Reviewing Our Built Environment in Global Economic Uncertainty

Ahmad Sanusi Hassan et al.

ICWSAUD

Reviewing Our Built Environment in Global Economic Uncertainty

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PREFACE

This book chapter consists of articles that address the theme 'Reviewing Our Built Environment in Global Economic Uncertainty'. The rise and fall of fuel price, civil wars, currency crisis and political instability around the world cause uncertainty to our global economy which creates haywire to the direction of sustainability and its development in the built environment. Unpredictable costs and prices of construction, energy, housing, property, services, management, planning and maintenance in the industry are among the significant factors which create this erratic condition. Due to this economic uncertainty, local government and private agencies are at high risk when they undertake investments in the construction industry. It is very risky when they finance new pre-plan cities, housing estates and buildings at the costs of construction materials and labour services affected by floated currencies because of fluctuated foreign-exchange market. In addition, a growing number of medium and high-income families who are able in bidding high house prices in the market is one of the many reasons for uncontrolled home prices in urban areas.

The condition generates high living cost which becomes unaffordable to the low-income families to live in the city. One of the crucial studies is to relook on the history and theory of our cities' growth to understand the present and future action in efficient energy usage, cultural, sustainability and economic vibrancy. Researches in architecture and built environment's sustainability regardless global economic and financial uncertainty are necessary to foster environmental and social concern as the key element. It is thus the aim of this conference to provide a platform for discussion of the new ideas, potential solutions, methodology, technology, social issues and critical discourse in responding our present global condition.

It is of major importance today to share professional and academic knowledge and expertise across the world working to improve the quality of process and physical place for the use of the urban and rural poor for a sustainable future.

ANALYSIS OF GROWTH DYNAMICS IN PERI-URBAN AREAS AND DEMAGNETIZATION

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ABSTRACT

Peri-urban area is the interface between rural and urban regions where urban and rural activities are juxtaposed. The peri-urban areas become part of the cities with its growth and expansion, and new peri-urban areas are formed, creating challenges in infrastructure, planning and governance. Peri-urban areas have potential as they are the future urban areas. So is the case with rural areas as they could be the future of human settlements in all respect in a complete manner. There is a need to identify the areas to transform these urban fringes. This study assesses the development outline in peri-urban areas and analyses characteristics and growth implications of peri-urban and rural settlements using various parameters and implications of growth in peri-urban areas and its transformation to challenges, potentials and constraints. The results show these peri-urban areas create balance or harmony to metropolitan-cosmopolitan cities. The mixture of urban and rural characteristics depends on the consistently growing population, migration, high level of accessibility and mobility. Rural areas can demagnetize urban and peri-urban areas to balance the resources. These areas have enormous potential to play a vital role in enhancing urban sustainability at the global level.

1. INTRODUCTION

To understand the word 'urban', we need to understand the meaning of 'rural'. Rural areas are agricultural or forest areas with a low population density and small settlements. Urban areas are infrastructure settlements of the built environment with high population density without agricultural areas. The physical boundaries of urban built-up areas often do not coincide with their administrative boundaries. Peri-urban areas are the transition zones adjoining urban and rural settlements. Urban and rural use often clash and can be termed 'Rurban' areas sharing rural and urban characteristics. This study is an attempt to understand the pattern of development emerging in and around peri-urban areas. It aims to understand the advantages, challenges and constraints in and around peri-urban development. This paper is also an attempt to neutralize Peri-urban areas, which is referred to as demagnetization. The demography can be distributed from urban to peri-urban and peri-urban areas to rural areas; migration (from rural to urban) can be reversed (from urban to rural). How the rural areas which are free from physical and mental exertion, green and clean if equipped with better

infrastructure and amenities can become the magnets for the people; as compared to the urban area which is preferred because of infrastructure, living standards and other amenities.

1.1 URBANIZATION

Urbanization is the process of industrialization and modernization. People believe that living in urban areas is better than the rural areas, so they leave their native places and their farms to work and live in cities. Urbanization changes lead to other changes in land use, economic activity and culture. It is a known fact that the footprint of urban areas like cosmopolitan, metropolitan and capital cities is already occupied; and due to constant population growth and migration; the bubble has burst. The balance between population and amenities like education, employment and healthcare are majorly affected.

1.2 PERI-URBAN AREAS

Peri-urban Areas consist of a narrow zone along important connecting routes between different cores. Economic activities within such regions are less concentrated but can expand. The nodal points of such zones can be developed to propel the development, but must not be situated too far apart. Khandelwal (2007) refers to this term Peri-Urban as consisting of bundles of infrastructure that link two or more areas having a relatively long history in spatial and urban planning.

Peri-Urban Areas are the transition zone, interaction zone, where urban and rural activities are juxtaposed, and landscape features are subject to rapid modifications, induced by human activities. Peri-urban areas are always in the transition process that they cannot be precisely defined spatially as they keep changing. Peri-urban areas have some inter-related characteristics as fast and unplanned and cater to the market demand; jurisdiction is unclear, duplicated in planning guidelines, and building regulations are not applied. Infrastructure facilities are not appropriate for a significant proportion of residents in lower-income categories. Peri-urban areas are valued in different terms and different ways by diverse groups of people and organizations as follows:

- These are places where it is easier for the poor to build shelters and uncomplicated to occupy the land.
- For the middle class, it is a potential residential zone for houses which has resulted in developers taking up townships; and
- For high-income class, it is used as their weekend luxury shelters in the form of farmhouses or cottages with recreational facilities; and
- For local authorities, the urban are often sites for locating landfills, bypasses and industries and mega-urban projects.

Peri-urban area underlines a new dimension in the study of urbanization over an extended territory. The structure behind the development of several urban systems is considered the structure behind urban regions' territorial developments (Saxena, 2001). Conceptually, they provide a tentativeness of territorial homogeneity over a heterogeneous landscape.

1.3 URBAN SPRAWL AND URBAN FRINGE

When cities becomes unaffordable place for the people to live within the municipal limits, living in the fringe areas of city creeps into the people's mind. This migration to cities results in outgrowth and urban sprawls, spreading of a city in outwards direction. Thus, any growth in suburban areas may be accused of – sprawling. Rural-urban fringe is an area of mixed rural and urban populations and land-use with agricultural land-use near the city. It extends to the point where villages have distinct urban land-use (Misra, 1998). Peri-urban areas are outside formal urban boundaries and jurisdiction which therefore progressively assume many of the characteristics of urban areas. The areas can be easily identified bordering a city with low-density housing and road development on the periphery of urban areas.

2. GROWTH DYNAMICS IN PERI-URBAN AREAS AND DEMAGNETIZATION

The concept of peri-urban area development is similar to ribbon development but with some difference. Ribbon development can be defined as a linear intrusion of urban conditions into rural areas. Heimlich and Anderson (2001) say that ribbon development is another process of urbanization. We find a sector expanding outwards from the belt's edge that includes an area a mile wide on each side of major transportation routes. Within this distance, villages can be influenced by any ribbon development outside the city. Thus, ribbon development is a narrow and linear growth along the traffic artery with open land behind it on either side of the road. Ribbon development can be considered as the initial stage of peri-urban area development.

Demagnetization is the process of neutralizing the urban and peri-urban areas. This process can be linked to distributing magnetic properties like infrastructure, education, employment, healthcare, and living standards from cities. Demagnetization can be referred to the reversal of population shift from rural to urban areas, or to make this increase in the proportion of people living in urban areas stagnant. This condition affects human behaviour of current three generations and the next generations like emotional values, sense of attachments, ancestral property, the standard of living, comfort zones and other basic amenities like education, employment, health.

2.1 RURAL-URBAN CONFLICT: THE CONCEPT OF CONURBATION

Planners made some attempts for solutions of rural-urban conflicts, such as Howard's Garden City Concept, Kropotkin's Concept of smaller rural settlements in the forms of industrial villages and many more. Reclus tried to combine both urban and rural viewpoint and expounded on the concept of allowing expansion of towns into rural areas thereby, evolving the countryside socially, culturally and economically through a vast network of human settlements and houses of different types and sizes. He argued that such urban expansion was necessary since remote houses and settlements are bound to existing cities. Patrick Geddes looked at the problem from his regional perspective and explained a city region or conurbation. Focusing on the city and the surrounding region separately, he emphasized the continuity between the two. He defined that everything in the city is routed in the country. His use of the term city refers to the larger region or region city and an urban center within

that region as the site of the highest concentration of a rural way of life. Geddes aimed to integrate existing cities into regional cities and conurbations that dissolve them into a smaller unit. A concept of the conurbation defined by Geddes can be extended to the concept of an urban peri-urban.

2.2 STAGES OF PERI-URBAN DEVELOPMENT

Peri-Urban Area development starts with a small settlement in rural areas which suffer from inadequate accessibility and unemployment. These act as push factors for migration of people to large settlements where informal sector employment opportunities and economic growth are available. The large settlements are expanding due to relocation and inability to provide for the whole population. Problems such as inhospitable environment, low quality of life and high land values arise. There is a pressure for development causing pressure in the core and peripheral areas of settlements with the ever-growing population needs. Such pressure for development pushes the city further to the fringe areas, mainly along the major transport routes such as highways. This development along the major transport route is ribbon development. Further, it expands from the transport route to the adjacent rural areas increasing their accessibility, land availability, and peri-urban and land speculation in this available land. Weak legislative and taxation measures lead to further intense development along these peri-urban areas are termed as peri-urban development.

3. CASE STUDY

Exponential growth and development can be observed in urban and peri-urban areas across the globe in the last few decades, especially in the late 1990s. There is an intermittent scope of further growth in cosmopolitan and metropolitan cities. Similar is the case for Delhi-NCR. The capital and national capital regions in the surroundings are so gigantic that essential amenities like education, employment, and healthcare are out of reach to the common man. Also, there is a scarcity of basic requirements to live everyday life like fresh air, clean water, and clean food. The main hubs for industrial areas as allocated by the government a few years back are relocated to outer limits of the city again and again in the last three decades. If rural areas are groomed to be self-sustaining with better amenities and living standards, such developed areas can help neutralize the urbanization (Bhagat, 2000). A case study for demagnetization:

3.1 BACHHRAON – A TOWN 125KM FROM THE CAPITAL, NEW DELHI

3.1.1 THE VILLAGE - BACHHRAON

The main village has a population of approximately 8000, but nearby villages that constitute, Bachhraon - a Nagar Palika Parishad (Municipal Corporation) had approximately 30,000, as per the 2011 India census. Bachhraon has agriculture-based, hand-loom weaving and mini-sugar plants. The town and surroundings produce more than 100 varieties of mangoes, and it is one of the biggest mango producers in northern India. Bachhraon has monuments of historical importance. Town has many old Mosques like Jama Masjid, Pathar Wali Masjid (Stone Mosque), Khoti Wali Masjid, Lal Masjid, and lots of temples such as Mahadev Mandir, Sotiwala Mandir and Shiv Mandir etc. The Urs (Death Anniversary) of Aughat Shah Warsi & Haji Peer Sahab and annual Ramlila, are widely

famous. Most of the developments take place along National Highways. It is not easy to understand which settlement belongs to which jurisdiction, so, to demagnetize the whole process, developments in a strategic manner can be planned across or around state highways.

3.2 PARAMETERS TO ASSESS THE STUDY AREA

Following parameters is a possibility of the transformation along the corridors in and around the study area:

3.2.1 LAND USE AND SPATIAL GROWTH

The town is along the state highway and connects nodal points of the state. The national highway is 12km from the town. Agriculture is the predominant land-use in the study area; while commercial, industrial, institutional establishments and even residential land use are almost negligible. Due to its better connectivity, it has a high potential for developments and establishments. If the development can be addressed considering the advantages of natives, sanctioning authorities can handle its establishment to increase education, healthcare, and employment.

3.2.2 POPULATION GROWTH

India had a negative growth rate in the rural population between 1991 to 2002 due to urbanization and migration to cities. Similar is the case with the study area; this growth can be attributed to decent connectivity through the highways, well-planned developments and establishments. The highways have a high potential of development in the outskirts of a city, which tends to go on decreasing as the highway moves further away from it (Datta, 2006).

3.2.3 CHANGE IN OCCUPATIONAL PATTERN

The three-sector model in economics was developed by Allan Fisher (1946), Colin Clark (1940) and Jean Fourastié (1949):

- Primary: Agriculture, Extraction of Raw Materials
- Secondary: Manufacturing
- Tertiary: Services.

The model focuses on the economy's activity shifts from the primary, through the secondary and finally to the tertiary sector. Fourastié (1949) saw the process as positive. In the great hope of the 20th century, he wrote of the increase in quality of life, social security, a blossoming of education and culture, a higher level of qualifications, humanization of work, and unemployment avoidance.

3.2.4 SCHOOLING SYSTEM OF INDIA

If we divide the schooling system of India, it can be divided into:

- Primary School - 5th Standard: 5-6 years to 10-12 years of age
- Middle School - 6th to 8th Standard: 11-12 years to 13-14 years of Age: Students opting out of

the school at this stage can join any Industrial or Skill Development Certificate Course; which can be a trimester, semester or a yearlong program.

- High School - 9th to 10th Standard: 14-15 years to 15-18 years of Age: People can join any Diploma Certificate Course, a 2-3 year-long program.
- Senior Secondary School - 11th to 12th Standard: 15-18 years onwards
- UG/PG–College/University: 17-18 years onwards

3.2.5 GREEN COLLAR VS BLUE COLLAR VS WHITE COLLAR: DIFFERENT SOCIAL CLASSES?

A Green-Collar (GC) worker is a worker who is employed in the environmental sectors of the economy. Environmental green-collar workers (or green jobs) satisfy the demand for green development. Generally, they implement an environmentally conscious design, policy, and technology to improve conservation and sustainability. White-Collar (WC) worker works in an office or administrative setting. Blue-Collar (BC) worker is a worker, whose job requires manual labours who can further be divided into skilled (BC-S) and unskilled worker (BC-US). Pink-Collar (PC) worker is a worker, whose labour is related to customer interaction, entertainment, sales & service-oriented work.

The blue-collar worker is perceived to make less than the white-collar worker. The white-collar worker might work behind a desk in the service industry. In contrast, the blue-collar worker gets his hands dirty in a division of manufacturing, infrastructure, repair and maintenance. The white-collar worker can be more qualified than the blue-collar worker. Another way to define these two phrases is the white-collar worker may or may not make more money than the blue-collar worker, but they fill a different social class (Table 1).

3.2.6 CHANGE IN HUMAN BEHAVIOUR WITH MATURITY IN AGE

The revenue of any region is achieved through the primary sector. Regions in a more advanced development stage, with a medium national income, generate their income mostly in the secondary sector. In highly developed countries with a high income, the tertiary sector dominates the economy's total output. The main source of income is the primary sector, which is agriculture. The three-sector model can easily be related to age-groups, but it can vary according to region or demography.

If we divide any generation concerning age groups, it can be divided into (Table 1):

- Gen-1: Infants to 18 years of age
- Gen-2: 19 to 40 years of age
- Gen-3: 41 to 60 years of age, and
- Gen-4: 61 Onwards.

Table 1: Considering the three-sector model and age group classification, we need to understand the same concerning qualification and social classes

Sector Model	Primary- Agriculture	Secondary - Manufacturing	Tertiary - Services	Others	
Age-Groups	Gen-1 (0-18)	Gen-2 (19-40)	Gen-3 (41-60)	Gen-4 (61 & Above)	
Work-Jobs	White-Collar	Blue-Collar (BC-S)	Blue-Collar (BC-US)	Pink-Collar	Green-Collar
Schooling	UG/PG	SSC	10th	8th	5th

Above discussion regarding Three-Sector Model, Age Group Classification, and Schooling System is mandatory to understand because agriculture is the most critical sector of the Indian economy. The Indian agriculture sector accounts for 18% of India's gross domestic product (GDP) and employs 50% of the countries workforce. Likewise, agriculture is the predominant activity in the study area. But farming, agriculture, or Primary Sector is considered the last priority by Gen-1, they come back to this sector if and when they fail in education or other career options. Gen-2 goes to urban areas or abroad either for studies or employment, and finally settle down there. Gen-3 is usually settled down in urban areas or abroad with their respective employment and families. Gen-4 finally wants to return to their roots but are little unsure of returning due to lack of basic amenities and the standard of living they had experienced in their lives. The basic needs of all the generations; Gen-1,2,3 and 4 are education, healthcare, and employment available in the village. These can act as magnets of rural areas and multiply with other necessities like air, water, and food.

Different generations are at different contexts to their village or their respective rural areas in the current scenario. To make it self-sustaining without disturbing its eco-system; the governing authorities can also support such initiatives through financial or administrative cooperation. It is attempted to indicate the priorities for Sector Model, Collar Jobs to Age Group and Qualification. If government policies and planning take time to reach villages and small towns; how can a local initiative favour local communities and natives of that particular area.

3.2.7 THE PROJECT – MIXED USE

The project is at the State Highway, 15 km from National Highway; on 2.35 acres of land. A project is perceived to keep in mind most of the factors to demagnetize the urbanization and stop the migration from this town Delhi or other urban areas. The project can be considered as a mixed-use planning project (Figure 1-8), comprising of below:

- A community school, mosque and madrasa for local natives with a hostel for nearby aspirants of age-group 5 to 15 years of age;

- A skill development centre with accommodation; for people of age-group 15 years of age and above, who are interested to learn skilled and technical work, who can learn and start working either locally or globally;
- Areas dedicated to indoor areas (on level-1) and outdoor sports facilities and amusement areas attract people of Delhi-NCR who want to spend their weekends or long weekends with family (3 Gen- parents and kids) in peace and joy. Corporate events, business launches, office off-sites with conferences and weekend festival celebrations can be held at swimming pool, Futsal (a variant of association football played on a hard court), amphitheatre etc.
- A 15000sqft floor on level-2 can accommodate approximately 250 people.
- Floor plate on level-3, primarily a media house, where different organizations can come, work and stay for days, weeks, months or so. It can act as a co-working space.
- Level-4 has 24 guest-house units. It can be an integral part of residencies, researches, events etc.
- Level-5 is the residence of clients, where this 15000sqft floor plate is divided into four parts so that it is combined and segregated planning.
- The terrace is to be covered with solar panels and a terrace garden.
- The building will be self-sustainable with sustainable solutions like rainwater harvesting, solar system, etc. with the exploration of local architecture, local materials, and local workforce.

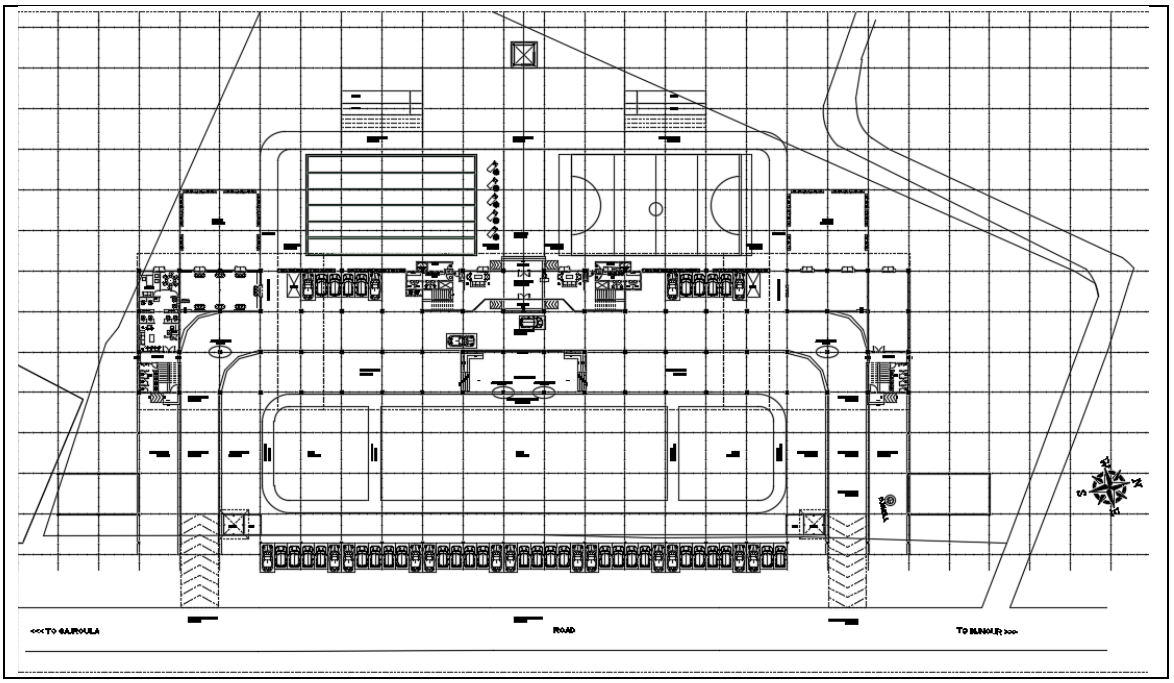

Figure 1: 3D images (top) and a Site Plan (bottom) showing building footprint, zoning and open areas

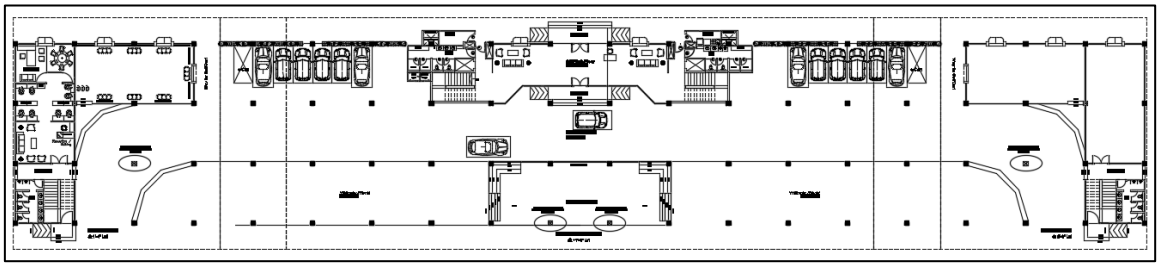

Figure 2: Stilt Floor Plan – Showing Vehicular Movement, LHS & RHS Building

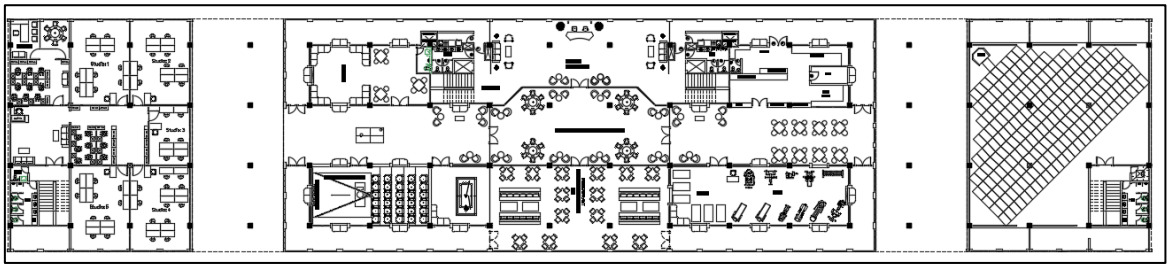

Figure 3: Level 1 – Amusement Floor, AV Room, Fine-Dining Restaurant, Café
LHS – Skill Development Centre with Office & RHS – showing the mosque floor

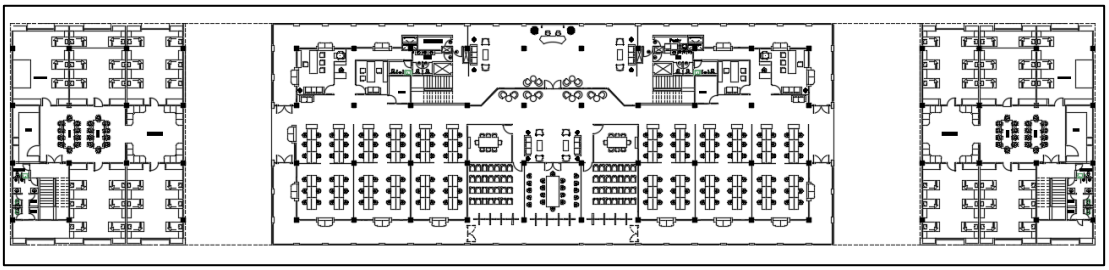

Figure 4: Level 2 – Showing Co-Working Office Space
LHS & RHS – Accommodation for Skill Development Centre Madrasa

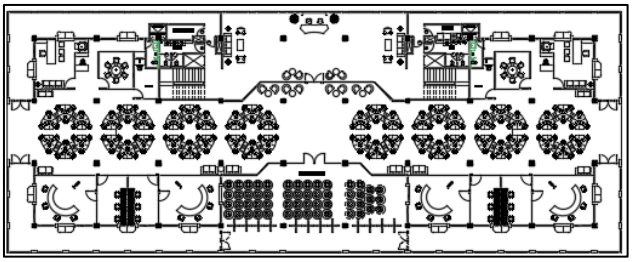

Figure 5: Level 3 – Media House Office Space

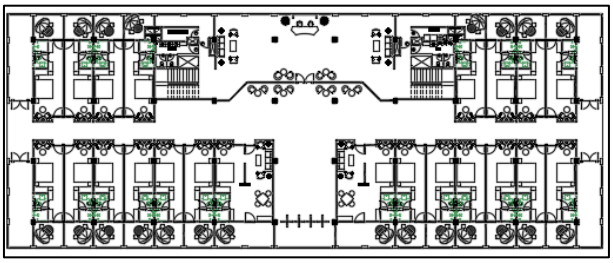

Figure 6: Level 4 – Hotel Floor

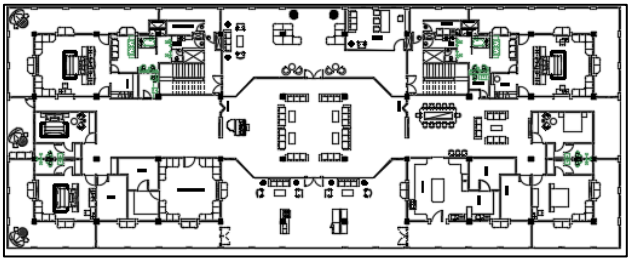

Figure 7: Level 5 – Residence Floor

Figure 8: The Building Rendering Image

This set up can accommodate approximately a thousand people, and around 2500 people during events and festivals; as lodging capacity can also go up to a hundred, which can utilize it for destination functions, no matter corporate, professional or personal. The facilities like this are in the

benefit of education and employment. Most of the outing places like Shimla, Nainital, Jaipur, Chandigarh, Manali, Lucknow are more than 300 km away from Delhi. People want to take a quick break from their hectic life of urban Areas and want to go on a short break for a couple of days, so a distance of approximately 125 km is a dream distance for a destination like this. Suppose an eco-system in respective rural areas can be planned at a favourable distance from urban and peri-urban areas. It can play a crucial role in neutralizing the urbanization and restrict the migration from rural to urban and peri-urban areas. As the conference theme suggests, 'Reviewing Our Built Environment in Global Economic Uncertainty', empowering the rural areas in a planned manner and making them self-sustainable can create an equilibrium.

4. DISCUSSION / FINDINGS

The study carried out can be summarized under the following significant findings:

- The over-growth and uncontrollable development of urban and peri-urban areas are crucial to restructuring peri-urban areas' outer limits and surrounding rural areas into efficient and autonomous space.
- When any urban and peri-urban areas have functional inter-dependencies, especially when either of them is a major economic center and another is an administrative center, they tend to go towards each other, unless the area is under strict regulation. It causes rural and peri-urban areas to neutralize or demagnetize the urbanization.
- For accessibility to urban areas, urban activities arrange themselves along transport routes leading to the city later on forming a continuous stretch of urban activities along the length of the route. The characteristics of such growth are intense development along the peri-urban, which becomes less intense as we go away towards rural areas from the peri-urban unless there are other local factors involved to increase the intensity of development.
- Strip development happens on either side of the national highway, pushing back the urban growth from the nodal cities, unplanned and unregulated. It is the formative stage in the growth of peri-urban cities.
- The process of peri-urban development starts with small settlements, special economic zones, Shopping complexes, etc., which gets converted into non-contiguous, non-conforming ribbon development.
- Peri-urban areas are spaces of urban influence or expansion in local and regional and sometimes, national perspectives.
- In peri-urban development, individual settlements tend to grow linearly along the mainline of movement, which brings the settlements closer to each other, resulting in mixed urban-rural characteristics.
- Land development, especially in areas where the local authority is not active or functional,

is driven only by private developers. They start taking advantages such as land pooling, development, etc., to exploit the government's policies and schemes.

- Unplanned conversion of agricultural land into land for urban use becomes a common phenomenon during peri-urban development.
- Major residential and commercial complexes coupled with unauthorized establishments are a typical character in these peri-urban areas.
- The infrastructure provision in these areas is always underestimated, and it does not match the pace of development and them.
- Workshops, factories, small-scale and large-scale industries creating pollution; which otherwise may not get clearance in an established city's industrial area, start taking advantage of no regulations and absence of related policies in the area.
- Investments on transportation infrastructure such as four-lane of highways result in increased movement along with the peri-urban areas, thus further increasing the pressure of growth should be planned.
- There are patches of land with very high potential for development in these areas which need to be identified. These generally include the nodal cities' peripheries, an access point of high-speed peri-urban, barren or wasteland, etc.
- To develop these areas, appropriate infrastructure facilities, and institutional arrangements become crucial, such as roads, water resource, etc., including the social amenities to make them sustainable.
- There is a lack of enforcement of the legislation made in Indian states due to various forces in the government and public.

5. CONCLUSION

In conclusion, agriculture and farming is the most critical industry; thus, it can provide incentives for working in the primary sector. Also, to strengthen the local economy, it should take up small scale non-polluting industrial development at suitable locations. It can reduce migration both rural to urban and vice-versa. Land use plan for the study area should be prepared to assess, analyze and accommodate future growth. Change in Land use should be taken up by the Town and Country Planning and Zila Panchayat. Development charges in high potential areas to be worked out to control unwanted developments. The infrastructure supporting the new developments should be made available for a sustainable approach. It should strengthen the identified nodal villages with common social infrastructure serving nearby villages and towns and provide education facilities for technical and vocational training to better service and improved labour force. Internal roads are to be interlinked with nearby areas, thus checking through traffic on the highways, caused by the local commuters working in this area, to reduce migration. There is a tendency in people to stay back in their native place if they are provided with good facilities and opportunities. Initiatives taken by local natives in

the respective village or town's interest should be appraised by the government or local authorities. They can provide proper funding or aid for the projects' good initiatives on similar notes of public-private partnerships. If any medium-income or high-income families have good workable plans for the growth of their native place; which is in line with government and local authorities policies, they should recognize them accordingly. The idea is to understand, incorporate and implement efficient energy usage, cultural sustainability and economic vibrancy.

6. AVAILABILITY OF DATA AND MATERIAL

Data can be made available by contacting the corresponding authors.

7. ACKNOWLEDGEMENT

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A STUDY OF PERCEPTION OF URBAN DESIGN ELEMENTS AT TAMAN PUCHONG INDAH, PUCHONG, SELANGOR

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ABSTRACT

This paper aims to examine the urban design elements with a case study at Taman Puchong Indah, Selangor. The study discusses the urban pattern and the quality of legibility by users within the site context. The research conducted will analyses on five urban design elements namely; -paths, edges, districts, nodes and landmarks through qualitative methods of data collections with site visit for a survey with observations. The site showcases a simple geometric pattern to ease circulation with distinguishable paths and edges but not obvious in boundaries of its districts. In addition, the amount of areas allocated for open spaces or greenery areas that act as nodes with the designated landmark influences the quality of social interactions within the site despite not to the maximum usage of space. As a conclusion, this research showed all of the design elements identified by Lynch (1960) that are important and represent good urban environments and mental mapping of a neighbourhood.

1. INTRODUCTION

Urban design is both a process and the result of making a place in which people live, engage with each other and also engage with the physical place around them. It involves the arrangement, appearance and function of villages, towns, suburbs and cities ("Creating Places for People," 2015). The most important factor in creating an identity or sense of place in a city is through imageability. People perceive a city through interpretation of various layers of images including its physical form, characteristics and experiences over a period of time. However, they need to be able to recognize and organize these urban elements into a coherent pattern (Lynch, 1960). The quality of being clear enough to read by people in a city is known as legibility.

Puchong is a major town located within the Kuala Lumpur-Klang Valley metropolitan area. This town was divided into numbered rock sequences (i.e. Batu 6) defining its own districts along Jalan Puchong, a road that connects Kuala Lumpur to Jalan Klang Lama on its north and Sepang district on its south. It is believed that this town got its name based on the numerous amount of a bird species called *Puchong* and have existed since early 1900s with the settlements of *orang asli* (Wikiwand, 2018).

Puchong begins to be explored when agriculture or plantation sector started booming and more estates were open up in the area, bringing in Indian immigrants to work as rubber tappers. Then, it was followed by the founding's of tin ore near the riverbanks of Sungai Klang which impacted in bringing Chinese immigrants, working as miners into this town. However, urbanization has occurred rapidly since 1985 after the discontinuation of mining industry with many industrial parks, commercial centers and residential areas mushrooming along Jalan Puchong.

The unique element of this town planning is its township are based on industrialization of tin-ore mining and spreads more new development due to urbanization. However, this research would only focus on the modern town planning after the independence era due to the fact that urbanization of the case study occurred after 1985. After the city's expansion, the population increase in the city from below 25% to 72.8% during 1921 to 2010 due to rural and urban migration (General Report of the Housing Census, 1991; CIA World Factbook, 2014). Effects of the migration causes the urban population in city centers like Kuala Lumpur to be overcrowding.

Therefore, the government has propose the decentralized program by developing new towns and garden housing estates in suburban areas. In present time, Puchong has become one of the new developing town with numerous garden housing estates nearby. The objectives of this paper is to examine urban design elements with a case study at Taman Puchong Indah, Selangor. The study discusses the urban pattern and the quality of legibility by users within the site context. Based on Lynch (1960), there are five types of elements that form a mental image of people's livable space or environment which are paths, edges, districts, nodes and landmarks.

2. LITERATURE REVIEW

2.1 URBAN DESIGN ELEMENTS

This study will apply urban design elements study of perception by the people at Taman Puchong Indah, Selangor. Based on Kevin Lynch's book "The Image of The City" (1960), he emphasizes that people can function in his or her own environment by defining *legibility*, which means that the cityscape can be 'read' through images or visibility as the user moves through the city by engaging in way-finding. Mental mapping is defined by the five urban design elements namely (1) paths, (2) edges, (3) districts, (4) nodes and (5) landmarks, as follows:

Paths

Paths are routes that people occasionally travels from one place to another. Typically, pedestrian walkways, roadways, railways, or even waterways are some examples of many paths in a city. For many people, navigating through these paths helps them form the mental image of a city.

Edges

Edges are perceived boundaries between two phases by linear elements such as shorelines or walls. This element can act as a closed-off barrier, penetrable, or seamless lines along two region.

Edges are important for a lot of people when it comes to organizing features particularly in generalizing areas like defining the outline of a city by water or walls.

Districts

Districts are relatively large sections distinguished by common character that creates identity of a city. Usually, observer's perception in a city as if entering "inside of" an area with prominent architectural styles compared to another and is considered as the same district.

Nodes

Nodes are urban spaces as strategic spots or concentrated areas within a city that acts as a focal point or loci. They may be junctions, transportation stop points, convergence of paths and many more.

Landmarks

Landmarks are identifiable objects that serves as external reference point. Commonly associated with easily visible buildings from a distance or even a signage of a commercial. These landmarks becomes a clue towards users as they identify the image of a city.

2.2 EXPLORING PUBLIC PERCEPTION OF URBAN IDENTITY: THE CASE OF ANKARA, TURKEY, M.E. BARIS, L. UCKAC AND A. USLU (2009)

This research paper done by Baris, Uckac and Uslu, (2009) says that urban spaces plays an important role in the processes of formation, change and reproduction of urban identity especially in a city like Kecioren district of Ankara. The research shows the elements that the inhabitants define their own living environment by its functions and both physical and social elements. "From this point, it is obvious that there exists a relation between the consideration of the respondents on the image of their neighbourhood and the image of the city. People perceive cities they live, primarily by the neighbourhood they live in". Researchers also discussed that urban spaces cannot be considered separate from the socio-cultural properties, political processes and economic structure of the city and society. While it is possible to give a new identity to an alley, a region or even the entire city, but urban design affects urban identity through social changes in the city and the way of living of its citizens. Hence, urban identity can only become meaningful to the citizens if they had feelings of faith, protection and belonging to the city. A well designed urban spaces and design plays an important role in creating this meaningful interaction between the citizens and their living environment of the city.

2.3 REKA BENTUK BANDAR DI SEMENANJUNG MALAYSIA (*URBAN DESIGN IN PENINSULAR MALAYSIA*), AHMAD SANUSI HASSAN (2005)

Another literature used as reference in this study is the book of *Reka Bentuk Bandar di*

Semenanjung Malaysia (2005). This book focusses on the urban design in Malaysia that evolves after the colonial era. Hassan in his book states that the morphology of garden city's new towns in Malaysia are categorized in three eras which are before and after the Independence from (1950)-1970; 1970-1990 and 1990-2010.

Before Independence (1950)-1970

During 1950 to 1970, British only build housing for their government officials. These development are based on Barry Parker's and Raymond Unwin's design of an ideal model village. Curvilinear roads dominate the street patterns during this period as a reflection of Garden City's informal housing layout patterns. During this time, Hassan (2005) observes that the hierarchical road access from the collector road to arterial roads with no direct access towards highways.

1970-1990

New towns were introduced during this period as part of the decentralized program to carry traffic away from the city center. Street patterns in this period embraces the idea of simple geometric styles such as squares, rectangles, circles, triangles, etc. The hierarchical streets similarly to before the independence era where access from collector roads to arterial roads and not immediately to highways. Universal approach in design is adapted during this era.

1990-2010

From 1990 to 2010, new towns like Seremban 2 and Putrajaya. Also built as part of the decentralized program. The new towns have an idea of complex geometric planning and a mixture with European architectural styles.

2.4 CASE STUDY: TAMAN PUCHONG INDAH

The site study location is at Taman Puchong Indah. This place is one of the mixed development area situated within a close proximity to Puchong's major town (Batu 12). It comprises of a mix low-cost apartments, single and double terrace houses as well as single-storey shop-offices. There are many basic amenities that can be found on this site including school, petrol station and also public transports facility.

This neighbourhood is one of the garden housing estate developed in Puchong as government's effort of decentralized overcrowding city dwellers. There are no written record of the specific date for Taman Puchong Indah started developing. However, based on the records of the amenities such as the primary school and mosque, it could be between late 1990s to early 2000s.

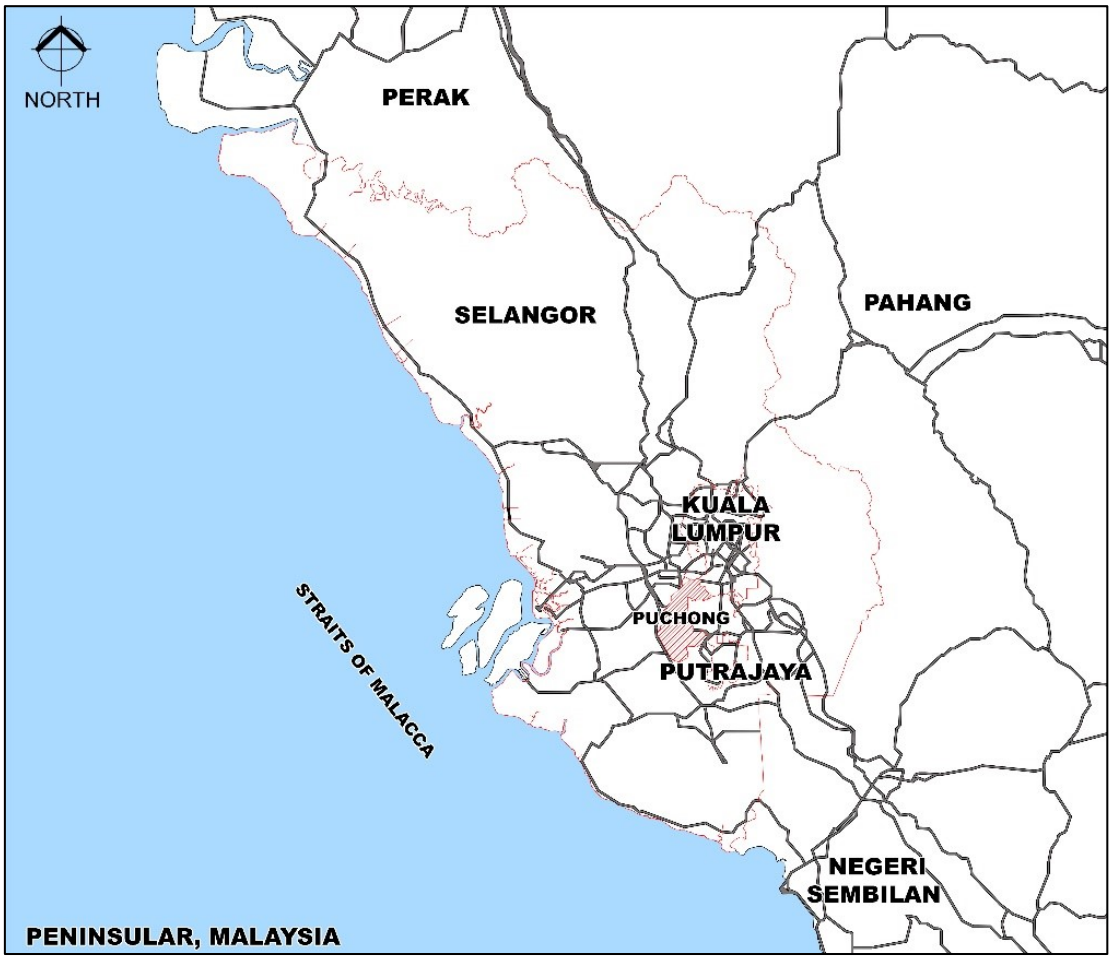

Figure 1: Key Plan of Taman Puchong Indah, Puchong, Selangor, Malaysia.

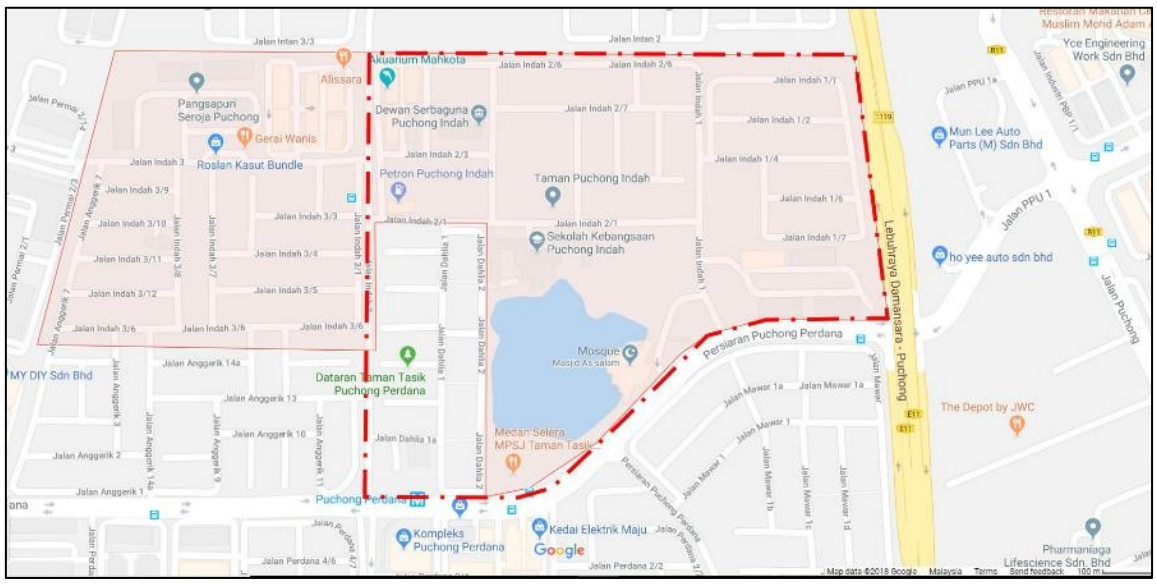

Figure 2: Location Plan of Taman Puchong Indah, Puchong, Selangor, Malaysia.
(Source from Google Map)

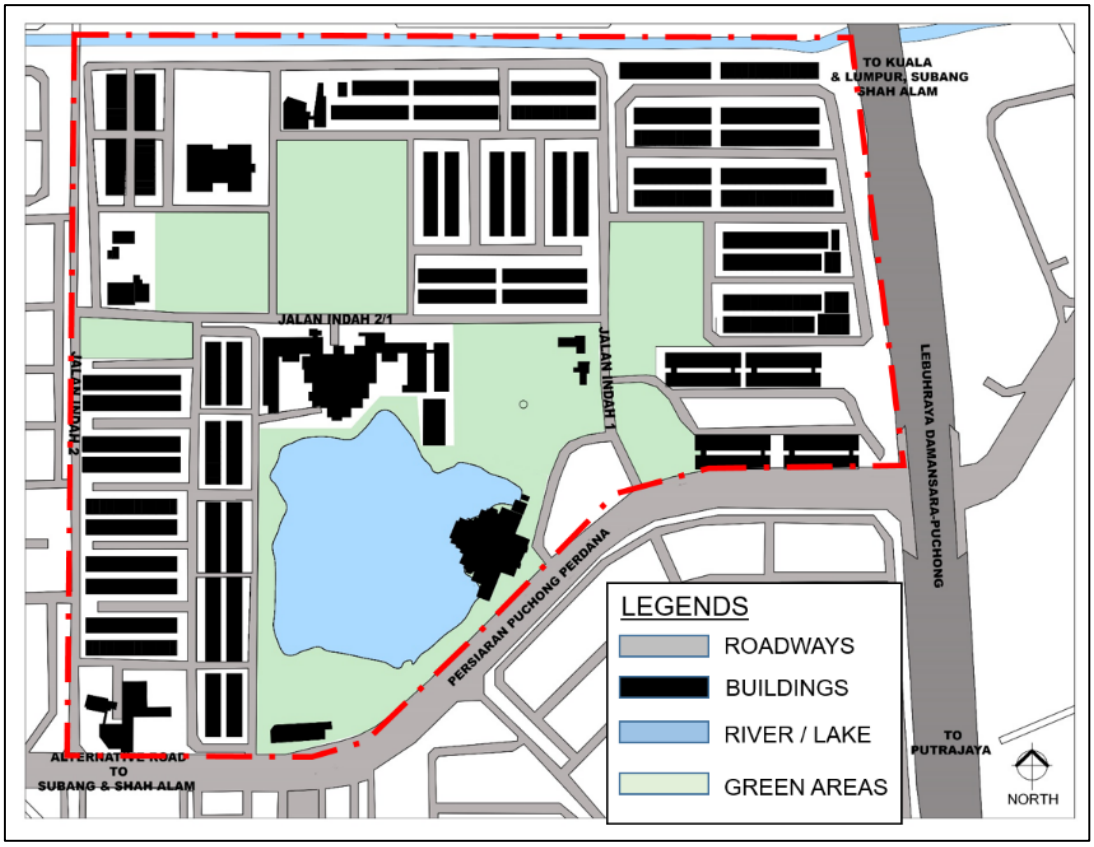

Figure 3: Figure-Ground Layout Plan of Taman Puchong Indah within the site context of case study.

3. METHODOLOGY

This research paper documents urban design elements that structure people's perception to their neighbourhood. Hence, qualitative methods were conducted during this study to gain relevant data and information based on level of quality by using Likert scales. A figure ground mapping of the site was drawn using Autodesk AutoCAD software for data collection used during the on field work study. The field work was conducted through site visits with researcher's observation survey to identify and understand the legibility in site context. Apart from that, this survey was also done to observe the people's mental image of the existing neighbourhood.

The survey was held two days with two different time sessions; on Friday evening from 5pm to 6pm and Saturday from 11am to 1pm. It was structured in a way to observe the people's behavior at different times of the day. These findings were mostly recorded through photos by driving or walking and noted down all the related data to Lynch's five urban design elements. Literature reviews on previous study of urban design elements from secondary printed sources such as books, journals and articles was conducted to gain the understanding of urban design elements. The figure-ground map was reproduced to include related site photos using software such as Adobe Photoshop and Microsoft Power Point. These diagrams are for ease of understanding about the findings of the case study. These process of conducting the research are explained in Figure 4, as follows:

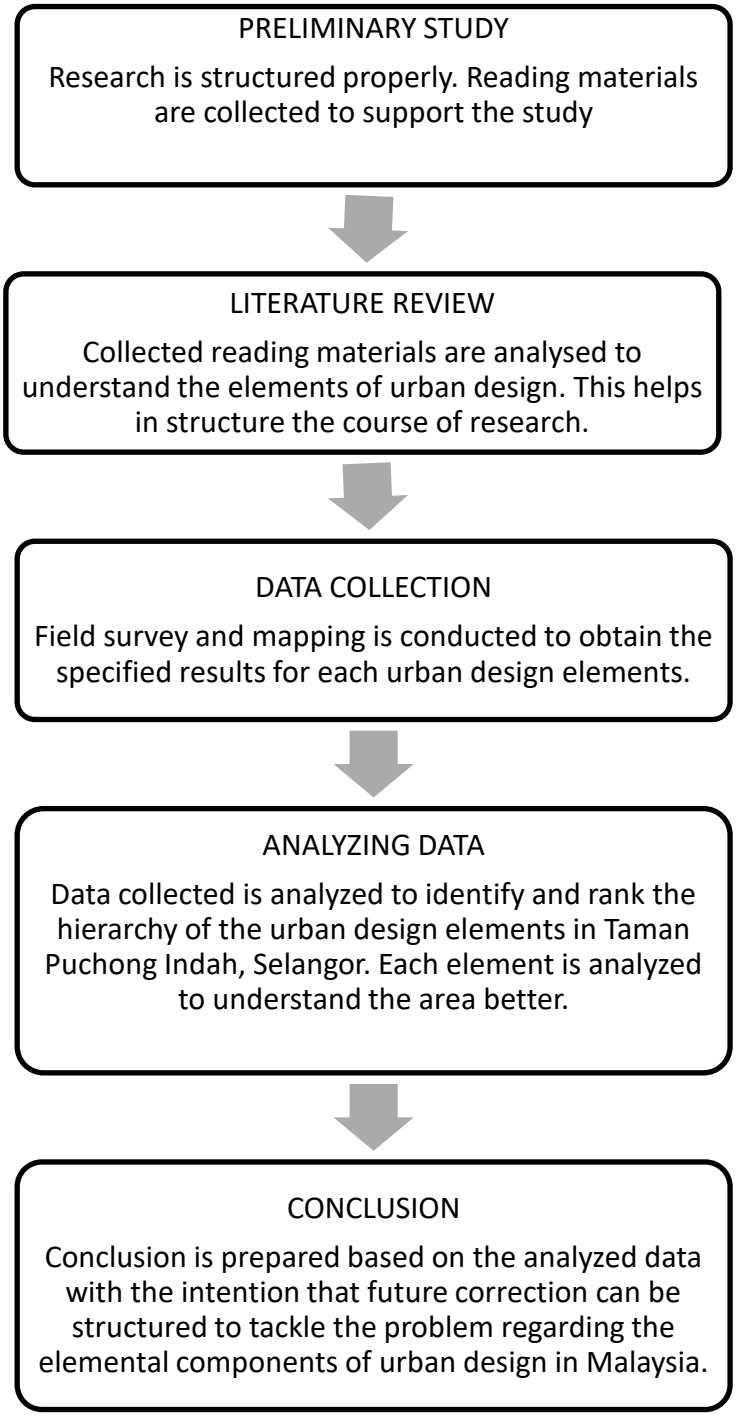

Figure 4: The Stages of Conducting the Research.

4. RESULTS, ANALYSIS AND DISCUSSION

After going through the fieldwork study, these were the findings that have been classified according to Lynch's urban design elements of paths, edges, districts, nodes and landmarks in hierarchical order. Most of these elements are based on the scale, size, popularity or importance of usage and movements of vehicles or/and people within the study area. The result and analysis are as follows:

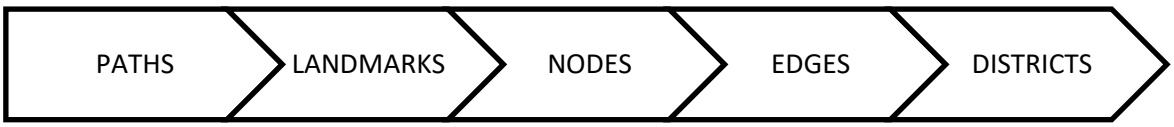

Figure 5: Hierarchical dominancy of Urban Elements in Taman Puchong Indah.

4.1 PATHS

Path would be the most dominant urban element in the township of Taman Puchong Indah. The new township of Puchong has contribute to the decentralized of city dwellers. Hence, numerous numbers of garden housing estate are being developed in Puchong area until today. These new township are mostly build along the highway that ease residents commuting to their work place in the city like Kuala Lumpur. The hierarchical analysis of road's order are as followings:

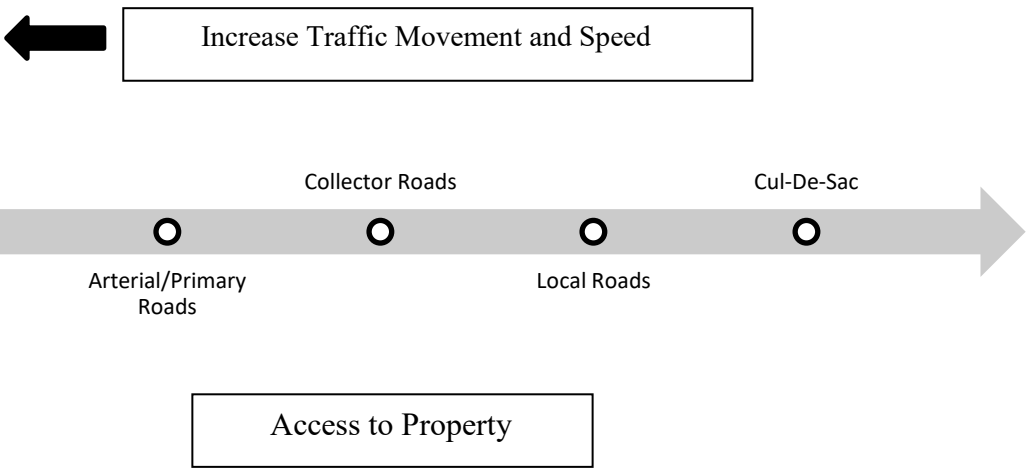

Figure 6: Roadway Hierarchy within Taman Puchong Indah.

Figure 7: Figure-Ground Map of Roadways Hierarchy within Taman Puchong Indah.

Highways

Based on the figure-ground map [Figure 7 (a)], the highest rank road would be the intercity highway of *Lebuhraya Damansara-Puchong* (LDP), which is highlighted in red. Located at the east of Taman Puchong Indah, this road becomes the major road that connects the neighbourhood to nearby towns and cities like Kuala Lumpur, Shah Alam, Subang Jaya and Putrajaya. The highway with a span of between 30m (100') to 40m (132') in width, can withstand the high traffic volume used by the locals commuting to other places every day.

Arterial roads

Arterial road or also called primary road is a high-capacity road that functions to deliver traffic from collector roads to highways. Situated at the south of Taman Puchong Indah, *Persiaran Puchong Perdana* is the major arterial road coloured in dark orange as shown in [Figure 7(f)]. In terms of size, *Persiaran Puchong Perdana* has a width of 20m (66'), wide enough to deliver traffic from the LDP highway to other neighbourhoods apart from Taman Puchong Indah and also an alternative route to Subang Jaya and Shah Alam.

Collector roads

Collector road is a low-to-moderate-capacity road that serves to move traffic from local streets to arterial roads and provide access to residential properties. In this context, *Jalan Indah 2* is the primary or major collector road meanwhile, *Jalan Indah 1* and *Jalan Indah 2/1* are the secondary collector roads like highlighted in pale orange as shown in [Figure 7(d)]. The 12m (40') width of *Jalan Indah 2* is considered a major collector road because it passes through the center of Taman Puchong Indah and connects to Taman Puchong Indah on the north. Apart from that, the traffic volume is higher compared to the other two minor collector roads. Thus, it concludes the most preferred road used by residents is *Jalan Indah 2*.

Local roads

Local road is a street that primarily used to gain access to the property bordering it likewise coloured in yellow as shown in [Figure 7 (b)]. Most of the local roads are 6m (20') in width. However, over the time residents owning more vehicles might use the road sides. This effect the local roads to be narrower and perhaps blocking access to respective residential.

Cul-de-sac

Cul-de-sac are local road with closed at one end or dead end road that is purposely design to limit traffic into residential areas. Cul-de-sac is a road type introduced during garden city design by Barry Parker and Raymond Unwin (Hassan, 2005). In the site study, they were only a few cul-de-sac used [All shown in green as in Figure 7(e)].

Entrances

There are four existing direct entrances to the neighbourhood currently [circled as **A**, **B**, **C** and **D** in (Figure 7)]. However, only entrance **A** [Figure 7(c)] is mostly used by the residents and also visitors due to its wide entrance and easy access from a less traffic road compared to **B** which access from an arterial road of *Persiaran Puchong Perdana*. Apart from that, much of the amenities and shoplots are located along both of *Jalan Indah 2* and *Jalan Indah 2/1*. Unlike **A**, **B** [Figure 8(a)] is less welcoming as an entrance due to its narrower and appeared dark as it is shaded by the trees. However, entrance **B** would be the main access to the mosque especially during Friday prayers'.

The other two minor entrances are located south of Taman Puchong Indah. The most unpopular entrance used by locals is entrance **C** which directly access to residential and the religious school. Coming from the main road of *Persiaran Puchong Perdana*, entrance **D** [Figure 8 (b)] is supposedly the most unsuitable access as it is narrower but directs users to the food court and also an improper parking area for the Light Rapid Transit (LRT) station.

Figure 8: From left: (a) Entrance B; (b) LRT parking area.

Railway Line

Elevated railway, an extension of the Light Rapid Transit (LRT) line from Sri Petaling to Putra Heights only been built and operates after 2013. This railway line runs parallel with the arterial road of *Persiaran Puchong Perdana* [Shown in (Figure 7) as in purple]. The Puchong Perdana station [Figure 8 (b)] is the nearest station located to our site study. Even though it is a public transport amenity provided to give local residents options, there was not a proper pedestrian walkway that connects to the station.

Pedestrian Walkway

There were no proper pedestrian walkway that can be seen by the arterial road nor collector road in the site. This housing area has a design mainly for motorcar users, not meant for pedestrians. The only proper pedestrian walkways are the jogging track located in several green areas or park within the site and at the bus stop area (Figure 8).

Figure 8: Pedestrian walkways facilitated in certain pockets at the park and bus stop area only.

4.2 LANDMARKS

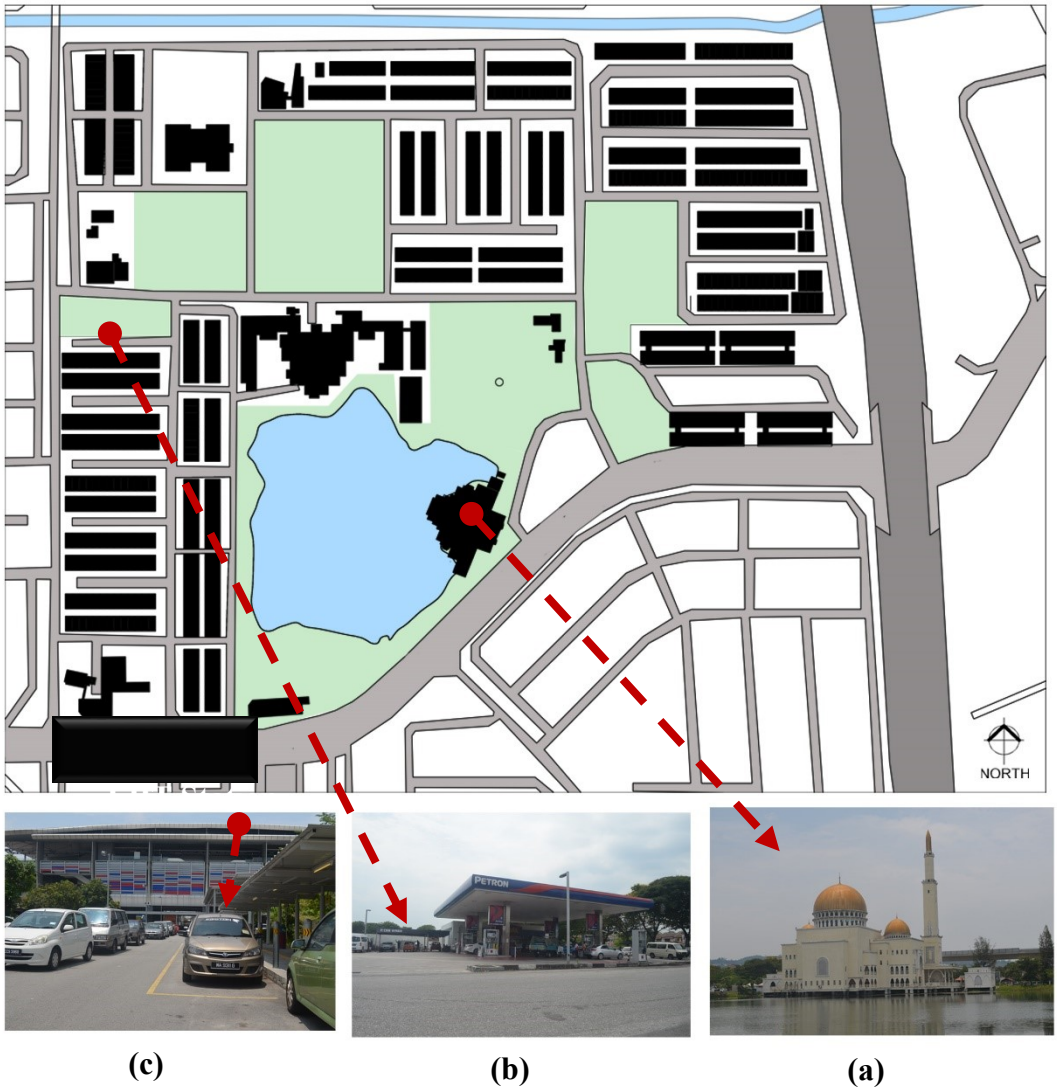

Figure 9: Landmarks of Taman Puchong Indah.

The only building that could be considered as a landmark in terms of Lynch's definition is *Masjid As-salam* [Figure 9(a)]. It is the most popular mosque associated to Puchong Perdana as a prestige religious building that floats by the lakeside and a large recreational park as its background. *Masjid As-salam* architectural style is inspired by the Middle East with a modern touch and was built during the early 2000's. It is visited not only by the local residents, but also outsiders as it is quite famous for holding religious talks from famous and infamous *ustadz*, solemnizations and wedding receptions. Next, is the Puchong Perdana LRT station [Figure 9(b)] which can be seen along the main road of *Persiaran Puchong Perdana*. The LRT station could also be considered as the secondary landmark due to its elevated position, façade design and massive size.

There are several other buildings that a person might think it as a landmark because of its size or brand. For example, the most common landmark perceived by people is the petrol station [Figure 9(c)] because brand tends to be associated in people's memory more than a building that has no distinctive architectural style or even functionality and characteristics. As for *Sekolah Kebangsaan Puchong Indah* and also *Dewan Serbaguna MPSJ Puchong Indah,* both could not be considered as a landmark because government schools and local community halls tend to have typical design as like any other areas in Malaysia (As shown in Figure 11).

Figure 10: From the left: Sekolah Kebangsaan (SK) Puchong Indah and Dewan Serbaguna MPSJ Puchong Indah.

4.3 NODES

Nodes would be rank in third for urban design elements that is dominant in the study area as there are a large amount of area allocated for open public spaces or green areas unlike other neighbourhood. Separated into three space rank as shown in (Figure 11), as follows:

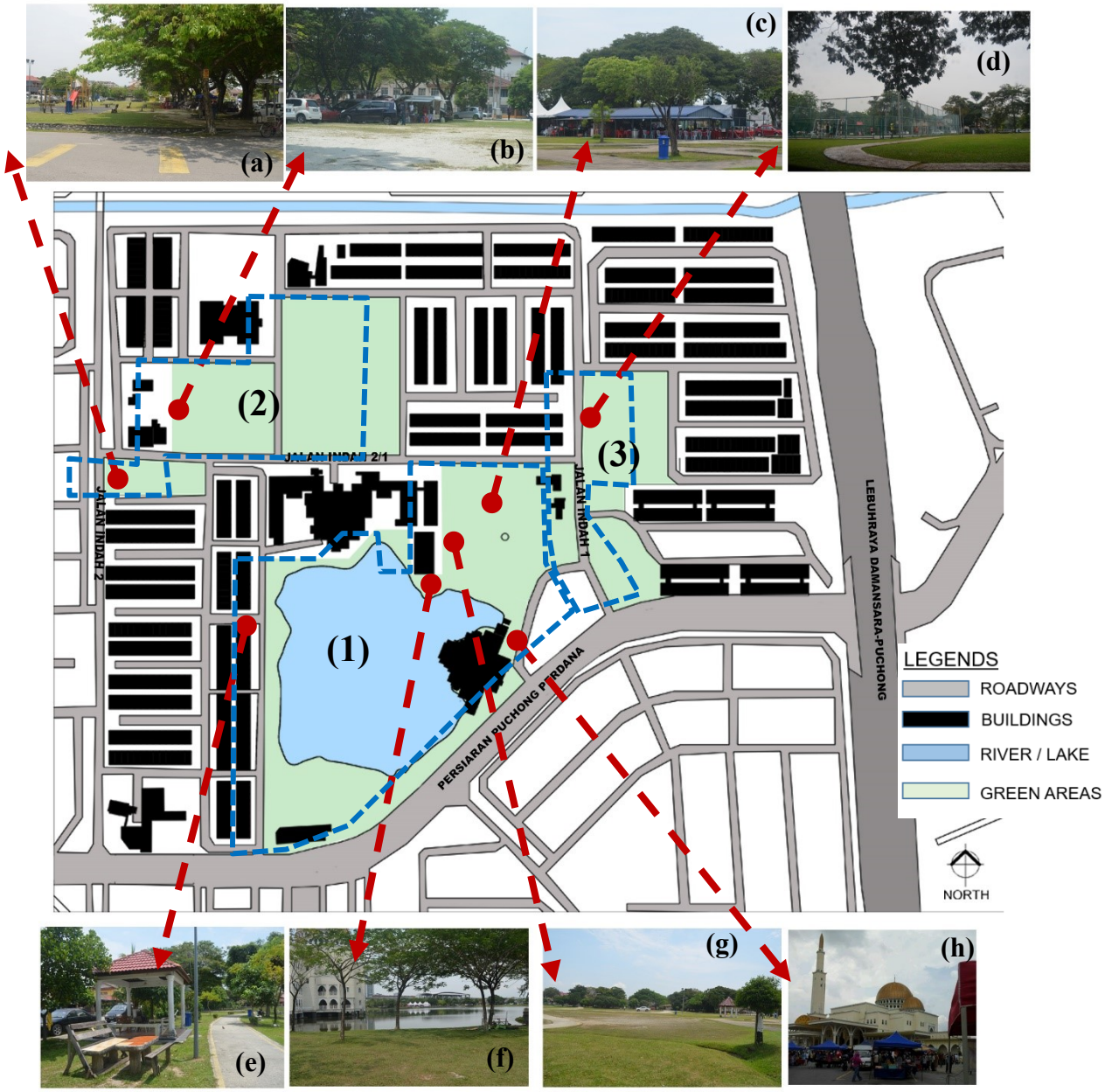

Figure 11: Nodes of Taman Puchong Indah.

(1) *Taman Tasik Puchong Perdana* is the largest community park that caters for the whole Puchong Perdana population. Known for having the man-made lake overlooking the *Masjid As-salam* with various softscape and hardscape spaces that promotes social and economic activities such as recreational likes fishing [Figure 11(f)] and jogging [Figure 11(e), wedding receptions, gathering spot for groups of people [Figure 11(g)] and selling food and goods at stalls, bazaar or/and food trucks [Figure 11(c), (h)].

(2) These three areas consists of an open space, football field and children's' playgrounds. The open space in the middle field is mainly used as a gathering spot. For example, in [Figure 11(b)] shows a group of bird-lovers showcasing their collections of bird in cages using their motorcars similarly to a car boot sale during the morning weekend. On the contrary, the largest field consist of an open public football field and a children playground nearby the residential. Considering the size, it is assume to be used by *SK Puchong Indah's* as their school field because there are not enough space in the school area by looking at the ground map. Its strategic location nearby the main entrance to Taman Puchong Indah, the smallest field with a children playground that is purposely design for the residential nearby has been taken advantage by sellers to open their small stall during the weekend.

(3) These two open spaces houses the most sport and recreational courts such as a basketball, a futsal [Figure 11(d)], badminton and takraw courts, and also children playground that caters for the residential nearby.

The existence of the public place is one of the important components in contributing to the place identity that constitute a sense of attachment affecting the wellbeing, quality of life and life sustenance of the residents. Literatures in urban design and urban landscape planning suggest that open public spaces is a domain that affords residents to establish bonding or rootedness to a town (Green, 1999; Hammit, 2004; Child, 2004). The meaning is directly influenced by (1), physical properties such as structures and/or buildings and interaction of people; (2) the perceptual and social attributes: sense of belonging, rooted, identity or familiarity of events and activities. However, the consequences of having too many open spaces with relatively near distance between each other sometimes cause wastage of land as it is left unattended or not wisely used most of the time.

4.4 EDGES

Edges is rank in fourth because in context of the site, it is less acknowledgeable by people when they move around the neighbourhood. However, there are some exceptional edge which clearly can be distinguish. The most distinct edge is at the south of Taman Puchong Indah, where the elevated LRT railway runs alongside the arterial road of *Persiaran Puchong Perdana* due to its visible position, size and length. Next, would be the highway on the east side of the site. This edge is mostly covered with natural plants and trees with long stretch of drainage meanwhile, only a certain portion of highway can be seen. The least distinguish edge would be up north of Taman Puchong Indah with a 12m (40') width of monsoon drain. (Figure 12). The monsoon drain is covered with a buffer zone of plants and also steel fences.

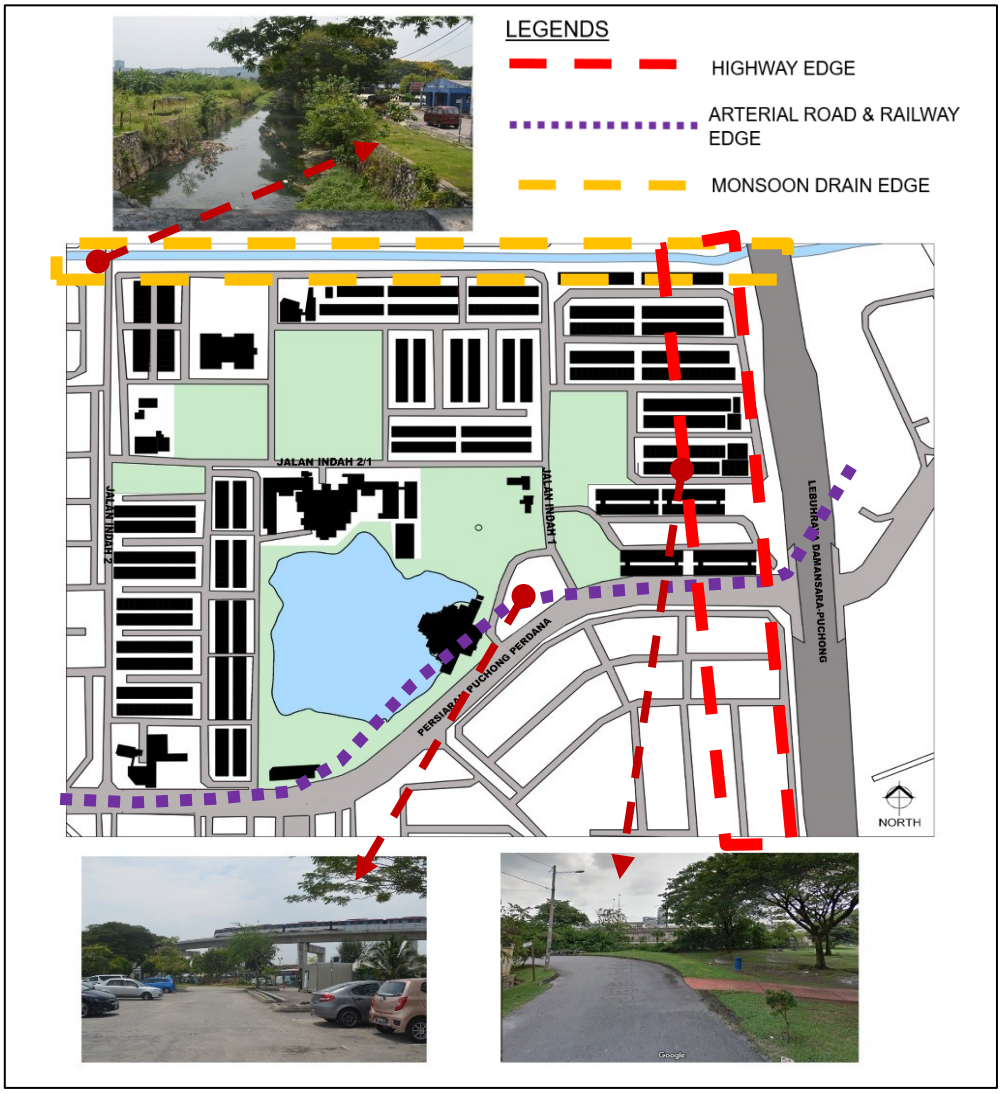

Figure 12: Edges of Taman Puchong Indah.

4.5 DISTRICTS

Districts is the poorest rank of dominant in the urban design elements for Taman Puchong Indah. It is the hardest for people to distinguish district even through visibility. Hence, people tend to distinguish districts base on its function, land use zoning or types of buildings and/or its architectural styles.

Figure 13: Districts of Taman Puchong Indah.

Based on (Figure 13), the red dashed box is a district of another garden housing estate called Taman Dahlia. However, visibly this housing neighbourhood is seamless and seems to connect with Taman Puchong Indah well and only can be distinguish by the road names. Since, the area is included as the case study area, the districts are classified as residential, commercial, and recreational or green areas. Green area or open spaces would be the most dominant district in the area. Next, would be the landed residential area coloured in pink in (Figure 13). It consist of a mix off single storey with double storey terrace houses. Another district that is distinct is the 8 blocks of low-medium cost apartment placed in the bottom right corner of the site. Only a small portion of commercial area can be seen on site.

4.6 URBAN PATTERN

After analyzing through the literatures and results based on Lynch' urban design elements, it is obvious that the urban pattern for Taman Puchong Indah is a simple geometry pattern used during the 1970-1990's style. It had an influenced from modern urban design pattern with various basic rectangles. Only the edges parallel to the arterial or main road of *Persiaran Puchong Perdana* is curvilinear, but the access to residential area uses straight collector roads and local roads.

Figure 14: The housing syles in Taman Puchong Indah.
Source from: Google Street View

Looking at the architectural style of its housing [Figure (14)], it looks more like simple geometric simplified cottage style for the apartment and also the single storey and double storey terrace house located at the west side of the case study site. Meanwhile, the double storey terrace house situated at the east side has a bit complex geometric simplified cottage style during the period of 1990-2010's (Hassan, 2005). In comparison to the period it is being built which is around end of 1990's to early 2000's, it should have applied a more complex geometric planning and its architecture styles should have a mixture with European. However, it might be explained with the target buyers for the houses built during that time was probably aim for low-income to medium-income families.

4.7 DISCUSSION: ISSUES AND RECOMMENDATIONS

Taman Puchong Indah consist of all the five urban design elements identified by Lynch (1960) and thus shows how legibility is the area to the local residents and visitors. However, there are several issues to be highlighted in improving the urban design of the studied area:

(1) Lack of proper pedestrian walkways to promote a safe pedestrian movement.

(2) Numerous allocated areas of open spaces with relatively near distance between each other creates wastage of land use.

Firstly, to provide a proper pedestrian walkways. The site have an access to public transportation like the LRT and intercity bus. However, there are not proper pedestrian provided users to the station and bus stops. Apart from that, with the numbers of open spaces and greenery areas, there should have provided linkages such as pedestrian or jogging tracks with cycling tracks that connects these parks. Currently, the open spaces are also lacking in terms of providing the right facilities for the proper activities. For example, providing a proper fishing area, adding more gazebos and seating area will encourage more users to make use of the existing green area. Since its lacking in shaded areas, more trees should be planted especially along the existing jogging track.

5. CONCLUSION

As a conclusion, this research has shown all of the design elements identified by Lynch (1960) that are important and represent good urban environments and mental mapping of a neighbourhood. An ordered and distinctive environment will help the local residents and also visitors to better orientate themselves in exploring the area. The simplified geometric urban pattern might be the factor for making it easy for users to read their way. The good connectivity of its streets from the residential to local road to collector road to arterial road and thus directly to the highway which ease accessibility of users to the city and other major towns. Moreover, the public transport also gave users alternative access to the city. However, a proper walkway should have been propose to encourage users to make use of the public amenities and create safe pedestrian zone.

Having an iconic landmark and ample amount of green areas in this neighbourhood has promote social interaction with recreational, sports and commercial activities. The existence of the public place is one of the important components in contributing to the place identity that constitute a sense of attachment affecting the wellbeing, quality of life and life sustenance of the residents. Literatures in urban design and urban landscape planning suggest that open public spaces is a domain that affords residents to establish bonding or rootedness to a town (Green, 1999; Hammit, 2004; Child, 2004). However, numerous allocated areas of open spaces with relatively near distance between each other creates wastage of land use for open spaces.

People perceived their living environment they need to be able to recognize and organize these urban elements into a coherent pattern (Lynch, 1960). The quality of being clear enough to read by people in urban design is what matters.

6. ACKNOWLEDGEMENTS

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IDENTIFY THE FUNCTIONALITY OF FIRE SAFETY ENGINEERING AND TECHNOLOGY IN THE CONTEXT OF MEANS OF ESCAPE (MOE) FOR GOVERNMENT HOSPITALS IN MALAYSIA

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ABSTRACT

This paper aims to present mainly about fire safety in terms of engineering and its technology. Fire safety itself has its system, steps and arrangements. Fire safety is one of the most important parts that need to be taken care of anytime and anywhere. It has its engineering system and technology. Fire protection engineering is an application of science and engineering principles to protect people, property, and their environments from the harmful and destructive effects of fire and smoke. It uses engineering which focuses on fire detection, suppression and mitigation and fire safety engineering which focuses on human behavior and maintaining a tenable environment for evacuation from a fire. In the United States 'fire protection engineering' is often used to include 'fire safety engineering'. In this paper, the literature based on the regulation will be thoroughly explained. An explanation will be given on the engineering and technology being used in the fire safety system to allow a better understanding. The discipline of fire safety engineering and technology do include the fire detection system, active fire protection system, passive fire protection system, smoke control and management, escape facilities and fire prevention program as well. But in this paper, there are 4 elements fixed. They are staircase, signage, emergency lighting and fire door. These 4 elements will be inspected during the site visit at all 6 selected hospitals. This is to ensure what type of technology they are having, either the old one or the latest one.

1. INTRODUCTION

The main objective to be achieved in this paper is to obtain a brief result of what technology the government hospitals are using for the selected 4 elements. The 4 elements are staircase, fire door, emergency lighting and signage. Then, the technology which is being used in other countries will be explained and will be suggested. The better the technologies the safer the building occupants will be. Fire safety systems are usually well planned and designed and located at a specified place. However, the problem usually occurs after the building is on fire where they realize the fire appliances are not in a condition where it can be used. Dieken (2013) stated that when facing the fire about one-third of security systems are not functioning properly due to the lack of inspection, testing or maintenance of such systems.

The authors stated that due to lack of maintenance activity, around 49% of installed fire appliances and fire systems fails and causes damage to property of about 15.9million dollars a year. Unfortunately, this failure can only be detected when the building is already on fire. It can be avoided if the maintenance activity being increased. More inspection must be done to decrease the damage to the property and deaths caused by fire. All the staffs also need to be aware of anything related to fire. Zailan (2015) has concluded that many of the staff did not aware of how to handle the fire hazards when the building is on fire.

2. LITERATURE REVIEW

The accident happened at HSA has been recorded as the worst fire accident ever happened involving an old government hospital building that killed 6 ICU patients. Based on that accident, Minister of Health Datuk Seri Dr. S. Subramaniam said that most government hospitals need audits (Kili,2016) this is because most of the fire accidents involving government hospital are the old hospital that has been built before the existing of regulation as stated by State Health and Environment Committee chairman Datuk Ayub Rahmat, the hospital was built in the 1930s and there was no requirement for the certification as the Fire Services Act 1988 is only exist and required for the building that is built after 1988 (Said 2016). Fire is a basic element in us that is very important to us as it is being used in our daily life activities. Fire incidents are inevitable but we as humans need to learn how to reduce the possibilities for a building to be on fire.

Generally, when a building is on fire it can cause a lot of damage to the building itself and the human too through its burning process. Humans begin to control fire about a million years ago, first by controlling and directing natural fires, then by utilizing and directing these fires, and by knowing how to light their fires (Stewart1956, Sauer1975, Schiile1990). They noticed that their game was being hunted in new grass after a lightning strike and mimicked the process. Since then, throughout the world and history, humans have relied on fire as a convenient, effective, and convenient tool for managing their environment (Thomas1956, Pyne1995). Native Australians were burned to control habitat for hunting and gathering (Lewis1989, Braithwaite1991). English aristocrats burned moorlands regularly to manage grouse habitat (Maltby et al. 1990), and Native Americans burned Great Plains 2 to increase grazing which continues until today, as breeders in the Kansas and South African territories to manage their areas, as forest dwellers in South America or India to promote certain forest habitats, or as Brazilian farmers to improve pastures and provide farmland (Mistry 1998).

According to the CTIF Fire Statistics Centre, at the beginning of the 21st century, the Earth's population was 6300 000 000 with annual burns reported 7 000 000 to 8 000 000 with 70 000 to 80 000 deaths and 500 000 to 800 000 fire injuries. At the beginning of the 21st century, the population of Europe is 700 000 000 with annual burns of 2 000 000 to 2 500000 reported with 20 000 to 25 000 fire deaths and 250 000 to 500 000 fire injuries. According to the Canadian Fire Marshal Council and the Commissioner of Fire (2001), in 2001, 55 323 fires were reported in Canada, resulting in 338 deaths, 2310 fire-related injuries and over one billion dollars in property loss. Of the reported fires,

39% occurred in residential areas and accounted for 81% of all fire-related deaths.

In Malaysia fire losses occur millions of dollars every year. The fire has caused many lives, causing widespread injury and damage to nature and the environment. Between 1985 and 1997, the Malaysian Fire and Rescue Department stated that the number of false fire alarms was 13249, the total number of firefighters was 163153, the death toll was 729, the total number of injuries was 1045 and the estimated loss was 3 728 987 million Malaysian Ringgit. The incidence of residential fires has significantly decreased (about 50%) over the last 20 years. 3 This is mainly due to increased public awareness of fire prevention strategies, improved building techniques, emergency services emergency response and strict fire code implementation (Forintek Canada Corp, 2002).

These advancements have been supported by increased knowledge of fire and smoke behavior in the structure as a result of ongoing fire research activities, which include a combination of large scale fire, laboratory and field tests, and computer modeling. The wind generation system will be used in future research to study the distribution of wind stress on the structure of the fire and how it affects the behavior of fire and the movement of heat and smoke within the structure (Weisinger,2004). The ability to understand and measure the thermal expansion of the compartment (room) is very important for the fire protection industry. Knowledge of compartment fire temperature enables the prediction of hazardous conditions, damage to property and structure, ignition of objects, change in combustion rate and the onset of flashover (Walton,2002).

So, to decrease the fire cases in Malaysia and mainly at the government hospitals, they need to upgrade their systems to a better one. Based on what we focus, the 4 elements, which is a fire door, emergency staircase, emergency lighting system and signage need to be upgraded and must be using the one with the best and the latest technology. The death caused by the fire in a building will surely decrease and this is the main reason why we are inspecting the government hospitals. Hospitals are a place that will be always compact with a huge number of people including patients, visitors and workers in the hospitals itself. So, it doesn't lose any benefit actually if they spend money to upgrade and replace their system and technology with the best and the latest one.

3. RESEARCH PROGRAMME

To achieve the aim and objective of this assessment of fire safety appliances at the government hospital building, this research will be starting with a literature survey for developing an understanding of fire safety and evacuation management in the government hospital building and to study the previous cases that happened. To increase the knowledge more about fire safety evacuation, this research is continued by doing the preliminary study. The main part which is being focused on is the technology used in some selected elements. The selected elements are staircase, signage, door and emergency lighting.

From the literature survey results it is very useful and good to develop a brief preliminary study. This preliminary study consists of a qualitative method and a quantitative method. Site observation is conducted by evaluating the fire safety appliances and evacuation management of the

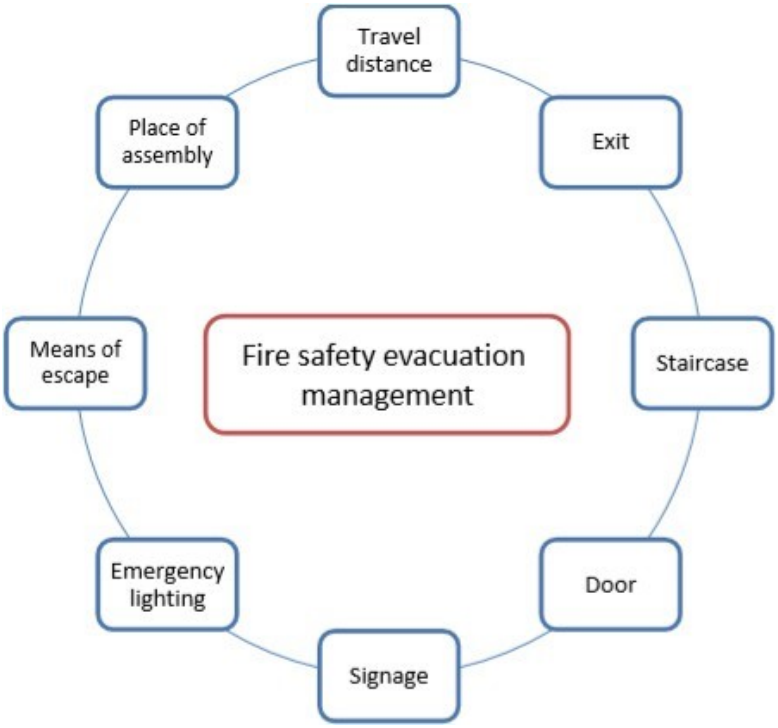
government hospital building by doing visual inspection based on the compliance code checklist and the check the documentation about the fire safety management. During the site visit, all fire appliances have been inspected in every 6 hospitals. All 6 hospitals mostly are using similar fire appliances and they just differ in the quantity of the fire appliances. The 6 hospitals stated areas in the table below.

Hospital Name	The year of hospital operation	No. of bed
Hospital Pulau Pinang	81	1090
Hospital Seberang Jaya, Seberang Perai Tengah	20	314
Hospital Bukit Mertajam, Seberang Perai Tengah.	50	242
Hospital Kepala Batas, Seberang Perai Utara	15	108
Hospital Sungai Bakap, Seberang Perai Selatan	50	105
Hospital Parit Buntar, Perak	91	150

Source: Researcher Survey, 2017

4. RESEARCH FINDINGS AND DISCUSSION

There are 7 elements of means of escape. They are travel distance, exit, staircase, door, signage, emergency lighting and place of assembly. All these elements are the main components for the fire safety evacuation management. But not all the elements require and have the technology. As an example, there is no such technology for the travel distance element. It is a measurement stated by the authority to make sure the building occupants will be easier to evacuate during an emergency. So, the elements inspected during the site visit are staircase, door, signage and emergency lighting. Based on the literature review, we can conclude that most of the government hospitals can be classified as an old building. So, the reason why we inspect the selected elements is to know the type of technology being used.



5. OVERALL FINDINGS

Description	Fire Staircase	Fire Door	Signage	Emergency Lighting
Hospital Pulau Pinang				
Hospital Seberang Jaya, Seberang Perai Tengah				
Hospital Kepala Batas, Seberang Perai Utara				
Hospital Bukit Mertajam, Seberang Perai Tengah.				
Hospital Sungai Bakap, Seberang Perai Selatan				
Hospital Parit Buntar, Perak				

Table 1: The table shows the overall finding collected at every 6 hospitals

Legend: YES
NO

5.1 RESULT BY HOSPITALS

Description	Hospital Pulau Pinang		Comments
	Yes	No	
Staircase			They are having a normal emergency staircase without any technology usage.
Door			They are having the normal fire-rated door.
Signage			They are using the latest version of the signage system.
Emergency lighting			They do have emergency lighting, but not with the latest technology.

Table 2: Data collected at Hospital Pulau Pinang.

Description	Hospital Seberang Jaya, Seberang Perai Tengah		Comments
	Yes	No	
Staircase			They are having a normal emergency staircase without any technology usage.
Door			They are having the normal fire-rated door.
Signage			They are using the latest version of the signage system.
Emergency lighting			They do have emergency lighting, but not with the latest technology.

Table 3: Data collected at Hospital Seberang Jaya, Seberang Perai Tengah.

Description	Hospital Kepala Batas, Seberang Perai Utara		Comments
	Yes	No	

Staircase			They are having the normal emergency staircase without any technology usage.
Door			They are having the normal fire-rated door.
Signage			They are using the latest version of the signage system.
Emergency lighting			They do have emergency lighting, but not with the latest technology.

Table 4: Data collected at Hospital Kepala Batas, Seberang Perai Utara.

Description	Hospital Bukit Mertajam, Seberang Perai Tengah.		Comments
	Yes	No	
Staircase			They are having a normal emergency staircase without any technology usage.
Door			They are having the normal fire-rated door.
Signage			They do have the signage but it is not the latest version.
Emergency lighting			They do have emergency lighting, but not with the latest technology.

Table 5: Data collected at Hospital Bukit Mertajam, Seberang Perai Tengah.

Description	Hospital Sungai Bakap, Seberang Perai Selatan		Comments
	Yes	No	
Staircase			They don't have any staircases in the emergency area.
Door			They are having the normal fire-rated door.
Signage			They are using the latest version of the signage system.

Emergency lighting			They do have the emergency lighting, but not with the latest technology.

Table 6: Data collected at Hospital Sungai Bakap, Seberang Perai Selatan.

Description	Hospital Parit Buntar, Perak		Comments
	Yes	No	
Staircase			They don't any have a staircase in the emergency area.
Door			They are having the normal fire-rated door.
Signage			They do have the signage but it is not the latest version.
Emergency lighting			They do have emergency lighting, but not with the latest technology.

Table 7: Data collected at Hospital Parit Buntar, Perak.

6. DISCUSSION

6.1 EXAMPLES OF TECHNOLOGY USED IN OTHER COUNTRIES

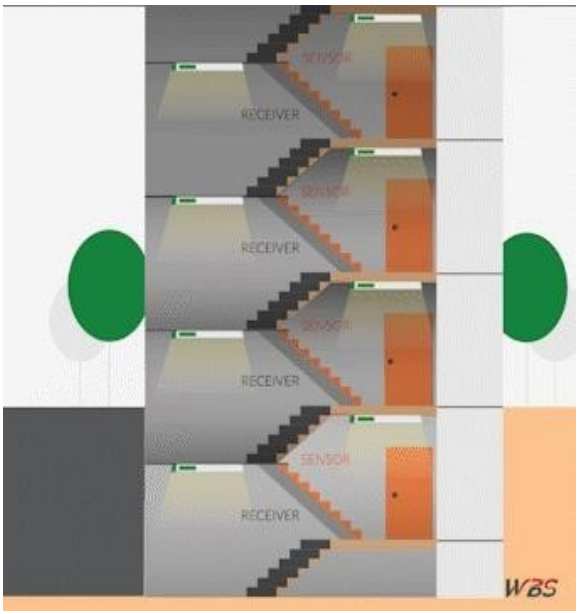
6.1.1 EMERGENCY FIRE DOOR

The emergency fire door nowadays is having many types of technology. There is 3 main technology being used which is a hard-wired fire door, radio-controlled fire door sound-activated fire door. Hard wired fire doors are used worldwide and are ideal for new buildings as they have a direct wire connection to the building's fire detection system. Under normal circumstances, 24 V dc power is supplied to the door handles so that they can hold the door open. When a fire is detected by a fire panel, the power is cut loose to allow the door to close. Errors in wiring or power supply to the door will cause them to fail and release the door.

Hard fire door handlers use all shapes, sizes and finishes to suit all applications. Radio-controlled fire door retainers are wirelessly triggered by radio waves connected to existing fire panels or interface units. Because of the minimal wiring required, these are often used for installation on large buildings which still offer high levels of protection. These systems are installed by a trained professional. Fire door alarms are activated by a reaction to a fire alarm and some devices can detect a specific fire alarm, so they will only be released when the alarm goes off. This is a cost-effective

solution as there is no need for wiring to the fire panel. Sound-activated fire door alarms use powerful batteries and can be installed quickly and easily. They are wire-free, so installing them will not affect the building's infrastructure.

6.1.2 EMERGENCY STAIRCASE



The NCC requires fireplaces in multi-story buildings for the safe evacuation of all residents during power outages and emergencies. To meet the requirements of the NCC and the Australian Standard, fire lamps are needed 24 hours a day, 7 days a week, resulting in significant energy waste and rising power consumption costs. WBS energy-saving lighting solutions provide up to 90% savings by reducing all emergencies and emergency lighting to 20% brightness when uninhabited. For improved occupants' safety, all lights are wireless and equipped with a motion sensor to light the street in front of the occupants. This can eventually save energy and at the same time can provide service during the emergency period to the building occupant.

6.1.3 EMERGENCY EXIT SIGN

For the exit sign, the latest is by using the image of a person running. The following information from International Signs (ISO 38641-1) Exit Signs is slowly replaced by pixels. All new buildings will be changed from the word EXIT to the running male picnic. This applies to all projects with

building approval after May 2006.

(Old type of exit sign)

(New type of exit sign)

An exit sign must be easy to be seen by anyone approaching the exit and must be installed above or adjacent to each door. Most of the new buildings are required to use these types of exit signs to make the building occupants more aware of where they need to go when the building is on fire. All the buildings in Malaysia also need to upgrade to this type of sign to make the building occupants easier.

6.1.4 EMERGENCY LIGHTING

This is the latest type of emergency light. Emergency lights and outlets are both subject to monthly, 6 months and 12 months maintenance as stated in AS 2293. Emergency signs and exits are installed in the building to guide the occupants to the exit in case of an emergency. They should also remain alert for 90 minutes should the building fail. To increase the technology of appliances in the building they should upgrade to this type of emergency light

7. CONCLUSION AND RECOMMENDATION

Based on the result obtained from the site visit, there are 4 selected elements inspected during the site visit. The 4 elements are staircase, fire door, emergency light, and emergency light. All the hospitals inspected do have the 4 elements, but they don't have the one with the latest technology which can help and save a lot more energy when compared to the energy usage now. The 4 hospitals, Hospital Pulau Pinang, Hospital Seberang Jaya, Hospital Sungai Bakap and Hospital Kepala Batas directs to the same result. They don't use the elements with technology for all elements except for the signage. The balance 2 hospitals, Hospital Bukit Mertajam and Hospital Parit Buntar don't have any elements with technology. Most of the hospitals don't use the elements with the latest technology. They need to upgrade and use to gain more benefits and save more energy. The energy being used there can be transformed and used to other places and at the same time they can save a lot of maintenance costs. It will direct to a big impact if they change the systems and technology that is being used in the government hospital. The technology that is explained in the discussion part is the latest technology that is used in other countries and it has been proven that it gives a positive result. These types of technology surely need to be implemented in Malaysian government hospitals. All 4 technologies explained in the discussion need to be introduced to increase the safety of building occupants in Malaysian government hospitals

8. ACKNOWLEDGMENT

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MENTAL MAPPING ON URBAN DESIGN ELEMENTS WITH A CASE STUDY AT KLANG CITY CENTRE, SELANGOR

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Mental Mapping on Urban Design Elements with a Case Study at Klang City Centre, Selangor

ABSTRACT

This study investigates urban design elements at Klang City Centre, Selangor. Klang is a royal city and former capital of the state of Selangor, Malaysia with the papulation of 240,016 peoples. Business and even its bus terminal have been dragged out of town. The livability of the town is declining, and antisocial activities are not uncommon. One of the important urban elements is the economy and sense of place by an understanding of the city through its history, it's dynamic and the process of growth. The study conducted by visiting the site, observations and open-ended interviews to understand the area. Targeted interviewees are observers who frequently use around Klang, Selangor as a Royal City. This study is to analyses the economy and sense of place is by an understanding of its history, its dynamic and the process of growth. The study also will approach five urban design element that proposed by Kevin A. Lynch which is the paths, edges, district, nodes and landmarks

1. INTRODUCTION

The aim of this study is to understand the urban design planning elements at a case study of Klang, Selangor and how the site integrates the five elements of urban design elements by Kevin Lynch (paths, edges, districts, nodes and landmarks). From the study, it is expected to find out whether the site successfully adapts the urban design elements not only on its usage, but also in the urbanity of the space. This could be a tool to determine the quality of urban design fabrics about their space characteristics.

As an introduction Klang are officially Royal Town of Selangor and former capital of the Selangor in an earlier prior to the emergence of Kuala Lumpur. Klang is divided by North of Klang and South of Klang, which are separated by the Klang River. North of Klang used to be the main commercial centre and its divided into three sub-district which is Meru, Rantau Panjang and Kapar. After 2008 more commercial and residential areas as well as government offices are being developed in South of Klang. Government and private health care facilities are also located at Klang South area and tends to be busier and becomes the centre of social and recreational activities after office hours and during the weekends. It can be seen by the rapid growth of new and modern townships all located within Klang South area.

In Kevin Lynch's book "The Image of the City", he analyzed on the way a citizen can

successfully function in his own environment as well as interacting with the other citizens by approaching five basic design elements in planning which is path, edges district, nodes and landmark. A clear mental map of the urban environment is needed to counter the always looming fear of disorientation. A legible mental map gives people an important sense of emotional security, it is the framework for communication and conceptual organization, and heightens the depth and intensity of everyday human experience.

2. LITERATURE REVIEWS

The renowned urban designer Kevin Lynch (1960) and his book The Image of the City stated 5 elements in urban design like paths, edges, districts, nodes and landmarks to make a city and help to make a visual image to the people. Kevin Lynch explains on the concept of perception where people understand the layout of a place with mental mapping which contains mental images in urban design as follow (Lynch, 1960):

2.1 PATHS

Paths is a passage that can make people move from one places to another place. Usually paths are something that connecting from one area with another area in order to link between areas. It is the elements that play important role in urban design element since it is important to connect the people to the building or area. Furthermore, paths with great and famous origins and locale have stronger identities and support to connect the city together. There are many types of paths such as walkways, streets, transit lines, canal, as well as railroads.

2.2 EDGE

Edges are one of the basic of urban design elements. They are boundaries which separate two areas with visually predominant and continuous form (Lynch, 1960) for examples shores, railroad cuts, edges of development and walls. The continuous flow and clear images are crucial, but strong edges also play it roles in urban design. Edges should be described as unity than becoming separately barrier and too far from another barrier, frequently paths like arterial road and seas always become the most effective orientation elements as well.

2.3 DISTRICTS

Inside a big city, there is a few large sections, medium to large that is tie to each other to become a city, known as districts. Districts are section or zone of the city or area which are scale from medium to large so that people can enter and remember as having some common, identifying single or uniform character like sizes, history, height, style, function, colors, income level and etc. District can be determined by its physical characteristics that are thematic continuities which may consist of

an endless variety of components: space, form, texture, detail, symbol and so on (Lynch, 1960).

2.4 NODES

According to Lynch (Lynch, 1960) ‘‘Nodes are strategic foci which observers can enter, which are not only small points but also squares, linear shapes and central districts etc.’’ Essentially, there are two types of nodes as urban spaces: concentrations of characteristics and junctions of path. A successful node should have unique features inside, and intensify some surrounding characters as well (Lynch,1960). Nodes act as the gathering points or location that strategically locate to be a main focal point of a city such as busy intersection or popular city center.

2.5 LANDMARKS

Landmarks are object or feature of focal points that is easily seen and recognized from a distance, especially one that enables someone to establish their location. Landmarks are one thing to indicate something or as reference points of certain places. Landmarks are usually something that are physically object that we can see such as buildings, signages or mountains. Landmarks also make people recognize the place by look it as the landmark, so it is set in their mind that the landmark is the icon to the certain place. Landmarks are not necessarily to be the tallest or biggest buildings, but landmarks can be any buildings or monuments that can related to the certain area so by looking at landmark, people can recognize and remember certain area.

3. BACKGROUND OF THE CASE STUDY

The study took place in Klang, officially Royal Town of Selangor and former capital of the Selangor in an earlier prior to the emergence of Kuala Lumpur. As a royal town and former capital of Selangor, Klang is characterized by historic buildings and traditional structures. Malaysia’s colonial history are mostly installed in its architectural style, social and cultural fabric. Among all these, the architectural fabric is probably the most enduring one (Kamal, 2008). The historic buildings themselves are important elements in a town development which can be seen in few cities in the world. They play an important role in defining the landmarks within the urban area. According to Fielden (2000), historic buildings give a sense of wonder and an eager feeling to the people to study the culture and people that produces them. In this study area there are various tourist attraction that can be visited which is Sultan Abdul Azizi Royal Gallery, Little India, the former Chartered Bank Building, Royal Klang Club, Klang Convent School and Tenku Kelana Indian Muslim Mosque. The Area are mostly consist of Government office and mix races commercial building.

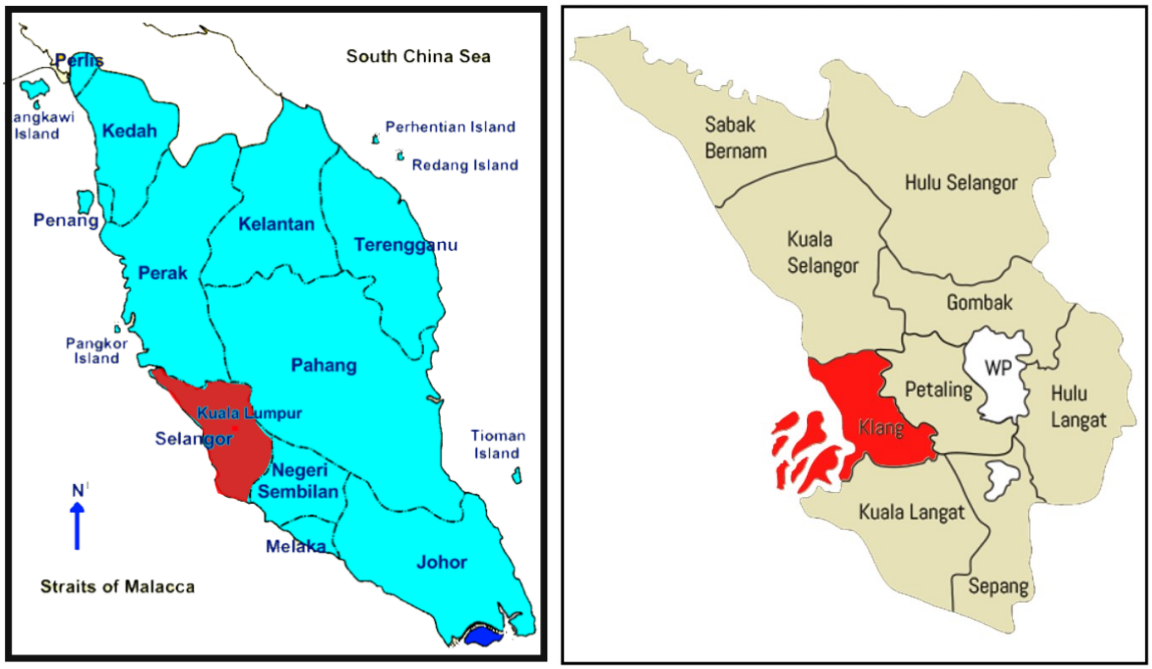


Figure 1: Key Plan of Selangor

Figure 3: Location Plan of Study Area

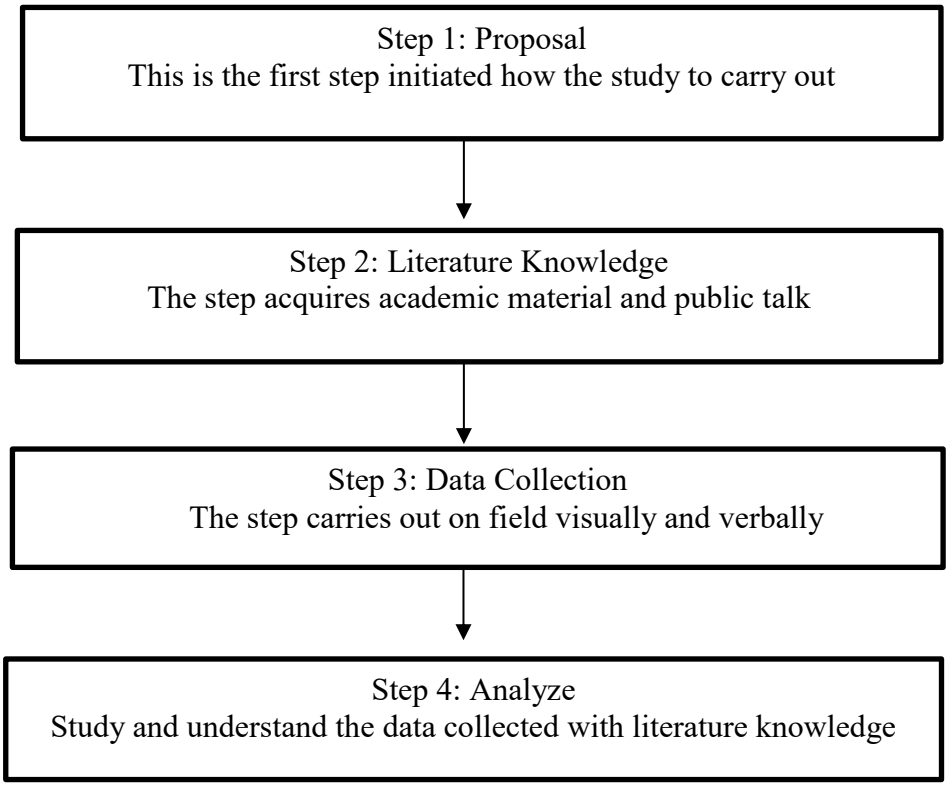
4. METHODOLOGY

This research applies out by qualitative method with reference to Lynch (1960) also used the same qualitative method to achieve his research aim. Urban elements and form are not easy to define, so there must be a practical and discussable analysis to be used as urban form is a composite of

characteristics related to land used urban design, patterns and transportations (Handy, 1996). Qualitative analyses method is used to observe and study the spatial pattern of the large, inert, permanent physical objects in Klang city based on the mental mapping projection after the urban trail around case study area. The method is aimed to analyses and understand every special urban character found within the case study area. of urban design elements.

The study conducted contained two phases for the purpose of the research methodology. The first phase consisted of literature search and review which was carried out through international journals. As the result of the literature review, the urban design elements are identified and defined in order to have initial understanding of each urban design elements before conducting the case study. Furthermore, a map of Klang, Selangor (Figure 3) is mapped out through AutoCad for the aim of conducting the survey. The second phase of the study, a site survey was conducted in Klang, Selangor in order to understand the quality of urban design elements by observing and collecting the data as well as interviewing local residents. In order to explore on the visibility of the urban design elements, they survey was conducted by foot. This would allow for recording of the existing forms and activities which could be used to fully understand the context and environment of the area.

There are three strategies to understand and analyses the basic urban design elements within Klang city. The first strategies is pre-assumption of the importance of basic urban design elements that can be found within Klang, Selangor .Secondly the importance and interaction of people to the urban design elements around Klang within the membrane of study's zone .Thirdly is manual extraction and analyses based on mental mapping of the urban design elements and its importance to the social, economic and cultural factors in hierarchical order. Figure 4 summarizes the stages of conducting this research.



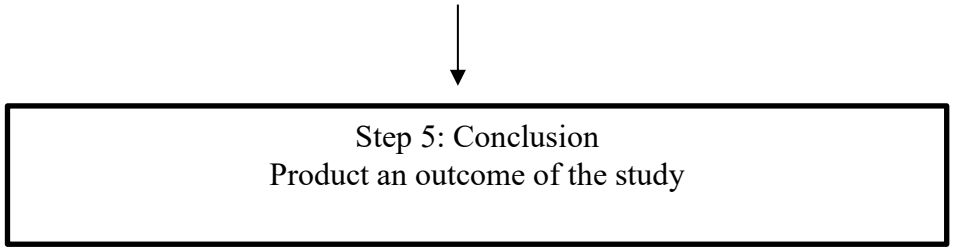


Figure 4: Methodology workflow

5. ANALYSIS OF URBAN DESIGN ELEMENTS IN K LANG, SELANGOR.

For the analysis, this research studied about the visual aspects of the precinct that were divided to five parts referring to the principles of urban design that was introduced by Kevin Lynch which are paths, edges, districts, nodes and landmarks.

5.1 4.1 PATHS

Path is considered as the most important element in urban design, as shown in Figure 5, Klang is accessible by a few roads and channels, which is by road or railway. The Hierarchical path order for the road start from arterial road, collector road and local road. Klang Royal City is accessible by two main road link (arterial road) that link from Kuala Lumpur to Klang which is Jalan Jambatan Kota(yellow) also known as Federal Highways and Jalan Tengku Kelana(yellow). Jambatan Kota road divided by 3 lane each direction while at Jalan Tengku Kelana only 2 lanes for each direction. Pedestrian walks (orange) can be identity along Jalan Tengku Kelana to ease the user to access to the other place especially to bus station and strain station. The bridge is connecting the North of Klang and South of Klang area.

With the width of 7 meter, the collector roads (green) are quite cramp and hard to supported by surrounding images because of scale of road against the building. The road quiet narrow(blue) and mostly it is one-way road while the building is pack, that's makes the road quite crowded with cars and public transport. Another access is by Klang rail station(purple) that connect the link from Pelabuhan Klang to KL Sentral. The Klang station is located close to the central part of Klang town. Serviced by a dedicated taxi and mini bus service and its within walking distance of Klang's Central Bus Hub, which provides connectivity to the whole of Klang and the surrounding areas.

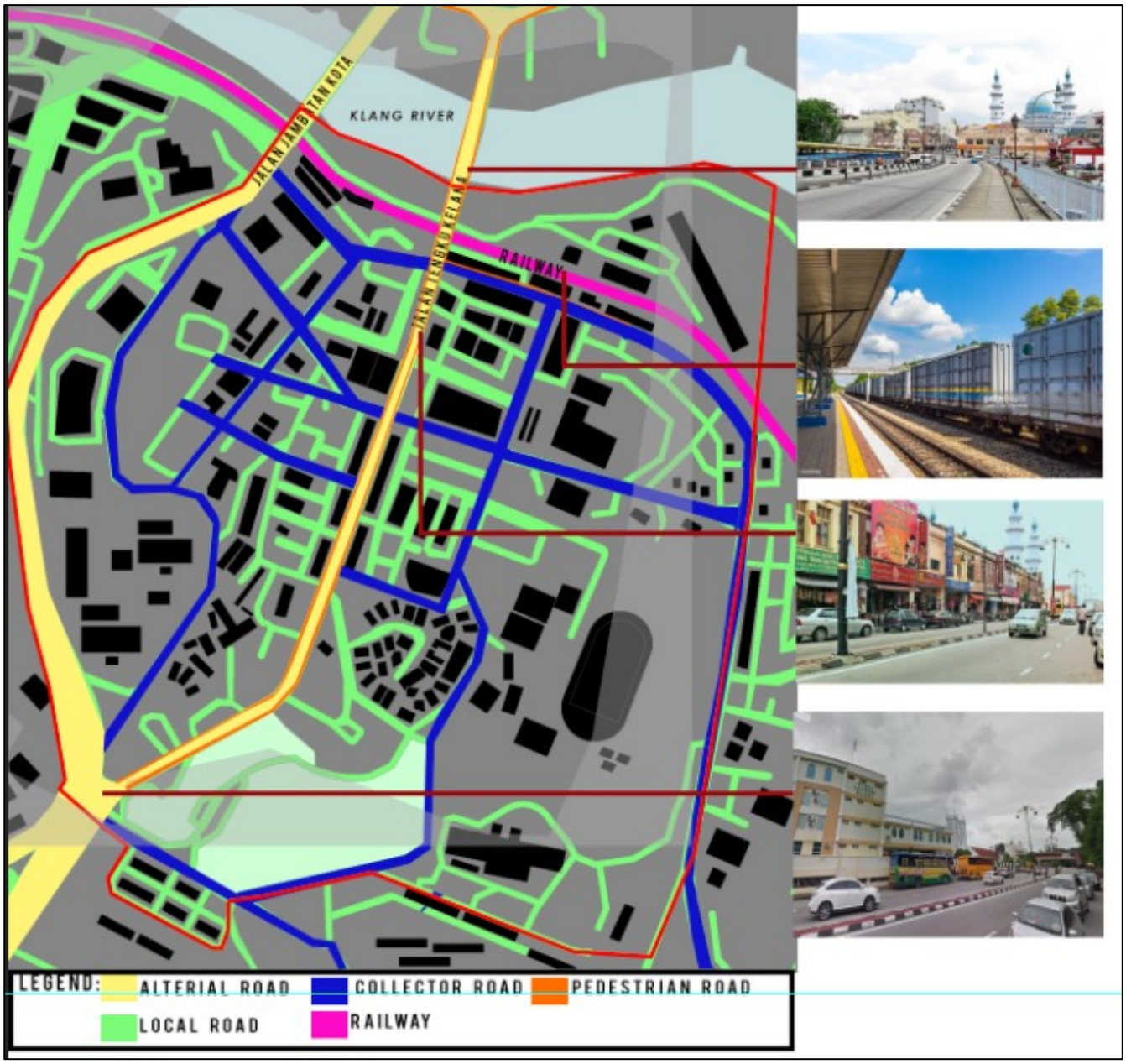


Figure 5: The paths in Klang, Selangor. The yellow indicates the primary road to the area, the blue lines indicate the arterial roads and the gray represent the Railway.

5.2 EDGES

Edges as the linear elements that act as boundaries between two kinds of areas and serve as lateral references. For Klang the edges that separate the area with the others are visually distinctive (Figure 6). The most dominant edges in Klang is Klang river that divide North of Klang and South of Klang, which are separated by the Klang River (Figure 7). Due to wide of the klang river, it become the natural boundary that divide the North area and South area of Klang.The only way to get into the North of Klang from the southern sides is by crossing the bridges that connect the area to the adjacent area (Figure 8). The railway at klang rail station (Yellow) that connect the link from Pelabuhan Klang to KL Sentral become the man-made edges that separate this Klang city area to another area.

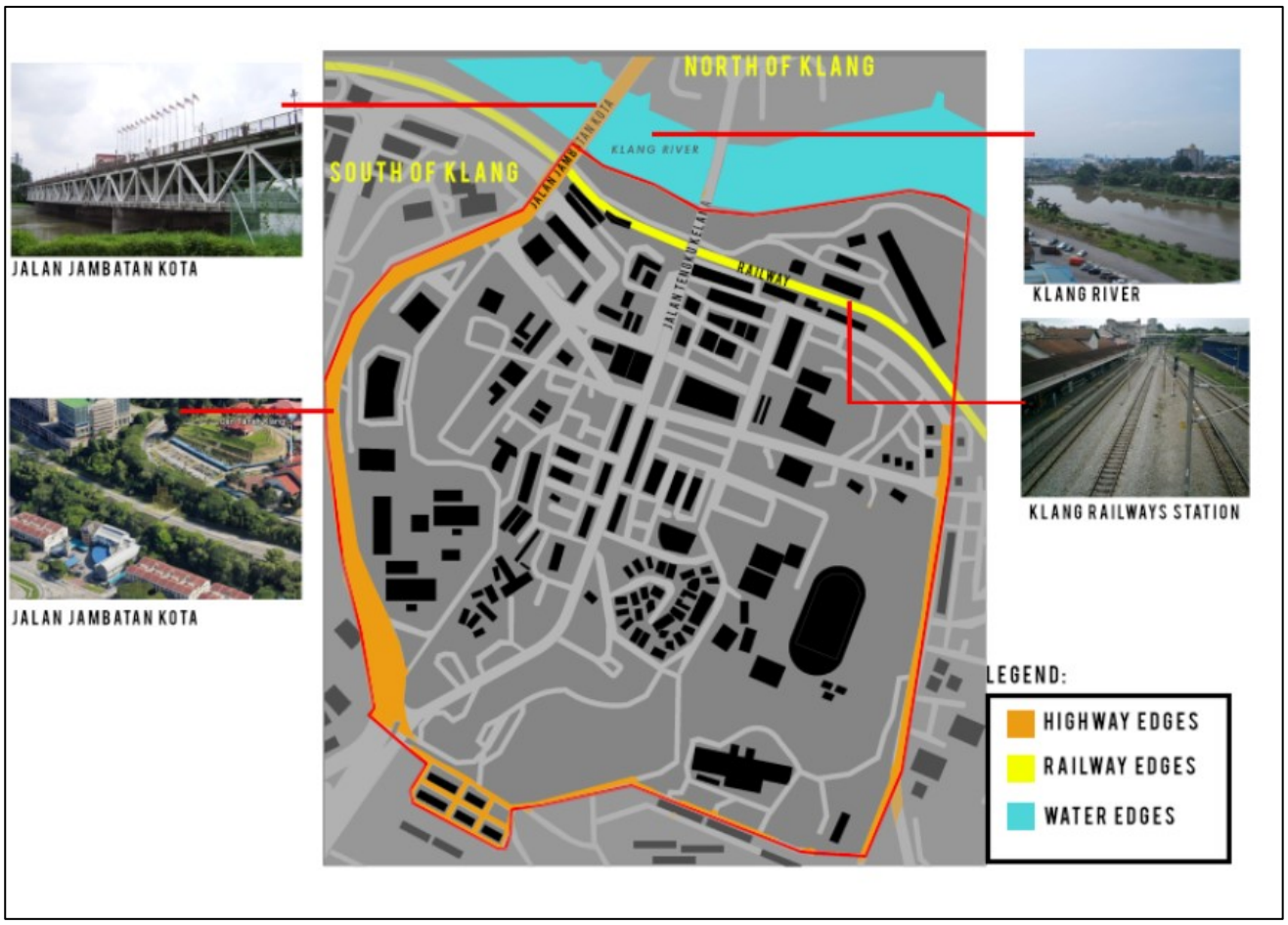


Figure 6: Edges Klang Selangor

Figure 7: Klang River

Figure 8: Jalan Jambatan Kota

4.3 Districts

Five districts identified on site are, residential, commercial, religious, educational, and government (Figure 10). 50% in this area are government and private health care facilities are located at Klang South such as Pejabat Daerah Dan Tanah Klang, Jabatan Pengairan Dan Saliran, SYABAS,

Pejabat Agama Islam Klang Balai Polis Klang, and Kompleks Mahkamah Klang. Hence, this area tends to be busier and becomes the centre of social and recreational activities after office hours and during the weekends.

Figure 9: Shop Houses Klang

Most of the shop houses at Klang City (Figure 9) are influences by the European, Chinese, Malay and Indian sources that were a mixture of various styles modified to the Malaysian environment. Frank Swettenham, the British Resident was responsible in the earliest urban development of Selangor, Malacca and Penang as well as Kuala Lumpur. He introduced building regulations as such that original extract shelter settlements to be rebuilt from bricks with tiled roofs and buildings were to be built five-foot away from the road allowing for passageway (Taylor University, 2013).

The area is predominantly a commercial area, where most of its businesses involving the clothing wholesaler especially at Little India Klang (Figure 11). Other minor businesses include the sale of food and beverages, sundries, electrical and electronic appliances, hardwires, hotels, and leisure clubs among many. The schools around the area include Sekolah Menengah Kebangsaan Convent (Figure 12), Sekolah Kebangsaan Klang Kolej Islam Sultan Alam Shah.

These schools however are not concentrated in one area but scattered into three different location; east, central, and west. For the residential districts, found that only a few bungalow houses located near to the Istana Alam Shah and also recreational area for public that provide sports court, field and running track. Similar to the educational district, the religious districts are not concentrate in one area, therefore, they hardly can be recognized as a district.

Figure 10: The Districts in Klang,Selangor.

Figure 11: Little India Klang

Figure 12: Sekolah Menengah Kebangsaan Convent

5.3 NODES

Nodes are the core element in urban design as they become the focus of the area and can be accessed from all directions. Based on his statement, nodes can be defined as a focus point of strategic nature that a person can penetrate. Node is the Klang train station (Figure13) at Jalan Raja Timur and Stadium Padang (Figure14). This station is also a taxi spot especially for people that come by train to the study area. Klang Station is served by the KTM Komuter service via the Port Klang Line, half-hourly service are scheduled daily with 4 trains per hour during peak.

Figure 13:Klang Railstation

Figure 14:Stadium Padang Sulaiman.

There is the node located at within the site area which is Klang royal garden (Nodes 1 figure 15) that being use by athletes, students and the public. People like coming here because they have proper parking space outside the stadium and the public. People like coming here because they have proper parking space outside the stadium and they can do their jogging and breeze walking in the stadium.

Figure 15: The Districts in Klang, Selangor

Figure 16 below summaries the nodes of Klang based on the hierarchical order.

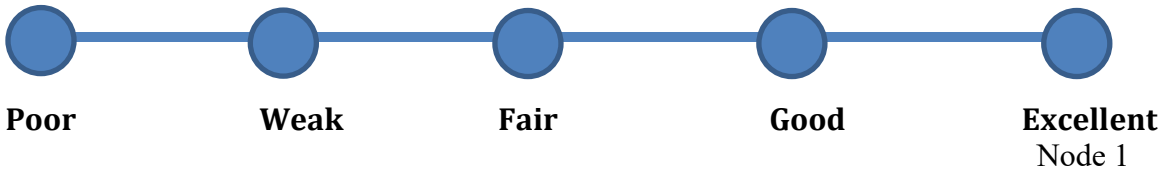


Figure 16: Hierarchical Order of Nodes in Klang

4.5 Landmarks

Figure 15 dictates the landmarks that are located within the study area. Masjid India Klang is a prominent landmark not only because of the size of the building but also because of its distinctive architecture style. To represent the royal city of Selangor, Keris Monument was located within the site. There are Keris Monument located at Klang Royal Garden. It's a huge monument in the shape of a kris in Klang. Its construction was ordered by the Sultan of Selangor, Almarhum Sultan Salahuddin Abdul Aziz Shah to commemorate the Silver Jubilee of his reign on 30 September 1985.

Figure 17: Keris Monument

Other landmark in the study area is Alam Shah Palace .Istana Alam Shah is the official palace of the Sultan of Selangor, located in southern Klang, the royal town of the state

of Selangor, Malaysia. The palace was built in 1905 during the rule of Sultan Sir Alaeddin Sulaiman Shah, who was the fifth Sultan of Selangor. Nearby to the palace is Kolej Islam Sultan Alam Shah (landmark 4 figure 15) which is one of popular Islamic school in Klang City. Figure 18 below summaries the nodes of Klang based on the hierarchical order.

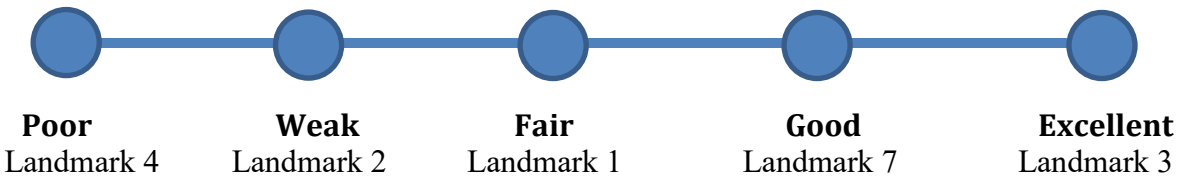


Figure 18: Hierarchical Order of Landmark in Klang.

6. DISCUSSION

After the site observation, the urban design elements of Klang City were identified based on the various scale of measurements that has been discussed in research methodology. As Klang city that can be considered a old township, the planning is not well arranged.

6.1 PATH

Paths' hierarchical order were determined by width and importance. The township of Klang city is surrounded by a series of arterial road which consists of Jalan Jambatan Kota and Jalan Tengku Kelana. These roads are the widest in length compared to the other roads in the site and the most important road access by the vehicles as they connect Klang city to surrounding areas. The roads have a very clear direction and minimal difficulties can be found navigating through them. For the collector road its quite cramp and hard to supported by surrounding images because of scale of road against the building.

6.2 EDGE

Edges for Klang city helped to create boundaries for the site. The most dominant edge in klang city which is Klang River have created a distinct boundary, breaking the site from its neighbors and determining the area of its own. This is important as people will be able to identify where they are currently positioned by referring to these two edges which is the North or South of Klang

6.3 DISTRICT

Districts are divided based on identity and usage. The most prominent district in the site is the commercial and government district which covers about 50% (Figure 10) of Klang city. In spite of this, other districts like residential and religious district effortlessly blend with the commercial buildings, providing a sense of place. This also increase the accessibility so that a lot of problems can be avoided from occurring.

6.4 NODE

Nodes are measured by their popularity. Total of three nodes were identified, the usage of the nodes is fully used most of the time every day. Places like Stadium Padang Sulaiman, Klang Royal Garden and Klang Railway Station used all the time of the day. It is also notable that the shophouses area are full of people whenever it is opened. Klang Royal garden is the dominant.

6.5 LANDMARK

Landmarks' hierarchical order are determined by its importance and attraction. From 5 landmarks identified in the site, it is concluded that Masjid India Klang, Istana Sultan Alam Shah and Kolej Islam Sultan Alam Shah is the most important as it is the most identifiable at the Klang City, it is the one people used the most as wayfinding and the activities surrounding it also attract people to the landmark.

7. CONCLUSION

The quality of urban planning of Klang City is above average due to its not well-planned site layout. The majority of commercial and in the area are shop lots and some of the residential area are landed area. Although several issues need to be addressed like the bad traffic condition of the site, most of the problems come from the vehicles parked at roadside due to the lack of parking area in the site, multi-storey car park can be introduced to the site to overcome this issue. Almost all the urban design elements of Klang city are effective with the exception of its nodes. "The activities of a town take place in public and private spheres" (Krier, 1979). Some of the nodes in the site are under-utilized due to lack of activities and mainly because it's a Government building area thus it is only used by the surrounding nearby residents. As years goes by the plan needs to amend according to latest technology and transportation.

The grid iron urban design might be the best design during old times, but the specification may vary. The vehicles and transportation need affect the design. Nowadays we need larger road and path for our vehicles, public transport and parking. Compared to last time, there less vehicles. For the edges, the edges well identified and continuous. Which is perfect because it doesn't confuse the local and tourism while travelling through the road. District are well formed, however modernization making it more and more similar to one and another.

The different elements of every district fading, and the community already mingle together. They seem like one big community not more like old time which only certain race in every district. Series of nodes along the hotspot are excellence as people can gather and having activities together. It becomes lively and peacefully. It also boost local people economy when there a lot tourist visiting. Landmarks are restored to it perfect condition which give advantage to the site and acts as magnet of attraction for people to come.

8. ACKNOWLEDGMENTS

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THE IMPACT OF THE TIGRIS RIVER ON THE URBAN LANDSCAPE OF THE CITY OF MOSUL WITHIN THE CONSIDERATION OF THE SUSTAINABLE CITY

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Sustainable Cities,
Waterfront.

ABSTRACT

A number of functional, morphological and symbolic variables have affected the modern Iraqi city, especially those located on the shores of the rivers, considering the river as an important and effective factor in the structure of the Iraqi city throughout history. Over time and the multiplicity of evens and variables, the urban bodies took their buildings overlooking the river shore the in that cities suffer from many problems and aggravated because of the considerations of the stage with the increasing needs of humanity, showed signs of distortion and confusion within the general appearance of the city and specifically in relation to the river, which was reflected directly on the urban landscape of his, considering that the city of Mosul is one of the important local cities that are of special importance demographically and geographically at the local level as well as its distinctive civilization dimension. There for, it is important to study and analyze the relationship of this city with the Tigris river as a model of the Iraqi river cities, to the city with its urban bodies and specially at the old foci adjacent to the river, which created a number of problems and requires analyses of this relationship problems in order to identify the causes of these problems and give possible solutions to them, on the other hand the emergence of sustainable cities and there applications at present, It represent one of the most important directions to improve the situation of cities and urban areas, Which suffer from many problems in the level of buildings and services and related thereto, we try through this research to review the problems caused by long neglect of the relationship of Mosul with the Tigris river and then give solutions and perceptions of the future image which is expected to be part of the sustainable cities, approach by analyzing global . Experiences and making use of the solutions presented

1. INTRODUCTION

Sustainable waterfronts are becoming one of the most celebrated aspects of urban design in sustainable cities. Each city is experimenting with new ways to tackle a particular challenge in sustainable waterfront development, Including the city of Mosul, This paper aims to study and analyze the relationship of this city with the Tigris river as a model of the river cities, especially at the old foci adjacent to the river within the consideration of the Sustainable city, The research methodology for this paper is based on three approaches: theoretical, analytical and applied study. The theoretical study identifies the concept of sustainable waterfront, its principles and its

applications. This is followed by an analytical for Old Mosul city before 2014. Next, an applied study of main waterfronts along the main edges of the River Tigris in old Mosul city now which suffer a great changes because the war 2017. The paper then concludes with the most important recommendations for reconstruction and development of urban waterfronts in this important area.

2. SUSTAINABLE WATERFRONT

Studies have defined the rim overlooking the cities on the rivers. Its sustainability has been linked to the redevelopment of the waterfront through the desire of people to improve and sustain it (Gospodini, 2001). It represents an area where urban development interacts with water and the needs of the city's population are mixed with their city (Breen, 1996). It is a distinctive part that integrates land with water and makes it difficult to determine its boundaries due to mixed use (Eves, 2011). Since the end of the twentieth century, there have been programs for the sustainability of coastal and adjacent rivers, which have increasingly focused on the planning and design of those areas (Lang, 2012).

3. LITERATURE REVIEW

The paper in this section deals with a series of recent studies on the Waterfront Developments, Introducing the most important sustainable principles in their development

3.1 YILDIZ, et al., 2015

The definition of sustainable urban design by providing a planning perspective of the coastal areas of cities in Turkey, which represents the study area through the presentation of topics related to the creation of a special and sustainable identity of the waterfront area such as accessibility and protection of the beauty of the sea and a sustainable design approach in the design of residential buildings and public places and improve life For residents and visitors as well. (Yıldıza , 2015)

3.2 RAGHEB, 2017

The application of sustainable development approaches to the waterfront in Alexandria through analysis to reach a design that meets the wishes of the community and respects biodiversity and the development of criteria suitable for the place, which included (Access and Linkages, Uses and Activities , Comfort and Image , Sociability (Riham , 2017).

3.3 NEPRAVISHTA et al., 2014

There is number of practical and planning problems of waterfront development and the possibility of improving its image through accessibility and preservation of natural heritage as well as archaeological and cultural heritage (Nepravishta, 2014).

3.4 KEYVANFAR et al., 2018

The study identified the most potential waterfront typology in tourism attraction and develop the waterfront sustainable revitalization (SWR) index assessment model. The SWR index can assist policy makers and urban developers to analyze the heritage waterfronts using Analytical Hierarchy

Process (AHP) method (Keyvanfar, 2018)

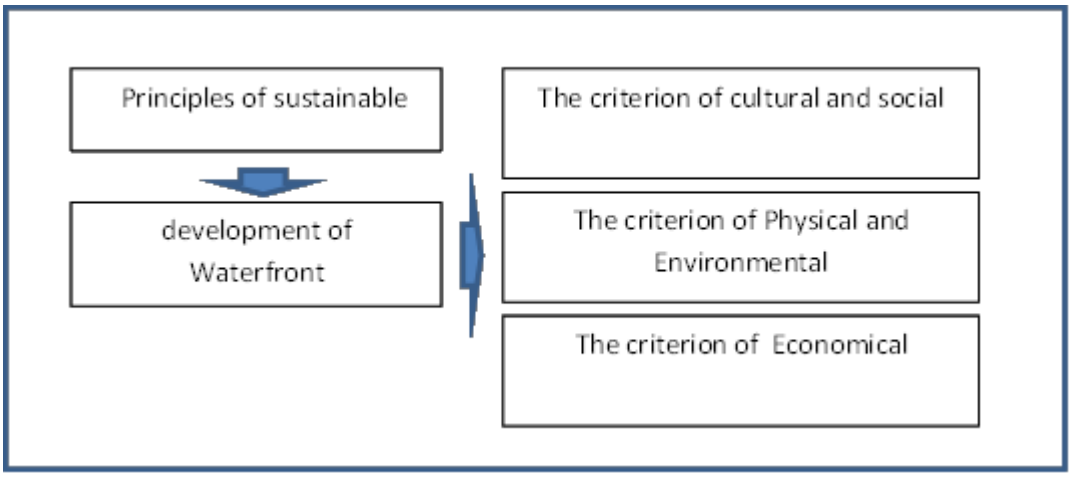


Figure 3: The criterion of Principles of sustainable in development of Waterfront

4. CRITERIA OF SUSTAINABLE WATERFRONT

In the last decades in many developed countries have been undertaken many initiatives for the development of urban areas that are confined by water. Many of these planning projects have resulted successful and other less successful in terms of environment and cultural heritage, therefor the waterfront revitalization features clustered based on three bottom-lines of Criteria on sustainability: (social, environmental and economic) (Yıldıza, 2015).

4.1 THE CRITERION OF CULTURAL AND SOCIAL

Traditional architecture in Arab traditional world represents a potential heritage, it's an image of the local identity, and it's also the support of social interactions and values (Soufianea, 2015). The local culture and background need to be considered and enhanced as the distinctive identity of the waterfront town that represents the image of the waterfront to visitors. In the sustainable development of coastal areas, protection of the historical identity, and organization of the urban activity (Yıldıza, 2015) and that is through preservation and maintenance of the site's original identity and restoration of buildings of great historical-architectural value.

4.2 THE CRITERION OF PHYSICAL AND ENVIRONMENTAL

Water has emerged as a positive and influential element for a new urban quality and with the capacity to attract a wide range of activities and people. (Moretti). A sustainable place (promote sustainable development, including the highest standard of energy efficiency in buildings, ensure the Waterfront is accessible to all by all types of transport, including bus, taxi, community transport, walking, cycling and the private car; enable an appropriate level of car parking; provide a movement strategy which avoids conflicts between different users (Yıldıza, 2015). 1t should include design and development techniques that will provide and enhance the following: integrated green infrastructure,

stormwater management practices, improved trail access, improved habitat corridor with increased vegetative types such as meadows and transitional woodlands, as well as increased tree canopy, open space amenity, integrated design of waterfront access and hardscape elements, and provision of ecosystem services (A Guide to Riverfront Development, 2016)

4.3 THE CRITERION OF ECONOMICAL:

Waterfronts are one of the most valuable resources for a country – being limited, precious and nonrenewable assets. To secure long-term growth of this resource, it is important for waterfront areas to be used strategically to maintain their economic value and enhance their specific features or image (Bruttomesso, 2006).

5. SUSTAINABLE EXPERIENCES IN CITY DEVELOPMENT

The designers adopted a set of sustainable principles in their development of waterfronts such as those adopted in the development of the city of Port Melbourne 2013, The development of various activities and the establishment of public squares and attention to the natural environment and improve commercial activities and the adoption of sustainable design of buildings and public places and reflect the history of the waterfront (Phillip, 2013).

Show fig2 while one of the most consistent themes across the different proposals has been the articulation of the Orikum waterfront's dual identity asboth an ecosystem and an urban space, This waterfront design is to enhance historical values and focuses on three management strategic elements (Accessibility , Linking, Preservation of natural and archaeological heritage) fig 3. (Nepravishta, 2014).

Fig 2.Port Melbourne Waterfront

Fig 3. urban development plan of Orikum

6. THE RELATIONSHIP OF THE CITY OF MOSUL WITH THE TIGRIS RIVER

The second half of the twentieth century witnessed a great expansion in the city of Mosul on both the urban and demographic levels, resulting in increased pressure on the central uses of the land, especially when it comes to those sites that have an important location within the city or which have

outstanding cultural and historical qualifications (Muhammad, 2017). The sites overlooking the Tigris River (in the right and left coastal areas) occupy the forefront within this framework, as they have now become in the heart of the city from the north to the south, representing the edge of both east and west in the past. Like It was an emergency or new within the city, but this interest had reached its peak when the city was overlooking its wall on the river both during the Assyrian state and its capital (Nineveh) on the east, or in other times that witnessed the Assyrian (Nineveh) Assyria and the growth of the city (Mosul) Arab and Islamic sites on the other side of the western side of the river (Mohammed, 2019).

Historical sources point out that the Assyrian gates of Nineveh were covered with its walls and its winged wings on the Tigris River, which represented a military barrier to protect the city as well as its commercial importance in transporting goods and goods. By the river they dig a stone of rain water gathered northeast of the city from a distance of approximately 22 km to penetrate the city (Nineveh) and pour into the Tigris River and is still present to this day on a low form known as a river (Khosr River). In the Islamic era, after the opening of the city of Mosul to the Islamic city to the old cities. (Aldewiji, 1982) the city flourished and developed and grew on the West Bank of the river and influenced the long history of time and place factors to leave the clear fingerprints, which made them interact to adapt to the conditions of location and location to remain in relationship with the river.

It is worth mentioning that the most prominent characteristic of the relationship of the city of Mosul with the Tigris River is the expression of one of the governors of Mosul during the Umayyad state when he turned a huge project downstream from a point in the north of the city to make it aligned to the plateau on which the focus The traditional ancient city across a hill (Qalyat) (Muhammad, 2017). Today, the relationship of the city with the river stories, novels, events and interpretations, there are historical landmarks are still telling the fragrant past, which is worn by the days, and symbolic value of the value and the dimension of civilization cannot be compensated in any way, and find other traces and features tell years of effort.

Some of them have tried to get out of the old traditional framework to look at the river in a new way to try to keep abreast of the urban development achieved in recent years, especially on the eastern bank of the river within the city on its left coast (Aldewiji, 1982). Sentences The events and factors in the formation and panorama of the city in its relationship with the river, which resulted in a large range of problems and obstacles that accumulated over the days to show us today after different stages passed through the city, and perhaps the damage that hit the city during the recent events is a good example, The urban bodies overlooking the river side of the most of this destruction, which requires a serious and systematic stand to promote the reality of the deteriorating situation of the city (Alobaidi, 2019).

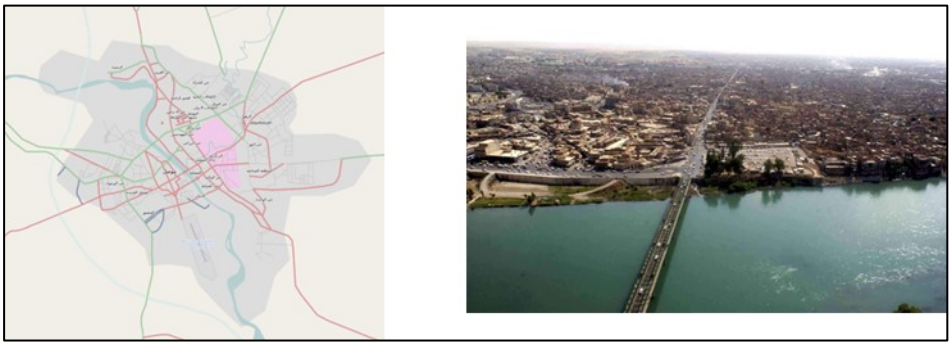


Fig 1 : The relationship of the city of Mosul with the Tigris River (https://ar.wikipedia.org)

Table 1:

Not achieved	Medium achieved	Achieved significantly	Detailed Vocabulary	Basic Vocabulary	Indicators	Sustainability standards
			Space organization of the urban fabric(Compact and compact fabric)	There is a prevailing urban character in the area	The cultural identity of the region	Social and cultural standards
			Formative elements used : Openings, Arches , owen, Chanchell			
			Formative relations of elements			
			Symbolic	Presence of signs (Characteristics)		
		`	Civilization			
			The nature of the architectural formation of the riverfront (Overlay and overlapping relations)	Belonging to the place through		
			The broken sky line			
			The presence of symbolic and civilizational signs			
			The nature of the building materials used from the area itself Which gave privacy to the place			
			Optical axes and river kinetics			
				Respect for social and cultural characteristics	originality	
			Civilized buildings	Preserving the cultural heritage		
			Establishing social gathering places Like squares and spaces	Within the city	Promote social interaction	
			Markets / Recreational places — Find social activities	On the river bank		
			Commercial / Residential / Religious / Service / Entertainment.	Activate mixed use:	Functional aspect / Land uses	Economic and functional standards
			Development of new services			
			Hierarchy of public-private traffic paths Streets / sub-alleys / closed alleys	The Presence of clear motor pathways — Into the city	Easy movement and accessibility	
			Nature paths: Zigzag It is straight and ends with clear indication points			
			Expansion at the intersection of the main tracks	Organization of movement contract		
			The presence of important buildings: symbolic and civilizational signs	Visual signs — The presence of optical axes — On the edge of the river		
			The presence of important elements such as: minarets / domes / other			

			They are scenes that carry sensory, aesthetic and historical values and considerations	Visual viewer task				
			The existence of corridors and walkways connecting the river to the city	Pedestrian axes	Axis movement			
			Stone, wood, clay	Local materials available and environmentally friendly			Investment structural resources available	
			Provide jobs	Experienced local manpower				
			Anchorage for boats	Means of river transport			River investment (as available resource)	
			Providing places for fishing	Take advantage of the wealth of fish				
			Irrigation projects	Watering of farms and orchards				
			Tourism Projects	Investment frontage and river edge of tourism				
			Provide spaces, corridors, gardens and public squares on the river's edge	Meeting humanitarian needs				
			Landscaping and green spaces	The presence of vegetation			preserving Biodiversity	**Physical and environmental standards**
			Fish and birds	Livestock development and conservation				
				Air pollution	By getting rid of :		Reducing environmental pollution	
			Recycling	Waste of all kinds				
				visual pollution				
			Attention to infrastructure projects (Sewerage network ends in landfills)	Heavy water streams				
				the noise				
				The possibility of change and future expansion			Design flexibility of the site	

7. PRACTICAL STUDY

The application in this research will include two aspects: The first is to analyze the urban system structurally through the system of space installation rules (Space syntax theory) ,Developed by Bill Hiller in the Bartlett Unit for Architectural and Planning Studies in Britain, By dealing with the theory of the rules of space composition and for the purpose of dealing with urban spaces within the traditional environment of the ancient city of Mosul and to demonstrate the degree of importance on the level of space organization as an important determinant towards achieving sustainability, the theory of the rules of space installation has developed important indicators and credibility in the description, and can be invested In interpreting the relationships between urban spaces, this is done by adopting a clear indicator for the purpose of measurement expressed, Inclusive degree of integration, which includes two equations , Integration Degree Global (Hillier, 1984) The integration index expresses the relative depth of space relative to all other system spaces in the pivot diagram, and is calculated in the following equation:

$$RA = 2 (MD-1) / (k-2)$$

Where:

RA = relative asymmetry

MD = relative depth rate

K = number of system spaces
Through the second equation, the value is adjusted to:
RRA = RA / Dk
Where:
RRA = modified relative asymmetry
RA = degree of asymmetry of space
Dk = degree of asymmetry of the base space

Fig 3: Site map of the ancient city of Mosul and relationship with the river

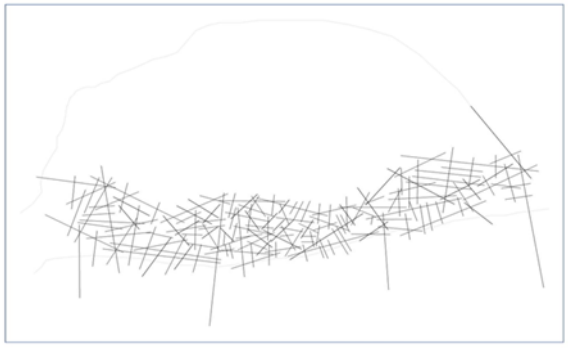


Fig 4. Axial map

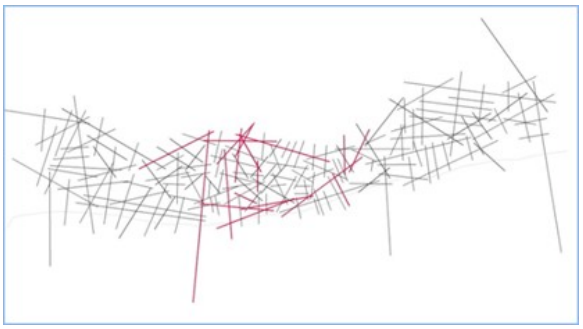


Fig 5. Integration core

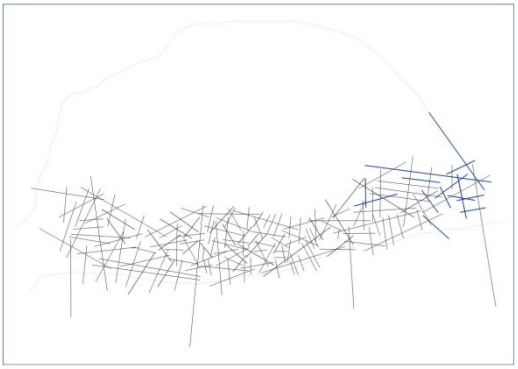
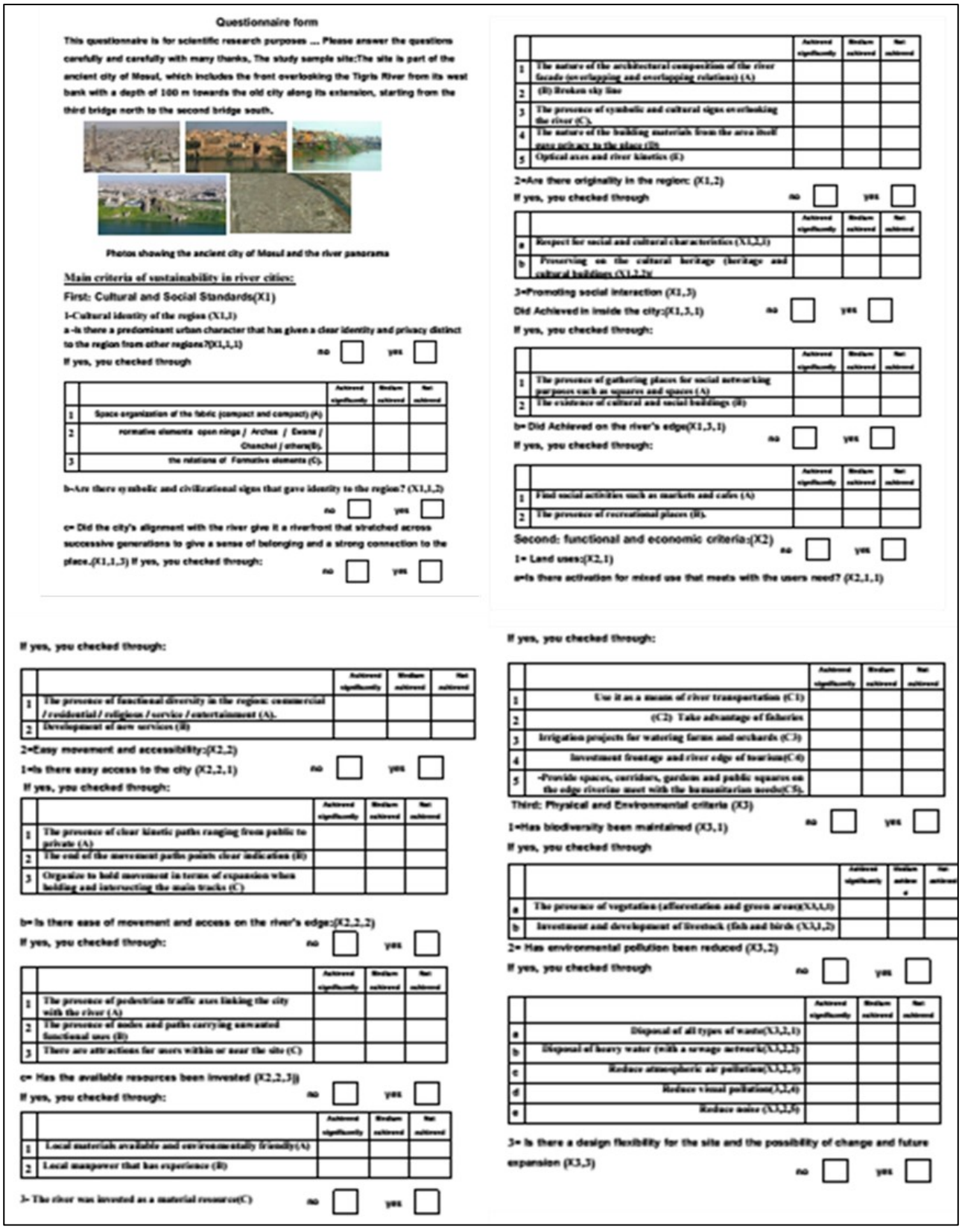


Fig 6. Isolation core

While the second aspect of the analysis includes the use of a questionnaire to elite specialists

to clarify the relationship of the city of Mosul show in fig 7, represented by its old focus with the Tigris River and come up with a set of results and ratios related to achieving the principle of sustainability architecturally and urbanely.



Questionnaire form

This questionnaire is for scientific research purposes ... Please answer the questions carefully and carefully with many thanks, The study sample site:The site is part of the ancient city of Mosul, which includes the front overlooking the Tigris River from its west bank with a depth of 100 m towards the old city along its extension, starting from the third bridge north to the second bridge south.

Photos showing the ancient city of Mosul and the river panorama

Main criteria of sustainability in river cities:

First: Cultural and Social Standards(X1)

1-Cultural identity of the region (X1,1)

a -Is there a predominant urban character that has given a clear identity and privacy distinct to the region from other regions?(X1,1,1) no yes

If yes, you checked through

		Achieved significantly	Medium achieved	Not achieved
1	Space organization of the fabric (compact and compact) (A)			
2	formative elements open rings / Arches / Ewans / Chanchel / others(B).			
3	the relations of Formative elements (C).			

b-Are there symbolic and civilizational signs that gave identity to the region? (X1,1,2) no yes

c- Did the city's alignment with the river give it a riverfront that stretched across successive generations to give a sense of belonging and a strong connection to the place.(X1,1,3) If yes, you checked through: no yes

		Achieved significantly	Medium achieved	Not achieved
1	The nature of the architectural composition of the river facade (overlapping and overlapping relations) (A)			
2	(B) Broken sky line			
3	The presence of symbolic and cultural signs overlooking the river (C).			
4	The nature of the building materials from the area itself gave privacy to the place (D)			
5	Optical axes and river kinetics (E)			

2-Are there originality in the region: (X1,2)

If yes, you checked through no yes

		Achieved significantly	Medium achieved	Not achieved
a	Respect for social and cultural characteristics (X1,2,1)			
b	Preserving on the cultural heritage (heritage and cultural buildings (X1,2,2)			

3-Promoting social interaction (X1,3)

Did Achieved in inside the city:(X1,3,1) no yes

If yes, you checked through:

		Achieved significantly	Medium achieved	Not achieved
1	The presence of gathering places for social networking purposes such as squares and spaces (A)			
2	The existence of cultural and social buildings (B)			

b- Did Achieved on the river's edge(X1,3,1) no yes

If yes, you checked through:

		Achieved significantly	Medium achieved	Not achieved
1	Find social activities such as markets and cafes (A)			
2	The presence of recreational places (B).			

Second: functional and economic criteria:(X2) no yes

1- Land uses:(X2,1)

a-Is there activation for mixed use that meets with the users need? (X2,1,1)

If yes, you checked through:

		Achieved significantly	Medium achieved	Not achieved
1	The presence of functional diversity in the region: commercial / residential / religious / service / entertainment (A).			
2	Development of new services (B)			

2-Easy movement and accessibility:(X2,2)

1-Is there easy access to the city (X2,2,1) no yes

If yes, you checked through:

		Achieved significantly	Medium achieved	Not achieved
1	The presence of clear kinetic paths ranging from public to private (A)			
2	The end of the movement paths points clear indications (B)			
3	Organize to hold movement in terms of expansion when holding and intersecting the main tracks (C)			

b- Is there ease of movement and access on the river's edge:(X2,2,2)

If yes, you checked through: no yes

		Achieved significantly	Medium achieved	Not achieved
1	The presence of pedestrian traffic axes linking the city with the river (A)			
2	The presence of nodes and paths carrying saturated functional uses (B)			
3	There are attractions for users within or near the site (C)			

c- Has the available resources been invested (X2,2,3)

If yes, you checked through: no yes

		Achieved significantly	Medium achieved	Not achieved
1	Local materials available and environmentally friendly(A)			
2	Local manpower that has experience (B)			

3- The river was invested as a material resource(C) no yes

If yes, you checked through:

		Achieved significantly	Medium achieved	Not achieved
1	Use it as a means of river transportation (C1)			
2	(C2) Take advantage of fisheries			
3	Irrigation projects for watering farms and orchards (C3)			
4	Investment frontage and river edge of tourism(C4)			
5	-Provide spaces, corridors, gardens and public squares on the edge riverine meet with the humanitarian needs(C5).			

Third: Physical and Environmental criteria (X3)

1-Has biodiversity been maintained (X3,1) no yes

If yes, you checked through

		Achieved significantly	Medium achieved	Not achieved
a	The presence of vegetation (afforestation and green areas)(X3,1,1)			
b	Investment and development of livestock (fish and birds (X3,1,2)			

2- Has environmental pollution been reduced (X3,2)

If yes, you checked through no yes

		Achieved significantly	Medium achieved	Not achieved
a	Disposal of all types of waste(X3,2,1)			
b	Disposal of heavy water (with a sewage network)(X3,2,2)			
c	Reduce atmospheric air pollution(X3,2,3)			
d	Reduce visual pollution(X3,2,4)			
e	Reduce noise (X3,2,5)			

3- Is there a design flexibility for the site and the possibility of change and future expansion (X3,3) no yes

Fig 7: Research Questionnaire (researchers)

8. DISCUSSION

Through analysis ,we can see the focus of integration spaces in the area represents the relationship between river side with the historical center of the old city ,which emphasizes the importance of the central region and the need to communicate with them, both physically and visually and open many spaces towards the river to provide the best out as possible., It is also noted that the integration spaces have concentrated in sites of high value ,both mentally and culturally ,giving them other importance with their cultural and historical value .another side of the analysis showed spaces less important than others have focused on the northern area overlooking the river from the old city exactly at transformation points from grid and organic system at the edges of the old city ,that's it determines the style to surrounding areas or areas transitional from the old city towards the most modern places especially in the coastal strip overlooking the river which represents the media , cultural and traditional of the old city ,Through this will appear three schemes, the first is the pivotal spaces of the system and the second is the nucleus of integration, which is the most integrated and important spaces and the third is the nucleus of isolation, which is the isolated and neglected spaces. The questionnaire results: Table 2 shows the results of the questionnaire conducted by the researchers, which included the research samples

Table 2: The questionnaire results

Degree of Achieved			The answer is yes	Possible values		Secondary vocabulary		The main variable
Not achieved	Medium achieved	Achieved significantly						
	(%15)2	(%85) 11	13 **(%100)**		**A**	**X1,1,1**	**X1,1**	**X1**
	(%46) 6	(%54) 7	13 **(%100)**		**B**			
	(%46)6	(%54) 7	13 **(%100)**		**C**			
			13 **(%100)**			**X1,1,2**		
	4 (%31)	(%69) 9	13 **(%100)**		**A**	**X1,1,3**		
	4 (%31)	(%69) 9	13 **(%100)**		**B**			
	(%54)7	(%46) 6	13 **(%100)**		**C**			
	(%54)7	(%46) 6	13 **(%100)**		**D**			
(%46)6	(%54)7		13 **(%100)**		**E**			
		(%46) 6	13			**X1,2,1**	**X1,2**	

	(%54)7		**(%100)**					
	(%46)6	(%54) 7	13 **(%100)**			**X1,2,2**		
(%46)6	(%46)6	(%8) 1	13 **(%100)**		**A**	**X1,3,1**	**X1,3**	
(%54)7	(%46)6		13 **(%100)**		**B**			
3 (%20)	4 (%31)	(%15)2	9 (%69)		**A**	**X1,3,2**		
(%46)6	3 (%20)		9 (%69)		**B**			
	(%8) 1	(%40) 5	(%46)6		**A**	**X2,1,1**	**X2,1**	**X2**
3 (%20)	3 (%20)		(%46)6		**B**			
	3 (%20)	(%20) 3	(%46)6		**A**	**X2,2,1**	**X2,2**	
(%15)2		(%31) 4	(%46)6		**B**			
	4 (%31)	(%15)2	(%46)6		**C**			
	4 (%31)	(%8) 1	5 (%40)		**A**	**X2,2,2**		
3 (%20)	(%15)2		5 (%40)		**B**			
3 (%20)	(%8) 1	(%8) 1	5 (%40)		**C**			
	(%15)2	(%40) 5	(%54)7		**A**	**X2,2,3**		
	(%15)2	(%40) 5	(%54)7		**B**			
(%8) 1	(%15)2	(%15)2	5 (%40)	**C1**	**C**			
	(%15)2	(%20) 3	5 (%40)	**C2**				
	3 (%20)	(%15)2	5 (%40)	**C3**				
3 (%20)	(%15)2		5 (%40)	**C4**				
5 (%40)			5 (%40)	**C5**				
	(%8) 1		1 (%8)			**X3,1,1**	**X3,1**	**X3**
	(%8) 1		1 (%8)			**X3,1,2**		
			0			**X3,2,1**	**X3,2**	
			0			**X3,2,2**		
			0			**X3,2,3**		
			0			**X3,2,4**		

			0			**X3,2,5**		
			4 (%31)				**X3,3**	

9. CONCLUSION

The results of the applied study resulted in analyzing the characteristics of space organization through the theory of space synthesis and questionnaire, and the results and ratios of a number of conclusions that can be illustrated by the following:

1. The old traditional focus of the city is the most important and topical and comprehensive center within this traditional urban body. Therefore, it is important to concentrate all the other supplements of the parts of the old city so as to communicate with this focus of the mosque (the Nuri Mosque) and the surrounding areas, but this does not prevent the graduation in the importance of the parts. So that the riverfront overlooking the Tigris River ranks second in importance and may reach a situation equal to the importance of the central location of the city in the case of the city of Mosul as a real reflection of identity as well as its economic and environmental outlet.
2. The city's view of the river important functional dimensions must be paid attention to, especially taking into account the existence of bridges across the Tigris River to represent the visual and functional containment of communication between the boundaries of the old city and the corresponding new urban expansion in the left coast.
3. The research showed a clear defect in the characteristics of space organization, especially in the isolation nucleus, which was concentrated in the north of the river's edge of the city. Better humanitarian and planning as a response to the growing humanitarian needs in the city over time.
4. With regard to the system of movement and accessibility, the research showed the existence of important axes and deep mental dimensions of users must pay attention to and deal with them positively within any plan for growth and development.
5. Since the site holds a design flexibility to qualify to add aspects contribute to the advancement of the status of the city in terms of views of the river, the tourist and recreational dimension must take its role, especially considering that the old city is facing the recreational forest area on the other bank opposite the river.
6. The necessity of activating the riverine economic activities, whether by transport or by the optimal utilization of plant and animal resources, taking into account the provision of environmental and animal balance required.
7. The problem of pollution in all its forms stand in the forefront of obstacles to development plans, especially with the growing and increasing causes of pollution, which requires a real deal effectively with this problem.
8. The role of official and government institutions in providing all that would enhance the riverfront

is a real reflection of the history of the ancient city of Mosul.

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