ISSN 2228-9860 eISSN 1906-9642 CODEN: ITJEA8

International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies

http://TuEngr.com

Analysis on Urban Paths and Edges at Farlim Township in Penang

Ooi Wei[1], Ong Poh Yin[1], Ahmad Sanusi Hassan[1*], Yasser Arab[1], Khiensak Seangklieng[2], Boonsap Witchayangkoon[3], and Joesron Alie Syahbana[4]

[1] *School of Housing, Building and Planning, Universiti Sains Malaysia, MALAYSIA.*
[2] *Faculty of Architecture and Planning, Thammasat University, THAILAND.*
[3] *Department of Civil Engineering, Thammasat School of Engineering, Thammasat University, THAILAND.*
[4] *Department of Urban and Regional Planning Faculty of Engineering, Diponegoro University, INDONESIA.*
**Corresponding Author (Tel: +60-4-6532844, Email: sanusi.usm@gmail.com)*

Paper ID: 12A5N

Volume 12 Issue 5

Received 01 October 2020
Received in revised form 02 February 2021
Accepted 04 March 2021
Available online 15 March 2021

Keywords:
Urban design elements; Mental Mapping; Private-developed township; Garden city; Hillside development; Self-sustained community; Residential neighbourhood; Urban pattern; Urban planning.

Abstract

This study analyses the place-making of Farlim, a Garden City, in Penang, focusing on two of the five urban design elements according to Lynch (1960), i.e. path and edge. Farlim is the first largest private-developed township in Penang comprising a mixed range of housing development as well as some supporting components such as commercial, business, healthcare, and educational institutions. The urban layout of this garden city is a gridiron plan adapted to the natural contour of the site in an irregular layout. To carry out the survey and analysis of the elements that compose the mental image of this site, this study uses qualitative methods including site visits, online research, and interviews. This study shows that the path is the most dominant urban design element at this site, ensuring smooth circulation and efficient connectivity to cater to the high traffic flow from neighbouring areas. The identified strong edge is formed by Bukit Romania, which created a clear boundary between the site and the undeveloped hill land. These two important urban design elements have successfully created a significant visual perception in Farlim, Penang.

Disciplinary: Urban and Regional Planning, Architecture and Sustainable Urban & Real Estate Development.

Cite This Article:

Ooi, W., Ong, P. Y., Hassan, A. S., Arab, Y., Seangklieng, K., Witchayangkoon, B., and Syahbana, J. A. (2021). Analysis on Urban Paths and Edges at Farlim Township in Penang. *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies, 12*(5), 12A5N, 1-13. http://TUENGR.COM/V12/12A5N.pdf DOI: 10.14456/ITJEMAST.2021.98

1 Introduction

This is a study on the physical features of Farlim, a residential neighbourhood in Penang, Malaysia, focusing on elements of architecture, landscape design and urban planning. Urban design

is the process of designing the physical features and shaping the built environment of towns and cities, or as simple as the making of places for people. (Carmona et al., 2003) Urban design elements are very important in defining a place, intended for people to easily understand what opportunities it offers (Hassan et al., 2018, Yong et al. 2020). In this case study, we will identify the mental image and understand how people use and perceive the physical environment in this town.

From how it was developed from a hillside forest to the place it is today, we will study Farlim's urban design and development as a private-developed township and one of the most recognizable Garden Cities in Penang. With reference to Kevin Andrew Lynch's The Image of the City, two out of five elements of urban design, namely Path and Edge, will be analysed based on the place-making of this Garden Housing Estate. People engage in way-finding by recognizing and organizing urban design elements into a coherent pattern. (Lange, 2009) This study will identify how people orientate themselves in the city through mental mapping based on these elements.

Our site of this case study, Farlim, is a Garden City located approximately 6km southwest of the George Town city centre. Garden City is a planned, self-sustained community surrounded by greenbelts and open spaces, aiming to promote a healthy lifestyle with employment opportunities. (Howard, 1902) This site comprises mainly residential properties, with some mixture of business, commercial, health, and educational entities that support the self-sustaining community.

This study's objective is to identify and analyse the strengths and weaknesses of the elements of urban design and to further discuss their respective significance to the people and their relationship with each other.

2 Literature Review

Farlim, officially known as Bandar Baru Air Itam, is a residential township located within the Air Itam suburb in Penang, Malaysia (Figures 1 and 2). The name Farlim means "beautiful forest" comes from the name of the company that developed the township, and describes the forested area before it underwent development (Tye, 2009). This major township is located approximately 6km southwest of the George Town city centre, with a total area of 356 acres previously known as Thean Teik Estate, owned by Khoo Kongsi since the 1920s. This forested area was developed by Farlim Group Berhad in the 1980s and it was the first largest property development is undertaken by a private sector on Penang Island at that time (The Star, 2016). The development initially composed mostly of landed properties, and then followed by a mix of low cost and medium-cost flats to upscale condominiums, supported by public amenities including a public park, schools, clinics, banks, hypermarkets, police stations, post offices, sports facilities, commercial outlets, places of worship and so on. The town centre is built around Lintang Angsana, where most of the businesses and eateries are located within a central cluster, including the headquarters office of Farlim Group Berhad. Most Farlim flat land has been developed by the 2000s, hence the newer apartments and condominiums are continued to be built on the hill slopes. Due to its rapid development and growing population, Farlim is considered one of the busiest townships in Penang Island today.

Figure 1: Key Plan

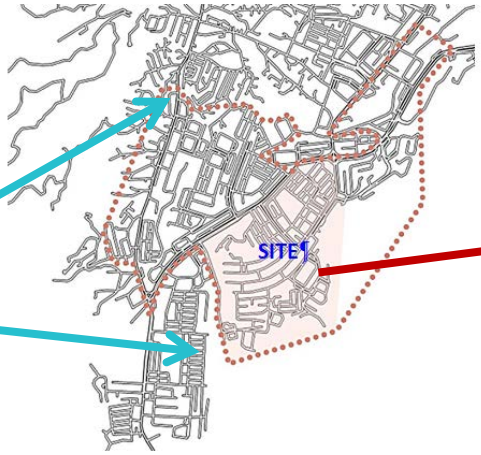

Figure 2: Location Plan.

Figure 3: Figure-ground of the studied site.

In this case study, we focus on one part of Farlim Township, an area of 156 acres bounded by Jalan Bukit Kukus, Thean Teik Highway, Jalan Angsana, and the edge of the forest (Figure 3). Among the main buildings are low-cost flats, semidetached houses, 3-storey terraced houses, 3-storey shop lots, banks, market place, open fields, petrol stations, and a government clinic.

2.1 The Urban Layout

This site's urban pattern is a fusion between gridiron plan and organic plan. A gridiron plan is a type of urban layout in which streets are arranged at right angles with each other, forming a grid-like arrangement of the buildings. The Grid plan is dated back to the Greek civilisations and was a versatile method of city structuring taking five important forms as the main hierarchy of boxes nesting on each other, or checkerboard pattern (Hassan, 2018). This urban layout design is a basic masterplan planning embraced by the British colonial administration, which has indirectly influenced the urban circulation and town image of this site (Hassan, 2009). However, this site's urban layout is not a perfect grid, it has adapted some irregular organic street arrangement to suit the topography of the site, which has some slope near the forested area at its southeast.

2.2 Garden City

Garden City is a residential community concept devised by Sir Ebenezer Howard, in conjunction with his Theory of Three Magnets (Howard, 1902). This movement is a response to improve the quality of urban life due to overcrowding and congestion in cities since the Industrial Revolution. The concept of this theory is to combine traditional countryside with the city, to capture the primary benefits of both countryside and city environments, to achieve a better urban life and have better infrastructure and facilities in a less congested town, which is referred to as Garden City. It is also a self-contained community that contains proportionate areas of residences, industry and agriculture. This site of our case study is one of the earliest Garden City in Penang Island, with its own town center 6km away from the central city in George Town.

2.3 Urban Design Elements

In *The Image of the City*, American urban theorist Kevin Lynch has discussed urban design by observing the visual and physical form of a city at an urban scale and has identified the five urban

design elements, namely Paths, Edges, Districts, Nodes, and Landmarks. These five elements are the principles of how people take in information about the city, which consequently formed the mental map of people that experience that city. With proper urban planning, these elements give impacts on a city to its function, history, name, or meaning (Larice & Macdonald, 2007). People often associate the historic townscape with the image of the city since the visual organization refers to the relationship of the objects (Lang, 1987). This image is the product of both the immediate sensation and the memory of the experience and is used to interpret the information and to guide action. (Lynch, 1960) Thus, a good layout plan will help users to be more direct and precise whenever they are moving towards a destination (Hassan, et al., 2017).

2.3.1 Paths

Paths are the channels along which the observer customarily, occasionally, or potentially moves (Lynch, 1960). Paths allow people to observe the city while moving through it. It is a channel where people potentially move such as roads, pedestrian walkways, transit lines, and railroads. (Hassan, et al., 2017) It acts as a network of tracks to link all the destinations together.

2.3.2 Nodes

Nodes are commonly known as strategic places and points in the city where it is an open area to cater to the concentration of people and activities that symbolizes that area. It has an equivalent concept as a path, nodes will be interpreted as the junctions of paths or events of the journey. It will be the strategic intersection point for the observer to view the direction of the journey clearly. Nodes may also be places of concentration such as public squares or plazas, sometimes signifying a centre of a city in terms of both its location and importance. (Lynch, 1960)

2.3.3 Edges

Edges are linear elements i.e. boundaries of the city that is continuous in form and can be either impermeable or permeable. These elements are commonly known as walls, buildings, streets, curb, river, and so on. Such edges may be barriers, more or less penetrable, which close one region off from another; or they may be seams, lines along which two regions are related and joined together. (Lynch, 1960)

2.3.4 Districts

Districts are categorized with the medium-to-large sections of the city, recognizable for having some common characteristics and similar styles. The physical characteristics may consist of an endless variety of components: texture, space, form, detail, symbol, building type, use, activity, inhabitants, degree of maintenance, topography (Lynch, 1960). The architectural design of buildings within any district and zoning usually appear to have strong similarities to one another due to the influence within the same area. Typically, the classification of the district can be based on functions and activities such as residential, commercial and public amenities.

2.3.5 Landmarks

Landmarks, the point references considered to be external to the observer, are simple physical elements that may vary widely in scale (Lynch, 1960). Landmarks can be objects or buildings such as monuments, skyscrapers, signs and public art to identify a place. It gives the public a clear visual image of being unique, special and contrasting with the surroundings, which can be distinguished from far.

3 Research Method

To carry out an in-depth study on the urban design elements of Farlim, a few qualitative methods are chosen that best suit our investigation. Qualitative methods are the main approaches to obtain unstructured and non-numerical data from open-ended sources. A preliminary study on the history and background of the site is conducted through the research on the Internet as well as some casual interviews with the local residents. General site information and measurements are obtained from Google Maps and transferred to AutoCAD for a more accurate measurement. Figure-ground mapping of the site was prepared using MapBox/AutoCAD then retraced to the existing layout, to prepare the base map for land use, building blocks, streets, topography, landscape and zoning for the site study. The photos of streetscapes, facilities, building blocks, soft and hardscapes of the site are taken during site visits, whereas the zoning plan of the site is obtained from the JUPEM website for better interpretation. The quality of each urban design element, namely paths and edges, of the site are identified based on the site study and then contextualized and analysed with reference to Kevin Lynch's theory on urban design. Each element is studied on different scales and analysed based on its relationship with the users. As both main authors are local residents of the site of this case study, the analysis of this study is further justified by daily observations and the interviews conducted with the local residents. Comparison is done by using ratios of area, size, length and height of each component to determine the hierarchy of the elements.

3.1 Paths

Paths allow people to observe the city while moving through it. It is a channel where people potentially move e.g. roads, pedestrian walkways, transit lines, and railroads (Hassan et al., 2017).

3.2 Edges

Edges are determined based on observations and relevant data information obtained from the site. By observing locals' behaviours and understanding locals' perceptions, both permeable and impermeable edges are identified through casual interviews with the locals. Measurements of the quality scale of edges are executed.

4 Result and Discussion

4.1 Paths

4.1.1 Highway & Entrances

Thean Teik Highway is the only freeway that leads to our site through five entrances (Figure 4). The main entrance is through **Jalan Angsana**, from its cross junction with Jalan Thean

Teik and Thean Teik Highway (Figure 4). It is also an arterial road that carries a large volume of traffic at all times especially during peak hours in the morning and evening. The width of this main entrance is 20m, the largest width among all entrances to the site.

Figure 4: Entrances to site

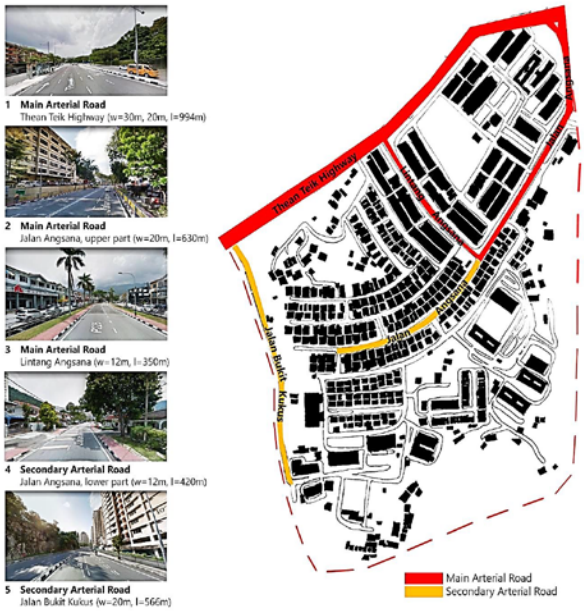

Figure 5: Main and secondary arterial roads.

There are two secondary entrances to the site, both from Thean Teik Highway. The first one is through **Jalan Bukit Kukus**, a 20m wide road that leads to the 7 blocks of apartments at the south of the site. Another entrance is through **Lintang Angsana**, a 12m wide road which leads to the main business and commercial area of this site, which is also the town centre of Farlim.

The other two entrances are categorised as tertiary entrances as they are least frequently used. Both entrances are 12m wide and cater for less traffic. Entrance from **Medan Angsana 1** leads to the rear side of the commercial area, while entrance from **Jalan Beriksa 3** leads to the landed housing properties. Table 1 gives the road entrances comparison.

Table 1: Comparison of Entrance Widths.

Road Name	Path	Width (m)	Percentage (%)
Jalan Angsana	Main Entrance	20	26.3
Jalan Bukit Kukus	Secondary Entrance 1	20	26.3
Lintang Angsana	Secondary Entrance 2	12	15.8
Medan Angsana 1	Tertiary Entrance 1	12	15.8
Jalan Beriksa 3	Tertiary Entrance 2	12	15.8

4.1.2 Arterial Roads

There are five arterial roads identified at this site (Figure 5), categorised based on their location and average traffic volume. The three main arterial roads are the ones that are used most frequently to commute to and within the site.

Thean Teik Highway (30m width), being the freeway at the edge of the site, is naturally the main arterial road that carries the most traffic. The heavy traffic coming from the cross junction of Thean Teik Highway, Jalan Thean Teik and Jalan Angsana has made **Jalan Angsana** another arterial road, leading to the inner parts of this site. Jalan Angsana is 1.15km, crossing the site from

the northeast to the west. The upper part of it is 20m wide, leading traffic from the cross junction (main entrance of the site) towards the commercial area, hence it is considered a main arterial road. However, the lower part of Jalan Angsana is only 12m wide and serves only the residential units, therefore this part is categorised as a secondary arterial road.

Connecting traffic between Thean Teik Highway and Jalan Angsana is **Lintang Angsana**, a 12m wide road crossing the business and commercial area of Farlim. This road is categorised as a main arterial road as it is a very important path at the site core area. **Jalan Bukit Kukus** is at the west edge of the site, leading traffic from Thean Teik Highway up to the apartment blocks at the south. Despite its width of 20m, it is identified as a secondary arterial road because it serves a smaller portion of the site. Table 2 gives details of arterial roads.

Table 2: Comparison of arterial road.

Road Name	Path	Width (m)	Percentage (%)
Thean Teik Highway	Main Arterial Road 1	30	31.8
Jalan Angsana (upper part)	Main Arterial Road 2	20	21.3
Lintang Angsana	Main Arterial Road 3	12	12.8
Jalan Angsana (lower part)	Secondary Arterial Road 1	12	12.8
Jalan Bukit Kukus	Secondary Arterial Road 2	20	21.3

4.1.3 Collector Roads

There are 12 main collector roads and 8 secondary collector roads identified at the site. **All collector roads are 12m wide**. Main collector roads connect and serve more people from the building components, while the secondary collector roads carry less traffic compared to main collector roads. Generally, main collector roads connect secondary connector roads to the arterial roads at the site.

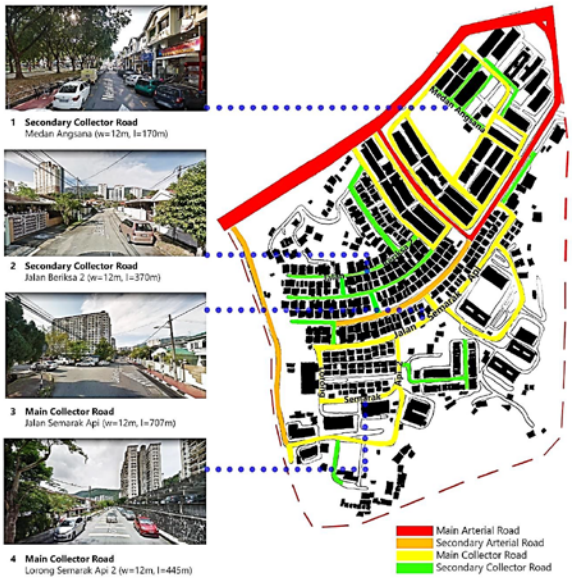

Figure 6: Main and secondary collector roads.

Figure 7: Local Roads at Site

4.1.4 Local Roads

On this site, most of the local roads have no name. The main local roads are the roads that serve high-rise apartments/flats, all with 15m width including car parking lots on both sides. There are two types of secondary local roads. The first type consists of all back lanes and side lanes of shop-lots, with 4.5m width. The other type includes the narrow back lanes of residential units, with

3m width. The rest of the informal roads, paved and unpaved, are categorised as tertiary local roads, with an average width of 3m.

4.1.5 Cul-de-sac & End Roads

Cul-de-sac is designed with proper turning space for vehicles at the end of the road, whereas the end-road terminates abruptly. There is only one cul-de-sac identified at this site (Figure 8), located at the end of a narrow lane at the back of a row of semi-detached houses leading to a few houses that are not arranged orderly. Its radius is 5m.

Figure 8: Cul-de-sac and end roads.

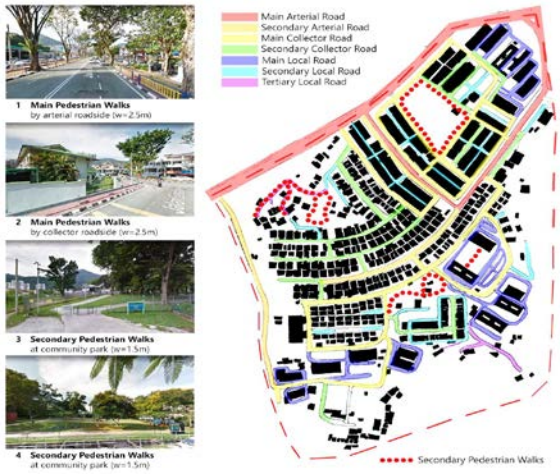

Figure 9: Pedestrian walks.

There are 10 end roads found on this site. Main End Roads refer to those with proper planning and paving. Two of the main end roads are found at the high-rise residential block, each with 15m width and car parking lots at both sides. Another five are end roads of 12m width that serve semi-detached and terraced houses. The three secondary end roads at this site are unfinished roads that will probably lead to future development.

4.1.6 Pedestrian Walks

Pedestrian walkway are present at sides of all arterial and collector roads (Figure 9, Table 3), with an average width of 2.5m, hence such paths are categorised as the main pedestrian walks at this site. Secondary pedestrian walks are the paths that do not carry vehicle traffic, such as walkways at the community parks, which are also usually used as a shortcut for pedestrians to cross from one side of the park to another instead of having to follow the vehicular roadside path.

Table 3: Comparison of Pedestrian Walk Widths.

Path	Width (m)	Percentage
Main Pedestrian Walks 1	2.5	31.3
Main Pedestrian Walks 2	2.5	31.3
Secondary Pedestrian Walks 3	1.5	18.7
Secondary Pedestrian Walks 4	1.5	18.7

4.1.7 Comparison of All Paths

Table 4 summarizes all paths of the Farlim studied site.

Table 4: Comparison of all paths at the site

Path	Number	Width (m)	Percentage	Average Length (m)	Percentage
Entrance	**5**				
	2	20	4.1	-	-
	3	12	3.7	-	-
Arterial Roads	**5**				
	1	30	3.1	994	6.4
	2	20	4.1	598	7.8
	2	12	2.5	385	5.0
Collector Roads	**20**	12	24.6	314	40.9
Local Roads	**42**				
	19	15	29.2	120	14.8
	11	4.5	5.1	128	9.2
	12	3	3.6	115	9.0
Cul-de-sacs	**1**	5m radius	-	-	-
End Roads	**10**				
	2	15	3.1	90	1.2
	8	12	9.8	110	5.7
Pedestrian Walks	**30**				
	25	2.5	6.4	*at sides of all arterial & collector roads	
	5	1.5	0.7	*walking trails at community parks	

4.2 Edges

4.2.1 Main Boundary Edge

4.2.1.1 *Mountain*

Topography is a vital element to reinforce the strength of urban elements. The sharp mountain can define regions and make strong edges as continuity and visibility are impenetrable. The mountain is located in the heart of Penang Island, commonly known as Bukit Romania. This island of greenery separates the townships of Farlim and Paya Terubong from Gelugor on the east coast. It offers magnificent views of Penang Hill, Farlim, Paya Terubong Valley (Figure 10).

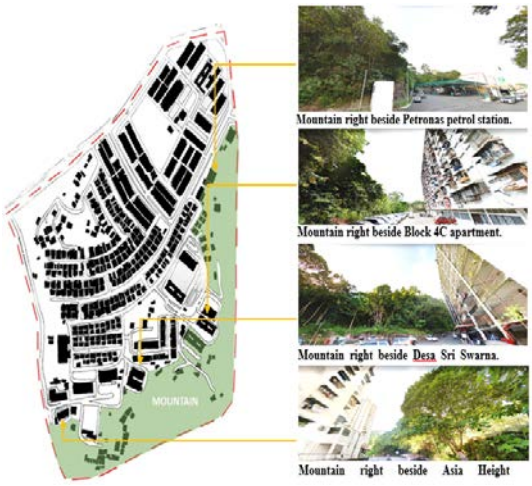

Figure 10: Mountain as edge.

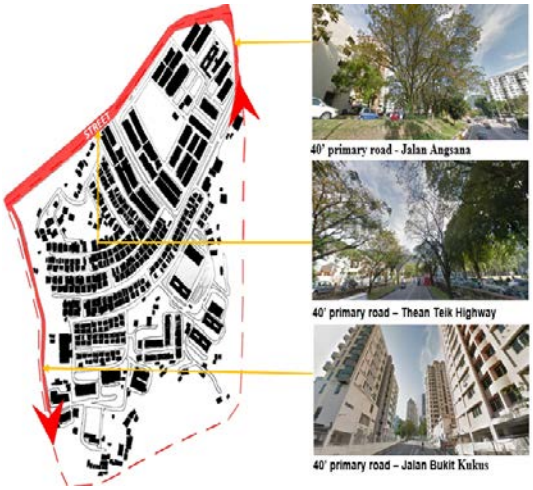

Figure 11: Street/highway as edge

4.2.1.2 *Street/Highway*

Streets or highways are often edges as well, having the highway next to the site increases difficulty to make connection to the site, thus, it can be considered as strong edges as well (Figure 11). The site is bounded by 40' Jalan Angsana, Thean Teik Highway and Jalan Bukit Kukus. Thean Teik Highway and Jalan Angsana are served as a main arterial road which always encounters

massive congestion, especially during peak hours, while Jalan Bukit Kukus is a secondary arterial road.

4.2.2 Secondary Boundary Edge - Residential and Commercial Building Blocks

The site comprises of residential and commercial development mainly, with some religion buildings scattered around our site. By differentiating the building blocks and forms, residential development is mostly landed properties, flats, apartments and condominium, while commercial development is mostly shop houses or shop offices with maximum 3-storey height. The strong edges are formed in our site with the boundaries of residential and commercial development.

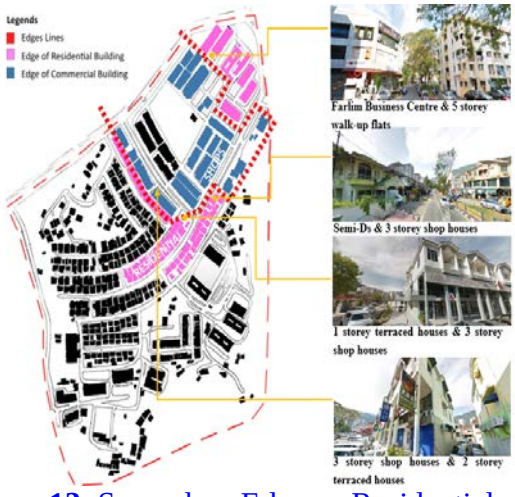

Figure 13: Secondary Edges – Residential and commercial building blocks.

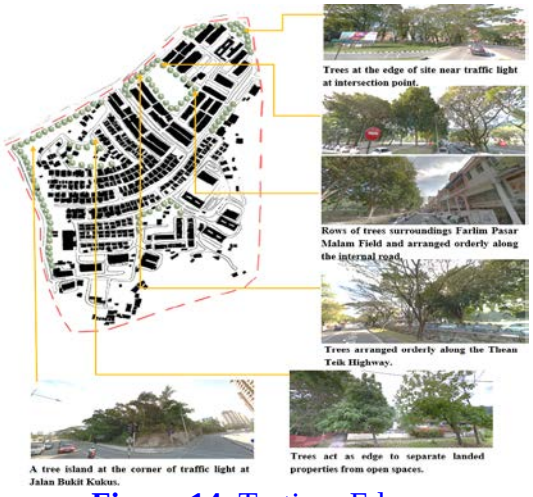

Figure 14: Tertiary Edges.

4.2.3 Tertiary Boundary Edge

Trees make natural boundary edges occurred in the studied site (see Figure 14).

Table 5: Comparison of all Edges at site

Name	Edge	Width (m)	Percentage	Length (m)	Percentage
Bukit Romania	Main Edge	1000 – 1750 (avg. 1375m)	98.1	1550	17.8
Jalan Angsana, Thean Teik Highway, Jalan Bukit Kukus	Main Edge	12.2m	0.87	1800	20.7
Medan Angsana, Jalan Angsana 1	Secondary Edge	3.05 - 12.2 (avg. 7.625m)	0.54	1000	11.5
Trees	Tertiary Edge	0.6 – 1 (avg. 0.8m)	0.06	1900	21.8
	Total	**1401.7**	**100**	**8700**	**100**

The widest width can be the strongest edge of the site, thus the mountain acts as the main edge of the site and becoming the only impenetrable natural edge. While rows of trees can only be the tertiary edge due to their smallest width under comparison. The lengths of the edge are almost similar, ranging from 11.5-21.8% (Table 5).

5 Discussion

5.1 Paths

Being the most dominant urban design element at this site, most paths are satisfactory and play an important role in connecting people, vehicles and buildings according to its hierarchy.

There are generally two types of paths, i.e. vehicular paths and pedestrian paths. The main arterial roads, i.e. Thean Teik Highway, Jalan Angsana and Lintang Angsana carry a large volume of traffic to and within the site, connecting vehicular circulation between different districts. Besides, the two dominant collector roads i.e. Jalan Semarak Api and Lorong Semarak Api 2 link users from the residential areas to the arterial roads and other parts of the site. Due to the convenience and facilities provided, this commercial district of this site has become a popular node for the neighbouring areas, hence the arterial roads act as the key that contributes to the smooth connectivity and accessibility at the site. Oppositely, local roads here serve as a side lane or back lane of buildings for alternative access as well as providing car parking area for high-rise flats. In contrast, the pedestrian walkways are considered the weakest path at the site. Most of them are designed on the side curbs at most of the arterial and collector roads, with some stops halfway without continuing paths. Moreover, proper pedestrian walkways are absent from local roads, hence pedestrians have to share the same path as the vehicles, which puts their safety at risk. Zebra crossings are only present at the few junctions with traffic lights, hence it is inconvenient and unsafe for pedestrians to cross the busy roads. Thus, to improve pedestrian connectivity and accessibility between places, the sidewalks at vehicular roads should be properly built and well maintained, and the number of zebra crossings should be increased especially at arterial roads.

5.2 Edges

The whole site is bounded by the strongest edges formed by the mountain and arterial roads - Bukit Romania, Jalan Angsana, Thean Teik Highway and Jalan Bukit Kukus which create clear boundaries encircled around the site. The public tends to recognize and differentiate things faster using visual recognition. On the site, there are mainly residential and commercial areas only. The building façade and form between residential and commercial is obvious enough to form a moderately good edge to help the public to identify the area demarcation and building function. terraced houses, semi-detached houses, flats, apartments and condominiums do produce consistent conventional architectural designs, needless to say, Farlim Business Centre, shop houses and shop offices share the almost same style of shopfront facades with various kind of shop signage.

Some less dominant edges can be traced along the highways, streets and open space. For example, rows of trees are planting neatly in linear form to provide shade and create a sense of garden for the public. The rows of trees also act as a buffer zone to filter the traffic noise from the arterial road and hustle-bustle of Farlim township. The softscape may give a lesser impact to form a strong edge of the site, however, it helps in giving a sense of direction to the public.

6 Conclusion

Farlim Township is deemed to be a Garden City concept, the urban planning of the site has fulfilled itself as a self-contained community that contains proportionate areas of residences and commercial. It is proud to say that both of these two urban design elements i.e. path and edges are significant in shaping the township. The identities of these urban elements are direct and

completely understandable to be perceived by the public. Generally, the path network has provided an effective and efficient circulation of vehicular and pedestrian pathways, which allowed easy access from the main roads linked to secondary roads. However, the pedestrian paths are not as satisfactory due to the lack of consistency and maintenance. At some point, the pedestrian may have to share the same path with the vehicles, which puts their safety at risk. To overcome this weakness, it is highly recommended to provide a continuous pedestrian path so as to increase the safety and accessibility for pedestrians. On the other hand, the identified edges are mostly notable and create strong impressions for the users. The bold and almost impassable natural edge of Bukit Romania and the distinctive boundary of streets and highways have successfully created some strong edges for the site.

7 Availability of Data and Material

Data can be made available by contacting the corresponding author.

8 Acknowledgment

The authors are fully acknowledged the financial supports from Universiti Sains Malaysia, the Bridging Grant Number 304.PPBGN.6316251.

9 References

Carmona, M., Tiesdell, S., Heath, T., & Oc, T. (2003). *Public Places - Urban Spaces The Dimensions of Urban Design*. Oxford: Architectural Press.

Hassan, A. S. (2009). The British colonial 'divide and rule' concept: its influence to transport access in inner city of George Town, Penang. *Transportation*, *36*(3), 309-324.

Hassan, A. S. (2018). *Ke Manakah Hala Tuju Reka Bentuk Bandar dan Seni Bina Kita?*. Penang: Penerbit Universiti Sains Malaysia.

Hassan, A., Yasin, N., & Al-Ashwal, N. (2017). Investigation of mental mapping in urban design: Case of Queensbay, Penang. *International Transaction Journal of Engineering, Management, & Applied Science & Technology*, *8*(4), 261-273.

Hassan, A., Zakaria, M., & Ismail, M. (2018). Urban Design Study on Kota Bharu City Centre, Kelantan, Malaysia. Allen Press.

Howard, E. (1902). *Garden Cities of To-morrow*. London: Swan Sonnenschein & Co.

Lang, J. T. (1987). *Creating Architectural Theory: The Role of the Behavioral Sciences in Environmental Design*. Van Nostrand Reinhold Company.

Lange, M. d. (2009). Review: Kevin Lynch - The Image of the City. *The Mobile City*. http://themobilecity.nl/2009/05/08/review-kevin-lynch-the-image-of-the-city/

Larice, M., & Macdonald, E. (2007). *The Urban Design Reader*. Routledge.

Lynch, K. (1960). *The Image of the City*. The MIT Press.

The Star. (2016). New Commercial Precinct to Enhance Growth of Bandar Baru Air Itam. *The star newspaper*. https://www.thestar.com.my/metro/community/2016/06/27/taking-town-to-greater-

heights-new-commercial-precinct-to-enhance-growth-of-bandar-baru-air-itam/

Tye, T. (2009). *Farlim (Bandar Baru Ayer Itam)*. Timothy Tye's Penang Travel Tips: https://www.penang-traveltips.com/farlim.htm

Yong, I. N. W., Arab, Y., Nordin, J. and Hassan, A. S. (2020). Urban Design Elements' Analysis of Bandar Enstek, Nilai Negeri Sembilan, Malaysia. *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies*, *11*(9), 11A9N: 1-12.

Ooi Wei is a student of Master of Architecture in University Sains Malaysia. She obtained her Bachelor's Degree in Architecture from Universiti Sains Malaysia. Her interests include Housing Development and Sustainable Urban Development.

Ong Poh Yin is a student of Master of Architecture in University Sains Malaysia. She obtained her Bachelor's Degree in Architecture from Universiti Sains Malaysia. She is interested in Urban Planning and Architectural Design for Sustainable Development.

Professor Dr Ahmad Sanusi Hassan is a Lecturer in the Architecture Programme at the School of Housing, Building and Planning, Universiti Sains Malaysia (USM), Penang, Malaysia. He obtained his Doctor of Philosophy (PhD) degree from the University of Nottingham, United Kingdom. His research focuses on Sustainable Architecture and Urban Design Development.

Dr. Yasser Arab is a Researcher in Architecture. 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.Khiensak Seangklieng is an Assistant Professor at Faculty of Architecture and Planning, Thammasat University, Thailand. He got his Bachelor degree in Architecture from the Institute of Architecture, University of Northern Philippines, Vigan Ilocos Sur, Philippines, a Master of Architecture from Chulalongkorn University and a Ph.D. in Architectural Heritage Management and Tourism from Silpakorn University, Thailand. He is interested in Green & Sustainable Architecture.

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.

Dr. Joesron Alie Syahbana is an Associate Professor and Chair of the Master of Regional and City Development at Diponegoro University, Semarang, Indonesia. He obtained an Engineer (Ir) and a Master of Science (MSc) from the Bandung Institute of Technology, and a Doctorate (Dr) from Gajah Mada University. His research focuses on City Development Management, Social Planning and Spatial Planning.

Note: The origin of this article was reviewed, accepted, and presented at the 5th International Conference on Sustainable Architecture and Urban Design (ICWSAUD 2020) (Virtual Conference), a Joint Conference with the 5th International Conference on Engineering, Innovation, & Technology (ICEIT 2020) held by the School of Housing Building and Planning, Universiti Sains Malaysia, Pinang, Malaysia during 22-23 September 2020.