

## The Walkability Concept in *Jurnatan* as A Buffer Area of *Kota Lama* Semarang

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**Abstract.** *Jurnatan* area is a trading and office hub in Semarang City which was built in the 1970s. Furthermore, the area is directly adjacent to Semarang's premier cultural heritage area, namely *Kota Lama*. Since the economic center shifted to the Simpang Lima area in the 1980s, *Jurnatan* area lost its chief appeal, and was gradually abandoned. This heavily impacted the area, resulting in abandoned complexes, declining trade, and its current status as a 'no man's land'. This study aims to find design concepts to revitalize the area, and revitalize its function as an area which supports the area of *Kota Lama* Semarang, in its ambition to become a World Heritage site. The area planning forwards the concept of walkability, which puts pedestrian needs ahead of vehicles. Besides being an important part of the Semarang City Government's plan to revitalize the *Kota Lama*, this concept is suitable for reducing the density of vehicles both in the cultural heritage area and the transition area of shopping complex.

Keywords: *Jurnatan*, *Kota Lama Semarang*, *Walkability*, *Buffer Area*, *World Heritage*

### 1. Introduction

The area of *Kota Lama* Semarang is a site of cultural heritage within City of Semarang, which is still in the submission process of the World Heritage program. World Heritage is a United Nations program which aims to preserve certain cultural and natural sites which are deemed to be significant to humanity (Giovine, 2009).

The conferment of World Heritage status to the *Kota Lama* will doubtless attract local and foreign tourists. However, there remain facilities and infrastructure in Semarang's *Kota Lama* area which are inadequate to support the needs of tourists.

*Jurnatan* area is an area located between the residential area and the cultural heritage area of the City of Semarang, the "*Kota Lama*" (see Figure 1). This is among the reasons why *Jurnatan* area needs to be redesigned. In the future, *Jurnatan* area has the potential to become a buffer zone, where the area is designed to be able to sustain the existence of protected areas or areas of cultural heritage or tourism (Muryono, 2008).

*Jurnatan* area is one of the gateways leading to the Semarang *Kota Lama* cultural heritage area, this is due to direct access from *Jurnatan* area towards Semarang's *Kota Lama* landmark, Blenduk Church (see Figure 1).

*Jurnatan* area, which is adjacent to the historical area of the *Kota Lama*, will be designed to be able to the activities needed to develop the tourism potential of the *Kota Lama*.

A unit of land/area may be conferred a buffer function if the area meets several general criteria, namely the physical condition of the land, which should for economic cultivation, the location of the area, which should be economically easy to develop as a buffer zone, and the ecological/environmental aspect of the area, namely that development of the area into a buffer zone should not harm the environment (Rukmana, Priyono, & Jumadi, 2012).

In order for Journatan area to become a buffer zone for the Kota Lama area, activities and facilities that are centered on the Kota Lama area should be distributed to the surrounding area, in this case to Journatan area, channeled through the transitional space connecting these two regions.

A current issue in urban design is walkability. Walkability refers to a pedestrian-friendly design concept. Walkability is when an urban environment/area or settlement that encourages people to walk by providing comfortable and safe pedestrian paths (Southworth, *Designing the Walkable City*, 2005).

Meanwhile, the mix-use concept is a concept in which the design of the area considers the need for space, function, the environment, and the use of building materials (Alfian, Rengkung, & Syafriny, 2017). The use of the mix-used concept is part of a broader strategy for sustainable regional development (Hoppenbrouwer & Louw, 2005).

The concept of mix-use has begun to be widely applied to cities which aim to make it easy for denizens to access given areas. Mix-use integrates various functions within a building or within an area, where a variety of activities and functions (offices, shopping, residences, cafes) are threaded within a single area or building (Narvaez & Penn, 2016).

The concept of urban walkability is one of the design revolutions in urban planning, aiming to reduce problems in an area related to public health, climate change, economic productivity and social justice (Dovey & Pafka, 2019). The application of the walkability concept has been proven to have a large positive influence on activity conducted in the area (Ellis, Hunter, Tully, Donnelly, Kelleher, & Kee, 2015), such as supporting and encouraging denizens to walk by providing pedestrians comfort and safety, thereby reducing pollution (Stevenson, et al., 2016), and connecting people with various destinations while offering a visually-stimulating traveling route (Southworth, *Designing the walkable city*, 2005).

The purpose of writing this paper is to formulate a design concept of Journatan area so that it may function more optimally as an Kota Lama area with an emphasis on walkability, supporting the Kota Lama's bid to become a World Heritage area. While in the 1980s, Journatan area was conceived as the center of trade and office complexes in the City of Semarang, the proposed redesign will apply the concept of walkability and mix-use. The ultimate goal of the redesign is to turn Journatan area into a supporting area for the tourism facilities in Semarang's Kota Lama.

## **2. Methods**

The descriptive method was used in the preparation of the current study entitled "The Concept of Walkability Design in the Kota Lama's Buffer Zone Towards World Heritage City". Descriptive research attempts to describe a phenomenon by examining it in conformity to a strict, careful, and regular method, which prioritizes objectivity (Furchan, 2004). This study analyzes the weaknesses and strengths of Journatan area, its location and sites, building mass, access and circulation, and function and architecture of its buildings. The descriptive method is employed by conducting literature studies, observational studies, interviews, and analysis. Furthermore, a literature review of the design concept, namely walkability and mix-use in building functions and open spaces in Journatan area, was conducted.

## **3. Discussion**

### **3.1. Kota Lama's Buffer Area**

According to the official WHC UNESCO website, Kota Lama Semarang is currently included in the Tentative List of World Heritage sites, and will subsequently be evaluated and assessed for eligibility to become a World Heritage in 2020.

In the application for the Kota Lama Semarang to become a World Heritage site, 2 criteria were mentioned to justify its status. The proposal first espouses Criterion ii, which states that the City of Semarang represents a special example of the multi-cultural Trade City in Southeast Asia, which was formed from the trading activities of the Dutch colonial power, along with Javanese, Malay, Chinese, and Arabic peoples, for nearly 350 years, each of which left a historical trail in the form of architectural works, city forms, and technology, which was the crossing point of human values in Asia at the beginning of the 19th century. The other criteria which was proposed in the proposal was Criterion iv, namely that the Kota Lama Semarang reflects a mixture of cultural influences, which created unique architectural, cultural and urban works, the mix of which is unparalleled elsewhere in Southeast Asia (Prabowo & Harsritanto, 2018).

The buffer zone/area plays a very important role for the preservation and conservation area as a to reduce population pressure on the cultural heritage area by combining the interests of conservation, tourism, and the economy of the surrounding community. The function of a buffer zone/region can be realized optimally by managing the use of environmental aspects, realizing economic value, and employing community-based methods of land conservation, through the rehabilitation of critical land using a community forest systems, or agroforestry (Lalatjantan, 2017).

The development and management model is based on the ecological, economic and socio-cultural aspects of the communities around the area, and takes the form of dividing the buffer area into a number of zones. Buffer area development is an important part of integrated regional development. Furthermore, the buffer zone is an important area to support neighboring conservation areas and may be managed to maintain sustainability (Bismark, 2004).

In establishing and managing a buffer zone, the conservation area must be based on three interrelated aspects, namely ecological, economic, and socio-cultural aspects of the community, so that the buffer zone has economic value and is consequently able to improve the standard of living and the perception of the community in maintaining the integrity of the conservation area. Therefore the development of conservation areas, buffer zones, and the community's economy has a reciprocal relationship that must be beneficial.

There are various spatial patterns and arrangements for buffer zones, all of which follow the same principle, but are applied under very different conditions (ecology, politics, economy, etc.). Therefore, a wide diversity of options must be considered in the criteria of creation and management. There are five aspects commonly considered in their creations. These are (Biodiversity, 2015):

- 1) Size: determined based on factors such as the purpose of creating a buffer zone, land availability, traditional land use systems, threats and opportunities.
- 2) Ecology: buffer zones vary depending on their focus on conservation of landscapes, habitats and/or species, each requiring a different approach to its creation.
- 3) Economy: this involves valuations such as cost-benefit analysis, time frames and price discounts, to assess the economic feasibility of building a buffer zone.
- 4) Legislation: several international treaties and conventions (eg, Convention on Biological Diversity, World Heritage Convention) and national-level guidelines for protected areas (eg Nepal) recommend the creation of buffer zones.
- 5) Social and institutional: the creation of a buffer zone also involves considering emissions issues as traditional rights of local communities, types of development activities to minimize the negative impacts of conservation, local organizations to manage buffer zones and land.

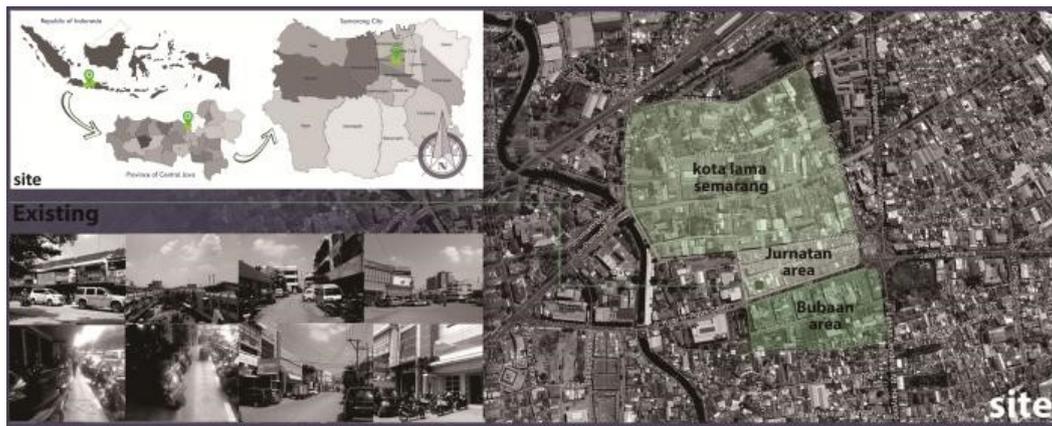


Figure 3.1. Location of the Journatan Area (Authors, 2019)

### 3.2. Present Condition of Journatan Area

The present condition of Journatan area may be seen in Figure 1. The figure shows building masses in Journatan. There are 5 masses of buildings and buildings that are already uninhabited, arid areas due to the absence of open space, along with a lack of vegetation and shade. The design process should facilitate activities and facilities which serve to attract visitors.

Present environmental/regional conditions:

- Journatan area is located between the *Kota Lama* (see figure 1) and the residential area of the city of Semarang
- In the Journatan area, many buildings are unused and are currently unowned, so they can be utilized
- Journatan area is adjacent to the Semarang's Johar Market
- Journatan area is within the immediate vicinity of Tawang Train Station
- Journatan area is passed by an arterial road, so a heavy volume of traffic is expected
- Journatan area is served by public transportation (BRT)
- Vehicle circulation, which causes a buildup of vehicles on one road.

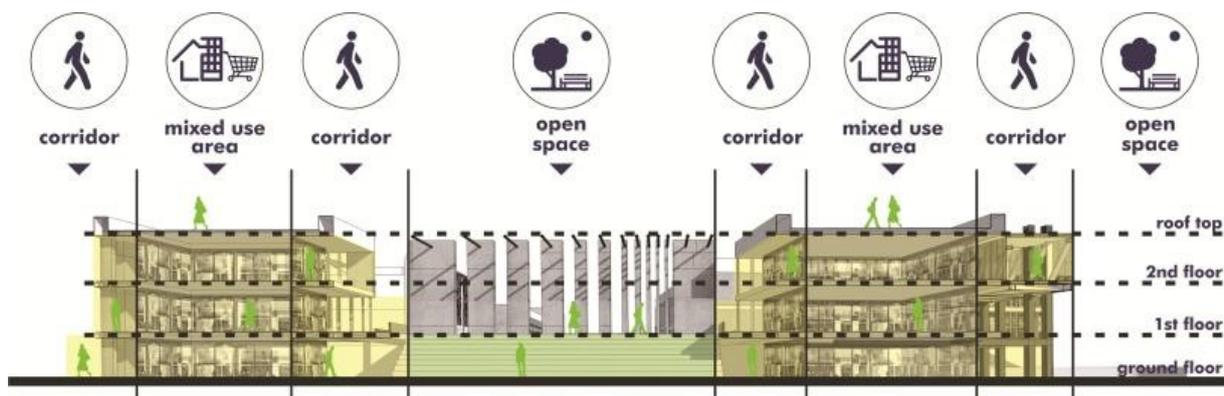


Figure 3.2. The Section of Journatan Area's Building Function (Authors, 2019)

- The concept of walkability plays an important role in the development of a modern city, including: 1) Serving as the basis for a sustainable city; 2) Serving as a driver of social interaction and activities; 3) Serving as a driver to improve mental and physical health

(Sondakh, 2017). In creating a walkable environment, the following objectives are observed:

- To provide urban structures with a walkable environment by forming compatible cities using mixed land concepts to reduce dependence on the use of private cars to travel to work facilities, retail and other public facilities.
- To ensure the creation of a walkable environment that provides access and services that can be used for all people, including those with disabilities.
- To provide access to public facilities that are interconnected by roads in a safe and pleasant manner, easily accessible by walking or cycling.
- To ensure the active use of the road by designing the front of the building facing the road, and increasing personal security through increased supervision and activity (Australia, 2007).

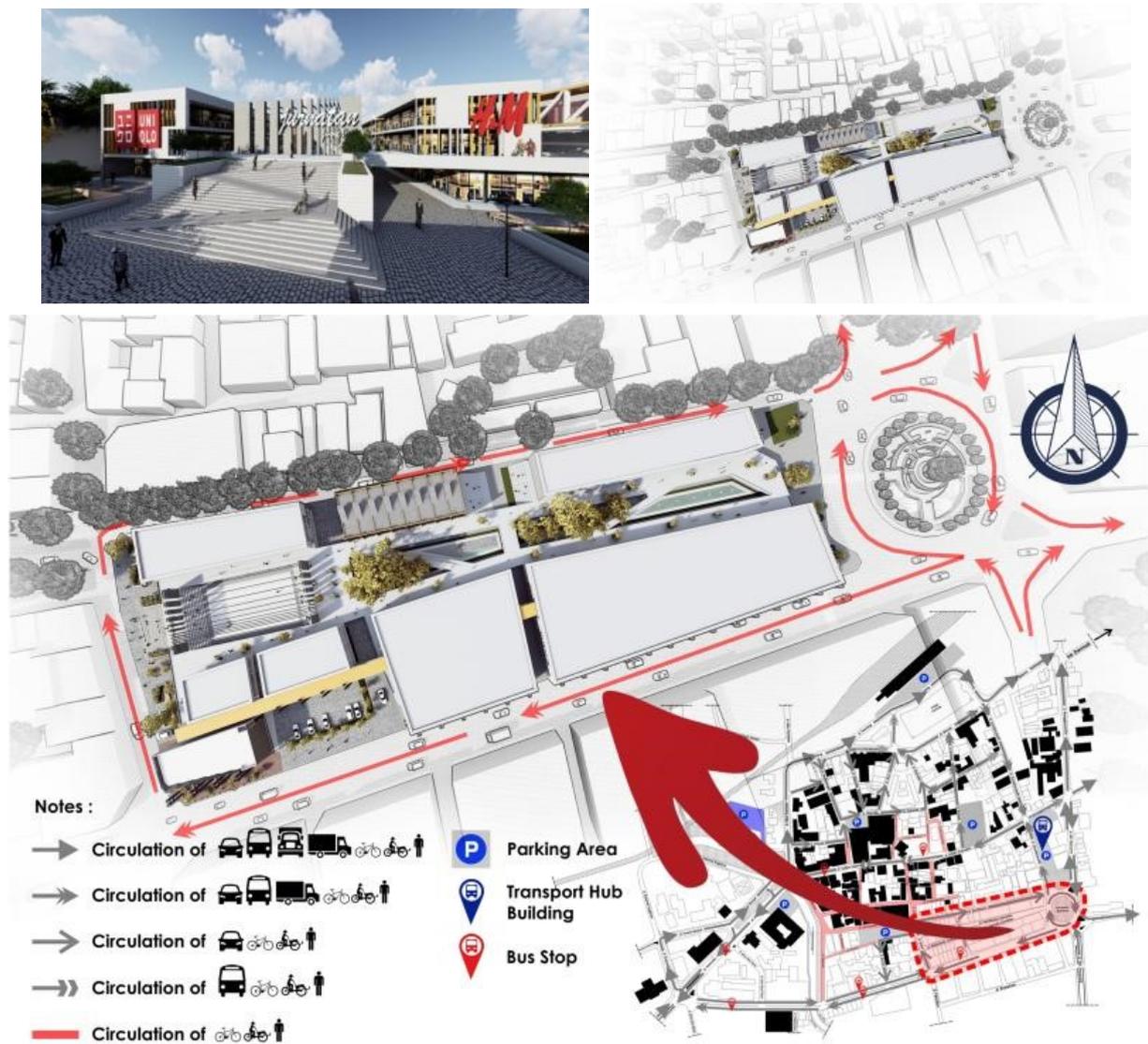


Figure 3.3. Circulation Plan for Jornatan Area (Authors, 2019)



Figure 3.4. Pedestrian way design (Authors, 2019)

### 3.3. Walkability Mixed – Used Neighborhood Concept

Jornatan area is a buffer zone for the Kota Lama is realized by designing a walkability mixed-used neighborhood concept, where an area has a compact neighborhood concept which is transit-oriented, can be traversed on foot, and combines the mix-used usage pattern, which in an area has various types of building activities and functions, including environmental schools, retail and commercial spaces, community institutions, and various types and styles of housing, which are proximate to one another (Shrivastava & Sharma, 2011). The design of Jornatan Area will have convenient and friendly pedestrian facilities, along with mix-use facilities, namely markets, street art, street food, hostels, and other events, which are situated in one area (see Figure 2).

- The market area will be divided into 2 areas, namely traditional and modern areas. The traditional areas are used for daily shopping needs, where goods are sold at low prices with the 'pasar' concept for fresh food, shopping areas with an economical market concept, bazaars for food, clothing, electronics, and antique markets. The modern area will function as a shopping, dining, and lodging area with local and international brands, in buildings connected by the lobby and a parking area.
- Open space, functioning as a green space, a pool of water (to cool the area), a parking lot, and a place to hold events (bazaars, exhibitions, live music and dance), and provided seating for visitors to relax and rest (see Figure 2).
- Connectivity, which is the integration of pedestrian routes as a whole (Sanjaya, Soedarsono, & Mudiyo, 2017). Buildings are connected using integrated corridors, along with the use of connectors in the form of ramps and stairs, and is also connected with the local pedestrian path. Access to the parking building also relies on a hallway section within buildings, complete with ramps. Many ramps are made to facilitate circulation and connectivity between buildings in an area and as access for people with disabilities (see Figure 6).



Figure 3.5. Building Connectivity Design (Authors, 2019)

## A. Access

A walkable-access concept must also pay attention to modes of access to locations, access networks that are multimodal, meaning that visitors can choose to walk, to cycle, to use a vehicle, and to use public transportation (Dovey & Pafka, 2019). Facilities that are on the track can also be accessed by seniors, people with disabilities, and people with walking aids, with adequate facilities.

The quality of pedestrian paths, since walking plays an important role in sustainable urban transportation (Setianto & Joewono, 2018). Pedestrian lane facilities which are part of the transportation services group, and are located on the edge of the road, are not well managed, and ultimately causes disruption in the functioning of the road network and transportation services (Saraswati & Priyatno, 2016). By providing pedestrian paths for pedestrians and connecting the centers of their activities with their associated activities, pedestrian paths can arguably also function as public spaces. Carr, Francis, Rivlin, & Stone (1995) revealed that public space rights have access to public space, having three main components in determining access:

### 1. Physical access

This access is directly related to the availability of access to public spaces, so that the spaces may be freely accessed at any time. There is no barrier to entry into the public space, and it should be connected to other roads for good circulation.

### 2. Visual access

Visual access is very important for people to feel a sense of freedom upon entering a room. This concept is related to whether people can see the function deeper than just outside the area. Clear visuals seem to be very important in assessing the security of a space.



Figure 3.6. Visual Void of Buildings (Authors, 2019)

### 3. Symbolic access

Symbolic access involves the presence of signs in the shape of people or design elements, showing who is accepted and not accepted in the space. In this case the design of public space in each of its elements represents who and for what purpose that space exists. This is akin to the commercial context and supporting activities. Symbolic access or visibility according to Weisman (1981), is the ability to be able to visually see an intended object. Visibility is related to the distance felt by humans. But the perceived distance is not just a dimensional/geometric distance: it involves a visual perception in which humans feel the presence or absence of obstacles to reach the intended object.

Access to Jurnatan environment, in order to attract visitors and create a welcoming 'impression' of Jurnatan area, requires there to be a significant remaking in the front area of Jurnatan area (see Figure 4). The design needs to feature as a point of interest. Circulation and parking in Jurnatan area are planned changes in circulation, mode and traffic flow. This

is done to break the gridlock, through the presence of car-free zones, only accessible by pedestrians and traditional vehicles (rickshaws and bicycles). In the car-free zones a traditional market is planned (see Figure 3).

## B. Aesthetics

Aesthetics is the science of discussing how beauty can be formed and appreciated.

### Building Height

Environmental conditions and regional development do not occur randomly, but follow certain patterns (Kojongian, Rondonuwu, & Tungka, 2016). According to Semarang City Regulation No. 5/2009 concerning Buildings, buildings should have a maximum height of 3 floors.. This 3-floor standard should be maintained; this is to maintain the uniformity of building height, and in accordance with UNESCO regulations for the area around the cultural heritage area which is applied in the *Kota Lama*, where the height of the building does not exceed the height of the *Kota Lama*'s landmarks, namely Blenduk Church.

### Material

The material used must be calculated and adjusted to the applicable rules regarding the color, texture, and material of the *Kota Lama*. Jurnatan area design, using natural stone/andesite material for circulation area, uses an environmentally-friendly material. Buildings should use white paint (monochrome).

## C. Safety and Security

The pedestrian path must be able to accommodate pedestrian safety and security by paying attention to aspects of comfort and security in its planning. This is because the pedestrian paths, will be used by many people, with many needs, and varying amounts of luggage (Organization, 2013). Comfort aspects include circulation, accessibility, the appeal of natural surroundings, climate, safety, cleanliness, and beauty (Kaliionga, Kumurur, & Sembel, 2014). The design of pedestrian paths must use non-slippery material, for example paving stones and seals as applied to pedestrian paths in Orchard Road, Singapore (Ashadi, Houtrina, & Setiawan, 2011), other alternatives are motif material with natural stone and dark colored granite or a natural stone motif granite with a matte finish, and will be supplemented with supporting elements (Rahadi, 2003) such as: lights, signs, sculptures, bollards, benches, shade plants, kiosks/shelters, canopies, clocks, and trash bins.



Figure 3.7. Pedestrian Paths Design (Authors, 2019)

## D. Comfort

The most important consideration in designing a building which facilitates many people is the extent to which it provides a comfortable environment for its inhabitants. Aspects that affect comfort include: personal factors, health and well-being, thermal comfort, indoor air quality, visual comfort, restricting noise pollution, ergonomics, and so on (Buildings, 2019). The comfort factor in designing an area where the occupants of a place feel relaxed, therefore

protection in the form of greening is required. Placement for trees in the area, affects noise, visual comfort, shade, and provides clean air to the area, including air exchange to buildings in the area. Another comfort factor is water. As an area that often suffers from tidal flooding, a retention pool is needed to handle tidal flooding. This retention pool becomes a water flow which then functions to be connected to the area as a “waterfront”. The presence of water in the area fulfills several functions as a tourist attraction, cooling the area, visual comfort, and as a function of retention ponds to cope with tidal flooding (see Figure 9).



Figure 3.8. Waterfront Schema (Authors, 2019)

Pedestrian ways will be widely used if they meet aspects of comfort, safety, and guaranteed efficiency (Sisiopikua & Akin, 2003). Pedestrians who pass through pedestrian ways have a different character, which is seen from age and gender, carrying goods while walking, and moving in groups, and other special needs (Rastogi, Thaniarasu, & Chandra, 2011). Pedestrian ways in Journatan area are designed at a human scale, and to meet the above aspects, with consideration of climatic conditions in Indonesia with a tropical climate (see figure 8).

Pedestrian activity, there are 5 (five) points, namely: 1) Pedestrian ways for pedestrians equipped with paths and ramps that are friendly to people with disabilities, 2) Street furniture (park benches, park lights, and trash cans), pedestrian facilities, 3) The material used is adapted to the conditions in the Kota Lama, this is to align with the use of natural stone and paving materials, 4) Shade, which also functions for greening and shade (ketapang trees, tamarind, tanjung and tabebuya trees), 5) Tone, harmonized with the surrounding area by selecting brown, orange-brown, gray, and green (see figure 5).

#### 4. Conclusion

The mission in this area of Journatan is to make this area attractive again, to become a new trade center and to revive Journatan. Journatan area itself has ties with the Semarang's Kota Lama area which will soon become a World Heritage area, so Journatan area which will be revived, becomes a buffer zone of the Kota Lama of Semarang, with a variety of activities and new facilities with the concept of design.

The concept of walkability and mix-use is applied in the planning of Journatan area, because the area is located between the residential area and the Kota Lama of Semarang (see Figure 1), this encourages researchers to apply the concept that can accommodate all activities that can support the surrounding area.

In Journatan Area design results, there are various types of activities, namely: markets (traditional and modern) to accommodate residents and cultural heritage for visitors who want to shop, cafes, restaurants, and lodging that can facilitate tourists. The addition of open space and vegetation as well as shade, due to the tropical climate conditions in Indonesia functions to reduce the influence of blistering heat and dust. The design of a retention pool,

because the main problem in this area is the presence of rob, to tackle the rob problem, retention pools are needed.

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## 6. References

- Alfian, N., Rengkung, J., & Syafriny, R. (2017). MIXED-USE BUILDING DI KOTA MANADO (Symbiosis Arsitektur). *Arsitektur UNSRAT* , 136- 145.
- Ashadi, Houtrina, R., & Setiawan, N. (2011). Analisa Pengaruh Elemen-Elemen Pelengkap Jalur Pedestrian Terhadap Kenyamanan Pejalan Kaki; Studi Kasus: Pedestrian Orchard Road Singapura. *Nalars*, 11(1).
- Australia, D. o. (2007). *A Walking Strategy for Western Australia*.
- Biodiversity. (2015, juni 15). *Biodiversity A- Z*. Retrieved juni 19, 2019, from Buffer Zone: <http://www.biodiversitya-z.org/content/buffer-zones.pdf>
- Bismark, M. (2004). *Model Sosial Forestri pada Kawasan Penyangga (Buffer Zone)*. Bogor: Pusat Litbang Hutan dan Konservasi Alam.
- Buildings, H. C. (2019, July 25). *Designing Buildings Wiki : Share your construction industry knowledge*. Retrieved July 26, 2019, from Human Comfort in Buildings: [https://www.designingbuildings.co.uk/wiki/Human\\_comfort\\_in\\_buildings](https://www.designingbuildings.co.uk/wiki/Human_comfort_in_buildings)
- Carr, S., Francis, M., Rivlin, L. G., & Stone, A. M. (1995). *Public Space*. Cambridge: Cambridge University Press.
- Design Implications of Walking Speed for Pedestrian Facilities 2011 *Journal of Transportation Engineering*
- Dovey, K., & Pafka, E. (2019). What is walkability? The urban DMA. *Urban Studies* , 1-16.
- Ellis, G., Hunter, R., Tully, M. A., Donnelly, M., Kelleher, L., & Kee, F. (2015). Connectivity and physical activity: using footpath networks to measure the walkability of built environments. *Environment and Planning B: Planning and Design* , vol 43(1): pg:130-151.
- Furchan, A. (2004). *Pengantar Penelitian dalam Pendidikan*. Yogyakarta: Pustaka Pelajar.
- Giovine, M. A. (2009). *The Heritage - scape Unesco, World Heritage, and Tourism*. United Kingdom: Lexingto Books.
- Hoppenbrouwer, E., & Louw, e. (2005). Mixed-use Development: Theory and Practice in Amsterdam's Eastern Docklands. *European Planning Studies* , 967-983.
- Kaliangga, F. G., Kumurur, V. A., & Sembel, A. (2014). Kajian Aspek Kenyamanan Jalur Pedestrian Jl. Piere Tendean . *Sabua* , Vol.6(2)pp. 243-252.
- Kojongian, J. O., Rondonuwu, D. M., & Tungka, A. E. (2016). KARAKTERISTIK KAWASAN KOTA LAMA MANADO ENGAN PENDEKATAN TEORI HAMID SHIRVANI. *unsrat* , 73-82.
- Lalatjantan*. (2017, februari 28). Retrieved juni 19, 2019, from <http://berylele.blogspot.com/2017/02/pengembangan-dan-pengelolaan-daerah.html>
- Muryono. (2008). *Arahan fungsi pemanfaatan lahan Daerah aliran sungai samin Kabupaten karanganyar dan kabupaten sukoharjo Tahun 2007*. Surakarta: Universitas Sebelas Maret.
- Narvaez, L., & Penn, A. (2016). The Architecture of Mixed Uses. *The Journal of Space Syntax* , 107-136.
- Organization, W. H. (2013). *Pedestrian safety:A Road Safety Manual For Decision-makersand Practitioners*. Geneva, Switzerland: WHO Press, World Health Organization.
- Pedestrian behaviors at and perceptions towardsvarious pedestrian facilities: an examination basedon observation and survey data2003*Elsevier* 249-274

- Prabowo, B. N., & Harsritanto, B. I. (2018). KOTA LAMA SEMARANG MENUJU STATUS PUSAKA DUNIA UNESCO: APA ITU STATUS WORLD HERITAGE? *MODUL* , 51-53.
- Rahadi, F. A. (2003). *Jalur Pedestrian di Kawasan Perdagangan dan Jasa di tinjau dari aksesibilitas dan kenyamanan pengguna*. Semarang: Tesis, Universitas Diponegoro.
- Rukmana, M. J., Priyono, K. D., & Jumadi. (2012). *The Modelling Of Referrals Function Of Land Areas For Existing Landuse Evaluation Using Remote Sensing Data In Opak Hulu Sub-Watershed*. Surakarta: UMS.
- Sanjaya, R., & Soedarsono, R. M. (2017). Analisis Fungsi dan Kenyamanan Jalur Pedestrian Kawasan di Kota Pangkalan Bun (Studi Kasus: Bundaran Pancasila). *Jurnal Unisula*, 108-122.
- Saraswati, R. S., & Priyatno, B. (2016). Kualitas Fasilitas Jalur Pejalan Kaki Di Pusat Kota Semarang. *Riptek* , Vol. 10(1)pp. 57-70.
- Semarang, P. K. (2009). *Bangunan Gedung*. Semarang: No.5 .
- Setianto, S., & Joewono, T. B. (2018). Penilaian Kualitas Fasilitas Pejalan Kaki (Walkability Assessment) . *Jurnal Jalan-Jembatan* , Vol. 35(1)pp. 51-66 .
- Shrivastava, R., & Sharma, A. (2011). Smart Growth: A Modern Urban Principle. *Department of Architecture and Planning* , 8-11.
- Sondakh, A. F. (2017). Metode Penilaian Walkability Permukiman di Perkotaan: Sebuah Kajian Literatur Sistematis. *Jurnal RUAS* , 1-12.
- Southworth, M. (2005). Designing the walkable city. *Journal of Urban Planning and Development* , 131(4), 246-257.
- Southworth, M. (2005). Designing the walkable city. *Journal of Urban Planning and Development* , 246–257.
- Stevenson, M., Thompson, J., Sá, T. H., Ewing, R., Mohan, D., McClure, R., et al. (2016). Land use, transport, and population health: estimating the health benefits of compact cities. *Urban design, transport, and health* , Vol 388 (10062) Pg:2925-2935.
- Weisman, J., 1981. Modelling Environment Behavior System. *Journal of Man Environmental Relation*, Pensilvania, USA.