 8. (left) Photo of open communal space looking from the entrance; (middle) Photo of glass door between communal area & market; (right) Photo of communal space looking from the third floor seating area.

Source: Photo by researchers

A.3 Play of Light and Color at the Corner House

The Corner House primarily applies white paint throughout most of the building elements such as columns, ceiling, and walls. The application of this color among vertical and overhead horizontal elements can reflect more natural light thereby illuminating the space. The reflected light inside the building interior provides enhanced brightness thus creating a visually open environment.

The white color also complements another design strategy used by the architect. The colored acrylic sheet was applied for the skylight boxes on the fourth floor (*Figure 9 and 10*). These boxes are fixed and beneath it penetrates through the ceiling. Given the material's transparent yet colored properties, this allows an interplay of colored light from various angles to enter the building which can be easily traced because of the white surfaces. This visual affordance enhances spatial perception and ambiance because of the dynamics of light.

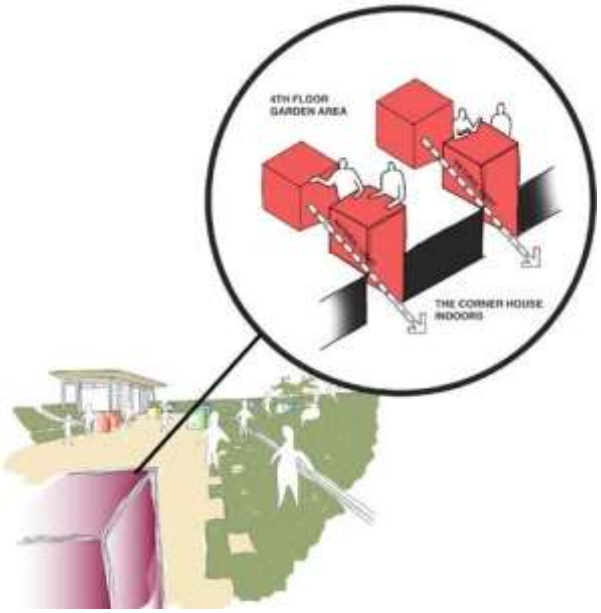

Figure 9. Diagram of how the skylight box works

Source: Drawn by researchers

Figure 10. (left) Diagram of how the skylight is used for the fourth floor (right) Photo of the skylight from inside

Source: Photo by researchers

Among the three buildings, the Corner House has an additional feature for the glass by applying patterned decals (*Figure 11*). The distance between these patterned decals are strategically placed to provide shade at specific sun angles when light is harsh and direct. Likewise, its visual affordance maintains the privacy of the indoor space while maintaining openness.

In tropical design, the visual affordances of the Corner House effectively use light and color as a way to passively enhance brightness and strategically use different sun angles to optimize spatial function and comfort throughout the day.

Figure 11. View from the exterior showing the decal pattern

Source: Photo by researchers

A.4 Conclusion for Visual Affordances

The visual affordances from the materials discussed are based on their properties such as color, transparency, permeability and reflectivity. Each affordance has a unique approach to effectively use materials: color as a signifier of space, permeability provides better views while maintaining security, the slenderness of a material can be used to provide shade and reflective surfaces passively enhance the brightness of a space. In tropical design, these visual affordances help in maximizing natural lighting, hence, leading to energy efficiency. But with the help of tactile affordances, differences in textures can regulate heat and counter these effects. It is through these visual affordances discussed, that the play of light and color can go beyond aesthetics.

Table 1. Summary of Visual Affordances
Source: Tabulated by researchers

SUMMARY OF VISUAL AFFORDANCES

THE COMMONS THONGLOR

Materials	Design Element	Form Giver / Finish	Design Affordance	Justification
Polished Concrete	Wall	Finish	Surface provides more illumination due to reflected light	Reflective surfaces enhance natural daylight, reduce heat.
Flat Bar	Handrail	Form Giver	Slenderness provides clear sightlines	Less obstruction, allows better air circulation,
Expanded Metal	Infill Panel - Safety Railing	Form Giver	Surface provides security while enabling airflow and visibility.	Less obstruction, allows better air circulation
	Facade	Form Giver / Finish	Surface provides clear view and allows natural lighting	Less obstruction, allows better air circulation
Tempered Glass	Partition	Form Giver / Finish	Surface provides transparency for both indoor/outdoor areas	Energy efficiency
Acrylic	Skylight	Finish	Surface allows natural light to enter the building	
Canvas	Facade	Finish	Surface softens natural light, preventing glare and harshness.	Reduces glare, enhances shade, improves thermal comfort.

THE COMMONS SALADAENG

Materials	Design Element	Form Giver / Finish	Design Affordance	Additional Notes
Polished Concrete	Walls	Finish	Surface provides more illumination due to reflected light	Reflective surfaces enhance natural daylight, reduce heat.
Onduline Corrugated Sheet - Red	Walls & Ceiling	Finish	Color serves as identifier of space	-
Onduline Corrugated Sheet - White	Walls & Ceiling	Finish	Color serves as identifier of space	-
Onduline Corrugated Sheet - Transparent	Skylight & Walls	Finish	Surface allows natural light to enter the building	Energy efficiency since it allows natural light
Expanded Mesh	Infill Panel - Safety Railing	Form Giver	Surface provides security while enabling airflow and visibility.	Less obstruction, allows better air circulation, Encourages users to stay outdoors
Tempered Glass	Partition	Form Giver / Finish	Surface provides transparency for both indoor/outdoor areas	Energy efficiency since it allows natural light

THE CORNER HOUSE

Materials	Design Element	Form Giver / Finish	Design Affordance	Justification
White Paint	Column, walls, and ceiling	Finish	White surfaces enhance brightness and spaciousness by reflecting light	Enhances natural light, reduces heat absorption, improves ventilation.
Grey Paint	Column, walls, and ceiling	Finish	Unique color serves as identifier of space	-
Tempered Glass with patterned sticker	Partition	Form Giver	Surface provides transparency for both indoor/outdoor areas	Enhances natural light
Colored Acrylic	Skylight Cubes	Form Giver / Finish	Surface allows natural light to enter the building	Enhances natural light
Canvas	Facade	Finish	Surface softens natural light, preventing glare and harshness.	Reduces glare, enhances shade, improves thermal comfort.

B. Tactile Affordances

B.1 The Polished Concrete and Pavers in The Commons Thonglor

The flooring materials in The Commons Thonglor serve functional purposes based on its surface property. For example, the polished concrete applied in most of the dining areas provides easy maintenance because of its non-porous surface, which minimizes the accumulation of dirt, dust, and moisture. Since the space is for dining, the tactile affordance of its smooth surface enables easy cleaning.

The last floor at The Commons Thonglor features brick and pavers for the flooring. The rough texture aligns with the intended passive use of the area, where users are meant to engage in sedentary activities such as gardening and dining. This tactile affordance uses its texture to signify its purpose in encouraging mindfulness and deliberate interaction within the space (Figure 12).

These two materials have different textures, yet provide the same tactile affordance. The smoothness of polished concrete and the roughness of the brick flooring signify cautionary movement to the users. Both materials also adapt to the tropical climate because of its efficient heat management and moisture resistance properties.

Figure 12. Photo of the pavement and the bricks at the fourth floor
Source: Photo by researchers

B.2 The Application of Pebble Wash Flooring in the Commons Saladaeng

The Commons Saladaeng has similar flooring materials to Thonglor. Most of the communal spaces use polished concrete with a similar affordance mentioned previously. The rougher surface however, like the pebble wash flooring at the garden area is a unique material for the building. Considering its location on the last floor surrounded by plants, the area is prone to moisture (Figure 13).. The components of pebble wash consists of small stones or pebbles mixed with a cement or resin binder. These properties provide a tactile affordance of making the surface slip resistant, hence improving safety by reducing the risk of falls, particularly in wet conditions. In the tropical environment, this material adapts well because of its moisture resistance and durability.

Figure 13. Photos at the third floor open courtyard, with non- skid stone pebble flooring. *Source: Photo by researchers*

B.3 The Application of Earthcrete in the Corner House

The main flooring material for the Corner House is earthcrete used mostly for the outdoor common spaces. It is composed of a mixture of earth, cement and natural fibers hence creating its rough surface. This material is suitable for the building because it is exposed to weather conditions. This is important given the numerous openings of the facade, where maintenance and durability would be an issue. For tropical environments, the use of earthcrete has an ability to regulate temperature and humidity (Nas C., personal communication, November 4, 2024). Furthermore, the rough texture of the earthcrete provides a tactile affordance of resistance to slippage making the communal spaces safe to use.

B.4 Conclusion for Tactile Affordance

The buildings discussed indicate how haptic sensation shapes the perception and functionality of a space. The various materials may vary in texture but share similar affordances because of their non-slip, weather resistant and durable properties. What distinguishes each material usage is based on its location, exposure to weather and spatial use. In tropical design, the variety of material textures can either regulate heat and resist moisture that reduce thermal absorption and probability of slippage when wet. These thermal properties have an immediate effect on the users because the interaction involves coming into physical contact with the material surface.

Table 2. Summary of Tactile Affordances
Source: Tabulated by researchers

SUMMARY OF TACTILE AFFORDANCES				
THE COMMONS THONGLOR				
Materials	**Design Element**	**Form Giver / Finish**	**Design Affordance**	**Justification**
Polished Concrete	Flooring	Finish	Texture provides durable, easy-to-maintain surface	High durability, suitable for humid tropical climates.
Brick Pavement	Floorng	Finish	Texure is signifier of different spatial activity	Reduces heat, encourages outdoor use.
Wood Plastic Compo	Stairs	Finish	Texture provides smooth non-slip surface	Resistant to moisture and buildup of molds and mildews
WPC Pavers	Flooring	Finish	Texure is signifier of different spatial activity	easy maintenance, and outdoor comfort.
THE COMMONS SALADAENG				
Materials	**Design Element**	**Form Giver / Finish**	**Design Affordance**	**Justification**
Wooden Pallet	Stairs	Form Giver / Finish	Texture provides smooth non-slip surface	Thermal resistance
Polished Concrete	Flooring	Finish	Texture provides durable easy-to-maintain surface	Thermal conductivity
Wood Composition	Entrance Stairs	Finish	Texture provides smooth non-slip surface	Enhances safety during rain and humid conditions. (moisture resistance)
THE CORNER HOUSE				
Materials	**Design Element**	**Form Giver / Finish**	**Design Affordance**	**Justification**
Polished Concrete	Flooring	Finish	Texture provides durable, easy-to-maintain surface	High durability, suitable for humid tropical climates.
Earthcrete	Flooring	Finish	Durable, long-lasting surface for high-traffic areas, while resistant to weather	Reflective surfaces enhance natural daylight, reduce heat.

C. Spatial Affordances

C.1 The Concrete and Flat Slab Construction in the Commons Thonglor

As mentioned previously in this study, concrete is extensively employed for the Commons Thonglor. However, its use is not just material finish but also the main structural element of the building (A. Luphaiboon, personal communication, October 26, 2024). TThe researchers observed the building's use of flat slabs for the building (Figure 14). This construction technique is capable of wider spans without the use of beams, hence provides a spatial affordance of wider unobstructed spaces.

With the vast space provided, an atrium was placed at the center of the building. On the succeeding floors, the main circulation space is placed around the perimeter of the atrium, thereby making user movement easier.

In tropical design, the spatial affordances mentioned help in air circulation. For instance, the use of flat slab construction provides increased ceiling height since the design has no large beams, hence improving thermal comfort. Additionally, the provision of the atrium space complements the flat slab construction as it provides a stack effect to enhance air circulation and keeps the whole building thermally comfortable.

Figure 14. Photos showing the concrete ceiling and the column connection used.
Source: Photo by researchers

C.2 The Steel Terraced Form of the Commons Saladaeng

The Commons Saladaeng uses steel as its primary structural element which made its distinct continuous gable form possible. For the building plan, the capabilities of constructing with this material enabled larger spans by minimizing the dimensions of the columns and beams. This form creates a large unobstructed view of the tree for the view of the tree at the front of the building, and of the building and at the same time provides a high ceiling throughout the outdoor area.

The architect maximized the usability of the terraced form, extending its functionality not only to the upper floor but also to the space beneath it. The architect was able to maximize the terraced space on the upper floor and the floor beneath it. This creates a usable space because of the beam's dimension while still retaining ample headroom. This additional retail space inside the building optimizes the functionality of the building (Figure 15).

Figure 15. The void underneath the terraced form is used as additional retail space.
Source: Photo by researchers

The spatial affordances discussed in The Commons Saladaeng is a result of maximizing a space because of the capabilities of steel construction. Similarly, the tropical response to spatial affordance mirrors that of The Commons Thonglor where increased ceiling height and wide unobstructed spaces optimize natural ventilation by enhancing air circulation.

C.3 The Steel Elements in the Corner House

The Corner House capitalizes on the same construction technique from The Commons Saladaeng with steel framing. Although unlike the previous building, the Corner House's spatial affordance maximizes the space even through the form of the material itself. An example of this would be that the space between the flanges of the steel I-section columns provides convenient locations for power outlets and storing fire extinguishers. This spatial affordance highlights that the columns serve more than structural support. The space from the void created was used for additional storage and installation (Figure 16).

Several examples of spatial affordances with the railings. The steel angle bars applied for the handrails maximize the actual form of the material by integrating strip lighting inside. This integration effectively illuminates pathways, staircases, or railings while concealing the lighting fixture. The steel rods applied at the safety railing that bound the perimeters of the upper floors encase plant boxes to provide additional vegetation without obstructing the circulation space. The slenderness of steel rods ensures securing plants while allowing ease of access for maintenance (Figure 17).

Figure 16. (left) Plant box encased underneath the countertop (right) The use of steel beams in the Corner House (right) The placement of fire extinguishers and outlets
Source: Photo by researchers

Figure 17. Photos showing how the lighting is concealed while illuminating the railings
Source: Photo by researchers

The spatial affordances of the Corner House show that space optimization is not only through material capability but also to material property. This is further demonstrated by how the spatial form and dimensions of steel were optimized.

C.4 Conclusion for Spatial Affordance

The spatial affordances discussed in this section show how spaces can be effectively utilized for their capabilities and properties. This enhances functional appeal and demonstrates how architecture can balance the utilization of form and function. Understanding spatial affordances can benefit tropical design. From the examples discussed, the design strategies properly provide airflow through open plans with less obstruction and an increased ceiling height enabling thermally comfortable environments with minimal use for energy consumption. Whereas the affordances guide users in maximizing the use of space while immersing them in the tropical climate.

Table 3. Summary of Spatial Affordances
Source: Tabulated by researchers

SUMMARY OF SPATIAL AFFORDANCES				
THE COMMONS THONGLOR				
Materials	**Design Element**	**Form Giver / Finish**	**Design Affordance**	**Justification**
Bare Concrete	Column	Form Giver	Flat slab design enables wider spans thus provideslarger spaces	Maximizes ventilation and spaciousness
	Ceiling	Finish	Exposed surface maximizes ceiling height	
Angle Bar	Balusters - Safety Railing	Form Giver	Defines the boundaries of the outdoor space,	-
Expanded Metal	Facade	Form Giver	Surface allows natural air to enter while preventing bird and bat intrusion	Less obstruction, allows better air circulation
THE COMMONS SALADAENG				
Materials	**Design Element**	**Form Giver / Finish**	**Design Affordance**	**Justification**
Bare Concrete	Ceiling	Finish	Exposed surface maximizes ceiling height	Enhances ventilation, provides better airflow
H-Shape Section	Columns & Beams	Form Giver	Material is capable of wide spans with minimal column dimension	Maximizes ventilation and spaciousness.
Angle Bar	Balusters - Safety Railing	Form Giver	Defines boundaries of the outdoor space	-

THE CORNER HOUSE				
Materials	**Design Element**	**Form Giver / Finish**	**Design Affordance**	**Justification**
I-Section	Columns & Beams	Form Giver	Material is capable of wide spans with minimal column dimension	Maximizes ventilation and spaciousness.
Angle Bar	Balusters & Handrail - Safety Railing	Form Giver	Defines the boundaries of the outdoor space,	-
Steel Rods	Pickets - Safety Railing	Form Giver	Multiple slender forms are used to house a plant box underneath	Less obstruction, allows better air circulation
Steel Mesh	Facade	Finish	Surface allows natural air to enter while preventing bird and bat intrusion	
Grey Granite Tiles	Planttroxes	Form Giver / Finish	define boundaries and provide spatial separation	Enhances biodiversity, improves thermal comfort, promotes natural cooling.

D. Behavioural Affordances

D.1 Social Interaction and Movement at The Commons Thonglor

The Commons Thonglor integrates materiality to enhance user comfort and function. One of its main architectural elements is the main staircase leading to the dining area. The stairs feature a form where several steps are skewed to allow seating while maintaining its primary function as a circulation space. As shown in Figure 18 this form allows an interplay of dining, circulation, lounging, and even placement of plants. This behavioral affordance is rooted in the form where it influences the proximity between people. This spatial arrangement allows interactions that range from public, such as large gatherings to more social such as dining (Hall, 1966). The material used here is a wood plastic composite panel, its specific form is capable of covering wide spans at the same time has weather-resistant properties (Archdaily, 2016)

There are other practical features integrated into The Commons Thonglor that facilitate specific actions for the users. The angle bar and expanded metal used for the stair and safety railings provide a higher level of security due to the material's durability (Figure 19). With the application of this material, its behavioral affordance as the users tend to position themselves near the edges to view the atrium.

The behavioral affordances in The Commons Thonglor show how material properties can facilitate specific actions. The forms created from the stairs enhance its multifunctional aspect as both for circulation and seating. The durability of steel, especially in its use near the atrium, ensures stability and safety, reinforcing user confidence in the space. These materials also adhere to the tropical climate as the WPC covering is weather resistant since it is used outdoors. Likewise, the steel railings with a mix of angle bars and expanded metal (Figure 20) lessen the obstruction of airflow. For instance, if glass, wood, or concrete were applied for the railing, then aspects such as durability, permeability, climate adaptability, security, and use of space may be compromised.

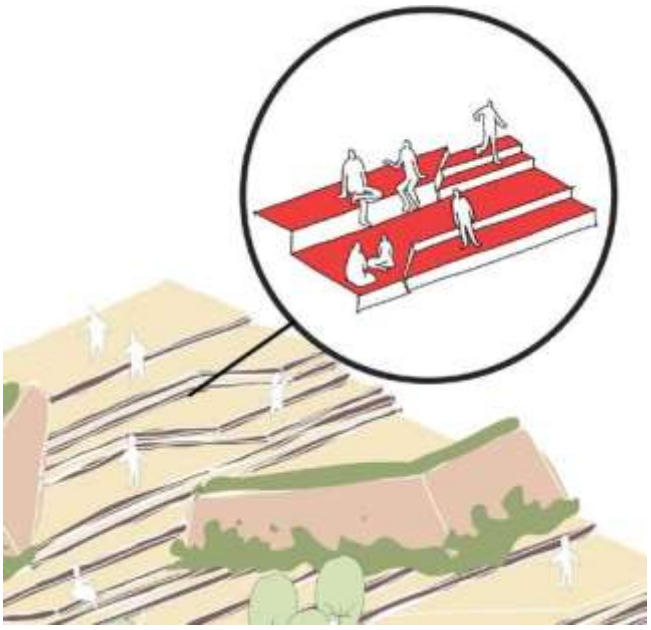

Figure 18. (upper) Diagram of stairs used for gathering and lounging (lower) Photo of communal space going to the ground floor

Source: Diagram by researchers; Photo by art4d.com

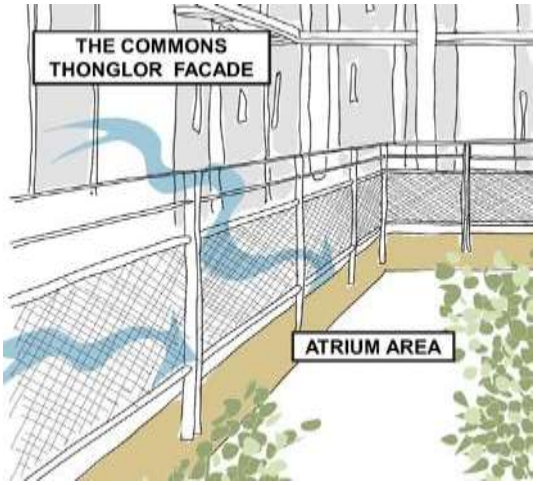

Figure 19. Diagram showing the expanded metal and railing

Source: Drawn by researchers

Figure 20. Photo of the expanded metal and railing
Source: Photo by researchers

D.2 The MultifunctionalForms of the Commons Saladaeng

The Commons Saladaeng provides a myriad of behavioral affordances due to the unique forms of architectural elements. The ground floor cafe area features wooden stairs which are designed to accommodate more seating while integrating circulation space. Its behavioral affordance is manifested through the corner of a stepped pyramid form. (Figure 21). This layout creates distinct proximities by accommodating solo users or groups of two to four people gathering in the space.

Figure 21. The stepped pyramid form of the ground floor cafe
Source: Drawn by the researchers

Another application of wood is through the removable pallets located at the entrance and the second floor. As shown through Figure 22, these pallets can be reconfigured by stacking to different layouts for various purposes. This flexibility provides behavioral affordances that can be used for additional seating, an elevated platform for the marketplace and a stage. The succeeding floors show an outdoor space with terraced form which can function as a venue for events similar in a theater setting. The behavioral affordances however are manifested in the material details of the space. The steel section safety railings provide adjustable panels that can be used for seating or can act as a table. As shown in Figure 22, this architectural element is at the edge along with the overall terraced form of the structure. The steel rods are positioned horizontally for users to securely and comfortably sit by placing their legs at the edge as shown in Figure 23. The stair railing located in the same area features a stepped form unlike the conventional slanted position. This unique form allows users to lean their elbows either to engage in an event or for casual socializing.

Overall, the materials like the application of wood for the pallets, is suitable because of its durability yet lightweight nature and the sturdiness of steel being capable of various forms. The choice of materials enable simple configuration of forms or positioning of elements which influence behavioral affordances. Moreover, these can divide or bring together people as forms can dictate proximity between users. Given the previously discussed tropical design strategies, this engages people to interact in communal spaces immersing them in an open-air environment.

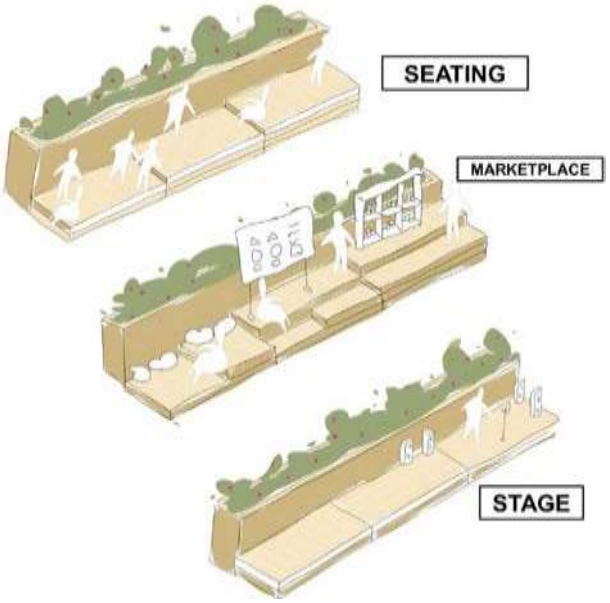

Figure 22. Diagram of different configurations for the wood pallet that can be turned for seating, as a market place and as a stage
Source: Drawn by researchers

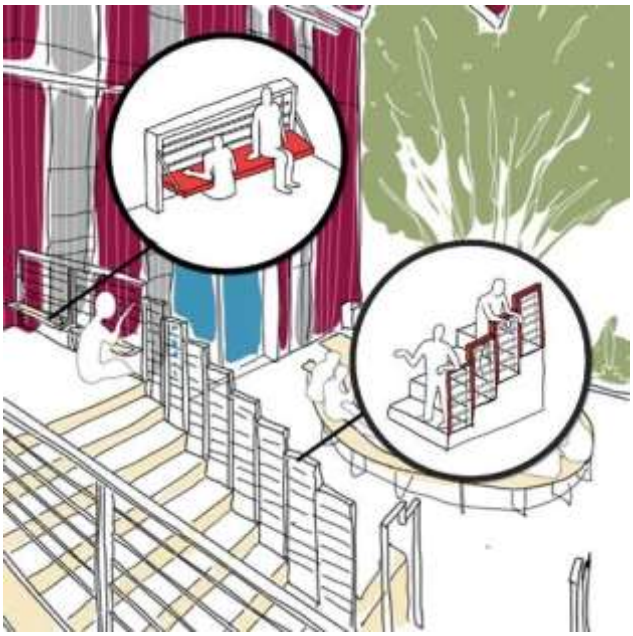

Figure 23. Diagram showing how the safety and stair railings are used
Source: Photo by researchers

D.3 Catering to Outdoor Lifestyle in the Corner House

The Corner House provides specific spaces that consider the demographic of the community. An example as discussed by the architect, is where the area of San Juan has inadequate space for people to jog in the morning (A. Luphaiboon, personal communication, October 26, 2024). As a response, the architect integrated a ramp that will serve as a jogging path that circulates throughout the building. The use of steel construction made this possible because it allowed for the creation of a lightweight, durable structure capable of supporting the continuous path of the ramp. This ramp (Figure 24) is used also as additional circulation space for walking pets and setting up stalls for special occasions given its gradual inclining surface.

The succeeding floors of the building feature a granite countertop added on the edge of the railing. This provides an additional lounging space for users. Given its linear form however, its behavioral affordance caters to solo users or pairs where activities done are often for working or studying. Complementing the visual with behavioral affordance, the skylight box on the last floor serves as a tabletop for the last floor. According to the architect, it is intended to be a bar area with a view of the indoors, and the form of the cube itself can be used for placing objects (A. Luphaiboon, personal communication, October 26, 2024). The use of these boxes as tabletops engages the users in casual alfresco dining, especially at night.

The Corner House through its design caters to a specific lifestyle of the community. The behavioral affordances are shaped by form and materiality to address specific activities. For instance, the use of a rubber mat and inclined form is suitable for jogging and the low-maintenance granite countertops make the material suitable for long-duration tasks such as working and studying. In this tropical climate, the behavioral affordances of the Corner House encourage a healthy lifestyle by encouraging users to do daily activities outdoors.

Figure 24. Granite countertop at the edge of the railing
Source: Photo by researchers

Figure 25. The jogging path on the lower level (left and middle), and upper floors on the outside (right)
Source: Photo by researchers

D.4 Conclusion for Behavioral Affordance

All the buildings discussed in this study show how designing forms can shape and encourage specific human actions within a space. Some of these features include integrated seating for the stairs, a ramp used for jogging, and even a railing shape that can afford to lean on. The materials used in these features can either enhance or hinder how people interact and behave. Likewise, the capabilities of materials to come up with various forms also help in suggesting interactions that vary in proximity from public gatherings to solo spaces. In terms of tropical design, behavioral affordances can help people do outdoor activities such as socializing, jogging, dining, and even hosting various events.

Table 4. Summary of Behavioral Affordances
Source: Tabulated by researchers

SUMMARY OF BEHAVIORAL AFFORDANCES				
THE COMMONS THONGLOR				
Materials	**Design Element**	**Form Giver / Finish**	**Design Affordance**	**Additional Notes**
Polished Concrete	Flooring	Finish	Texture enables ease of movement	Smooth surface, promotes airflow, reduces humidity buildup.
Bare Concrete	Ceiling	Finish	Exposed surface evokes a sense of simplicity	Maximizes ventilation and spaciousness.
Angle Bar	Balusters - Safety Railing	Form Giver	Form allows less obstruction of view from several angles evoking a wider and spacious sensation for users	Form allows installation of striplight underneath
				Material is capable of providing sturdiness with minimal dimensions
Flat Bar	Handrail - Safety Railing	Form Giver	Form provides a stable grip for support	Less obstruction, allows better air circulation,
Circular Section	Handrail - Stair Railing	Form Giver	Form provides a stable grip for support	-
Acrylic Glass	Skylight	Finish	Form is used as a table for outdoor events	Energy efficiency
Rubber Mat	Flooring	Finish	Texture enables child-friendly fast-paced activities	Reduces heat absorption, suitable for outdoor play areas.
Wood Plastic Composite	Stairs	Form Giver / Finish	Form is used as stairs and additional seating	Maximizes the space and encourages users to stay outdoors
THE COMMONS SALADAENG				
Materials	**Design Element**	**Form Giver / Finish**	**Design Affordance**	**Additional Notes**
Wood pallet	Stairs	Form Giver / Finish	Form is used as stairs and additional seating	Maximizes the space
Polished Concrete	Flooring	Finish	Texture enables ease of movement	Smooth surface, promotes airflow, reduces humidity buildup.
Bare Concrete	Ceiling	Finish	Exposed surface enables easy maintenance due to exposed utilities	Enhances ventilation, provides better airflow
Angle Bar	Balusters - Safety Railing	Form Giver	Material is capable of providing sturdiness with minimal dimensions	-
	Sliding Ladder	Form Giver	Capable of mounting on to steel structure	-
	Adjustable Panels - Safety Railing	Form Giver	Form provides additional seating/table space	Encourages users to stay outdoors
Steel Rods	Rails - Safety Railing	Form Giver	Slenderness provides wider view of the congregation space	Less obstruction, allows better air circulation, Encourages users to stay outdoors
			Horizontal rods support leg placement, enables informal seating	
		Form Giver	Slenderness provides wider view of the congregation space	
THE CORNER HOUSE				
Materials	**Design Element**	**Form Giver / Finish**	**Design Affordance**	**Additional Notes**
Polished Concrete	Flooring	Finish	Surface enables ease of movement	Smooth surface, promotes airflow, reduces humidity buildup.
I-Beam	Columns & Beams	Form Giver	Form is used to place socket and fire extinguisher	-
Angle Bar	Balusters & Handrail - Safety Railing	Form Giver	Form allows installation of striplight underneath	-
			Provides a higher level of physical security due to material capability	-
Steel Rods	Pickets - Stair Railing	Form Giver	Material is capable of providing sturdiness with minimal dimensions	Less obstruction, allows better air circulation
Steel Mesh	Facade	Finish	Material is capable of providing sturdiness with minimal dimensions	Less obstruction, allows better air circulation
Grey Granite Tiles	Countertop	Finish	supports dining activities while exposed to outdoors	Encourages users to stay outdoors
Colored Acrylic	Skylight Cubes	Form Giver / Finish	Form is used as a table for outdoor events	Enhances natural light,
Rubber Mat	Flooring	Finish	Texture enables child-friendly fast-paced activities	Reduces heat absorption, suitable for outdoor play areas.

VI. Evaluation

A. Spatial and Behavioral Affordances Enrich Community Spaces

The need for community spaces does not only call for what benefits society but also the environment. All the buildings discussed offer enriched community spaces because of the spatial and behavioral affordances used. In the Commons Thonglor, the multifunctional stairs encourage social activities (behavioral) while immersing the users to natural air through the atrium space (spatial). In the Commons Saladaeng, the outdoor areas (spatial) uses its terraced form design by introducing removable wood pallets to reconfigure the platform to suit various activities (behavioral). In the Corner House, the creation of a jogging ramp (behavioral) was made possible by maximizing the vertical space through steel construction (spatial). Both spatial and behavioral affordances, promote diverse activities and encourage active participation. All of which not only provides a community space itself, but enhances the spatial experience of the users by adapting to the environment.

B. Visual and Spatial Affordances Rediscover Lost Spaces

The concept of "lost spaces" was discussed in this study, highlighting the underutilization of spaces due to poor design and neglect. Visual and spatial affordances give clear visual cues to guide users in navigating the building. Material properties (ie, color and surface) and material capabilities (i.e., durability and flexibility) can be used to optimize user experience. In The Commons Thonglor, the visual acuity of the outdoor communal space (spatial) is enhanced through the indirect lighting of the bare concrete ceiling at night (visual). In The Commons Saladaeng, the transparency of the corrugated sheet for the walls and ceiling (visual) maximizes natural light to further illuminate the terraced communal spaces (spatial). While in the Corner House, the application of white paint finish passively enhances the brightness (visual) for the outdoor dining and lounge spaces (spatial). The integration of the two affordances provides clear spatial relationships that makes the building more engaging to both users and the environment.

C. Affordances Breaks the Resistance of Adaptable Materials

The resistance towards the application of adaptable materials is due to the lack of understanding of the material's potential. The gap between perception and introducing new applications of materials lies in their affordances. For example, the variety of textures in all the buildings go beyond aesthetic value since its surface properties influence the movement of users (tactile). The corrugated sheets in The Commons Saladaeng, shows that it can be applied not only for roofs but also for walls. This new application showed alternative material options to allow natural light to enter the building. (visual) Another case is the steel construction of the Corner House which posed challenges due to its limited application in the

Philippines (Nas C., personal communication, November 4, 2024). This construction technique proved successful, as the minimal structural dimension of steel enabled the integration of a jogging path while optimizing space for communal areas (spatial). The buildings discussed manifest how adaptable materials can be applied without complex methods, but rather through an understanding of its affordances.

D. Materials and Affordances in the Context of Tropical Design

Materials in tropical architecture must respond to both environmental conditions and user needs. From the buildings discussed in this study, the materials applied such as concrete and steel use their structural efficiency to increase spatial dimension. This design strategy harnesses better natural ventilation through open unobstructed spaces hence minimizes reliance on artificial cooling.

The understanding of materiality in tropical design was further deepened when the theory of affordances was introduced. For instance, the material characteristic of light-colored finishes and glass with decals in the Corner House optimizes light reflection to brighten spaces. This design strategy visually affords a comfortable work and study environment for users while reducing energy consumption. Another example are the lightweight and thermal insulating wood pallets in the Commons Saladaeng which functions as a movable platform which can be reconfigured for different outdoor events. These affordance-driven cases show how materiality creates functional and engaging spaces that enhance user experience by adapting to the tropics.

VII. Conclusion & Recommendations

This study focuses on the problem surrounding the resistance of applying adaptable building materials in community spaces within the tropical environment (see I. Introduction). Thus, the researchers were able to evaluate how the use of materials shapes the visual, tactile, spatial, and behavioral aspects of architectural affordances in the tropical context. This study was conducted by analyzing three buildings, The Commons Thonglor and The Commons Saladaeng by determining the materials applied and analyzing their affordances (see III. Research Design & Methodology). The visual affordances show how material properties such as color, transparency, permeability and reflectivity enhance a function of a space. Tactile affordances influence precautionary measures for users because of the non-slip and weather resistant properties of the material. The spatial affordances discussed show how material capabilities maximize the space to optimize its function. Lastly, the behavioral affordances show how material forms and surfaces influence activities by shifting their proximity. (see V. Analysis of Materials). After a cross-case synthesis, the findings of this study show that affordances can provide user comfort in the tropical climate when material properties and capabilities are leveraged in the design. It is through the proper application of materials that affordances bridge the gap between perception and the use of adaptable materials (see VI. Evaluation).

Moving forward, the researchers recommend further research on material specification analysis and incorporate surveys or interviews among users. Furthermore, other factors for material selection such as cultural influence, client preferences and financial limitations need to better understand the design intent.

This study reinforces the idea that materials shape the perception to users through how it was applied in the building. This contextual approach in design not only adapts to the environment but also communicates to the user. In this sense, material is indeed a language.

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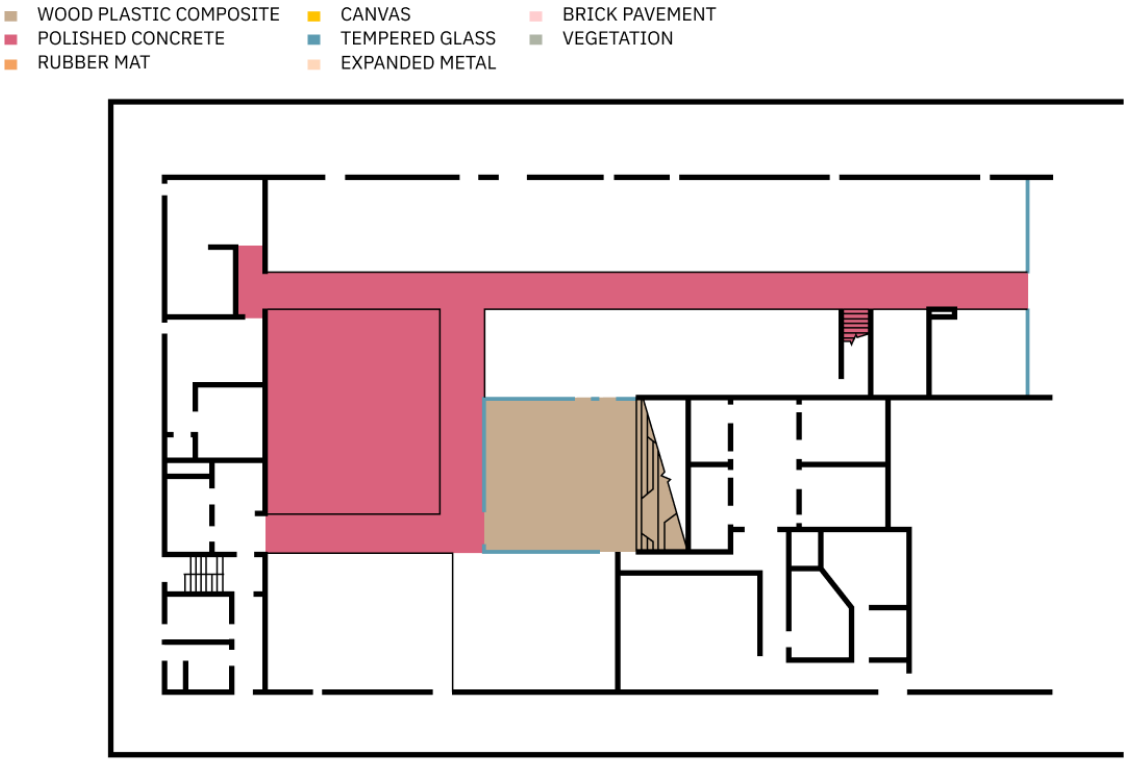
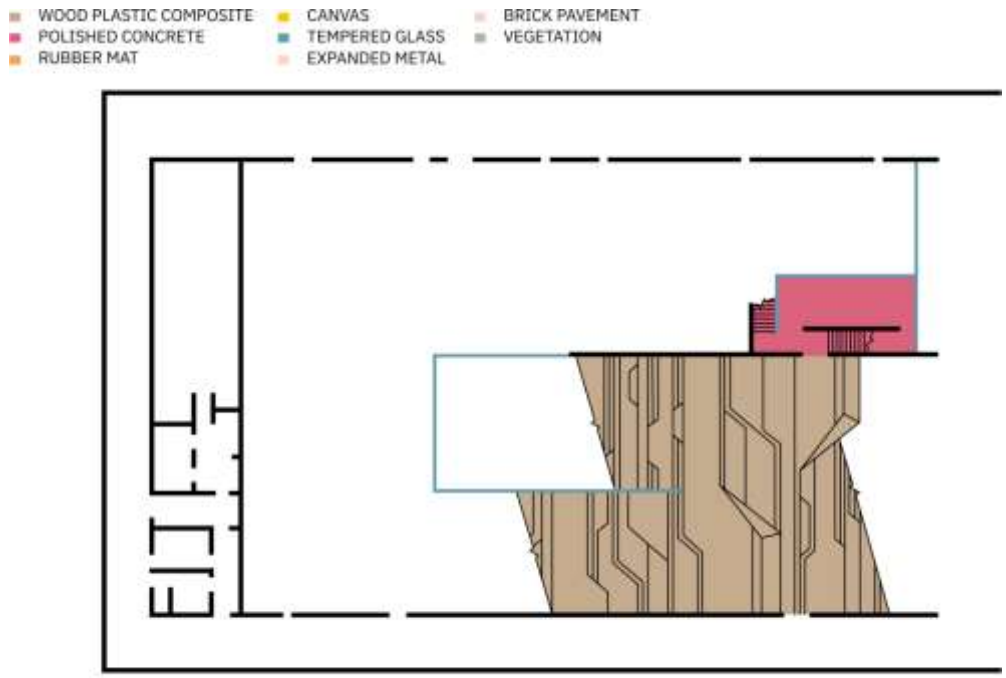
IX. Annex

A. The Commons Thonglor Material Mapping

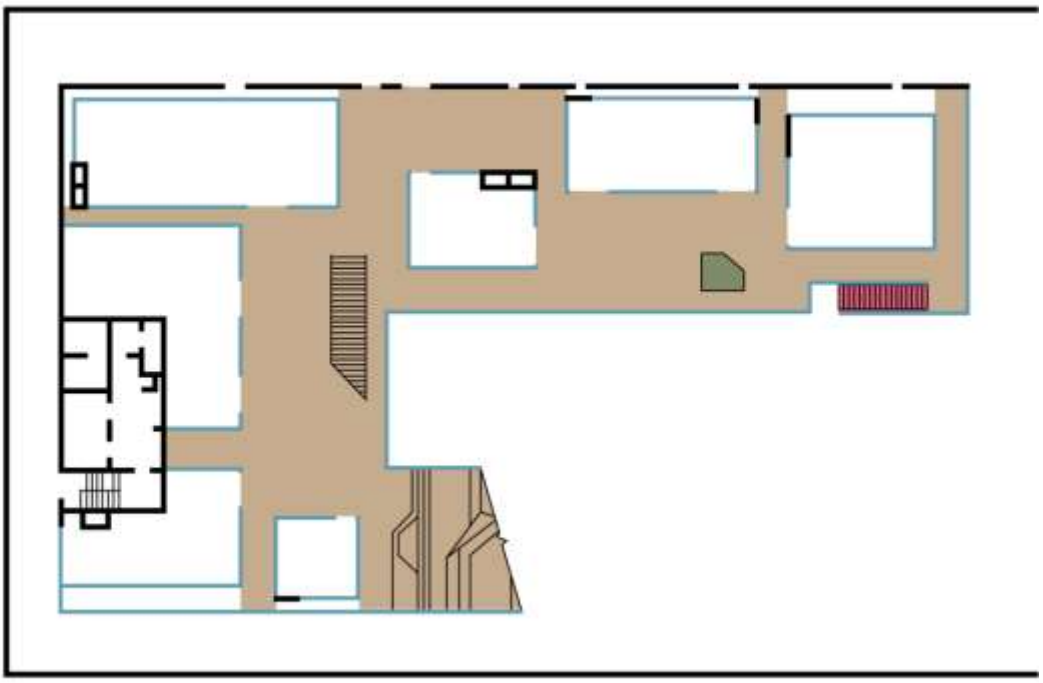


theCOMMONS THONGLOR - TH
GROUND FLOOR



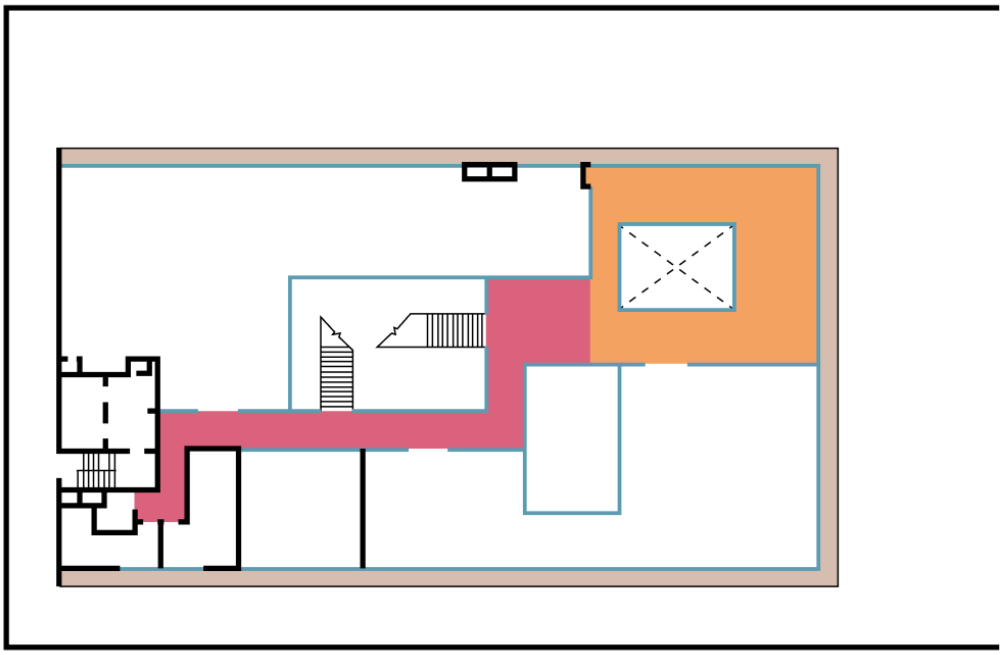
theCOMMONS THONGLOR - TH
MEZZANINE FLOOR

WOOD PLASTIC COMPOSITE
POLISHED CONCRETE
RUBBER MAT
CANVAS
TEMPERED GLASS
EXPANDED METAL
BRICK PAVEMENT
VEGETATION

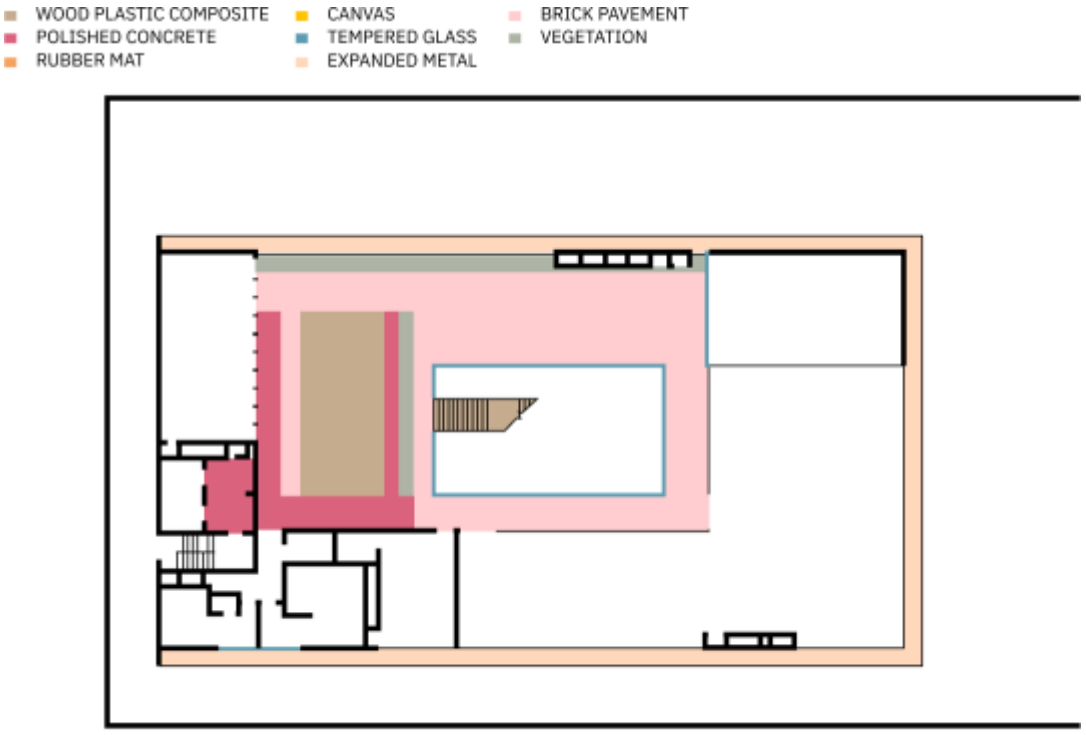


theCOMMONS THONGLOR - TH
SECOND FLOOR

WOOD PLASTIC COMPOSITE
POLISHED CONCRETE
RUBBER MAT
CANVAS
TEMPERED GLASS
EXPANDED METAL
BRICK PAVEMENT
VEGETATION

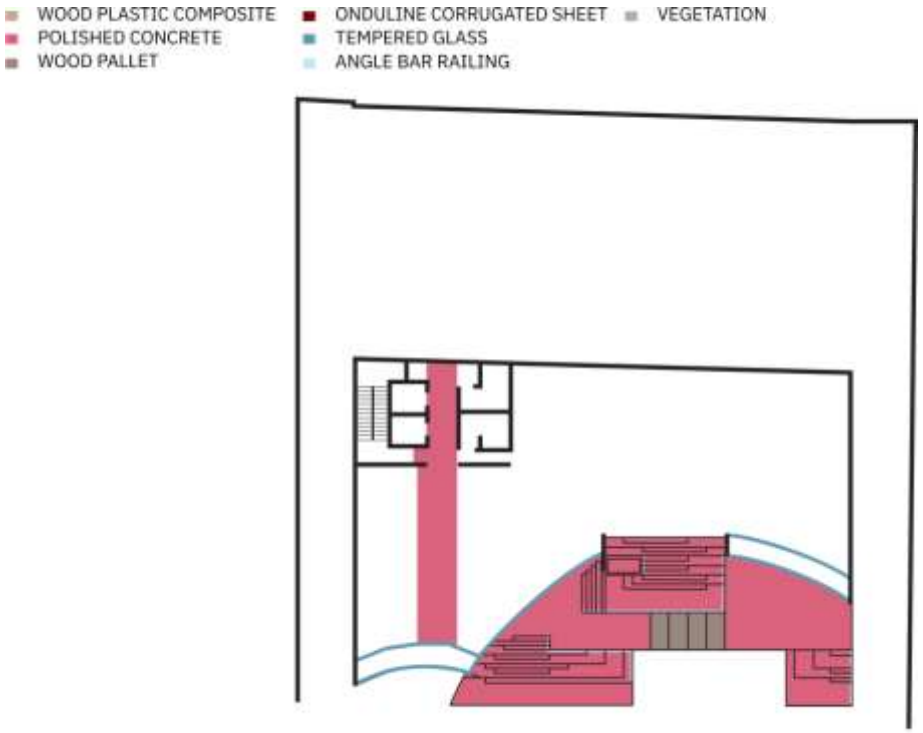


theCOMMONS THONGLOR - TH
THIRD FLOOR

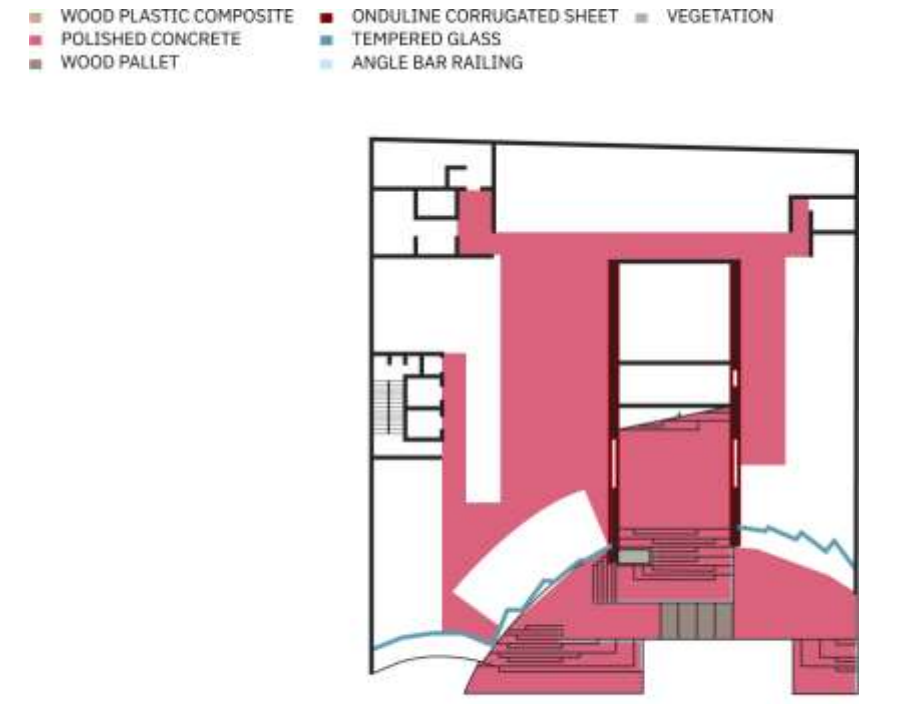


theCOMMONS THONGLOR - TH
FOURTH FLOOR

B. The Commons Saladaeng Material Mapping

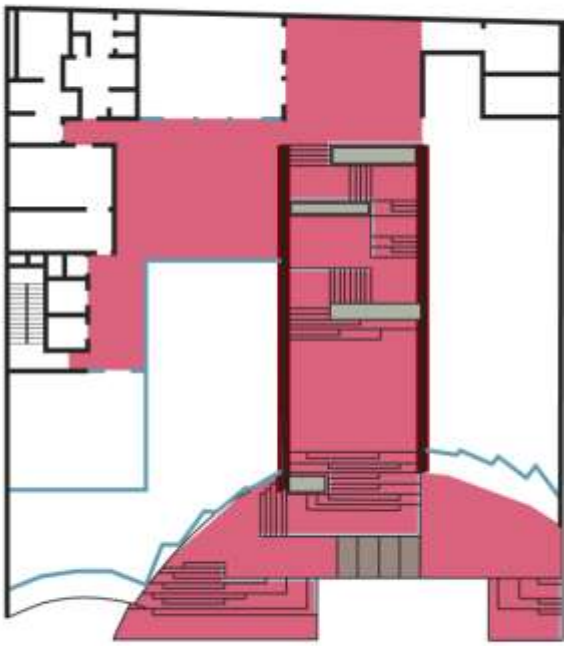


theCOMMONS SALADAENG - TH
GROUND FLOOR



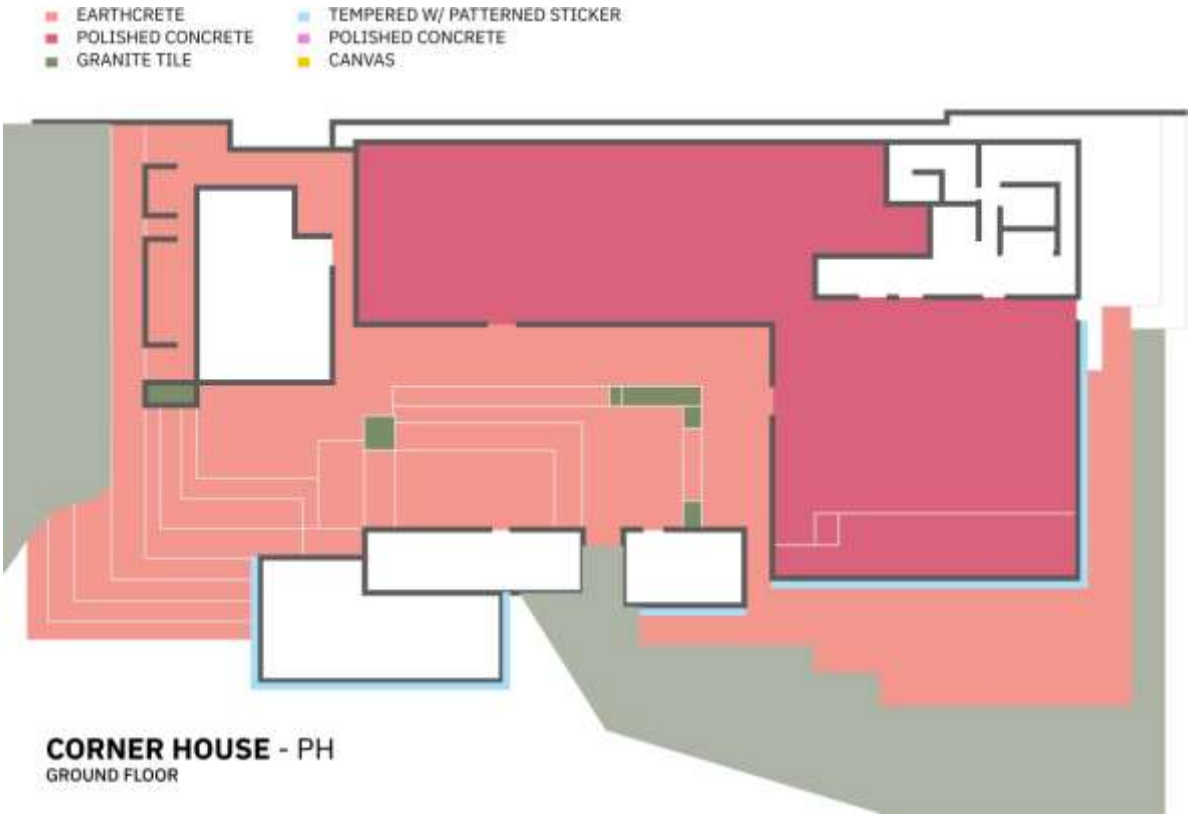
theCOMMONS SALADAENG - TH
SECOND FLOOR

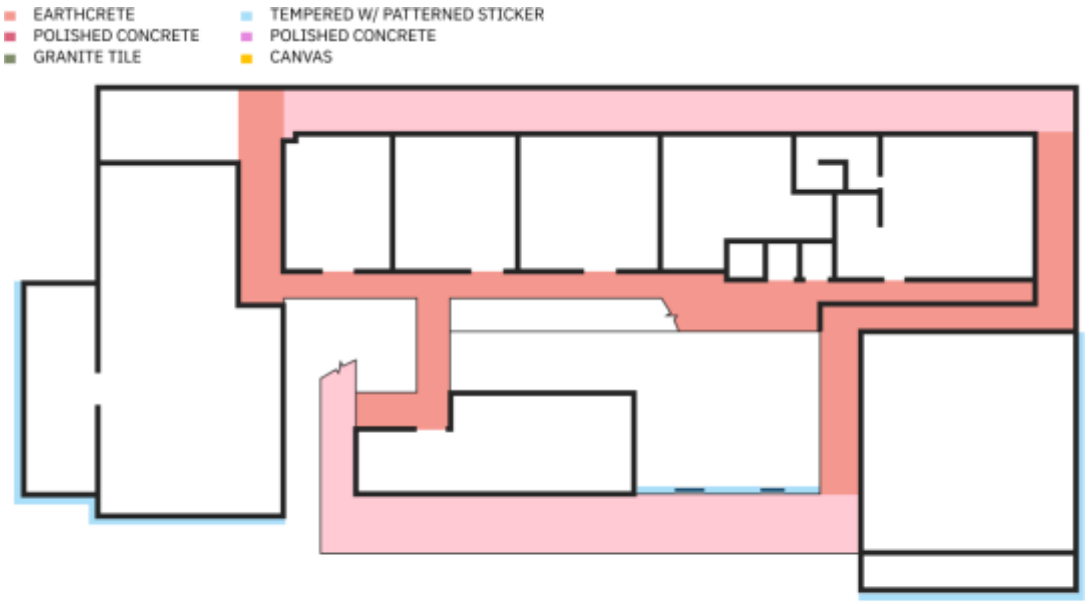
WOOD PLASTIC COMPOSITE
POLISHED CONCRETE
WOOD PALLET
ONDULINE CORRUGATED SHEET
TEMPERED GLASS
ANGLE BAR RAILING
VEGETATION



theCOMMONS SALADAENG - TH
THIRD FLOOR

C. Corner House Material Mapping





CORNER HOUSE - PH
SECOND FLOOR