The Concept of Extending Tradition Majapahit's Architecture in Mojokerto Hybrid Community Center

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Abstract- The city of Mojokerto is an area with a high population density. The high population density of Mojokerto City is not matched by the amount of city public space, both in the form of green open spaces and non-green open spaces. The city of Mojokerto has cultural potential, local products, culinary, and traditional arts that are still less exposed due to lack of marketing. This study aims to provide design ideas in the form of site, spaces and forms concept in public open space facilities that accommodate function of social, cultural-educational, and recreational with an extending tradition approach design to introduce the characteristics of Majapahit architecture. This study uses a qualitative method with the initial steps to find primary data in the form of observation studies (site, climate, and environmental data) and secondary data (study of object and approach literature). Then the data is analyzed by the linear method in the form of analysis of function, space, site and form. The design concept (site, space and form) is obtained from the results of the analysis with the principles of the Extending Tradition approach. The results of this study are suggestions of design concepts in the form of site, spaces, and forms concepts that are applied in the Mojokerto Hybrid Community Center design in the hope of answering the needs of the people of Mojokerto City for public spaces that carry the characteristics of Majapahit architecture.

Keywords—traditional architecture; architecture concept; public space

I. INTRODUCTION

Mojokerto City with an area of 16.46km^2 has a population of 140,161 people in 2016. The large number of residents of Mojokerto City compared to the total area makes the population density of Mojokerto City very high by 8.511 people / km2 in 2016. [1]

The high population density of Mojokerto City is not matched by the amount of city public space, both in the form of green open spaces (RTH) and non-green open spaces (RTNH). The available green space in Mojokerto City is only 29.97 ha. The standard for providing green open space in urban areas is 30% of the total area of the city, with 20% of public green space and 10% of private green space also applies to RTNH.[2] The public space of Mojokerto City has only two from the 14 existing city tourism potentials, namely the town square (alun-alun) of Mojokerto and Park in St. Benteng Pancasila. [3]

RTNH can have socio-cultural, economic and architectural functions.[4] Permen PU. Mojokerto has cultural potential and local products such as shoes, batik and other accessories. In the culinary sector Mojokerto has onde-onde and kerupuk rambak as typical city food. From the traditional arts sector there are ludruk, bantengan and wayang kulit performances. Unfortunately, the potential of local culture and products is still less exposed because of the lack of marketing efforts to the wider community.

The public space is a space that is able to accommodate the needs of joint activities and allow the occurrence of meetings between humans to interact with each other. Each public space has a meaning as a location that is designed to a minimum that has great access to the surrounding environment, a place where humans / public space users meet and the behavior of the public users of each other in accordance with local applicable norms.[5]

The existence of public space is quite important for the community. Public space can help increase community interaction directly and balance the tendency of cyber activity in this digital era. Other functions of public space besides as a means of public communication as well as a place of recreation or tourist destination, a place to play and relax. City buildings that tend to be closed can be balanced with an open public space and will produce a beautiful city environment if arranged properly.

Community center is a place that can accommodate people's activities in social aspects, culture-educative and even recreation. [6] With the existence of this Community Center, the people of Mojokerto City can use it in various activities that are public, social, cultural, educative, and recreational. Like holding art exhibitions, seminars, cultural performances, sports and other activities.

The Extending Tradition approach is chosen as an attempt to bring up regional identity. At the end of this study presents the concept or general idea of MHCC as one of the solutions of the Mojokerto City government in providing a good public space for the community.

II. METHODS

The research method uses qualitative methods. With the initial stages of looking for ideas / ideas about public space and community activities in the city of Mojokerto. The second stage collects and processes primary and secondary data.

The method used in this study is literature study related to design objects and approaches. Sources of data were obtained from the literature relating to the activities of the people of Mojokerto City. The data is then analyzed linearly to produce design criteria that can solve the problem of lack of public space and open space in the city of Mojokerto.

The concept obtained was obtained from a combination of Mojokerto Hybrid Community Center's object function analysis with extending tradition principles (asceticism, framing, peratapan, persungkupan, persolekan) from the majapahit architecture.

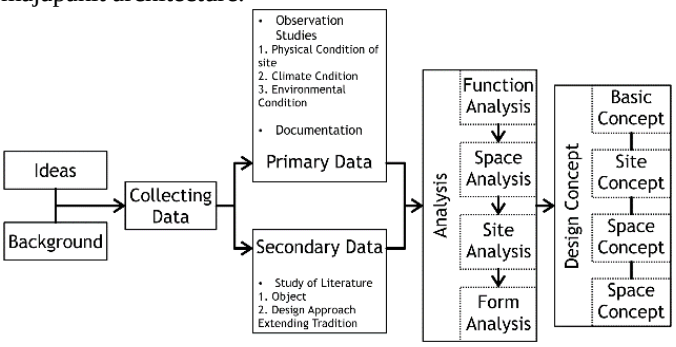

Fig. 1. Methods
(Analysis, 2018)

III. DISCUSSION

A. *Community Center*

Community center is a place that can accommodate people's activities in social aspects, culture-educative and even recreation. Community Center is a community forum for carrying out various activities, especially those that are public. There are Community Centers for community activities only, such as Community Centers for religious communities, sports, art, Community Centers in school and campus areas. But also the provisions that exist for general public activities. This function depends in part on the area of the Center Service.

The general space is basically a container that can accommodate certain activities of the community, both individually and in groups, where the form of public space is very dependent on the pattern and composition of the building mass. [7]

Community center is a place that can accommodate people's activities in social aspects, culture-educative and even recreation. [8] With this Community Center, the people of Mojokerto City can use it in various activities that are public, social, cultural, educational, and recreational. Like holding art exhibitions, seminars, cultural performances, sports and other activities

B. *Majapahit Kingdom*

Majapahit Kingdom is a Kingdom of the Hindu-Buddhist centers in East Java, which was founded in 1293 by up to 1500 m. of the Kingdom is experiencing the peak of glory during the leadership of King Hayam Wuruk. Some relic of buildings on the Majapahit Kingdom still used in architecture in Indonesia.[10]

The following is a description of the capital complex of the Majapahit Kingdom illustrated by Tjahja Tribinuka.

Fig. 2. Ilustration of Capital City of Majapahit
(http://jawakuno.com/disain-keraton-majapahit/)

The area of the royal complex is divided into 9 blocks (sanga mandala) with an area (160x160) m each side of the block, separated by a high fence wall. The complex is surrounded by canals with a depth of 4m. access into the complex via south, west and north through the gate. Division of blocks in accordance with their respective functions.[10]

From several heritage sites of the Majapahit Kingdom in Trowulan, several building typologies can be seen. buildings in the Majapahit Kingdom that can be found such as the following reconstruction drawings.[11]

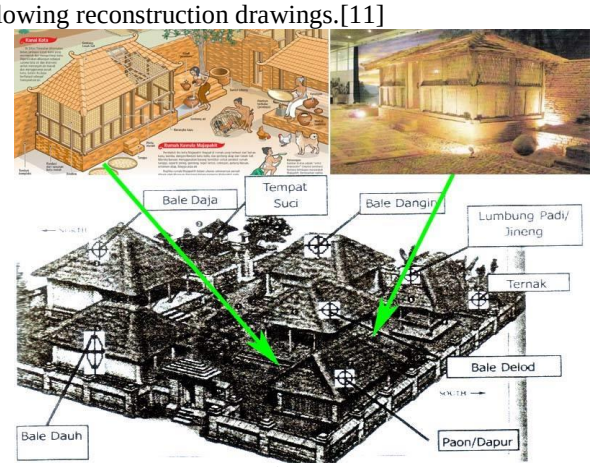

Fig. 3. Reconstruction of House in Majapahit Kingdom
(http:/-/roda2blog.com/2014/09/03/rekonstruksi-desain-rumah-era-maja-pahit/, 2014)

C. *Community Center*

Extending Tradition according to Tan Hock Ben is an effort to nationalize architecture by looking for the sustainability of local traditions generated by directly quoting the forms and features of past sources and adding them innovatively.[12]

Based on Tan Hock Beng's definition can be classified in 6 regionalism strategies that can be applied to Extending Tradition:

1. Showing traditional identity specifically based on place / region and climate.

2. Showing formal and symbolic identity into a new, more creative form.
3. Know it as a tradition that is suitable for all ages.
4. Finding a balanced truth between regional and international identity.
5. Decide which principles are still feasible / current (actual).
6. Using the demands of modern technology, from things traditionally used as elements for modern styles.

Here are some principles that can be applied to objects, as in the following table.

Table. 1. The Application of Extending Tradition on Object

No	Extending Tradition	Majapahit Architecture	Architecture Parameter
1	Pertapakan (value of site)	The division zone of functions in sanga mandala in the capital region of Majapahit.	Consider harmony with nature, and design according to needs (functions). Like the determination of the masses in the capital region of the Majapahit Kingdom which is adapted to the natural conditions of the agrarian. Use rivers and canals as irrigation and transportation streams.
2	Perangkaan (framing)	The structure on the roof, body and the foundation of the house of the Majapahit Kingdom.	Using joint typologies of roof structures and house foundations of the Majapahit Kingdom with the application of materials that are in accordance with current environmental conditions.
3	Peratapan (roofing)	The use of the roof of the shield building is like the house of the Majapahit residents at the Trowulan Museum in Mojokerto	Using a limasan roof that is like a building during the Majapahit Kingdom is found in many buildings today.
4	Persungkupan (enveloping)	Space typology from the reconstruction of the Majapahit royal house.	In the Majapahit Kingdom building there is no partition which separates space, space is separated through different building objects.
5	Persolekan (beautify)	Ornaments found in the terracotta kingdom of Majapahit, such as the majapahit kingdom symbol.	Using ornamentation in the Majapahit kingdom that can still be found at this time, such as terracotta carvings or temple reliefs.

(Analysis, 2018)

IV. ANALYSIS

A. *Space Analysis*

Mojokerto Hybrid Community Center has the main function as a public space that can be accessed in general for activities with the people of Mojokerto City. In addition to functioning as a gathering place, Mojokerto Hybrid Community Center also has a function as a container for the potential development of regional residents of Mojokerto City.

Table. 2. Function Analysis

No	Classification	Function
1	Primary	Place to gather and interact
		Community empowerment place (development of artistic and cultural creativity of the City of Mojokerto)
2	Secondary	Local arts and cultural staging places Mojokerto product exhibition
3	Support	Management / managerial place, Storage, Lavatory, Musholla

(Analysis, 2018)

After knowing the space needed, then compile zones between buildings in accordance with the Majapahit architecture zone.

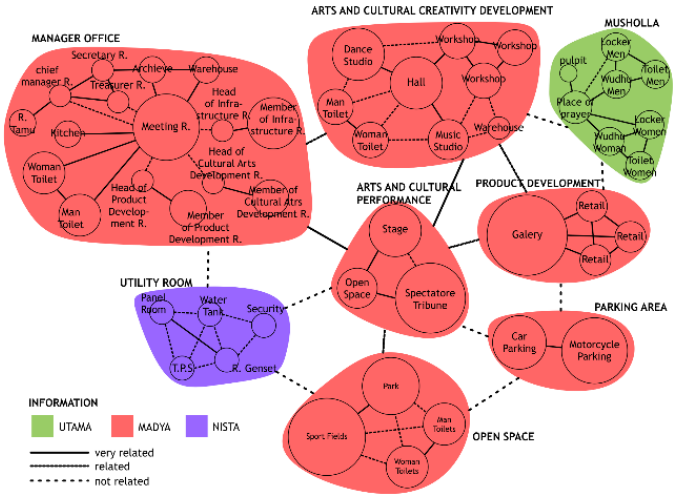

Fig. 4. Diagram of Room's Connectivity
(Analysis, 2018)

Next do the preparation zone area by implementing the zone sanga mandala of Majapahit Kingdom.

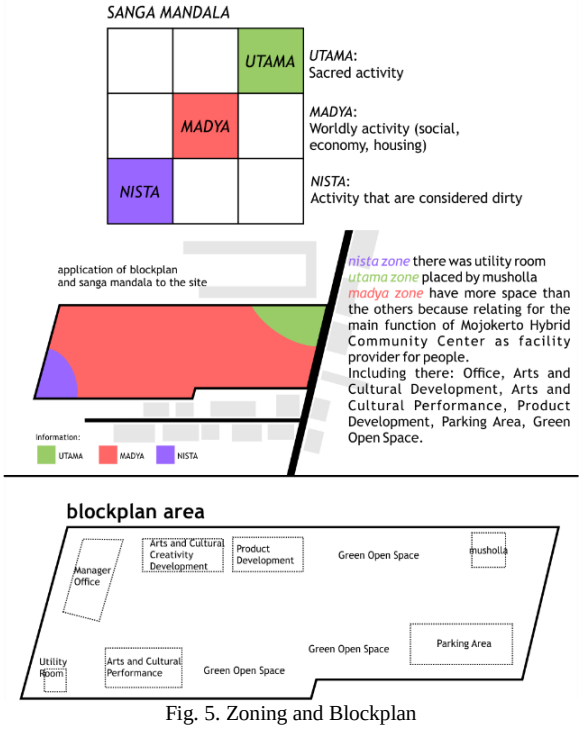

Fig. 5. Zoning and Blockplan
(Analysis, 2018)

There are three main sections in the main sanga mandala namely utama, madya and nista. Each section has a different zone designation.

Blockplan that is already adapted to the development of zoning sanga mandala subsequently became a basis of every mass building. That became a reference in the stage of site analysis.

B. Site Analysis

Site analysis is the stage of providing solutions or responses to existing conditions on the site. The first site analysis phase is climate analysis, namely sun, wind, rain. At this stage of analysis, it will produce a design proposal for the building and outside the building.

a) Sun Analysis

- Existing Data

The site is always illuminated by the sun during the day. Because there is no vegetation or large trees covering the site.

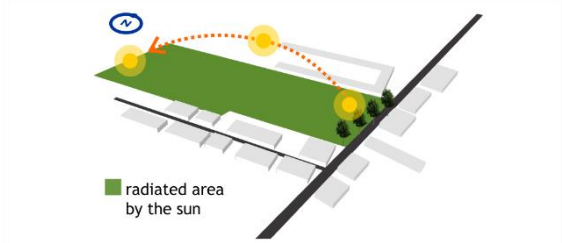

Fig. 6. Existing Data of Sun Analysis
(Analysis, 2018)

- Design Ideas

Using a shield roof with a ceiling to help reduce the heat of the sun, also this roof have same characteristics with the building of the reconstruction house in the Majapahit Kingdom.

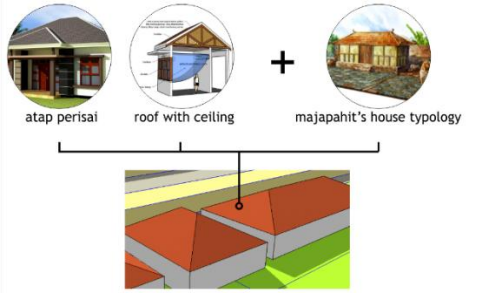

Fig. 7. Design Idea of Sun Analysis: Roof Form
(Analysis, 2018)

Building Orientation. orientation of the building to the south to avoid falling sunlight directly from the east-west direction.

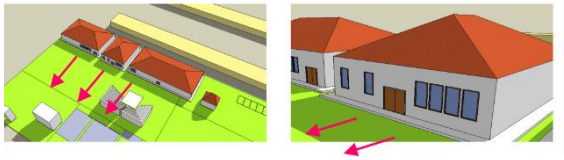

Fig. 8. Design Idea of Sun Analysis: Building Orientation
(Analysis, 2018)

Form of Openings. using transparent window openings to use the sunlight during the day which is placed on the north and south of the building to avoid glare.

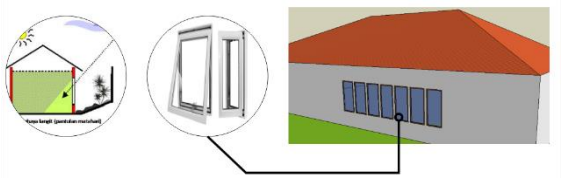

Fig. 9. Design Idea of Sun Analysis: Ventilation Form
(Analysis, 2018)

Building materials. using brick material as a building wall, and clay tile to provide room temperature comfort. Also having the same material typology used in the building era building of Majapahit.

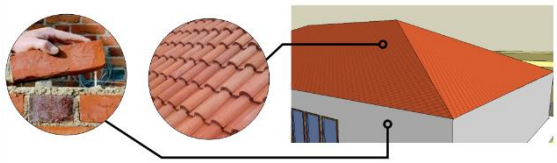

Fig. 10. Design Idea of Sun Analysis: Building Materials
(Analysis, 2018)

b) Wind Analysis

- Existing Data

Wind comes from any direction with an average speed of 3.88 - 6.88 knots / month. the wind carries various things such as the potential for odor, dirt and dust from outside into the site.

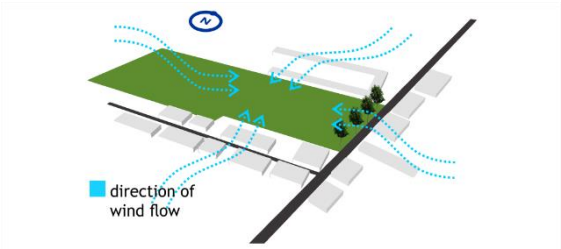

Fig. 11. Existing Data of Wind Analysis
(Analysis, 2018)

- Design Ideas

Openings. using a cross ventilation system as air circulation in the room allows the occurrence of a new air exchange in the room. It can reduce the temperature that cause the humidity.

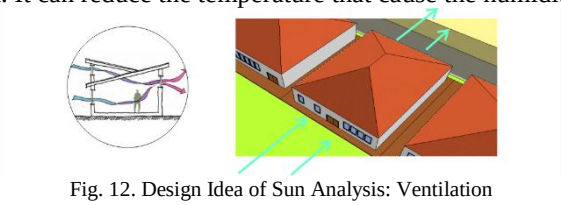

Fig. 12. Design Idea of Sun Analysis: Ventilation
(Analysis, 2018)

Buildings. provide space between the mass of the building for the wind circulation path on the site.

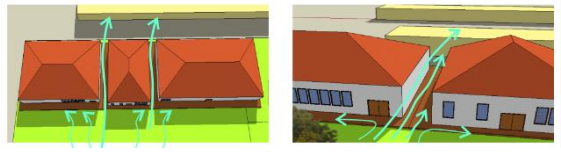

Fig. 13. Design Idea of Wind Analysis: Buildings
(Analysis, 2018)

Vegetation. using wide-crowned vegetation that can reduce wind with strong currents as well as the potential for odor and pollution from outside the site carried by the wind.

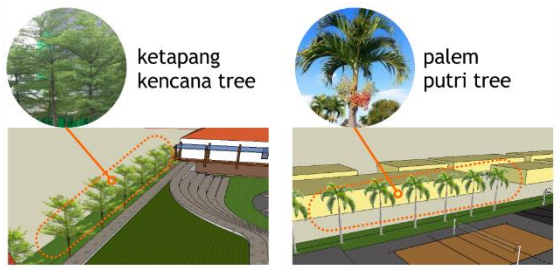

Fig. 14. Design Idea of Wind Analysis: Buildings
(Analysis, 2018)

c) Rain Analysis

- Existing Data

The average rainfall is 10.58 mm, the water absorbing the soil is low, there is a pool of water on the site when the rainy season.

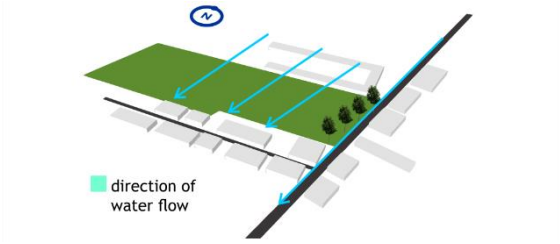

Fig. 15. Existing Data of Rain Analysis
(Analysis, 2018)
Design Idea

Pavement. using pavement that can overcome muddy on the ground, such as applying a yard to a house in the capital of the Majapahit Kingdom.

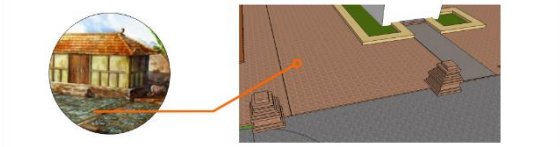

Fig. 16. Design Idea of Rain Analysis: Pavings
(Analysis, 2018)

Water utility. pouring rainwater towards the ditch in front of the footprint, which connects to the city riol.

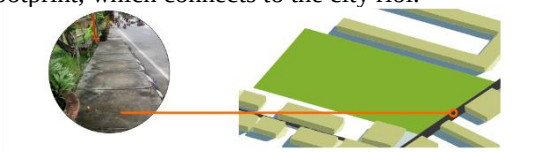

Fig. 17. Design Idea of Rain Analysis: Grey Water Utility
(Analysis, 2018)

Sloping roof. using sloping roofs and gutters to channel water from the top of the building to the bottom of the building.

Fig. 18. Design Idea of Rain Analysis: Roof
(Analysis, 2018)

d) Accessibility and Circulation Analisys

- Existing Data

The site is next to the local primary road with a width of 6m and can be passed in two directions from north and south.

Fig. 19. Existing Data of Accessibility and Circulation Analysis
(Analysis, 2018)

- Design Idea

Centralized circulation. Using circulation centered in the middle with consideration of avoiding potential congestion.

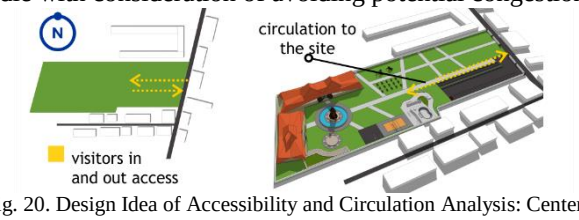

Fig. 20. Design Idea of Accessibility and Circulation Analysis: Centered Circulation
(Analysis, 2018)

Vehicle parking placement. Placing a parking area in front of the site so as to facilitate motorized vehicle access to the highway.

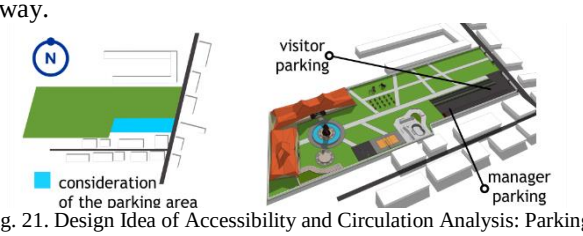

Fig. 21. Design Idea of Accessibility and Circulation Analysis: Parking placement
(Analysis, 2018)

User circulation. differentiate access for visitors and managers, especially waste and emergency access fire trucks.

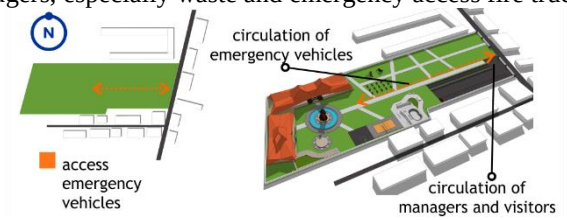

Fig. 22. Design Idea of Accessibility and Circulation Analysis: User Circulation
(Analysis, 2018)

The main entrance. make the entrance gate signify the difference in space zoning on the site.

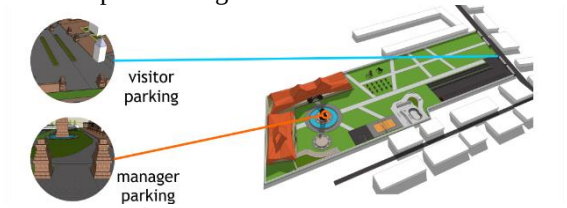

Fig. 23. Design Idea of Accessibility and Circulation Analysis: Main Entrance
(Analysis, 2018)

e) View Analysis

- Existing Data

View outside the site is as follows. North of Brawijaya Vocational High School, east of Jl. Fort Pancasila and residential areas, south facing residents' settlements, and the west facing rice fields. Whereas there is no interesting view into the site, because the site is an empty area.

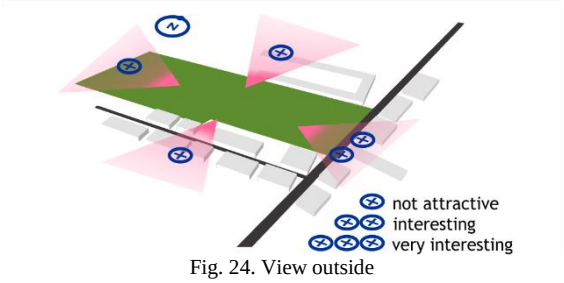

Fig. 24. View outside
(Analysis, 2018)

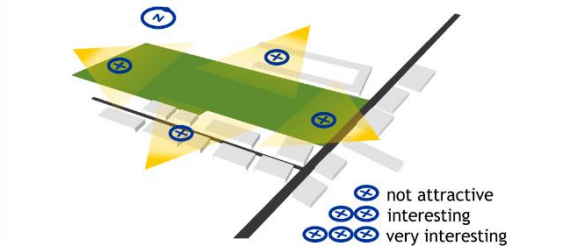

Fig. 25. View Inside
(Analysis, 2018)

- Design Idea

Signage. Make signage in front of the site as a sign of Mojokerto Hybrid Community Center location.

Fig. 26. Design Idea of View Analysis: Signage
(Analysis, 2018)

amphitheater shape. processing the formed amphitheater formation taken from the Majapahit kingdom symbol.

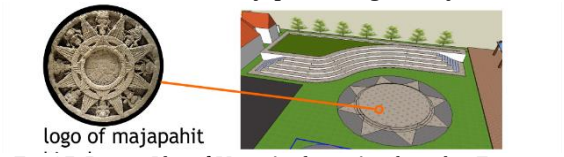

Fig. 27. Design Idea of View Analysis: Amphiteathre Forming
(Analysis, 2018)

Landmarks in the park. make the formation of the temple in the middle of the park as an attraction and strengthen the character of the object.

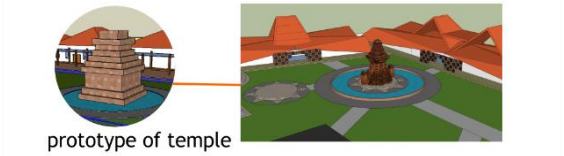

Fig. 28. Design Idea of View Analysis: Landmark
(Analysis, 2018)

f) Noise and Odor Analysis

- Existing Data

The biggest odor potential is in front of the site, namely on the highway, namely the presence of motor vehicle smoke. While the potential for noise comes from residential activities, roads and school activities.

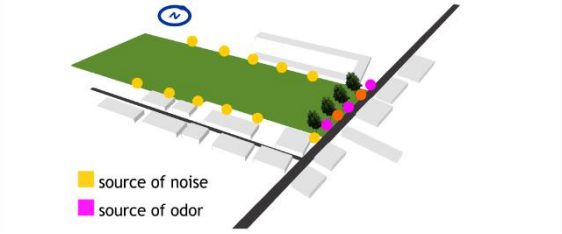

Fig. 29. Existing Data of Noise and Odor Analysis
(Analysis, 2018)

- Design Idea

Pollution Reducing Vegetation. apply small-sized vegetation that can help reduce odors and pollution.

Fig. 30. Design Idea of Noise and Odor Analysis: Vegetation
(Analysis, 2018)

Space zoning. Placing an area that requires calm apart from the source of noise. such as office areas, meeting rooms.

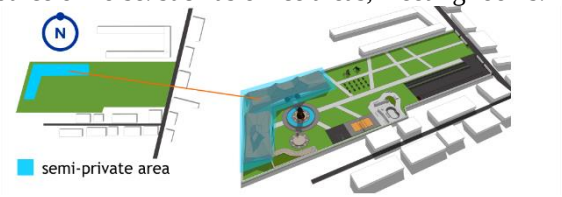

Fig. 31. Design Idea of Noise and Odor Analysis: Zoning
(Analysis, 2018)

g) Utility System Analysis

Analysis of utilities carried out relates to clean water distribution systems, sewerage systems, electrical systems, fire fighting systems, and solid waste systems on the site.

- Water Utility System

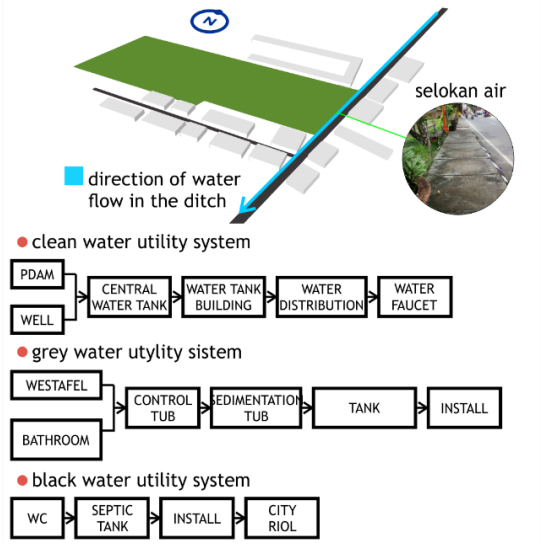

Fig. 32. Water Analysis System
(Analysis, 2018)

Use clean water sources from PDAMs and wells so that they can supply clean water. Water reservoirs are placed at the top of the site, or above the building.

- Electric Utility System

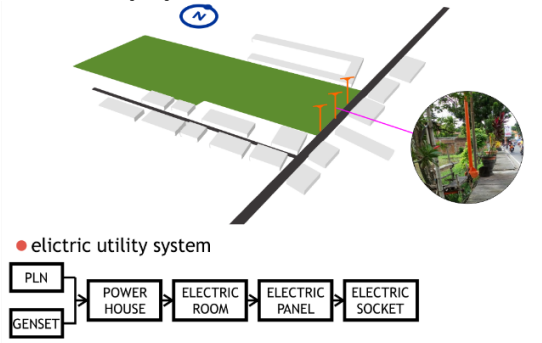

Fig. 33. Electric Utility System
(Analysis, 2018)

- Fire Emergency Utility System

Use water on the reservoir to extinguish the fire. Make circulation for fire engines.

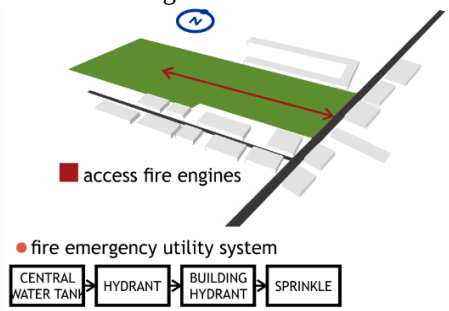

Fig. 34. Fire Emergency System
(Analysis, 2018)

- Solid Waste System

Garbage in each room is collected to the central waste in the site, then taken by the garbage truck to the city landfills.

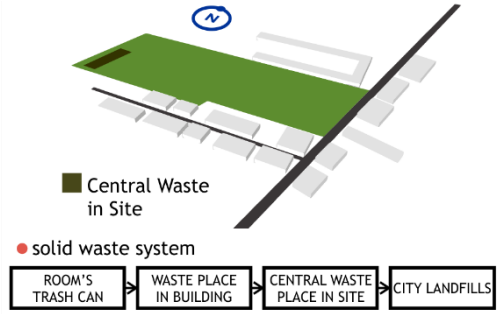

Fig. 35. Solid Waste System
(Analysis, 2018)

C. *Form Analysis*

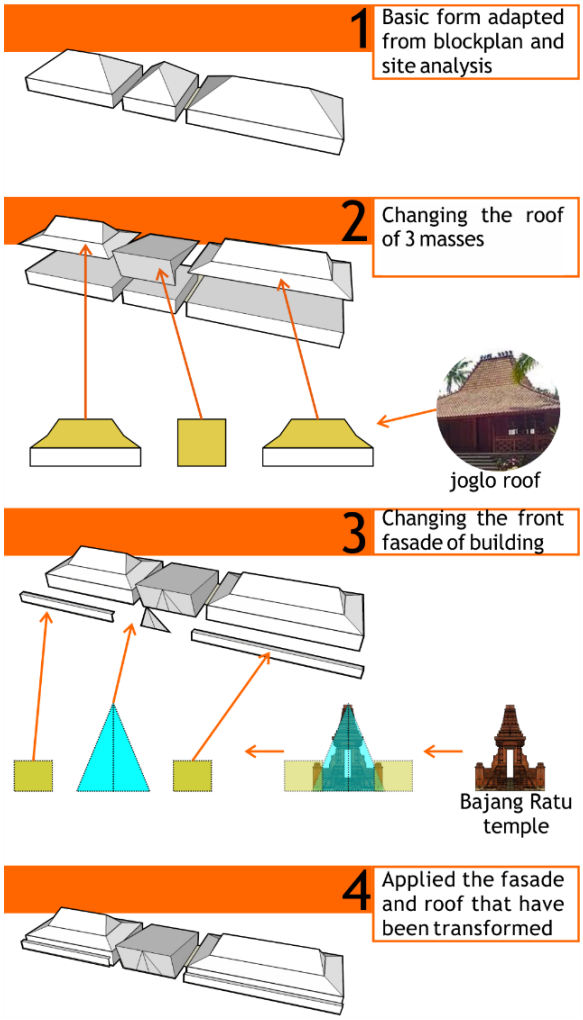

Fig. 36. Form Transformation
(Analysis, 2018)

D. Structure Analysis

The low structure of the building using the pile foundation (Fig. 37) that is used as a reinforcement for soil structures with low water absorption.

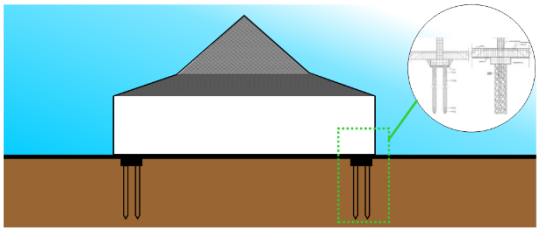

Fig. 37. Low Structure
(Analysis, 2018)

The benefit using pile foundation is to continuing the construction load above the ground to deeper soil with better soil carrying capacity. Also to strengthen the surface of the soil or sand which has a weak load resistance

concrete columns and beams as body structures (middle srtucture) (Fig. 38), structures and materials are commonly used in buildings around the site.

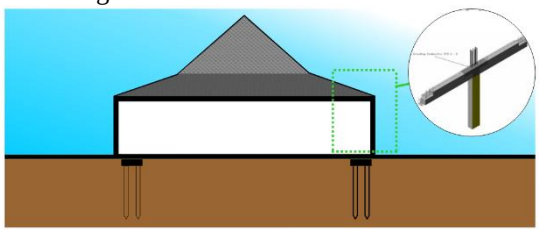

Fig. 38. Middle Structure
(Analysis, 2018)

The function of the column is as a successor to the load of the entire building to the foundation. The function of the beam is as a horizontal reinforcement frame of the building will be loads.

The roof structure of the building is a lightweight steel framing structure for joglo roof (Fig. 39). Mild steel used is galvanized or galvalume / zincalume.

Fig. 39. Up Structure
(Analysis, 2018)

Uses Mild steel as a roof is resistant to shrinkage due to temperature changes and cannot be weathered with moisture or termite attacks

V. RESULT

The result for the analysis is concept design. It is consist basic concept, site concept, space concept and form concept.

A. Basic Concept

The basic concept is a mind, an idea or a general mental picture of design. The macro concept is derived from the incorporation of the basic principles of 3 aspects, namely object, object approach, and Islamic integration.

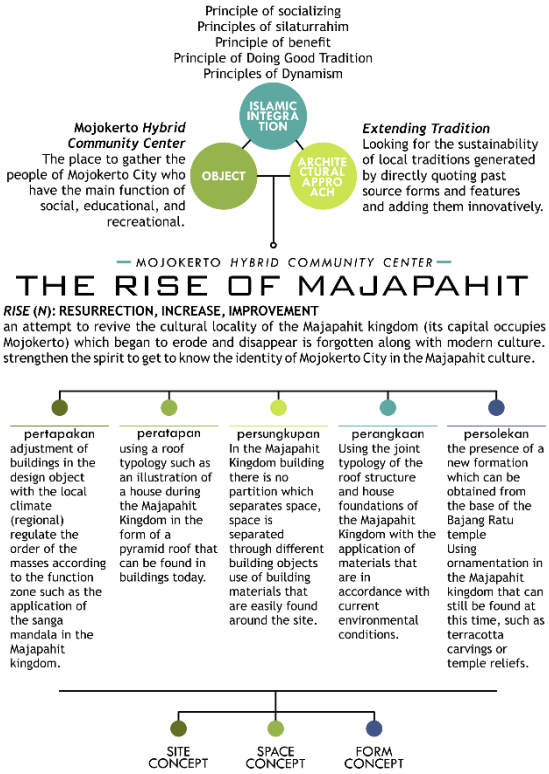

Fig. 40. Basic Concept
(Analysis, 2018)

B. Site Concept

The space zone is divided into consideration of the block plan and zoning distribution of the sanga mandala (Capital of the Majapahit Kingdom).

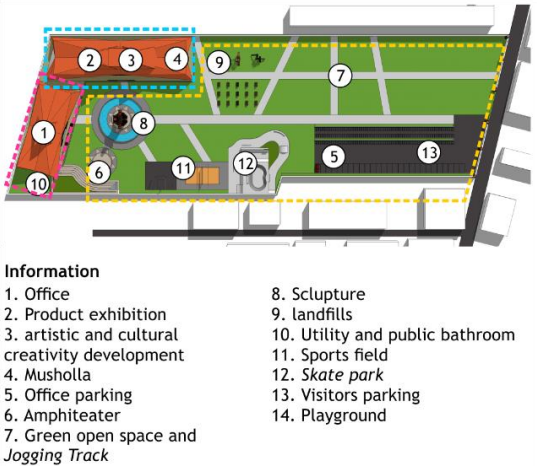

Fig. 41. Site Concept
(Analysis, 2018)

a) Public Zone

The Public Zone consists of amphitheater, park, sclupture, Sports Field, Skate Park, Playground and Visitor Parking. This zone is dominated by open spaces such as parks and sports fields, which can be accessed publicly by visitors. Parking is placed in front of the site to facilitate vehicle access when entering the object. there also a jogging track and sclupture in the middle of the park. The amphitheater at the back end of the site with the orientation of the spectator facing towards the site.

b) Semi-Public Zone

The Semi-Public Zone consists of a product exhibition venue, artistic and cultural creativity development and musholla. Semi-public zones are used as a place to develop artistic and cultural creativity with special visitors to practice the arts and culture of Mojokerto City, and product exhibitions. The art and cultural creativity development is located in a row of other function buildings, used as a place to practice the arts and culture of Mojokerto City and accessed by special visitors. Then, Product exhibition venue are adjacent to the place of artistic and cultural creativity.

c) Private Zone

The last zone is Private zones consist of the management office and utility place. Private zones are reserved for offices and utilities that can only be accessed by managers. The management office is in another series of buildings, and is located at the end of the site because it is private. The place to stop and the landfills at the end of the site, far from the other buildings and placement in accordance with the division of the zone of sanga mandala.

C. Form Concept

The basic form is taken from the blockplan for each building and site analysis. the development of the shape is influenced by the formation of a joglo house and the formation of a bajang ratu temple.

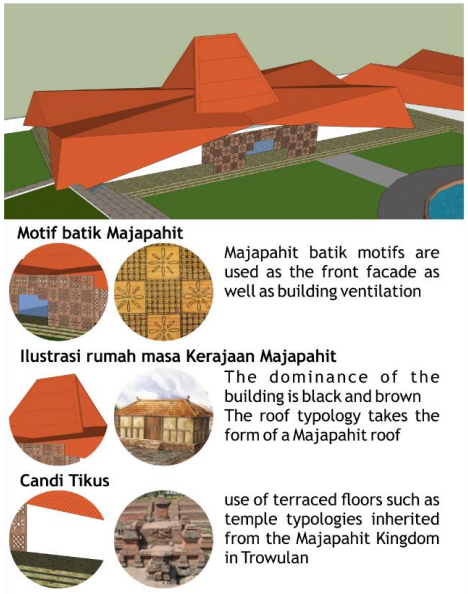

Fig. 42. Form Concept
(Analysis, 2018)

D. Space Concept

Space concept is the design idea for the space in the site.

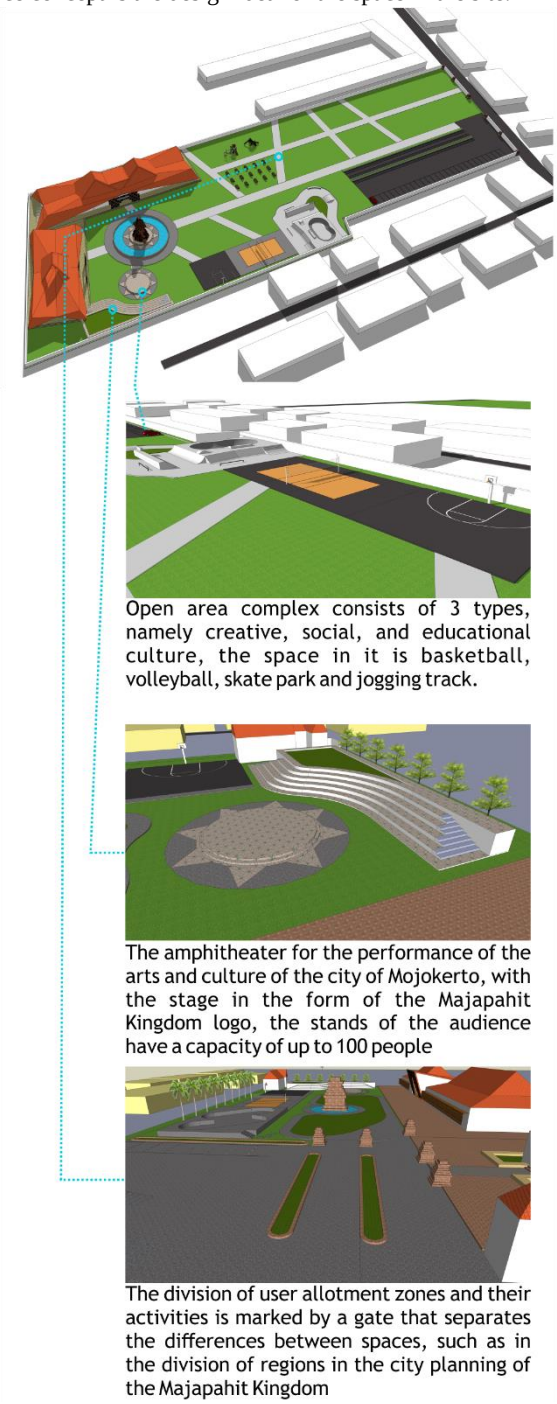

Fig. 43. Space Concept
(Analysis, 2018)

VI. CONCLUSION

From the issue of lack of fulfillment of the needs of the public space facilities in Mojokerto City, the Mojokerto Hybrid Community Center Design tried to provide some design concepts. The concepts produced are site concepts, space concepts and form concepts. The site concept provides solutions related to the arrangement and division of space zones in the need for green open spaces and cultural product development facilities in the city of Mojokerto. The concept of space describes the provision of space in more detail in each zone. The concept of form answers the issue of the adoption of local architecture, namely the majapahit architecture applied to objects. Overall the concept from Mojokerto Hybrid Community Center tries to provide a public shared space that accommodates social, cultural-educative and recreational functions.

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