

CHAPTER 3 STATEMENT OF NEED

3.0 Introduction

From the macro perspective, economic growth can be seen to be increasingly related to the mobility of people, goods and information. This state of affairs strengthens the relationship between the extent and characteristics of the transport infrastructure and the level of economic development in a given area. Thus, high levels of development are commonly associated with high density road infrastructure and highly connected road networks.

The transport sector is therefore an important component of economic development. Efficient road systems provide economic and social opportunities and benefits that results in positive multiplier effects such as better accessibility to markets, employment and additional investments. When road systems are deficient in terms of capacity or reliability, they can have economic costs such as reduced or missed opportunities and lower quality of life. However, there may also be unintentional consequences. For example, road traffic congestion is often an unintended consequence in the provision of transport infrastructure to the users. Nonetheless, congestion and its accompanying effects are also indications of a growing economy where capacity and infrastructure have difficulties keeping up with the rising mobility demands.

Thus, road transport carries an important socio-economic and environmental burden that cannot be neglected. It is linked to producer, consumer and production costs. The mobility it confers are linked to a level of output, employment and income within the state's economy. The importance of a good and efficient road infrastructure can thus be assessed for each sector of the economy.

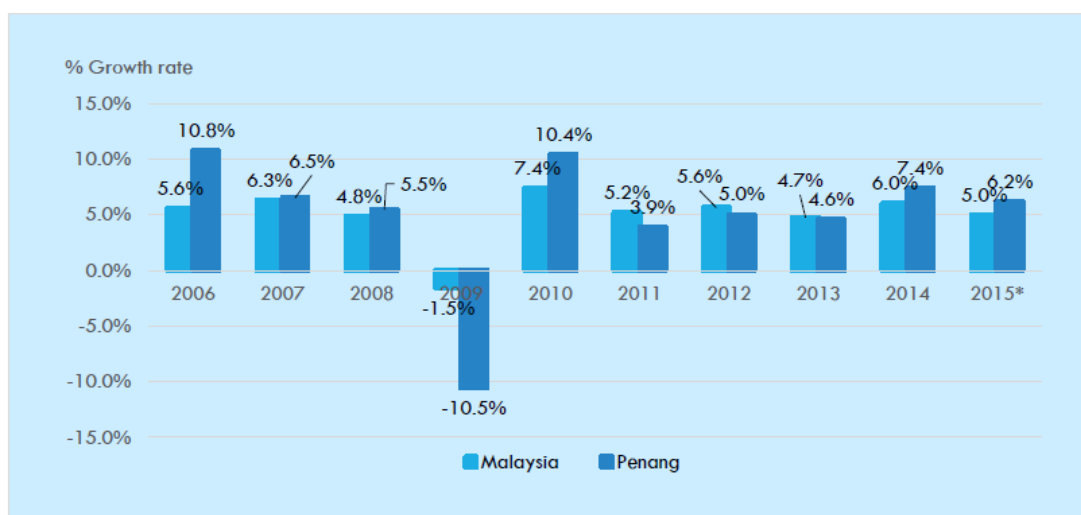
3.1 Growth of Penang

New development corridors have emerged in Penang in the last decade, namely the Bayan Baru-Bayan Lepas development corridor and the Seberang Jaya-Bukit Mertajam, Butterworth-Bertam and Jawi-Nibong Tebal development corridors. These growth corridors contain a mix of land uses and activities that promote qualitative improvements in human

capital (e.g. income, education level, job opportunities) as well as infrastructure development (e.g. utilities, communication, transport systems) which are directed at improving the social and economic conditions in Penang State. These new development corridors and the George Town conurbation also play a significant role in supporting economic and urban growth of neighboring towns such as Kulim, Sungai Petani and Gurun in the state of Kedah, and Selama and Parit Buntar in Perak. These concentrations of activities generate a demand for a good and efficient transportation network throughout the State and with the rest of the country.

3.2. Penang's GDP and Economic Growth

Penang's GDP has been growing over the last five years. The state GDP has improved to 6.2% posting a 0.2 percentage point higher than the projection made in January 2015 (**Figure 3.2.1**) (Report BNM, 2014). The factors that contributed to the growth of Penang's GDP include: manufacturing investments (principally in electronics and electrical products which contributed over 60% of the total investments), a surplus in the balance of trade (Penang contributed 23% of Malaysia's surplus and ¼ of Malaysia exports), favourable global demand for semiconductor components, steady growth in tourism and a robust employment market.



Notes: The growth rates for 2006-2010 are based on 2005 constant prices. While the growth rates for 2011-2015* are based on 2010 constant prices.

*projection

Figure 3.2.1. GDP annual growth in Malaysia and Penang

A total of 169 projects had been approved in Penang for 2014. The State contributed about 11.4% of total investment in 2014 – four per cent more than 2013. Total capital investment reached RM8.16bil. Of this, domestic and foreign investments respectively made up RM3.05bil and RM5.11bil. The share of foreign investment has grown from about 15% in 2010 to over 60% in 2014 (**Figure 3.2.2**), while the share of domestic investments halved from about 85% in 2010 to nearly 40% in 2014.

Penang's trading environment seems to portray a moderating trend in 2015. The structure of exported and imported commodities indicate that over 90% of Penang's commodities that are exported comprise E&E related products, including electrical machinery, apparatus and appliances; professional and scientific instruments and telecommunication, and sound recording and apparatus (**Figure 3.2.3**).

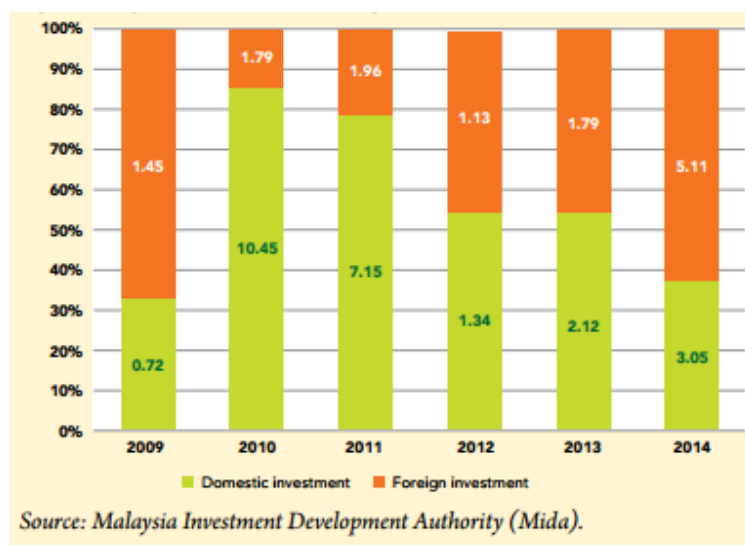


Figure 3.2.2. Capital investment in Penang (RM bil), 2009-2014

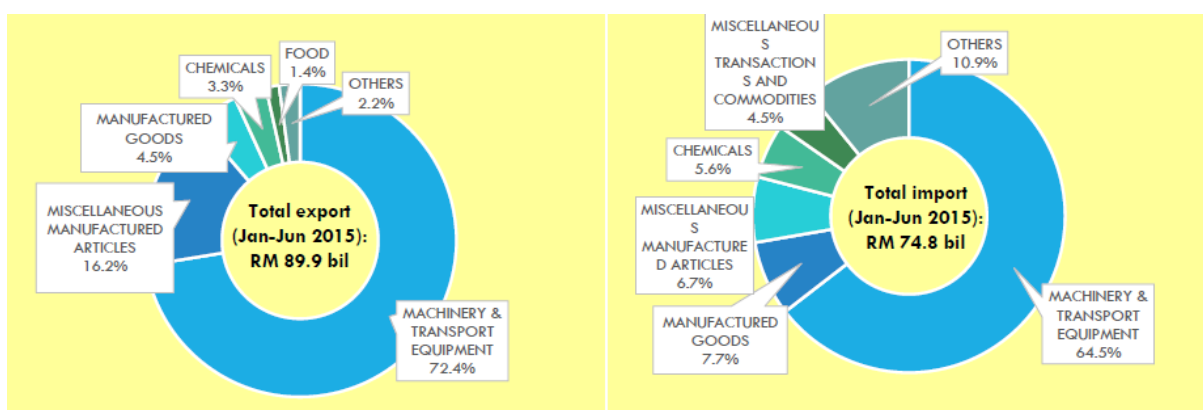


Figure 3.2.3. Major trade products at entry and exit points of seaport and airport.

For 2015, approved manufacturing investments in Penang fell to RM3.5bil compared to year 2014 due to global challenges that also affected the Malaysian economy (**Figure 3.2.4**).

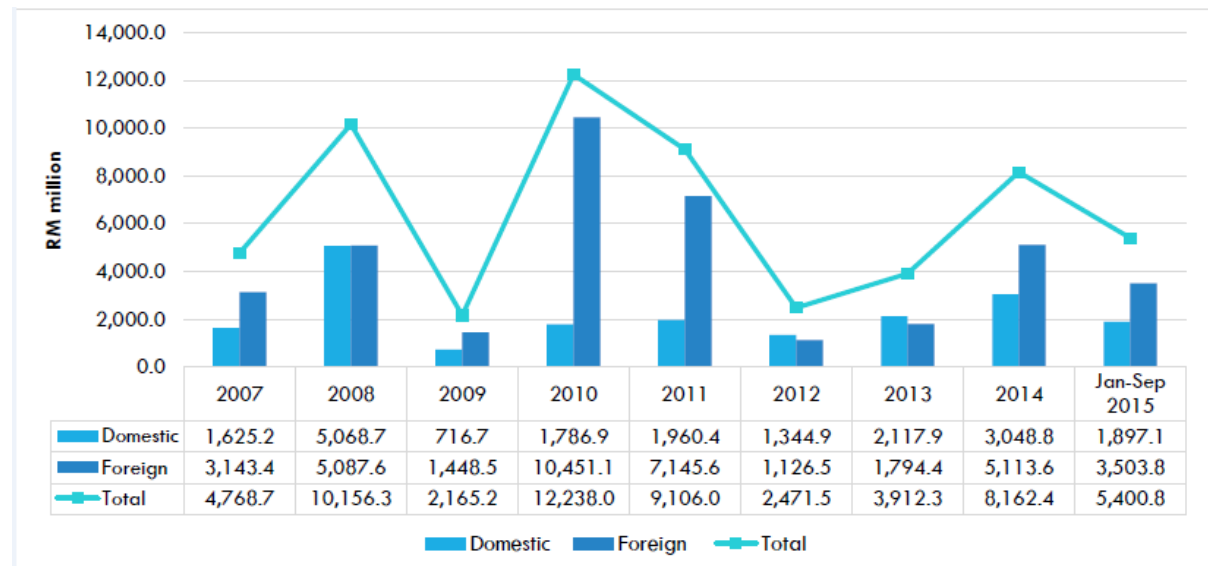


Figure 3.2.4. Approved manufacturing investments contributing to Penang's GDP.

Tourism Sector

Ever since George Town was recognized as a Unesco World Heritage Site in 2008, Penang's tourism sector has been experiencing a growing trend. Penang's international visitors expanded by 7.5% annually from 2008-2014, accounting for about 720,000 visitors arriving at the Penang International Airport in 2014 (**Figure 3.2.5**). By destination, the three major countries of origin of Penang's international visitors are Indonesia, Singapore and China, making up 78% of Penang's total international visitors.



Figure 3.2.5. Steady growth in tourism.

Visitors from Indonesia continued to be the largest share with 42.8% of the total international visitors from Jan-Sep 2015. This trend is expected to continue into 2016.

Labour Market

In Q3 2014, the total labour force (defined as working age citizens ranging from 15-64 years) was recorded at 823,100. Of this, 810,800 were employed and only 12,400 were unemployed. Those outside the labour force remained at about 350,000 for the same quarter. They include students and housewives. By industry, the services sector made up the largest proportion of Penang's total employment in Q3 2014 (**Figure 3.2.6**). The manufacturing sector came second (30.6%). Penang recorded a higher labour force participation rate of 70.6% in 2015 compared to that of Malaysia's 67.5%.

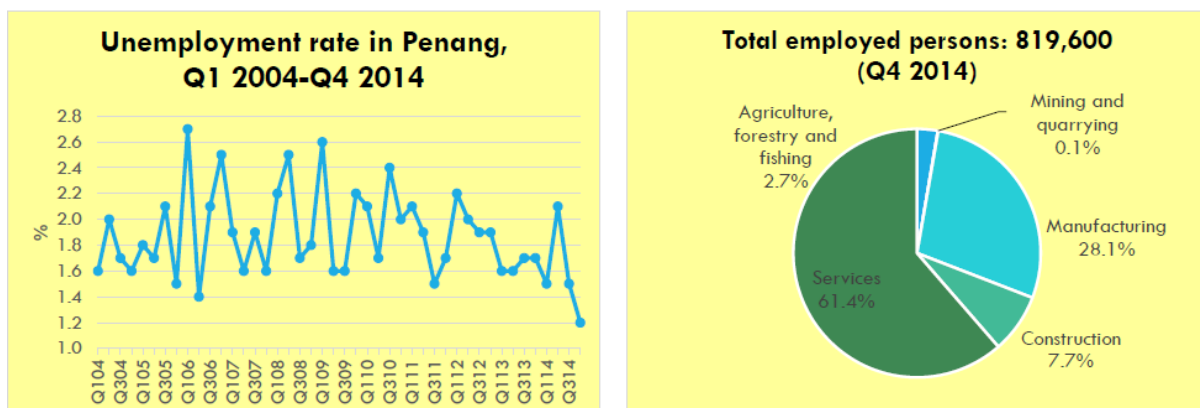


Figure 3.2.6. Employment share in services sub-sectors in Penang (%), Q1-Q3 2014.

In the services sub-sectors, employment in wholesale and retail trade was found to form the greatest proportion of Penang's services sector in Q3 2014. Approx. 59.7% persons worked in the services sector; about 24% of Penang's total employed persons work as services and sales persons - the largest workforce in Penang. It is anticipated that the employment market will keep flourishing in the services sector, particularly in administrative and support service activities.

Cargo Handling

Table 3.2.1 shows mixed progress in Penang's international air cargo handling and sea gross registered tonnage. Exported and imported goods would most likely be transported in/out through roads and highways. Malaysia's monthly external trade statistics in Sept 2015 indicated that E&E, timber and rubber products registered growth in exports. Positive growth is also predicted for 2016.

Table 3.2.1. Penang's international air cargo handled and sea gross registered tonnage.

H1 comparison	Air cargo (million kg)	% change	Sea cargo (million tonne)	% change
Jan-Jun 2014	61.17	-7.5%	19.77	8.0%
Jan-Jun 2015	56.57		21.36	

To conclude, Penang's GDP output can be expected to expand albeit at a slower rate in 2016 (due to fluctuations in oil prices and the Malaysian Ringgit) and the manufacturing and services sectors are estimated to equally contribute an important share to Penang's output/growth. The US economic recovery (in Q2 2016) would translate to higher demand for electronics and electrical items. This will largely benefit Penang's economy. Thus the demand for a good and efficient transportation network throughout the State and with the rest of the country is re-affirmed in order to sustain and stimulate economic growth.

3.3 Transport Situation in Penang – Vehicle Re-Registration

Vehicle re-registration across all types has undergone steady growth albeit with a slowdown occurring in 2012-2013 (**Table 3.3.1**). Despite falling growth rates, increase in the number of

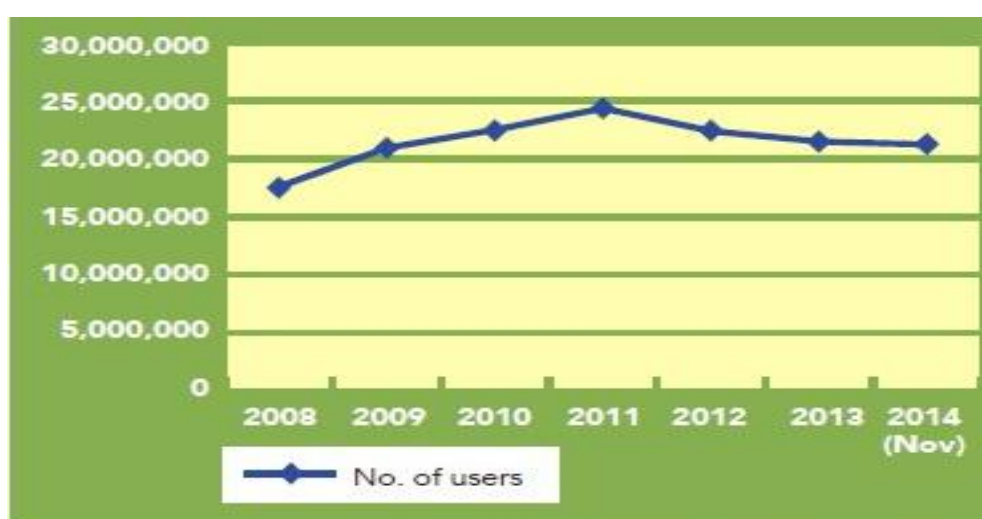
private vehicles has led to a rise in the vehicle-to-population ratio. With a population of about 1.6 million in Penang, the ratio has increased from 1.17 in 2008 to 1.39 in 2014.

	2008	2009	2010	2011	2012	2013	Jan-Mar 2014
Motorcycle	1,033,025	1,076,409	1,124,476	1,172,311	1,226,223	1,264,046	1,278,908
Private car	780,519	830,678	890,652	945,444	1,000,131	1,024,197	1,037,770
Bus	5,232	5,511	5,781	5,960	6,131	4,739	4,794
Taxi	3,387	3,545	3,701	3,841	3,931	3,512	3,546
Rental car	479	500	529	517	499	1,620	1,640
Goods vehicle	57,462	59,744	62,952	65,603	68,381	72,391	73,050
Others	17,648	18,271	19,140	20,071	20,920	38,210	38,408
Total	1,897,752	1,994,658	2,107,231	2,213,747	2,326,216	2,408,715	2,438,116

Table 3.3.1. Number of vehicle re-registration in Penang, 2008-March 2014.

The trend shows that private vehicle ownership is consistently increasing which may have significant environmental and socio-economic consequences. Congested roads (due to rising vehicle numbers and slower travel speeds), lack of public transport facilities and parking space are the main problems among others in Penang. The impacts from the congestions can be substantial in terms of time, resources, and pollution.

In the case of buses, there has been a shift of preference towards private vehicle usage as can be seen from the increase in private car and motorcycle re-registration and declining Rapid Penang users (**Figure 3.3.2**).



Source: Rapid Penang.

Figure 3.3.2. Total number of Rapid Penang users (single fare).

Use of Rapid Penang services has not been on a favourable trend; the increase in traffic congestion in Penang Island has not encouraged Penangites and/or tourists to use Rapid Penang bus services. Peaking in 2011, the decline in usage conflicts with efforts to increase route and bus availability. The most frequent bus by a large margin is the 101, which plies along Penang's busiest roads such as Jalan Penang, Jalan Burmah, Jalan Tanjung Tokong, Bagan Jermal and Jalan Macalister.

Transport by means of private vehicles (individually owned cars or motorcycles) remains the most popular mode at 89% of total usage. This in turn has placed excessive pressure on the local road networks and has led to an average speed during peak hours of 30.75km/h in George Town and 32km/h in the Butterworth region in 2013. The over-reliance on private transportation needs to be stemmed as the compounded annual population growth rate is expected to be at 3.04% till 2020. Both, the island and the mainland will not be able to sustain the LOS of the local roads if there are no viable alternatives.

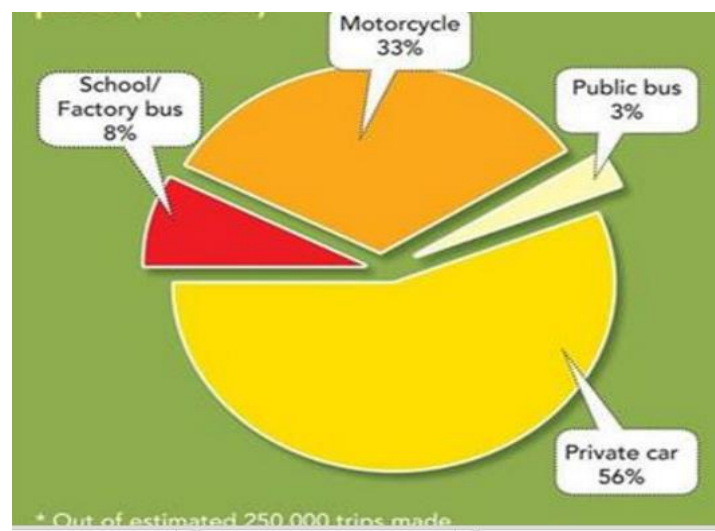


Figure 3.3.3. Mode of transport for the morning peak period (% share) 2010.

3.4 Penang Road Network

Roads are associated with significant economic opportunities to service industrial and commercial markets with reliable door-to-door deliveries. **Table 3.4.1** shows the major Expressways and Roads in Penang. They connect to other municipal roads of different functional hierarchies on the Island via interchanges and junctions.

Table 3.4.1 . Major Expressways and Roads in Penang Island.

Expressway/Road	Status	Length (km)	Major Junctions	Remarks
Gelugor Road	Part of Federal route 6	-	<i>North End:</i> George Town on Brick Klin Penang Middle Ring Road (P19) Penang Bridge Jalan Tun Awang Lebuhraya Kampung Jawa Jalan Batu Maung Federal Route 6 <i>South End:</i> Bayan Lepas	Completed 1985. Connects : Jelutong, Gelugor, USM, Sungai Nibong, Penang International Airport
Jalan Tun Dr Awang	Federal Route. Zero km at Bulatan Bayan Lepas roundabout.	-	<i>Northeast End:</i> Sungai Nibong Interchange Tun Dr. Lim Chong Eu Expressway (3113) Gelugor Road (6) Jalan Dato Ismail Hashim (220) <i>South End:</i> Penang International Airport	Connects : Sungai Nibong, Bukit Jambul, Relau, Sungai Ara, Bayan Lepas
Penang Middle Ring Road (major ring road)	State Route P19 comprising Scotland Road, Jalan Masjid Negeri and Jalan Tengku	5.1	<i>North End:</i> Jalan Utama Jalan air Itam (P13) Gelugor Hwy (6) Tun Dr. Lim Chong Eu Expressway (3113)	Completed in 1985 Connects to Air Itam, Jelutong



THE PROPOSED PAN ISLAND LINK 1 ROAD PROJECT, PENANG



	Kudin.		<i>South End:</i> Jln. Tunku Kudin Interchange, Gelugor	
Sultan Abdul Halim Muadzam Shah	Expressway 28 (Penang Second Bridge)	24	<i>East End:</i> Bandar Cassia (Batu Kawan) Seberang Perai North-South Expressway (E1) Jalan Batu Maung (P10) Tun Dr. Lim Chong Eu Expressway (3113) <i>West End:</i> Batu Maung, Penang Island	Opened March 2014 Connects Seberang Perai, North-South Expressway, Batu Maung,
Tun Dr Lim Chong Eu Expressway	Federal Route 3113 Tun Dr Lim Chong Eu Expressway	17.84	<i>North End:</i> George Town on Weld Quay Penang Middle Ring Road (P19) Penang Bridge (E36) Jalan Tun Awang Jalan batu Maung (P10) Jalan Sultan Abdul Halim Muadzam Shah <i>South End:</i> Batu Maung	Connects George Town city to Batu Maung. Connects Gelugor, Bayan Lepas, Penang International Airport.

The Tun Dr Lim Chong Eu Expressway (LCE) is the sole north-south expressway on Penang Island. However, it currently experiences peak-hour congestions as shown in **Figure 3.4.1**, which is expected to worsen in the future according to the traffic volume forecasts summarised in the PTMP. In addition to current traffic volume, the LCE has to cater for additional traffic demand facilitated by newly constructed infrastructure such as the Penang Second Bridge from new developments on Penang Mainland ie. Batu Kawan, the Penang International Airport expansion, as well as simultaneous developments on the eastern coast of Penang Island.

Surrounding developments, brought by the expanding periphery of George Town, currently place constraint on the LCE corridor leaving only limited opportunities to create more capacity on the expressway. Furthermore, vehicle access is effectively uncontrolled along the LCE (with some 20 accesses - either signalised junction, Left in-Left out (LILO) or property ingress/egress) as shown in **Figure 3.4.2**.

To add to the problem, there is no fitting alternative or bypass route to transfer regional traffic from the Penang Second Bridge and the Penang International Airport to George Town and the north coast region; traffic is forced to go through a network of ring roads and radial routes – including LCE and Jalan Kelawei – to reach their destinations. This adds to the congestion as regional and local traffic are both navigating through a concentrated road network in the George Town locale.

Without long-term strategic intervention measures, conditions on the LCE will continue to deteriorate – impeding the future growth and liveability of Penang.



Figure 3.4.1: Typical Peak-hour Traffic Conditions on the LCE.

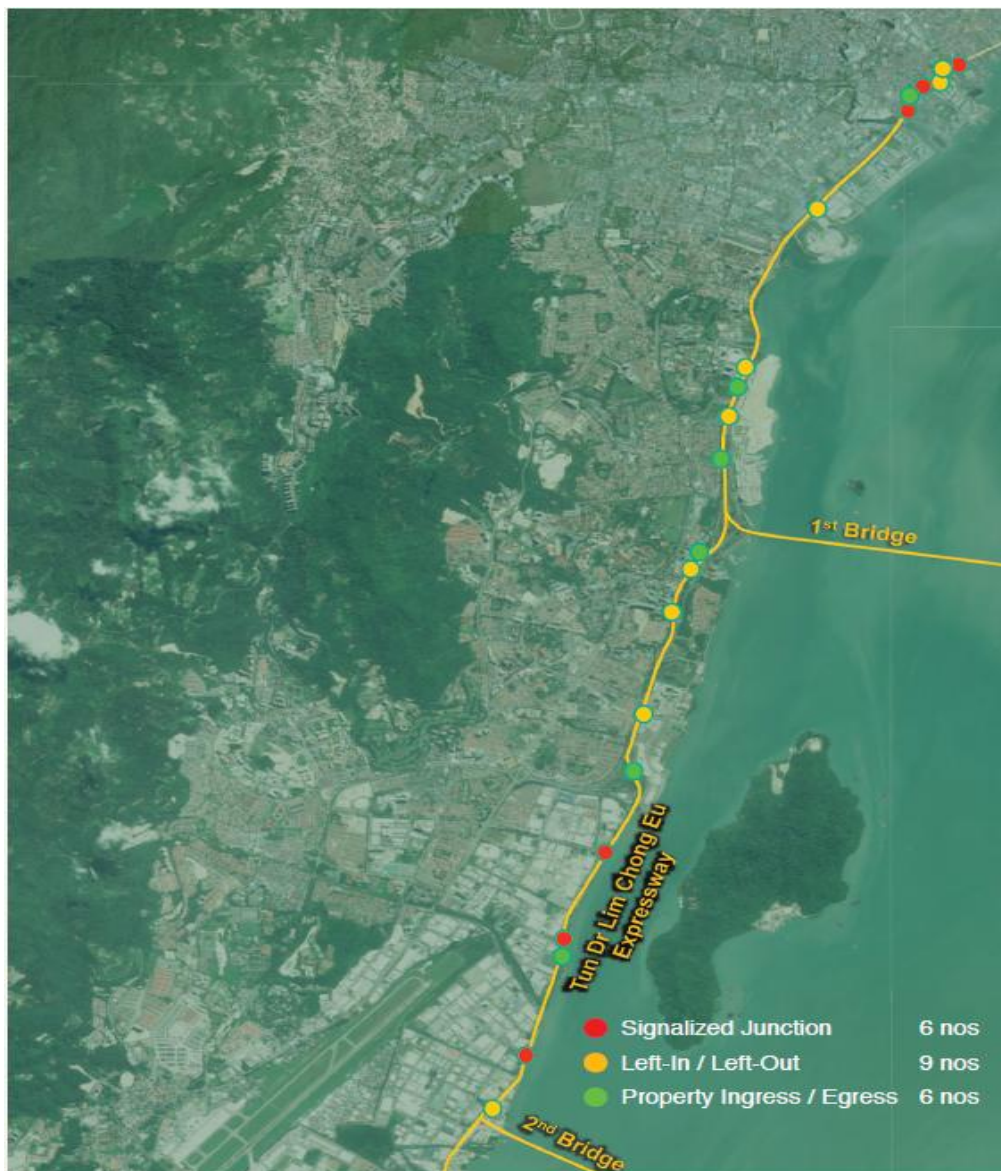


Figure 3.4.2. LCE – Lack of Access Control.

3.5 Statement of Need

The PIL1 Highway is proposed to alleviate the heavy traffic load that passes through the Tun Dr Lim Chong Eu Expressway (LCE) and adjacent arterial roads such as Pengkalan Weld, Jalan Masjid Negeri, Jalan Jelutong and Jalan Sultan Azlan Shah.

Given that little can be done to improve conditions on the LCE, the solution must be to provide a second North–South spine road. With this new strategic north-south link, it also addresses the importance of traffic dispersal from the Second Penang Bridge and the proposed future undersea tunnel and 3 major roads.

The PIL 1 Highway will be able to accommodate anticipated potential increase in travel demands from the expansion of the Penang International Airport (as per Budget 2018), future expansion of the Bayan Lepas industrial zone, and increased population from the proposed reclaimed islands in the Southern Coast of Penang Island.

The PIL 1 Highway is designed with six interchanges (Gurney, Utama, Paya Terubong, Relau, Awang, and LCE) to link highly-populated residential, commercial and transport hubs on the island from the Second Penang Bridge and the Penang International Airport all the way towards George Town, Paya Terubong, Bayan Baru, and Relau.

The PIL1 Highway will be a dual three-lane purpose-built highway with limited points of access to ensure certainty in speed and travel time over the entire length of the highway. The alignment along the central mountainous terrain of Penang Island also avoids the possibility of congestion caused by future developments. The new proposed highway will be built beyond the developed periphery of George Town, to disperse traffic away from it rather than forcing traffic to converge in the extended parts of the city.

The PIL1 Highway would not only allow for better traffic dispersal but also serves to improve accessibility to various suburban areas along the north-south corridor of Penang Island. Upon completion, it will significantly shorten north-south travel time by car to only 15 minutes (estimated) from Gurney Drive to the airport, favourably compared with the current estimated 45 minutes required under normal traffic conditions on the LCE.

In the PTMP, the PIL 1 Highway shall serve as one of the five important links in the Penang state highway network ("Greater Ring Road") together with the Gurney Expressway, undersea tunnel, Proposed NSE Link Road (Bypass), and the 2nd Bridge (**Figure 3.5.1**).

Free-flow traffic interchanges are provided at both ends of PIL 1 Highway -- similar to the interchanges along the North-South Expressway, as well as along the LCE at Penang Bridge and the Penang 2nd Bridge.

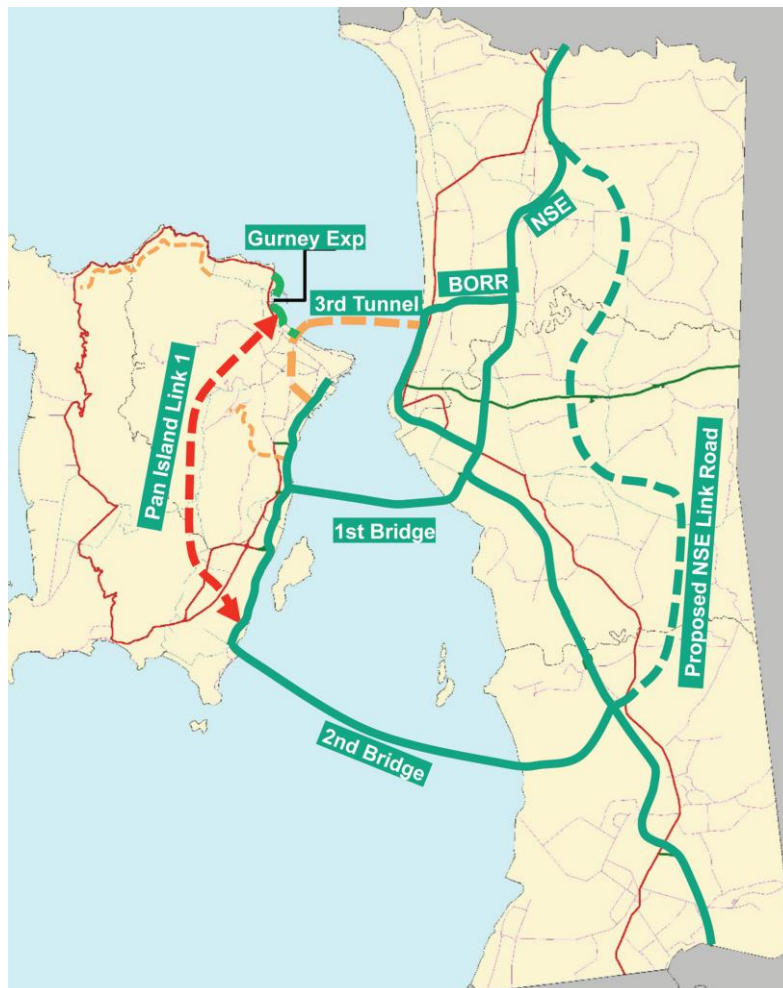


Figure 3.5.1. “Greater Link Road”

Penang State needs the PIL 1 Highway because:

- Despite the State’s target to achieve a 40% public transport mode share by the Year 2030, the mode shift cannot happen overnight. Such shift needs to be encouraged progressively through policies and providing viable public transport alternatives for the public. For example, it took more than 25 years for the highway concessionaires in the Klang Valley to budge motorists to shift to full electronic tolling.
- Despite the Penang state’s motto of “Moving people, not cars”, there is still a need to cater for the remaining 60% private vehicles mode share.
- Penang currently has only has one strategic highway linking the south of the island to the north i.e. the LCE Expressway. This compares unfavourably with Singapore which, despite successfully achieving a 60% public transport mode share, continues

to build new highways. As of 2014, there were 163 km of expressways in Singapore traversing the island with the key Pan Island Expressway (PIE) extending from east to west (43 km) to disperse regional traffic (**Figure 3.5.2**). The road network continues to expand over the years.



Figure 3.5.2. Highway network in Singapore

- The LCE is heavily congested with no sight for further improvement without strategic intervention. Being the only north-south highway on Penang Island, there is currently no alternative route that affords similar capacity and travel speed. With PIL 1 Highway as a new strategic bypass, traffic dispersal will be significantly enhanced by providing a alternative route that directly links the Penang Airport and the Penang 2nd Bridge to Komtar and Gurney Drive (**Figure 3.5.3** and **Figure 3.5.4**).
- PIL 1 Highway also functions as a strategic bypass that segregates regional traffic from local traffic to improve connectivity and travel speed from north to south of Penang Island;
- PIL 1 Highway will have six interchanges that connect the main residential, commercial and transport hubs on the Island - the Second Penang Bridge, the

Penang International Airport, Bayan Lepas, Relau, Air Itam, Tg Bungah and also Gurney Drive (George Town) (**Figure 3.5.5**);

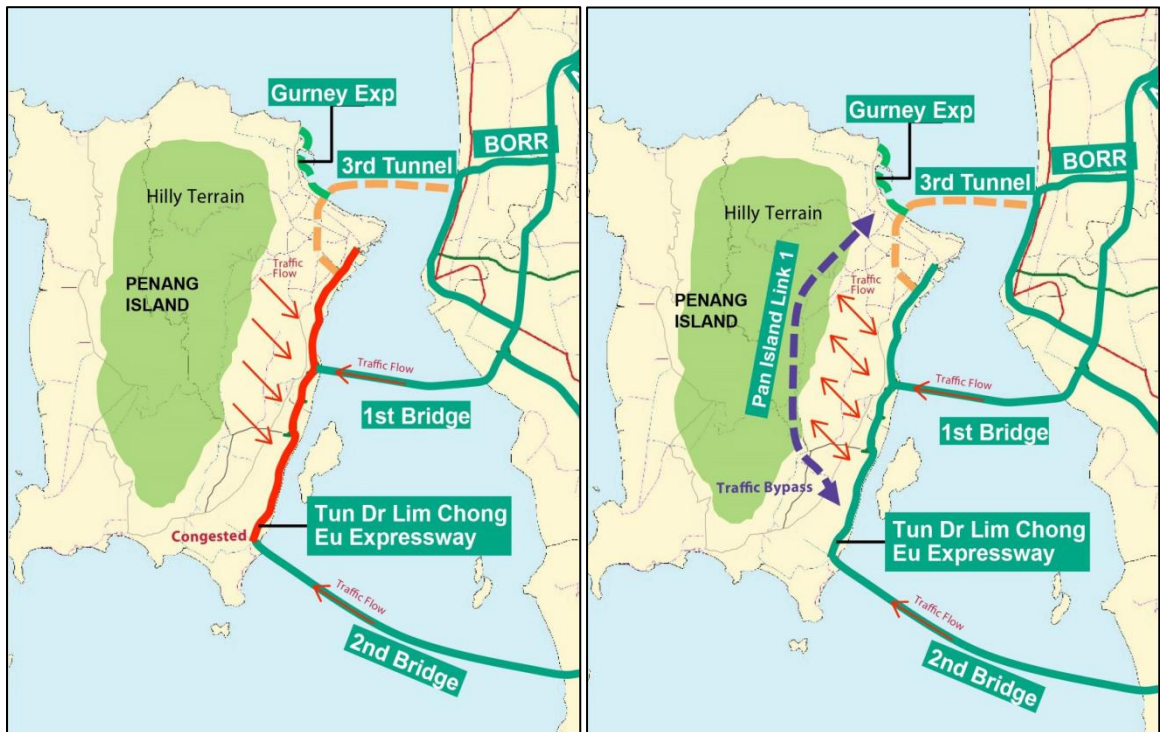


Figure 3.5.3 & Figure 3.5.4 : PIL1 as as bypass to Lebuhraya Tun LCE

- Be built beyond the developed area of the George Town, to effectively disperse traffic away from the city rather than forcing it to converge in the periphery of the city;
- Be constructed as a dual 3-lane purpose built limited access highway. This limiting of intermediate access will ensure certainty in speed and travel time over the entire length of the PIL 1 Highway;

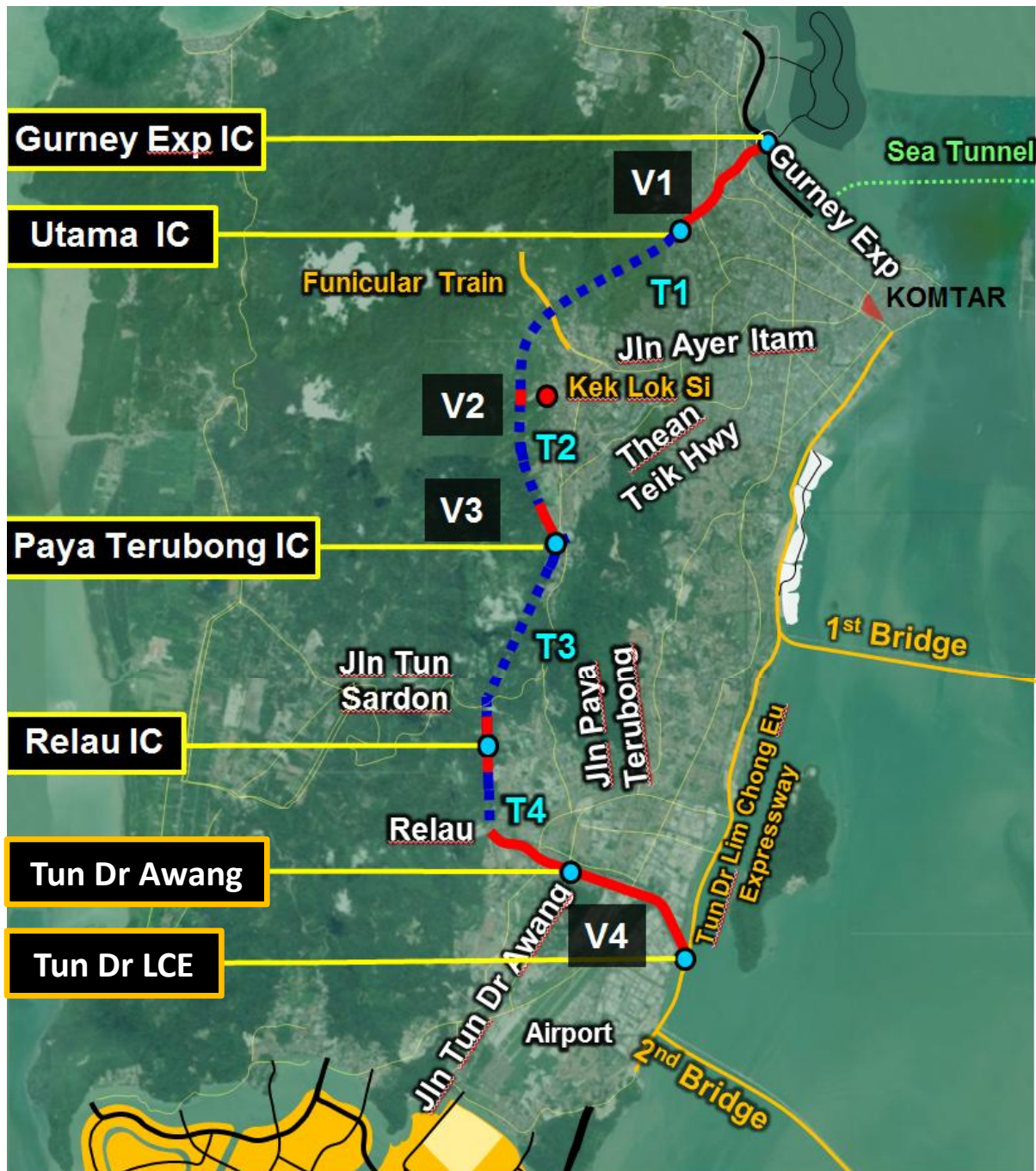


Figure 3.5.5. Pan Island Link 1 and its Six Interchanges.

- Will significantly shorten north–south travel times. Once completed, road users will only require 15 minutes (estimated) to drive from Gurney Drive to the Penang International Airport compared with the current estimated 45 minutes under normal traffic conditions;
- Provide relief to local traffic traversing on heavily congested radial roads on the eastern region of Penang Island other than the LCE, namely Jalan Sultan Azlan Shah, Jalan Masjid, Jalan Bukit Gambir, Jalan Gelugor, Jalan Paya Terubong, Jalan Sultan Azlan Shah, Jalan Dato Ismail Hashim, Jalan Tun Dr. Awang, Jalan Bayan Lepas, and Jalan Batu Maung.
- To enable smoother regional traffic flow on Penang Island (north-south regions) and Mainland (from/to Second Bridge) from the already built-up and upcoming areas of George Town, Jelutong, Gelugor, Bukit Dumbar, Bayan Lepas, Bayan Baru, Batu Maung and Batu Kawan.
- Overall, PIL 1 Highway will help relief traffic congestion on:
 - i. Major roads in George Town such as Jalan Burma and Gurney Drive; and
 - ii. Major Penang Island north-south link roads/ highways such as LCE, Jalan Bayan Lepas, Jalan Teluk Kumbar, Jalan Sultan Azlan Shah, Jalan Masjid, Jalan Permatang Damar Laut, Jalan Paya Terubong, Jalan Sungai Nibong, and Jalan Bukit Gambir (**Figure 3.5.6 – Figure 3.5.12**).



Figure 3.5.6. Traffic crawl on Jalan Burma during the peak hours.



Figure 3.5.7. Traffic crawl on Gurney Drive during the peak hours.



Figure 3.5.8. Traffic crawl on Gurney Drive during the peak hours.



Figure 3.5.9. Traffic crawl on Tun Dr Lim Chong Eu Expressway - peak hours.



Figure 3.5.10. Traffic Crawl on Jalan Sultan Azlan Shah during peak hours.



Figure 3.5.11. Traffic crawl on Jalan Masjid during peak hours.

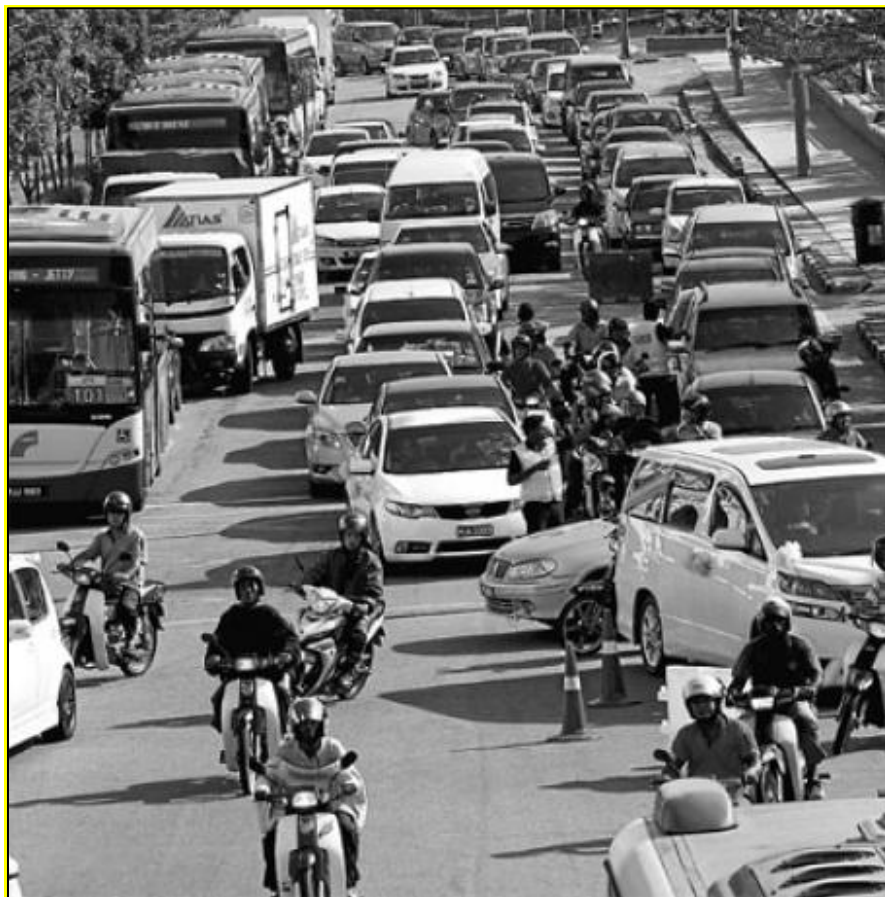


Figure 3.5.12. Traffic crawl on Jalan Paya Terubong during peak hours.

- To alleviate the traffic impacts made by additional trips generated by new developments and projects in Penang State (**Figure 3.5.13** and **Figure 3.5.14**);
- Catalyses public transport adoption and usage by providing faster alternatives for new proposed bus routes; then
- Improves public transport experience by shortening travel times/ reliability for existing bus routes by shifting vehicles on congested roads to the PIL 1 Highway.



(a)

(b)

Figure 3.5.13 & Figure 3.5.14 : Development project on Penang Island (a) Major development (b) Small scale development.