

PAPER ID: 11A11I



LEGIBILITY PATTERN AT A CITY CENTRE OF KUALA TERENGGANU, MALAYSIA

Ahmad Syamil Sazali¹, Ahmad Sanusi Hassan¹,
Yasser Arab^{1*}, Boonsap Witchayangkoon²

¹ School of Housing, Building & Planning, Universiti Sains Malaysia, MALAYSIA.

² Department of Civil Engineering, Thammasat School of Engineering, Thammasat University, THAILAND.

ARTICLE INFO

Article history:

Received 14 May 2019

Received in revised form 01

April 2020

Accepted 04 May 2020

Available online 19 May 2020

Keywords:

Coastal heritage city;
Urban Planning; Urban
city design; City zoning;
Mental map; Malay town;
City identify.

ABSTRACT

This paper seeks to determine five elements of the urban design that can be analysed in Kuala Terengganu City Centre to form a clear mental map of the urban environment and planning strategies by the government of Terengganu. A comprehensive urban trail conducted focusing on the city centre to study the urbanism elements and planning strategies by the government of Kuala Terengganu. Urban planning and community building ideas towards a better city have been taking into considerations by the authority of Kuala Terengganu in presenting the ideas of Coastal Heritage City. The strategic and pragmatic urban design approaches by the government of Terengganu by indicating the specific zoning within the city centre itself have indirectly strengthened the city development identity. The outcomes of this study prove that urban design elements play an essential role in creating a specific mental mapping in persona picturesque about Kuala Terengganu City Centre.

Disciplinary: Sustainable Architecture and Town Planning, Urban and Regional Science.

©2020 INT TRANS J ENG MANAG SCI TECH.

1. INTRODUCTION

Malay towns, as studied by Hamid (1988) and Ezrin (1985) began as traditional Malay settlements with its own fascinating cultural landscape environment. Several old towns such as Kota Bharu, Kuala Terengganu, Kuala Dungun, Pekan, Johor Lama, Bandar Maharani, Kelang, Kuala Selangor and Kota Setar were initially Malay towns because of their physical and non-physical elements. Half of these towns evolved into the states capitals influenced by the colonial British Administration development during the colonial period.

However, the Malay towns are currently undergoing tremendous changes due to rapid

industrialisation, economic development and urbanisation. The original characteristics of these towns have changed as a result of increasing population, migration, economic wealth and changes in lifestyle brought about by the development of modern housing schemes, business premises and other infrastructures. A myriad of development activities taking place across the country does not leave these towns untouched. Modern structures such as skyscrapers encroached into the town centres and Malay historic sites.

As stated in *Sejarah Melayu* (Malay Annals) as well as in other sources of Malay literature, the Kuala Terengganu town centre was founded by a Malay Sultan in the early 18th century. This is also evident by the discovery of Terengganu coins that bear the name of Sultan Zainal Abidin, dating back to 1708. The town was rich in Malay cultural heritage. It was built as a self-containing Malay town with the palace, mosque and market built within walking distance of each other to serve the daily need of the community. The Kuala Terengganu town centre was replete with characteristics reflecting the culture of the Malays who live or used to live there.

In Kuala Terengganu, the palace was the administrative centre, the mosque as a place of worship, the market as a place to conduct commercial activities, and the traditional villages a place where the larger community lived. Today, the Malay cultural landscape in the town centre is facing threats from changes brought about by rapid development. These threats are real and can be seen in its working. Take the case of the old palace. Even though it is maintained, it is now only used for royal ceremonies. Many of the traditional villages in the old quarters had been replaced with commercial buildings and modern houses development, and this process will continue with the other remaining traditional villages. There is a need for authority to monitor and control development that impinges on the pristine existence of these villages.

2. LITERATURE REVIEW

This study is to measure the quality of urban design elements to the selected urban area in Kuala Terengganu as the case study. These urban elements were introduced by Kevin Lynch (1960) in his book *The Image of the City* stated that elements like nodes, paths, districts, edges, and landmarks make a city and help to make a visual image to the people. In this book, Kevin Lynch explains the concept of legibility where people always understand the character of a place with their mental mapping, which contains images in urban design as follow (Lynch, 1960):

Paths: Paths are related to the connectivity of the city that connects to all channels, road, streets or walkway within a city; this is where the user customarily, potentially or occasionally moves. The path can be a backbone for a city as it provides urban form network and also serves a unique character to its specific urban design. Therefore, the path can be a predominant element for many people because users can feel and observe the cityscape while moving through the paths. Along these paths, the other urban design elements are related to it (Lin et al. 2019).

Edges: Edges are boundaries that separate two districts visually. It is the element that breaks the continuity of the city, making it visible that the city consists of different areas. Despite that, these boundaries are often defined as a unity rather than isolation because even though it breaks the city, it also ties several different elements together, making a seamless transition from one area to another (Batty & Longley, 1994). In other words, it must be visually prominent, yet the observers will still mentally omit the edges. Some elements of edges can be from paths such as rivers, highways, and railway or other things

like parks and difference in building height.

Districts: Districts are relatively area of various large cities with common characteristics that can be visually and logically determined of those areas. The physical characteristics that determine districts are thematic continuities that may consist of an endless variety of components: texture, space, form, detail, symbol and others (Lynch, 1960). Various components and elements are visually recognised in a specific characteristic cluster that forming a strong contra effect. Furthermore, a particular series of clues are required to produce a sharp image of a whole district.

Nodes: Nodes are strategic foci which observers can enter, which are not only small points but also squares, linear shapes and central districts etc. There are two types of nodes, junctions of path and concentrations of characteristics. A successful node should have unique features inside and intensifies some surrounding characters as well. Nodes are the urban spaces or voids as places of attraction by the people or focal points and intersections of the road. They may be only concentrations, which gain their importance from being the condensation of some use or real character, as a street-corner hangout or an enclosed square.

Landmarks: Landmarks can be defined as objects in the urban area used as a point of reference. Landmarks are usually something that physical objects that we can see, such as buildings, monuments, signages or mountains. Landmarks also make people recognise the place by viewing it as the landmark, so it is set in their mind that the landmark is the icon to a specified place. Landmarks are not necessarily to be the tallest or biggest buildings, but landmarks can be any buildings or monuments that can relate to the specific area so by looking at the landmark, people can recognise and remember the specific area (Pauzi et al. 2018).

3. CASE STUDY: CITY CENTRE OF KUALA TERENGGANU

The case study is located at Kuala Terengganu City Centre of Terengganu. It encompasses the administration, economic zones, public amenities, religious and settlements area in front of Terengganu River. This city is also well-known as a Coastal Heritage City (*Bandaraya Warisan Pesisir Air*) due to its location of the city just beside the South China Sea (Figure 1) and the priceless value of the traditional heritage of Terengganu to bring it until now.

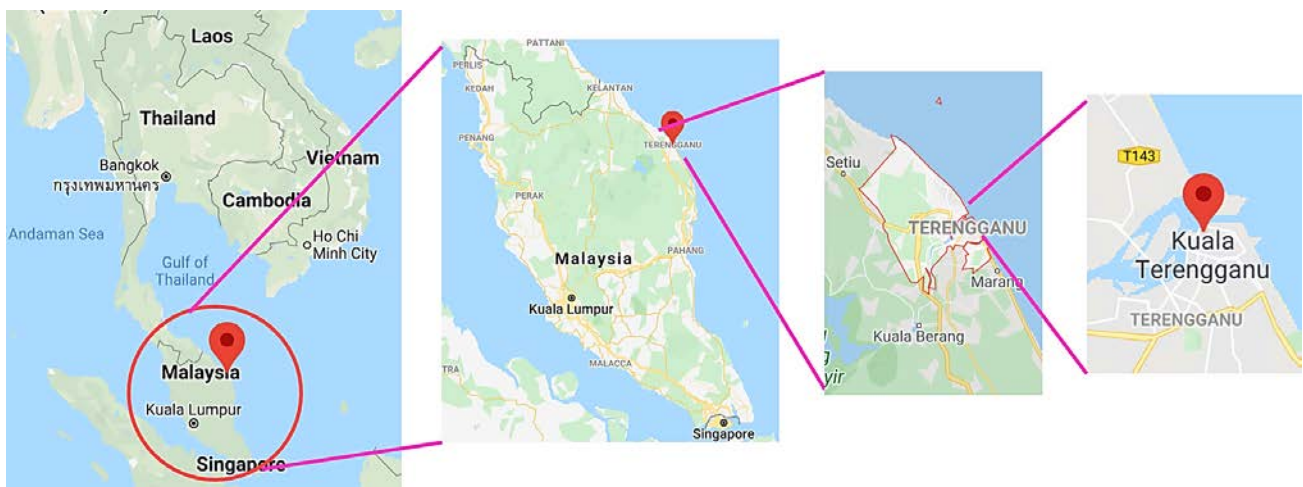


Figure 1: Geolocation of Kuala Terengganu City (Courtesy of Google Map)

Based on the Terengganu map, Kuala Terengganu City Centre, the centre of Terengganu, has many landmarks and nodes defined as an identity of Kuala Terengganu. The site area is a strategic area for the

local people and tourist because of the landmarks of Kuala Terengganu cum with the traditional architecture of Terengganu on the surrounding buildings which are it was the priceless element that we cannot see at other states. Terengganu is very well-liked with its traditional element of architecture built using colonial and modern material construction such as *'Bumbung Pemeleh'*, *'Dinding Janda Berhias'* and *'Kayu Tunjuk Langit'* and also with the original traditional cultural of Terengganu practised from colonial architecture and urban layout that they practice a long time ago until now.

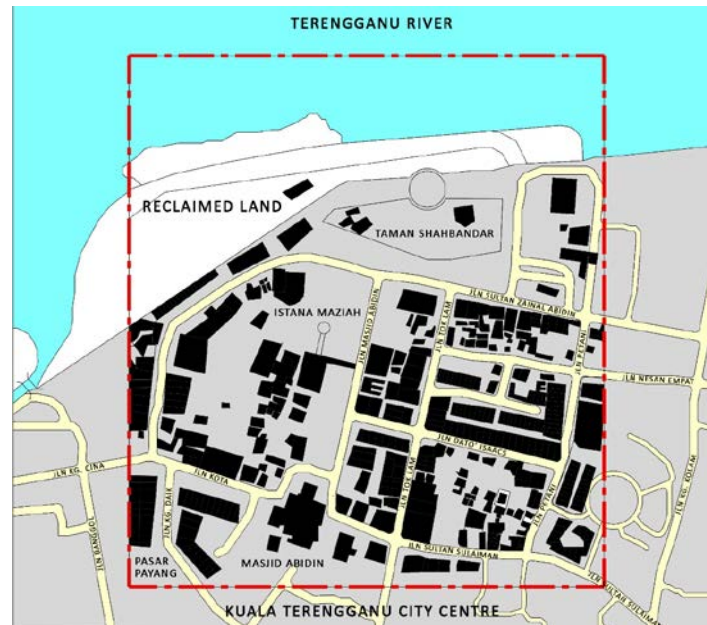


Figure 2: Site Plan - Kuala Terengganu City Centre

4. METHODOLOGY

The methodology applies a qualitative site survey and analysis referring to Kevin Lynch (1960) is an observation survey on the quality of the five urban elements including paths, edges, districts, nodes and landmarks that are essentials on analysing the urban layout in Kuala Terengganu City Centre for this research. A fieldwork study by a site visit to Kuala Terengganu City Centre and a study from the layout plan in Figure 2. Meanwhile, in-depth interviews selected the residents and tourists, both local people and international visitor were also conducted.

The study used three strategies to understand and analyses the essential urban design elements within Kuala Terengganu City Centre: First, pre-assumption of the importance of essential urban design elements that can be found within Kuala Terengganu. Second, urban trail and observation of the importance and interaction of people to the urban design elements around Kuala Terengganu within the membrane of study’s zone and third, 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.

5. ANALYSIS

5.1 PATH

Based on Lynch (1960), the path is considered as the most crucial element in urban design, and it is the first element designed in any plan. Figure 3, the hierarchy of road layout in Kuala Terengganu City Centre exists in this area are Arterial Road (Primary Road), Collector Road (Secondary Road)

and Local Road (Tertiary Road) that connects many sides of Kuala Terengganu into the site which is it is a tourists attraction area.



Figure 3: Hierarchy of road layout.

The site can be accessed by a few roads and channels, by land routes or water routes. The dominant entrance (arterials road - blue) to the site is by Jalan Sultan Zainal Abidin, Jalan Sultan Sulaiman and Jalan Kampung Cina. Furthermore, Jalan Daik becomes the secondary entrance (collectors road - yellow) routes to the site. These roads being the main entrances due to their connections with the other arterial roads. Other than that, the site also can be accessed by water routes go through Terengganu River from Seberang Takir Jetty and boats from Redang Island or Perhentian Island will come to the Ferry Terminal just inside the site of this case study (Figures 4 and 5).



Figure 4: Ferry Terminal



Figure 5: Terengganu River

The paths to the site are quite clear and straight forward as the Kuala Terengganu city centre was designed based on grid concept. (1) Jalan Sultan Zainal Abidin, (2) Jalan Petani and (3) Jalan Dato' Isaacs became the primary paths and numbered according to hierarchical order. These roads are congested during peak hours and school holidays as the users leaving or entering the site because of the location of Ferry Terminal to the Redang and Perhentian Island, Pasar Payang, Taman Syahbandar and the Post Office located beside the Istana Maziah. The existence of other arterial

roads such as Jalan Masjid Abidin, Jalan Tok Lam and Jalan Petani eased the traffic flow on the main roads (Figures 4). The formal pedestrian walkway, on the other hand, is located along all roads to ease the user, especially to the tourist because the site is one of the tourist attraction in Kuala Terengganu.

The Terengganu River (Figure 5) is not only as the transportation routes to enter and leave the site but also as a separation between Kuala Terengganu city centre and Seberang Takir. This natural topography becomes one of the dominant edges for the city centre. The importance of the river is to divide the territory and functions of both cities, and, to reconnect them. It generates a different way of living, economic approaches and architectural values between these two cities. Even, there is new construction of the bridge to connect Kuala Terengganu and Seberang Takir, which is the first draw bridge (Figure 7) constructed in Malaysia. The bridge is constructed there because of the route for the ferry, ship and boat along the Terengganu River.



Figure 6: Jalan Sultan Zainal Abidin
The arterial road along Taman Shahbandar until
to the Pasar Payang



Figure 7: The first drawbridge in Malaysia
connecting Kuala Terengganu City Centre
to Kuala Nerus (in construction)

5.2 EDGES

Lynch (1960) defined edges as the linear elements that act as boundaries between two kinds of areas and serve as lateral references. Terengganu River, located along with Kuala Terengganu City Centre, can be considered as the edge by the people who live or visit at Kuala Terengganu City Centre. Edges is an essential elements of urban design. Edges are boundaries that can determine the limit of the area, for example, in this case, is the Terengganu River as a shoreline.



Figure 8: Terengganu River

The edges of Terengganu River have differentiated between the land area of Kuala Terengganu City Centre and the land area of the other side called Seberang Takir. The river separates land and water area, as indicated in Figures 5 and 8. This makes more accessible for people to recognise the edges since the difference between two elements are very obvious (Lynch, 1960) due to its physical barrier creating lines along which separate or join two regions.

It does not only act as a separation between districts but also as the connection route among those districts. Terengganu river is connecting a few districts in Terengganu such as between Kuala Terengganu District, Setiu District and Hulu Terengganu District and also the river will connect to Tasik Kenyir. The existence of Terengganu River divides the city functions between Kuala Terengganu, Setiu and Hulu Terengganu and eases the administration for those cities.

Unfortunately, the importance of the Terengganu River as a transportation route seems to be forgotten due to the introduction of land transportation that more convenient to the users. The appreciation among the locals and tourists towards Terengganu River as a vital edge for the city centre seems to be diminished because fewer activities happen along the river as contrary during the past days. This is very contrary to ecological consideration in urban planning (Rameli and Wong, 2015) although water body is very prominent components of Kuala Terengganu.

5.3 DISTRICT AND ZONING

The division of the district at Kuala Terengganu city centre is generally based on the historical and geographical factors as well as planning consideration in the future as a Coastal Heritage City. These zones are vital for future references and guideline in preserving cultural and social aspects. Figure 9, Kuala Terengganu city centre was divided into six zones, identified through the function and activity. Zone 1 is for reclamation area, zone 2 for tourism, zone 3 for commercial area, zone 4 for the royal area, zone 5 for the old residential and commercial area and zone 6 for the religious area. Functions and activities were identified based on the locations of the buildings and the planning consideration from the government of Kuala Terengganu.

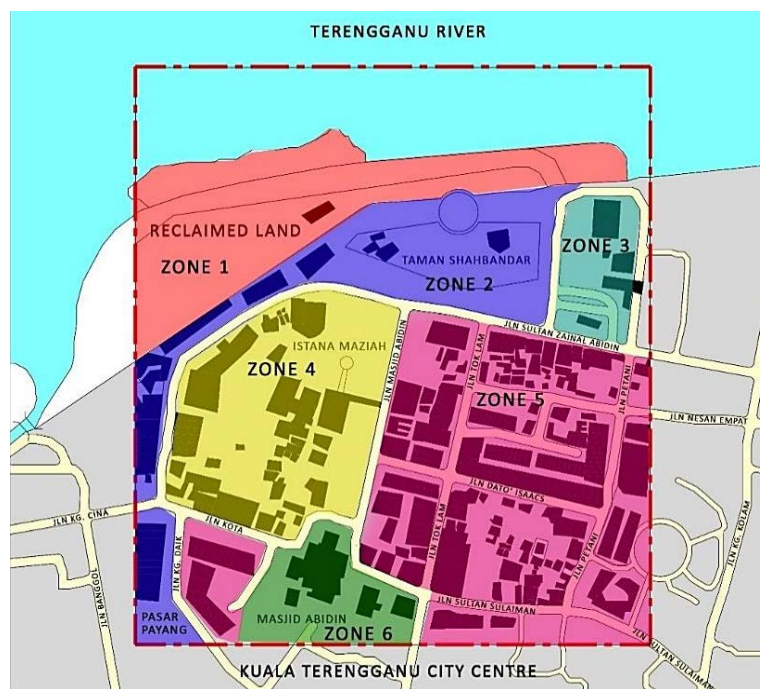


Figure 9: Zoning of Kuala Terengganu following historical aspect and future planning approaches.

The reclamation land in **Zone 1** is in construction to enlarge the tourism area that is one of the future planning approaches to get more tourists in Kuala Terengganu since the area is tourist attractions. The government plans to build more recreational area, a parking area (Figures 10) and upgrading the environment there because the tourist population in Kuala Terengganu increases every year. These approaches are useful in terms of tourism activity and economy in Kuala Terengganu.



Figure 10: The reclamation land turns into a car park and recreational area for tourist purpose

For **Zone 2**, it is called tourism zone because of the location of attractive places such as Taman Syahbandar, Jetty Terminal, Bazaar Warisan, Bukit Puteri and Pasar Payang are inlined, and it is walking distance between each other. This zone is significant as there are so many dominant landmarks, and it is similar to an introduction of Kuala Terengganu to the tourist. They got the most tourist visitors around this area every year because of the Pasar Payang, which is the famous market in Kuala Terengganu, and this reflects the historical traits and values of Kuala Terengganu. Next, **Zone 3** is for the commercial area that there have Astaka Hypermarket, which is the famous hypermarket back in the 1990s until now. **Zone 4** is for the royal area which is there have Istana Maziah is one of the official palaces of the Sultan of Terengganu.

Zone 4 is divided into a private area and semi-private area. Istana Maziah itself is in the category of private area and for the semi-private area in the park in front of the Istana Maziah. The purpose of the park is to ties several different elements together, making a seamless transition from one area to another (Batty & Longley, 1994). Tourists or the public can use the park anytime without any hesitate of disturbing the privacy of the palace.



Figure 11: The only traditional house with Terengganu architecture element in the middle of Kuala Terengganu city centre



Figure 12: Commercial shophouses

Zone 5 is for the traditional residential (Figure 11) and commercial area (Figure 12) because of the history of the site a long time ago. They insist on staying there because of their family members and the sentimental value of their place since a long time ago. This result is based on the interview session with the villagers. Figure 11, the government wants to develop that area, and there is the only house that standstill there with the construction occur around their house.

Finally, Zone 6 is for a religious area that encompasses Masjid Abidin (Figure 13) and

neighbouring compounds such as Islamic Museum, the Terengganu Royal Mausoleum that is the members of the royal family who have been buried beside Masjid Abidin and an array of shops that offer a variety of Islamic attires, religious books and non-alcoholic perfumes. The mosque is also known as the White Mosque or the Big Mosque. The original building material of the Masjid Abidin was wood, but during the reign of Sultan Umar at around 1852, the mosque was replaced with one made out of bricks. In 1881, Sultan Ahmad II ibni Yang Dipertua Muda Tengku Mahmud constructed a new dome to replace the old one erected under Sultan Zainal Abidin II.



Figure 13: Masjid Abidin (White Mosque or the Big Mosque).

The district element in Kuala Terengganu city centre was divided into 6 different zones and each zone are differentiated with the arterials road along the site study area.

5.4 NODES

Nodes are the core element in urban design as they become the focus of the area (Lynch, 1960) and can be accessed from all directions. Based on his statement, nodes can be defined as a focal point of strategic nature that a person can penetrate.

From the site observation, there is only one distinctive node (Figure 14) that become the essential elements in the whole Kuala Terengganu city centre which is Taman Shahbandar, or the other names are Dataran Shahbandar (Figure 15). Its scale and activities can distinguish Taman Shahbandar as a district garden or park and. The garden or park is mainly designed for the usage of recreational place for the public. Taman Shahbandar, which can be accessed by foot, bicycle and car, serves the purpose of creating a node for the public to gather and interact with each other. This idea can be seen as imperative for the user that is dedicated for all purposes.

Meanwhile, the scale and size of Taman Shahbandar also can cater any significant events such as a cultural event, entertainment event, a big scale of night market or Bazaar Ramadhan and any concert that can hold at Taman Shahbandar. Mostly, any significant events in Kuala Terengganu are held in Taman Shahbandar because of the important place, and the location of Taman Shahbandar itself is facing to the river that people can feel the calmness of Terengganu River.

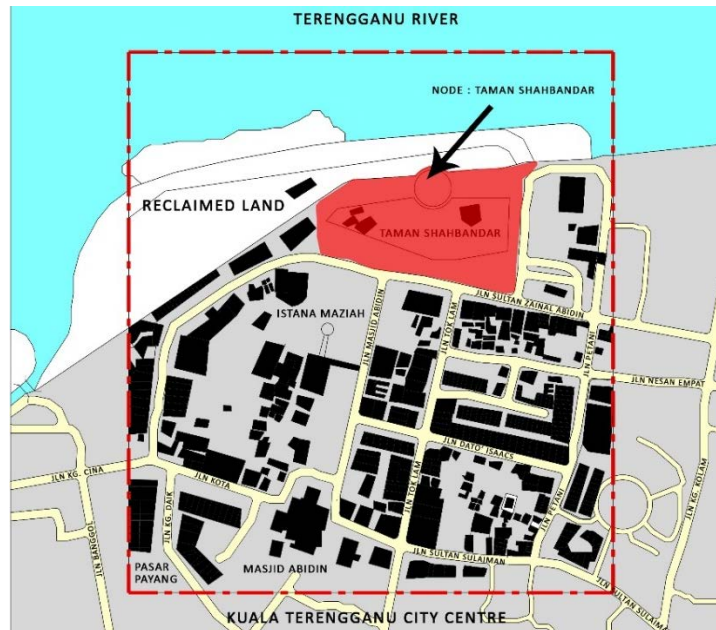


Figure 14: Nodes – Taman Shahbandar

Taman Shahbandar is a suitable place for the tourists to visit because of the design and the layout planning is very lovely, and there is a seafood restaurant (Figure 16) with the fantastic view towards to the Terengganu River. Tourists who want to go to Perhentian Island or Redang Island, they will see the beauty of Taman Shahbandar because the Jetty Terminal just beside the Taman Shahbandar. Lydon, Garcia and Duany (2015) researched the tactical urbanism where they concluded that by re-imagining parks to create a vibrant plaza as neighbourhood gathering place could be a way to shape urban spaces in new development to inspire the residents.



Figure 15: Taman Shahbandar



Figure 16: Seafood Restaurant

5.5 LANDMARKS

Landmarks, which are physical elements, are the external references to the individuals (Lynch, 1960). There are a few reasons that make a landmark memorable, which are its significance, uniqueness, contrast to the background and its distinctive location.

Kuala Terengganu City Centre has many distinctive landmarks (Figure 17) that can be recognised as its visual identity with its activity, design and architectural element. There is a lot of unique, traditional and local architectural styles rest around the site that falls under the category of landmarks. Some of them are known due to the historical significance and local identity representation. The landmarks that can be found around the site are Taman Syahbandar, Istana Maziah, Bukit Puteri,

Bazaar Warisan, Pasar Payang and Masjid Abidin. All these places have their own sentimental and historical value.

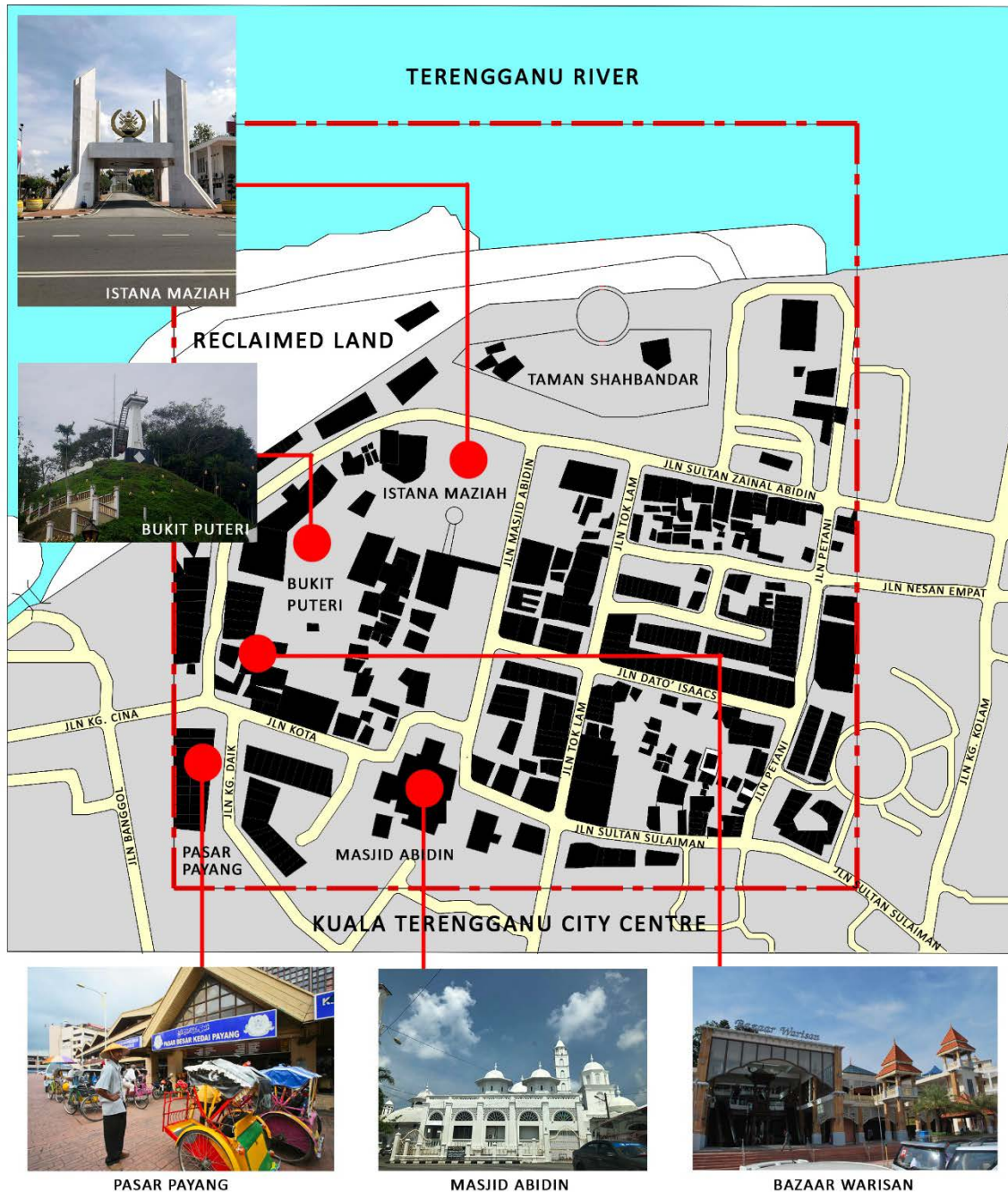


Figure 17: Landmarks in Kuala Terengganu City Centre

6. DISCUSSION

Although Kuala Terengganu City Centre is developed from colonial style of planning, the ideas and concept that being implemented by the authority reflects the local culture, way of living and architectural symbolism. The high integration of the urban design elements with the non-visual elements that are related to social interpretations, connectivity and appreciations at Kuala Terengganu City Centre reflects the considerations of brilliant urban quality of life. The evolution and transformation of the city image since the declaration of Kuala Terengganu as a Coastal Heritage City

have shown some positive progress and at the same time picturesque a clear identity and character rooted from local culture and heritage. However, there are less ecological considerations in responding with the garden city concept and to meeting the challenges in the future. The natural environment that exists at the site should be fully utilised as a large tract of greenery in responding with the garden city concept because landscaping and water bodies are prominent here at Kuala Terengganu City Centre. Moreover, the uses of the technology in accordance of millennium era is not fully utilised to meet the local government visions to create a model of Coastal Heritage City that reflects the cultural and natural heritage of Terengganu. Hence, Kuala Terengganu City Centre seemed to be distanced with the development as compared to the other city. However, many alternatives have been derived from creating a competitive city, great urbanism and meaningful city image to the people.

7. CONCLUSION

After the site observation, the urban design elements of Kuala Terengganu City Centre were identified based on the various scale of measurements that has been discussed in research methodology. As Kuala Terengganu City Centre can be considered a heritage township, the planning is not as hectic, the place and architecture are full with the history of Kuala Terengganu and the relationship with the neighbouring contexts are also carefully laid out.

The roads are designed with proper hierarchy. Some path already changed from two ways into one lane, for example, Jalan Sultan Zainal Abidin along the Dataran Shahbandar until Pasar Payang. Some lanes also make some amendment from two ways into one way. Jalan Sultan Zainal Abidin well-identified lead towards the upper site of Kuala Terengganu. There few landmarks along the path.

The most significant edge for Kuala Terengganu City Centre is Terengganu River itself. The Terengganu River connects a few districts in Terengganu such as between Kuala Terengganu District, Setiu District and Hulu Terengganu District and also the river will connect to Tasik Kenyir. The existence of Terengganu River divides the city function between Kuala Terengganu, Setiu and Hulu Terengganu and ease the administration for those cities. Unfortunately, the importance of the Terengganu River as a transportation route seems to be forgotten due to the introduction of land transportation that more convenient to the users. The appreciation among the locals and tourists towards Terengganu River as a vital edge for the city centre seems to be diminished because fewer activities are happening along the river as contrary during the past days. This is very contrary to ecological consideration in urban planning as stated by (Rameli and Wong, 2015) although water body is very prominent components of Kuala Terengganu.

The Kuala Terengganu City Centre is zoned based on their function and urban images into six zones at which are reclamation land zone, tourism zone, royal zone, residential and commercial zone and religious zone. The existing function of each area determines the division of the districts/zones. The other zonings have then been defined due to its specific functions and individual architectural styles that then create a unique mental image for the city itself. The establishment of sub-zoning within Kuala Terengganu City Centre is derived from 'divide and rule' concept where the zonings' functions and image are different from each other. To form a city, those small zonings in Kuala Terengganu City Centre have then been connected by the identical structures such as archway or unique architectural elements and also access that create a large section for the city (Hassan, 2009).

Most dominant nodes within the site are influenced by the existence of cultural, socio-economical influences, the history behind it and amalgamation of structures and most importantly, due to its functions. This cohesion of a few factors creates a centre of attraction within Kuala Terengganu City Centre. Due to Kuala, Terengganu is diverse in cultural aspects such as thousands of delicious traditional delicacies, traditional architectural and locals products, and it becomes the prime factor for the locals to start the business on the nodes. The significant nodes that are also recorded assemblance the specific functions that are vital and also special for the people. Hence, most of the main nodes recorded are standing because of that catalyst. Other than that, there are some other nodes become strategic foci due to its necessary historical background and as an essential identity to picturesque the overall concept of the city as a Coastal Heritage City.

The landmarks as perceived at Kuala Terengganu City Centre are affected by the cultural and architectural inheritance as well as the overall urban development concept by the governing party. These landmarks are usually well-known due to its functions and local architectural styles. The unique characteristics create a permanent mental image of the city and then overlap with individual interpretations about the city itself. The mental images created by the resemblance of the concepts and urban design elements, which portraying throughout the city. In parallel with the city planning concepts and idea, the Terengganu traditional architectural styles are merged with the Malay vernacular architecture and created urban signage for the city. Few dominant landmarks function as the urban signage and symbolical identities for Kuala Terengganu.

8. DATA AND MATERIAL AVAILABILITY

Information regarding this study is available by contacting the corresponding author.

9. REFERENCES

- Abdullah, N.H. (2014). Resident's needs and organisers goals towards the Organization of Monsoon Cup Event, Malaysia. *International Journal of Economics and Management*.
- Barnett, J. (1986): *The Elusive City: Five Centuries of Design, Ambition and Miscalculation*.
- Corbusier, L. (1971), *The City of Tomorrow and its Planning*, 3rd Ed. (trans: by Etchells, F.).
- Hall, P. (2014). *Cities of Tomorrow: An Intellectual History of Urban Planning and Design Since 1880*. 4th Ed. West Sussex: Blackwell Publishing.
- Handy, S. (1996). Methodologies for Exploring the Link Between Urban Form and Travel Behavior. *Transportation Research: Transport and Environment*: D 2(2): 151-65
- Harvey, D. (1989). From Managerialism to Entrepreneurialism; The Transformation of Urban Governance in Late Capitalism, *Geografiska Annaler* 71B:3-17
- Hassan, A.S. (2001). Perancangan Rekabentuk Bandar Bukan Geometri. *Journal of Housing, Building and Planning*, 13, 89-104, Penang: USM Press
- Hassan, A.S. (2009). The British Colonial 'Divide and Rule' Concept in Inner City of George Town. Penang: Its Influence to Irregular Layout of the Transport Access. *International Journal of Transportation*, 36(3), 309-324.
- Lin, L. H., Nordin, J., Hassan, A. S., & Arab, Y. (2019). Elements of Paths, Edges, Nodes, Districts

And Landmarks in Fishing Village Waterfront, George Town, Penang. *International Transaction Journal of Engineering Management & Applied Sciences & Technologies*, 10(18), 10A18E

Lynch, Kevin (1960). *The City Image and Its Elements, The Image of the City*, Cambridge: MIT Press

Pauzi, M. H. M., Hassan, A. S., Arab, Y., & Samad, M. H. A. (2018). A Study on Mental Mapping: Case of Government Buildings, George Town, Penang. *International Transaction Journal of Engineering Management & Applied Sciences & Technologies*, 9(3), 211-219.

Snedcof, H.R. (1985), *Cultural Facilities in Mixed Use Development*, Urban Land Institute. London: The Architectural Press.



Ahmad Syamil Sazali obtained his Master of Architecture from the School of Housing, Building, and Planning, Universiti Sains Malaysia (USM).



Professor Dr. Ahmad Sanusi Hassan is a Professor in Architecture Programme at the School of Housing, Building and Planning, Universiti Sains Malaysia, Penang, Malaysia. He obtained a Bachelor and Master of Architecture degrees from University of Houston, Texas, USA, and Doctor of Philosophy (PhD) degree focusing on Sustainable Architecture and Urban Design Development for Southeast Asia from University of Nottingham, United Kingdom.



Dr. Yasser Arab is a senior lecturer at Universiti Sains Malaysia. He obtained his Bachelor of Architecture from Ittihad Private University, Aleppo, Syria. He obtained a PhD in Sustainable Architecture from Universiti Sains Malaysia (USM), Penang, Malaysia. His research focused on the Environment Performance of Residential High-Rise Buildings' Façade in Malaysia.



Dr. Boonsap Witchayangkoon is an Associate Professor of Department of Civil Engineering at Thammasat University. He received his B.Eng. from the King Mongkut's University of Technology Thonburi with Honors. He continued his PhD study at University of Maine, USA, where he obtained his PhD in Spatial Information Science & Engineering. His current interests involve Applications of Emerging Technologies to Engineering.
