

Executive Summary

ENVIRONMENTAL IMPACT ASSESSMENT FOR *CADANGAN PELAN INDUK PEMBANGUNAN TEBUS GUNA TANAH SELUAS 407 HEKTAR DARI BAGAN AJAM HINGGA TELUK AIR TAWAR UNTUK TUJUAN PEMBANGUNAN BERCAMPUR SERTA:*

- A. *TEBUSGUNA 11.453 HEKTAR PROMENADE***
- B. *MEMBINA 25.091 HEKTAR PANTAI BERPASIR***
- C. *TEBUSGUNA 35.005 HEKTAR TANAH SEDIA ADA KEPADA KEMUDAHAN MASYARAKAT & UTILITI***
- D. *MENAIKTARAF 21.080 HEKTAR TANAH SEDIA ADA KEPADA KEMUDAHAN MASYARAKAT & UTILITI***

Project Proponent

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EIA Consultant



Legislative Requirements

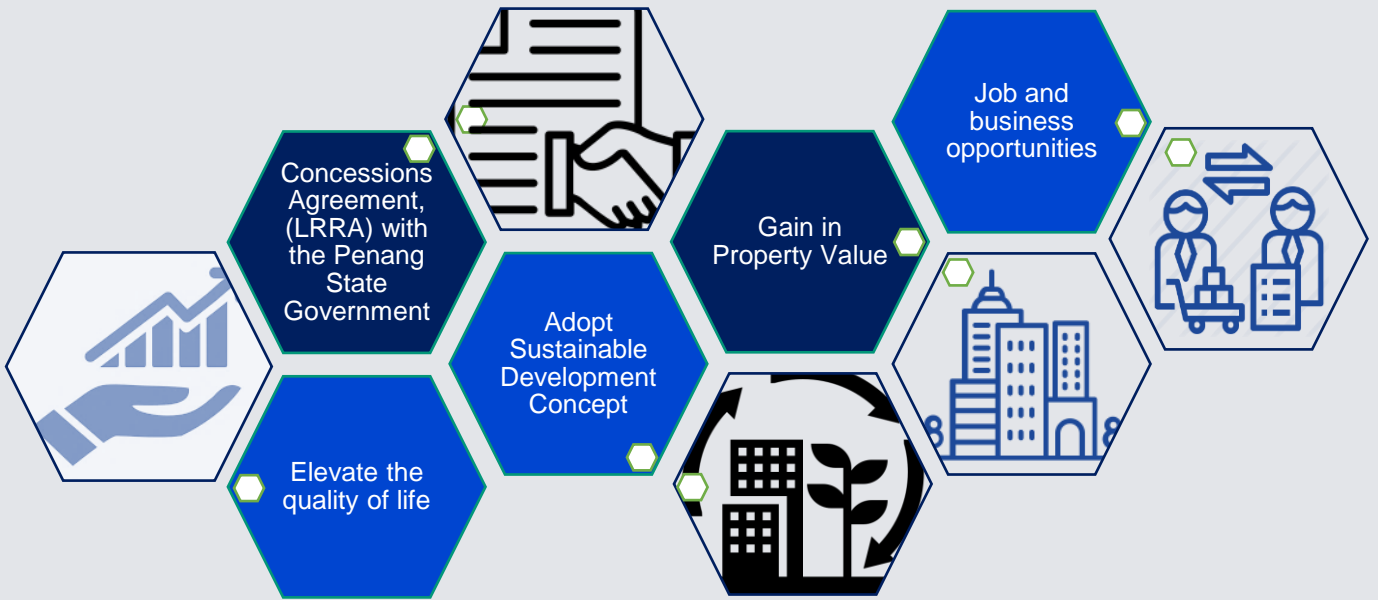
Based on the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015, the proposed Project is categorised as a prescribed activity under Second Schedule as follows:

Second Schedule

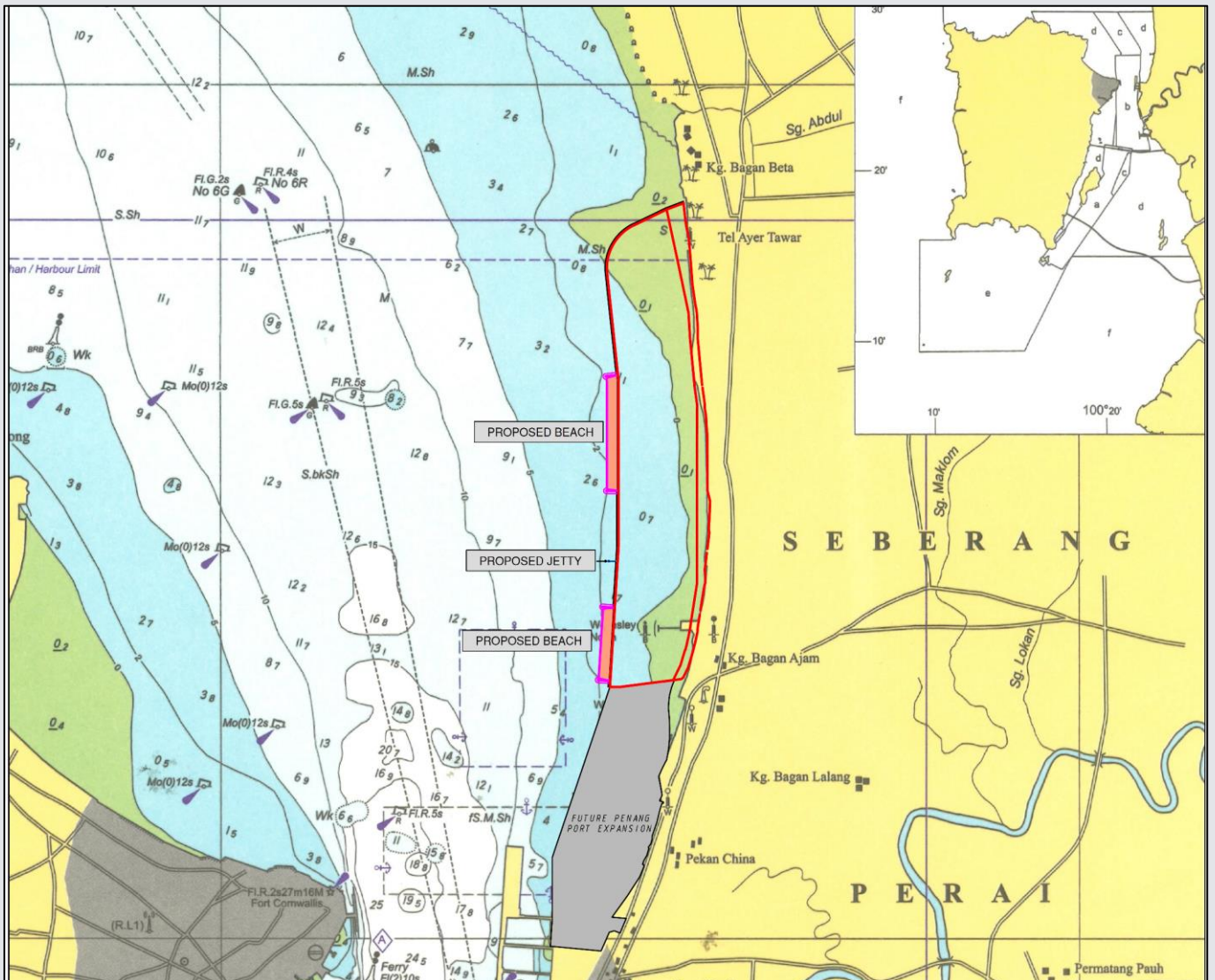
Activity 7. Land Reclamation

- (a) Coastal reclamation or land reclamation along river banks involving an area of 50 hectares or more

Statement of Need



Project Location








Project Concept

CADANGAN PELAN INDUK PEMBANGUNAN TEBUS GUNA TANAH SELUAS 407.000 HEKTAR DARI BAGAN AJAM HINGGA TELUK AIR TAWAR UNTUK TUJUAN PEMBANGUNAN BERCAMPUR SERTA:

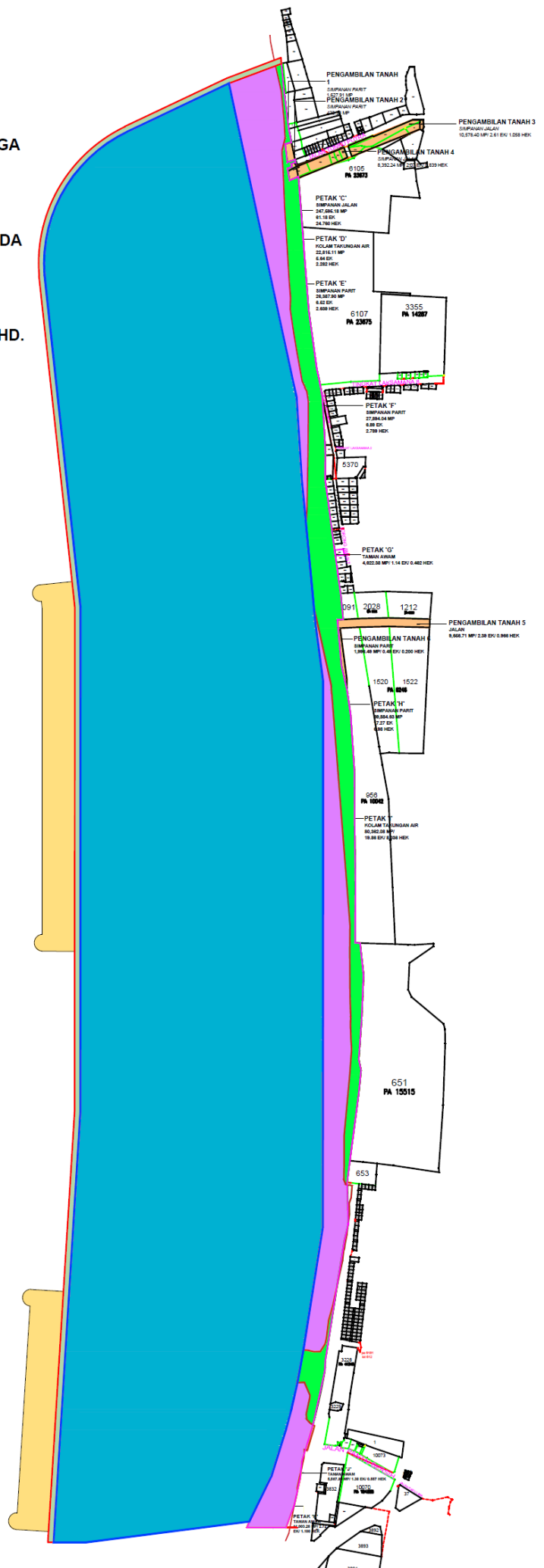
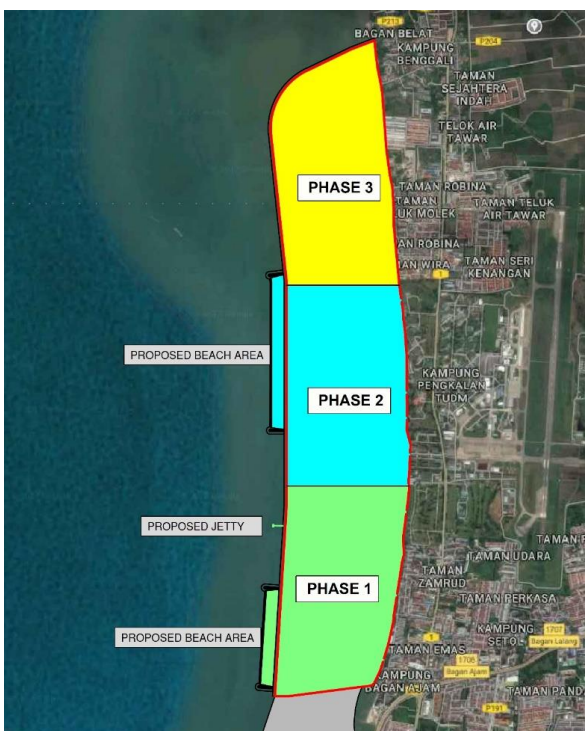
- (A) TEBUSGUNA 11.453 HEKTAR PROMENADE
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 - (C) TEBUSGUNA 35.005 HEKTAR TANAH SEDIA ADA KEPADA KEMUDAHAN MASYARAKAT & UTILITI
 - (D) MENAIKTARAF 21.080 HEKTAR TANAH SEDIA ADA KEPADA KEMUDAHAN MASYARAKAT & UTILITI UNTUK:
- TETUAN RAYSTON CONSORTIUM (BUTTERWORTH) SDN. BHD.

Component breakdown of the proposed reclamation areas:

-  • 407.000 Hectare of Development Area
-  • 11.453 Hectare of Promenade
-  • 25.091 Hectare of Proposed Sandy Beach
-  • 35.005 Hectare of Land for Utility and Infrastructure
-  • 21.080 Hectare of Land to be Upgraded to Public Utility and Infrastructure

Reclamation work will be carried out in 3 phases.

Expected to take about 6 years to complete.

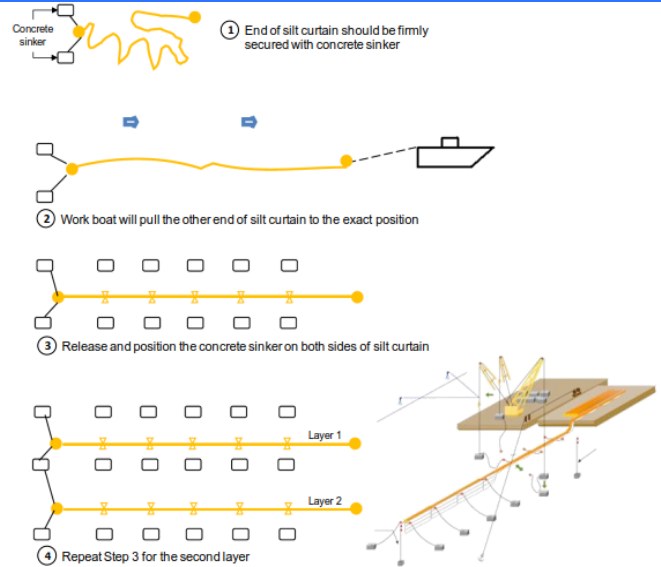
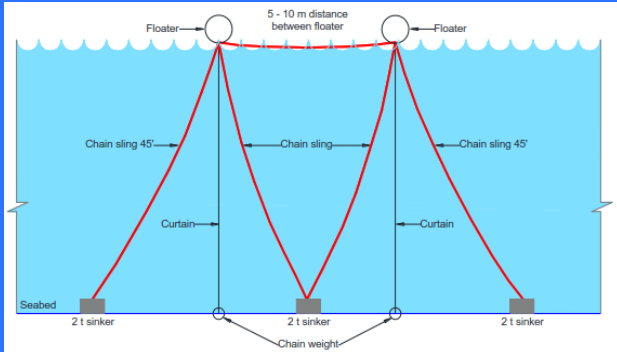


Pre Reclamation Stage

Installation of Environmental control

Installation of:

- Sand bund
- Double layer silt curtains
- Temporary drainage



Relocation of Existing Jetty



- Remove *Jeti Nelayan Bagan Ajam* which is located within the proposed Project site.
- The jetty was built within RCSB's concession area by the Department of Irrigation and Drainage with an agreement to remove the jetty when reclamation works is to start.
- Proposal for fishermen to use Pantai Bersih beach as temporary fish landing area.
- A new jetty is planned on reclaimed land within Phase 1 area.

Reclamation Stage

Fill Material

- Filling material is marine sand
- Potential marine sand sources - off the coast of north Perak, approximately 75km southwest from site
- Estimate of total sand required is 41.0 million m³
- Potential rock source: Juru Development Quarry
- Rock shall be transported by barges from Batu Kawan (PDC) Jetty
- Estimate of total rock required is 660,000 m³

Methodology

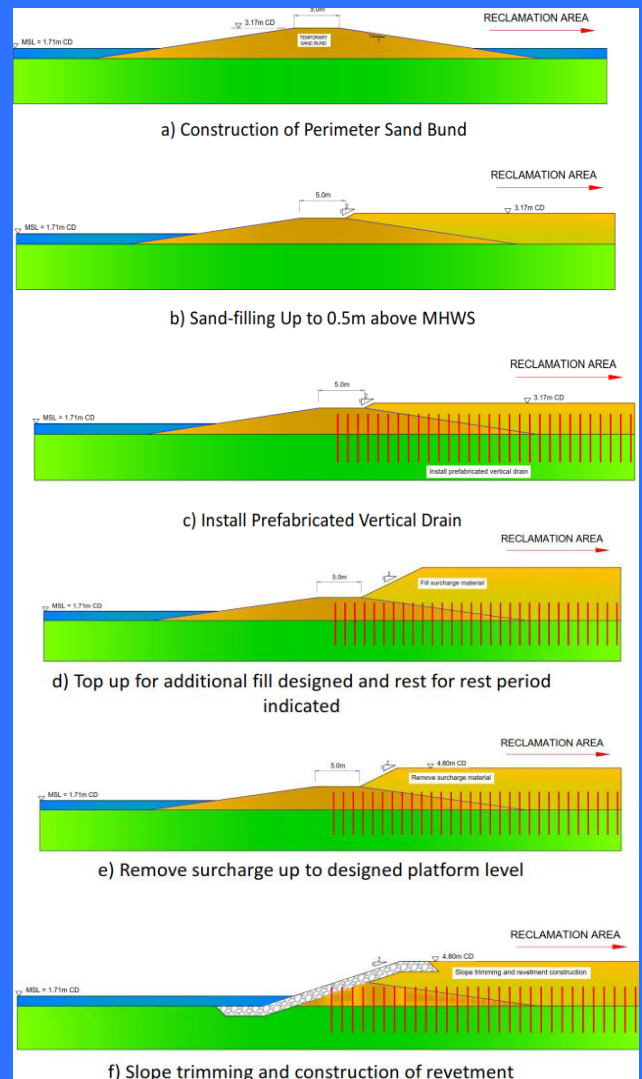
- Dredger to be used:
 - three Trailer Suction Hopper Dredgers (TSHD) with hopper capacity of 12,000 m³; or
 - one TSHD with hopper capacity of 35,000 m³
- Hydraulic filling - moving pipe nozzles gradually from Phase 1 to Phase 3



- 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

Permanent Shoreline Protection

- Rock Revetment
- Groyne
- Designed slope with armour rock
- Retaining vertical wall along the seafront



Permanent Monsoon Drain

- Suitable temporary drains convert into permanent drainage system after completion of each phase

Existing Environment

BATHYMETRY

Project site is on intertidal zone with deepest point of about 2m. Seabed sediments are of gravel, sandy, silty clay with shell fragments. No pipeline, cable or coral mass were observed

HYDROLOGY

Sg. Abdul (estuary about 800m north), Sg Penaga (estuary about 3.3km north), Sg Tembus (estuary about 5km north), Sg Muda (estuary about 11km north) and Sungai Prai (estuary about 6.5km south).

18 drainage outlets were identified along the coastline of Project site.

METEOROLOGY & CLIMATE

High annual rainfall with relatively uniform high humidity and temperature

SOCIO-ECONOMIC

Surveys conducted among fishermen and residents. More residents are agreeable to the Project than fishermen.

Main reason for support: progress and development, benefits for future generation, job opportunities, wider coastal area be protected from erosion.

AQUATIC ECOLOGY

Macroenthos density was 2,637 ind/m², consist of four (4) phyla and 45 species belonging to 33 families.

Phytoplankton diversity was fairly low with an index value of ranging from 1.76 – 3.10 indicating moderately polluted water.

30 species of Zooplankton from 18 different families from 7 main groups with total density of 26,037 ind/m³

Fish and crustacean diversity is much larger at Control Point (CP) which is less disturbed as compared to the Project site. CP is surrounded by mangrove patches which are nursing ground for fish larvae and a place rich with nutrient.

FOCUS GROUP DISCUSSION

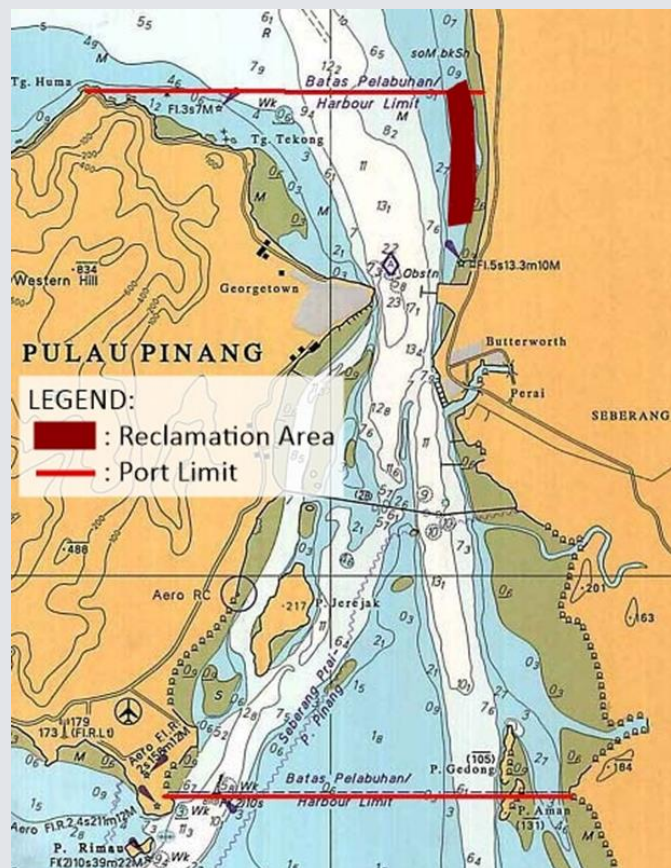
Dialogue session with Penang Fishermen conducted on 20 December 2018. Fishermen feedback were taken into consideration during Project planning.

Engagements with NBCT, TUDM, Marine Department, LKIM, Fishery Department, MBSP, PLANMalaysia@Pulau Pinang, JPS..

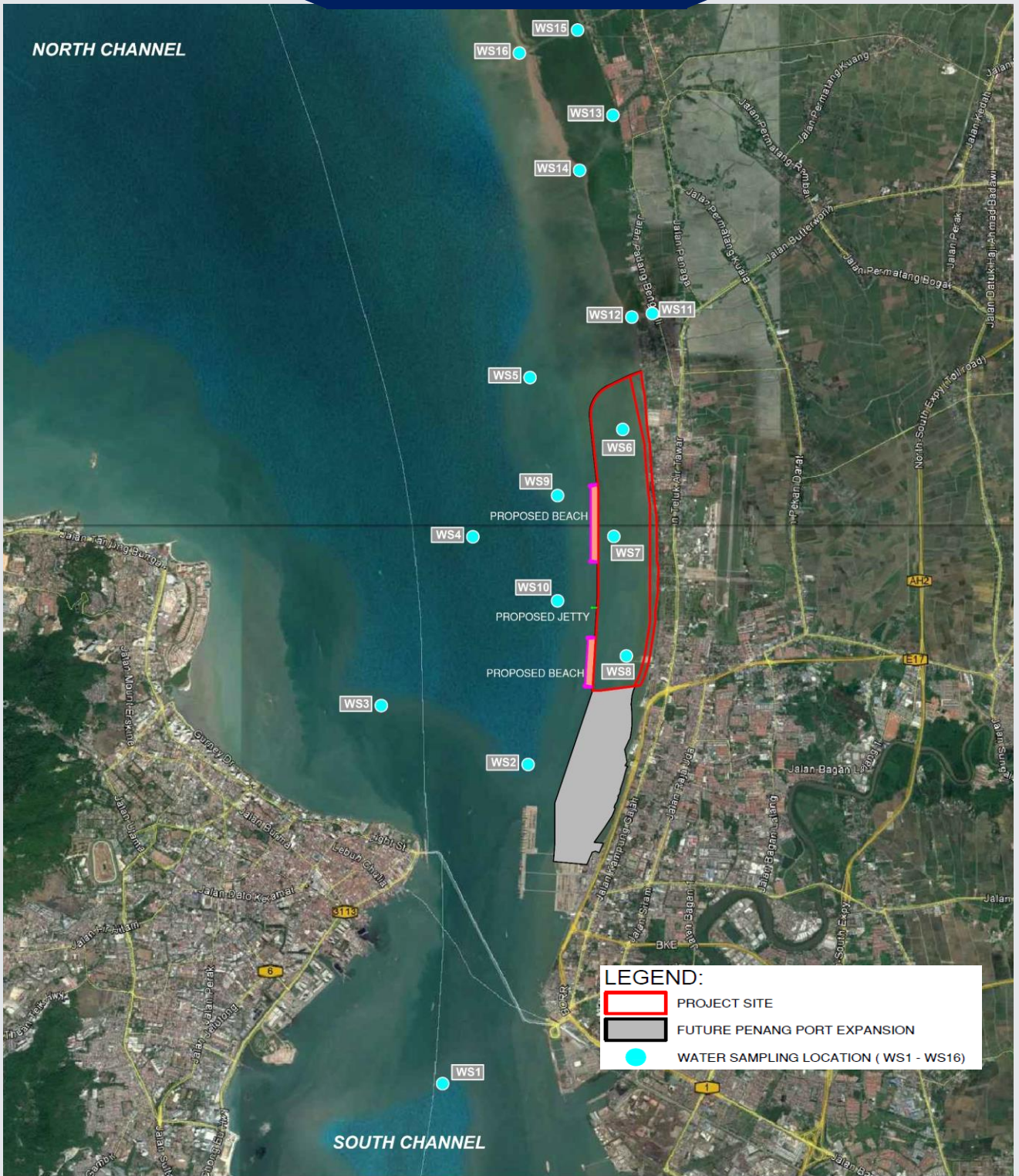
Jawatankuasa Perancang Negeri through a meeting on 30 September 2019 and endorsed on 24 October 2019, has approved the proposed Project's Masterplan for Mixed Development land use zoning.



River system around site



Environmental Baseline



WS1 to WS10 are marine water within the Penang port limit - compared to Class 3 (Industry, Commercial Activities & Coastal Settlements) of the Malaysia Marine Water Quality Standard and Index. MWQI: Range 0 to 91

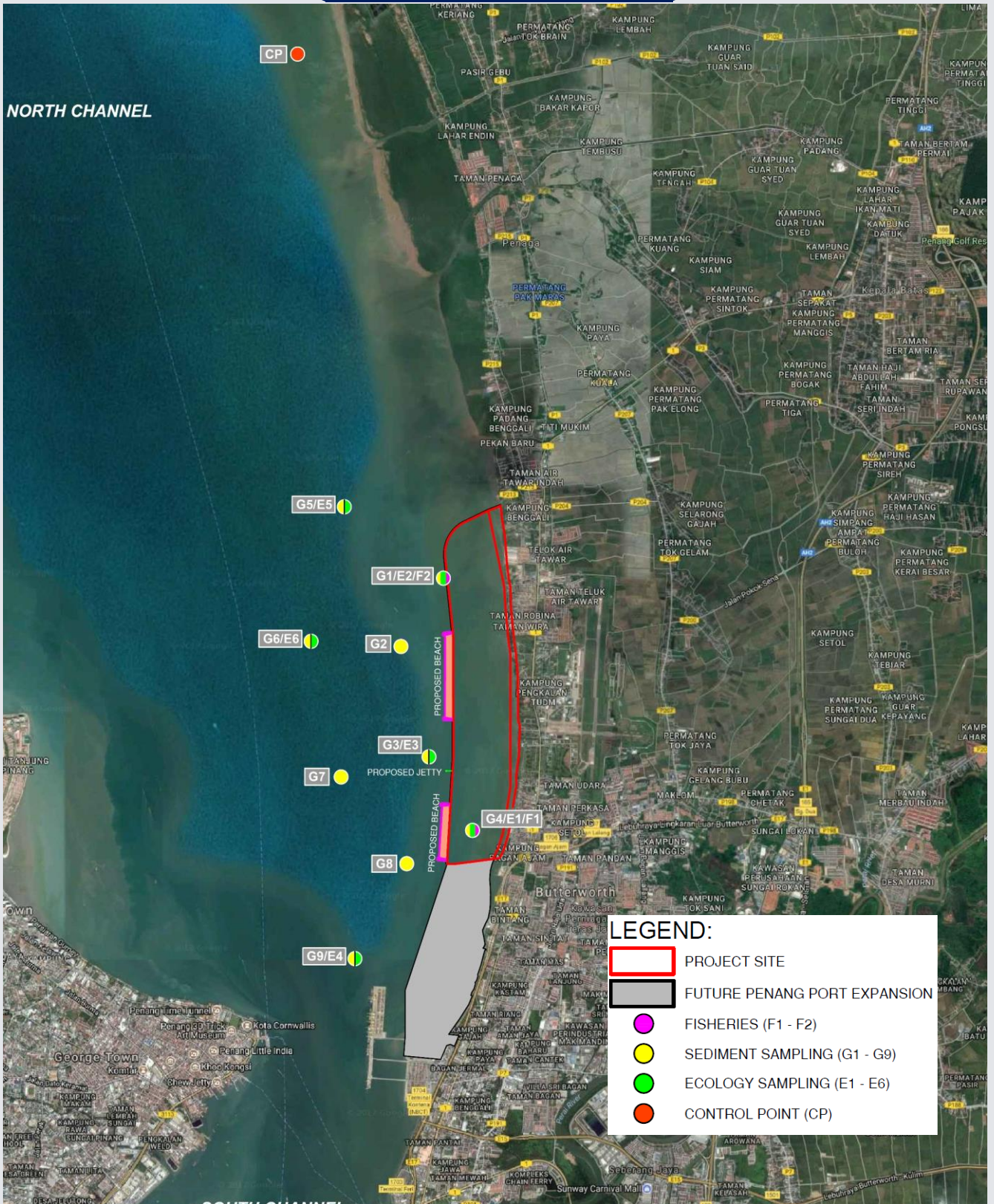
WS1 observed to have the lowest index score, reaching 0 and a few more occasions with index lower than 10.

W11 – W16 compared to Class E1 (Estuary – Coastal Plain) of the Malaysia Marine Water Quality Standard and Index.

MWQI at the estuary (WS12, WS14 and WS16) - 0 and 91; WQI at the upstream (WS11, WS13 and WS15) - 0 to 39

The main caused of contamination, from the laboratory results, is the concentration of faecal coliform, nitrate and phosphate

Environmental Baseline



Marine sediment is relatively clean.
 Heavy metals are relatively low with exception of aluminium.
 Correlates with marine water quality where elevated aluminium were reported.

Environmental Baseline



Ambient air quality at all stations complied with MAAQS. Elevated NO_2 level at A6, near to an existing Chinese Temple, during morning measurement.

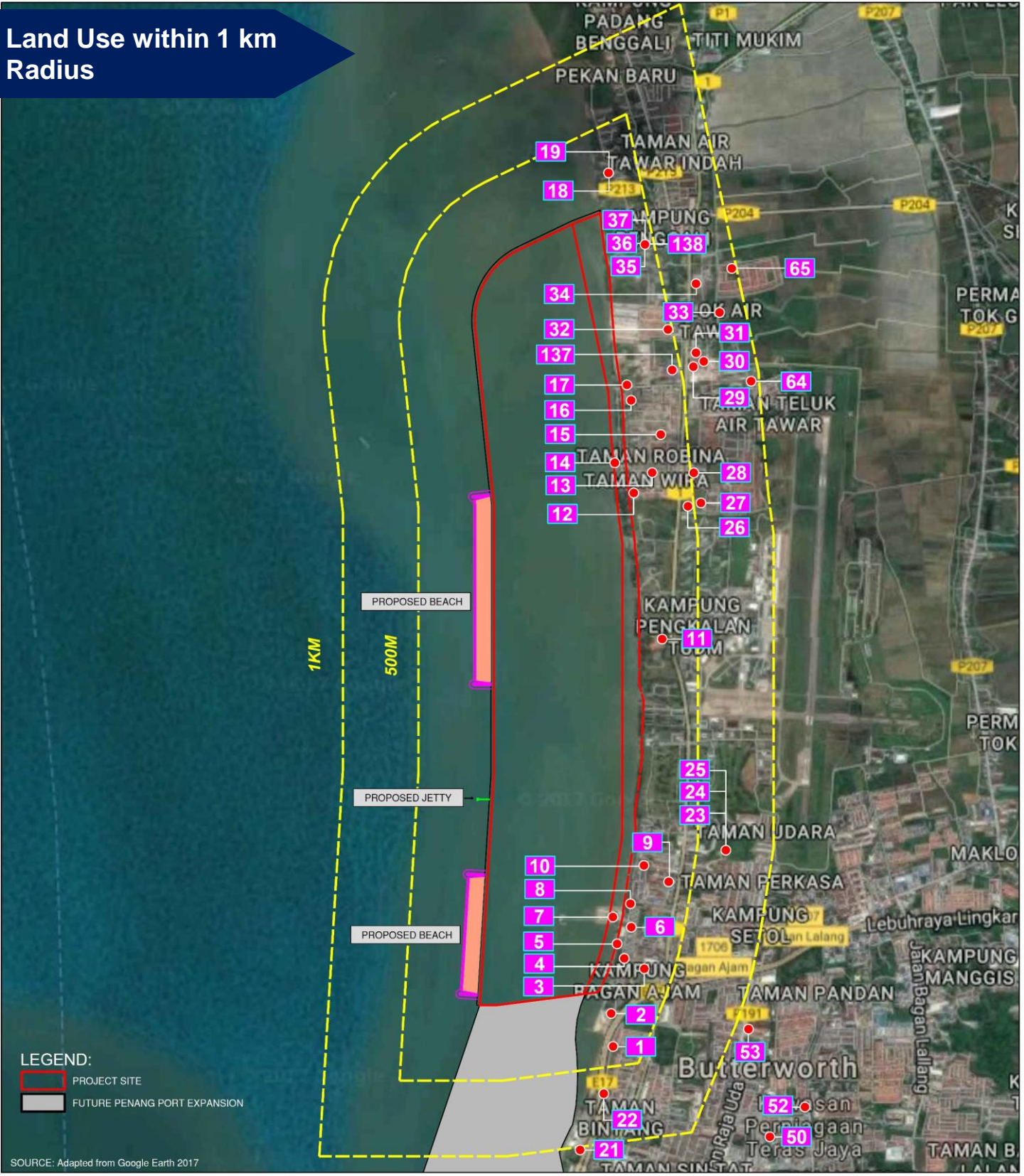


Baseline in 2017, measured noise levels at all stations complied with guideline limits for both daytime and night time.

During second baseline in 2019, noise levels at N1, N3 and N5 were above 65 dB(A) during daytime while N1 and N5 exceeded the limit of 60 dB(A) during night time .

Indicates noise levels have gradually increased over the 2 years gap.

Land Use within 1 km Radius



SOURCE: Adapted from Google Earth 2017

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> 1) TAMAN PANTAI INTAN 2) SEAFOOD RESTAURANT 3) BOMBA PEKAN AJAM 4) TAMAN TUN DR AWANG 5) SURAU TAMAN TUN DR AWANG BAGAN AJAM 6) DEWAN PANORAMA 7) JETI NELAYAN PEKAN AJAM 8) KG. CONTOH 9) SK DATO ONN 10) PERSATUAN NELAYAN KAWASAN SEBERANG PERAI 11) WISMA PERWIRA TUDM BUTTERWORTH 12) PUSAT PEMULIHAN DALAM KOMUNITI AROMA KASIH 13) TAMAN WIRA 14) TAMAN ROBINA 16) CADANGAN MEMBINA 1 BLOK P2 RUMAH PANGSA KOS RENDAH 17) QUAYSIDE CLEAR WATER BAY BUTTERWORTH 18) PARLIMEN TASIK GELUGOR 19) MASJID JAMEK BAGAN SELAT | <ul style="list-style-type: none"> 20) PLAZA TOL 21) KAWASAN REHAT BAGAN AJAM 22) ARULMIGU DEWI SREE VEERAPATHRA MAHA 23) PUSAT PENGISYTIHARAN IKAN LKIM BAGAN AJAM 24) SMK ST MARK 25) MASJID JAMEK KARIAH BAGAN LEBAI TAHIR 26) BIRD RECREATION PARK 27) SK TAMAN SENANGAN 28) KOLEJ VOKASIONAL BUTTERWORTH 29) MASJID DAERAH SEBERANG PERAI UTARA 30) PROJEK PANGSAPURI KOS RENDAH 1MALAYSIA 31) SJK AIK KEOW TELOK AIR TAWAR 32) BAYU AMAN 33) BAGAN BELAT 34) SK TELOK AIR TAWAR 35) RUMAH KELUARGA TUDM SERAI BAYA 36) BAGAN TAMBA 37) SURAU BAGAN TAMBA | <ul style="list-style-type: none"> 50) TAMAN PERINDUSTRIAN RINGAN TERAS JAYA 52) BALAI POLIS KOMUNITI MAK MANDIN 53) TOW BOO FONG TEMPLE BUTTERWORTH 64) TAMAN SERI TAWAR 65) TAMAN SEJAHTERA INDAH 137) SMK TELOK AIR TAWAR 138) PUSAT PERKHIDMATAN KOMUNITI RELA MK7 |
|--|--|---|

Land Use within 3 km Radius



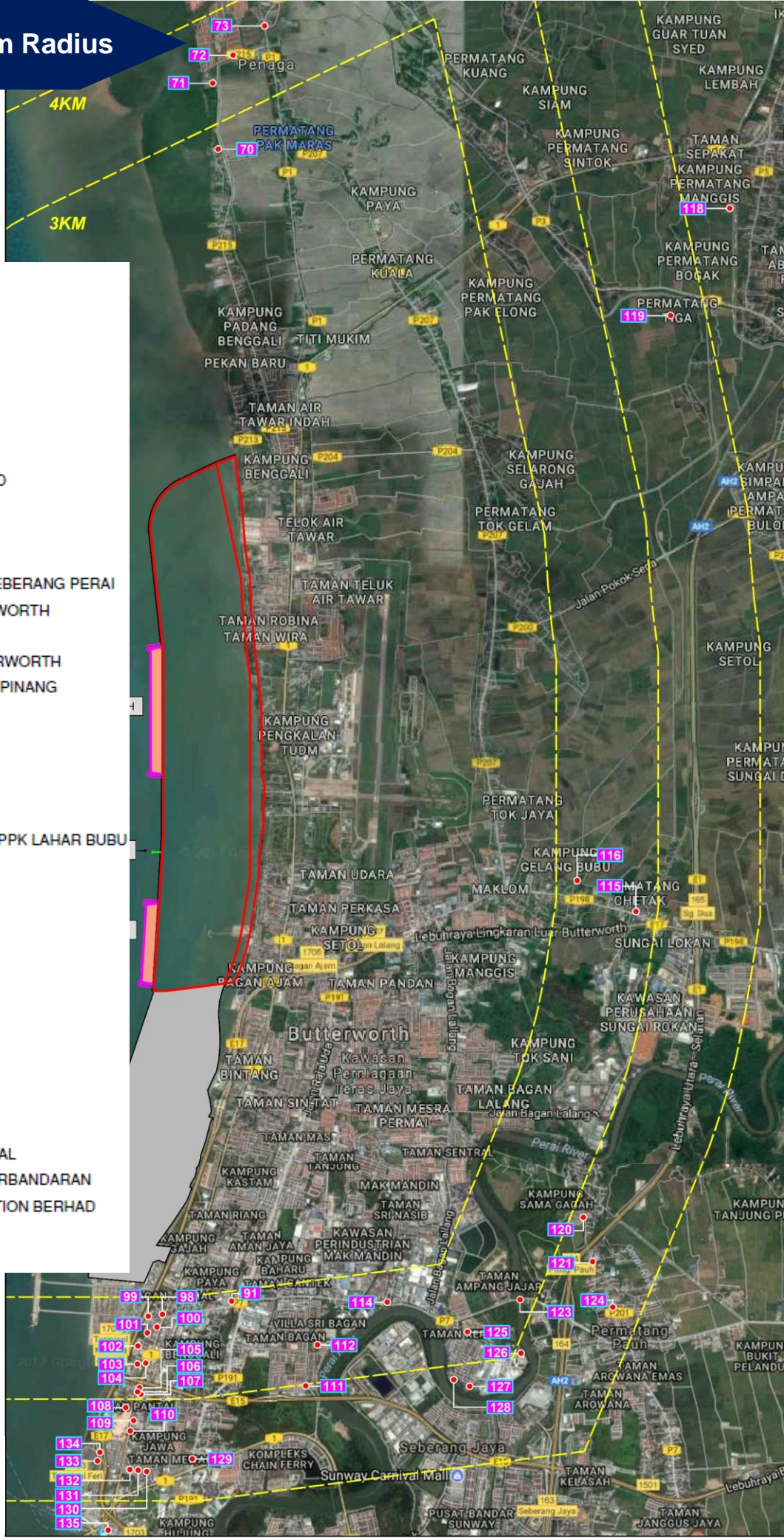
- 20) PLAZA TOL
- 38) TIME STESEN Pendaratan Kabel
- 29) SURAU TUAN HJ. MOHD TAHA PEKAN BARU
- 40) SK SERI GEMILANG
- 41) MASJID JAMEK PADANG BENGALI
- 42) SMK GEMILANG
- 43) SK PADANG BENGALI
- 44) KUBUR BAGAN JERMAL
- 45) MAHKAMAH BUTTERWORTH
- 46) PERUMAHAN AWAM KERAJAAN PULAU PINANG
- 47) RUMAH PANGSA JALAN MOHD SAAD
- 48) PEJABAT JKKK
- 49) SJK (C) CHUNG HWA 1
- 51) AWANA SOFA SDN. BHD
- 54) TAMAN CENGAL
- 55) BUTTERWORTH LAY BUDDHISTS SOCIETY
- 56) TAMAN SEGEMAL INDAH
- 57) WAT PHOTICHAREANTAM TEMPLE
- 58) ARULMIGU SRI MUTHU MARIAMMAN KOVIL
- 59) TAMAN SELAYANG JAYA
- 60) TAMAN SELAYANG PERMAI
- 61) SK SG. PUYU
- 62) TAMAN DESA OREN
- 63) TAMAN SELAYANG INDAH
- 66) DEWAN HARMONI TAMAN KG. TITI MUKIM
- 67) PANGSAPURI TITI MUKIM
- 68) PERPUSTAKAAN DESA
- 69) MAJLIS SUKAN NEGERI PULAU PINANG
- 74) PERMATANG TOK GELAM
- 75) KLINIK DESA PEKAN DARAT
- 76) SK PERMATANG TOK JAYA
- 77) MASJID JAMEK PEKAN DARAT
- 78) SMK PERMATANG TOK JAYA
- 79) UNITED WOODWORK & CONSTRUCTION (M) SDN. BHD
- 80) PERMATANG TOK JAYA
- 81) FOCAL PARK
- 82) TAMAN SERI PINANG
- 83) SY MOTORSPORT
- 84) PUSAT PERNIAGAAN MAKLOM
- 85) TNB PENCAWANG
- 86) TAMAN KEMPAS
- 87) TAMAN PUYU
- 88) SMJK (C) CHUNG LING
- 89) TAMAN MESRA PERMAI
- 90) JKKK KAMPUNG BAHRU MK 14
- 92) KG. PAYA
- 93) WISMA PELADANG
- 94) WISMA PANTAI
- 95) BAHAGIAN KAWALAN PENERBITAN DAN TEKS AL QURAN
- 96) NAUTICAL BAY
- 97) PERDA
- 113) TAWAKAR ENTERPRISE SDN. BHD
- 117) PERMATANG TOK BIDAN
- 122) TAMAN BANDAR AMPANG JAJAR

LEGEND:

- PROJECT SITE
- FUTURE PENANG PORT EXPANSION

Land Use within 5 km Radius

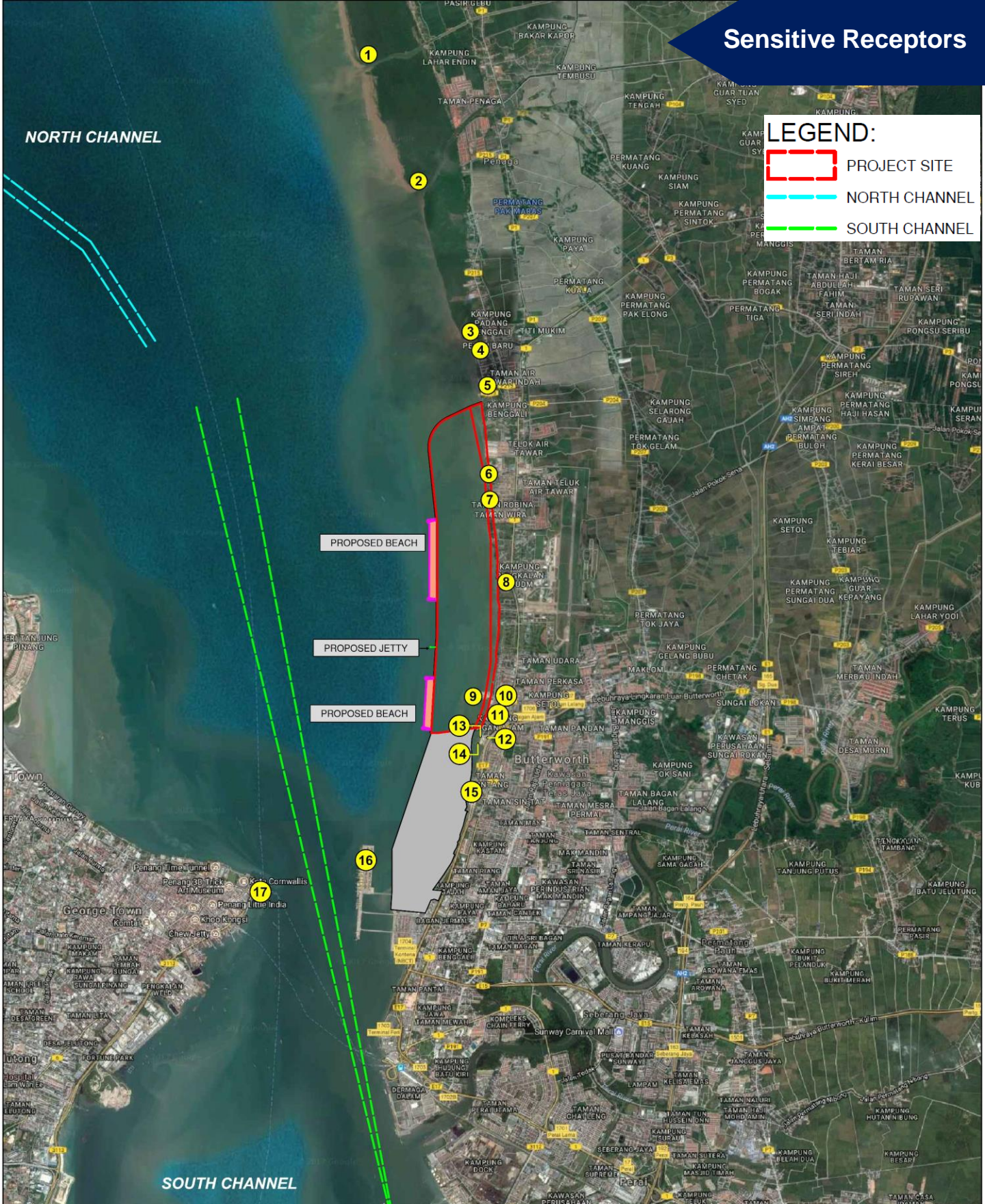
- 70) JUTA TEGAS SDN. BHD
- 71) TAMAN BERKAH INDAH
- 72) TAMAN PENAGA PERMAI
- 73) JALAN BESAR PENAGA
- 91) SJK (C) CHUNG HWA 1
- 98) JALAN JETI LAMA
- 100) SRI SITHI VINAYAGAR TEMPLE
- 101) PUBLIC MARKET BAGAN LUAR
- 113) TAWAKAR ENTERPRISE SDN. BHD
- 102) ABANDONED BUILDING
- 104) DATARAN PEMUDA MERDEKA
- 105) POS OFFICE
- 106) PEJABAT PERGIGIAN DAERAH SEBERANG PERAI
- 107) KOMPLEKS KESIHATAN BUTTERWORTH
- 108) PEJABAT PENGHULU
- 109) BALAI POLIS CAWANGAN BUTTERWORTH
- 110) JOBS MALAYSIA CENTER PULAU PINANG
- 111) SJK (C) CHUNG HWA 2
- 112) BAGAN SPECIALIST
- 114) KASTAM BUTTERWORTH
- 115) SG. LOKAN
- 116) JAMBATAN SG. ALOR MERAH
- 118) PUSAT PENGELUAR BENIH PADI PPK LAHAR BUBU
- 119) PERMATANG TIGA
- 120) SMK SAMA GAGAH
- 121) KG. SAMAGAGIH
- 123) SG. PERAI BRIDGE / GATE
- 124) TAMAN CERMAI
- 125) TAMAN KERAPU
- 126) MAK MAUDIN PUMP HOUSE A
- 127) TOKONG KERAPU
- 128) MAK MAUDIN PUMP HOUSE C
- 129) SK SG. NYIOR
- 130) TAMAN JAWA
- 131) MAHKAMAH MAJISTRET MUNISIPAL
- 132) PEJABAT CAWANGAN MAJLIS PERBANDARAN
- 133) MALAYSIA SMELTING CORPORATION BERHAD
- 134) TNB STATION
- 135) KTM BUTTERWORTH



LEGEND:

- PROJECT SITE
- FUTURE PENANG PORT EXPANSION

Sensitive Receptors



LEGEND:

- PROJECT SITE
- NORTH CHANNEL
- SOUTH CHANNEL

- | | | |
|--------------------------------------|----------------------------|------------------------------------|
| 1) MANGROVE SG. TEMBUS | 7) TAMAN ROBINA | 13) DISCHARGE OUTLETS |
| 2) MANGROVE SG. PENAGA | 8) KAMPUNG TUDM | 14) JPS STRUCTURE |
| 3) MANGROVE PATCHES | 9) JETI NELAYAN BAGAN AJAM | 15) RnR BAGAN AJAM |
| 4) FISHERMEN JETTY SG. ABDUL | 10) SG BAGAN AJAM | 16) TERMINAL CONTAINER PENANG PORT |
| 5) MASJID JAMEK BAGAN SELAT | 11) THEN HOCK KEONG TEMPLE | 17) PENANG JETTY |
| 6) DISCHARGE OUTLETS BESIDE QUAYSIDE | 12) SEAFOOD RESTAURANT | |

Impact Assessment and Mitigating Measures



MARINE WATER QUALITY

Impact

- Potential sediment plume during reclamation are insignificant. Pattern of sediment plume does not change significantly across three monsoons.
- Generally the plume dispersion is minimal. It will not cause significant plume dispersion to all surrounding ESRs.
- Among three discharge points, the highest spill concentration is occurred at Phase 1 during NE Monsoon.
- Project will not contribute to sedimentation at Sg Abdul estuary.

- Provision of BMPs (containment bund, double layered silt curtains, weir box, sediment basins)
- Prohibit discharge of untreated sewage into the sea
- 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
- 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

Impact Assessment and Mitigating 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



NOISE

Impact

- Noise generated through earth moving equipment will attenuate and reaches a noise level of 65 dB(A) (a day time noise requirement for urban residential) at a distance of about 125 m (worst case).
- Nearest receptors about 200m
- Impact from noise is deemed to be insignificant

- 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

Impact Assessment and Mitigating Measures



SOCIAL

Impact

Social concerns identified are:

- Potential loss of mudflat due to the reclamation
- Socio economic effect to the income for directly affected stakeholders in particular to fishermen.
- Change in production from affected small and medium enterprise (SME) particularly restaurant owners, hawkers and locals.
- 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



- Temperature, pH, Salinity, Dissolved Oxygen, Total Suspended Solid, Oil and Grease, Mercury, Cadmium, Phenol, Copper, Nitrate, Nitrite, Arsenic, Ammonia (unionized), Lead, Chromium VI, Zinc, Cyanide, Phosphate, Tributyltin, Polycyclic Aromatic Hydrocarbon, Faecal Coliform
- Monthly
- Turbidity, TSS (Weekly during reclamation)
- Class III of Malaysia Marine Water Quality Criteria and Standard (WS1 – WS5)
- Class E1 of Malaysia Marine Water Quality Criteria and Standard (WS6 and WS7)



- Daily inspections on BMPs
- Monthly – Discharge water on Total Suspended Solids and turbidity




Proposed Environmental Monitoring Programme

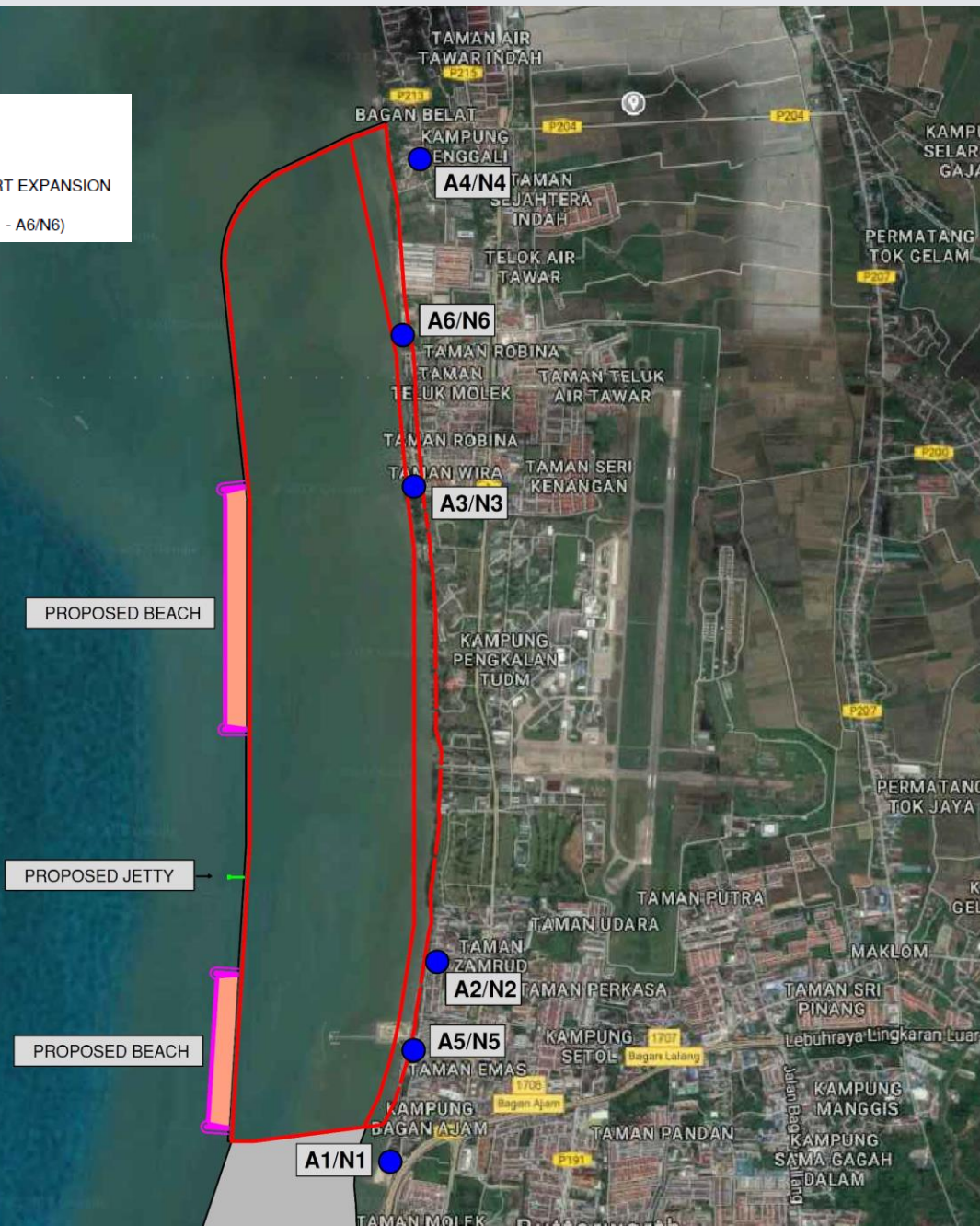


- Marine Ecology: Zooplankton, Phytoplankton and Macro benthos
- Quarterly:

Proposed Environmental Monitoring Programme

LEGEND:

-  PROJECT SITE
-  FUTURE PENANG PORT EXPANSION
-  AIR AND NOISE (A1/N1 - A6/N6)

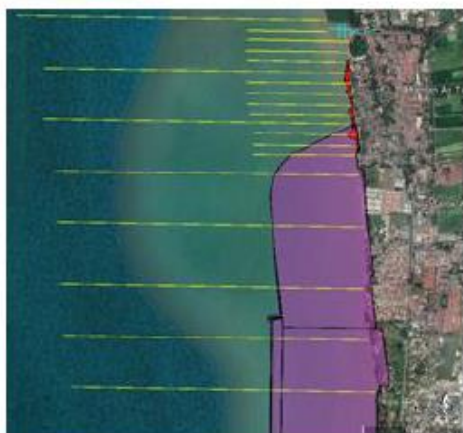
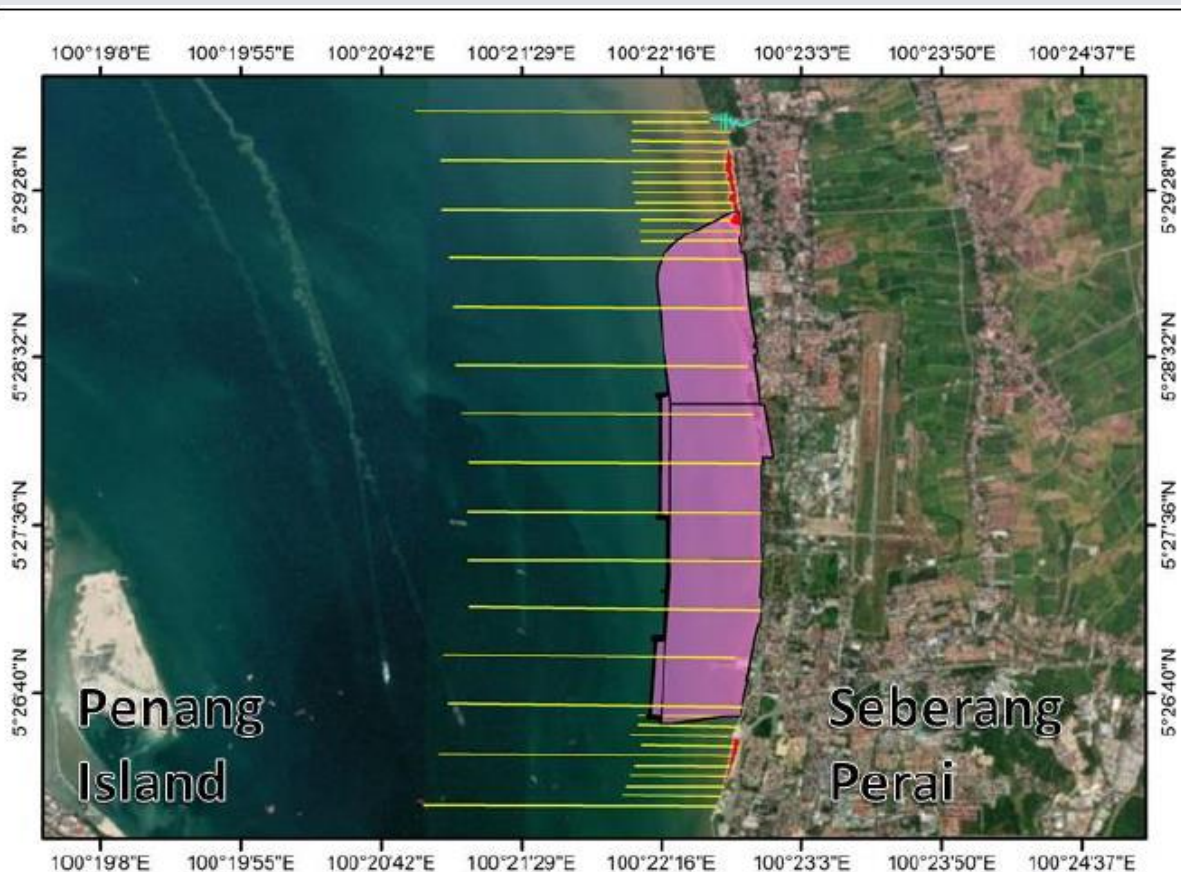


- Ambient air for PM₁₀
- Quarterly
- MAAQS 2020



- Noise level for L_{eq} , L_{max} , L_{min} , L_{90} , L_{10}
- Quarterly
- Compliance limit based on Land Use

Proposed Shoreline Monitoring Programme

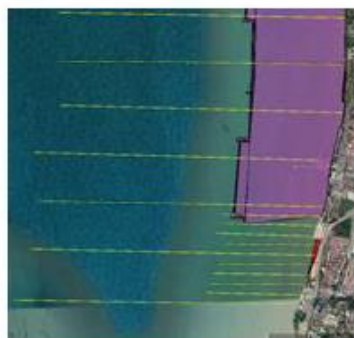


Area 1: Proposed Site - Upper Part

Landward limit: 10m

Seaward limit: 3km

Specification: 3km (8 lines @ 500m interval), 1km (11 lines @ 100m interval) at the erosion category 1 area – South of Sg. Abdul



Area 2: Proposed Site - Lower Part

Landward limit: 10m

Seaward limit: 3km

Specification: 3km (7 lines @ 500m interval), 1km (8 lines @ 100m interval) at the erosion category 1 area – West of Taman Molek)



Area 3: Sg. Abdul

River Cross Section Survey

Landward limit: 10m

Survey length: 500m

Extent: from river mouth until the barrage

Specification: 50m interval

- Every 3 months during reclamation
- Every 6 months post reclamation for 3 years.