Design Criteria of Pedestrian Mall in the Conservation Area in Surabaya

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Abstract— Colonial buildings as cultural heritage represents the architectural history and early city development of Surabaya to become an urban city with dynamic social and rapid economic development as a trading city. Conservation of colonial buildings in an environment with high historical value may attract visitors to take a walk and enjoying the heritage atmosphere which represented from the past through the song "Rek Ayo Rek". This paper formulates the design criteria of commercial building which is 'Pedestrian Mall' that reuse colonial building and presenting shopping activities as an expansion of social interaction. The research was conducted, among others, through observations of the heritage environment, colonial buildings, and community activities-behavior within Balai Pemuda Surabaya to formulate design criteria regarding building styles unto social system. The results indicate that the reuse of colonial building requires a design that responds to the heritage environment. The environment is studied from social, architectural, and cultural aspects to formulate design criteria.

Keywords— Place, Responsive, Reuse, Social Interaction.

I. INTRODUCTION

Surabaya is a city with strategic geographical location which the Dutch Colonial government had established Surabaya as the main port in the East of Java Island from the colonialism era. Therefore, the Dutch government built several important buildings in Surabaya, such as government buildings, places of worship, hospitals, shops, and others. This shows that there are many colonial buildings conserved in some historical areas in Surabaya. Until now, Surabaya has become one of the cities that continues to conserve dan preserve the important colonial buildings as one of building heritage of Indonesia.

The acceleration of development can certainly threaten the existence of colonial buildings. The case of colonial buildings demolition as modern buildings is evidence of uncontrolled development and the lack of public awareness and knowledge of these heritage buildings meaning, such as Toko Nam which now only leaves the front pillar in front of Tunjungan Plaza 5. Historical buildings are valuable because it has advantages in terms of architecture and because it is an achievement of the ancestors[1]. Rodwell explained that historical places have an identity and culture where human traditions develop over time[2]. Therefore, to maintain and preserve them requires conservation. Objectively, the conservation does not only on physical aspect, but also there are other influential aspects, such social aspect.

Dutch colonial architecture in Indonesia is unique cultural phenomenon, where there is a mixture of colonial culture (European/Dutch) with Indonesian culture that does not occur anywhere else, including other former colonial countries[3]. Handinoto[4] explains this uniqueness can be observed by several styles, including Indische Empire Style, transitional architectural style, and Indo-European style. Reuse of colonial building is related to the formation of characters that are formed and able to represent the environment as an effort to respond the environment[5]. It is how the built environment has its meaning and social relations through architecture[1].

Demolition of old buildings on the other hand is justified if the condition of the building can no longer fulfill its purpose. Many owners think that demolishing building is the right choice for economic value. In fact, some of these buildings can be reused by replacing and changing some elements that are not suitable. The old buildings reuse depends on several specific factors such as the physical condition, potential for building maintenance and socio-cultural value, and spatial suitability that demands other/new functions, memory, as far as its placement in context[6].

Colonial buildings with good conservation will create pleasent view and comfort in the environment that can attract visitors. The examples can be seen in Kota Lama Semarang and Kota Tua Jakarta, which become the city's tourist destinations. Levana and Hanson[7] stated that why the community perspective keep coming to the old city is appreciative perspective. Visitors in these places enjoy the atmosphere and the beauty of the environment through walking. Walking affects the beauty where the beauty can be depicted from the buildings that pedestrians pass through[8]. Furthermore, it can be supported by building functions, with the result that people are no longer reluctant to walk but can enjoy and observe the beauty of the city.

Walking was one of habits by Surabaya people in the past, depicted with the song "*Rek Ayo Rek*" by Is Haryanto. Walking activities have been encouraged by Surabaya Government by vitalizing Tunjungan Street, the area known as Tunjungan Romansa. Since its inauguration on November 21, 2021, Tunjungan Romansa attracts many visitors by presenting various building functions (shops, restaurants, cafes) through colonial style. However, Surabaya still leaves many colonial buildings, not only on Tunjungan street.

This paper is explained the design parameters and criteria for design concept of commercial building (Pedestrian Mall). The idea formulated using Concept-based Framework[9] to generate the design criterias. This writing aimed to study the theories based on the colonial building issue. Thus, it can generate design criteria to present shopping activities as an
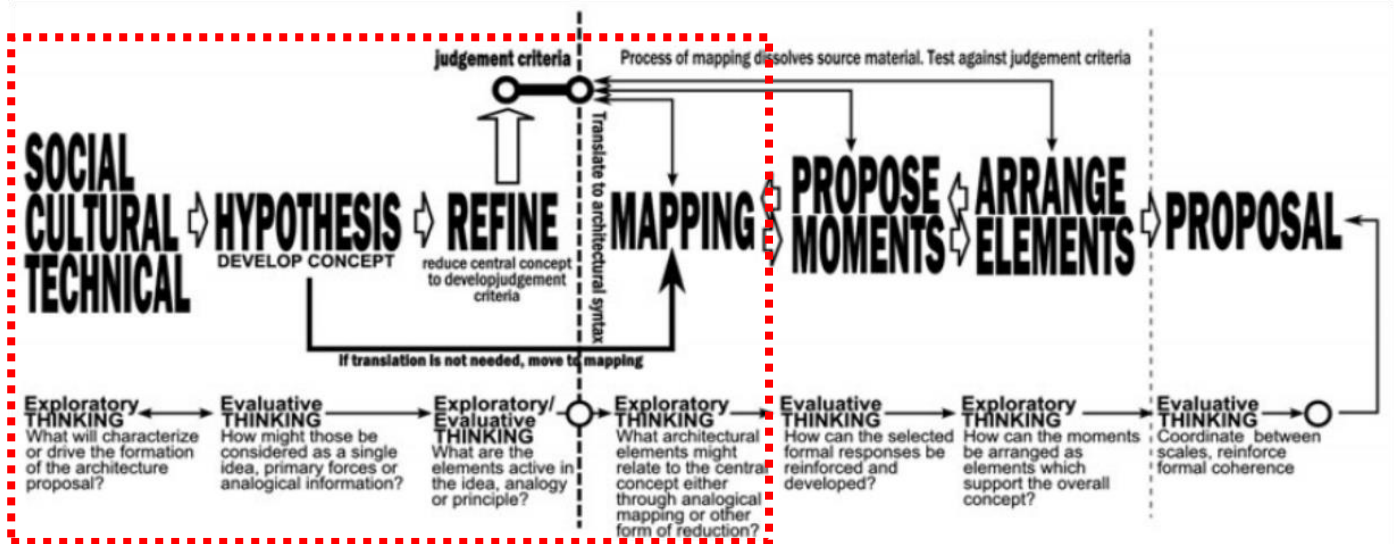
Fig. 1. Concept-based Framework. *(Source: Plowright, 2014)*

extension of social interaction through environmental and cultural values.

II. METHOD

Concept-based Framework is used to formulate design criteria of Pedestrian Mall that reuse colonial building. Plowright[9] states that Concept-based Framework is an abstract idea used to construct elements of an architectural design project. The early stage of the process starts from searching data and fact by exploring social, cultural, and technical issue. Furthermore, the formulation of hypothesis, and refine, thus generate the judgement criteria of the design. This paper presents only the initial stage of determining the design criteria, specifically in Mapping process, assisted with Responsive Environment proposed by Bentley et al.[5]. Refine process that requires domain transfer is not implemented because Pedestrian Mall concept can be directly translated to architectural syntax. For more details, the following is Figure 1 which contains chart of the Concept-based Framework.

III. RESULT AND DISCUSSION

A. Social Activities, Shopping, and Walking

Buildings that are located on pedestrian paths are very influential in psychological comfort, which is explained by J. O. Simonds[10]. The comfort shows the use of space in harmony both in terms of shape, texture, color, smell, sound, sound, light, etc. The relationship in question can be harmony, regularity, dynamic, and diversity that support each other to create space for social activities that occur. Hakim and Utomo[8] describe several factors that affect comfort, including circulation, climate, accessibility, facility, safety, cleanness, and beauty.

One of these seven factors plays a role in the description of a place from the observer's point of view and includes psychological comfort, namely beauty. Beauty must be maintained in its arrangement even though there are various activities. Beauty includes matters of inner satisfaction and the human senses. Improving the quality of space through beauty

becomes a guideline for designers as an identity that is presented so that it will be easy to remember and recognize. It can be said that the identity of space is obtained through the meaning of a place that has a direct relationship with its success.

Shopping centers or known as malls are part of the daily activities of urban communities and become one of the urban public spaces with various functions. Spatial quality resulting from malls has always served three vital functions, such as as a meeting place, as a shopping area, and also as a liaison between urban spaces. Pedestrian malls create space to form social network because they provide opportunities to interact and oversee social activities. Gehl[11] explains that this can be done by providing space for interaction at a simple level that creates opportunities for interaction at other stages. Pedestrian Malls provide a place to maintain stable interactions and provide a source of information for the social world as well as provide a place of inspiration and stimulation.

Fig. 2. Pedestrian at Tunjungan Street.

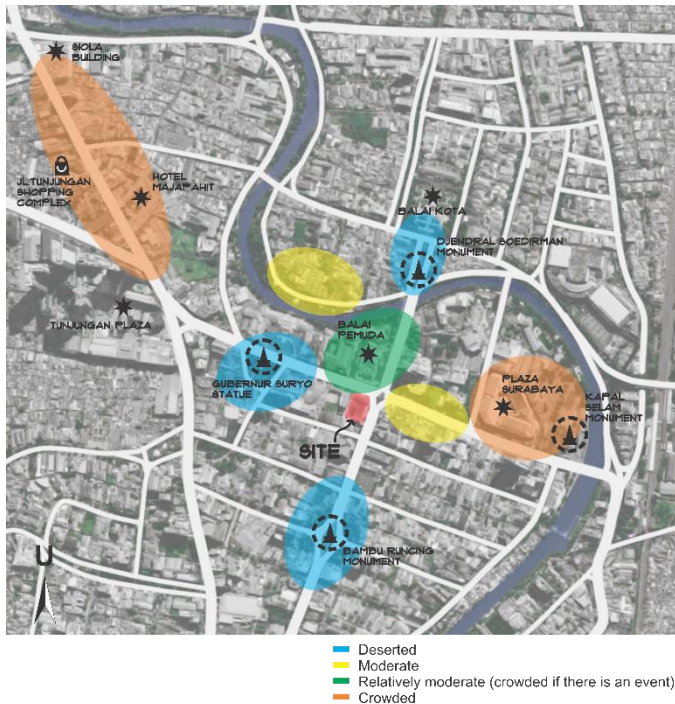Fig. 3. Pedestrian at Plaza Surabaya.

Fig. 4. Pedestrian Crowd Levels.

Social analysis is studied to understand the situation objectively. This examines several aspects, including circulation, activity, and how it is described. Some of the places were Balai Pemuda area, Plaza Surabaya, Bambu Runcing Monument, Jendral Soedirman Monument, Apsari Park, and Tunjungan Street. Figure 4 explains that the busiest pedestrians are found on Tunjungan Street and Plaza Surabaya as shown in Figure 2 and Figure 3. Both streets corridor provides functions to cover various activities, from shopping to eating. Crowd levels are being found at the North-West of Balai Pemuda (Prestasi Park) and at the East of Balai Pemuda (Pemuda Street) where these areas are related to the crowds in Balai Pemuda. Balai Pemuda itself is classified as a moderate level but significantly increase when observed on holidays and on certain events. Other areas with low levels of crowds are shown at Apsari Park and Bambu Runcing Monument.

Fig. 5. Design Object (ex-Indra Cinema)

The design object is ex-Indra Cinema located opposite Balai Pemuda, precisely at the intersection between Gubernur Suryo

Street and Jendral Sudirman Street. The building shows lack of social interaction unlike Balai Pemuda despite its opposite location. Visitors prefer in the Balai Pemuda area because there are no commercial buildings even though both buildings have colonial style. Wong[6] explains that the utilization of old buildings depends on several specific factors, such as the condition, the potential, spatial suitability that demands other/new functions, memory, and its placement in context. Based on Wong, ex-Indra Cinema considered to have the potential to make lively environment with heritage atmosphere (Figure 5).

B. Character of Surabaya

Frederick[12] described the natives of Surabaya are as free-thinking and quick to defend themselves. These characters reflect people who have a strong desire, always want to feel free, tend to react strongly when pressured, and are hardworking individuals. In essence, the people of Surabaya have a populist nature, and this cannot be separated from life during the colonial period and can be said to be a typical urban proletariat from the colonial period[12]. They also adhere to social principles that uphold the individual's right to speak frankly between friends, the desire to be neighbors, and minimize individualism. The people of Surabaya also uphold equality which is reflected in the rough Javanese language used in everyday life.

Along with the culture of the developing community, it cannot be separated from the song "*Rek Ayo Rek*" which became kind of anthem for Surabaya. The song is often played during big events in connection with the city. The song describes an important role on Tunjungan Street, not only due to economic factors, but also because of its historical value. There is also Majapahit Hotel which witnessed the history of Indonesia with the tearing of the Dutch flag incident on September 18, 1945. In addition, The Third Preparatory Committee of Habitat III (PrepCom3) UN Habitat, which was held on July 25-27, 2016, also catapulted the name Tunjungan Street to international scene by restoring colonial styles covered by shop signage. This is the beginning of the development of Jl. Tunjungan which until now is crowded with people who interact on the street.

The intro of the song is an invitation to take a walk on Tunjungan Street with the intention to enjoy the atmosphere of the city while interacting with one another. It is clarified by "*golek kenalan cah ayu*" which means "get acquainted with beautiful girl". The chorus describes the line of shops with social interactions that are presented through it. The line of shops is described as the bustling conditions which in addition to shops, there are food vendors such as rujak cingur (Surabaya indigenous food). Although not shopping, the song describes walk that can be enjoyed with streets set against colonial buildings. There are interactions generated through buying and selling activities untill get acquainted with one another.

C. Responsive Environment

Consider the discussion of colonial buildings and the song "*Rek Ayo Rek*", clearly indicates that human has a transactional nature with place. Relph[13] explains that place related to

physical, activities and meanings. These three aspects are the focus in this writing, thus Responsive Environment[5] is chosen to study these aspects and to assist in the depiction of place. Responsive Environment has several similarities to the basic aspects of legibility developed by Lynch[14]. Responsive Environment focuses on how to responds the environment that can affect in design. Exploration on how the environment described is needed to undestranding the user's needs[15]. This will result in Pedestrian Mall design that responds environmentally. Bentley et al.[5] develop guidelines that consists of permeability, variety, legibility, robustness, visual appropriateness, richness, and personalization.

Permeability examines the ease of accessibility in the environment. Accessibility depends on path placement and object orientation. There are two types of permeability, namely physical permeability (e.g., pathway) and visual permeability. Visual permeability relates to accessibility described visually. If it is not described obviously, the permeability allows to not be used. This also influenced by the nature of space, such as private or public access.

Variety is characterized as the quality or condition of being extraordinary or divers, the shortfall of consistency or repetitiveness. It refers to the range of activities, users, and building forms that shaped the environment. This diversity creates various meanings and can affect in the various options that are available. The outcome provides features on the user's path of movement.

Legibility is the quality that makes a place graspable or being clear enough to be described, understood, and read. It describes how easy for users to build a mental map of the environment. It also depends on the environment form and the activities within it. Lynch[14] explain these aspects through five readabilities, namely path, nodes, landmarks, districts, and edges. Legibility can be understood at two levels, such as physical layout and activity patterns

Robustness explores how space can be used for multiple purposes. A robust environment has a continual possibility for reinterpretation, reenactment, and revreation. It also affected by the user's time. In this case also channelling and controlling movement. Spaces that can be used for different purposes offer the users more choices than places where design limits them to a single fixed use.

Visual appropriateness is how the provisions of cues can support variety, robustness, and legibility. It is vital if people are to correctly interpret how to make appropriate use of an environment. This is when buildings in the environment are so similar in color and appearance that it is difficul to differentiate them. Visual Appropriateness is significant in the places which are most likely to be visited by people from a wider range and variety of backgrounds, particularly when the appearance cannot be altered but the users themselves.

Richness is the interesting quality of something that has a lot of different features or aspect. It relates to sensory experiences, such as sight, smell, touch, and sound. Richness also affects the user's emotional experience with the place. Users are aware of the environment, in visual sense, it is important to consider how long something in the environment

can be seen and from where something can be seen (e.g., building façade).

Personalization clarifies the gist of designing to meet user's requirements. It is an individual's ability to adapt with environment or the ability to costumise it. This influence can be calssified to large-scale or small-scale personalization. Small-scale personalization can include moving chairs in a space, while lage-scale personalization is the ability to change the appearance of a building.

TABLE I. Points of Observation Related to Responsive Environment.

RESPONSIVE ENVIRONMENT	Permeability	• Circulation • Ease of Access
	Variety	• Variegated Functions • Variegated Activities
	Legibility	• Path • Edge • Landmark • District • Node
	Robustness	• Space Use • Points of Access
	Visual Appropriateness	• Visual Cues • Similarity • Continuity • Dominance
	Richness	• Visual Richness (Contrast) • Non-Visual Richness
	Personalization	• Public Participation

Source: Bentley et al. (1985)

Aside from studying urban aspect, Responsive Environment also tied to the architectural dimension which refers to buildings and the built environment[16]. The proccess is used as a tool to understand each of the key elements that contribute to environmentally responsive design and decide what to achieve and maintain. The seven variables are correlated and interrelated. When the design building can serve the users, the environment considered as responsive.

Ideally, the qualities described should be considered in design process and how the design relates with outdoor space (environment)[17]. Understanding form and space is needed as the result of social interaction. It requires observation and combination of design ideas with patterns that are formed from the environment by itself. In addition, it also evaluates opportunities or potential for users with existing buildings and public spaces. Therefore, exploration of the environment is conducted, one of the steps was by identifying the legibility aspect as introduced by Lynch[14]. The result will create sustainability and continuity between the design and the heritage environment.

D. Respond to Heritage Context

Responsive architecture is the embodiment of an object or design that has the function of responding to something related to the object or design. This approach shows that there is important relationship between social and the environment. Each formation will affect user choices or actions on several levels. These levels are the key in making a place responsive which aims to demonstrate the quality that can be achieved in designing a building and outdoor space. The seven responsive environment variables can be categorized into two aspects,

including environmental aspects and architectural aspects. Environmental aspect are variables that are obtained and has implications for the area or "large-scale" variables. While architectural aspect regulates how the design can respond to the environmental context in its formal aspects.

TABLE II. Responsive Environment Variables.

Environmental Aspects	Architectural Aspects
• *Permeability*	• *Visual Appropriateness*
• *Legibility*	• *Richness*
• *Variety*	• *Personalisation*
• *Robustness*	

Source: Bentley et al. (1985)

Permeability

Locations with a high level of accessibility are places that have a variety of access options. In this case, permeability is the number of alternative circulations in an environment. Like a good circulation is a circulation that is continuous and interconnected with other circulations, not a circulation that is not continuous/dead end (*cul-de-sac*) that stops human movement.
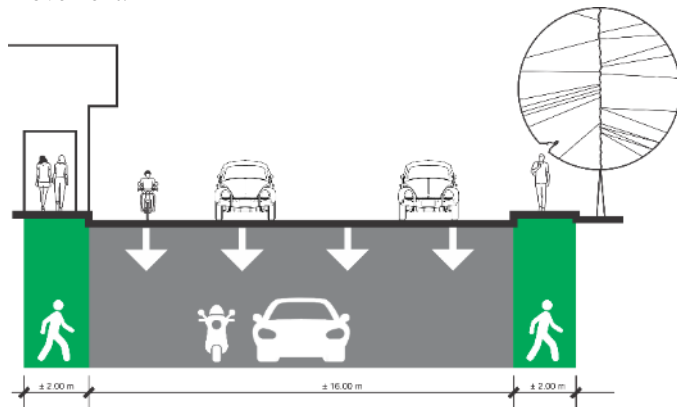

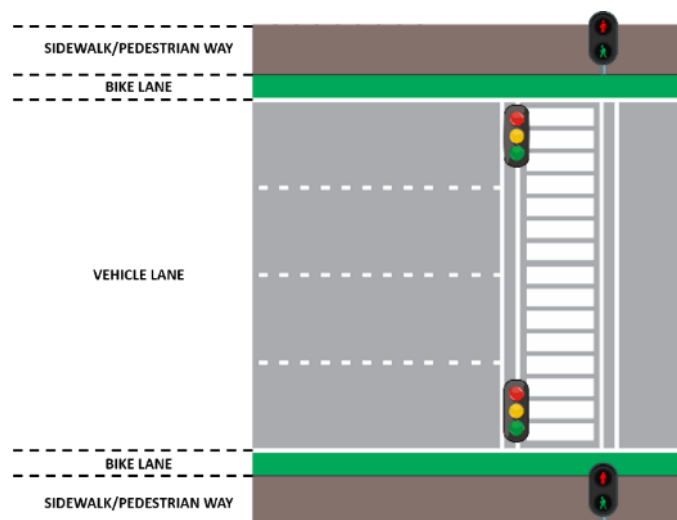Fig. 6. Gubernur Suryo Street Section.

Fig. 7. Crosswalk Lights Addition on Gubernur Suryo Street.

Figure 6 indicates that the road for vehicles consists of four lanes with a total width of ±16 meters with bicycle lanes on both sides. The street is a one-way route. In addition, it is also equipped with a pedestrian way that has ± 2 meters width. This allows pedestrian accessibility from the site to the Siola Building, even to Balai Kota and Plaza Surabaya. The convenience of crossing from Balai Pemuda to site can be added with crosswalk light. Its function is to regulate vehicles and provide security in crossing by visitors. Figure 7 describes the added a traffic light on the side of the road, considering Gubernur Suryo Street has high traffic density.

Variety

Analysis of variety is studied by examining the two street corridors, namely Gubernur Suryo Street and Jendral Sudirman Street. Significant differences are shown in the two street corridors. Gubernur Suryo Street corridor has buildings with a variety of functions including restaurants, schools, and government buildings. So that the activities presented are also diverse. This is not shown in the corridor of Jl. General Sudirman, which is dominated by offices.

Fig. 8. Classification of Buildings Function.

Legibility

Legibility of the location is very important in facilitating human accessibility. With this legibility, humans can enjoy the beauty of nature and the existing architecture. Legibility can be helped by the existence of elements that can clarify or become a reference in the search for information. Factors that can clarify information which are also included in city elements that can reflect the image and form city network (node, path, edge, district, landmark)[14].

The location is in Genteng District which is divided into several areas through the Kalimas River boundary. In Balai Pemuda area, similar functions can be identified through the allotment map of Surabaya. The area is in international/national service scale designation. The service scale is a trading sub-zone with the code K-4 with the allotment of space that is functioned for the development groups of trade or service activities including private offices that supports the city's function as a trading city.
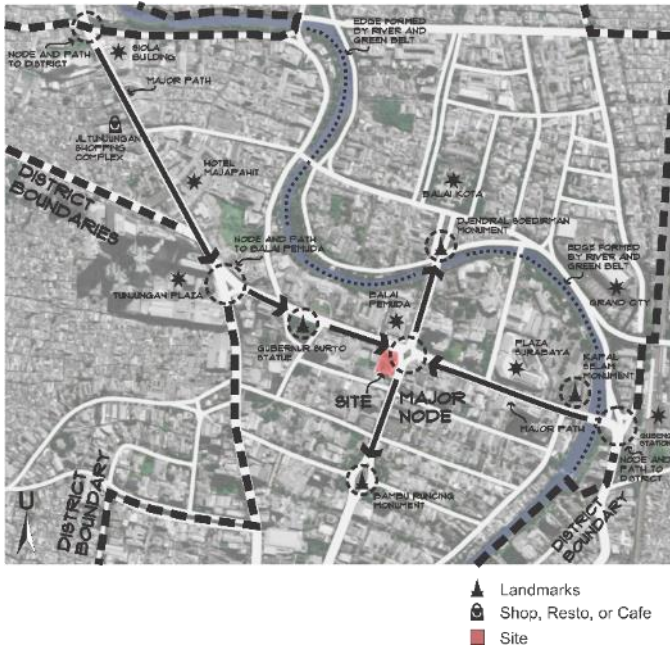
Fig. 9. Identification of Legibility.

By formulating a design that focuses on pedestrian, new social interaction will be formed at the nodes that connect the design with Balai Pemuda. The formation of this new social interaction allows the existing social interaction to expand. This expansion can occur in two street corridors, where the design facing Gubernur Suryo Street corridor is the active façade and the main attractor for pedestrian from Balai Pemuda. Furthermore, this new social interaction can affect on Jendral Sudirman Street where there is Bambu Runcing Monument as another attractor (landmark) for pedestrian.

Robustness

Robustness is equally important in both indoor and outdoor designs, but the design implications for buildings are different from outside. Activities that occur in open spaces (outdoors) are strongly influenced by what is produced by the surrounding buildings. Robustness also governs the active use of the building's facade. This plays a role in what functions and activities that want to show to the public, because the building faces two different sides of the road.
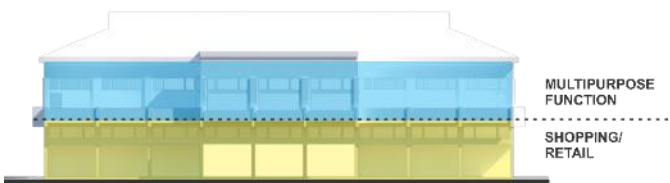

Fig. 10. Robustness on Existing Building.

The facade facing the side of Gubernur Suryo Street can be displayed with two different activities. Where on the ground floor of the building that interacts directly with the people who pass through the building is functioned as retail or shopping. This is intended so that the retail can attract visitors to the spaces in the building. The activities for the second floor consider the public's memory of the building. The building that

used to function as a cinema building on the second floor, will be used for multipurpose room that can be used for various activities, Such as exhibitions, art performances, meetings, etc.

Visual Appropriateness

Number of buildings in an environment can form an impression of the area that comes from facade of the existing buildings. The shape of the mass or the facade of buildings is very influential on human interpretation in the area where the interpretation affects the character and quality. Visual appropriateness is created from legibility of form, function, and building ornaments that form a characteristic that creates continuity.

Observations indicates that the surrounding buildings are dominated by modern buildings. However, on the north side of the site there is a cultural heritage building which is Balai Pemuda Surabaya. The cultural heritage building looks submerged surrounded by other modern buildings. The design must maintain the colonial style in order to support visual quality produced by colonial buildings.
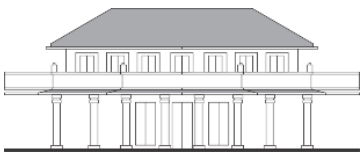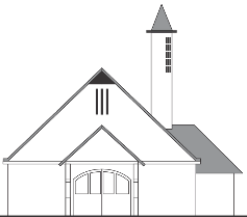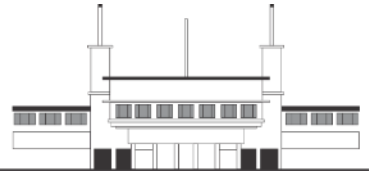

Fig. 11. Environment View from Out to In.

Fig. 12. Environment View from In to Out.

Richness

The step is to study the elements and their relationship to the environment. The effect is on the styles that exist around the site, thus it can be determined what kind of visual contrast that

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want to present. Furthermore, it is studied about the viewing distance, number, and time of observers. That way, richness will be achieved. In this stage, typological method is used to studies colonial buildings in the environment. The colonial buildings discussed shown in Table III.

TABLE III. Comparative Analysis of Colonial Buildings Elevation.

Buildings	Elevation
Balai Pemuda	
Grahadi Building	
Balai Kota (Town Hall)	
Maranatha Chatolic Church	
Majapahit Hotel	

These buildings have their own characteristics with their own colonial architectural style. However, these buildings have similarities in the symmetrical aspect. Symmetrical forms arise through the facade of the building, the layout of the building, to the floor plan of the building. The symmetrical shape provides balance by creating an entrance on its axis line. In addition, there are three buildings that use schildak roofs. Unlike the Majapahit Hotel, which reflects the influence of new architectural styles such as art deco. Another thing that has something in common is the use of towers.

Personalization

Public participation can increase and achieve a responsive environment in which participation for some parties must be forced to accept the decisions of others in their group. It is therefore very important to create conditions that allow each

user to personalize their environment. This way can achieve satisfaction and create the characteristics, footprints, and values of each. Personalization will also clarify the pattern of activity in the community or place.
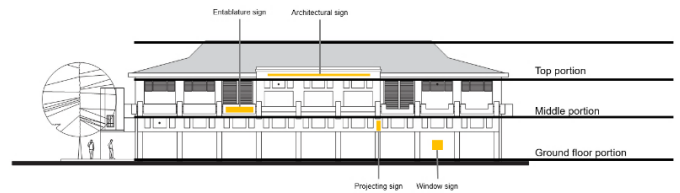

Fig. 13. Signage Application on Existing Building.

Personalization can be done with signage usage, considering the function of the building that will be used as a shopping mall. Colonial building can be divided into three parts where the division includes a portion or part of the view. The bottom part of the building can be used as the main entrance. These sections can be personalized, including window signs, building address signs, and entablature signs. The middle part is the second or third floor of the building. Personalization can be done including window sign (for 2nd floor), and projecting sign. The last is the top of the building which is the very top. This section can be personalized, such as installing architectural signs.

E. Hypothesis: Shopping as an Expansion of Social Interaction

Based on the "Pedestrian Mall" concept and the issue that have been explained, this writing proposes to reuse colonial building with shopping activities as an expansion of social interaction. To maintain and present a local identity (heritage and colonial style), it is necessary to understand how the design context is depicted. The purpose is the design stays in line with the historical environment and can respond through it. Responsive Environment[5] is used to understand and respond how the environment is designed in a wider perspective. Thus, not only in the context of the buildings, but also how activities related to social interaction in the environment to understand the integration between the building and the environment and vice versa.

The concept of a pedestrian mall in this paper is not designing the entire street corridor but designing the old building of ex-Indra Cinema. The reuse is to presenting design that able to expand social interaction in the street corridor where ex-Indra Cinema building is located. The goal is to provide pedestrian visibility and accessibility so that Balai Pemuda Surabaya as a cultural heritage building that attracts the main attention have connectivity with the design. Therefore, visitors not only interact in Balai Pemuda area, but also to the design as an attractor for Gubernur Suryo Street and Jendral Sudirman Street. Similar to The Cap at Union Station, Ohio designed by David Meleca[18].

F. Judgement Criteria

Based on the theoretical studies, general design criteria were obtained. The criterion is to present architecture as a representation of the cognitive, affective, and conative dimensions in heritage context. Therefore, the judgement

criteria can be generated following the design concept, including:

- Creating architecture that presents habitus and activities of the past in the present.
- Creating architecture that presents shopping as an expansion of social interaction.
- Creating architecture that able to respond the environment with high historical value through reused of old buildings.

IV. CONCLUSSION

Issues explored regarding the reuse of colonial building (ex-Indra Cinema) indicates that there is existing social interaction in Balai Pemuda area. Ex-Indra Cinema, which is located opposite from Balai Pemuda has the potential to expand this social interaction. Thus, Responsive Environment is used to study the design environment. The result obtained from the seven Responsive Environment variables are used to fulfill user needs in the design criteria.

Environmental studies conducted with reponsive environment guidelines set criteria on how the design can respond to the environment. In permeabity, accessibility from accros the site requires convenience in crossing roads, considering the social interaction at Balai Pemuda Surabaya. Variety indicates that commercial building function (Pedestrian Mall) considered to support social interaction by presenting shopping activities. Therefore, the street corridor where design object is located able to generates social interaction.

In Legibility, indicated that the social interaction presented in the design will affect the nearest landmark. The design facing two street corridors will affect the distribution of pedestrian. Robustness sets the active use of the building's façade. With the public space formed by the pedestrian mall, the facade facing Gubernur Suryo Street has two functions. the gorund floor is for retail and shopping, while the second floor is used for multipurpose room.

Visual appropriateness indicates that the environment has strong colonial expression. The expression (colonial style) must be maintained in its design. Exploration executes in richness through typological studies obtained elements that forms colonial style. In personalization, design of commercial building (Pedestrian Mall) requires the use of signage. Signage serves as marker or provides information about retail to attract visitors.

Concept-based Framework propose three judgement criterias of Pedestrian Mall design in heritage environment. The idea of Pedestrian Mall design through Responsive Environment provides a clearer way of looking for specific features within an environment and how they impact upon the heritage place, in particular to expand social interaction in Balai Pemuda Surabaya. It clearly does not cover all aspects of the place but does provide a useful tool upon which expression to be maintained and what function the design should provide. Therefore, the expansion of social interaction will be in accordance with the needs and activities through Responsive Environment.

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