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**REHABILITATION OF PERAK TRADITIONAL HOUSE:
REPURPOSING RUMAH TOK SEDARA BONGSU INTO EDUTOURISM CENTRE**

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ABSTRACT

Rumah Kutai is an old Perak traditional architecture that has become extinct due to modernisation and lacking proper preservation and conservation efforts. According to the National Heritage Act no. 645 standard, to overcome the issue and sustain its architectural heritage, the traditional building needs to be properly restored before being repurposed. This study aims to revitalise abandoned traditional houses, notably Rumah Tok Saudara Bongsu in Perak Tengah, with a dual purpose: conserving cultural and heritage values and transforming them into Perak pottery educational and tourism centre. Methodologically, this study employs two case studies: one for assessing dilapidation studies and another for designing a traditional pottery edutourism. The findings advocate a comprehensive approach. The main facades must be preserved to maintain the building's identity; dilapidated materials and areas necessitate restoration according to the standard, and additional face-lift, including additional spaces are proposed to support the new functions of the building with minimal disruptions. The study is significant to enhance the lifelong span of the house with proper conservation approaches. Besides, it promotes new function of the building for the public towards sustainable Perak cultural heritage.

Keywords : Rehabilitation, adaptive and reuse, Perak Traditional Malay House, building conservation, edutourism

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INTRODUCTION

The number of traditional Malay houses is dwindling due to the swift advancement and modernisation of development processes. Although there are efforts to preserve traditional buildings by many parties, traditional Malay houses that preserve their original materials and styles are hard to see due to many of the houses have been adapted to the current usage, styles, materials and technology (Ramele, Yaman & Muhammad Ariff, 2021). Traditional Malay house is known as '*rumah Melayu*' in Malay. It is a type of vernacular architecture that is native to the Malay Peninsula and other Malay Archipelago. The house uses locally available resources and traditions to address local building and design needs. In Perak, '*rumah Kutai*' is regarded as an ancient architecture often adorned with a distinctive long roof structure referred to as '*bumbung Perak*', and previously, many can be found lining the Perak River (Rashid, Baharuddin & Alauddin, 2021). However, the current observations reveal a stark contrast; those along the river have either undergone modernisation to suit the preferences and requirements of their current occupants or have been left to succumb to abandonment (Rashid, Baharuddin & Alauddin, 2021).

In building conservation, adaptive and reuse refer to the practice of repurposing the existing structure for new functions while preserving its historical, cultural and architectural significance. This practice necessitates innovative approaches and strategies to balance adaptation to contemporary needs with the maintenance of historical authenticity while appropriately extending its lifespan (Mohamad et al., 2023). For this reason, this study applies rehabilitation procedures and processes on Rumah Tok Sedara Bongsu, which includes a dilapidation survey to identify building defects. The project aims to propose appropriate interventions and treatments before repurposing the building.

LITERATURE REVIEW**SUSTAINABILITY OF TRADITIONAL BUILDING**

According to the Heritage Building Conservation Guidelines (JWN, 2012), all building conservation concepts practice authenticity in heritage conservation. When it comes to heritage building conservation, the sustainability of traditional buildings is often evaluated based on several key factors:

1. **Material Conservation:** Traditional buildings are often made from locally sourced materials that are durable and have a low environmental impact. Conservation efforts focus on preserving these materials rather than replacing them with new, potentially less sustainable materials.
2. **Energy Efficiency:** Traditional buildings are often designed with features that promote natural ventilation, daylighting, and thermal comfort, reducing the need for energy-intensive heating, cooling, and lighting systems. Conservation efforts aim to maintain or enhance these features to improve energy efficiency.
3. **Cultural Value:** Traditional buildings often have significant cultural and historical value, representing the architectural, social, and cultural heritage of a place. Conservation efforts aim to preserve this cultural value for future generations.
4. **Adaptability:** Traditional buildings are often adaptable to changing needs and environmental conditions. Conservation efforts focus on maintaining this adaptability by preserving the flexibility of the building's design and construction.

In general, the sustainability of traditional buildings in heritage conservation is often viewed holistically, considering not just environmental factors but also social, cultural, and economic aspects. Conservation efforts often involve local communities, fostering a sense of ownership and pride in the heritage of the building. This community engagement can help ensure the long-term sustainability of the building. The goal is to balance the preservation of heritage with the need for sustainable development.

EDUTOURISM FOR SUSTAINABLE HERITAGE OF PERAK TRADITIONAL POTTERY

Educational tourism, also referred to as edutourism or study tours, entails travel experiences geared towards learning and personal growth. It involves visiting destinations to delve into their culture, history, traditions, and natural surroundings, typically facilitated through guided tours, workshops, classes, and interactions with local communities (Malihah & Setiyorini, 2014; Sudiarta, 2020). The primary objective of edutourism is to furnish travelers with profound insights into the destination, foster cultural interchange, and bolster local economies. It encompasses various activities, ranging from exploring historical sites, museums, schools, and cultural centres to engaging in hands-on experiences and volunteer initiatives. Edutourism in the form of Perak pottery workshops can offer a unique and enriching experience for visitors interested in learning about the traditional craft of pottery-making. These workshops can be designed to provide hands-on learning opportunities, allowing participants to engage directly with the art and techniques involved in Perak pottery. According to Kamaruddin et al. (2013), attendees at pottery workshops can anticipate:

- Delving into the historical and cultural significance of Perak pottery.
- Receiving practical guidance from skilled artisans on various pottery-making techniques, including shaping, molding, and decorating.
- Crafting their own pottery pieces under the expert supervision of seasoned potters.
- Cultivating an admiration for the expertise and dedication inherent in Perak pottery craftsmanship.
- Unleashing their creativity and self-expression through the art of pottery-making.

Perak pottery, particularly exemplified by Labu Sayong and Labu Pulau Tiga, embodies significant cultural values and stands as a symbol of Perak's rich heritage and craftsmanship, making it an ideal product for an edutourism centre. Labu Pulau Tiga and Labu Sayong are traditionally recognised as clay water storage containers, distinguished by their distinct appearances resulting from unique firing techniques. These containers were once frequently used in traditional Malay ceremonies and were also popular as decorative items and souvenirs. However, their popularity has diminished over time. According to a study by Ariffin et al. (2023), the sustainability of these traditional practices necessitates innovative approaches across various domains, as proposed in this study. Below are several factors explaining the importance of a centre for Perak pottery:

1. **Tourist Attraction:** : The unique shape and cooling properties of Labu Sayong make it an attractive souvenir for tourists. An edutourism centre showcasing Perak pottery could attract visitors interested in traditional crafts and cultural experiences.

3. **Cultural Heritage:** Perak pottery is a part of the state's cultural heritage, reflecting the traditional craftsmanship and skills of its people. An edutourism centre focusing on Perak pottery can help preserve and promote this cultural heritage.
4. **Educational Value:** A dedicated centre focusing on Perak pottery can offer educational programmes and workshops, enabling visitors to delve into the history, significance, and techniques of pottery-making. This presents a valuable learning opportunity for both locals and tourists alike.
5. **Economic Opportunities:** Promoting Perak pottery through an edutourism centre can create economic opportunities for local artisans and craftsmen. It can also stimulate the local economy by attracting tourists and generating income for the community.
6. **Preservation of Traditional Skills:** Through the promotion and preservation of Perak pottery, an edutourism centre plays a pivotal role in ensuring that traditional pottery-making skills are perpetuated for future generations.

In essence, a dedicated edutourism centre specifically on Perak pottery has the potential to become a focal point for cultural exchange, education, and economic growth, offering advantages to both the local populace and tourists by perpetuating the preservation of traditional Perak pottery. Consequently, this study aimed to underscore the significance of the Perak pottery workshop as an edutourism hub, emphasising its capacity to provide visitors with an enjoyable, educational, and memorable experience while enriching their appreciation of Perak's cultural heritage and traditions, thereby bolstering its long-term sustainability.

EDUTOURISM AS A BOOSTER FOR PERAK'S ECONOMY

Based on the 11th Malaysia Plan, Perak Development Plan Amanjaya 2020 (PAJ) and other plan initiatives, the State Government needs to continue to succeed in human capital preparation and development agenda to meet the needs for socioeconomic growth and industrial development in the future (refer Figure 1). Some of the issues that need to be addressed include improving the efficiency of the labour market and reinforce lifelong learning. It is important to meet the demands of industry, attract investment and improve human capital skills.

Experience economy is an important concept that gives understanding that experiences can be created for profit as well as image and branding. The experience economy offers aesthetic value to consumers to stay using products and services. It can attract new customers through the sharing of experiences by customers who are satisfied with the product and service.

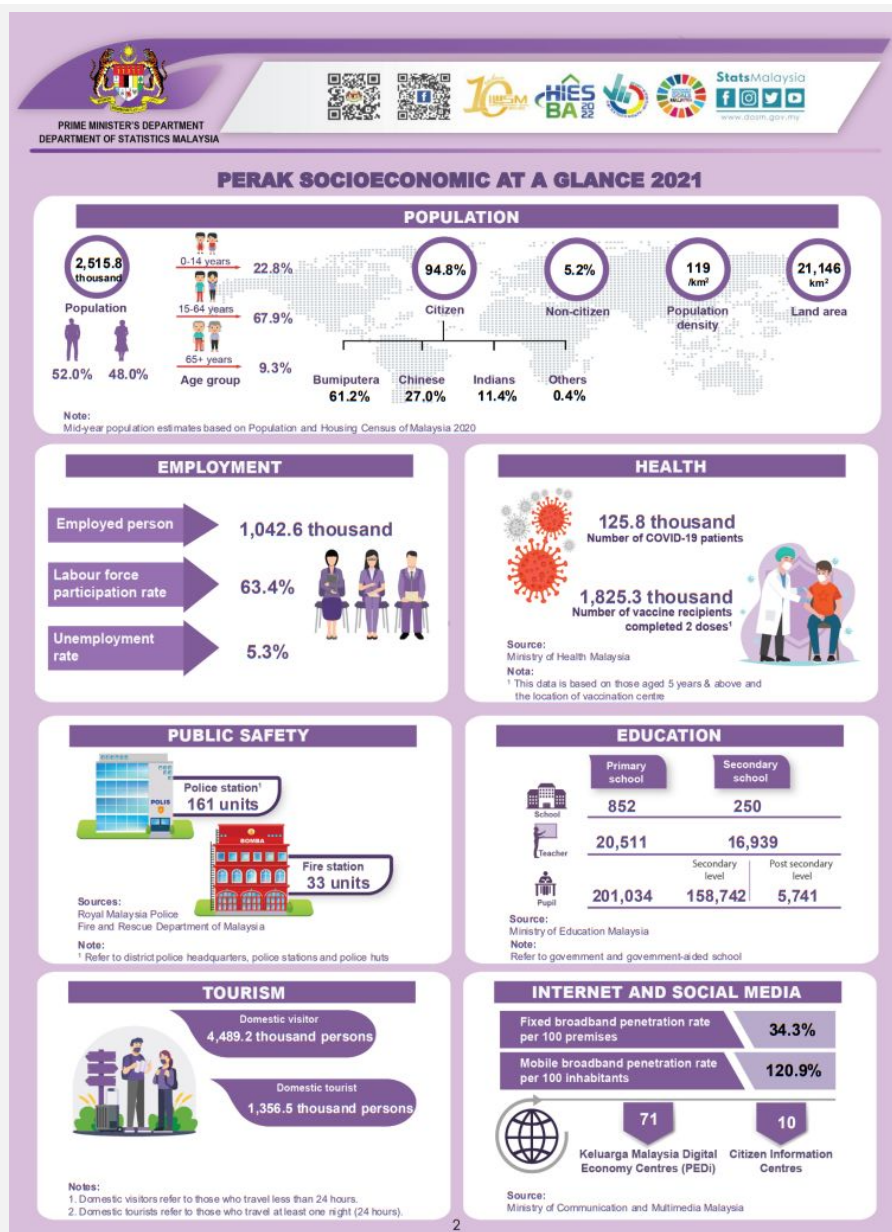


Figure 1: Diagram of Perak socioeconomic 2021

Tourism in the state of Perak has its own aesthetic value such as from its natural resources, the sultanate heritage and cultural resources. The state of Perak has flora and fauna, as well as geological resources that offer visitors a valuable tropical experience. The value of civilisation such as international archeology centres are able to provide new horizons in the experience of economy sector. All these values guarantee good experience and satisfaction of tourists, thus making the state of Perak as a destination to find peace and well-being.

The economy in the state of Perak needs to be empowered to improve its quality of experience. It should be planned more strategically so that it can contribute to the economic activity and sustainability of the state of Perak. Therefore, the proposal can increase domestic investment to provide the best services to users in various sectors (Yusof & Kalirajan, 2021). Therefore, the state government needs to focus on the provision of training and modules for the development of an experience-based economic design thinking.

Edutourism has the potential to significantly boost Perak's economy. By leveraging its rich cultural heritage, historical sites, traditional crafts, and natural attractions, Perak can attract a new segment of tourists who are interested in learning and experiencing the local culture and history.

This can lead to several economic benefits:

- Revenue Generation:** Edutourism can generate revenue for Perak through entrance fees to historical sites, workshops, cultural performances, and the sale of local crafts and products.
- Job Creation:** The growth of edutourism can create new job opportunities in various sectors, including hospitality, tour guiding, transportation, and the arts and crafts industry.
- Infrastructure Development:** To support edutourism, Perak may invest in infrastructure improvements such as the development of visitor centres, museums, cultural villages, and transportation networks, which can benefit both tourists and locals.
- Preservation of Cultural Heritage:** Edutourism can also contribute to the preservation of Perak's cultural heritage by raising awareness and providing financial support for the conservation of historical sites and traditional crafts.
- Promotion of Local Businesses:** Edutourism can stimulate the growth of local businesses, including hotels, restaurants, souvenir shops, and transportation services, by increasing demand for their products and services.

Overall, edutourism has the potential to diversify Perak's economy, create sustainable growth, and enhance the overall quality of life for its residents. The sustainability of traditional buildings in heritage conservation is often viewed holistically, considering not just environmental factors but also social, cultural, and economic aspects. Conservation efforts often involve local communities, fostering a sense of ownership and pride in the heritage of the building. This community engagement can help ensure the long-term sustainability of the building. The goal is to balance the preservation of heritage with the need for sustainable development.

METHODOLOGY

The methodology illustrated in Figure 4 was employed to attain the objective of the intended study. The study used a qualitative approach as the main method with 2 types of case studies: one is for the dilapidation study and the other is for the pottery centre design study. The study commenced with a literature review and conceptualisation, followed by an examination of successful analogous projects through precedent and case studies. The findings were used to formulate the rehabilitation analytical proposal for Rumah Tok Sedara Bongsu (Figure 2 and Figure 3), which is the selected site project for development of edutourism centre.



Figure 2: Rumah Kutai Tok Saudara Bongsu from front view



Figure 3: Side view of Rumah Kutai Tok Saudara Bongsu

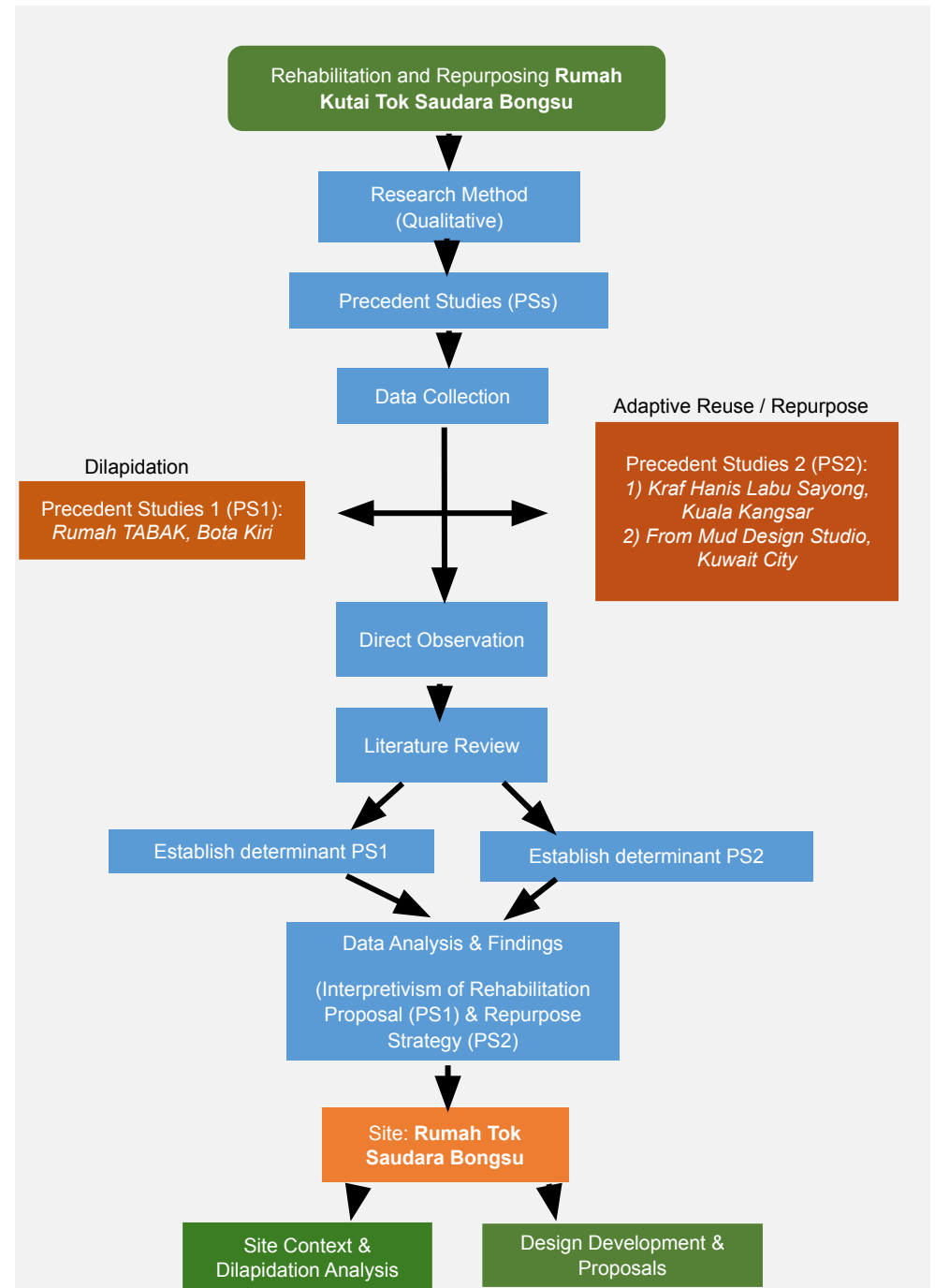


Figure 4: The methodology used in the study.

SITE & DILAPIDATION FINDINGS

SITE ANALYSIS: RUMAH TOK SEDARA BONGSU (TOKSU)

Rumah Tok Sedara Bongsu, shortened as Rumah TOKSU is a Kutai house located in a rural area in Kampung Aji, Bota Kiri, Perak, just about 100 metres away from Perak River (Figure 5). Rumah Kutai is a Traditional Malay House that originated from Perak. The traditional Malay houses that are found along the Perak River are very valuable in terms of historical and architectural value. Kutai house is closely related to the development of traditional village settlements in the State of Perak, especially along the Perak River.



Figure 5: The location of Rumah TOKSU (pinned) and how close it is to Perak River (Source: Google Maps)

HISTORICAL BACKGROUND

Rumah Tok Sedara Bongsu is a foster home of the UiTM (Universiti Teknologi MARA) Sri Iskandar, used for reference and learning in building heritage conservation (Nor, Misnat, Isa & Abd Karim, 2021). Historically, the house is owned by Mrs. Hajjah Habsah Nordin who is the sixth-generation owner of the house. This house is believed to be more than 130 years old (refer Figure 6) and linked to the descendants of the Perak royal family and was built by Tok Matut, a religious officer in Bota. The house is named after the owner who was a governor called Tok Sri-Indera Bongsu.

CURRENT BUILDING CONDITIONS

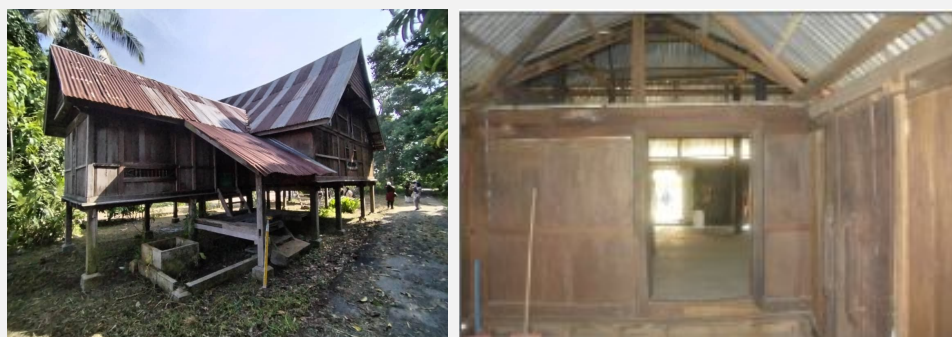


Figure 6: Side view and current condition of the exterior of Rumah Kutai Tok Saudara Bongsu (left) and the interior of the house (right)

Based on the observations, despite the house's age of over 100 years the primary structural elements, such as pillars, beams, and rafters, have managed to withstand the test of time (Figure 6). On the other hand, non-structural components like door and window frames, ceilings, and decorative wood have significantly deteriorated, some to the point of breaking or disappearing entirely (Figure 9 & Figure 10). Even though the roof was replaced with zinc there is new damage found from our inspections (Figure 7).

Some parts of the external and internal wall are damaged, which varied from major and minor defects and need immediate repair. The timber floorboards and joists are at an unsatisfactory level. Minor defects and damages can be found in several spots. The main pillars, a critical part of the house's structure, are among the few elements that have remained intact, with all 16 of them still standing (Figure 8). The core of the house, known as *rumah ibu*, has also managed to survive (Figure 9), while other areas like the porch and kitchen have been previously documented as destroyed.



Figure 7: Current condition of the exterior roof(left) and interior roof (right) of Rumah Kutai Tok Saudara Bongsu



Figure 8: Current condition of the pillars of Rumah Kutai Tok Saudara Bongsu



Figure 9: Current condition of *rumah ibu*



Figure 10: Current condition of *rumah bilik*

DILAPIDATION ANALYSIS

Wooden structures can also rot when attacked or overgrown by fungus or mildew. This fungus or mushroom is a type of plant that does not have chlorophyll and they get substances that contain nutrients through plants or organisms found on wood structures.

Termites make holes in the ground. It also breeds in damp places and places where there are piles of wood. Termites live by using dead wood as their food source. Among the places that are often attacked by termites are roofs, windows, doors, wooden frames, ceilings and floor joists. The wooden structure will lose its strength and rot as a result of termite attacks.

This Kutai house is basically no longer inhabited because the heirs have moved away. Its abandoned state to weather factors and the attack of pests, termites and fungi as well as severe mildew have resulted in the quality of the structure of building materials deteriorating.

The pie chart in Figure 11 and Table 1 summarised the defects division for the interior of Rumah Tok Saudara Bongsu. The highest defects were termites and discoloration with a total number of 4 defects detected. Each of the defects took up 18.2% of the chart. Issues like detachment, rust, crack, and missing parts in the other hand took up 9.1% each of the charts with a total number of 2 defects each. The least detected defects were deformed roof, chipped wood, broken hinge, rot, white spot and vandalism with 1 defects and took up 4.5% each of the chart.

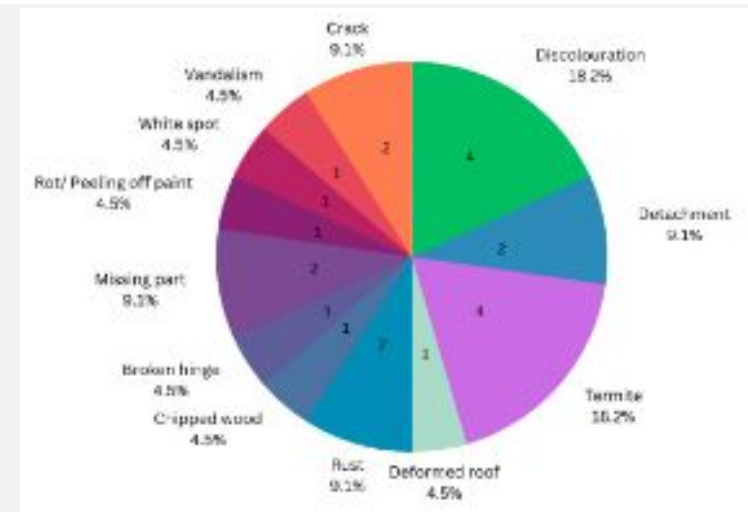


Figure 11: Pie chart from defect analysis summarising in percentage the identified defects from the interior of Rumah Kutai Tok Saudara Bongsu

SECTION	TYPE OF DEFECT	DEFECT NUMBER	TOTAL DEFECT	OVERALL TOTAL OF DEFECT
Rumah Ibu	Termite	RTRI01, RTRI07, RTRI11	3	12
	Chipped wood	RTRI02	1	
	Broken hinge	RTRI03	1	
	Detachment	RTRI04	1	
	Discoloration	RTRI05, RTRI06, RTRI10	3	
	Rust	RTRI08	1	
	Missing wooden plank	RTRI09	1	
Bilik	Deformed roof	RTRI12	1	6
	Termite	RTB01	1	
	Missing wall panel	RTB02	1	
	Rot/ Peeling off paint	RTB03	1	
	White spot	RTB04	1	
	Vandalisme	RTB05	1	
Rumah Dapur	Crack/ Wide gaps	RTB06	1	4
	Discolouration/ rot/White spot	RTRD01	1	
	Rust	RTRD02	1	
	Detachment	RTRD 03	1	
	Crack	RTRD04	1	
			Total damage	22

Table 1: Summary of identified defect on the interior of Rumah Kutai Tok Saudara Bongsu

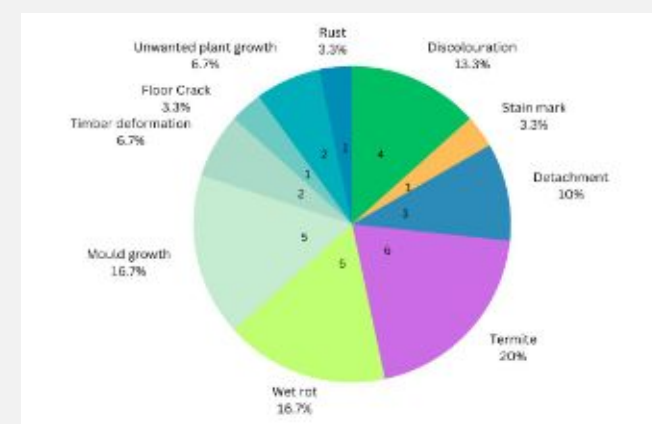


Figure 12: Pie chart from defect analysis summarizing in percentage the identified defects from the exterior of Rumah Kutai Tok Saudara Bongsu

SECTION	TYPE OF DEFECT	DEFECT NUMBER	TOTAL DEFECT	OVERALL TOTAL OF DEFECT
Front elevation	Discolouration	RTE12	1	6
	Stain mark	RTE17	1	
	Detachment	RTE19, RTE25	2	
	Termite	RTE28	1	
	Wet rot	RTE24	1	
Right elevation	Discolouration	RTE01, RTE12	2	13
	Termite	RTE04, RTE06	2	
	Mould growth	RTE 11, RTE15	2	
	Wet rot	RTE13, RTE27	2	
	Broken/ Timber deformation	RTE18	1	
	Detachment	RTE19	1	
	Floor crack	RTE26	1	
	Unwanted plant growth	RTE14, RTE23	2	
Left elevation	Wet rot	RTE02, RTE10	2	6
	Rust	RTE05	1	
	Discolouration	RTE12	1	
	Termite	RTE22	1	
	Deformation of timber	RTE21	1	
Rear elevation	Mould growth	RET05, RTE09, RTE16	3	5
	Termite	RTE07, RTE08	2	
Total damage				30

Table 2: Summary of identified defect on the exterior of Rumah Kutai Tok Saudara Bongsu

Type of defect in Rumah Toksu (Exterior)

The pie chart of Figure 12 and Table 2 on the other hand shows the identified defect on the exterior of Rumah Tok Saudara Bongsu. The highest defect detected was termite. 6 termite defects were detected which took up 20% of the chart. Next is wet rot and mould growth with 5 defects detected. It took up 16.7% each of the charts. Besides, discolouration took up to 13.3% of the chart with a total of 4 defects. Detachments took 10% of the chart followed by timber deformation, and unwanted plant growth. Floor crack, rust and stain mark took the least defects detected on the exterior of the house with each of the defects being only 1 and each of the defects took 3.3% out of the chart.

STRUCTURE ELEMENTS

ALANG

- The alang (attic) is at Rumah Ibu that connected with roof structure. This attic are cannot be used as storage or any other things.

ROOF STRUCTURE

- Roof functions as a shield for the house dweller to stay inside safely from any weather such as thunderstorms and heavy rain.
- It has two roof bones; on the upper side is called the tulang bumbung jantan and below is called tulang bumbung betina.

ORNAMENTAL

- Rumah Toksu are categorised as rumah Kutai that have decorative panels at doors and windows. It functions are to beautify the house and for air ventilation purposes.
- The pattern is from a floral organic pattern and is considered as the only rumah Kutai that has an element of curve panel of the surface.

WALL

- Rumah Toksu has both vertical and horizontal wood arrangement of the wall, the vertical is for walls from all sides and the horizontal is for the upper wall up until the roof.
- Possible material for the wall is from chengal wood (*Neobalanocarpus heimii*).
- Most of the horizontal wood wall is installed in a seamless way to make it like a one piece of wood installation.

FLOOR

- Floor functions as a protective surface for human feet to step on.
- As Rumah Toksu has a high floor that is not from the ground, it has more air ventilation that enters the house. Thus, it is considered good in terms of health.

PILLAR

- Rumah Toksu has 16 pillars for Rumah Ibu and 6 for Rumah dapur; 2 pillars holding both of the rooms, which make up 20 pillars in total.
- The base of the pillar uses concrete thus the pillar material is not only from the wood but includes concrete.

BASE

- The type of the column is named as elephant foot because of the look that has a slightly bigger base after the concrete part, and it curves to a small pillar.

RECOMMENDATION AND RESTORATION METHODS

As observed above, several damages require the same or similar restoration methods. For any wooden parts missing or damaged, the severity of the damage is categorised as minor, moderate and major. Only the major damages will be replaced with a new wood while the moderate and minor damage will be repaired, with stains of paint. Paint remover is advisable or using a paint colour that is similar to the wood is advisable to cover up the uneven colouring. Insect infestations can be removed using pest control.

Table 3 shows that there are three different types of wood damage that was found in this house, in which 21 of them are minor defects, 16 are moderate and 10 major damages that require immediate replacement to prevent structural damage. The remaining 4 defects are the corrosion on the nails (RTRI08) and the door hinge (RTRD02) including the zinc roof (RTE02) that is rusting and deforming (RTRI12). The suggested material replacement for the zinc is induline roof, which is more environmentally friendly, light weight, leak proof and easy to install. For preventive measures, it is important to establish a routine maintenance schedule to monitor the condition of the house and address any issues promptly and to clear overgrown vegetation and remove debris from the surrounding area to prevent soil buildup near the foundation.

Table 3: Summary of identified defect based on location and treatment recommendations.

TYPE OF WOOD DAMAGE	LOCATION	RECOMMENDATION
Minor	RTE01, RTE03, RTE04, RTE05, RTE06, RTE11, RTE12, RTE13, RTE14, RTE16, RTE17, RTE21, RTE23, RTE28, RTRI01, RTRI05, RTRI06, RTRI07, RTB04, RTB05	<p>1.Sanding and Finishing: Minor scratches or surface stains can often be removed through sanding, followed by refinishing to restore the wood's appearance.</p> <p>2.Fillers and Putty: For small checks, splits, or gaps, fillers and putty can be used to fill and conceal imperfections. Match the filler colour to the wood's finish.</p> <p>3.Polishing and Waxing: Use polish and wax to enhance the wood's appearance, particularly for minor surface imperfections.</p> <p>4.Regular Maintenance: Implement routine maintenance to prevent minor defects from worsening.</p>
Moderate	RTE07, RTE08, RTE09, RTE15, RTE20, RTE24, RTE27, RTRI02, RTRI04, RTRI09, RTRI11, RTB01, RTB03, RTB06, RTRD03, RTRD04	<p>1.Partial Replacement: In cases of large knots or extensive surface damage, consider partial replacement of the affected wood sections.</p> <p>2.Reinforcement: Add reinforcement, such as splints or brackets, to strengthen areas with cracks or weakened wood.</p> <p>3.Filling and Resurfacing: Fill deeper defects with epoxy, wood filler, or custom-made patches to restore a smooth surface.</p> <p>4.Repairs and Finish: After restoration, sand, and refinish the wood to blend the repaired areas with the surrounding wood.</p>
Major	RTE10, RTE18, RTE19, RTE22, RTE25, RTE26, RTRI03, RTRI10, RTB02, RTRD01	<p>1.Structural Assessment: Conduct a detailed structural assessment to identify the extent of damage and potential risks to the overall structure.</p> <p>2.Complete Replacement: In cases of major defects, complete replacement of damaged wood components may be necessary to ensure structural stability.</p> <p>3.Termite Eradication: Implement thorough termite eradication measures, including treatment of the surrounding area to prevent further infestations.</p> <p>4.Environmental Control: Address moisture-related issues, such as inadequate ventilation or drainage, which may be contributing to the defects.</p>

REHABILITATION FINDINGS

EXPLODED ISOMETRIC DIAGRAM

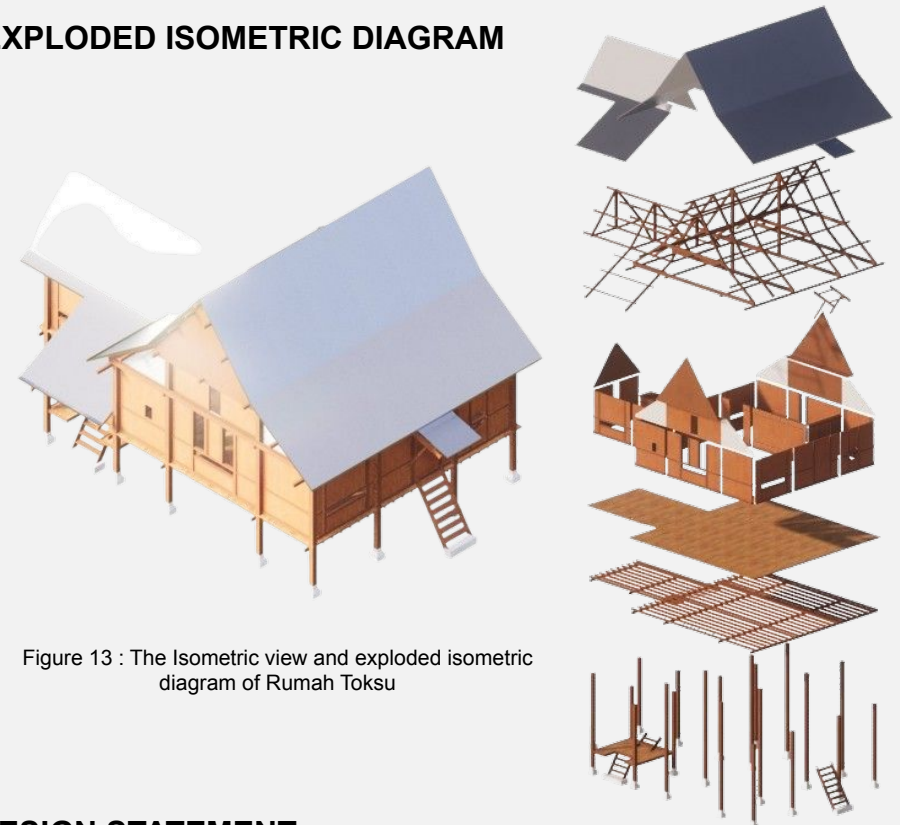


Figure 13 : The Isometric view and exploded isometric diagram of Rumah Toksu

DESIGN STATEMENT

LECAH KEMIN's name was derived from two Perak dialect words: Lecah means mud and Kemin means neat. These words were taken in order to represent the significance of the cultural value of Perak because this was a proposed rehabilitation of Rumah Tok Sedara Bongsu, TOKSU in Bota Kiri, Perak. The word lecah represents the main attraction of this rehabilitation (rehab) project, which is to convert Rumah TOKSU to a Labu Sayong workshop that mainly uses mud/soil based raw material.

Workshops are important for knowledge sharing, skill development, collaboration, and innovation. They provide a structured and interactive environment where participants can learn, exchange ideas, and solve problems. This initiative is taken to preserve significant artwork in Perak to the public. Combining the Perak traditional values on this proposed rehab can spread the heritage knowledge from extinct. This workshop will provide the learning course, exhibition, and business to clients that can benefit the continuity of Perak cultural values in terms of dialect, architecture, and traditional artwork.

THE TANGIBLE AND INTANGIBLE OF PERAK HERITAGE

PERAK DIALECT

- Although it is neither the official language nor the standard dialect in the whole state of Perak, its existence which co-exists with other major dialects in the state of Perak still plays an important role in maintaining the identity of Perak. This presence applied in the workshop's name, signage of sections and learning course.

RUMAH KUTAI ARCHITECTURE

- Rumah Kutai or Kutai House is a traditional house that was built around the 1890s. In Perak, the word “Kutai” means old or ancient. Its relationship with the monarchy system at that time in which the Kutai House architecture was used only for the residence of members of the royal family and important people who had connections and close relationships with the palace. Thus, this type of house is unable to expand. This architectural heritage value of Rumah Toksu will be remained while adapting the new standard of rehabilitation without damaging its authenticity.

TRADITIONAL POTTERY ARTWORK

- Perak is certainly more popular with pottery. Perak’s pottery is different from pottery of Pahang and Kelantan due to its form adaptation from gourd or pumpkin. The pottery is called ‘labu sayong’. Labu sayong is typically made to store water, either in the kitchen or for daily use. Given its slightly porous nature that cools any water it contains, villagers believe that drinking from it has health benefits. So, the artworks’ type will be introduced and be promoted again to attract public on the beautiful of local artwork as souvenir, gift and learning outcome.

FINDINGS FROM PRECEDENT STUDIES

PRECEDENT STUDY 1 : LOCAL CERAMIC WORKSHOP

ORIGINAL BUILDING	GARAGE & HOUSE BACKYARD
NEW FUNCTION	LABU SAYONG WORKSHOP
RENOVATED	2019
AREA	250 mx2
LOCATION	Sayong Lembah, Kuala Kangsar, Perak, Malaysia
OWNERS	Pn. Nurhanis & Mehan Enterprise
STRUCTURE	Steel, Wood & Concrete
DESCRIPTION	The uniqueness of making sayong pumpkins is welcomed by the entrepreneur of Mehan Enterprise, Nurhanis Mohd. Nasir, 30, when continuing the family legacy from 20 years ago. Through Hanis Labu Sayong Crafts, he who is also a Friend of Amanah Ikhtiar Malaysia (AIM) produces traditional handicraft designs by applying various motifs. Because of my love for heritage art, I am ready to take over this business and want to take it to a further level,” he said when contacted recently.



Figure 14: Kraf Hanis Labu Sayong as the local case study. Preparation area (left) and molding area (right).

PRECEDENT STUDY 2: INTERNATIONAL CERAMIC WORKSHOP

ORIGINAL BUILDING	SHOP LOT
NEW FUNCTION	CERAMIC WORKSHOP & STUDIO
RENOVATED	2021
AREA	98 m2
LOCATION	Kuwait City, Kuwait
ARCHITECTS	Rawan Muqaddas
STRUCTURE	Wood & Concrete
DESCRIPTION	The young ceramicist behind From Mud felt a need for the therapeutic and magical art of clay sculpting in the heart of Kuwait City; this was how the space came to be. Sitting comfortably on the first floor of a 1967 Modernist building in Kuwait City’s textile market the zen workspace draws inspiration and texture from the beautiful craft of clay and its simplicity. The studio’s holistic approach is conveyed through clean lines and a soothing palette that reflects the binding theory behind the studio’s own ethos.



Figure 15: Mud Design Studio as the international case study. Baking area (left) and display area (right) (Source: From Mud, n.d).

ANALYSIS OF CASE STUDIES’ FACILITIES

Table 4: Comparison of facilities from the case studies.

No.	Facilities	Precedent Study 1 : Kraf Hanis Labu Sayong	Precedent Study 2 : From Mud Design Studio
1.	Storage	/	/
2.	Preparation Area	/	
3.	Moulding Area	/	
4.	Finishing Area	/	
5.	Drying Area	/	
6.	Baking Area	/	/
7.	Restroom	/	/
8.	Seating Area	/	
9.	Artwork Display Area	/	/
10.	Counter Cashier	/	

No.	Facilities	Precedent Study 1 : Kraf Hanis Labu Sayong	Precedent Study 2 : From Mud Design Studio
11.	Hallway	/	/
12.	Sculpting Area – Meluru Technique	/	/
13.	Cafeteria		/
14.	Workshop Area		/
15.	Lobby		/
16.	Office		/
17.	Signage	/	/
18.	Prayer Room		/

REHABILITATION STRATEGIES

S Rumah Kutai Toksu still kept the original decorative panel & the house's exterior structure is notably well-designed as historically

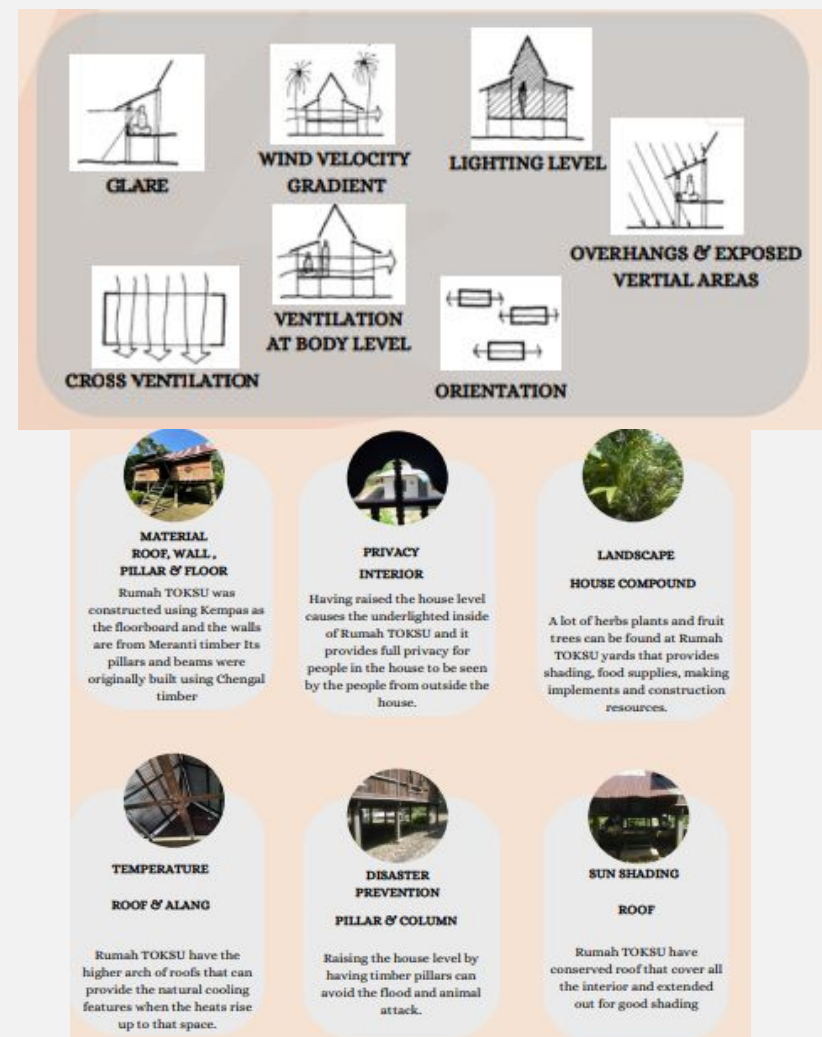
W There are a lot of minor and moderate levels of defect that make the house look old and obsolete.

O This house can become a tourist attraction because of its authenticity of heritage value for everyone to explore,

T Exposure to the elements, such as heavy rain, humidity, and intense sunlight, can cause the materials of these houses to deteriorate over time.

Table 5: Design limitations and its solution and approaches.

DESIGN LIMITATIONS & ISSUES	DESIGN SOLUTIONS
<ol style="list-style-type: none"> 1. Not having plumbing system 2. Not having electricity supply 3. Not having drainage system 4. Limited spaces 5. Under house is too low for human standard height 6. Not having proper footing under house 7. Not having storage/prep space 8. Poor ventilation for premise standard 9. Stairs on entrance are too steep 10. Not having lighting for both interior & exterior 11. Not provide signage 12. Trail & road issue 13. Building structure not conserve well 14. PWD-friendly space is not available 	<ol style="list-style-type: none"> 1. Provide a plumbing system 2. Provide electricity supply 3. Provide drainage system 4. Add-on the extended roof as porch without damage house value 5. Raise concrete columns of under house (300mm from base) 6. Provide cement flooring at part of under house (20mm & 10mm) 7. Provide additional storage area 8. Provide fans/aircond and ekzos fans 9. Modified the degree's stairs & raise the concrete step 10. Provide signage for public uses 11. Provide a friendly guidelines of trails with reasonable reasons 12. Provide suitable lighting according to workshop standard 13. Conserve the structures with wood-based structure 14. Provide PWD equipment & services



SPATIAL ANALYSIS

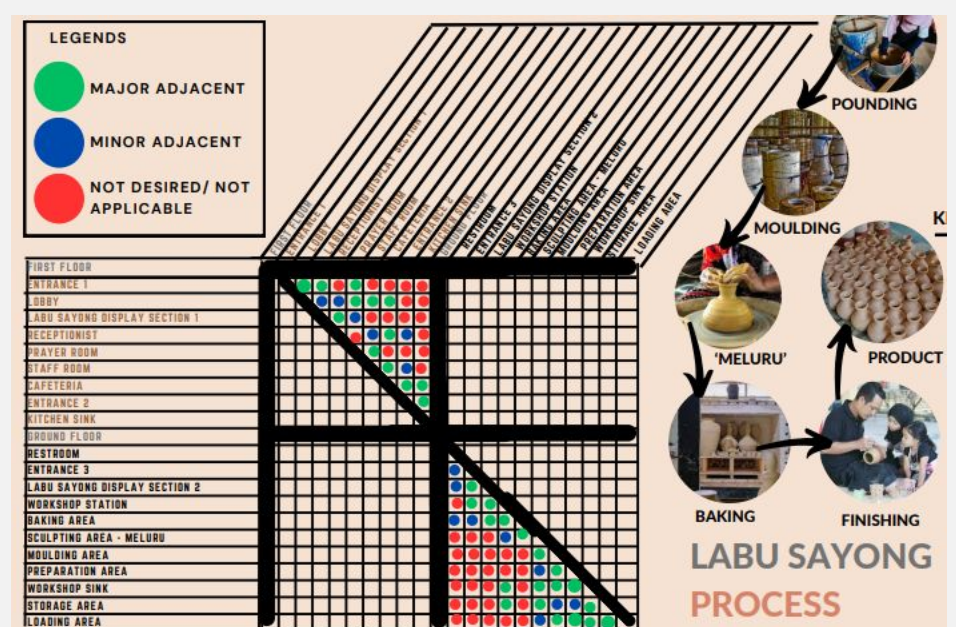


Figure 17: The adjacent matrix for space planning for rehabilitation of Rumah Tok Saudara Bongsu.

BUBBLE DIAGRAM

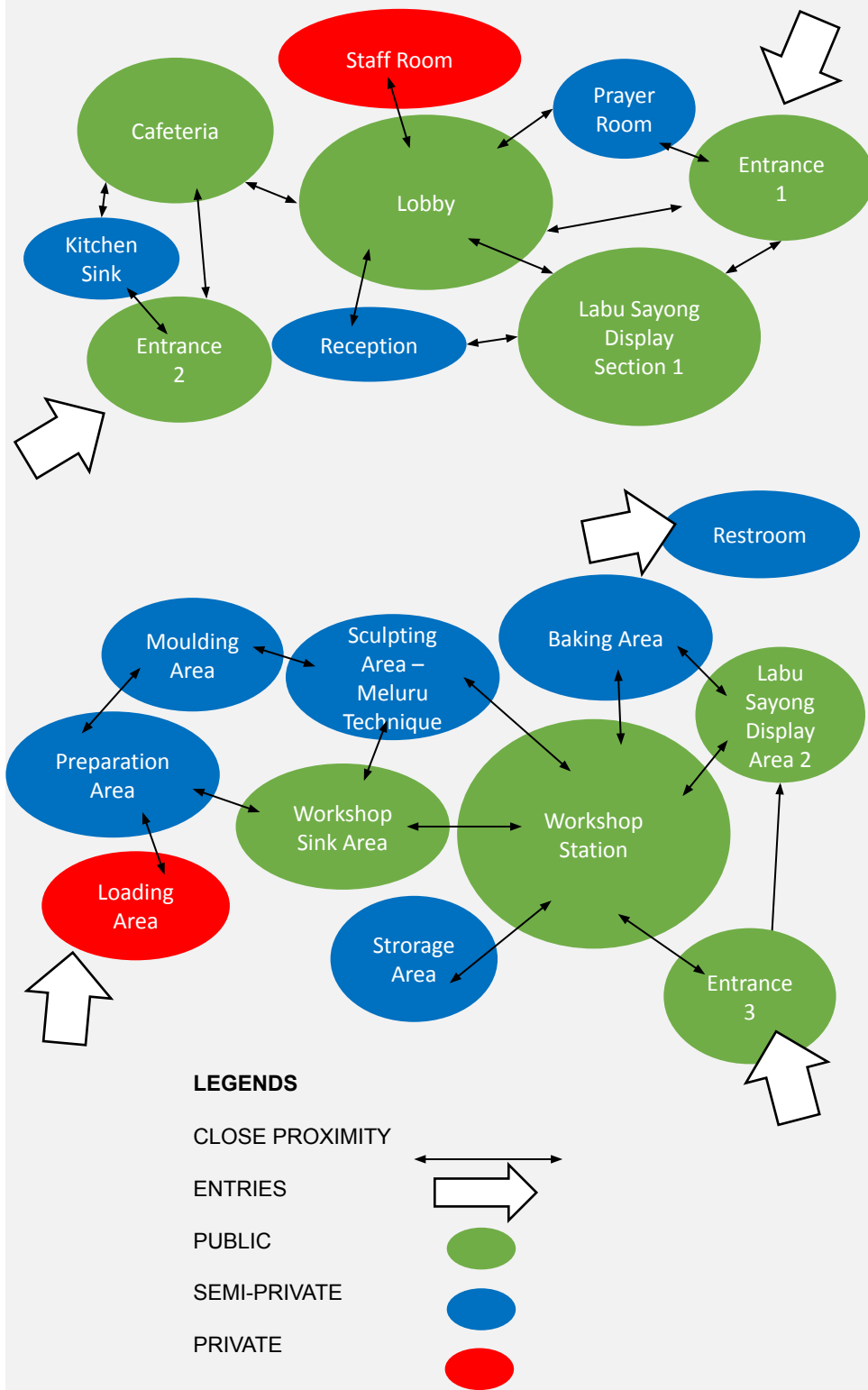


Figure 18: Bubble diagram showing adjacency of spaces for the first-floor (top) and for the ground floor (low)

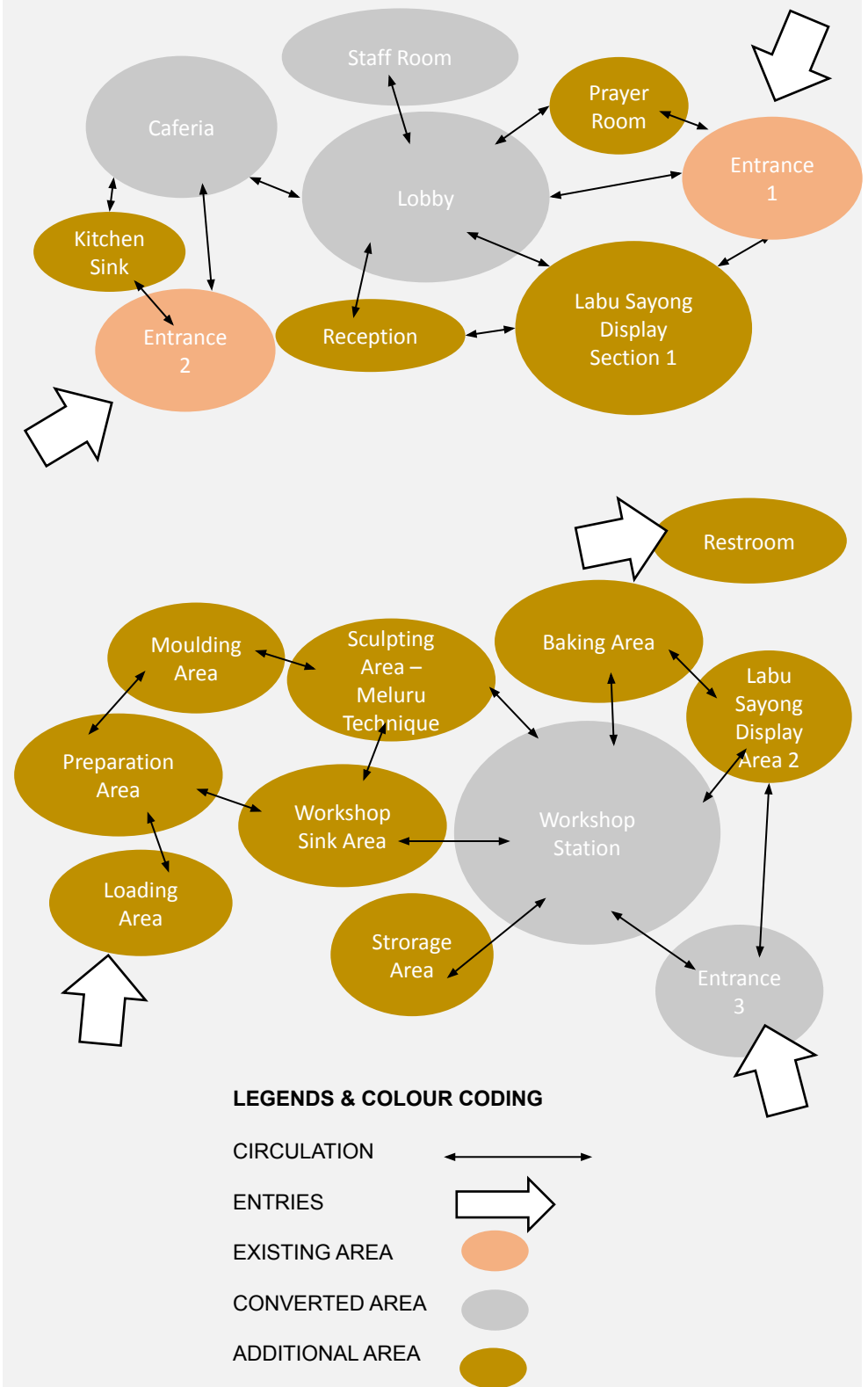


Figure 19: Bubble diagram showing the original and additional areas for the first floor (top) and for the ground floor (low)

NEW SPATIAL DESIGN PROPOSAL

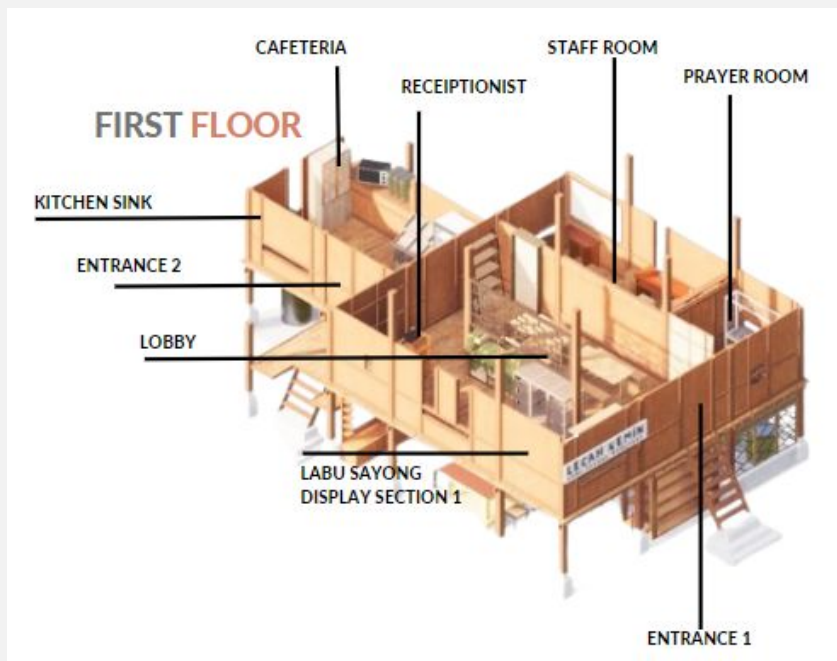


Figure 20: The first-floor isometric view

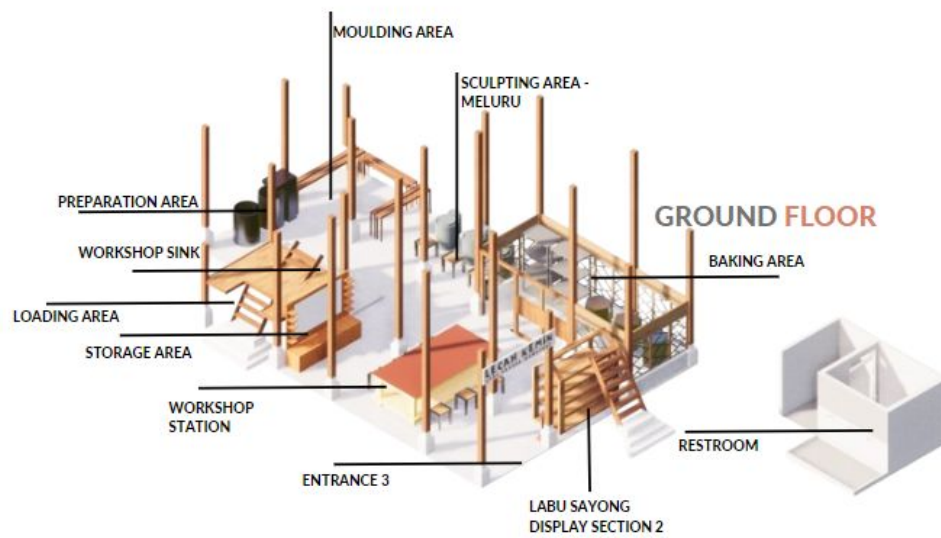


Figure 21: The ground floor isometric view

BEFORE-AND-AFTER IMAGES



Figure 22: *Rumah Ibu* before rehabilitation (left), after rehabilitation (right)

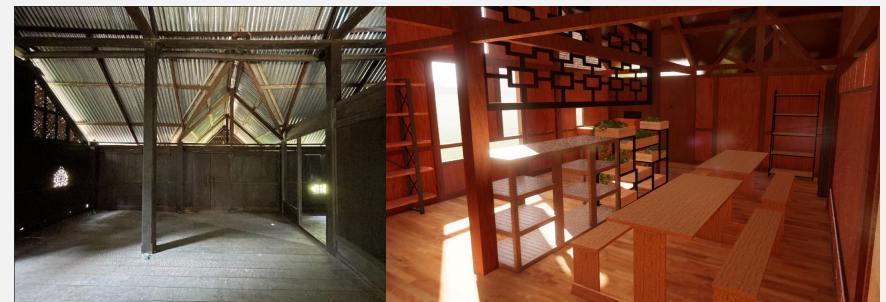


Figure 23: *Rumah Ibu* before rehabilitation (left), after rehabilitation (right)

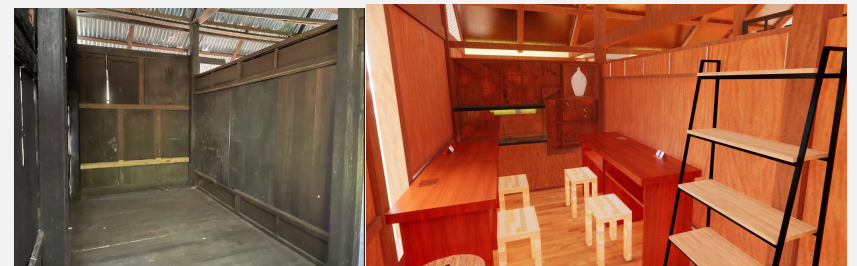


Figure 24: *Bilik* before rehabilitation (left), after rehabilitation (right)



Figure 25: Under house space before rehabilitation (left), after rehabilitation (right)



Figure 26: *Rumah Toksu's* rear facade before rehabilitation (left), after rehabilitation (right)

ADDITIONAL FEATURES

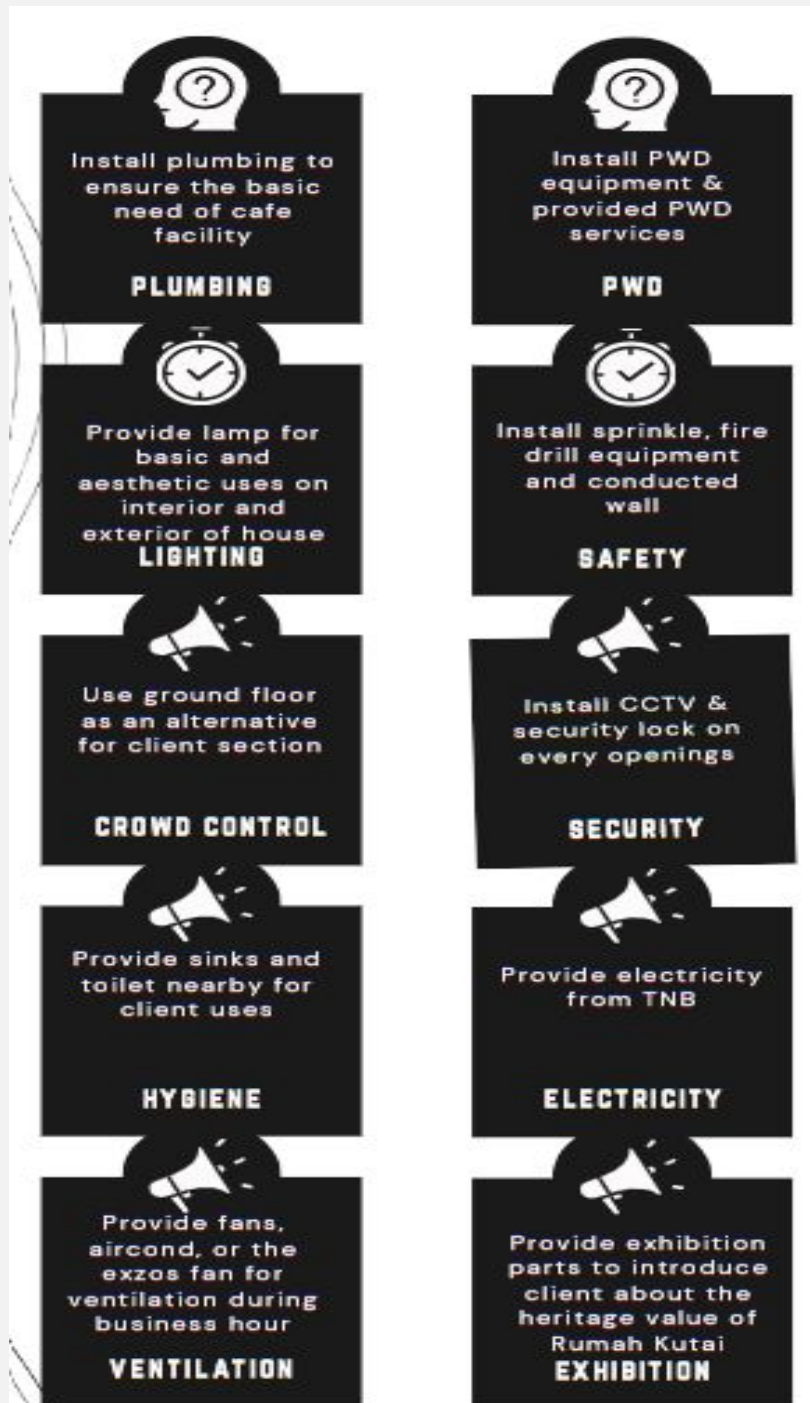


Figure 27: The features' diagram that included in proposed rehabilitation of Rumah TOKSU.

PROPOSED REHABILITATION DESIGN OF RUMAH TOKSU FOR POTTERY EDUTOURISM

EXTERIOR VIEWS



Figure 29: Signage and front view



Figure 30: Rear view



Figure 31: Anjung view

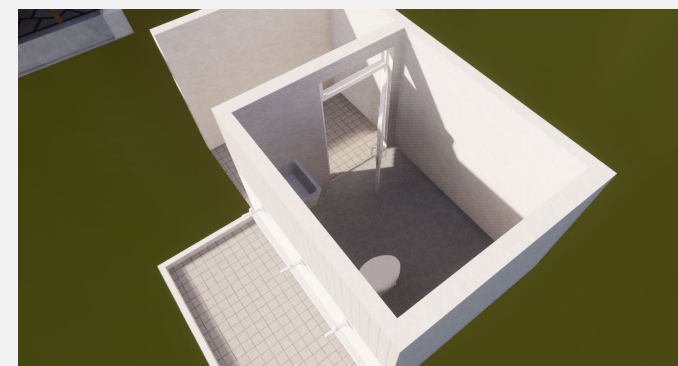


Figure 32: Restroom and ablution area

FIRST FLOOR INTERIOR VIEWS



Figure 33: Lobby view



Figure 34: Labu Sayong display section 1



Figure 35: Prayer room



Figure 36: Staff room

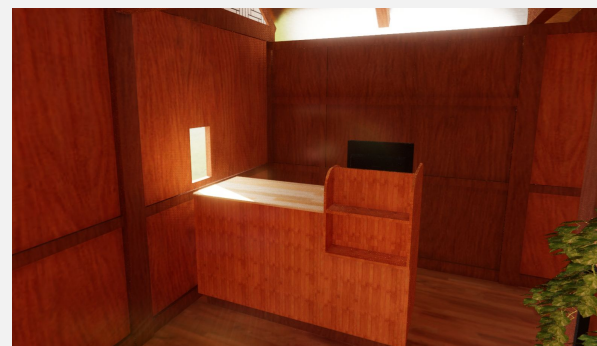


Figure 37: Reception area



Figure 38: Cafeteria



Figure 39: Kitchen sink area



Figure 40: Wall partition

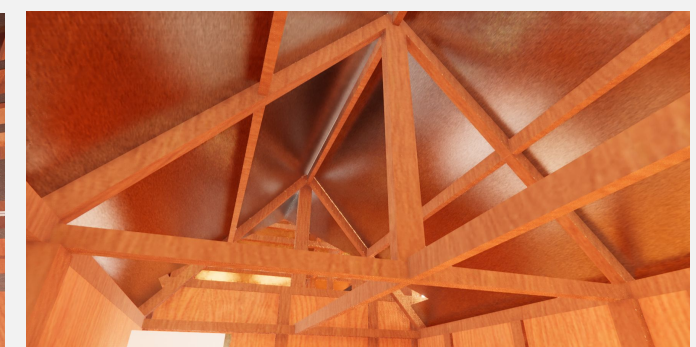


Figure 41: *Alang Rumah Dapur*

PROPOSED REHABILITATION DESIGN FINALISATION

GROUND FLOOR 3D VIEWS



Figure 42: Workspace area



Figure 43: Storage area



Figure 44: Baking area - Exterior



Figure 45: Labu Sayong display area 2

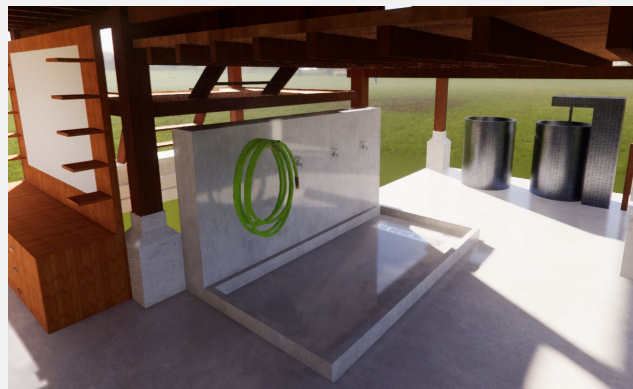


Figure 46: Workshop sink area

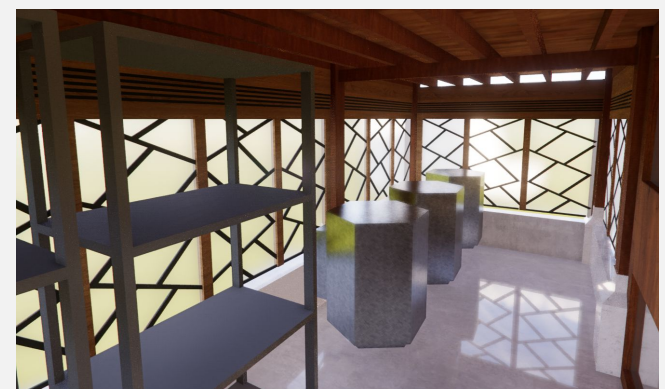


Figure 47: Baking area - interior

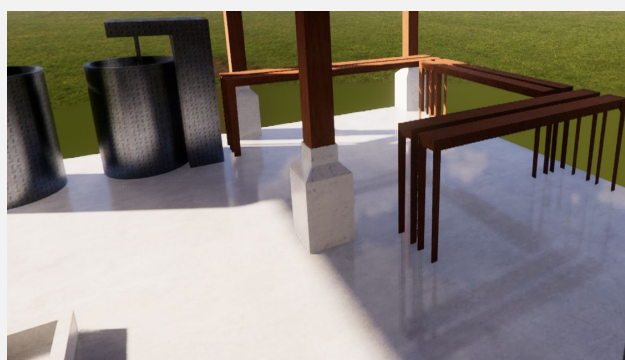


Figure 48: Moulding and preparation area



Figure 49: Sculpting area – Meluru technique

PROPOSED REHABILITATION DESIGN MEASURED DRAWINGS

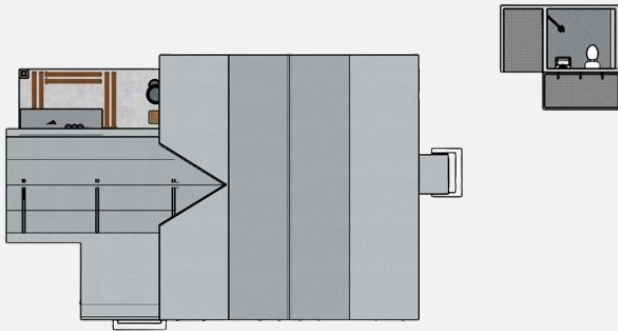


Figure 50: Roof plan



Figure 51: Left elevation



Figure 52: First floor plan



Figure 53: Section A-A'



Figure 54: Ground floor plan



Figure 55: Right elevation



Figure 56: Front elevation

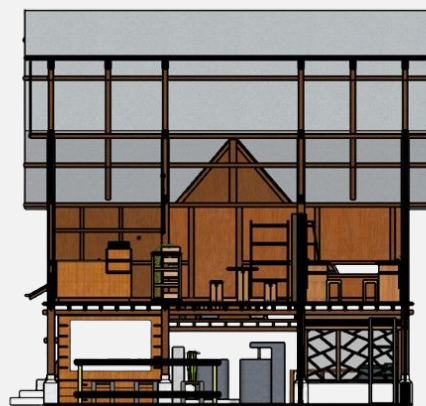


Figure 57: Section B-B'



Figure 58: Rear Elevation

CONCLUSION

Preserving traditional Malay houses is a vital strategy for fostering sustainability by ensuring a continuous building life cycle and averting destruction. This preservation extends beyond mere conservation; it embodies the promotion of sustainable environments and the safeguarding of cultural heritage, exemplified by the heritage timber houses that dot the landscape. Retaining the distinctive features of these traditional houses is paramount in preserving the culture and identity of the local Malay populace. Given Perak's reputation as a bastion of local culture and a prime destination in Malaysia, it becomes imperative for the community and authorities to intensify heritage activities and attractions. Proposals for rehabilitating Perak's traditional values not only disseminate heritage knowledge but also inject vitality into cultural practices threatened by modernisation. Through workshops offering educational courses, exhibitions, and entrepreneurial opportunities, this initiative can ensure the continuity of Perak's cultural legacy, encompassing dialects, architecture, and traditional artwork. With the realisation of suggested projects, Perak's cultural vibrancy can attain national recognition. It is envisaged that this narrative appraisal will inspire younger generations to delve into the exploration of Perak's local heritage and culture with a profound understanding, artistic expression, and sincere appreciation.

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