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Design of Pasaman Culture Center Using Minangkabau Symbolism Architecture Approach

Purnama Sakhrial Pradini[1], Herol[2], Abdul rahman[3]*

Architecture Study Program, Faculty of Engineering, Pelita University
*Correspondence: E-mail: purnama_sakhrial@pelitabangsa.ac.id

ABSTRACT

Pasaman is one of the districts in the province of West Sumatra, Indonesia. The district capital is located in Lubuk Sikaping, which is dominated by the Minangkabau ethnic group. Minangkabau is one of the tribes that is famous for its culture, language, special food, traditional houses, and various branches of art. However, over time, this art has begun to be abandoned. The entry of foreign culture is one of the factors that affect the decline in public interest in Pasaman Regency towards Minangkabau culture. In Pasaman itself there is still a small group of cultural circles who are still trying to preserve Minangkabau culture which the Pasaman local government is currently paying attention to, such as holding inter-Nagari festivals. From this it can be seen that there are still people who care about Minangkabau culture in Pasaman, to preserve this culture it is necessary to have a Pasaman culture center as a forum that can regenerate public interest in Minangkabau culture, a gathering place for culturalists and art connoisseurs to continue to preserve culture. The Minangkabau architectural concept approach aims to give the nuances of Minangkabau customs, strengthen the image as a means of preservation and promotion of art and culture and its unique form will attract visitors to come and show the regional context through symbols as a characteristic of Minangkabau

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1. INTRODUCTION

Pasaman Regency is one of the regencies in the Province of West Sumatra, Indonesia. The district capital is located in Lubuk Attitude. This regency has an area of 3,947.63 km² and a population of 253,299 souls. Pasaman comes from Mount Passover. Pasaman is taken from the Minangkabau language which means equality, the dominant Pasaman people are Minangkabau tribes and the government system in Pasaman itself applies a lot of the Minangkabau Cultural Government system.

Minangkabau is very famous for its culture, language, special food, traditional houses, and all kinds of arts. Various branches of arts ranging from Dance and weaving, to Pencak Silat have developed into a distinctive identity. However, as time goes by, these arts have begun to be abandoned. The influx of foreign culture is one of the factors that greatly influence the decline of people's interest in Pasaman Regency towards Minangkabau culture. The community, especially the younger generation, prefers the modern arts that are mushrooming today so that they forget their own identity as Urang Minang (Minang People).

The invasion of foreign cultures and so on makes the younger generation forget their cultural arts. Even though on the contrary, it is not uncommon for foreigners to admire and love Minangkabau culture (Padang Ekspres, 2020). Even so, in Pasaman itself there are still a small number of cultural groups who are still trying to preserve Minangkabau culture. holding inter-Nagari festival activities. The West Sumatra Provincial Government together with the DPRD is trying to pay attention to Pasaman in improving and developing human resources, especially cultural matters, namely with the Governor of West Sumatra's flagship program which will develop Minangkabau arts and culture.

Who are prosperous, religious, and cultured through such things as sustainably improving infrastructure and public facilities. Looking at the case studies above, it can be seen that there are still people who care for and love Minangkabau culture in Pasaman. The desire to preserve this culture certainly requires a place that is quite extensive considering that there are various kinds of branches of art. So there is a need for a Culture Center which can revive people's interest in Minangkabau culture and a gathering place for culturalists and art connoisseurs to continue to preserve Minangkabau in Pasaman Regency.

2. THE MATERIALS

2.1 Concept of Lighting and Ventilation

The benefits obtained from this type of radial circulation also affect the concept of lighting and ventilation(Permana, et al., 2021), namely the location of buildings that do not block both the sun at sunrise and sunset, besides that the wind entering the area can be spread thoroughly so that natural ventilation in each building is evenly distributed.

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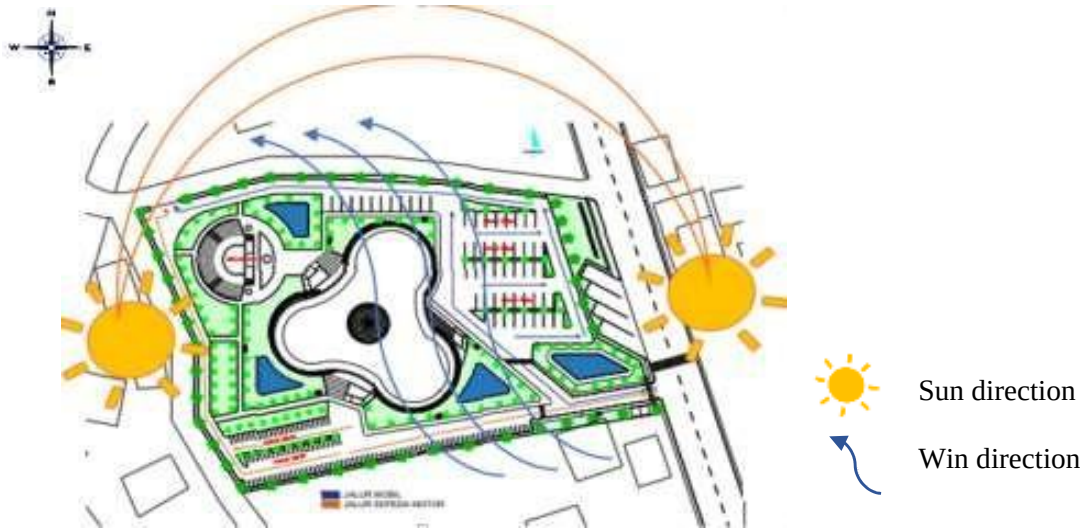

Figure 1: The concept of lighting and ventilation
Source: Personal

This design will apply a secondary skin and openings using glass material which aims to make it easier for light and wind to enter the building so as to reduce and minimize the use of electrical energy for both air conditioning and lighting as shown in the image below:

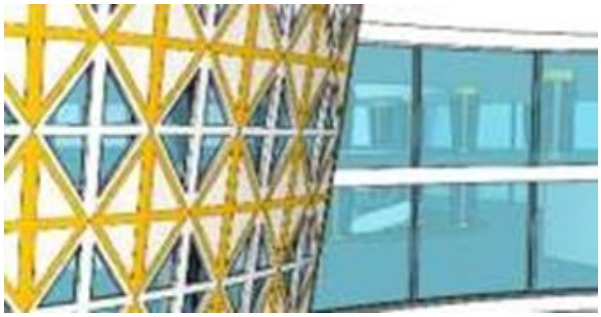

Figure 2: Design Application
Source: Personal

2. Structural Analysis

1. Sub-Structures

(Sub-structure) is located at the bottom of the building which functions to support the entire load of the building and transmit it to the ground below. Given its location in the ground covered by a layer of tiles and yard soil, the foundation must be made strong, safe, stable, durable, and able to support the load of the building, because damage to the foundation will be very difficult to repair. Determining the type of foundation to be used must pay attention to the following matters, all of which are influenced by: - The weight of the building to be supported – The type of soil and its carrying capacity – The work tools, and the existing workforce(Kencanasari et al., 2020).

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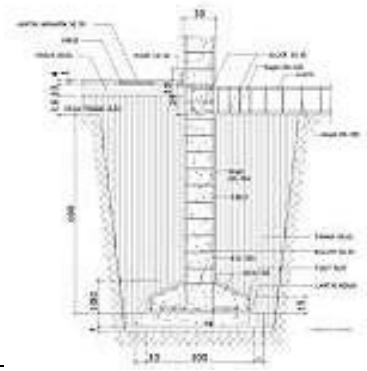
Table 2. Site Foundation

Foundation Type	Advantages	Disadvantages
Tread or chicken feet (for 2-3 storey buildings) 	Can be built on soft ground	Not suitable for small buildings
	No need drainage system	Installation is a little complicated
	Chicken claw filled with very strong solid concrete	
	Foundation work will reduce the material	

Source: https://septiantoni.wordpress.com/

Based on the needs of the building structure, it is necessary to consider the function of the building, economic value, building requirements, building height and technical factors in the conditions around the site. So the foundation used in the culture center building is the tread or chicken claw foundation.

2. Frame Structure

The frame structure to be used is a rigid frame structure. Rigid frame structure (rigid frame) is a structure consisting of linear elements, generally beams and columns which are connected at their ends by joints which can prevent relative rotation between the connected structural elements. The building will be channeled through columns and beams.

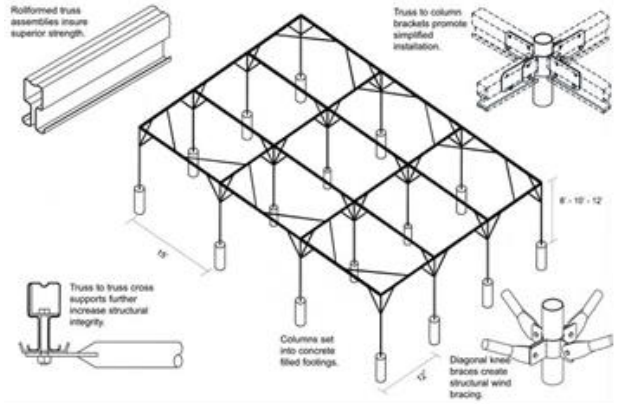


Figure 2 : Rigid frame
Source: https://septiantoni.wordpress.co

3. Structure Roof

The roof structure uses no structure because the roof of the building will function as an escape building.

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Figure 3. Roof Dak
Source : www.dekoruma.com

4. Fasad Structure
   The facade structure will use a 2.5 inch galvanized iron frame material and use an ACP (Aluminum Composite Panel) facade material, which is a blend of aluminum and composite materials.

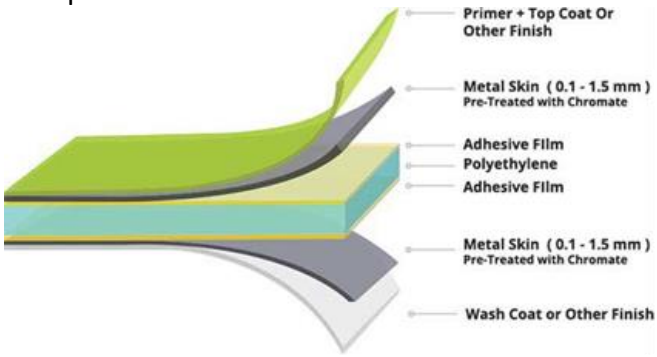

Figure 4 : Material ACP
Source : https://distributoracp.com/acp-alcopla-aluminium-composite-panel/

3. Utility System Analysis

Building Utilities System is a complete building facility that is used to support the achievement of elements of comfort, health, safety and mobility in buildings.

4. Clean Water System Analysis

The clean water system in the building starts with taking water from the PDAM or meter and continues with making a water reservoir or commonly called a Ground Water Tank (GWT) if it is placed on the base of the building (Underground) or a tank placed on top of the building, namely in the form of a reservoir in the form of large tub with a volume size that is adjusted to the water needs of the building.

Then proceed with a pumping system with a machine that has a varying amount of power according to the needs of the pump discharge which is distributed through the piping system to each floor according to the design at the water intake points that have been planned in the plan. The analysis used is to collect the required data both primary and secondary data calculations using the hardy cross method are then analyzed with the EPANET 2.0 program. The stages in the analysis of the EPANET 2.0 Program are as follows:

1. Choose the dimensions used, namely meters, and choose the Headloss Formula, namely Hazen-Williams

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2. Draw a pipe network map
3. Enter reservoir data, pipe length and junction according to conditions in the field.
4. Perform a simulation with the Run Analysis command
5. After that, the results are obtained, namely flow, velocity, head loss, friction factor and visual picture

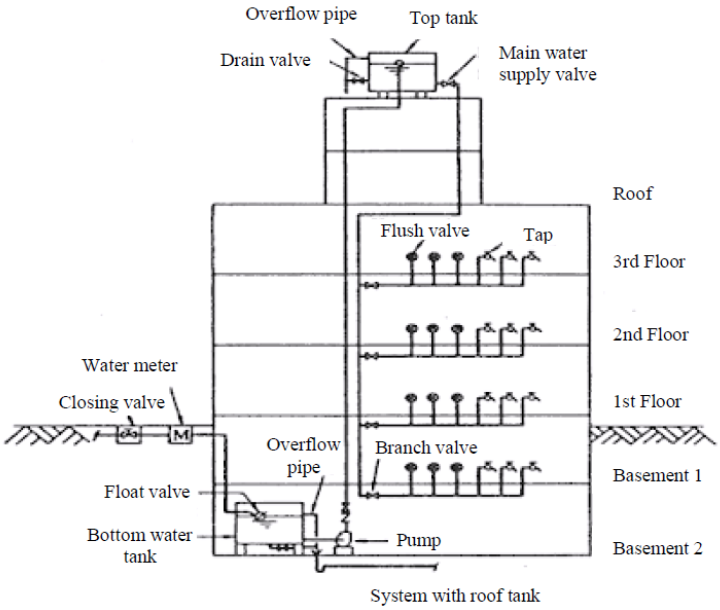

Figure 4 : Clean water system
Source: Google Scholar

5. Analysis of liquid and solid waste disposal systems

The waste disposal system in buildings begins with the creation of a system for managing the remaining waste which generally comes from disposal from toilets (Floor drain), hand washing sinks or kitchen waste and disposal from closed toilet manure, namely by making a Sewage Treatment Plant (STP) system in the form of a septic tank which is a type of modern utility that functions not only to accommodate but can manage waste residue so that the remaining waste is safe for the environment and can also be reused or recycled for water needs.

Local sanitation system (on site sanitation) is a wastewater disposal system in which wastewater is not collected and channeled into a network of channels that will take it to a wastewater treatment site or receiving water body, but is disposed of on the spot. While the centralized sanitation system (off site system) is a system for disposing of wastewater that is channeled out of the location to the waste water collection channel and then channeled centrally to the wastewater treatment plant before being discharged into water bodies. In this analysis, the study is only focused on the centralized wastewater treatment process (off-site system). The centralized system wastewater treatment process is generally 1. Initial processing (pre-treatment)
2. First stage processing (primary treatment)
3. Second-stage processing (secondary treatment)
4. Final processing (tertiary treatment)
divided into four stages, namely:

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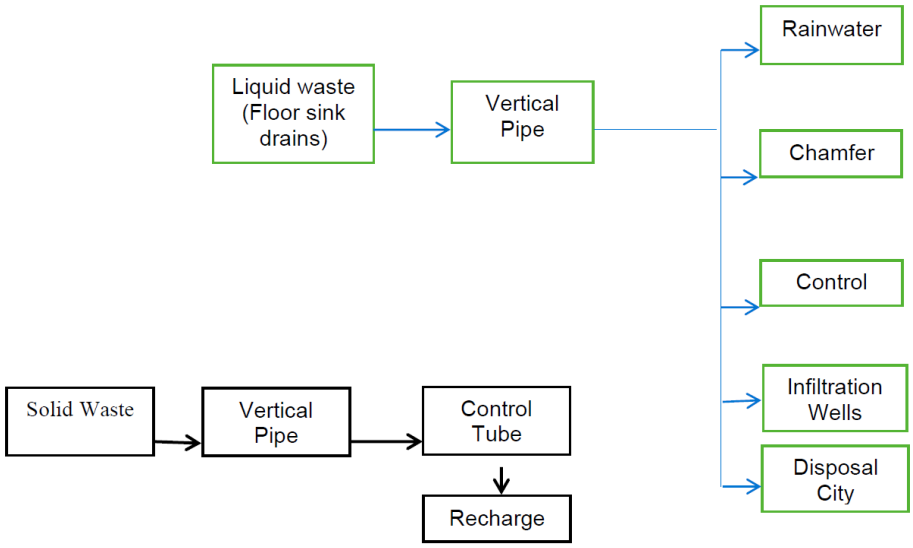

Figure 5 Solid waste disposal

Source: Google Scholar

6. Lighting, Mechanical and Electrical Analysis

The lighting system is something that needs to be planned in accordance with the placement of the lighting points to be determined, as well as the electrical and mechanical systems of a building which need to be planned properly according to the needs and desired capacity.

The lighting system also does not only depend on lighting devices, but can be in the form of natural lighting openings from the sun in the form of valves and secondary skins that are placed according to the sun's orientation. While the mechanical and electrical system culture center consists of:

A. Mechanical System

a. System Fire Fighting (Fire Fighting System)

A fire fighting system or fire extinguishing system is provided in the building as a preventive for fires. This system consists of a sprinkler system, Hydrant Pillar system and Fire Extinguisher. And in certain places a gas fire system is also used. But the culture center building uses a system consisting of: sprinkler system, Hydrant and fire extinguisher.

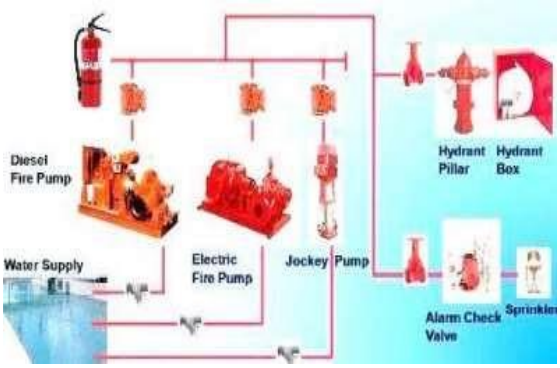

Figure 6 : Fire suppression system

Source: Atul Chauhan

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Figure 7 : Head Sprinkler
(Source: http://www.proveex.com.ar)

Figure 7a: Hydrant Box
(Source: https://www.bromindo.com)

Figure 7b : Apar
(Source: https://www.agenalatpemadamapi.com)

b. Vrf (Variable Refrigerant Flow) Air Conditioning System Structure

Analyzing the culture center building has a warm air conditioning system, the Air Conditioning System used is VRF which functions to maintain room air conditions, both temperature and humidity so that the air feels more comfortable. The structure of the VRF air conditioning system consists of:

1) Outdoor unit (consisting of 1 unit or more compressors)
2) Multiple indoor units (1 – 64 indoor units)
3) Refrigerant pipes of varying sizes in one system from outdoor to all indoor
4) Refnet joints (dividing copper pipes on refrigerant pipes)
5) Communication cable (consisting of 2 cables that are installed in series from outdoor to all indoor in 1 closed loop network. Is 1 main part in every ac vrf installation)
6) Indoor remote control (each indoor is controlled by a separate remote controller)
7) Centralized controller (centralized control that can control the entire indoor from 1 location)
8) power cable

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Figure 8 : Air conditioning system structure
Source: Makassar contractor design

The Electrical System is a series of electrical power supply equipment to meet the needs of low voltage electric power. The series of equipment provided in the culture center building includes medium voltage PLN (20,000 volts) to low voltage. In this building the electric voltage is distributed from the medium voltage channel through the transformer becomes a 3 phase low voltage channel R,S,T, where the voltage between the phases is 380 volts, and 220 on the neutral line.

a. Sourcepower / voltage

The main power source/electrical voltage source from the building usually uses a source from PLN. Apart from the PLN, the building also provides a backup voltage source (emergency) in the event of a blackout or a blackout, namely by providing a generator set. Generators are usually operated if there is a disturbance or blackout from the PLN, and generally have been set in such a way that when the PLN turns off, the voltage is automatically supplied from the generator, which has been set automatically, with intervals of seconds.

b. Power distribution

The voltage required by the building is low voltage. Medium (for larger power) the incoming voltage from PLN is medium voltage (20 thousand volts). So it is necessary to change equipment from medium voltage to low voltage. The medium voltage flow is converted to low voltage through the transformer, which is then distributed through the main low voltage distribution panel or LVMDP (Low voltage distribution panel). From this low voltage panel it is then distributed to the sub-distribution panel (also called the MDP panel (main distribution panel) or some call it the SDP panel (sub-distribution panel) and so on to the equipment panel to user outlets (sockets, lights, etc.) -other).

1) Panels

In the installation system in buildings, panels usually consist of 2 types, namely medium voltage panels which are usually called MV (medium voltage) panels or which are often referred to as cubicle panels and low voltage panels.

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2) Genset Panels

In a building to cover the source of power from PLN if it dies, another source of generator is provided. To enter the low voltage distribution to the building, the power from the generator then flows through the generator panel, which will automatically turn on the generator if the PLN is off. The Genset panel is equipped with A.M.F - A.T.S, which stands for Automatic Main Failure - Automatic start and stop Genset. The function of A.M.F (Automatic Main Failure) is to Automatically Turn on (Start) the Genset when the electricity supply from PLN Fails / Goes Out. while the function of the A.T.S (Automatic Transfer Switch) is to automatically open the electricity supply from the generator and close the electricity supply from the PLN and vice versa opens the electricity supply from the PLN and close the electricity supply from the generator automatically when the electricity supply from PLN returns.

7. Analysis of Waste Treatment and Disposal Systems

After being analyzed for waste treatment and waste disposal, a place for organic and inorganic waste is provided at every point within the scope of the culture center building. The waste will be sorted according to the texture of the waste to make it easier for garbage collectors sent by the cleaning service. The stages of the activity process in waste management are as follows:

1) Collection As waste management from the place of origin to the temporary disposal site before going to the next stage. At this stage facilities are provided in the form of organic and inorganic trash bins for collection
2) The transportation stage is carried out by using assistance in the form of certain means of transportation to the final disposal/processing site. This stage also involves workers transporting waste from the temporary disposal site to the final disposal site (TPA).
3) At the final disposal/waste processing stage, it will undergo processing both physically, chemically and biologically until the complete completion of the entire disposal process.

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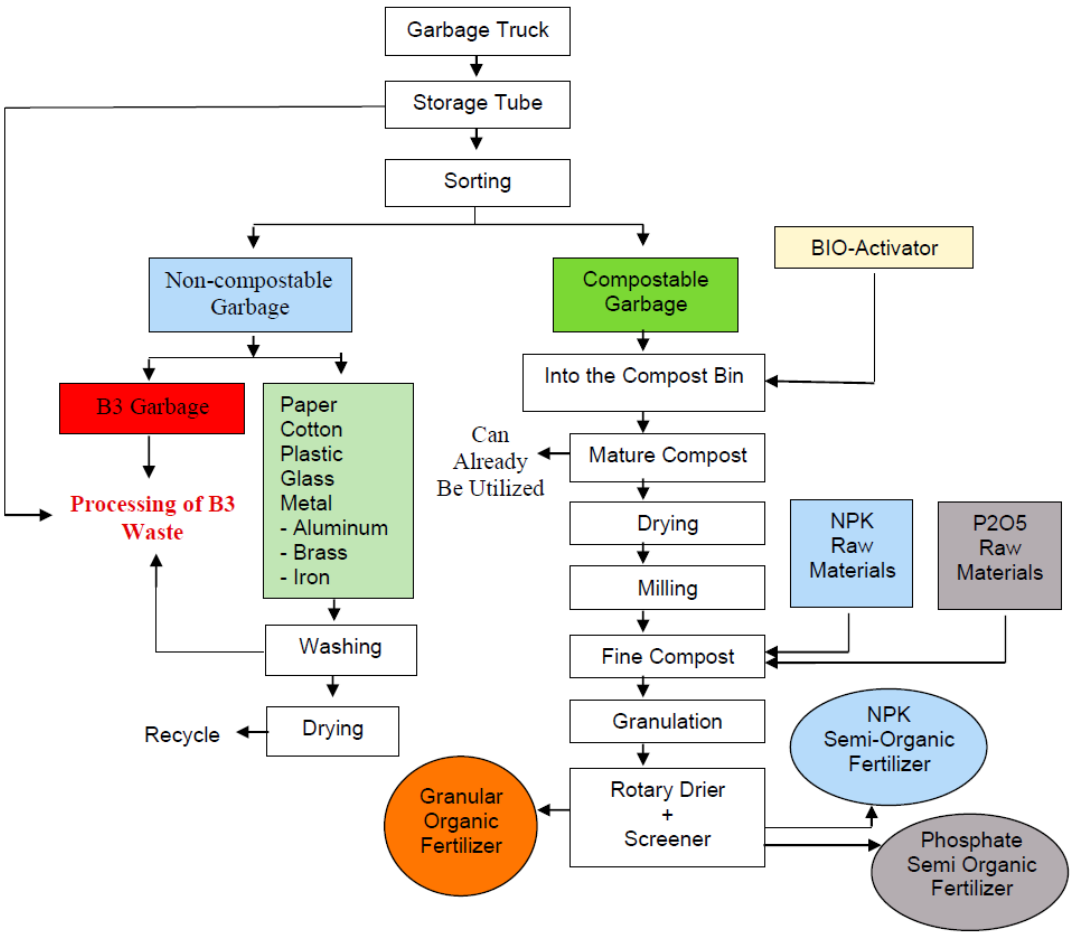

Figure 9 : Sistem Pembuangan Sampah
Source: Jamest Hoengsa

Result and Discussion

a. West Sumatera

West Sumatra (abbreviated as West Sumatra) is a province in Indonesia located on the island of Sumatra with the capital city of Padang. West Sumatra Province is located along the West Coast of Sumatra in the center, the Bukit Barisan plateau to the east, and a number of islands off the coast such as the Mentawai Islands. From north to south, the province with an area of 42,012.89 km².

b. Pasaman

The word Pasaman comes from Mount Pasaman. Pasaman is taken from the Minangkabau language which means equality. This refers to the heterogeneous people living in this district. Whereas in the Mandailing language there is the word Pasaman which has the same meaning as the Minangkabau language. Pasaman Regency is one of the regencies in West Sumatra Province, Indonesia. The district capital is located in Lubuk Attitude. This regency has an area of 3,947.63 km² and has a population of 253,299 people according to the 2010 population census, and as many as 301,444 people in 2021.

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C. Spatial Size Analysis

Inter-room circulation = 4,116 m² + (4,116 x 30%) = 5,350.8 m² So, the Pasaman Culture Center design space requirement is 5,351 m². The source data for calculating the size of the Pasaman Culture Center space is as follows:

1) Architect Data
2) (TSS) Standard Time-Saver For Building Types 2
3) Assumptions
4) (NAD) Neufesrt Architects Data Volume 1&2

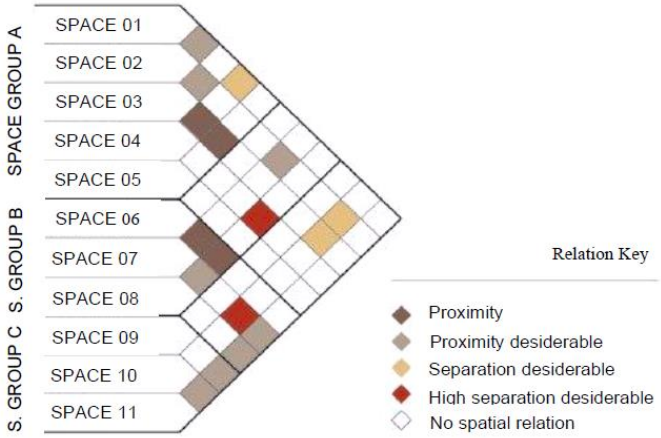

Figure 10: Spatial Proximity Relationship Analysis
Source: Researchgate

c. Site Analysis

The selected site location is located on Jl Antar Lintas Sumatra Jorong Kampung Luar Nagari, Durian Tinggi Village, Lubuk Attitudeing District, Pasaman Regency. This location is right on the side of the road. The main liaison between provinces in Sumatra and is also in the capital city of Pasaman district, namely Lubuk Attitude. The condition of the site itself is the rice fields of the surrounding community and also vacant land.

The site is right on the edge of the main road, high noise levels come from the east (directly adjacent to the main road) and west (adjacent to SD IT Cahaya Madani Lubuk Attitude) for the north direction the noise level is sufficient because it is directly adjacent to the arterial access road for residents For the south direction, the noise level is low because it is adjacent to vacant land. To minimize the noise level, apply dense vegetation so that the noise level can be controlled.

d. Circulation analysis within the site

Vehicle Circulation Analysis Some things that need to be considered in analyzing vehicle circulation include:

a. The driver's lane is wider and easier to park
b. Driver's lane does not collide with pedestrian's lane
c. Easy driving paths to enter and exit the site area

Pedestrian Circulation Analysis Some things that need to be considered in analyzing pedestrian circulation include:

a. Pedestrian lanes do not collide with motorist lanes
b. There is a zebra crossing at every crossing in the driver's lane
c. Convenient walking paths (Such as planting shady trees and beautiful gardens)

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e. Off Site Circulation Analysis

Circulation on Jl Antar Lintas Sumatra is a two-way lane that has a road width of 15m. Based on the circulation analysis outside the site, the selection of circulation enters from the east, namely Jl Antar Lintas Sumatra, and exits behind the Culture Center building.

Figure 11. Folder
Source : Wikimapia.org

To minimize the east and west sunlight, the use of vegetation and exterior facades that use secondary skin or wooden fins can reduce heat in the Culture Center building.

f. View Analysis

View analysis aims to determine the direction of the position of the building mass. The picture above shows the view around the site. The design of the building will face east where in this view is the Sumatra Intersection road which is a strategic position, because people will easily see the building from that road

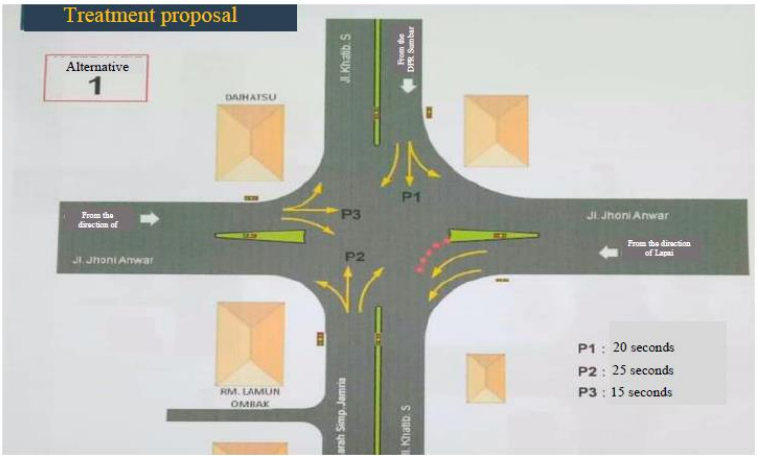

Figure 12: Sumatra interaction
Source: InfoPublik

g. Concept of Waste Management

At each point in the circulation area, visitors are provided with organic and inorganic waste bins, then the waste is transported from the TPS to the TPA, which is disposed of at the Lubuk Attitudeing landfill.

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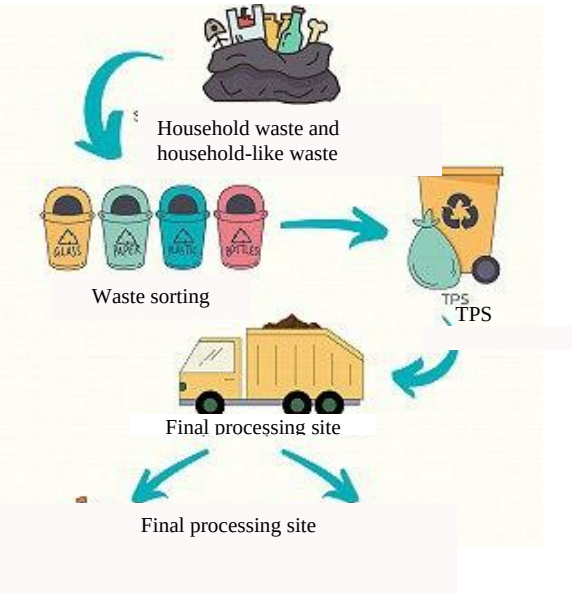

Figure 13: Waste Managemen
Source: djkn.kemenkeu

Conclusion

It can be concluded that this design describes the identity and richness of the Minangkabau culture in Pasaman. The Minangkabau symbolism architectural approach produces buildings that are not only functional but also pay attention to symbolic aspects that reflect Minangkabau culture and philosophy. In addition, the design of the Pasaman Cultural Center uses environmentally friendly principles such as the use of renewable energy, the use of environmentally friendly building materials, and good wastewater management. This is an effort to reduce the negative impact on the environment and show concern for nature.

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