

Executive Summary

ENVIRONMENTAL IMPACT ASSESSMENT

FOR

PROPOSED COASTAL RECLAMATION AND DEVELOPMENT OF PLOT C2A (120 ACRE) PROJECT AT MUKIM BANDAR PORT DICKSON, DAERAH PORT DICKSON, NEGERI SEMBILAN DARUL KHUSUS

Project Proponent

PD Development Sdn. Bhd.

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Contact Person: Mr. Lim Fang Ching
Pn Fadhilah Binti Hj. Yahya



Chemsain Konsultant Sdn Bhd

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Fax: +603 5637 0385
Contact Person: Ms Lina Chan (EIA Team Leader)

EIA Consultant

Legislative Requirements

Based on the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015, the proposed Project is categorised as a prescribed activity under First Schedule as follows:

First Schedule

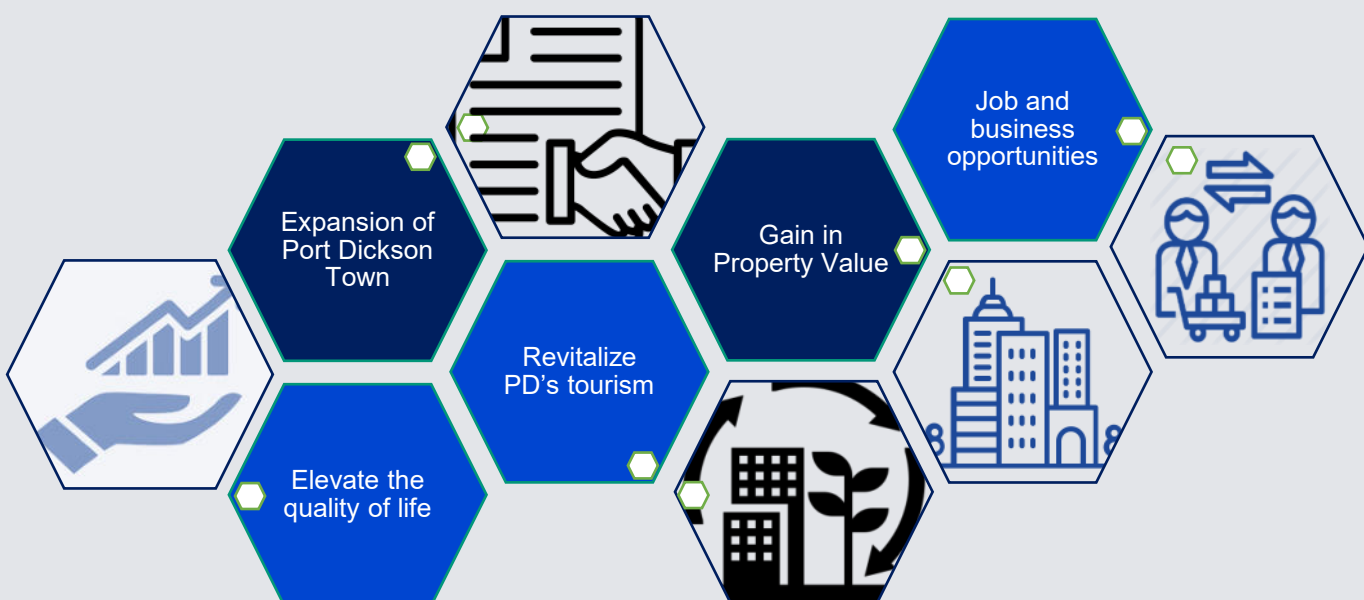
Activity 7. Land Reclamation

(a) Coastal reclamation or land reclamation along riverbanks involving an area of less than 50 hectares.

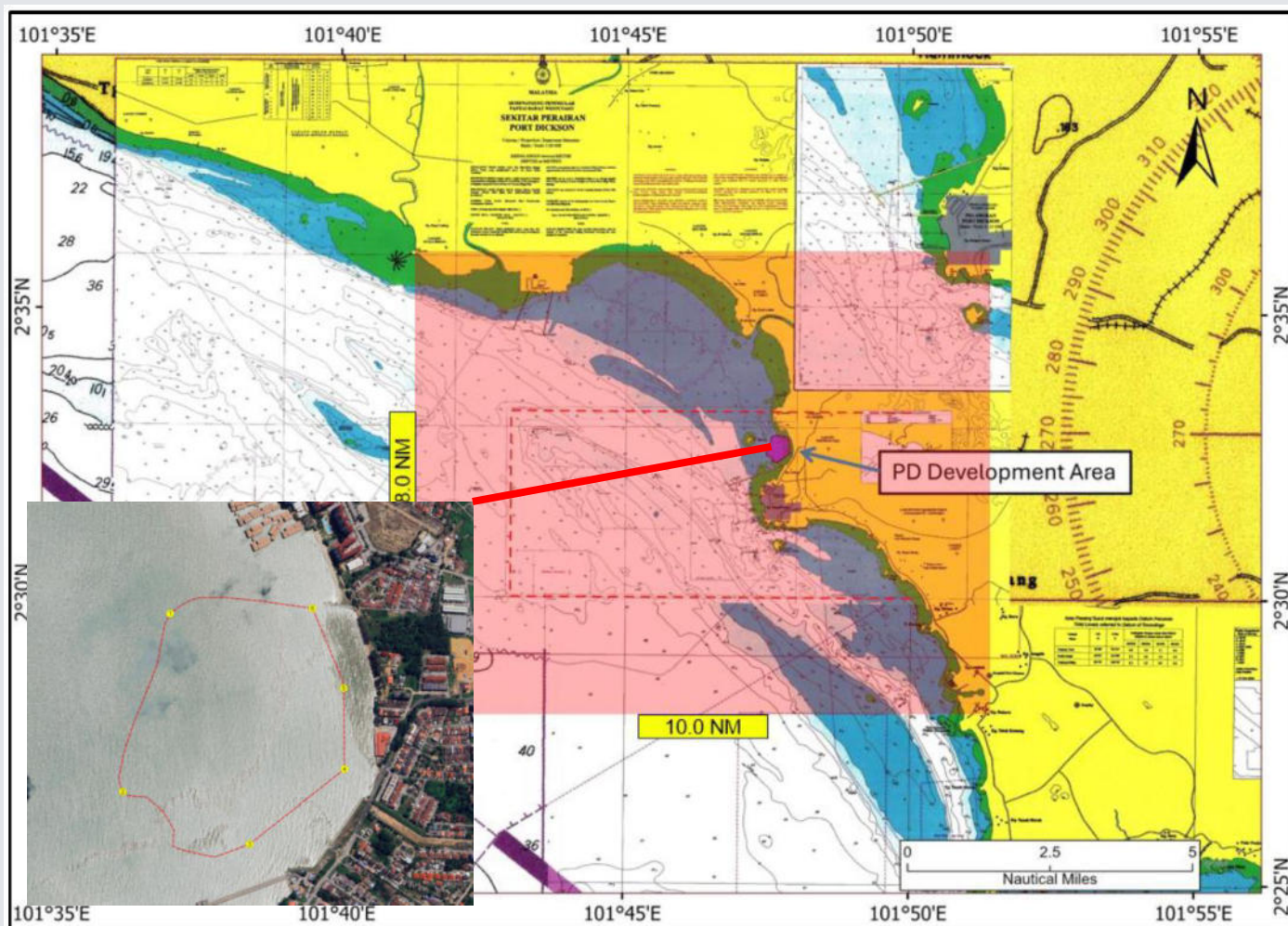
Activity 14 Waste Treatment and Disposal

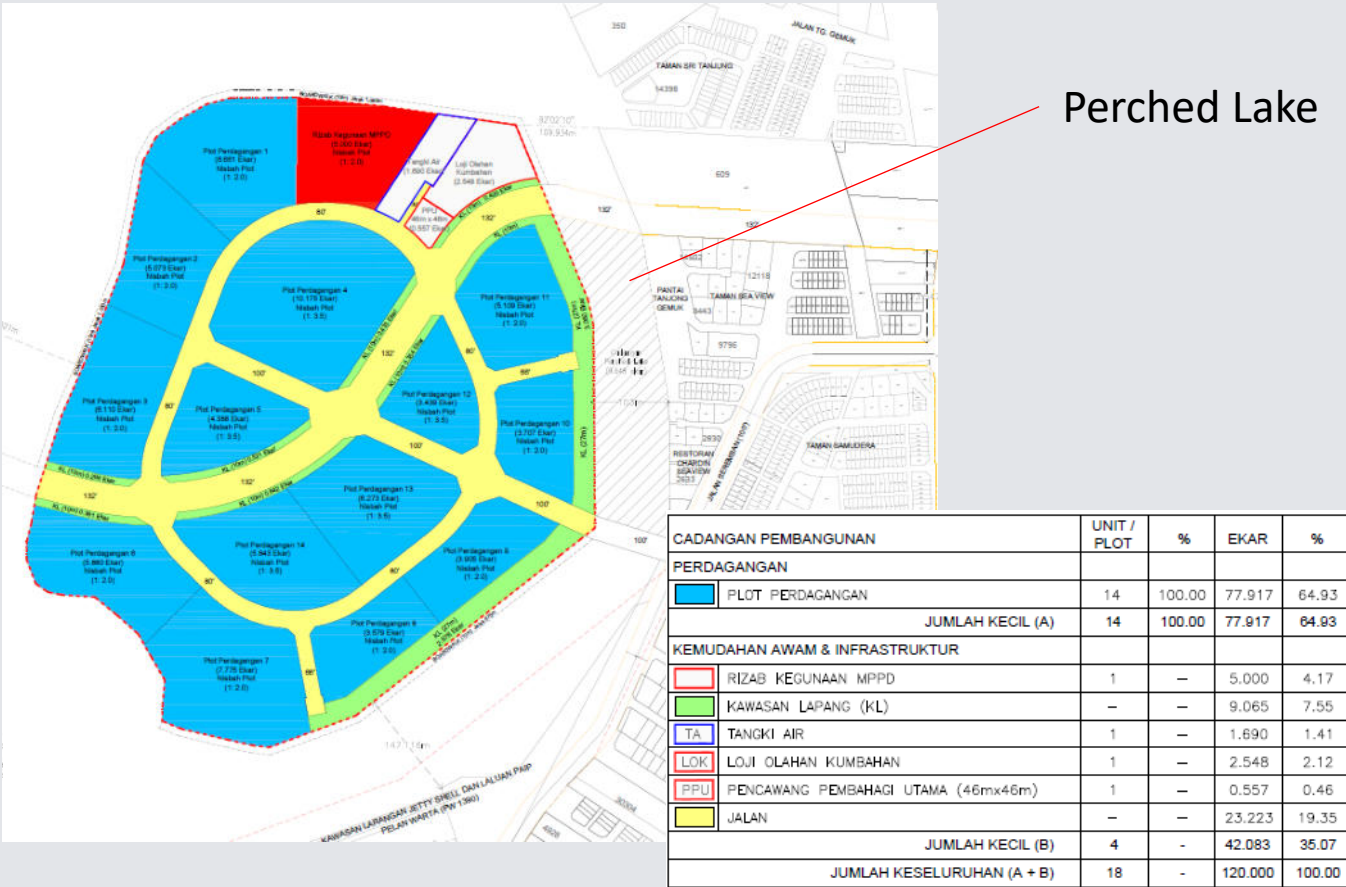
(c)(i) Construction of sewage treatment plant with 20,000 population equivalent or more

Statement of Need



Project Location





- Proposed Project is a joint venture (JV) project between the Menteri Besar, Negeri Sembilan (Incorporation), (MBI) and Selat PD Sdn Bhd which forms PD Development Sdn Bhd
- The Project - coastal reclamation of 120 acres and development on the reclaimed land for commercial use, to be known as Plot C2A.
- Majlis Mesyuarat Kerajaan (MMK) Negeri Sembilan held on 16 April 2025 has agreed on the conversion of the land use zoning of the project site from water body to commercial.

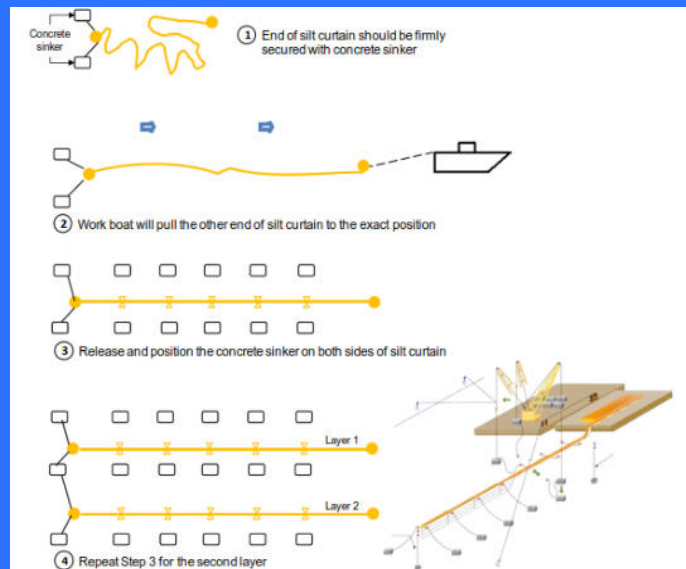
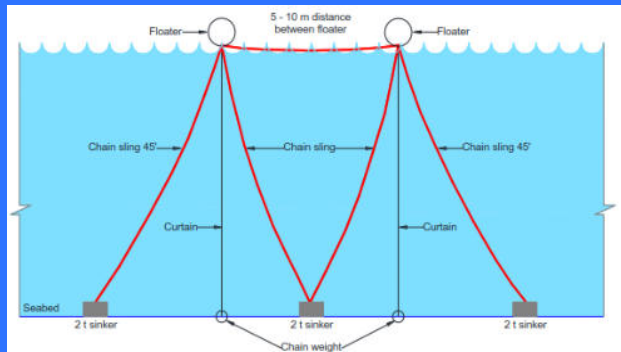


Reclamation Stage

Installation of Environmental control

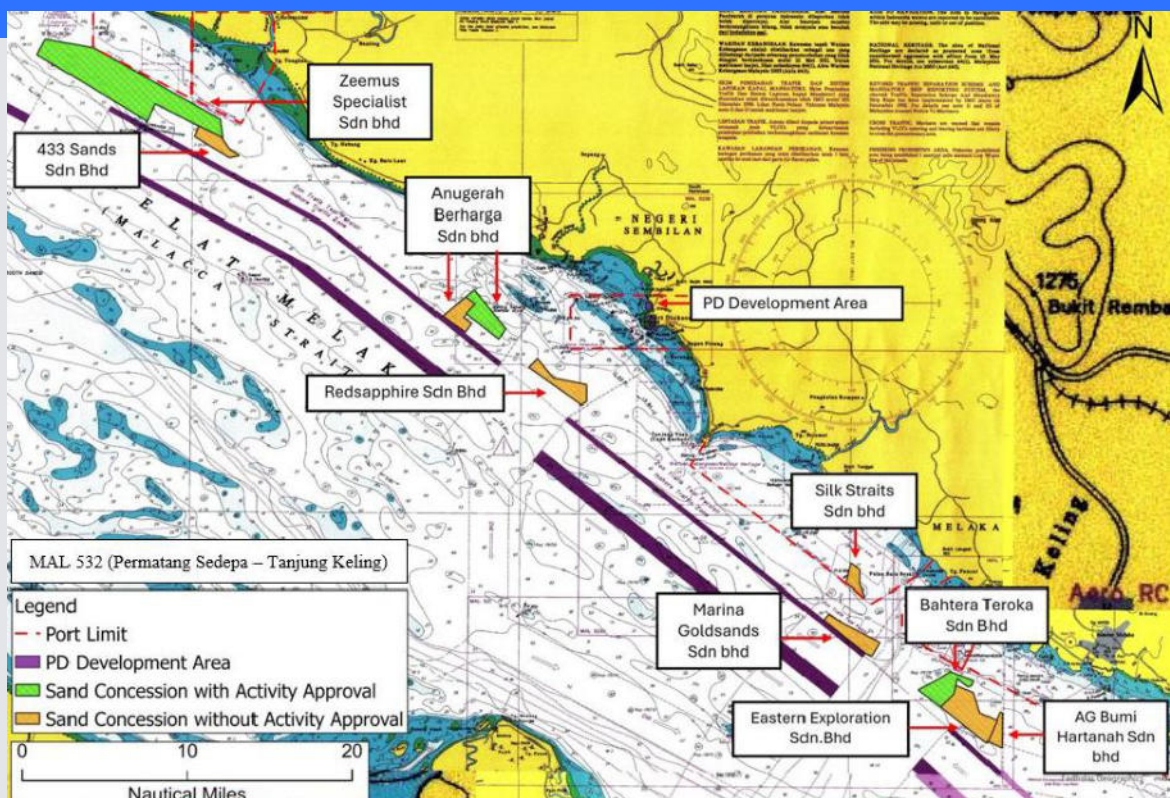
Installation of:

- Perimeter Sand Bund
- Double layer silt curtains
- Temporary drainage



Fill Material

- Filling material is marine sand
- Potential marine sand sources – multiple sources with the nearest one off the coast of Negeri Sembilan by Redsapphire Sdn Bhd
- Estimate of total sand required is 4.5 million m³
- 2 – 5 mix of 3-in-1 dredger / sand carrier, 2-in-1 sand carrier, trailing suction hopper dredger (TSHD) and tug and barge

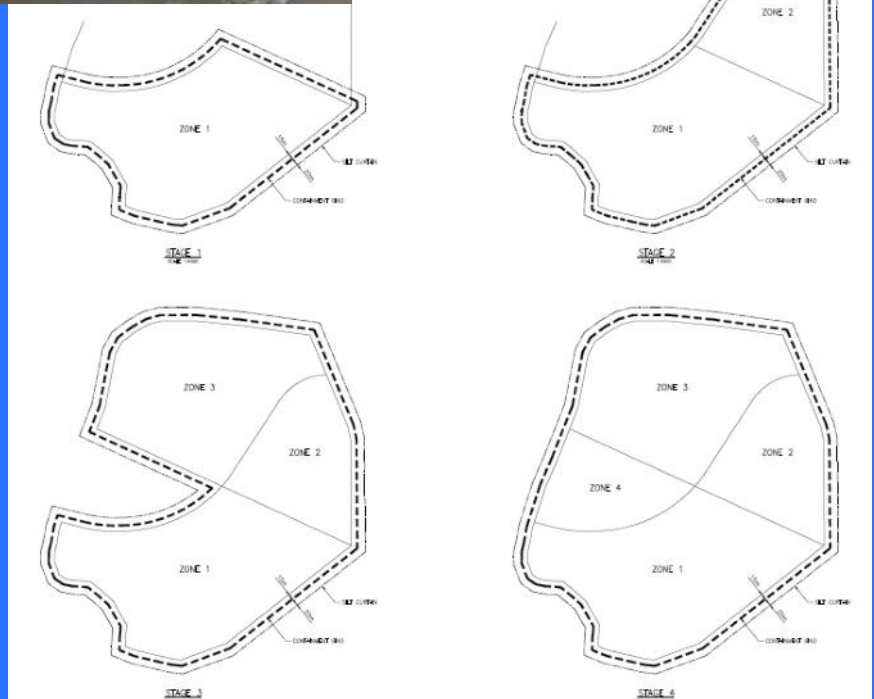


Reclamation Methodology

- Dredger to be used:
 - Minimum two (2) 3,500 m³ 3-in1 sand carrier
- Dry filling
- Land machineries will be used to level and spread the fill materials
- Prefabricated Vertical Drain (PVD) will be installed once platform level is achieved
- Filled to the surcharge level, 2 to 3 m above platform level for compaction
- Targetted platform level to be minimum 3.6m asl
- Reclamation to be carried out in 4 phases span across 2 years

Permanent Shoreline Protection

- Rock Revetment
- Groyne
- Designed slope with armour rock



Existing Environment

BATHYMETRY

Project site is on intertidal zone with deepest point of about 3m. Seabed sediments are consisting majority of sand. No pipeline, cable or coral mass were observed within Project Site

METEOROLOGY & CLIMATE

High annual rainfall with relatively uniform high humidity and temperature

SOCIO-ECONOMIC

Surveys conducted among fishermen, business owners, residents and tourist. More respondents are agreeable to the Project other than fishermen.

Main reason for support: progress and development, benefits for future generation, job opportunities, potential revitalization of PD tourism and business.

AQUATIC ECOLOGY

Closest coral found is at Pulau Burong (Batu 1) (700m west from site) with poor (<25% live) and fair (25 – 50% live) condition

Sg. Sepang, Sg. Lukut, and the shoreline from Sg. Sepang to Pantai Tg. Gemok were observed to be dense with fringing mangroves

Macrobenthos diversity was fairly low with an index value of ranging from 0.67 – 2.10 indicating moderately polluted water.

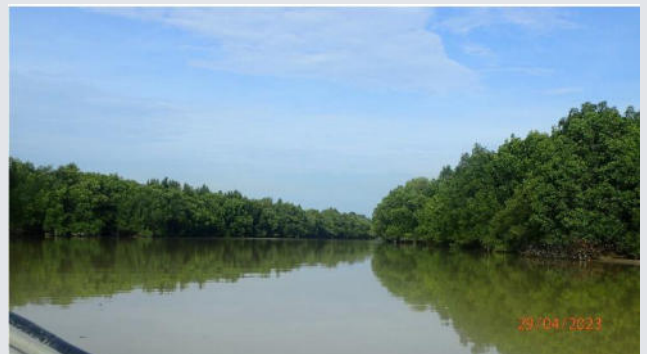
Phytoplankton diversity was fairly low with an index value of ranging from 1.33 – 1.83 indicating moderately polluted water.

Zooplankton diversity was fairly low with an index value of ranging from 0.84 – 1.68 indicating moderately polluted water.

Closest turtle landing at Pantai Glory Beach ; with 2 species recorded along PD coastline, green turtle (*Chelonia mydas*) and hawksbill turtle (*Eretmochelys imbricata*)



Pantai Glory Beach



Mangrove at Sg Lukut

Environmental Baseline



Marine water samples were collected during flood and ebb tides over both neap and spring tides

Compared to Class 3 (Industry, Commercial Activities & Coastal Settlements) of the Malaysia Marine Water Quality Standard and Index. MWQI: Range 0 to 91

The water quality index is fair good (Moderate and Good) during Neap tide, but the index shows worse result (Poor and Moderate) during Spring tide

The main caused of contamination, from the laboratory results, is the concentration of faecal coliform and nitrate. Aluminium concentration also high despite it is not considered in Marine Water Quality Index Calculation



Environmental Baseline

Legend:

-  Project Boundary
-  Marine Sediment
-  Marine Ecology



Marine sediment is relatively clean.

Heavy metals are relatively low with exception of aluminium.

Correlates with marine water quality where elevated aluminium were reported.

Sediment has high sand content except G4 which has more silt

Environmental Baseline



Ambient air quality at all stations complied with MAAQS.



Noise level during nighttime at N1 and N3 exceeded the limit of 55 db(A).
Mostly caused by human activities

Land Use within 1 km Radius



Legend:

Project Boundary

Amenities

1) Rock Revertment

Tourism, Hotel, Resort

- 1) Lexis Port Dickson
- 2) Glory Beach Resort
- 3) Hotel Paradise Spa
- 4) Pantai Tanjung Gemok
- 5) Seaview Restaurant
- 6) Seafront Hotel
- 7) Biker Cafes
- 23) Pulau Burong

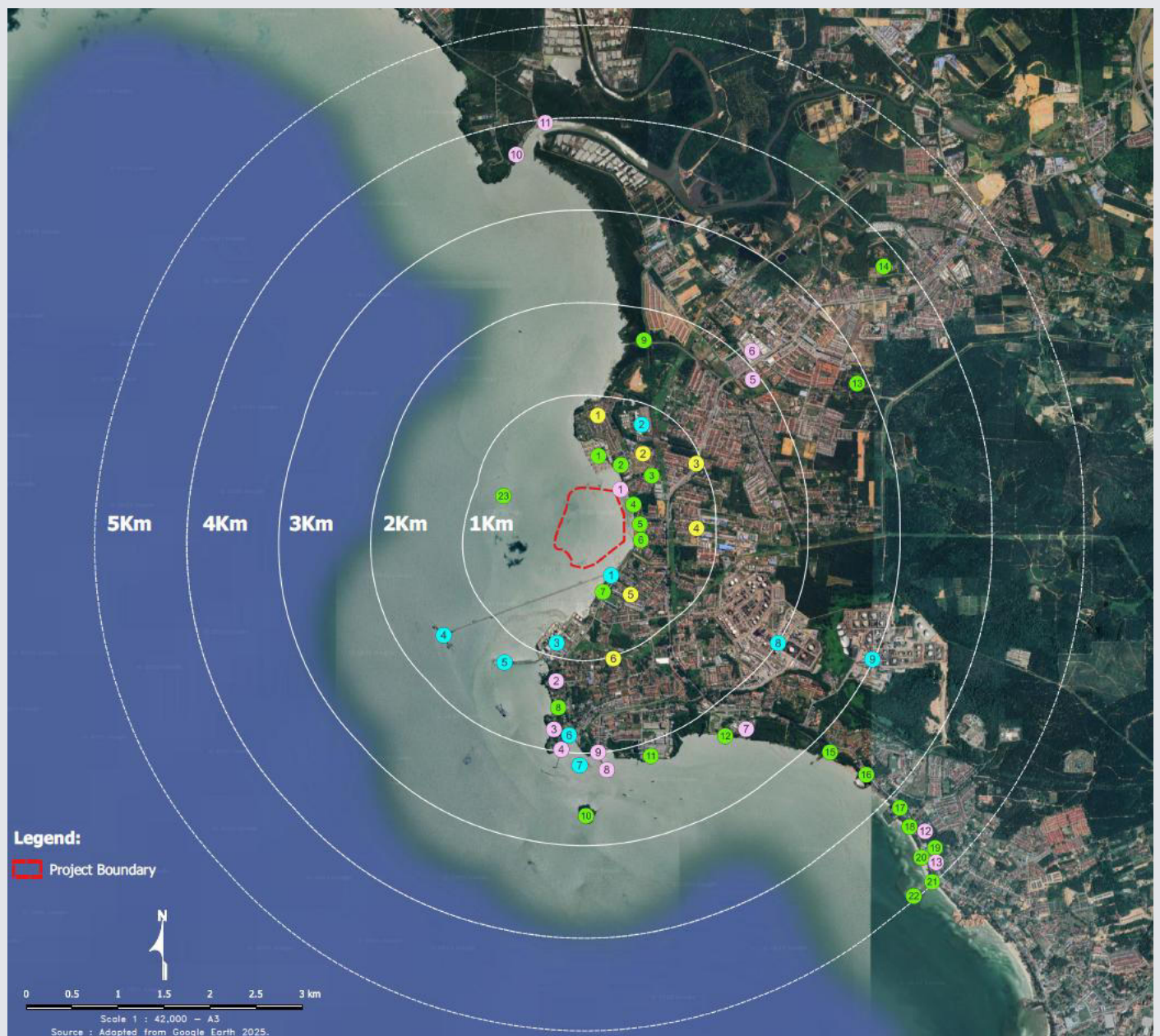
Residence

- 1) Taman Tanjung Fasa II
- 2) Taman NLFCS
- 3) Taman Sri Intan
- 4) Kg Paya
- 5) Kg Gelam

Industries

- 1) HRC Jetty Samudera
- 2) Port Dickson Power Station
- 3) Tuank Jaafar Power Station

Land Use within 5 km Radius



Tourism, Hotel, Resort

- 1) Lexis Port Dickson
- 2) Glory Beach Resort
- 3) Hotel Paradise Spa
- 4) Pantai Tanjung Gemok
- 5) Seaview Restaurant
- 6) Seafront Hotel
- 7) Biker Cafes
- 8) Hotel Legacy Port Dickson
- 9) Restaurant Seafood Soon Huat
- 10) Pulau Arang
- 11) PD Waterfront City
- 12) Small Jetty with Seaview
- 13) PD Maze
- 14) Kota Lukut
- 15) Sunshine Bay Resort
- 16) Corus Paradise Resort
- 17) Mayangsari Beach Resort
- 18) Embok Village Steamboat and Seafood
- 19) Golden Stairts Villas Beach Resort
- 20) Port Dickson Beach
- 21) Pantai Bagan Pinang
- 22) Pulau Bagan Pinang
- 23) Pulau Burong

Amenities

- 1) Rock Revertment
- 2) Klinik Kesihatan Port Dickson
- 3) Shell Refining Company Staff Club House and Conference Centre
- 4) Ferry Terminal Port Dickson
- 5) SMK Raja Jumaat
- 6) Lotus Lukut
- 7) District Administrative Complex PD
- 8) Marine Jetty
- 9) Jabatan Laut Malaysia
- 10) Jeti Kelong Mamud
- 11) Fishing Jetty Kuala Lukut
- 12) Regent International School
- 13) SPH Pondok Awam

Residence

- 1) Taman Tanjung Fasa II
- 2) Taman NLFCS
- 3) Taman Sri Intan
- 4) Kg Paya
- 5) Kg Gelam
- 6) Kg Dhobi

Industries

- 1) HRC Jetty Samudera
- 2) Port Dickson Power Station
- 3) Tunku Jaafar Power Station
- 4) Shell Jetty Dock
- 5) Tunku Jaafar Power Station Cooling Water Intake Point
- 6) DON Maritime Sdn Bhd
- 7) DON Jetty
- 8) Oil Refinery
- 9) Oil Refinery

Impact Assessment and Mitigating Measures



MARINE WATER QUALITY

Impact

- The reclamation to be carried out in 4 stages.
- Sediment Plume during stage 1 and 4 are expected to be minimum; stage 2 and 3 will be at a shallower area. If the discharge is into shallow area, the nearby receptors along the shore will be impacted.
- The impact from the sediment plume during stage 2 and 3 to the surrounding will be much reduced if the discharge points / weir is set at the deeper water (west of project site)
- Project will not contribute to sedimentation at Pulau Burong (Batu 1)
- Minimal thermal impact to the surrounding
- Proposed STP, if discharge at shallow area (east) normal operation will have minimal impact to surrounding except at Glory Beach due to its close proximity to the Project site

- Provision of BMPs (containment bund, double layered silt curtains, weir box, sediment basins)
- Prohibit discharge of untreated sewage into the sea
- Discharge point / Weirs during reclamation to be set at deeper water (West side of Project site).
- Discharge point of Proposed STP to be channeled to deeper water (West side of Project site) to avoid shallow water.
- Permanent shoreline protection
- Marine water quality monitoring
- Shoreline monitoring



MARINE WATER QUALITY

Mitigation Measures



MARINE ECOLOGY

Impact

- Sediment plume and turbidity pose risk of injuring fishes, impacting nearby coral and seagrass
- Potential release of biogenic and chemogenic by dislodging of seabed sediments.
- Disturbance of the sediments can potentially release metal ions to the water column
- Migration of mobile organisms out of the environment

- All mitigation measures prescribed for control of marine water quality shall be adhered
- Vessels involve in Project activities are to comply with MARPOL requirements
- Project Proponent to cooperate with the state government and relevant agencies to come out with a development planning that will benefit the community and safeguarding the environment



MARINE ECOLOGY

Mitigation Measures



AIR QUALITY

Impact

- Potential air quality impacts from marine works are insignificant.
- Combustion gases from the machineries, equipment and working barges and marine vessels.
- Emissions generated near coastal area will be dispersed quickly by sea breeze.

- Proper control of fugitive dust.
- Prohibit open burning at site.
- Vessels involve in Project activities are to comply with MARPOL requirements



AIR QUALITY

Mitigation Measures

Impact Assessment and Mitigating Measures



NOISE Impact

- Noise generated through piling equipment will attenuate and reaches a noise level of 60 dB(A) (a day time noise requirement for urban residential) at a distance of about 764 m (worst case).
- Nearest receptors about 100m

- Establish periodical maintenance schedule for motorised machineries and equipment.
- Provision of hoarding along the land side boundary of the work areas
- Enclosure or other type of acoustic measures for equipment which may emit noise levels higher than 85 dB(A).
- Safety signage shall be installed to inform workers of areas with high noise level.
- Adequate protective devices for workers who work in high noise level areas.



NOISE Mitigation Measures



WASTE MANAGEMENT Impact

- Generation of construction waste, domestic waste and scheduled waste.
- Waste generated by ships and barges shall be managed by ship owner or contractors hired by the ship owner.

- Disposal of wastes generated on marine vessels will be managed at designated port facility authorised to receive such wastes.
- Scheduled wastes shall be managed and handled in accordance with Environmental Quality (Scheduled Waste) Regulation 2005.
- No open burning at the Project site.



WASTE MANAGEMENT Mitigation Measures



MARINE TRAFFIC Impact

Various potential marine traffic risks were identified as follows:

- Collision with Sand Carriers (Broadside/Oblique) during navigation to/from offshore sand source area, if applicable.
- Collision between Tug/Work-boats and other vessels during transportation of work material.
- Collision between vessels due to avoidance of site and/or work vessels.
- Striking against vessels at Port Dickson Port Anchorage.
- Impact collision of Grab Dredgers from Loss of station-keeping.
- Foundering of sand-carriers/hopper barge due to loss of stability.

- All vessels involved in project operation shall keep AIS equipment 'ON' at all times.
- Sand carriers shall beware of fisherman equipment/gears during manoeuvring approach toward reclamation area. Any complaint from the fisherman, the proponent is to liaise with the respective DOF / LKIM.
- Follow the pre-determined navigation channels recommended in approved MRA report.
- All vessels involve with the operation shall maintain close communication with Mardept VTS, HRC Terminal and Jimah Terminal.



MARINE TRAFFIC Mitigation Measures

Impact Assessment and Mitigating Measures



SOCIAL

Impact

Social concerns identified are:

- Socio economic effect to the income for directly affected stakeholders in particular to fishermen.
- Impacting fishing areas and potentially disturbing turtle landing at Glory Beach
- Recreational services: mainly involve angling activities along the coastal area
- Land traffic dispersion from reclaimed land.

- Periodic engagement with local communities to provide information about the Project
- Project Proponent to cooperate with the state government and relevant agencies to come out with a development planning that will benefit the community
- Project Proponent to work closely with local fishermen group and Fishery Department to minimize the impact from the Project to the community
- Project Proponent shall establish a community grievance response team as the channel to receive any comments, suggestions or complaints related to the Project.
- Project Proponent to conduct Corporate Social Responsibility (CSR) programme



SOCIAL

Mitigation Measures



ABANDONMENT

Impact

- Potential impaired aesthetic due to abandoned structures.
- Contamination of soil, water and air from hazardous materials and wastes.
- Breeding of pests and disease vectors, such as mosquitoes, rats etc.
- Safety to workers and other passer-by due to falling materials or structures.

- Notification to the relevant authority(s).
- Removal of machineries, equipment and construction materials.
- Proper waste management.
- Clean-up of work area, especially grounds contaminated with chemicals or oils.
- Rehabilitation and restoration (e.g. re-vegetation of exposed areas).
- Post-abandonment inspection until the Project site is stabilised.



ABANDONMENT

Mitigation Measures

Proposed Environmental Monitoring Programme

Legend:

-  Project Boundary
-  Marine Water



- Dissolved Oxygen, pH value, Salinity, Temperature, Total Suspended Solid (TSS), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Ammoniacal Nitrogen, Oil and Grease, Phosphate, Phenol, Nitrate (NO₃), Unionised Ammonia as (NH₃), Arsenic (III), Cadmium, Lead, Cyanide, Chromium (VI), Zinc, Mercury, Copper, Faecal coliform, Enterococci, Aluminium, Tributyltin (TBT), Polycyclic Aromatic Hydrocarbon (PAH)
- Monthly
- Malaysia Marine Water Quality Criteria and Standard



- Daily inspections on BMPs
- Monthly or after rainfall event of ≥ 12.5 mm – Discharge water from sediment basin (Total Suspended Solids and turbidity)

Proposed Environmental Monitoring Programme



Reclamation & Construction Period

Component	Proposed Monitoring Point	Parameters	Proposed Frequency
Coral	Pulau Burong (Batu 1)	Percentage of live coral cover, species identification, coral diseases, coral bleaching	Quarterly
Mangrove	South of Tuanku Jaafar Power Station, Pulau Burong (Batu 1)	Species, health (e.g., crown senescence, standing dead), presence of seedlings/saplings and mangrove-related fauna.	Quarterly
Macrobenthos, Plankton	One control station away from the reclamation area One location within potential impact zone Near marine habitats (i.e., coral, mangrove)	Species identification, density, diversity and evenness.	Quarterly
Fish Fauna	One control station away from the reclamation area One location within potential impact zone Near marine habitats (i.e., coral, mangrove)	Abundance, diversity, weight and length.	Quarterly
Sea Turtle	Pantai Glory Beach	Number of nests, number of eggs deposited, and number of live, emergent hatchlings	Monthly during nesting season

Post Construction Period

Component	Proposed Monitoring Point	Parameters	Proposed Frequency
Coral	Pulau Burong (Batu 1)	Percentage of live coral cover, species identification, coral diseases, coral bleaching	Quarterly for a year
Macrobenthos, Plankton,	One control station away from the reclamation area One location within potential impact zone Near marine habitats (i.e., coral, mangrove)	Species identification, density, diversity and evenness.	Quarterly for a year
Fish Fauna	One control station away from the reclamation area One location within potential impact zone Near marine habitats (i.e., coral, mangrove)	Abundance, diversity, weight and length.	Quarterly for a year
Sea Turtle	Pantai Glory Beach	Number of nests, number of eggs deposited, and number of live, emergent hatchlings	Monthly during nesting season for 2 years

Proposed Environmental Monitoring Programme

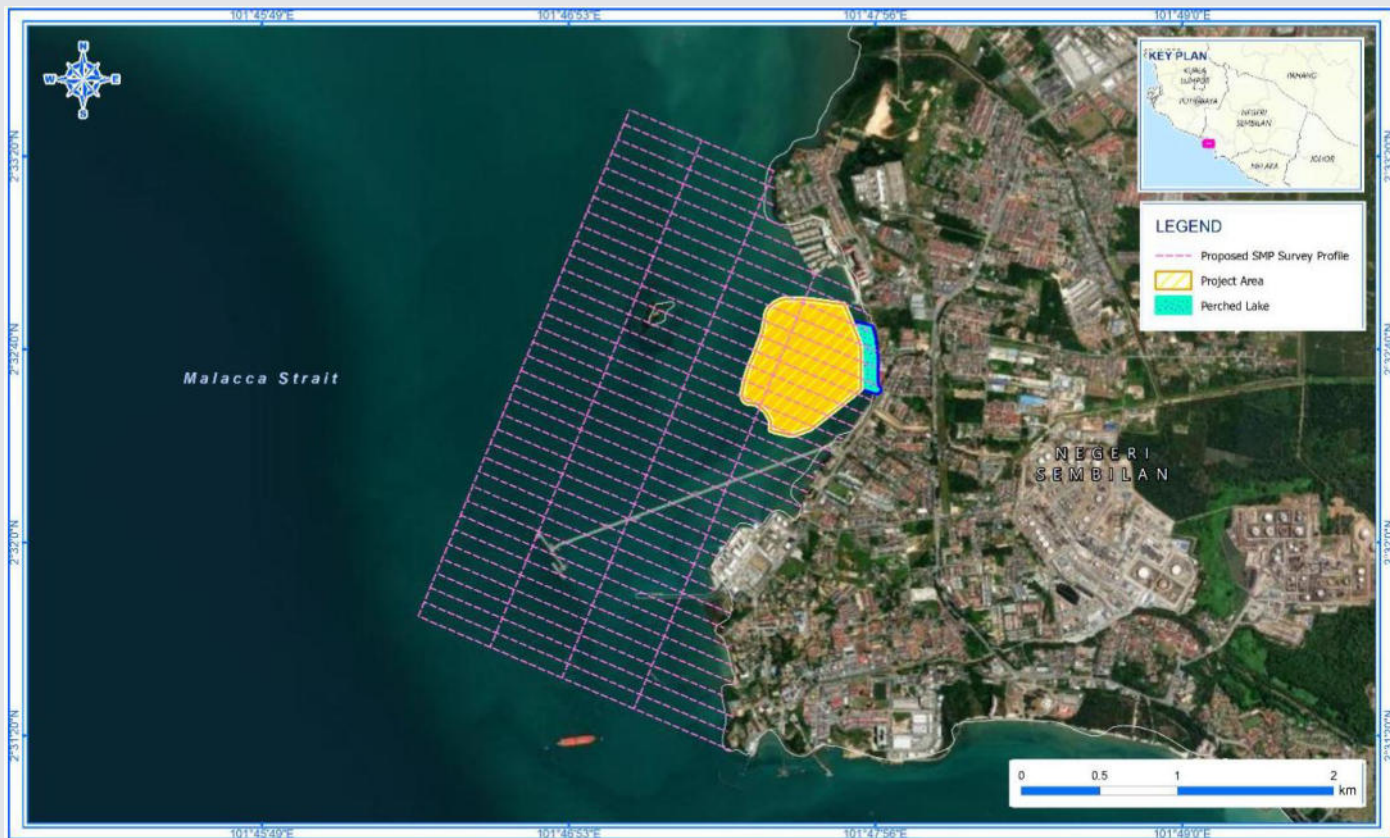


- Ambient air for PM₁₀, PM_{2.5}, SO₂, NO₂, CO, O₃
- Quarterly
- MAAQS 2020



- Noise level for L_{eq}, L_{max}, L_{min}, L₉₀, L₁₀
- Quarterly
- Guidelines for Environmental Noise Limits and Control 2019

Proposed Shoreline Monitoring Programme



- Every 3 months during reclamation
- Every 6 months post reclamation for 3 years. Shoreline monitoring to discontinued if the shoreline is found to be stable
- Shoreline monitoring report to be submitted to Department of Irrigation and Drainage Negeri Sembilan

Item	Specification
SMP Profile Interval	100 m
Cross-Sectional Profile Interval	500 m
Spot Interval	10 m
Landward Limit	10 m landward from MHHW line
Seaward Limit	Minimum 1 km from Proposed Reclamation Boundary

Ringkasan Eksekutif

Ringkasan Eksekutif

PENILAIAN IMPAK ALAM SEKITAR

UNTUK

CADANGAN PROJEK TEPUBAU PANTAI DAN PEMBANGUNAN PLOT C2A (120 EKAR) DI MUKIM BANDAR PORT DICKSON, DAERAH PORT DICKSON, NEGERI SEMBILAN DARUL KHUSUS

Penggerak Projek

PD Development Sdn. Bhd.

Aras 3, Wisma Ekovest ,

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Orang yang Boleh Dihubungi: Encik Lim Fang Ching

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Orang yang Boleh Dihubungi: Cik Lina Chan (Ketua Pasukan EIA)

Perunding EIA



Keperluan Perundangan

Berdasarkan Perintah Kualiti Alam Sekitar (Aktiviti yang Ditetapkan) (Penilaian Impak Alam Sekitar) 2015, Projek yang dicadangkan dikategorikan sebagai aktiviti yang ditetapkan di bawah Jadual Kedua seperti berikut:

Jadual Pertama

Aktiviti 7. Penebusgunaan Tanah

- (a) Penebusgunaan kawasan pantai atau penebusgunaan tanah sepanjang tebing sungai yang melibatkan kawasan kurang daripada 50 hektar.

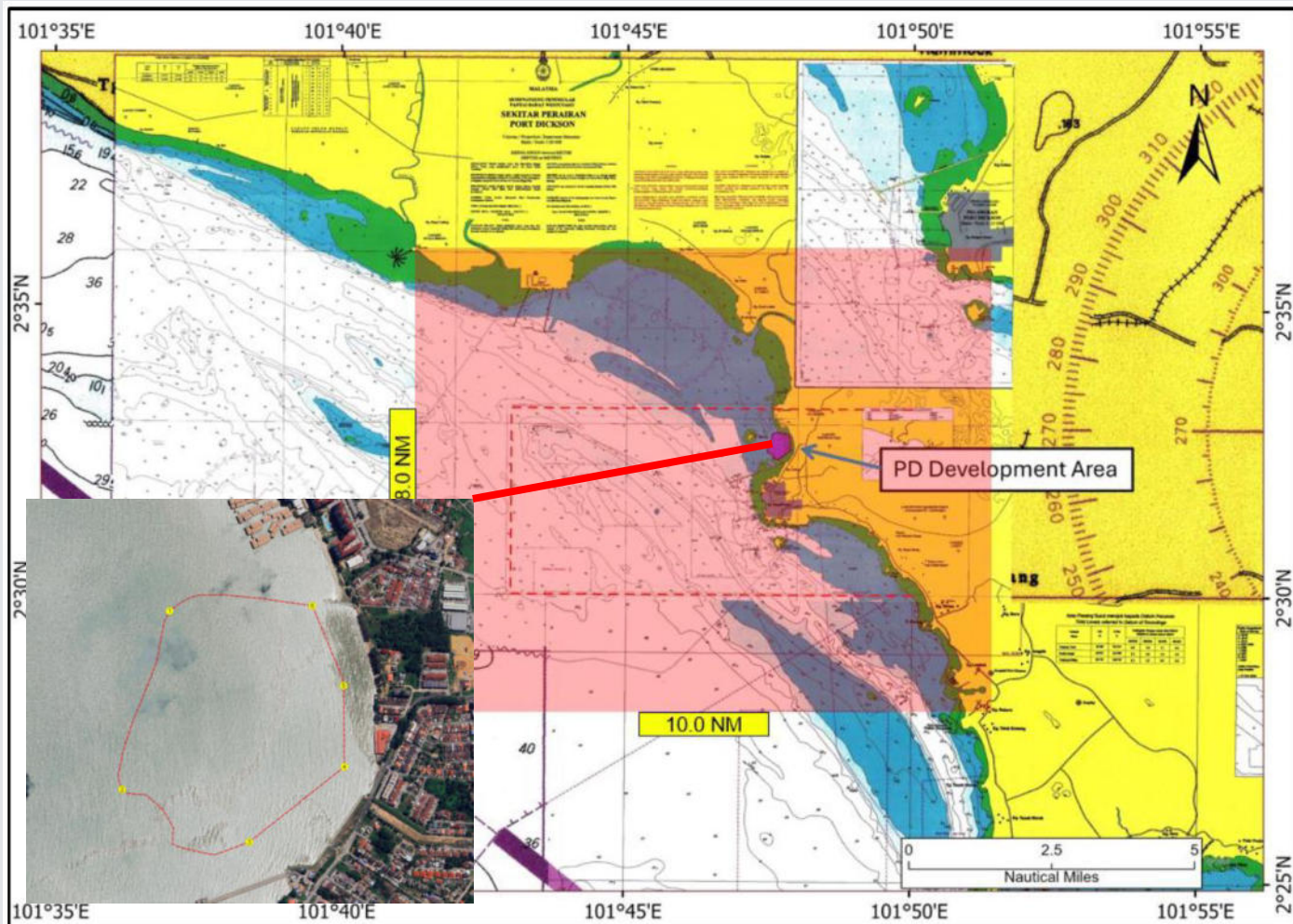
Aktiviti 14 Pengolahan dan Pelupusan Buangan

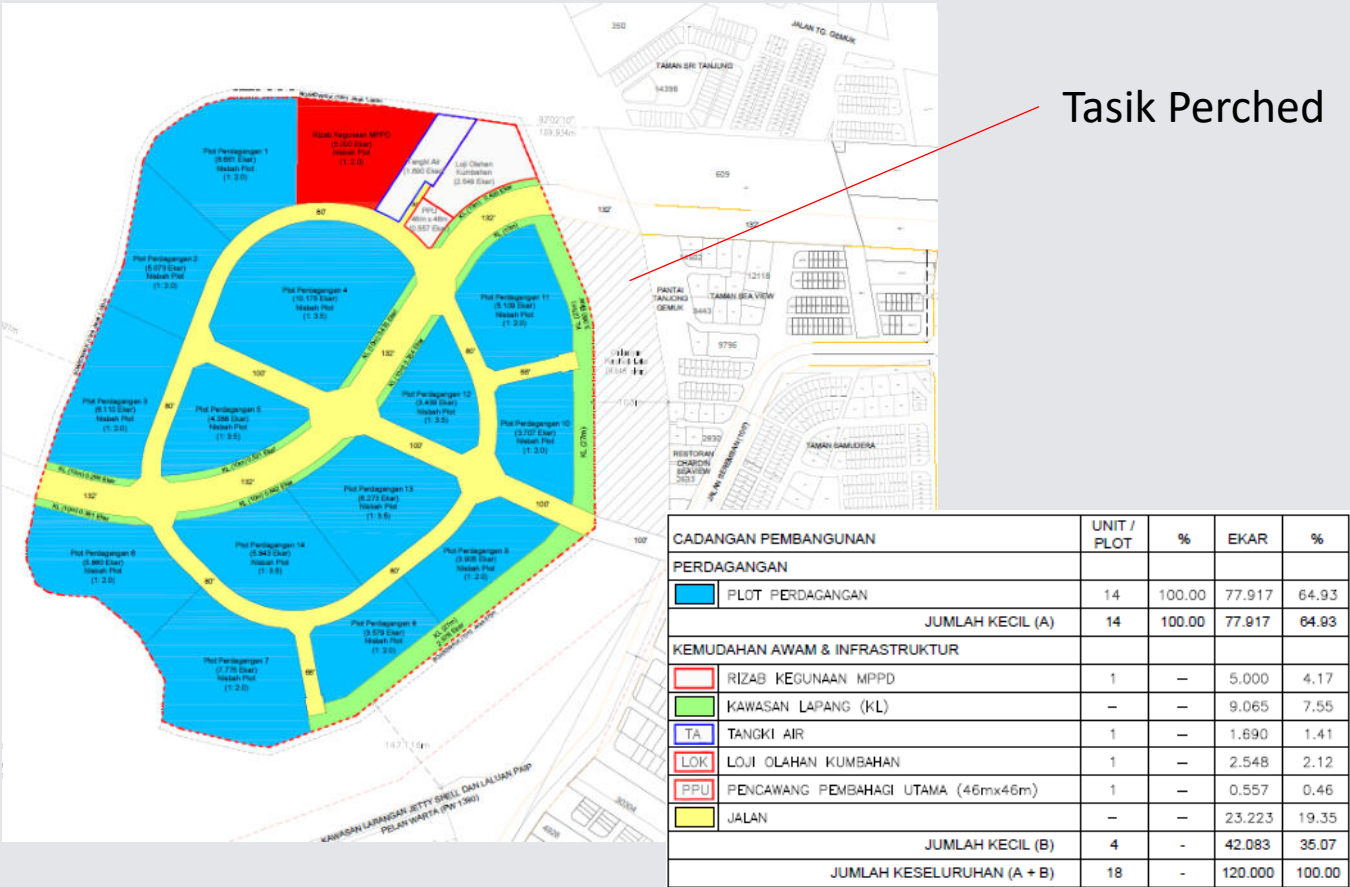
- (c)(i) Pembinaan loji pengolahan kumbahan dengan 20,000 kesetaraan populasi atau lebih

Pernyataan Keperluan



Lokasi Projek





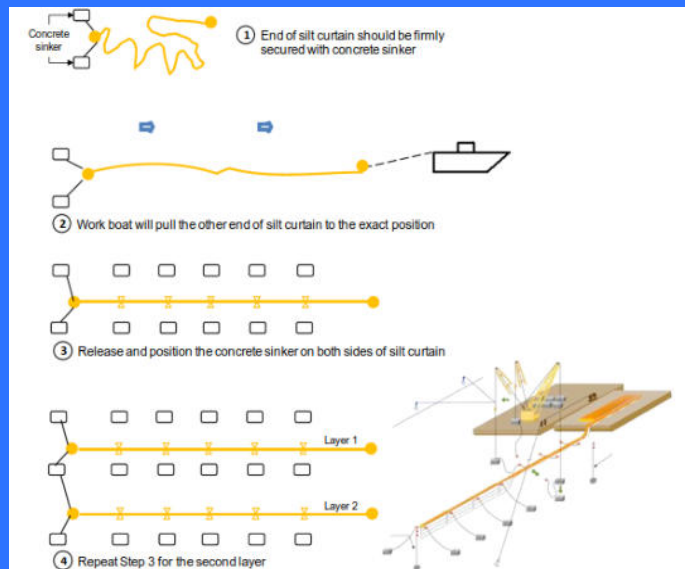
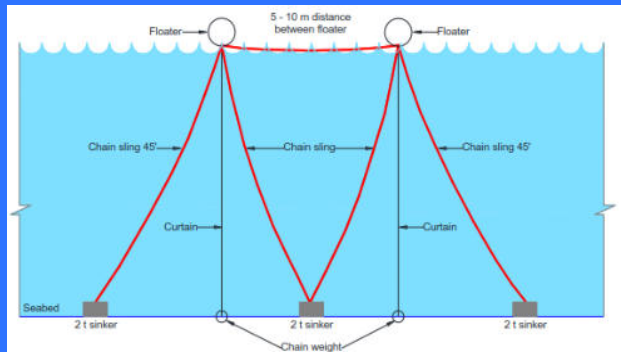
- Projek Cadangan ialah projek usaha sama (JV) antara Menteri Besar, Negeri Sembilan (Incorporation) (MBI) dan Selat PD Sdn Bhd yang membentuk PD Development Sdn Bhd
- Projek - penambakan pantai seluas 120 ekar dan pembangunan di atas tanah yang ditambah untuk kegunaan komersial, yang akan dikenali sebagai Plot C2A.
- Majlis Mesyuarat Kerajaan (MMK) Negeri Sembilan yang diadakan pada 16 April 2025 telah bersetuju dengan penukaran zon guna tanah tapak projek daripada badan air kepada komersial.



Pemasangan Kawalan Alam Sekitar

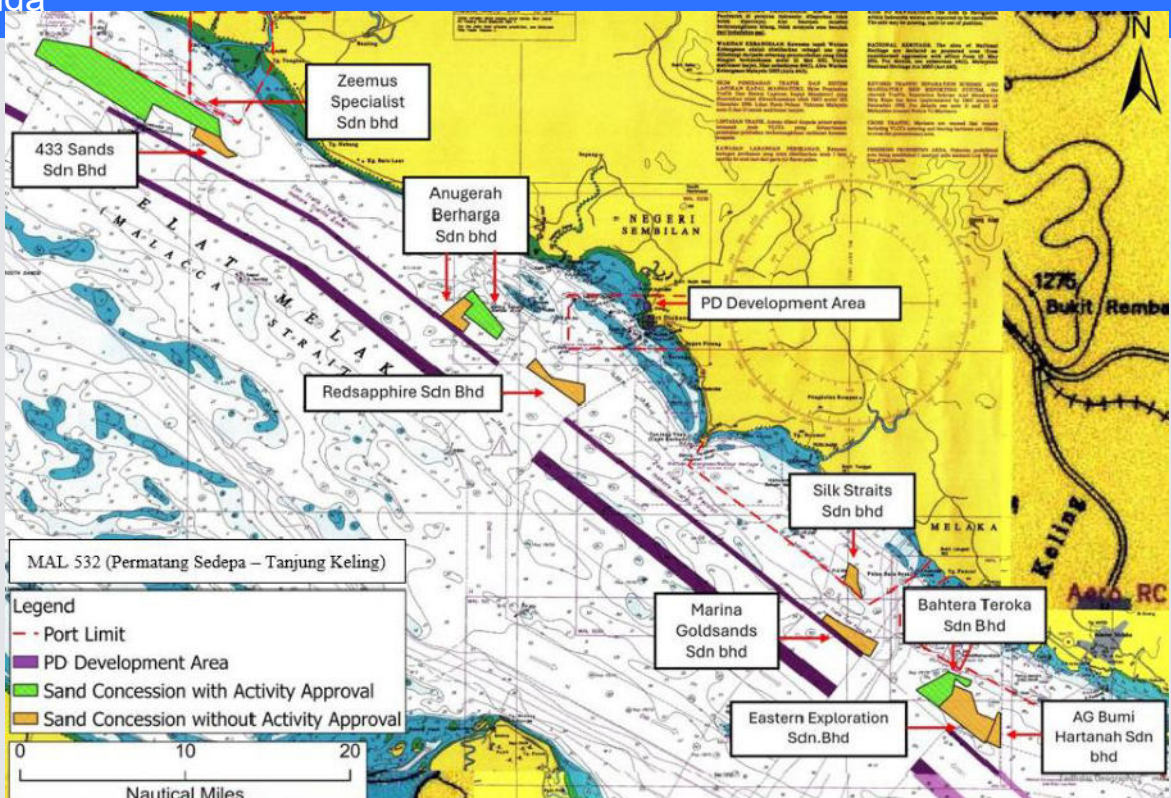
Pemasangan:

- Perimeter Sand Bund
- Langsir lumpur dua lapisan
- Saliran sementara



Bahan Isi

- Bahan pengisi adalah pasir laut
- Sumber pasir laut yang berpotensi – pelbagai sumber dengan sumber yang terdekat di luar pantai Negeri Sembilan oleh Redsapphire Sdn Bhd
- Anggaran jumlah pasir yang diperlukan ialah 4.5 juta m³
- Campuran 2 – 5 kapal korek/pengangkut pasir 3-dalam-1, kapal korek pasir 2-dalam-1, kapal korek corong sedutan belakang (TSHD) dan tongkang dan tunda

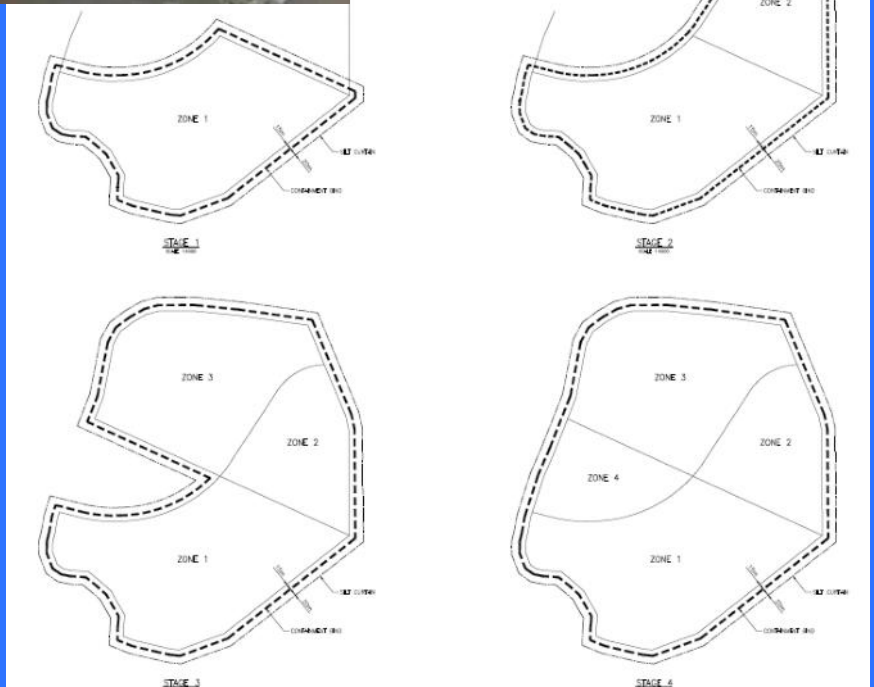


Metodologi Penambakan

- Kapal keruk yang akan digunakan:
 - Minimum dua (2) pembawa pasir 3-dalam-1 3,500 m³
- Pengisian kering
- Jentera tanah akan digunakan untuk meratakan dan menyebarkan bahan timbunan
- Saliran Vertikal Pasang Siap (PVD) akan dipasang sebaik sahaja aras platform dicapai
- Diisi sehingga paras surcay, 2 hingga 3 m di atas paras platform untuk pemadatan
- sasaran hendaklah minimum 3.6m dpl
- Penambakan akan dijalankan dalam 4 fasa sepanjang 2 tahun

Perlindungan Garis Pantai Kekal

- Revetment Batu
- Groyne
- Cerun yang direka bentuk dengan batu perisai



Persekitaran Sedia Ada

BATIMETRI

Tapak projek berada di zon pasang surut dengan titik terdalam kira-kira 3m. Sedimen dasar laut kebanyakannya terdiri daripada pasir. Tiada saluran paip, kabel atau jisim karang diperhatikan di Tapak Projek.

METEOROLOGI & IKLIM

tinggi dengan kelembapan dan suhu tinggi yang agak seragam

SOSIO-EKONOMI

Tinjauan dijalankan dalam kalangan nelayan, pemilik perniagaan, penduduk dan pelancong. Lebih ramai responden bersetuju dengan Projek ini selain nelayan.

Sebab utama sokongan: kemajuan dan pembangunan, faedah untuk generasi akan datang, peluang pekerjaan, potensi pemulihan pelancongan dan perniagaan PD.

EKOLOGI AKUATIK

Batu karang terdekat yang ditemui ialah di Pulau Burong (Batu 1) (700m barat dari tapak) dengan keadaan yang teruk (<25% hidup) dan sederhana (25 – 50% hidup)

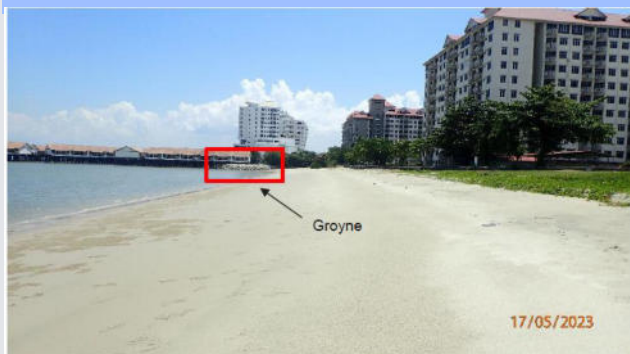
Sg. Sepang, Sg. Lukut, dan garis pantai dari Sg. Sepang ke Pantai Tanjung Gemok diperhatikan padat dengan pokok bakau

Makrobentos adalah agak rendah dengan nilai indeks antara 0.67 – 2.10 yang menunjukkan air tercemar sederhana.

Fitoplankton agak rendah dengan nilai indeks antara 1.33 – 1.83 menunjukkan air tercemar sederhana.

Kepelbagaian zooplankton agak rendah dengan nilai indeks antara 0.84 – 1.68 menunjukkan air yang sederhana tercemar.

Pendaratan penyu terdekat di Pantai Glory; dengan 2 spesies direkodkan di sepanjang pesisir pantai PD, penyu hijau (*Chelonia mydas*) dan penyu sisik (*Eretmochelys imbricata*)



Pantai Glory



Bakau di Sungai Lukut

Garis Asas Alam Sekitar



Air marin telah dikumpulkan semasa air pasang dan surut pada kedua-dua air pasang dan air laut

Berbanding dengan Kelas 3 (Industri, Aktiviti Komersial & Petempatan Pesisir) bagi Piawaian dan Indeks Kualiti Air Marin Malaysia . M WQI: Julat 0 hingga 91

Indeks kualiti air adalah agak baik (Sederhana dan Baik) semasa Air Pasang, tetapi indeks menunjukkan keputusan yang lebih buruk (Lemah dan Sederhana) semasa Air Pasang

Punca utama pencemaran, berdasarkan keputusan makmal, adalah kepekatan koliform najis dan nitrat. Kepekatan aluminium juga tinggi walaupun ia tidak diambil kira dalam Pengiraan Indeks Kualiti Air Marin.



Garis Asas Alam Sekitar

Legend:

-  Project Boundary
-  Marine Sediment
-  Marine Ecology



Sedimen marin agak bersih.

Logam berat agak rendah kecuali aluminium.

Berkaitan dengan kualiti air marin di mana peningkatan aluminium dilaporkan.

Sedimen mempunyai kandungan pasir yang tinggi kecuali G4 yang mempunyai lebih banyak kelodak

Garis Asas Alam Sekitar



ambien di semua stesen mematuhi
MAAQS.



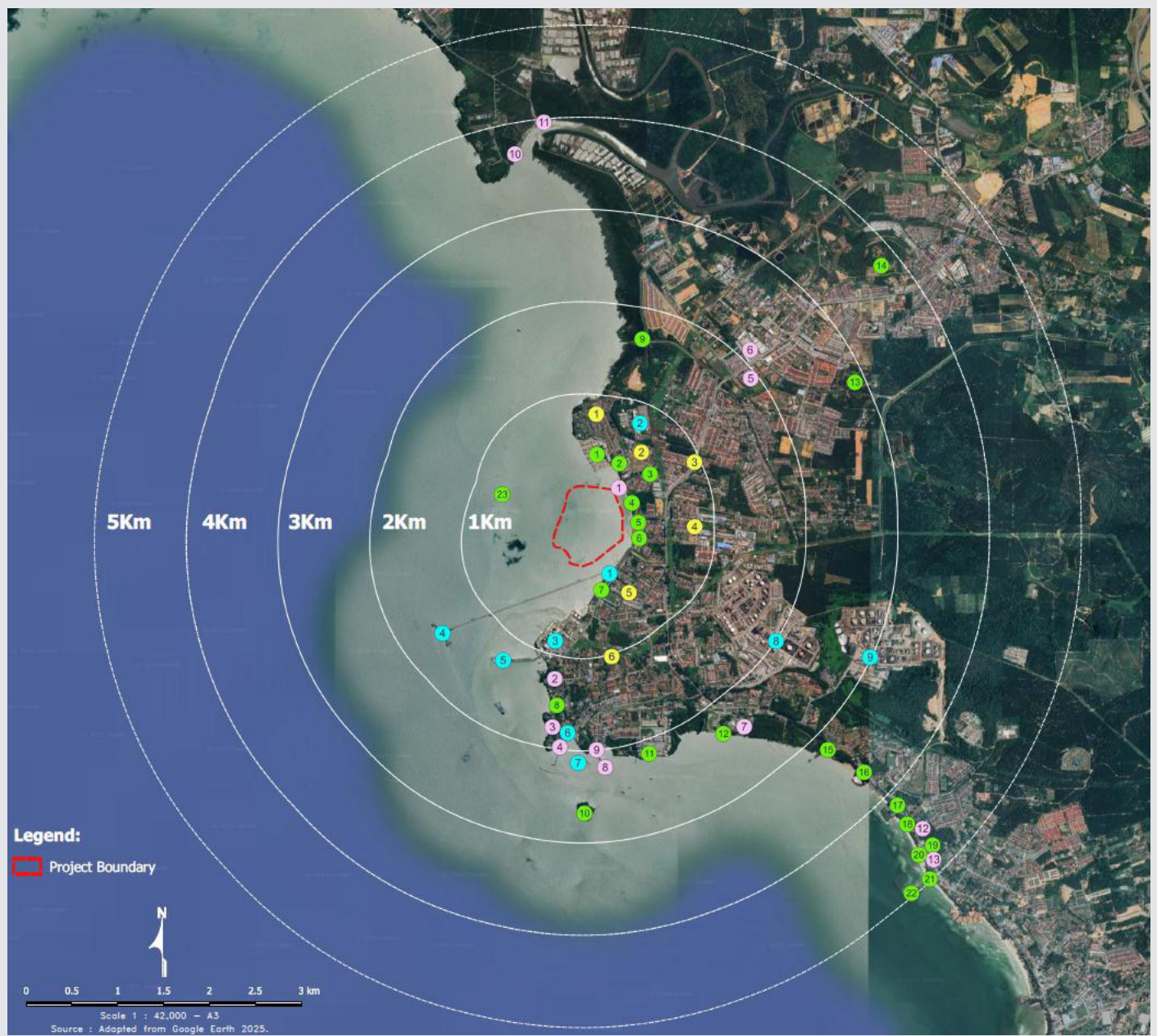
Tahap hingar pada waktu malam di N1
dan N3 melebihi had 55 db (A).

Kebanyakannya disebabkan oleh
aktiviti manusia

Guna Tanah dalam lingkungan 1 km Radius



Guna Tanah dalam lingkungan 5 km Radius



- Tourism, Hotel, Resort**
- 1) Lexis Port Dickson
 - 2) Glory Beach Resort
 - 3) Hotel Paradise Spa
 - 4) Pantai Tanjung Gemok
 - 5) Seaview Restaurant
 - 6) Seafront Hotel
 - 7) Biker Cafes
 - 8) Hotel Legacy Port Dickson
 - 9) Restaurant Seafood Soon Huat
 - 10) Pulau Arang
 - 11) PD Waterfront City
 - 12) Small Jetty with Seaview
 - 13) PD Maze
 - 14) Kota Lukut
 - 15) Sunshine Bay Resort
 - 16) Corus Paradise Resort
 - 17) Mayangsari Beach Resort
 - 18) Embok Village Steamboat and Seafood
 - 19) Golden Stairts Villas Beach Resort
 - 20) Port Dickson Beach
 - 21) Pantai Bagan Pinang
 - 22) Pulau Bagan Pinang
 - 23) Pulau Burong

- Amenities**
- 1) Rock Revertment
 - 2) Klinik Kesihatan Port Dickson
 - 3) Shell Refining Company Staff Club House and Conference Centre
 - 4) Ferry Terminal Port Dickson
 - 5) SMK Raja Jumaat
 - 6) Lotus Lukut
 - 7) District Administrative Complex PD
 - 8) Marine Jetty
 - 9) Jabatan Laut Malaysia
 - 10) Jeti Kelong Mamud
 - 11) Fishing Jetty Kuala Lukut
 - 12) Regent International School
 - 13) SPH Pondok Awam

- Residence**
- 1) Taman Tanjung Fasa II
 - 2) Taman NLFCS
 - 3) Taman Sri Intan
 - 4) Kg Paya
 - 5) Kg Gelam
 - 6) Kg Dhobi
- Industries**
- 1) Shell Jetty Samudera
 - 2) Port Dickson Power Station
 - 3) Tunku Jaafar Power Station
 - 4) Shell Jetty Dock
 - 5) Tunku Jaafar Power Station Cooling Water Intake Point
 - 6) DON Maritime Sdn Bhd
 - 7) DON Jetty
 - 8) Oil Refinery
 - 9) Oil Refinery

Penilaian Impak dan Langkah-langkah Mitigasi



KUALITI AIR MARIN

Impak

- Penambakan akan dijalankan dalam 4 peringkat.
- Kepulan sedimen semasa peringkat 1 dan 4 dijangka minimum; peringkat 2 dan 3 akan berada di kawasan yang lebih cetek. Jika pelepasan ke kawasan cetek, reseptor berdekatan di sepanjang pantai akan terjejas.
- Kesan daripada kepulan sedimen semasa peringkat 2 dan 3 terhadap persekitaran akan berkurangan dengan ketara jika titik pelepasan/empang diletakkan di perairan yang lebih dalam (sebelah barat tapak projek).
- Projek ini tidak akan menyumbang kepada pemendapan di Pulau Burong (Batu 1)
- Impak haba minimum kepada persekitaran
- Cadangan STP, jika pelepasan di kawasan cetek (timur) operasi normal akan memberi impak minimum kepada persekitaran kecuali di Glory Beach kerana kedudukannya yang berdekatan dengan tapak Projek.

- Penyediaan BMP (bendungan, langsir kelodak berlapis dua, kotak empangan, lembangan sedimen)
- Melarang pembuangan kumbahan yang tidak dirawat ke laut
- Titik pelepasan / Empangan semasa penambakan hendaklah ditetapkan di perairan yang lebih dalam (sebelah barat tapak Projek).
- Titik pelepasan Cadangan STP akan disalurkan ke perairan yang lebih dalam (sebelah barat tapak Projek) untuk mengelakkan air cetek.
- Perlindungan pesisir pantai yang kekal
- Pemantauan kualiti air marin
- Pemantauan pinggir pantai



KUALITI AIR MARIN

Langkah-langkah Mitigasi



EKOLOGI MARIN

Impak

- Kepulan sedimen dan kekeruhan menimbulkan risiko mencederakan ikan, memberi kesan kepada karang dan rumpai laut berdekatan
- Potensi pembebasan biogenik dan kemogenik melalui penyingkiran sedimen dasar laut.
- Gangguan sedimen berpotensi melepaskan ion logam ke turus air
- Migrasi organisma mudah alih keluar dari persekitaran

- Semua langkah mitigasi yang ditetapkan untuk kawalan kualiti air marin hendaklah dipatuhi
- Kapal-kapal yang terlibat dalam aktiviti Projek hendaklah mematuhi keperluan MARPOL
- Penggerak Projek akan bekerjasama dengan kerajaan negeri dan agensi berkaitan untuk menghasilkan perancangan pembangunan yang akan memberi manfaat kepada masyarakat dan melindungi alam sekitar.



EKOLOGI MARIN

Langkah Mitigasi



KUALITI UDARA

Impak

- Potensi impak kualiti udara daripada kerja-kerja marin adalah tidak ketara.
- Gas pembakaran daripada jentera, peralatan dan tongkang yang berfungsi serta kapal marin.
- Pelepasan yang dihasilkan berhampiran kawasan pantai akan tersebar dengan cepat oleh angin laut.

- Kawalan habuk yang betul.
- Melarang pembakaran terbuka di tapak.
- Kapal-kapal yang terlibat dalam aktiviti Projek hendaklah mematuhi keperluan MARPOL



KUALITI UDARA

Langkah Mitigasi

Penilaian Impak dan Langkah-langkah Pengurangan



BUNYI BISING Impak

- Bunyi bising yang dihasilkan melalui peralatan cerucuk akan berkurangan dan mencapai tahap bunyi bising 60 dB(A) (keperluan bunyi bising waktu siang untuk kediaman bandar) pada jarak kira-kira 764 m (kes terburuk).
- Reseptor terdekat kira-kira 100m

- Menetapkan jadual penyelenggaraan berkala untuk mesin dan peralatan bermotor.
- Penyediaan papan tanda di sepanjang sempadan sisi tanah kawasan kerja
- Kandang atau jenis langkah akustik lain untuk peralatan yang mungkin mengeluarkan tahap bunyi lebih tinggi daripada 85 dB(A).
- Papan tanda keselamatan hendaklah dipasang untuk memaklumkan pekerja tentang kawasan yang mempunyai tahap bunyi bising yang tinggi.
- Alat pelindung yang mencukupi untuk pekerja yang bekerja di kawasan tahap bunyi yang tinggi.



BUNYI BISING Langkah- langkah Mitigasi



PENGURUSAN SISA Impak

- Penjanaan sisa pembinaan, sisa domestik dan sisa terjadual.
- Sisa buangan yang dihasilkan oleh kapal dan tongkang hendaklah diuruskan oleh pemilik kapal atau kontraktor yang diupah oleh pemilik kapal.

- Pelupusan sisa yang dihasilkan di atas kapal marin akan diuruskan di kemudahan pelabuhan yang ditetapkan yang dibenarkan untuk menerima sisa tersebut.
- Sisa terjadual hendaklah diuruskan dan dikendalikan mengikut Peraturan Kualiti Alam Sekeliling (Buangan Terjadual) 2005.
- Tiada pembakaran terbuka di tapak Projek .



PENGURUSAN SISA Langkah- langkah Mitigasi



TRAFIK MARIN Impak

Pelbagai potensi risiko trafik marin telah dikenal pasti seperti berikut:

- Perlanggaran dengan Pembawa Pasir (Broadside/Oblique) semasa navigasi ke/dari kawasan sumber pasir luar pesisir, jika berkenaan.
- Perlanggaran antara bot tunda/bot kerja dan kapal lain semasa pengangkutan bahan kerja.
- Perlanggaran antara kapal kerana mengelakkan tapak dan/atau kapal kerja.
- Menyerang kapal-kapal di Pelabuhan Port Dickson.
- Perlanggaran hentaman kapal korek Grab akibat kehilangan kawalan stesen.
- Pengangkut pasir/tongkang corong terbalik akibat kehilangan kestabilan.

- Semua kapal yang terlibat dalam operasi projek hendaklah memastikan peralatan AIS 'HIDUP' sepanjang masa.
- Pembawa pasir hendaklah berhati-hati dengan peralatan/gear nelayan semasa bergerak ke arah kawasan penambakan. Sebarang aduan daripada nelayan, pemaju hendaklah berhubung dengan Jabatan Kemajuan Perikanan/LKIM masing-masing.
- Ikut saluran navigasi yang telah ditentukan terlebih dahulu yang disyorkan dalam laporan MRA yang diluluskan.
- Semua kapal yang terlibat dengan operasi hendaklah mengekalkan komunikasi rapat dengan Mardept VTS, Terminal HRC dan Terminal Jimah .



TRAFIK MARIN Langkah- langkah Mitigasi

Penilaian Impak dan Langkah-langkah Pengurangan



SOSIAL

Impak

Kebimbangan sosial yang dikenal pasti adalah:

- Kesan sosioekonomi kepada pendapatan bagi pihak berkepentingan yang terjejas secara langsung khususnya kepada nelayan.
- Memastikan kawasan perikanan dipagar dan berpotensi mengganggu pendaratan penyu di Pantai Glory
- Perkhidmatan rekreasi: terutamanya melibatkan aktiviti memancing di sepanjang kawasan pantai
- Penyebaran trafik darat dari tanah yang ditebus guna.

- Penglibatan dengan komuniti tempatan untuk memberikan maklumat tentang Projek
- Penggerak Projek akan bekerjasama dengan kerajaan negeri dan agensi berkaitan untuk menghasilkan perancangan pembangunan yang akan memberi manfaat kepada masyarakat
- Penggerak Projek akan bekerjasama rapat dengan kumpulan nelayan tempatan dan Jabatan Perikanan untuk meminimumkan impak Projek kepada komuniti
- Penggerak Projek hendaklah menubuhkan pasukan tindak balas aduan komuniti sebagai saluran untuk menerima sebarang komen, cadangan atau aduan berkaitan Projek.
- Penggerak Projek untuk menjalankan program Tanggungjawab Sosial Korporat (CSR).



SOSIAL

Langkah-langkah Mitigasi



PENGABAIAAN

Impak

- Potentia li terjejas estetika disebabkan oleh struktur terbengkalai.
- Pencemaran tanah, air dan udara daripada bahan dan sisa berbahaya.
- Pembiakan perosak dan vektor penyakit, seperti nyamuk, tikus dan sebagainya.
- Keselamatan kepada pekerja dan orang yang lalu-lalang akibat bahan atau struktur yang jatuh.

- Pemberitahuan kepada pihak berkuasa yang berkaitan.
- Pembuangan mesin, peralatan dan bahan binaan.
- Pengurusan sisa yang betul.
- Pembersihan kawasan kerja, terutamanya tanah yang tercemar dengan bahan kimia atau minyak.
- Pemulihan dan pemulihan (cth. penanaman semula kawasan terdedah).
- Pemeriksaan selepas pengabaian sehingga tapak Projek stabil.



PENGABAIAAN

Langkah-langkah Mitigasi

Program Pemantauan Alam Sekitar yang Dicadangkan

Legend:

-  Project Boundary
-  Marine Water



- Oksigen Terlarut, nilai pH, Kemasinan, Suhu, Jumlah Pepejal Terampai (TSS), Permintaan Oksigen Biokimia (BOD), Permintaan Oksigen Kimia (COD), Nitrogen Ammonia, Minyak dan Gris, Fosfat, Fenol, Nitrat (NO₃), Ammonia Tersatukan sebagai (NH₃), Arsenik (III), Kadmium, Plumbum, Sianida, Kromium (VI), Zink, Merkuri, Kuprum, Koliform Najis, Enterokokus, Aluminium, Tributiltin (TBT), Hidrokarbon Aromatik Polisiklik (PAH)
- Bulanan
- Standad dan Indeks Kualiti Air Marin Malaysia



- Pemeriksaan harian ke atas BMP
- bulanan atau selepas ≥ 12.5 mm – D mengeluarkan air dari lembangan sedimen (Jumlah Pepejal Terampai dan kekeruhan)

Program Pemantauan Alam Sekitar yang Dicadangkan



Tempoh Penambakan & Pembinaan

Komponen	Cadangan Titik Pemantauan	Parameter	Kekerapan yang Dicadangkan
Karang	Pulau Burong (Batu 1)	Peratusan litupan karang hidup, pengenalpastian spesies, penyakit karang, pelunturan karang	Suku Tahunan
Bakau	Selatan Stesen Janakuasa Tuanku Jaafar, Pulau Burong (Batu 1)	Spesies, kesihatan (contohnya, penuaan mahkota, kematian berdiri), kehadiran anak benih/anak pokok dan fauna berkaitan bakau.	Suku Tahunan
Makrobentos, Plankton	Satu stesen kawalan dari kawasan penambakan Satu lokasi dalam zon impak berpotensi Berhampiran habitat marin (iaitu, batu karang, bakau)	Pengenalpastian spesies, ketumpatan, kepelbagaian dan kesamarataan.	Suku Tahunan
Fauna Ikan	Satu stesen kawalan dari kawasan penambakan Satu lokasi dalam zon impak berpotensi Berhampiran habitat marin (iaitu, batu karang, bakau)	Kelimpahan, kepelbagaian, berat dan panjang.	Suku Tahunan
Penyu Laut	Pantai Glory	Bilangan sarang, bilangan telur yang diletakkan, dan bilangan anak telur yang masih hidup dan baru muncul	Bulanan semasa musim bersarang

Tempoh Lepas Pembinaan

Komponen	Cadangan Titik Pemantauan	Parameter	Kekerapan yang Dicadangkan
Karang	Pulau Burong (Batu 1)	Peratusan litupan karang hidup, pengenalpastian spesies, penyakit karang, pelunturan karang	Suku tahun selama setahun
Makrobentos, Plankton,	Satu stesen kawalan dari kawasan penambakan Satu lokasi dalam zon impak berpotensi Berhampiran habitat marin (iaitu, batu karang, bakau)	Pengenalpastian spesies, ketumpatan, kepelbagaian dan kesamarataan.	Suku tahun selama setahun
Fauna Ikan	Satu stesen kawalan dari kawasan penambakan Satu lokasi dalam zon impak berpotensi Berhampiran habitat marin (iaitu, batu karang, bakau)	Kelimpahan, kepelbagaian, berat dan panjang.	Suku tahun selama setahun
Penyu Laut	Pantai Glory	Bilangan sarang, bilangan telur yang diletakkan, dan bilangan anak telur yang masih hidup dan baru muncul	Bulanan semasa musim bersarang selama 2 tahun

Program Pemantauan Alam Sekitar yang Dicadangkan

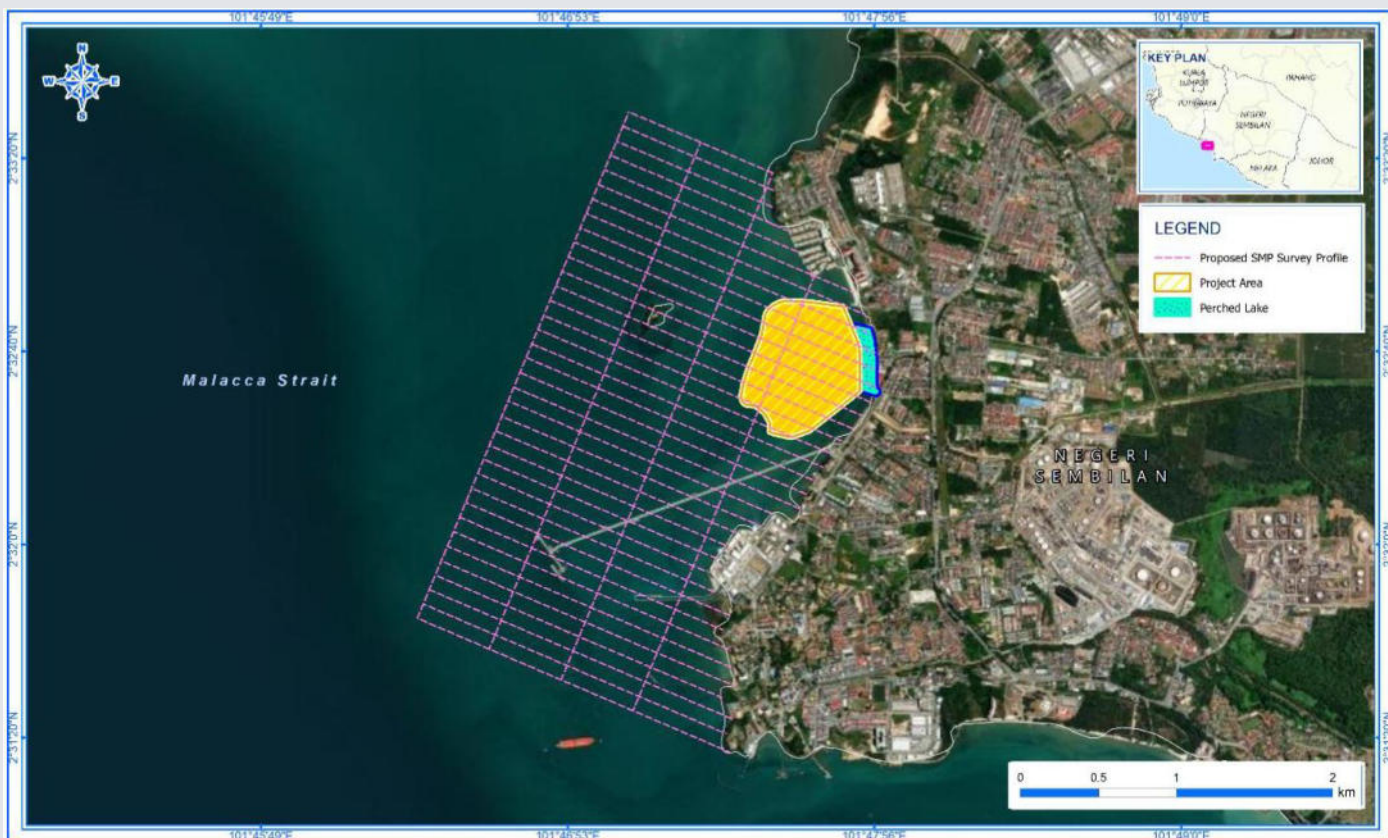


- Udara ambien untuk PM_{10} , $PM_{2.5}$, SO_2 , NO_2 , CO , O_3
- Suku Tahunan
- MAAQS 2020



- Tahap bunyi untuk L_{eq} , L_{maks} , L_{min} , L_{90} , L_{10}
- Suku Tahunan
- *Guidelines for Environmental Noise Limits and Control 2019*

Program Pemantauan Pinggir Pantai yang Dicadangkan



- Setiap 3 bulan semasa penambakan
- Setiap 6 bulan selepas penambakan selama 3 tahun. Pemantauan pinggir pantai akan dihentikan jika garis pantai didapati stabil.
- Laporan pemantauan garis pantai akan dihantar ke Jabatan Pengairan dan Saliran Negeri Sembilan

Barang	Spesifikasi
Selang Profil SMP	100 meter
Selang Profil Keratan Rentas	500 m
Selang Titik	10 meter
Had Ke Darat	10 m ke arah darat dari laluan MHHW
Had Ke Laut	Minimum 1 km dari Sempadan Penambakan yang Dicadangkan