04

ECO VOCATIONAL ACADEMY AS SUSTAINABLE EDUCATIONAL SYSTEM FOR ORANG ASLI IN HULU LANGAT, SELANGOR

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ABSTRACT

Education is essential for success in a globalised world, yet marginalised communities such as Malaysia's Orang Asli face significant barriers due to culturally irrelevant curricula, inadequate facilities, and systemic misalignment with their traditional values. This research explores sustainable education approaches for the Orang Asli, with three key objectives: (1) to identify strategies that attract Orang Asli to education, (2) to determine suitable curriculum components for this community, and (3) to develop a sustainable education framework that supports their long-term potential. Employing interviews, field observations, and literature reviews, the study underscores the importance of culturally responsive and environmentally sustainable educational models. The findings reveal that familiar environments, locally adapted curricula such as the Kurikulum Asli dan Penan, and the use of indigenous materials enhance engagement and learning outcomes. The study highlights the value of aligning educational systems with local culture and ecology to promote inclusive, equitable development offering actionable insights for educators and policymakers addressing indigenous education globally.

Keywords: *Orang Asli education, Sustainable education, Indigenous learning, Culturally relevant curriculum, Educational equity, Inclusive education.*
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1.0 INTRODUCTION

Education is a foundational pillar of national development, equipping individuals with essential knowledge and skills to contribute to economic growth and social progress (Mustapha & Abdullah, 2019). In Malaysia, despite policies aimed at promoting accessibility and inclusivity (Ministry of Education Malaysia, 2022), the Orang Asli community continues to encounter significant educational disparities. Systemic barriers such as inadequate school infrastructure, limited access due to geographic isolation, and economic hardship hinder their academic participation (Sharif et al., 2021; Hassan et al., 2023). Mainstream education models often overlook the Orang Asli's distinct cultural background, resulting in disengagement and high dropout rates (Sawalludin, Jia Min, & Mohd Ishar, 2020). Additionally, the national curriculum is frequently misaligned with the community's values and learning preferences, which emphasise experiential and skill-based knowledge (Zainal, 2021).

A shortage of indigenous educators and culturally aware teaching practices further contributes to a sense of exclusion within the schooling system (Ismail & Yunus, 2022). Bridging these gaps requires a more adaptable and context-sensitive educational framework that incorporates vocational training, localised curricula, and community-driven models. This study addresses these concerns by proposing a sustainable, culturally grounded education system tailored to the needs of Orang Asli communities, focusing on equity, inclusivity, and long-term capacity building

Figure 1: Orang Asli students in class
(Source: Leaderonomics)

Research Problem

High dropout rates among Orang Asli students, as shown in Figure 2, especially during transitions to secondary school, remain critical. Jabatan Kemajuan Orang Asli (JAKOA), (2012–2018) reports over 50,000 dropouts annually, limiting future opportunities. A 2014 Ideas report notes 40,000 Malaysian students, many Orang Asli, left school in 2012. Dropout rates peak from Standard 6 to Form 1 and Forms 3 to 4. Despite better secondary enrollment, compulsory education remains limited to primary school, disproportionately affecting Orang Asli. Addressing systemic, socioeconomic, and cultural barriers is crucial for equitable education and national development.
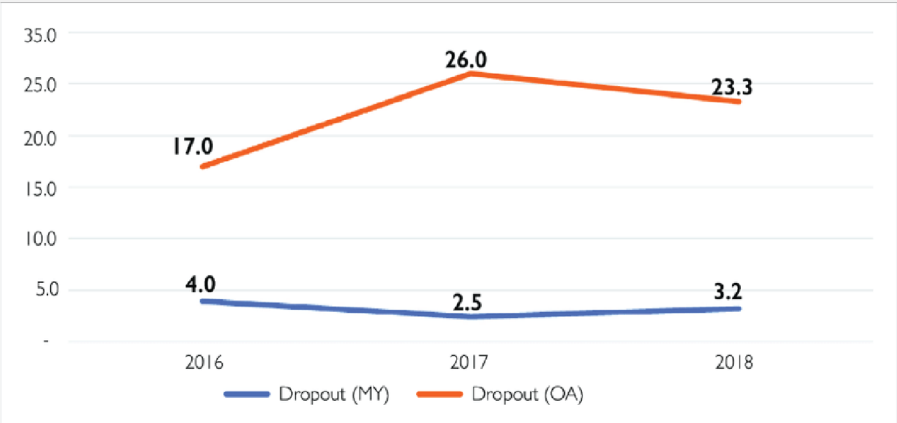
Figure 2: Dropout rates between Orang Asli and general races
(source: Ministry of Education, 2019)

Research Issues

From the Figure 3 chart, Orang Asli dropout rates after Year 6 improved from 2008 to 2016 but rose to 26% in 2017 before slightly improving to 23% in 2018, still well above the national average. From 2016 to 2018, Malaysia's overall dropout rate stayed below 4%, while Orang Asli rates remained above 17%, highlighting persistent educational disparities. These figures emphasize the need for targeted interventions to address systemic challenges.
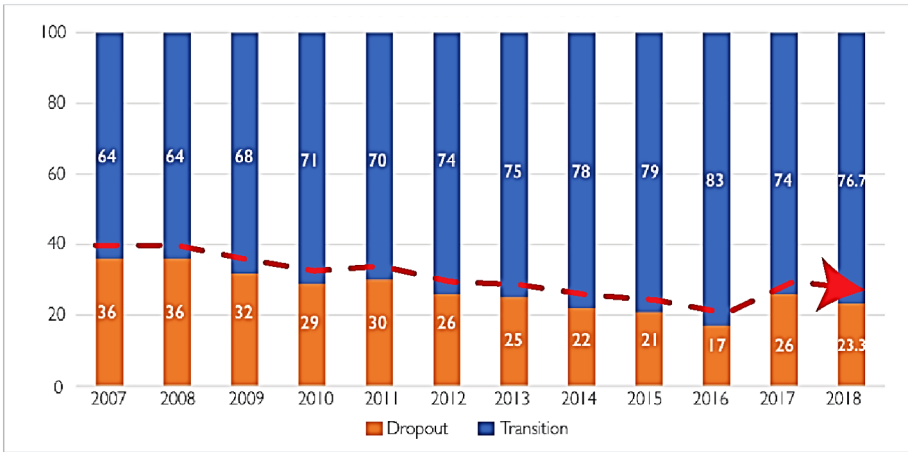
Figure 3: Declining bar chart of Orang Asli in continuing study
(source: Ministry of Education, 2019)

Research Causes

Orang Asli children encounter multiple barriers to education, leading to high dropout rates and low achievement. Figure 4 shows poverty restricts access to resources, while remote locations make school attendance difficult. Language and cultural gaps hinder learning, as the national curriculum lacks adaptation to their needs. Additionally, a shortage of culturally aware teachers limits academic support. These challenges result in lower enrollment, higher dropouts, and reduced access to quality education, ultimately restricting their long-term opportunities.

Year	Total Head of Household (HoH)	Poverty					
		Poor		Hard Core Poor		Total	
		%	HoH	%	HoH	%	HoH
2000	25,337	39.80	10,085	43.60	11,046	83.40	21,131
2001	26,198	39.80	10,428	41.03	10,749	80.83	21,177
2002	28,476	41.20	11,732	37.88	10,788	79.08	22,520
2003	29,873	41.63	12,435	35.26	10,532	76.88	22,967
2007	27,841	18.00	5,011	32.00	8,909	50.00	13,920
2008	27,841	17.75	4,942	32.34	9,004	50.09	13,946
2009	27,841	33.53	9,335	15.47	4,307	49.00	13,642
2010	36,658	11.19	4,102	19.97	7,321	31.16	11,243

Figure 4: Poverty table of Orang Asli by total head of House
(source: Ministry of Education, 2019)

Research Effects

Orang Asli children experience significant educational disparities, with lower enrollment, higher dropout rates, and reduced secondary school completion, as shown in Figure 5 below. Despite efforts to improve inclusivity, systemic inequalities persist as policies fail to address their unique challenges. Geographical isolation, socio-economic disadvantages, and limited culturally responsive education further widen the gap. These issues emphasise the need to implement targeted interventions to ensure equitable learning opportunities.
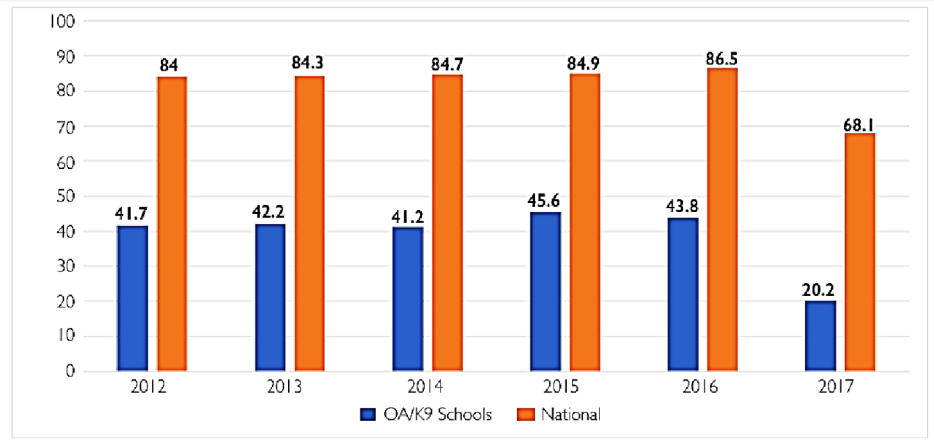
Figure 5: Declining bar chart of Orang Asli's UPSR passing rate per year
(source: Ministry of Education, 2019)

2.0 LITERATURE REVIEW

Efforts to enhance Orang Asli education are outlined under the Pelan Pembangunan Pendidikan Malaysia (PPPM) 2013–2025 (see Figure 6), which promotes culturally responsive and inclusive learning. One key initiative, the Kurikulum Asli dan Penan (KAP), integrates indigenous knowledge, local language, and traditional practices into the curriculum, enhancing relevance and engagement for Orang Asli learners (Ahmad & Rahim, 2020; Ministry of Education Malaysia, 2022). Kelas Berkeperluan Khas offers adaptive, smaller-sized classes for students with learning or linguistic gaps, supporting smoother integration into the formal education system (Ismail & Yunus, 2022). The Sekolah Model Khas Komprehensif initiative strengthens rural educational infrastructure by combining classrooms, dormitories, and teacher development under one roof, ensuring that underserved students, especially from remote Orang Asli villages, have better learning environments (Sharif, Ahmad, & Yunus, 2021). Furthermore, Information and Communication Technology (ICT) integration enables Orang Asli students to access digital tools and localised content, bridging geographic and resource-based educational gaps (UNESCO, 2019; Hassan, Zainal, & Ismail, 2023). Complementing these efforts, the Twelfth Malaysia Plan (RMKe-12) (see Figure 7) prioritises Technical and Vocational Education and Training (TVET) to equip Orang Asli youth with practical, employment-ready skills. A dedicated trainee teacher programme also encourages Orang Asli individuals to support classroom instruction while developing teaching capacity within their communities (Ministry of Human Resources, 2023). Together, these initiatives present a holistic strategy that aligns formal education with cultural identity, equity, and long-term empowerment.
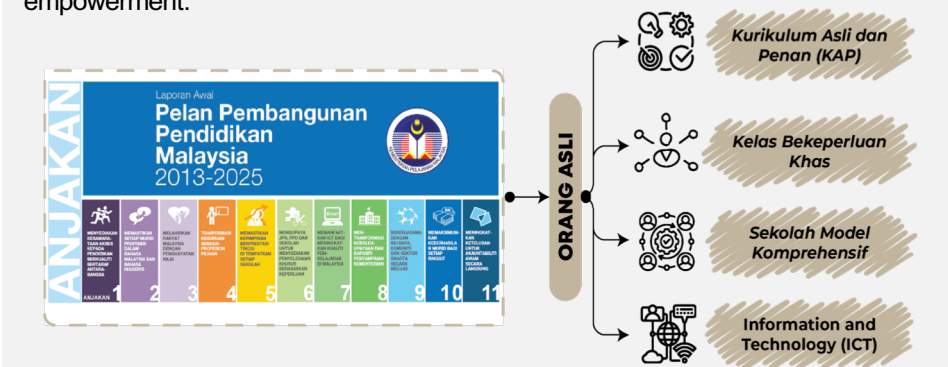

Figure 6: Effort made for Orang Asli under the PPPM (2013-2025)
(Source: Ministry of Education, September 6, 2013)

Figure 7: The declining bar chart of Orang Asli in continuing study
(Source: Ministry of Education, 2019)

Research Aim

This paper examines the quality of education for Orang Asli in Malaysia, aligning with SDG 4 (Quality Education) and SDG 11 (Sustainable Cities and Communities), as illustrated in Figure 8. It explores disparities in access, enrollment, and learning outcomes, highlighting challenges like poverty, geographical barriers, and cultural misalignment within the national curriculum. By assessing existing policies and programmes, the study aims to propose sustainable, community-centered solutions to enhance educational equity, empowering Orang Asli children and supporting their long-term socio-economic development.
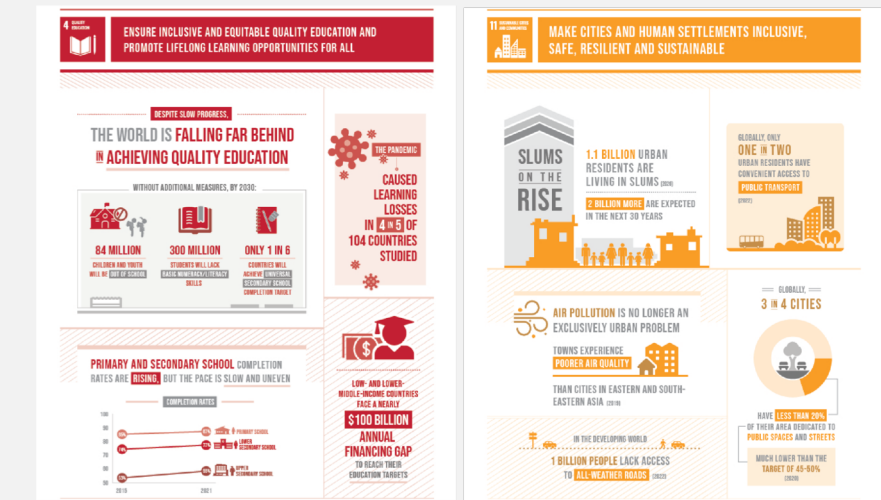

Figure 8: The SDG NO 4 AND 11
(Source: Sustainable Development Goals Report, 2023)

Research Questions

Figure 9 shows the need to understand what attracts Orang Asli to education is key to closing the gap and ensuring long-term participation. A suitable curriculum must respect their culture while providing relevant skills. Leveraging their potential in sustainable education preserves heritage while promoting self-sufficiency and economic opportunities. These factors guide the design of a TVET school that enhances accessibility and engagement. This project aims to establish an educational framework integrating tradition, sustainability, and practical vocational training.
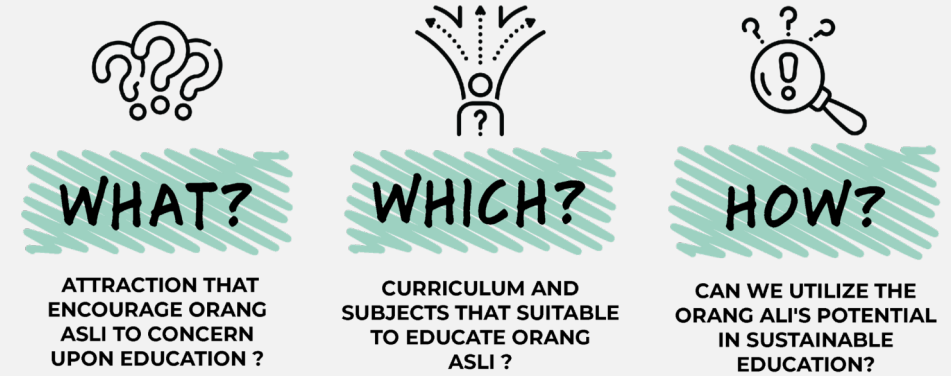

Figure 9: Questions Diagram

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Research Objective

This research is structured around three primary objectives: (1) to identify effective strategies that can encourage Orang Asli youth to pursue education, (2) to examine curriculum elements that combine practical skills with indigenous knowledge, and (3) to develop a sustainable educational model that cultivates the potential of Orang Asli communities and supports long-term development. These objectives align with Malaysia's Sustainable Development Goals (SDG 4 and SDG 11), emphasising quality education and inclusive community growth, as portrays in Figure 10.
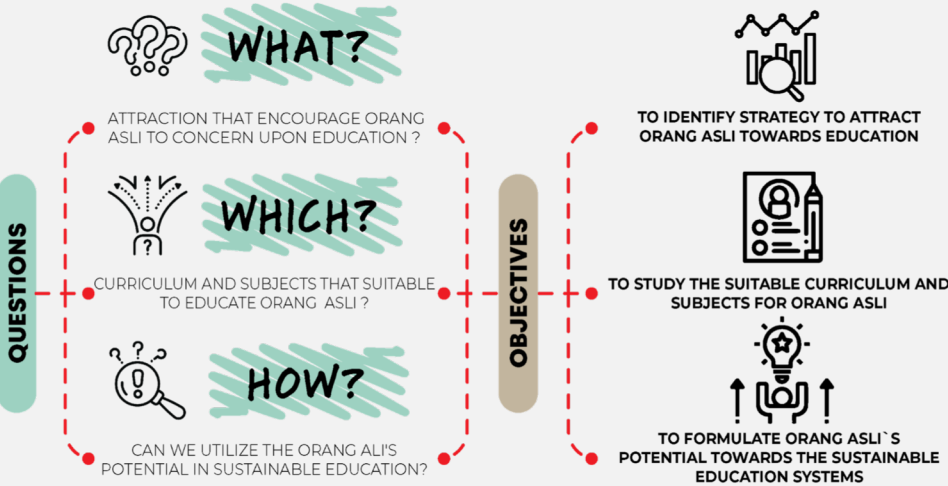

Figure 10: Relationship of Questions and Project Objectives
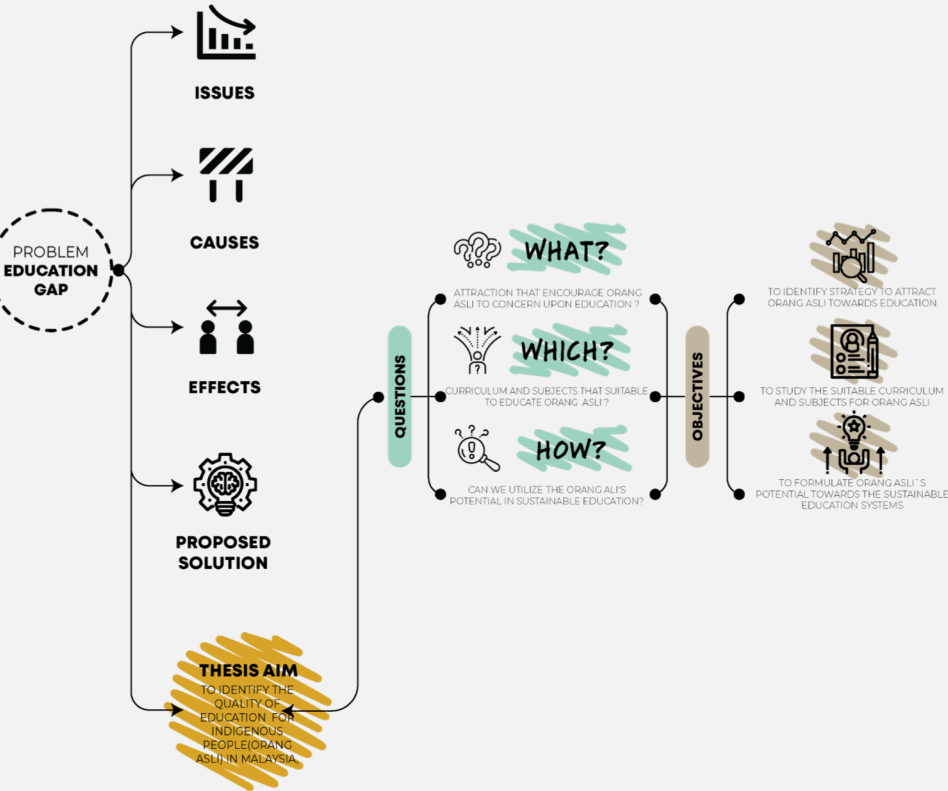
Research Framework

Figure 11: The Project Framework Diagram

3.0 RESEARCH METHODOLOGY

This research adopts a mixed-methods approach, combining qualitative and quantitative strategies to comprehensively explore the educational needs and preferences of the Orang Asli community in Hulu Langat. The qualitative component consists of semi-structured interviews and field observations, while the quantitative component involves the analysis of demographic and educational data (Figure 12).
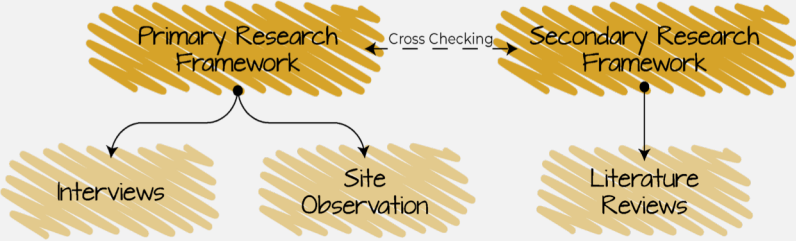

Figure 12: Research Methodologies applied in this research

Data Collection

An extensive literature review was conducted to contextualise the study within the existing academic discourse. Sources included peer-reviewed articles, government publications, and relevant case studies on indigenous education, sustainable design, and vocational training. This review informed the development of the research framework and interview protocol. Semi-structured interviews were carried out with key stakeholders, including Orang Asli students, community leaders (Tok Batin), and educators from JAKOA. A total of 15 interviews, each lasting approximately 45 minutes, provided valuable insights into the community's educational challenges, aspirations, and experiences (Figure 13).

Figure 13: Respondents during the field visit

Field Observations Site visits to eight Orang Asli villages in Hulu Langat were conducted to observe existing educational facilities, infrastructure, and environmental conditions. Observations focused on factors such as accessibility, building materials, and spatial organisation, providing contextual data to inform the design proposal as portrayed in Figure 14.

Figure 14: Orang Asli Village in Hulu Langat

4.0 DATA ANALYSIS

Qualitative data from the interviews were transcribed and analysed thematically to identify recurring patterns related to educational challenges and preferences. Quantitative data—such as demographic indicators and academic performance—were assessed using descriptive statistical methods to provide a foundational understanding of the current educational landscape (Figure 15).
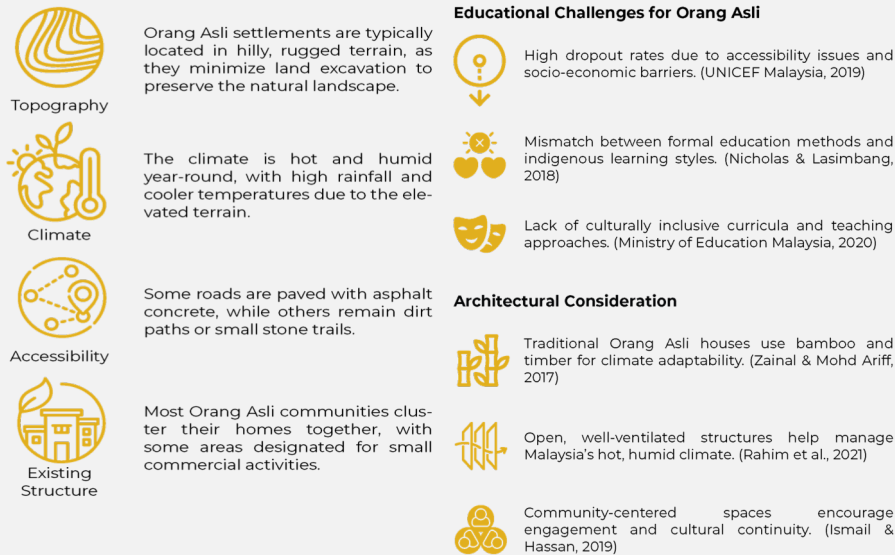

Educational Challenges for Orang Asli

Topography
Orang Asli settlements are typically located in hilly, rugged terrain, as they minimize land excavation to preserve the natural landscape.

High dropout rates due to accessibility issues and socio-economic barriers. (UNICEF Malaysia, 2019)

Climate
The climate is hot and humid year-round, with high rainfall and cooler temperatures due to the elevated terrain.

Mismatch between formal education methods and indigenous learning styles. (Nicholas & Lasimbang, 2018)

Lack of culturally inclusive curricula and teaching approaches. (Ministry of Education Malaysia, 2020)

Accessibility
Some roads are paved with asphalt concrete, while others remain dirt paths or small stone trails.

Architectural Consideration

Traditional Orang Asli houses use bamboo and timber for climate adaptability. (Zainal & Mohd Ariff, 2017)

Existing Structure
Most Orang Asli communities cluster their homes together, with some areas designated for small commercial activities.

Open, well-ventilated structures help manage Malaysia's hot, humid climate. (Rahim et al., 2021)

Community-centered spaces encourage engagement and cultural continuity. (Ismail & Hassan, 2019)

Figure 15: Thematic data analysis

Limitation

This study is limited to the Orang Asli communities in Hulu Langat, which may not represent the broader indigenous population in Malaysia. Logistical constraints and limited access restricted the sample size and geographic coverage. Future research should consider longitudinal data and a more diverse sampling strategy to enhance the study's generalizability.

Findings

The findings highlight critical challenges faced by Orang Asli in education, including systemic barriers, a strong preference for practical and culturally relevant learning, and the strategic selection of Kampung Pangsun as a suitable intervention site.

- Socio-Educational Barriers: Dropout rates among Orang Asli remain disproportionately high due to poverty, limited school accessibility, and an education system that lacks cultural relevance (MOE, 2019). Interviewees expressed feelings of alienation in mainstream schools, citing language, teaching methods, and unfamiliar environments as significant deterrents.
- Community Aspirations and Educational Preferences: Respondents highlighted a strong preference for skill-based education aligned with traditional occupations such as agriculture, carpentry, and ecotourism. Community leaders and educators advocated for culturally responsive institutions situated within or near Orang Asli villages.
- Site Suitability: Kampung Pangsun was identified as a strategic intervention site due to its high dropout rates, population density, and absence of secondary education facilities within a 14-kilometer radius. The area offers accessible terrain, natural landscapes, and existing infrastructure, including JAKOA Kindergarten and Mutiara Integrated School

Results

As illustrated in Figure 16, the primary barriers for Orang Asli students include physical distance to schools, misaligned curriculum, and inadequate infrastructure. Interviews confirmed a preference for vocational, hands-on learning models. Field observations further revealed terrain-informed construction and insufficient educational facilities, validating the necessity of a localized TVET institution that integrates indigenous knowledge and sustainable architecture.

Category	Interview Findings	Site Observations	Literature Review
Education Barriers	Distance to school, cultural disconnect	Remote, limited transport	Socio-economic gaps, policy issues
Preferred Learning	Hands-on skills, vocational training	Practical space needed	Indigenous education models
Architectural Needs	Natural materials, open spaces	Vernacular houses, climate-adaptive design	Sustainable, Community-driven design

Figure 16: Research Methodologies applied in this research

5.0 SITE SELECTION

The site was selected based on Orang Asli population density, dropout rates, and areas with the greatest educational need. This strategic approach ensures the TVET school maximises accessibility and impact, addressing key challenges and supporting long-term educational development, as shown in Figure 17 below. Pahang, Perak, and Selangor have the highest density of Orang Asli in Malaysia, which covers 76.71% of the overall population of 215,215 people.
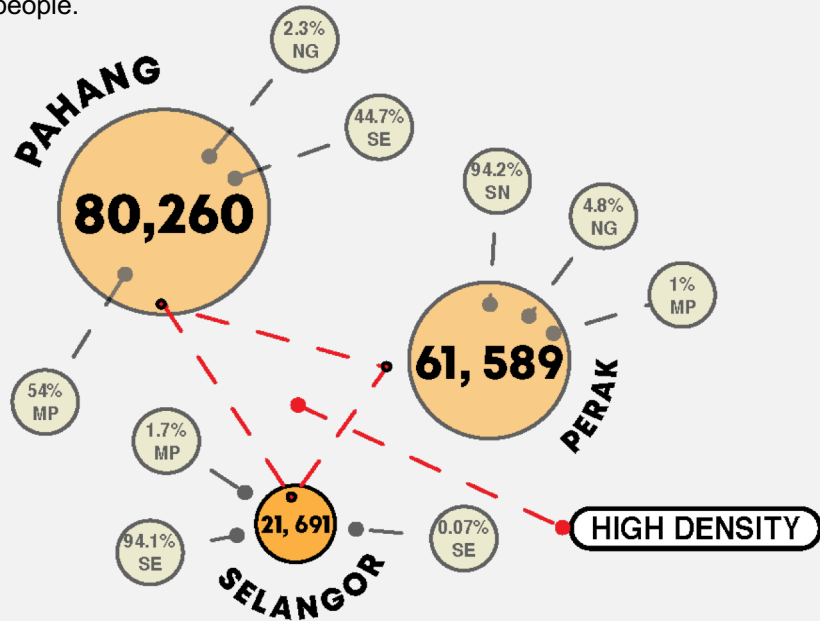

Figure 17: Orang Asli Population 2024
(Source: Author)

5.0 SITE SELECTION

In Figure 18, comparing Selangor, Pahang, and Perak, Pahang has the highest population density, followed by Perak, with Selangor having the lowest. Despite its lower density, Selangor's dropout rate of 27% is the highest, making it the most crucial district for targeted educational support and development initiatives to address this issue.
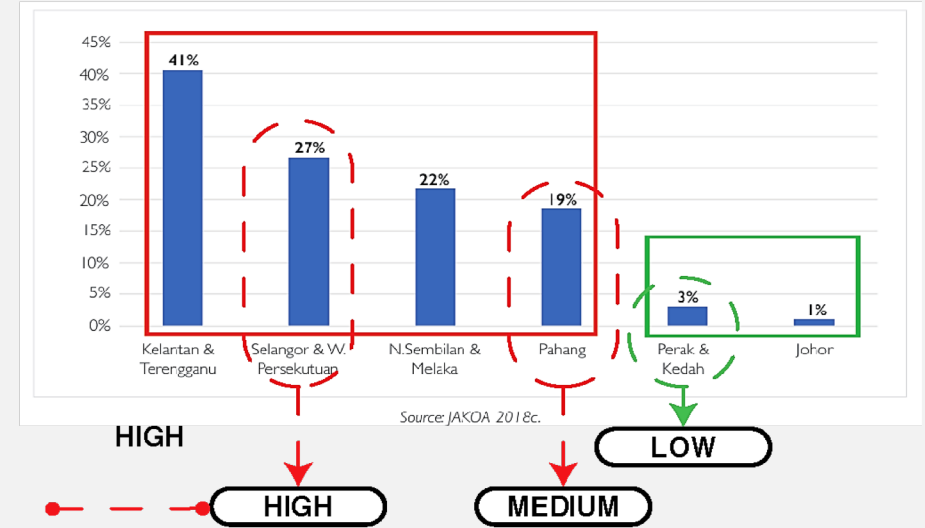

Figure 18: Chart shows Orang Asli Highest dropouts in Malaysia
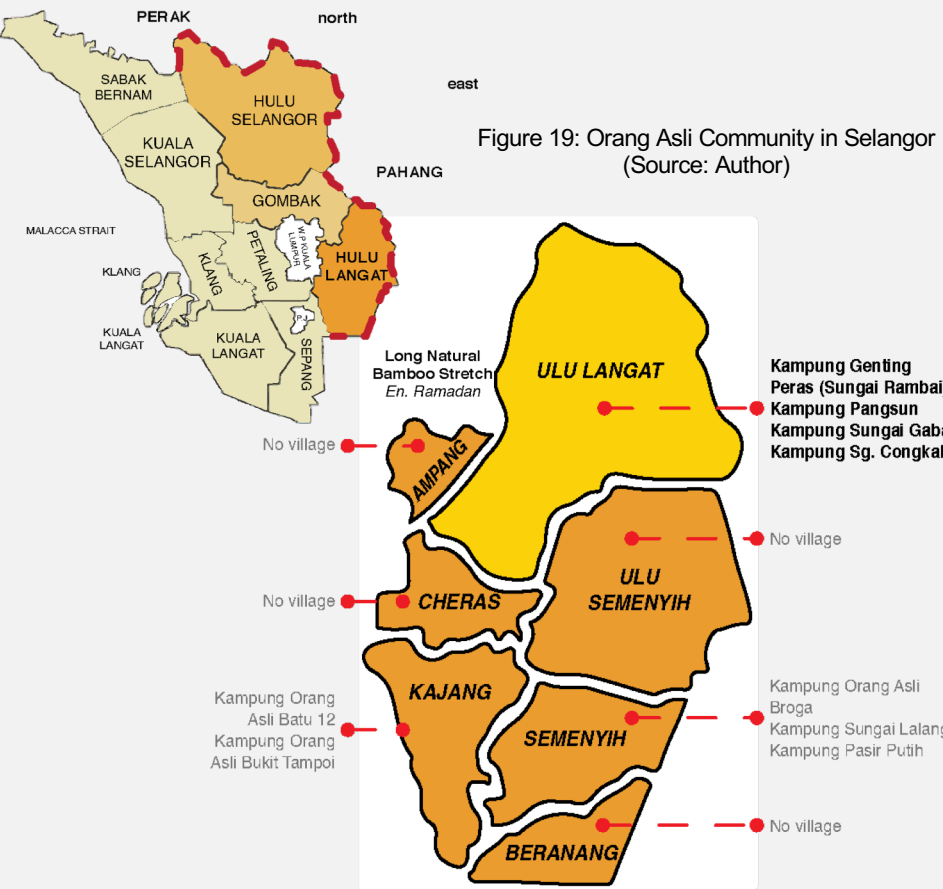(Source: Jabatan Kemajuan Orang Asli (JAKOA), 2018)

Figure 19: Orang Asli Community in Selangor
(Source: Author)

Figure 20: Orang Asli settlement in Hulu Langat
(Source: Author)

Ulu Langat, Selangor, was chosen for its high Orang Asli population and lack of nearby schools, contributing to high dropout rates. The TVET programme aims to improve education access and reduce dropouts through local vocational training, as illustrated in Figure 19. Several Orang Asli villages are in Hulu Langat, primarily in Ulu Langat, with none in Cheras, Beranang, or Ulu Semenyih, as shown in Figure 20. Kuala Pangsun has the highest number of total Households that located 14km to the nearest secondary schools, as highlighted in Figure 21.
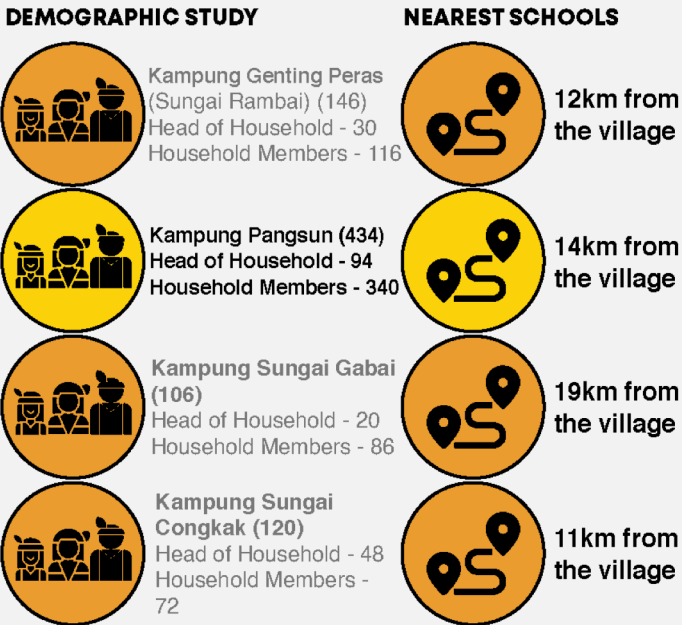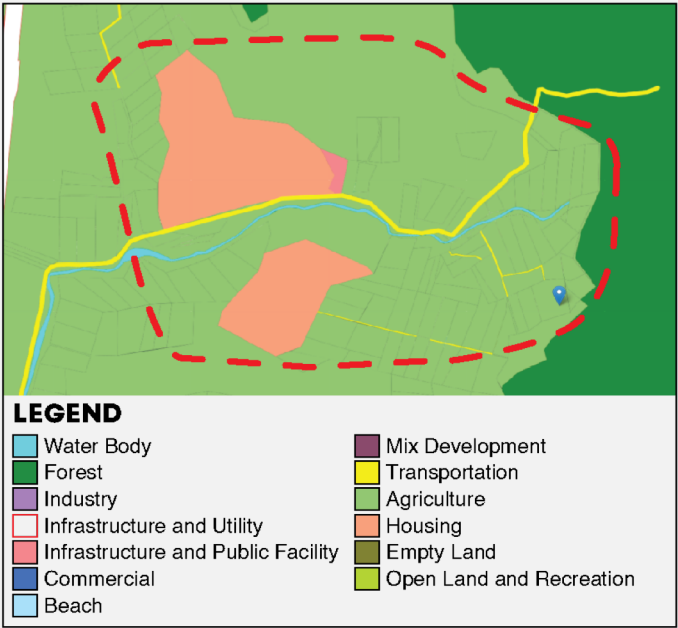

Figure 21: The villages' filtration by the school proximity

Kampung Pangsun is an Orang Asli village that is mainly covered with agricultural areas and housing near the river, as in the figure below.

Figure 22: Land use of the selected village

5.0 SITE SELECTION

The site is surrounded by dense forests, reflecting the Orang Asli's deep connection to nature, with the scenic Sungai Hulu Langat flowing nearby. It also hosts two key institutions: Mutiara Integrated Secondary School and JAKOA Kindergarten, making it a strategic location for education while preserving the natural landscape, as shown in Figure 23.

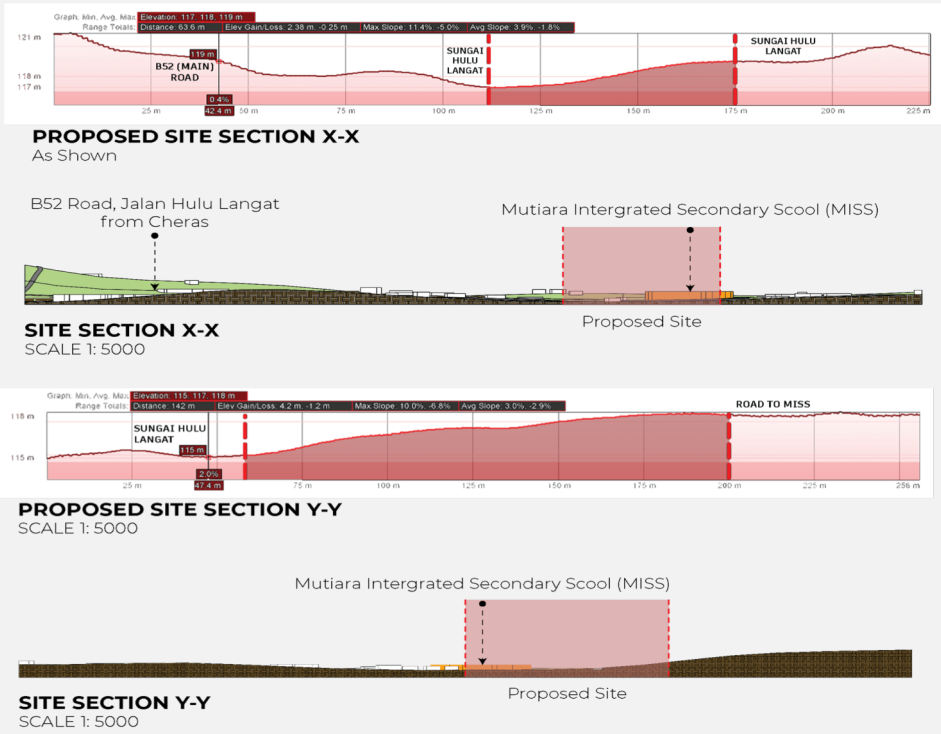Figure 23a: Master plan on detail of the site

PROPOSED SITE SECTION X-X
As Shown

SITE SECTION X-X
SCALE 1: 5000

PROPOSED SITE SECTION Y-Y
SCALE 1: 5000

SITE SECTION Y-Y
SCALE 1: 5000

Figure 23b & 23c: The cross-section of the site

6.0 DESIGN BRIEF FORMULATION

The design brief was developed through a comprehensive framework that identifies core educational issues, their causes and effects, and aligns these with targeted research questions. This process informed the creation of programmatic elements, space planning strategies, and zoning requirements (Figure 24).
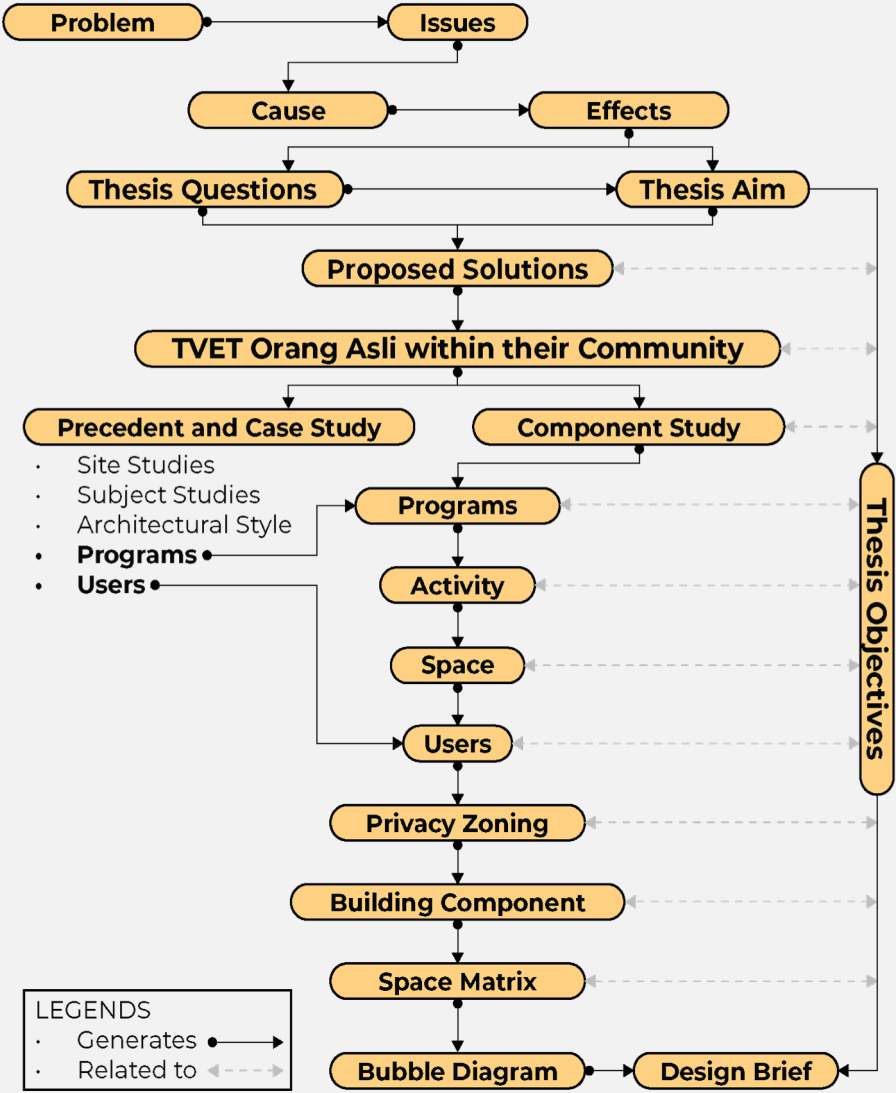

Figure 24: Design brief formulation
(Source: Author)

ECO VOCATIONAL ACADEMY: A SUSTAINABLE EDUCATION SYSTEM FOR ORANG ASLI, IN HULU LANGAT

Introduction

The Eco Vocational Academy is a design thesis project aimed at creating a sustainable education system for the Orang Asli community in Hulu Langat. This institution seeks to provide a tailored Technical and Vocational Education and Training (TVET) programme that aligns with the cultural values, skills, and aspirations of the Orang Asli while promoting environmental sustainability.

Project Objectives (The project focuses on three key objectives):

• Identifying effective strategies to attract Orang Asli youth to education.
• Developing a suitable curriculum that integrates practical skills and indigenous knowledge.
• Formulating a sustainable education system that nurtures the Orang Asli's potential and long-term community development.

Target Users

The academy will serve multiple user groups, including Orang Asli students, teachers, operational staff, and tourists who seek to learn about indigenous culture and sustainable practices.

Site Context and Analysis

The site, strategically located near Orang Asli villages in Hulu Langat, boasts breathtaking natural landscapes surrounding it. The location fosters a strong connection between the academy and the local community, allowing for immersive, hands-on learning experiences. However, the area is prone to occasional flooding, which requires strategic mitigation measures.

Programme

The academy will offer a specialised TVET curriculum designed for Orang Asli students, focusing on skills that enhance their livelihood while preserving their cultural heritage. The programme will integrate traditional craftsmanship, ecotourism, agriculture, and modern technical skills.

Architectural Approach

The design adopts a modern vernacular style rooted in Orang Asli traditions, utilising locally sourced bamboo, timber, and concrete. This approach harmonises contemporary functionality with cultural expression, promoting environmental stewardship and community identity.

Philosophy

Guided by the Malay proverb "Meluntur buluh biarlah dari rebungnya," the project emphasises early, culturally relevant education as a means of long-term empowerment

Environmental Strategy

The proposal incorporates passive design strategies, such as natural ventilation, daylighting, and rainwater harvesting. These methods reduce energy dependency while aligning with the community's ecological values.

Expected Outcome

• A comprehensive master plan tailored for the Orang Asli's educational and environmental needs.
• A scalable prototype of a sustainable TVET academy adaptable to other indigenous settings.
• A model integrating architecture, education, and community development in harmony.

7.0 DESIGN CONCEPT

Introduction

Concept: Dynamic Resilience The Eco Vocational Academy is shaped by the principle of "*meluntur buluh biarlah dari rebungnya*," reflecting early-stage education for lasting impact. It integrates three core sub-themes:

• Resilient Skills: Practical, vocational learning embedded with cultural identity.
• Indigenous Synergy: A built form that respects Hulu Langat's ecological and community fabric.
• Sustainable Craftsmanship: Materials and methods that combine tradition with contemporary efficiency.
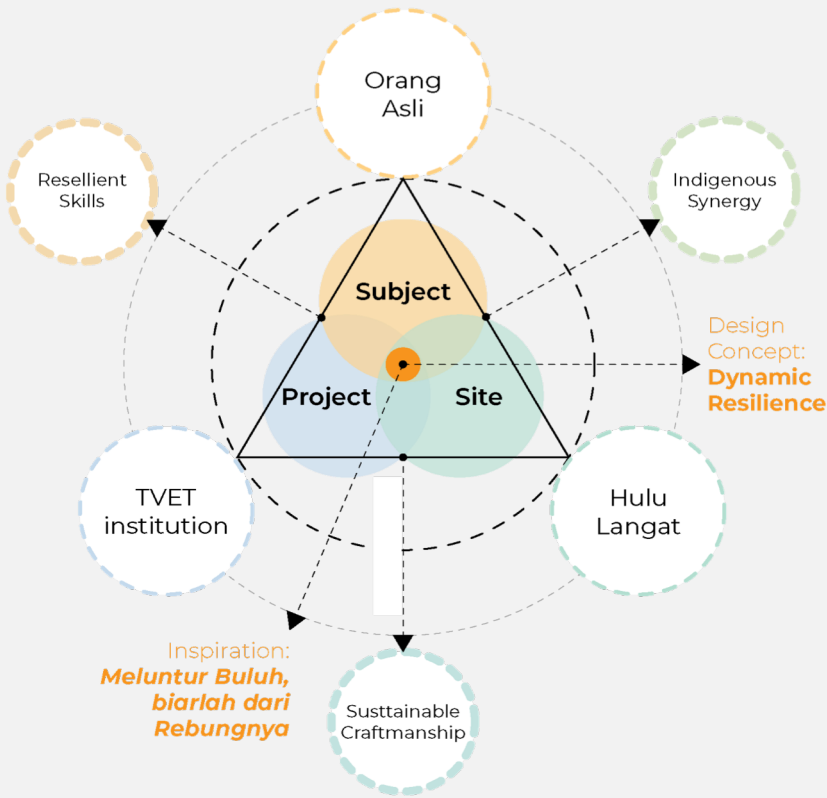

Figure 25: Design concept
(Source: Author)

Design Development

The design development of the Eco Vocational Academy follows a strategic approach, integrating resilient skills, indigenous synergy, and sustainable craftsmanship. Initial strategies focus on cultural preservation, adaptive learning spaces, and eco-conscious materials. These evolve into design solutions emphasisng spatial flexibility, vernacular architecture, and sustainability, shaping a resilient and culturally integrated educational environment.

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Design Strategies

The proposal includes elevated structures to mitigate flood risks and features open-plan spaces for adaptive learning. Ecotourism nodes such as galleries and cultural parks further foster community involvement
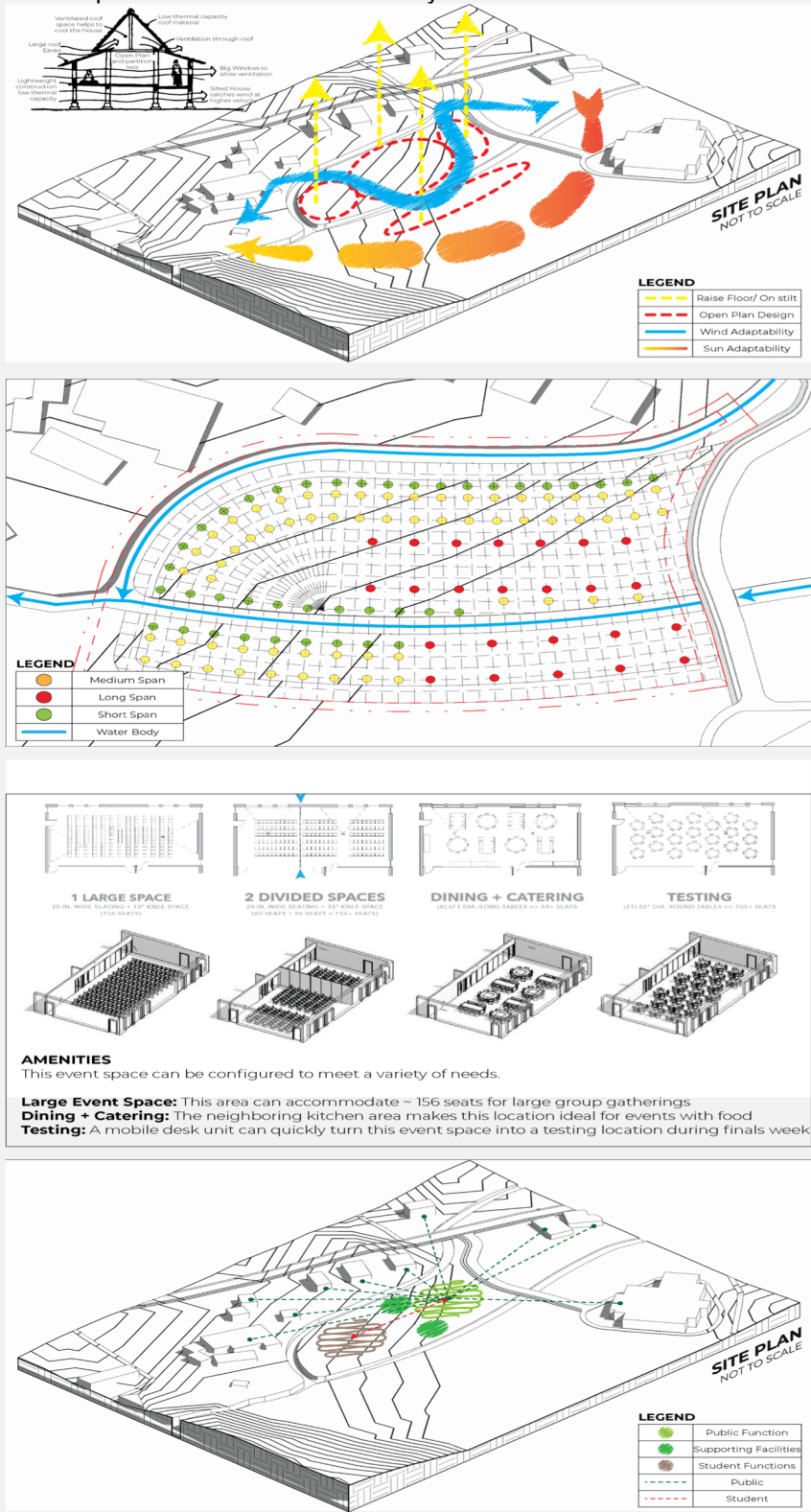

Design Solution

Technical features construction leverages modular units, passive cooling systems, and sustainable services, as in Figure 27 below.

- Treated bamboo and sustainably sourced timber framing promote ecological integration and structural longevity.
- Elevated modular design with uniform height and span enhances adaptability to terrain and flood resilience.
- Strategic building orientation and operable openings optimise natural ventilation and passive cooling through effective air scooping.
- Integrated solar energy systems and rainwater harvesting infrastructure support off-grid functionality and environmental self-sufficiency
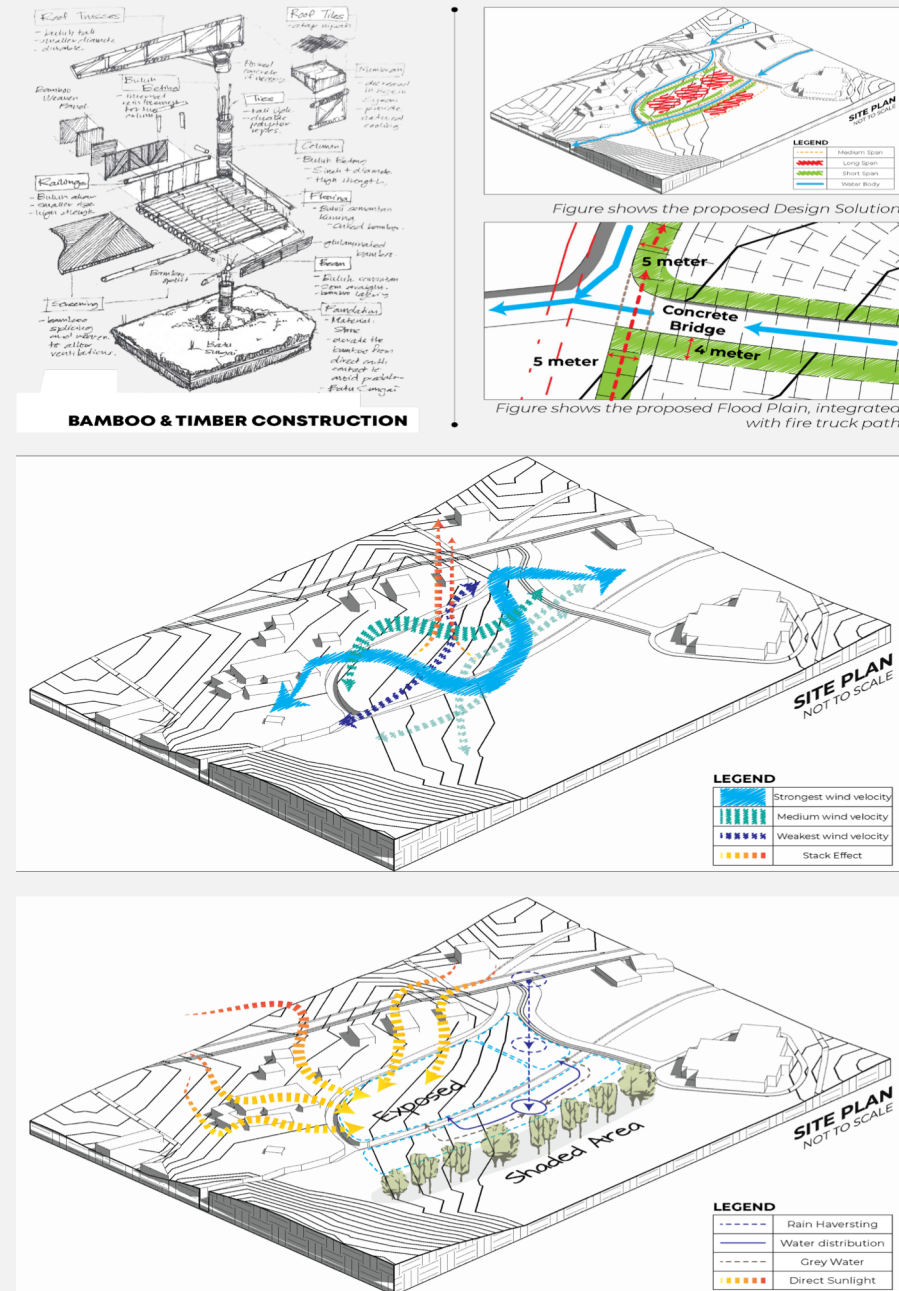

Figure 26 shows the design strategies

Figure 27 shows proposed technical features construction

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8.0 FINAL DESIGN SCHEME

Building upon prior research, the design advanced through a systematic process of material testing, environmental analysis, and iterative spatial planning. Passive design strategies and context-responsive structural solutions were integrated to ensure both feasibility and functional performance. This phase culminated in the development of technical drawings and 3D visualisations, presenting a comprehensive architectural proposal aligned with the project's sustainability objectives and overall design vision, as illustrated in the figures shown below.
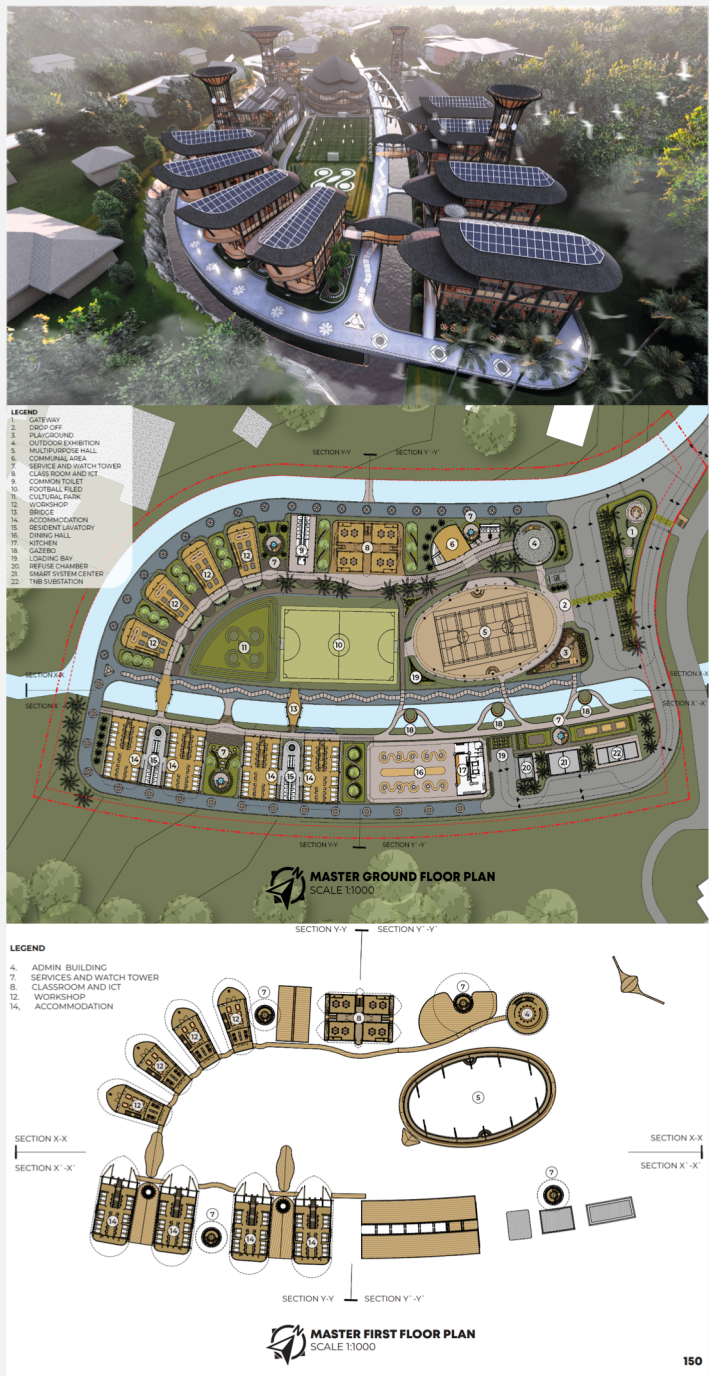

Figure 28: The final scheme

Elevation

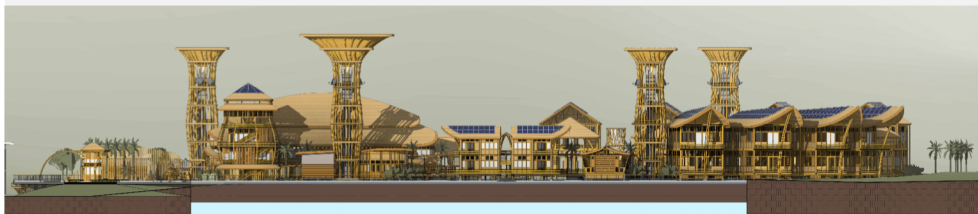Figure 29a: The Front Elevation

Figure 29b: The Right Elevation

Figure 29c: The Left Elevation

Figure 29d: The Rear Elevation

Sections

Figure 29e: The Section X-X

Figure 29e: The Section Y-Y

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Figure 30: The workshop and accommodation perspective

Figure 31: The classroom and ICT exterior perspective

Figure 32: The cultural park perspective

9.0 CONCLUSION

This study proposes the Eco Vocational Academy as a context-driven solution to the educational disparities faced by the Orang Asli community in Hulu Langat. By integrating vocational training, indigenous knowledge, and sustainable architectural practices, the design addresses systemic and cultural barriers that hinder access to inclusive education. Findings confirm that localised, culturally aligned institutions can significantly improve engagement and reduce dropout rates among indigenous students. The design leverages passive systems, vernacular materials, and modular structures to enhance climate responsiveness and environmental integration while reinforcing cultural identity. Community participation, particularly from Tok Batin, educators, and students, shaped the proposal to ensure the academy reflects real needs and aspirations. The curriculum's focus on agriculture, ecotourism, and construction promotes both educational relevance and economic resilience. As a replicable model, the Eco Vocational Academy illustrates how spatial design can support socio-educational transformation. Future studies should evaluate long-term educational outcomes and spatial performance while building strategic collaborations to scale and adapt the framework for broader indigenous application.

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