Senibong Cove - A New Integrated Waterfront Development In Johor Bahru

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1. INTRODUCTION

Senibong Cove is a new integrated high-end waterfront residential-cum-commercial development coming up on the Eastern Corridor of Iskandar Malaysia with 208 acres of land and an estimated gross development value (GDV) of RM1.7 billion. The project is located at the special economic zone in South Johor – fronting the Lunchoo River and the Straits of Johor (see Figure 1). Australian property developer, Walker Group, is spearheading this unique project through a joint venture with Iskandar Waterfront Development Sdn Bhd (landowner).

2. ENGINEERING WORKS

2.1 Original Conditions

At the time of project commencement, the site was covered almost entirely by fish ponds and low land.

2.2 Filling Works

The total fill volume required to raise the ground to about 1.5m above high tide is around 3.3 million cubic metres, mainly imported from adjacent land presently under development. The average fill thickness is around 4m.

A perimeter bund is formed prior to the general filling of land. This will minimise siltation to the surrounding areas, and enable revetment construction to proceed without waiting for the completion of filling works. At areas where revetment will be built later, the bund is covered by geotextile and anchored with rock pieces.

2.3 Soil Treatment to Facilitate Early Building Works

Soft layers are common in riverine and estuary conditions, and will settle gradually under the weight of fill. To select a suitable soil treatment method to minimise further settlement, a trial was done, see Figure 2. Due to the presence of sand and silt in the soft layer, it was found that a 1.5m fill surcharge can complete the settlement process in three months. The addition of prefabricated vertical drain did not alter the result. The 1.5m surcharge is being applied over the entire filled land, except the areas for greens and open space. Settlement plates were installed and monitored.

2.4 Waterfront elements

Senibong Cove offers four different natural sets of waterfront environment – the Lunchoo River, the Lunchoo Estuary, the Johor Straits as well as a preserved mangrove swamp along the river, each with its own unique characteristics. Artificially, three additional sets of waterfront are added - a marina, a canal system to facilitate waterfront living to more lots, and sandy beach along the Straits of Johor.

Along the water's edge in the Phase 1 area, a boardwalk is being built to allow the residents to get close to the water. The boardwalk is built about 1m above high tide.

Figure 1: Master Plan of Senibong Cove

Figure 2: Trial soil improvement before the commencement of filling works

2.5 Riverine and Drainage Consideration

The original riverbed is very shallow, practically dry with a small gully upstream during low tide. To improve the water quality and to permit boating in the rivers, dredging is being carried out to have 4m of water at the marina during low tide, and generally 2m elsewhere. Normal tidal range at the site is around 3m.

With a catchment area of 7.5km^2, the drainage requirement for Lunchoo River is about 40m wide including slope according to the Drainage Master Plan for the area. The width of the river at the project site is about 90m, much more than the drainage requirements. According to the National Flood Study, there is no record of flood within the catchment area.

The river reserve at the project site is established along the land lot boundary. The narrowest section is 95m wide. The resulting drainage capacity is five times larger than that actually required as the depth of the river is dredged as explained previously. The water body at the lower reach of the river at the site is further enlarged with a marina basin.

2.6 Coastal Consideration

Due to the sheltered condition, there is no continuous sandy beach along the water edges in the Johor Straits, indicating an absence of sandy littoral zone and related beach erosion as experienced along the East Coast.

The wave action in the area is presently dominated by waves generated by ferries to/from the Riau islands in Indonesia. These ferry services to Riau became popular after the opening of the ferry terminal at Stulang Laut about 10 years ago. Unlike waves generated naturally, these ferry-generated waves do not generate a continuous drift but are destructive to the shoreline. Rock revetment is being built to counter this wave action.

According to the hydraulic study, current velocity in the area is in the order of 0.2m/s - a very calm environment with respect to the current. This project will thus have no impact to the environs with respect to the tidal current, especially considering that the project is located within a slightly indented bay between two headlands.

2.7 Canal System

A water canal system will be developed under Phase 2 of the development. To retain water in the canals while permitting flushing to maintain the water quality, a system of weirs is introduced as follows, as recommended by a hydraulic simulation:-

a) Two eastern openings with 15m wide weirs at +0.6m RL for the intake of rising sea water from the east;
b) Three western openings with 15m wide weirs at +0.6m RL and with 1.2m diameter concrete pipes for the discharge of ebb water to the west during low tide;
c) Canal water complete turnover is 14 days;
d) Minimum canal water level is +0.6m RL. Average high water level is +1.2m RL, with highest astronomical tide at +2m RL. Canal average water level variation is thus 0.6m.

3. PLANNING CONSIDERATIONS

The river flows continuously and the greenery grows healthily with nature and human living in harmony – the consideration of preserving and enhancing the quality of the environment is the core element in the proposed Senibong Cove, starting from concept development, master planning and implementation.

In total, approximately 25 acres of Senibong Cove have been allocated for greens, parks and canals.

The systematic traffic and smooth circulation, with a dedicated underpass which provides direct access to Senibong Cove via the soon-to-be-completed coastal highway, is also an essential part of sustainable living within Senibong Cove.

Social element components such as a multipurpose hall, public hall, kindergarten, river management centre and marina facilities will strengthen the relationship between man and man, as well as between man and nature within Senibong Cove.

Incorporation of green technologies such as the harvesting of rainwater, minimisation of waste, management of surface run off, utilisation of energy saving methods and deployment of solar energy in public areas, are part of the challenges that have been taken into consideration in the development concept.

A permanent river management centre will be established within Senibong Cove, to be operated by the developer with input from local universities and the authorities. This centre is the first of its kind in Iskandar Malaysia, perhaps even in the country, with respect to private development along waterfront. The centre will be equipped with state-of-the-art technology to facilitate river cleaning and improvement, enforcement, educating the public, as well as the testing of new methods or concepts on river management.

4. CONCLUSION

The effort by the developer to promote a sustainable and conducive living environment in Senibong Cove is being achieved by implementing the concept of strengthening key elements such as water, green, parks, together with the incorporation of green technologies, sound traffic management, good environmental management practice, social participation as well as promotion of a healthy living environment. ■