

# SUSTAINABLE DEVELOPMENT OF LUMUT PORT. AN OVERVIEW

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## ABSTRACT

As part of an effort to enhance port capacity in handling bulk and general cargo, Lumut Port has decided to construct a new terminal along the Manjung (Dinding) River, opposite its present location. Therefore, this paper aims to present an overview on the effects of reclamation of mangrove swamp along the river, the deepening of the river and construction activities on and along the river front to the surrounding marine environment as part of the expansion plan of Lumut port. This study concludes with several recommendations to mitigate the impact of the new port development to the marine environment particularly those involving reclamation of mangrove swamp, deepening of the river basin and construction work at or near the river.

**Keywords:** Green Port, Seaport, Sustainable Development.

## INTRODUCTION

Although the Malaysian government has pledged its support to the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) 2030 Agenda for Sustainable Development and emphasized on the requirements for ports to become environmentally friendly and commercially-viable, not many ports have come out with their own sustainable or green port policy/strategy (Thestar Online, 2016). Similarly, despite the Ministry of Transport of Malaysia adopting their Motto of “Sustainable Transport, The Heart of National Development”, national guidelines for the transport sector to achieve such motto or mission statement is still difficult to trace. Notwithstanding the preceding statement, contemporary literature demonstrates that sustainable approach in port development projects are increasingly being deployed especially in developed economies with the objective of promoting and developing sustainable approaches to port infrastructure works. In this regard, the port authorities and operators in Malaysia such as Lumut Port are left with not much choice but to take the que from the developed economies by performing pro-actively in support of a long term vision of achieving a sustainable transport system.

Lumut is a small town in Malaysia situated along the Straits of Malacca about 170 km Northwest of Port Klang. Unlike Port Klang that has maintained its position as one of the top 20 container ports of the world for about two decades, Lumut port is smaller in size and dedicated to handling bulk and general cargo. It was established by the state government of Perak with the launching of the Lumut Maritime Terminal (LMT) in 1995. Its second terminal, the Lekir Bulk Terminal (LBT) subsequently started operation in 2002. Whilst the LBT was developed to focus on coal import for electrical power generation, the LMT adopted a multipurpose concept by handling dry bulk, break bulk and liquid bulk cargo. In response to market demand, the LMT main berth has been extended by 280 metres in 2001, giving it a total length of 510 metres. To date, Lumut port receives more than 500 ships

annually and is considered as the most productive bulk port in Southeast Asia. Lumut Port is further strengthened with an industrial park with an area of 1000 acres, with more than 80% sold and occupied by investors involved in maritime sector, import and re-export, mineral, fabrication, bio-diesel and other related activities (Lumut Port, 2018).

## OBJECTIVE

This paper aims to present an overview on the effects of reclamation of mangrove swamp along the Manjung (Dinding) river, deepening of the river basin, and construction activities on and along the river front as part of the expansion plan of Lumut port to the surrounding marine environment.

## EXPANSION OF LUMUT PORT

Due to an increase in demand to use Lumut Port for import and export activities, the authority has approved for the expansion of the LMT in October 2015. After various studies involving land size, length of waterfront, accessibility, depth, development cost and available infrastructure, the Board of Directors of Lumut port has decided to purchase an additional piece of land on the opposite side of the Manjung River from where LMT is currently situated to develop a new terminal (See Figure 1 for the locations of LBT, LMT and the forthcoming LMT 2). Known as LMT 2, this terminal is expected to have a land area of 114 acres, which is bigger than LMT that has an area of 93 acres, with a potential for the development of new industrial plants and cargo operation centre based on the potential of the surrounding land area facilities (Briefing at Lumut Port, 4 July 2018).

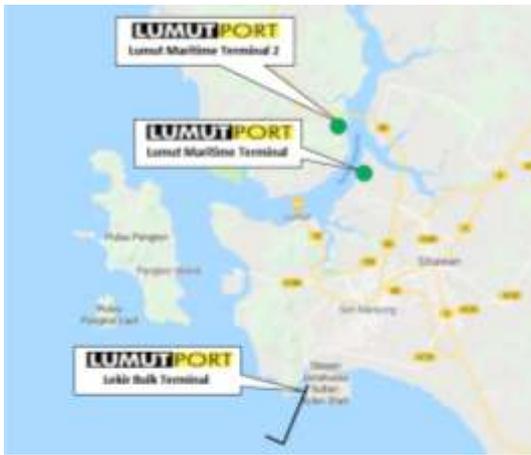


Figure 1. Geographical locations of the terminals of Lumut Port

Generally, the development of LMT2 will involve the reclamation work on about 114 acres of mangrove swamp along the Manjung River, the construction of suspended wharf to about 400 metres in length with a 228 metre-trestle, a 300 metre-vertical revetment, dredging of berth and basin from an average depth of 7.5 metres to 13 metres, as well as other constructions involving access roads and other land side facilities (Briefing at Lumut Port, 4 July 2018). Based on the briefing given, it is a clear indication that the expansion of Lumut Port will be carried out in line with the green port policy as envisaged by the Ministry of Transport. In ensuring such intention is realized, the port management needs to adapt the concept of a green and environmental friendly approach in their planning. The activities that can be planned as a strategy to achieve green port status are divided into the following areas:

- Introduction of modern energy-efficient technology;
- Ongoing reduction of emissions into the environment through systematically emissions monitoring processes and result reporting;
- Provision of prompt and efficient responses in emergency situations;
- Continuous improvement of the environment management system;
- Building partnership relations with local communities (Beskovnik and Bajek, 2015).

### FOCUS GROUP DISCUSSION

As one of the efforts to identify the issues that may arise from the development of LMT 2 and in realizing the concept of partnership with local communities, a focus group discussion between the port operators, contractors and representatives of the surrounding population comprising of 30 participants was organized at LMT on 4<sup>th</sup> July 2018. Focus group discussion involves participants chosen on the basis of their expertise to discuss for about two hours on a particular topic, concept or product. The focus session is aimed at obtaining respondents' impression, interpretation, and opinion about the issue discussed with the moderator playing a vital role to steer the discussion in a manner that draws out the information

sought and keep the members on track (Sekaran and Bougie, 2013). Representatives of the surrounding population include leaders of fishermen associations in Manjung district, cage fish farmers along Manjung (Dinding) River and village representatives. The discussion was moderated by representatives from Lumut port and the main contractor. Based on the discussion, the main issues highlighted by local population based on their previous experiences are as follows:

- Reclamation work on the 114 acres of mangrove swamp will reduce the number of fishery resources in Manjung River and its surrounding area.
- The effect of dredging on water quality in Manjung River and its surrounding area that may disrupt nearby fishery resources including the cage fish.
- Construction of wharf, terminal, trestle and other structures near the riverside may disrupt the water quality of Manjung River.
- Dredging of river may permanently increase the water temperature that will result in the reduction in the number of fish,
- Dredgers may discharge some of the wastes along her passage out of the harbour that can alter the condition of river bed and give a negative effect to fishery resources.

Other issues highlighted during the focus group discussion are traffic congestions, noise pollution and air pollution during the construction period, which are outside the scope of this paper.

### MITIGATING THE EFFECTS OF PORT CONSTRUCTION

On the issue of reclamation of the 114 acres mangrove swamp, it is unavoidable due to the difficulty to select a more suitable site based on the limited availability of land along the water front. As mangroves in wetland play an important role in providing habitat for terrestrial and aquatic biota, as well as directly affecting water quality (United Nations, 1992) it is imperative that the reclamation work to be done only when it is necessary. For instance, the reclamation of land for the construction of access roads can be reduced to what is necessary. Bridges can also be built across the mangrove swamp where possible. As terrestrial fauna and flora will also be altered by reclamation work, careful study on the available fauna and flora should be done and if necessary they should be moved to a suitable habitat nearby. Another recommended effort to mitigate the impact on terrestrial fauna is planting green plants around the port area (United Nations, 1992). The construction of revetment along the waterfront as planned by Lumut Port is also expected to minimize erosion along the waterfront.

The mangrove species along the Manjung River is from the Rhizophoraceae family with the characteristics of roots that are stilt and branches as shown in Figure 2. The common sub-species along the Manjung River is *Rhizophora Mucronata*, which has been described as a common, hardy and fast growing type of mangrove (Duke et al., 2010). The roots play important roles in coastal

stabilization such as supporting land deposit and strengthening river banks. This mangrove species live in muddy areas and is a front type mangrove. Therefore, this species has a high resistance to the retaining of tidal, waves energy and wind. Generally, mangroves can absorb carbon dioxide and store carbon by as much as 40% more than the dry land forest ecosystem. Total carbon deposits per square kilometer in the coastal systems is up to five times the carbon stored in tropical forests (Hamdan et al., 2012). A study conducted in 2010 has categorised the *Rhizophora Mucronata* as among the Least Concern category and not placed under the International Union of Conservation of Nature (IUCN) Red List although the rate of loss is about 20% globally (Duke et al., 2010). Due to the fast growing nature of this sub-species, it is imperative for the port authority and operator to take initiative to plant similar type of mangroves in nearby area to ensure it can continue to perform its role as the habitat to the local flora and fauna besides retaining its contribution to the environment.



Figure 2. Affected mangrove plants along Dinding River

The second issue involves the effect of dredging activities on the water quality and fishery resources. In dealing with this issue, it is important for Lumut Port to make it known to the local stakeholders that dredging work to ensure safe passage of ships is a necessary and continual process and not just limited to the construction period. Although dredging activities will only be limited to waters around the wharf and its nearby basin, certain measures could be carried out to ensure the negative impact of the activities could be minimized. Dredging may affect the current flow and beach erosion. However the effect on current flow is normally not serious whilst beach erosion could be avoided by carefully planning the steepness of the dredging slope and the deviation from the shoreline (United Nations, 1992). The International Association of Dredging Companies (IADC) recommends the use of an environmental dredging technique such as the green valve system, which reduces turbidity caused by overflow during the dredging process (Hamdan et al., 2012). Generally, environmental dredging tries to optimize the precision with which operations are done, for example dredging thin layers to ensure less dredged material is disposed-off, especially when it is contaminated (IADC, 2011). During the focus group discussion, it has been requested that the dredging activities to be carefully executed so that it will not affect the water quality around fish cages that lie about 1 kilometre upstream from the

new terminal. This can be done by limiting the dredging activities during ebbing as the tidal stream will flow out of the river during this period (Focus Group Discussion, 2018). As for the equipment to be used, it has been mentioned that grab dredger will be used as it can minimize the impact on the environment (Focus Group Discussion, 2018). In term of the disposal of dredged material that may cause problems if disposed on land or at sea, it may be beneficial if it can be included as part of landfill for the land reclamation.

Concerning the claim that dredging will permanently increase the water temperature, such claim cannot be substantiated through a literature search done by the authors. Perhaps the destruction of the mangroves will result in a reduction of shady area at the river side allowing the water nearby a longer exposure to sunlight. In addressing the final issue, it is worth to consider using the waste as landfills as proposed earlier. However, if it is still required to be dumped at sea, necessary measures should be taken to avoid spillage during the shipment as well as to ensure dumping is only done at a permissible site. Examples such as the creation of a bird island using 26 million cubic metres of dredged sediment by Le Havre port should be considered as part of a compensation effort to the environment that has been impaired (Rijks et al., 2014).

In addressing the third issue, construction activities that may involve pile driving, deposition of rubble, dredging, sand compaction and other construction work in or near the water can cause resuspension of sediments and turbid water. This will lead to the increase in the level of suspended solids and the concentration of organic matter to toxic or harmful level. Therefore, the impact can be minimized by appropriate selection of pile driving or dredging equipment, usage of silt curtains, careful planning of settling ponds and overflow barriers for landfills, as well as using suitable transport for construction and moving dredged material (United Nations, 1992). Using the waste and dredged material as landfills for reclamation work should be seriously considered by Lumut Port as it may offset the problems of accidental discharge whilst transporting and the negative effects of dumping at sea.

## CONCLUSION

In retrospect, port development is imperative for economic development of a particular region and its surrounding hinterland. Since seaport must be built along the waterfront to facilitate for the connection between ships and land based transport, some negative impacts on the marine and coastal environments may be unavoidable. Notwithstanding the preceding statement, some measures that have been utilized by the developed economies to mitigate those effects on the marine and coastal habitats can be considered for implementation in the case of Lumut port. This study concludes with several recommendations to mitigate the impact of the new port development to the marine environment particularly those involving reclamation of mangrove swamp, deepening of the river basin and construction work at or near the Manjung (Dinding) River.

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