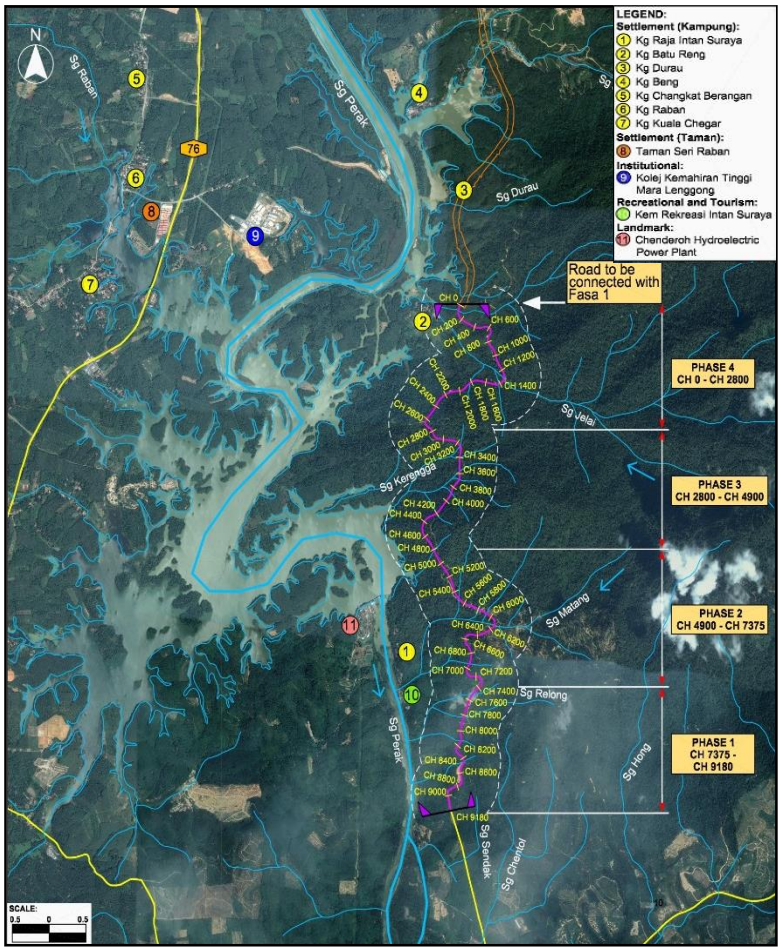
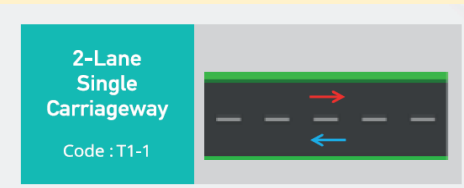
SECOND SCHEDULE ENVIRONMENTAL IMPACT ASSESSMENT FOR *MEMBINA DAN MENYIAPKAN JALAN DARI KG. BENG KE KG. RAJA INTAN SURAYA, HULU PERAK (FASA 2 – DARI KG. BATU RENG KE KG RAJA INTAN SURAYA) UNTUK TETUAN JABATAN KERJA RAYA PERAK*

Executive Summary



Project Brief

- The Project is for the construction of a new 2-lane single carriageway road complying with JKR R2 standard.



- The total length of the Project alignment is **~9.18 km (CH0 – CH9180)**, with a right-of-way (ROW) of ~50 – 100 m stretching from Kg Batu Reng to Kg Raja Intan Suraya.
- The Project is a continuation of the **Fasa 1: Kg Beng – Kg Batu Reng** with a total length of 4.15 km which is currently under construction.
- **Current Landuse:** Forest area, agricultural land; the Project alignment will traverse through the Hutan Simpan Kekal Piah.

Scope of Works:

(i) Design and construction of a new road complying with JKR R2 standard.
(ii) Design and construction of new bridge, box culverts and underpass for wildlife crossing.
(iii) Design and construction of pavement works, drainage system, road furniture and traffic control.
(iv) Carry out analysis and reports of Site Investigation Works.
(v) Design and construction of Foundation Works and Geotechnical Works.
(vi) Conforming to all necessary independent auditing and checking.

The Project alignment is **aligned** with the gazetted:

(i) RTD Hulu Perak 2030 (No. Warta: 2106) and
(ii) RTD Kuala Kangsar 2020 (No. Warta: 2294).
Future Landuse Zoning: **Transportation**

Project Proponent:	Main Contractor:	Environmental Consultant:
JABATAN KERJA RAYA (JKR) PERAK	GTS CONTRACTOR SDN BHD	ES ECO SMART SDN BHD

Construction Phases and Implementation Schedule

Construction Phase	Chainage	Length (km)	Expected Timeline
Phase 1	CH 7375 – CH 9180	2.77	2023
Phase 2	CH 4900 – CH 7375	2.01	2023 – 2024
Phase 3	CH 2800 – CH 4900	2.60	2023 – 2024
Phase 4	CH 0 – CH 2800	1.80	2024 - 2026

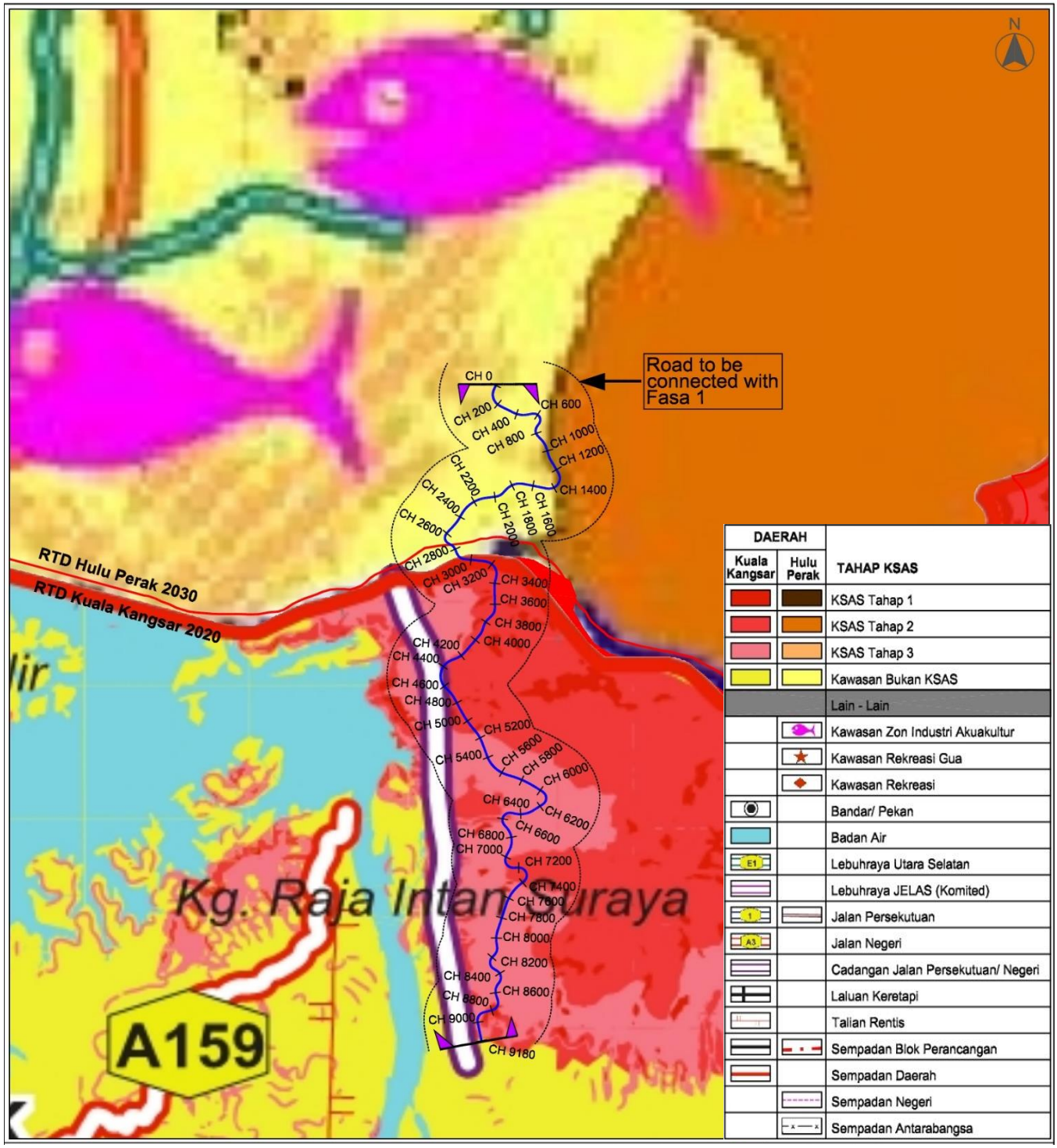
Proposed Main Features of the Project

Proposed Features	Description
Mainline	• ~9.18 km (from CH 0.000 to CH 9180). • Two (2) lane single carriageway complying with JKR R2 Standard. • Climbing lane provided for road gradient exceeding 5.00% inclination.
Main Access Provisions	• Road connected from Kg Raja Intan Suraya in the south and to be jointed to *Fasa 1* road (Kg Beng – Kg Batu Reng) which will eventually connect to Kg Beng in the north.
Box Culvert/ Bridges/ Underpass for Wildlife Crossing	• There are a total of six (6) box culverts and one (1) bridge accounted within the road development. • One underpass will be constructed for wildlife crossing. • One roundabout.

Statutory Requirements

Schedule	Prescribed Activity	Details
First Schedule	Activity 5: Forestry 5(a): Conversion of forest at 300 meters or more above mean sea level to other land use covering an area of 20 hectares or more but less than 100 hectares.	The Project alignment and Right of Way (ROW) has a total area of ~64.5 ha and highest elevation at 364 m MSL.
	Activity 20 (c): Construction of road, tunnel or bridge traversing or adjacent or near to environmentally sensitive areas.	Construction of the ~9.18 km new road alignment which connects Kg Batu Reng to Kg Raja Intan Surata traversing Hutan Simpan Kekal (HSK) Piah.
Second Schedule	Activity 5: Forestry 5(b): Logging or conversion of forest to other land use within: (i) A catchment area of reservoirs used for municipal water, irrigation or hydro-power.	The Project is located within the catchment area of reservoir for Stesen Janaelektrik Chenderoh which is used for hydropower generation.
	Activity 13 (b): Construction of road, tunnel or bridge traversing an area with slope greater than or equal to 35º.	A total of 10.27% of the Project alignment and its Right of Way (ROW) comprise slopes ≥ 35º.

Environmental Sensitive Area



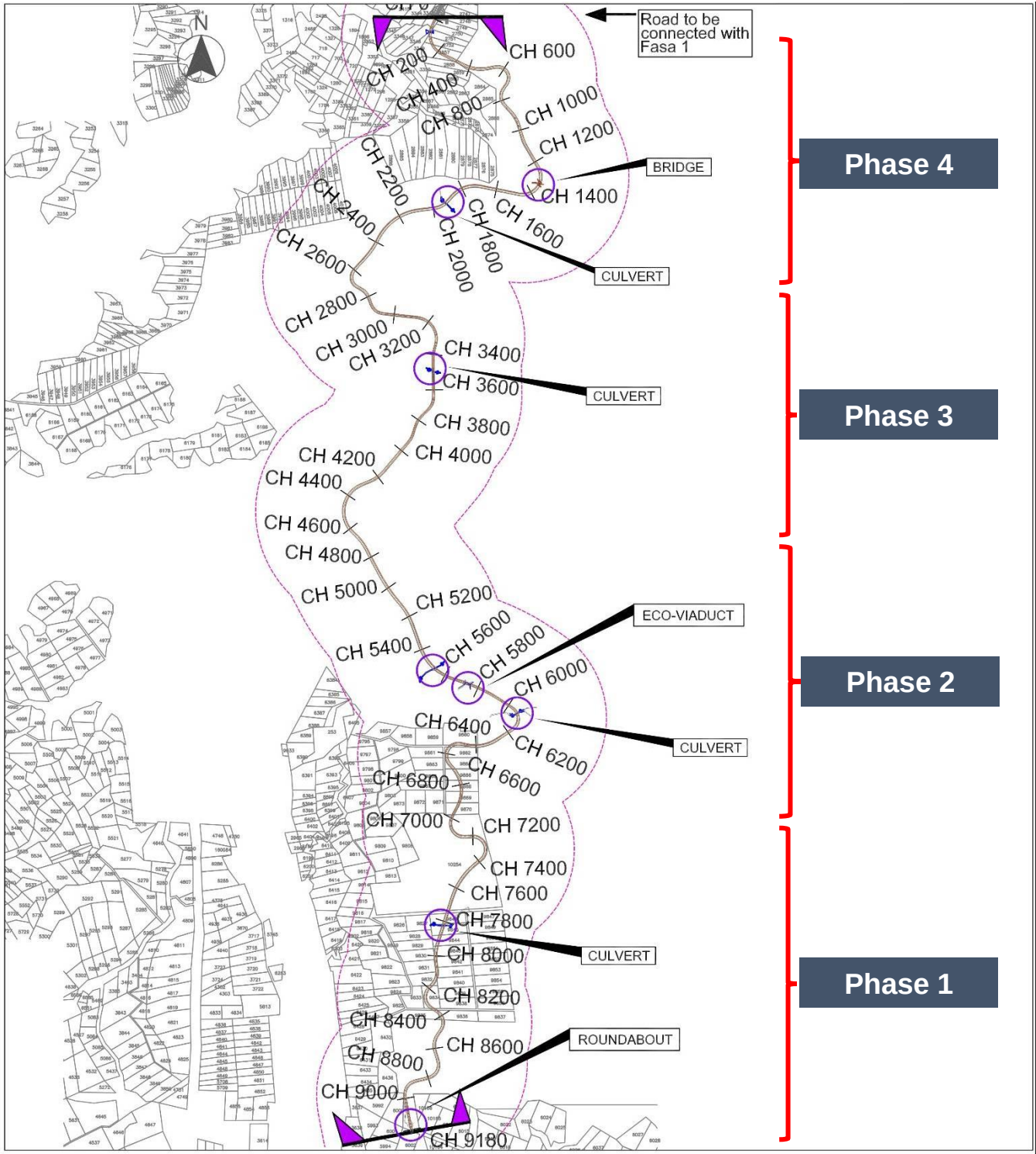
Sensitive Receptors

Within 1-km Corridor of Impact (COI)

Nearest settlements : Kg Raja Intan Suraya, Kg Batu Reng

Environmental Sensitive Areas: HSK Piah, Chenderoh Lake

Schematic Project Layout Plan



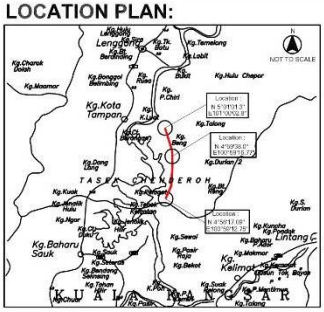
LEGEND:

- Proposed Road Alignment
- 1-km Corridor of Impact (COI)

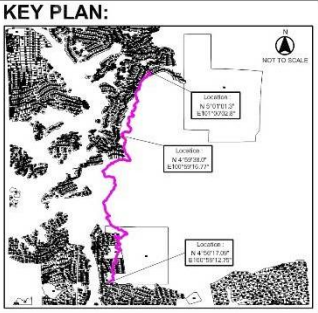
DATA SOURCE:

(1) Road Layout Plan, Perunding KHR, October 2022.

LOCATION PLAN:



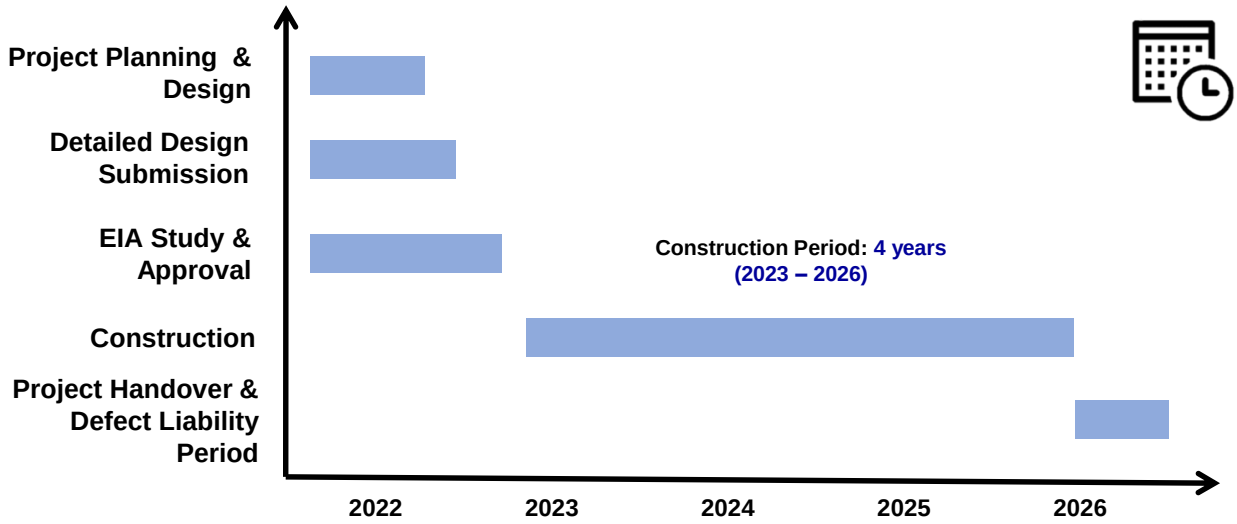
KEY PLAN:



Project Activities

Pre-Construction	Construction	Operations
1. Project planning 2. Preliminary surveys 3. Conceptual design 4. Detailed design 5. Data gathering for EIA 6. Land acquisition	1. Site preparation & workforce deployment 2. Land clearing and earthwork 3. Alignment construction 4. Final finishing	1. Operation and maintenance of the road.

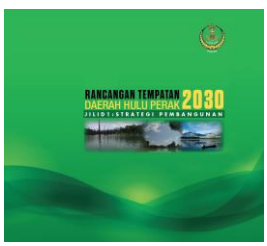
Proposed Project Implementation Schedule



Statement of Need

Support National and State Policies and Development Plans

RFN-4, RSN Perak 2040, RTD Kuala Kangsar 2020, RTD Hulu Perak 2030



Spur Economic Growth and Tourism Activities

Catalyse local growth, create job and employment for local communities.

Improved Road Connectivity to the Region

Improve connectivity and access as well as greatly reduce the travelling hassle.

Improve Road Users' Driving Experience

Safer journey and faster arrival time. Increase movement of people and goods to/fro regions and states.

EXISTING ENVIRONMENT, IMPACT ASSESSMENT & MITIGATION MEASURES

LANDUSE

Existing Environment

- Falls under **BP10 – Durian Pipit [BPK 10.3 Kg. Beng – Hutan Simpan Piah (Selatan)]**, *RTD Hulu Perak 2030* (MDL, 2017) and **BP5 – Chegar Galah dan Pulau Kamiri (BPK 5.1 Sauk**), *RTD Kuala Kangsar 2020* (MPKK, 2012).
- **Landuse within and Adjacent to the 1-km COI:**

(i) Within 1-km COI: Mainly consists of forest reserves [Hutan Simpan Kekal (HSK) Piah] and privately-owned agricultural lands (rubber small holdings and oil palm estates); a very small part of Chenderoh Lake water body falls within the COI; only one settlement, namely Kg Batu Reng, found within the COI.

(ii) Beyond 1-km COI: Kg Raja Intan Suraya, Kg Beng, Kg Beng Dalam, Kg Dusun, Kg Bukit Sekolah, Kg Durian Lubuk; Chenderoh Hydroelectric Power Plant and Chenderoh Dam.

Potential Impacts

Construction Phase:
- A total of **39 lots** of land will be acquired for the Project.
- Permanent loss of forest lands along the Project alignment, involving the conversion of forest and agricultural land to roadway.

Operations Phase:
- The Project is **compatible with future landuse planning (Transportation) in *RTD Hulu Perak 2030 and RTD Kuala Kangsar 2020***.
- Improved transportation network and connectivity will improve the socio-economy of the surrounding areas.

Pollution Prevention & Mitigation Measures (P2M2)

Construction Phase:
- Land acquisition would have already been completed prior to the construction of the Project.
- Vegetation clearing shall be strictly restricted within the ROW of the Project.
- No further landuse-specific measures needed.

- **Operations Phase:**
- No mitigation measures are required during the operations phase.

APPROVED LAND USE CLASS ORDER

KLASIFIKASI GUNA TANAH
NO. RUJUKAN PELAN : 11
NO. INDEKS : 426

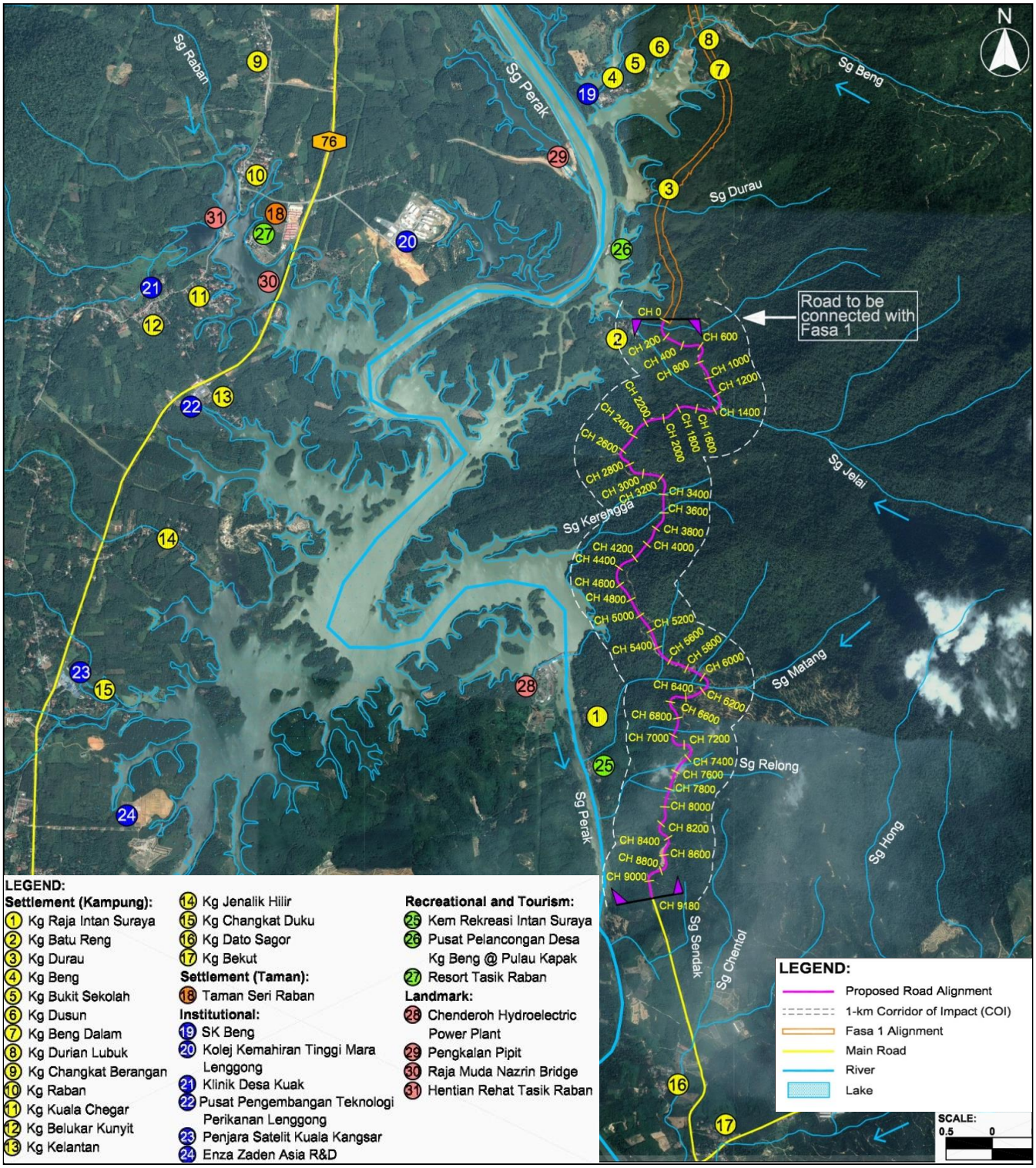
KOLUM I	KOLUM II	KOLUM III	KOLUM IV		KOLUM V
BPK	GUNA TANAH	AKTIVITI YANG DIBENARKAN	AKTIVITI LAIN YANG DIBENARKAN DENGAN SYARAT AKTIVITI	SYARAT	CATATAN/SYARAT
5.1 Sauk	F: Pengangkutan	F1 : Jalan	Tiada	1. Tidak Berkenaan	1. Keperluan rizab jalan adalah tertakluk kepada garis panduan JKR.
5.2 Lintang	G: Infrastruktur dan Utiliti	G1 : Bekalan Elektrik k : Lain-lain Yang Berkaitan (Loji Janakuasa Hidro)	Tiada	1. Tidak Berkenaan	1. Perlu merujuk garis panduan dan piawaian perancangan mengikut keperluan agensi berkaitan.

Source: *RTD Kuala Kangsar 2020*, MPKK, 2012.

KOLUM I	KOLUM II	KOLUM III	KOLUM IV		KOLUM V
Blok Perancangan Kecil (BPK)	Jenis Guna Tanah	Aktiviti Yang Dibenarkan	Aktiviti Lain Yang Dibenarkan Dengan Syarat: Aktiviti	Syarat	Catatan
			F: Tanah Lapang dan Rekreasi F1 : Tanah Lapang F2: Kemudahan Sukan Dan Rekreasi F3: Rekreasi Dan Komersial F4 : Kawasan Hijau	1.Keluasan minima adalah 10 peratus daripada jumlah keseluruhan kawasan. 2. Perlu disediakan dengan kemudahan rekreasi dan landskap yang memenuhi piawaian pembangunan dan tempat letak kereta	
			G: Pengangkutan G1: Pengangkutan Darat G4: Jalan	1.Keperluan rizab jalan adalah tertakluk kepada garis panduan JKR dan PBPT.	

Source: *RTD Hulu Perak 2030*, MDL 2017.

EXISTING LANDUSE WITHIN AND BEYOND 1-KM CORRIDOR OF IMPACT (COI)



LEGEND:

Settlement (Kampung):
1. Kg Raja Intan Suraya
2. Kg Batu Reng
3. Kg Durau
4. Kg Beng
5. Kg Bukit Sekolah
6. Kg Dusun
7. Kg Beng Dalam
8. Kg Durian Lubuk
9. Kg Changkat Berangan
10. Kg Raban
11. Kg Kuala Chegar
12. Kg Belukar Kunyit
13. Kg Kelantan
14. Kg Jenalik Hilir
15. Kg Changkat Duku
16. Kg Dato Sagor
17. Kg Bekut

Settlement (Taman):
18. Taman Seri Raban

Institutional:
19. SK Beng
20. Kolej Kemahiran Tinggi Mara Lenggong
21. Klinik Desa Kuak
22. Pusat Pengembangan Teknologi Perikanan Lenggong
23. Penjara Satelit Kuala Kangsar
24. Enza Zaden Asia R&D

Recreational and Tourism:
25. Kem Rekreasi Intan Suraya
26. Pusat Pelancongan Desa Kg Beng @ Pulau Kapak
27. Resort Tasik Raban

Landmark:
28. Chenderoh Hydroelectric Power Plant
29. Pengkalan Pipit
30. Raja Muda Nazrin Bridge
31. Hentian Rehat Tasik Raban


Existing Project site – Logging Road

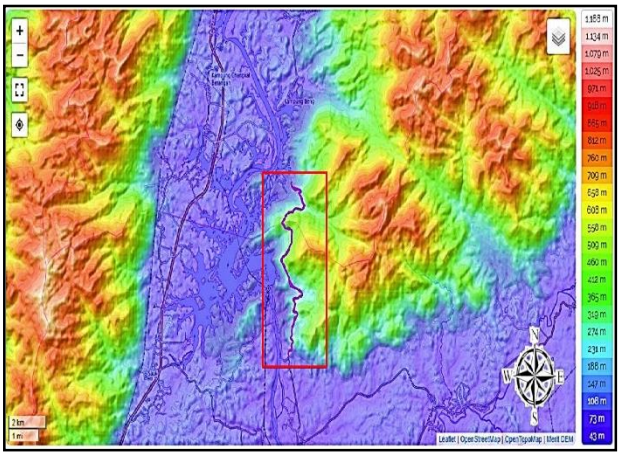

Kg Batu Reng

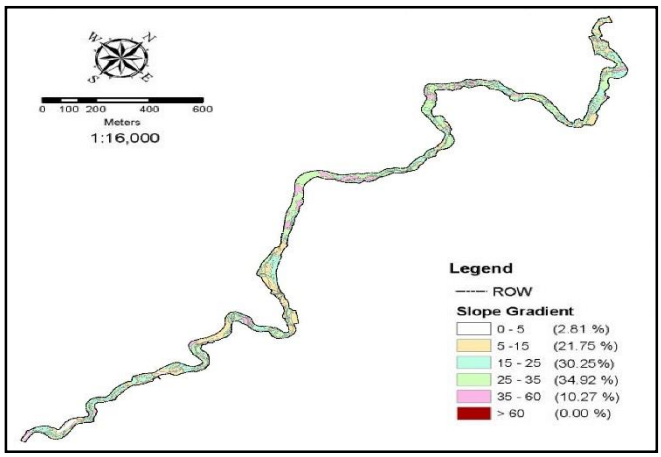

Kg Raja Intan Suraya

EXISTING ENVIRONMENT, IMPACT ASSESSMENT & MITIGATION MEASURES

TOPOGRAPHY, SOIL EROSION and SEDIMENTATION

Existing Environment





- **Terrain:** 70 – 340 m above MSL.
- **Slope:** 34.92% of the Project alignment falls within Class III slope (≥25 – <35°), 30.25% in Class II (≥15 – <25°) and 10.27% in Class IV (≥35°). The remaining 24.56% falls within Class I slope.

Potential Impacts

Construction Phase:

- Soil erosion and sedimentation, during:
  i. Land clearing and earthwork.
  ii. Fill slopes and embankments during heavy rains.

Operations Phase:

- No significant adverse impact as most of the ROW will be paved, turfed or landscaped.

Construction Stage	Average Annual Erosion (ton/ha/yr)	Soil Erosion Risk Class
Pre-construction	42.3	Moderate
Construction (Worst Case)	997.7	Very High
Construction (With Mitigation)	29.8	Moderate
Post Construction	6.7	Low

Pollution Prevention & Mitigation Measures (P2M2)

Construction Phase: Implementation of LD-P2M2 and BMPs for:

(i) Runoff control and stormwater management - temporary earth crossing, temporary runoff diversion bund, pipe slope drain;
(ii) Erosion control – temporary slope protection, turfing, compaction;
(iii) Sediment control - silt traps/ sediment basin, silt fence, wash trough;
(iv) Inspection and maintenance of the above required.

Operations Phase:

- No additional P2M2 is needed if turfing and slope stabilisation measures are properly maintained.
- All cut and fill slope areas should be inspected closely.

EXISTING ENVIRONMENT, IMPACT ASSESSMENT & MITIGATION MEASURES

GEOMORPHOLOGY, GEOLOGY AND SOILS

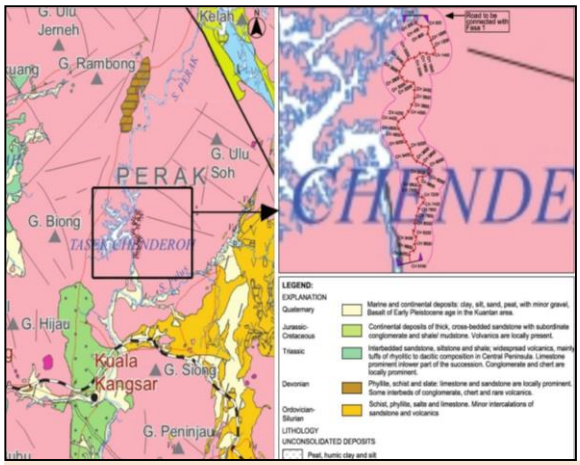
Existing Environment

- **Main Geological Units:**
  i. Acidic intrusive igneous rocks.
  ii. Granitic rocks.

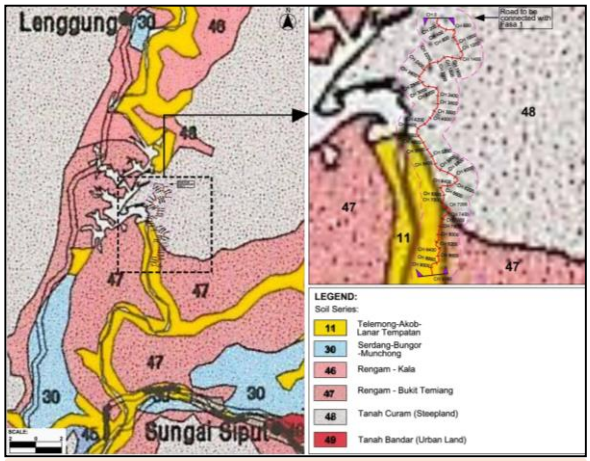
- **Geomorphology:** Project alignment located on the western slope of a broad N-S trending ridge to some 808 m above sea-level at Gunung Kerangga.

- **Soils:**
  i. Steepland.
  ii. Telemong-Akob-Lanar Tempatan.
  iii. Rengam – Bukit Temiang.

- **Boreholes: 58** nos. drilled with results in *Soil Investigation (SI)* attached to EIA.



Geology Map



Soils Map

Potential Impacts

Construction Phase:
- Soil erosion resulting from removal of vegetation cover.
- Impacts associated with placement of fill.
- Impacts associated with excavation of slope cuts.

Operations Phase:
- Surface erosion at embankments and cut slopes
- Stability of cut slopes.

Pollution Prevention & Mitigation Measures (P2M2)

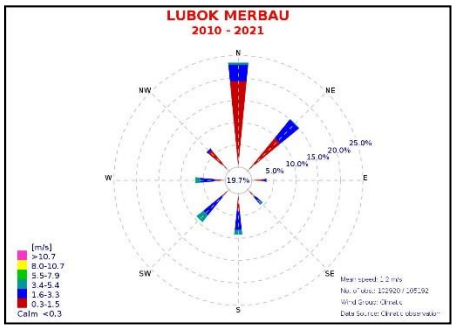
Construction Phase:
- Sedimentation control measures to be constructed/ installed on-site prior to the commencement of earthworks.
- Provision of adequate surface drainage lines to minimize impact of local ponding.
- Minimize impacts associated with cut slopes.

Operations Phase:
- Regular maintenance of the surface and subsurface drainage systems.
- Regular and systematic 'walk-over' surveys along the berms are essential.

Slope Turfing

EXISTING ENVIRONMENT, IMPACT ASSESSMENT & MITIGATION MEASURES

CLIMATE



Existing Environment

Rainfall

- Average annual rainfall (2010 – 2021): 1,940.4 mm
- Highest (2015): 2,357.6 mm; Lowest (2013): 1,515.0 mm

Temperature

- Mean Annual 24-hour temperature: 26.7°C to 27.7°C
- Mean annual maximum: 33.9ºC (2016) to 32.8ºC (2011 & 2021).
- Mean annual minimum: 24.0ºC (2020) to 23.3ºC (2011 & 2021).

Humidity

- Mean annual maximum: 86.7% (2015) to 90.7% (2017).
- Mean annual minimum: 69.6% (2014) to 77.4% (2017).

Surface Wind

- Mostly from north (23.4%), followed by northeast (15.0%) and southwest (9.4%).

Cloud Cover

- Mean cover: fairly constant throughout the years at 7 oktas.

Waste Management

Existing Environment

Nearest local authority approved landfill:

- *Tapak Pelupusan Jalan Kuala Kangsar*, ~13 km southeast of the Project alignment.

Potential Impacts

Construction Phase:

- Types of wastes: Biomass, excess/unsuitable earth materials and spoils, C&D wastes, scheduled wastes and municipal solid wastes.
- Improper waste management may pose significant impacts to the environment and public health.

Operations Phase:

- Minimal waste generation, municipal solid waste disposed off by irresponsible road users.
- Spent oil and grease and lubricants from heavy vehicles may accidentally spill on the road.

Pollution Prevention & Mitigation Measures (P2M2)

Construction Phase:

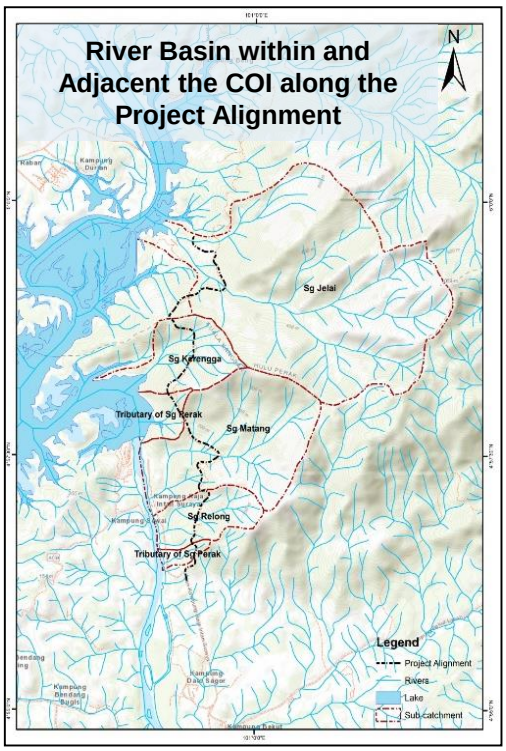
- Designated temporary biomass disposal site.
- Stockpile overburden and protect it by windbreakers or compactions, unless taken out for dumping.
- Provide adequate rubbish bins at strategic locations.
- All scheduled wastes to be handled and managed in accordance to Environmental Quality (Scheduled Waste) Regulations 2005.

Operations Phase:

- Regular street cleaning to be carried out by appointed concessionaire.
- Clean up spillage of scheduled waste on road immediately.

EXISTING ENVIRONMENT, IMPACT ASSESSMENT & MITIGATION MEASURES

HYDROLOGY REGIME



Existing Environment

- **Main River Catchment:**
  (i) Sg Jelai: 14.664 km^2
  (ii) Sg Kerengga: 2.245 km^2
  (iii) Sg Matang: 5.847 km^2
  (iv) Sg Relong: 1.599 km^2
- **Flood Hazard:** Project site is not flood prone nor subjected to flooding.
- **Water Infrastructure:** Downstream part of Chenderoh Lake is designed for flood control and hydropower generation.
- **Water Intake:** Nearest Water Treatment Plant (WTP), namely Kota Lama Kiri WTP, is located ~27 km south of the Project site.

Potential Impacts

Construction Phase:

- Increased surface runoffs during transient period.
- Water ponding and/or stagnation of flood water at lower elevation ground.
- Slope cutting at the higher ground/slope areas may lead to soil erosions.

Operations Phase:

- Risk of flooding is minimal during monsoon season as Project alignment is located far upstream from the flood prone area.
- Clogging of drains leading to localised flooding.
- Water ponding increase the rate of pothole formation and deterioration of the road.

Pollution Prevention & Mitigation Measures (P2M2)

Construction Phase:

- Schedule the cutting and removal of biomass.
- Proper terrains to be constructed beside steep roads to avoid landslide or slope failure.
- Proper dedicated channels to be constructed and installed along the diversion tunnel/ river.

Operations Phase:

- Riverbank maintenance and improvement works adjacent to the bridge structures are recommended to control soil erosion and siltation.
- Regular drainage cleaning and maintenance to ensure no blockages of the drains, which can lead to ponding or localised flooding during heavy rainfalls.

Maintain river buffers

Permanent drainage

Drainage maintenance

EXISTING ENVIRONMENT, IMPACT ASSESSMENT & MITIGATION MEASURES

WATER QUALITY

Sampling Date: 12 – 13 September 2022

Existing Environment

- **Baseline Sampling:** 28 river water samples and three (3) lake water samples were collected from selected rivers, streams and tributaries within and outside the proposed Project alignment.
- **River Water Quality:** WQI at W4, W5, W27 and W28 fall under Class I limits of the NWQS, while the remaining stations were under Class II limits, except W20 under Class III limit. The status for all sampling stations was “Clean”.
- **Lake Water Quality:** All lake water samples were compared to Category A of the NLWQS.

Potential Impacts

Construction Phase:

- Increased suspended solids and level of turbidity.
- Chenderoh Lake is at risk from construction runoff.
- Sewage generated from portable or temporary toilet facilities.
- Spillage and leakage of fuels, oils and lubricants.
- Soil contamination and floatable wastes from construction activities.

Operations Phase:

- Increased surface runoff due to impermeability of the road surface.
- Heavy metals from the wear and tear of vehicular parts can be washed into the waterways.
- Garbage thrown by irresponsible road users.
- Accidental spillage of oil, fuel & lubricants.
- Waste generated from landscaping and road maintenance.

Pollution Prevention & Mitigation Measures (P2M2)

Construction Phase:

- Erosion and sediment control through provisions of sediment basins, drainage systems, etc.
- Overburden stockpile management.
- Oil spill and leakage management.
- Proper waste management.

Operations Phase:

- Road reserves must be well-maintained and landscaped properly.
- Proper spillage and waste management, complying to the BMPs provided.
- Regular water quality monitoring.

Slope turfing

Scheduled waste storage area

Silt Fence

Sediment trap

EXISTING ENVIRONMENT, IMPACT ASSESSMENT & MITIGATION MEASURES

AIR QUALITY

Existing Environment

- **Baseline Sampling:** Six (6) sampling locations at sensitive receptor areas (A1 – A6) along the Project alignment.

- **Ambient Air Quality:** All baseline ambient air quality parameter levels, $PM_{2.5}$, PM_{10}, NO_2, SO_2, CO and O_3, complied with the *Standard 2020 of the Malaysian Ambient Air Quality Standards (MAAQS)* by Department of Environment (DOE).

Sampling Date: 28 – 30 March, 11 – 12 April 2022

Potential Impacts

Construction Phase:

- Fugitive dust: in the form of particulate matters.
- Emissions: from vehicular and construction machinery.
- Predicted maximum average incremental concentration (MAIC) of PM_{10}: Reduced with 84% control efficiency.

Operations Phase:

- Increase traffic volumes: reduce in air quality.
- Calculated 24-hours Ground Level Concentration (GLCs) averaging time concentration for $PM_{2.5}$, CO and NO_2 at all ASRs met the MAAQS.

Pollution Prevention & Mitigation Measures (P2M2)

Construction Phase:

- **Dust Prevention**: Phase out earthwork, erection of hoarding, practice wet suppression.
- **Control of Gas Emissions**: Turning off equipment when not in use, regular maintenance of vehicles/ equipment.
- **Workers' Health**: Provide suitable PPE such as masks and goggles to all construction workers.
- **Traffic Management**: Control the number of construction vehicles and equipment used at any one time.
- **Blasting Controls**: Blast nets, canvas covers to be used and blasting shall not be carried out when there is strong wind.
- **General Controls**: Prohibit open burning, prompt action on public complaints, regular air quality monitoring.

Operations Phase:

- Maintaining the tress within the buffer area.
- Impose speed limits especially near the rural settlement areas.


Water bowsing


Turfing on bare land


Compacted earth


Lorries/trucks covered with tarpaulin sheet

EXISTING ENVIRONMENT, IMPACT ASSESSMENT & MITIGATION MEASURES

NOISE AND VIBRATION

Existing Environment

- **Baseline Sampling:** Six (6) sampling locations (N/V1 – N/V6) at sensitive receptor areas along the Project alignment.
- **Noise Level:** L_{Aeq} at all points were within the DOE permissible limit for both day time [60 dB(A)] and night time [55 dB(A)].
- **Vibration Level:** Ground vibration level at all points were within the DOE permissible limits for both day time (0.2 mm/s – 0.4 mm/s) and night time (0.2 mm/s) except at V1.
- **Vibration Source:** Vibration recorded at V1 was likely generated by the boat activities.

Sampling Date: 28 – 29 March, 11 – 12 April 2022

Potential Impacts

Construction Phase:

Noise:

- Noise generated from construction activities, equipment and machineries.
- The anticipated community response to noise was “None” at all identified NSRs, except for NSR2 (“Little”) and NSR5 (“Very Strong”).

Vibration:

- Very minimal residual vibration causing any significant human response and annoyance and building damage.
- A 5.8 m and 23.3 m zone of influence setback distance (for vibratory roller) will be adopted.

Operations Phase:

Noise:

- The predicted cumulative LA_{eq} noise levels at the identified NSRs ranged from 45.2 dB(A) to 58.3 dB(A) during daytime and 42.5 dB(A) to 55.2 dB(A) during night time.
- The anticipated community responses to noise were “None” at all identified NSRs for both day time and night time.

Vibration:

- Vehicular movements rarely create vibration unless there are bumps due to frequent potholes.
- Insignificant disturbance to the population and public safety from blasting activities (if any).

Pollution Prevention & Mitigation Measures (P2M2)

Construction Phase:

- Construction activities involving heavy machineries shall be carried out during day time only.
- Maintenance of all equipment and machineries to avoid emitting excessive noise.
- Impose speed limits and regular maintenance of construction vehicles.
- Erect hoarding and/or temporary jersey barrier with plastic hoarding.
- Monitor regularly ambient noise and vibration level at sensitive areas.
- Blasting activities (if any) are to adhere to the requirements mandated under the Minerals Development Act 1995, Mineral Development (Blasting) Regulations 2003 and the Explosives Act 1957; Explosive Rules 1923.
- All site personnel are required to wear PPE at all times during active blasting operations.
- Blasting Mats may be used to contain the blast, suppress dust and noise.

Operations Phase:

- Adopt BMPs where applicable.

EXISTING ENVIRONMENT, IMPACT ASSESSMENT & MITIGATION MEASURES

BIOLOGICAL RESOURCES

Existing Environment

- **Flora:**
  (i) Study area enclosed with secondary vegetation and scrub vegetation.
  (ii) A total of 104 floral species from 51 families were recorded in the study area.
  (iii) 98.98% of the identified plants consist of low conservation value or have not been evaluated globally and/or locally.
  (iv) Three (3) High Conservation Value (HCV) species recorded.
- **Fauna:**
  (i) 12 species of mammals recorded in the study area, five (5) of which are Totally Protected species and four (4) Protected species as listed in *Wildlife Conservation Act 2010*.
- **Herpetofauna:** 17 species were encountered in the study area.
- **Avians:** 71 species from 13 Orders and 21 families were observed and recorded in the study area.
- **Human Wildlife Conflict (HWC):** PERHILITAN recorded 935 cases of HWC from 2017 to 2021 within the area nearby of the Project alignment.

Leopard (*Panthera pardus*)

Yellow-throated marten (*Martes flavigula*)

Potential Impacts

Construction Phase:

Flora:
- Loss of vegetation.
- Reduction in soil quality.
- Habitat loss for fauna.
- Increase in land surface temperature.

Fauna:
- Road kills and human-wildlife conflict.
- Noise and light disturbance/ pollution.

Operations Phase:
- Habitat loss will lead to the migration of animal to the nearby forested area.
- Human-wildlife conflict and road kills.

Pollution Prevention & Mitigation Measures (P2M2)

Construction Phase:

Flora:
- Vegetation clearance must be done ethically.
- Terracing method is suggested for upland sites.
- All cleared and completed areas should be re-vegetated immediately.

Fauna:
- Construct underpass for large mammals.
- Wildlife trapping can be done to translocate animals.
- Establish and maintain buffer zones.

Operations Phase:

Flora:
- Fast-growing and shady tress to be planted along the road side.

Fauna:
- Rehabilitate and enhance the degraded areas.
- Prevent trespassing, illegal poaching and collection of forest produce.
- Implement monitoring, patrolling, community wildlife trapping and awareness programmes.

EXISTING ENVIRONMENT, IMPACT ASSESSMENT & MITIGATION MEASURES

SOCIO-ECONOMY

Existing Environment

- **Settlements:** ~19 settlements located within 5-km Zone of Impact (ZOI).
- **Nearest to Project site:** Kg Raja Intan Suraya, Kg Batu Reng.
- **Total population:** ~3,610; ~988 households (average of 3.8 persons per households).
- **Social survey:** A total of 384 samples were taken from 9 – 13 August 2022.
- **Focus Group Discussion (FGD):** An FGD was held with the community leaders on 10 August 2022 for their qualitative in-depth views/ perceptions/ concerns/ suggestions.
- **Public Dialogue:** 17 January 2023; attended by agencies, Penghulu, residents of the nearby settlements. Issues of concern: Water resources, environmental pollution, flooding, human-wildlife-conflict (HWC)
- **Social Survey Results:** Majority (98.7%) were positive on the Project. They perceived that they will not be unfavourably impacted by the Project, compared to 1.3% who perceived otherwise.

Potential Impacts

Construction Phase:

- 39 land lots identified to be affected and therefore, land acquisition is needed.
- Employment and business opportunities created.
- Disruption and contamination of water resources.
- Safety concerns and higher risk of accidents.

Operations Phase:

- Improve accessibility of the hinterland.
- Land and property value appreciation.
- Gradually draw more people to the area.

Pollution Prevention & Mitigation Measures (P2M2)

Construction Phase:

- Implement all BMPs.
- Prioritize local communities in Project-induced employment opportunities.
- Undertake daily housekeeping.
- Ensure public safety.

Operations Phase:

- Ensure the upkeep of signages, signals, markings, speed limits, etc.
- Have an effective ERP in place.
- Communicable disease control.
- Continuous engagements between Project Proponent/ contractors and the local communities.

Focus Group Discussion (FGD)

On-ground Social Survey

Public Dialogue

EXISTING ENVIRONMENT, IMPACT ASSESSMENT & MITIGATION MEASURES

TRAFFIC

Existing Environment

Connectivity:

- Via Jalan Ipoh – Kuala Kangsar [Federal Route 1 (FR1)], turning off into Jalan Karai (A156) and subsequently turning off at Kg Pulau Kamiri and head northward to Kg Raja Intan Suraya.

Peak Hour:

- 5.00 pm to 6.00 pm, with peak hour traffic volume ranging from 332 – 1,278 PCU/hr, at the nearest traffic count station, AR501 (FR1), AR503 (FR76), AR504 (FR76) and AR801 (FR76).

Level of Service (LOS):

- Jalan Karai (A156) is presumed to operate at LOS A, similar to FR1 and FR76.

Potential Impact

Construction Phase:

- Increased in heavy vehicle traffic.
- Materials spillage.
- Potential road damage e.g., potholes to existing public roads.
- Travel delays.
- Increase in vehicular emission.

Operations Phase:

- Traffic disruption and congestion are expected to be minimal.
- Anticipated to accommodate a higher traffic volume.
- Potential risks of accidents.

Pollution Prevention & Mitigation Measures (P2M2)

Construction Phase:

- Proper logistic management plan.
- Wheel cleaning/ tyre washing.
- Construction vehicle to avoid peak hours to minimise adverse traffic impact.
- Impose speed limits.
- Provision of adequate warning signage and lightings.

Operations Phase:

- Proper traffic control and road safety procedures.
- Install road safety features such as guardrails, fences, etc.
- Carry out regular road maintenance.
- Impose speed limits.

Jalan Ipoh – Kuala Kangsar (FR1)

Jalan Karai (A156)

EXISTING ENVIRONMENT, IMPACT ASSESSMENT & MITIGATION MEASURES

PUBLIC HEALTH

Existing Environment

Community Health Status:

- Out of 384 respondents, 45.1% perceived their level of health as 'good', followed by 33.6% as 'very good' and 18.2% as 'fair'.

Most Frequent Visited Health Facilities:

- *Hospital Taiping, Hospital Sungai Siput, Hospital Ipoh, Hospital Kuala Kangsar, Institut Jantung Negara* (IJN), *KPJ Ipoh, Klinik Kesihatan Luat, Klinik Kesihatan Sungai Siput, Klinik Kesihatan Lenggong, Klinilk Kesihatan Sauk, Klinik Kesihatan Karai, Klinik Desa Kg. Beng, Klinik Desa Kuak* and *Klinik Azhar*.

Malaria Cases Reported:

- Only one case reported for the past 5 years.

Dengue Cases Reported:

- One case reported each year for the past 5 years.

Vector-borne Diseases:

- No cases had been reported.


Klinik Desa Kg Beng


Klinik Desa Kuak

Potential Impact

Construction Phase:

- Malaria vector in the surrounding areas as deforestation will be involved.
- Dust emissions associated with construction activities.
- Workers might be exposed to silica dust and to asphalt fumes.
- Potential heavy metal contamination of water resources.

Operations Phase:

- Emissions of heavy vehicles that consist of dust and carbon monoxide.
- Breeding sites for rodents and disease vectors.
- Increased in Motor-Vehicles Accidents (MVA).
- Landslide posing a risk to the road users.
- Possible collision with elephants.

Pollution Prevention & Mitigation Measures (P2M2)

Construction Phase:

- All occupational health and safety regulations must be adhered to.
- Exposure control plan for silica dust and asphalt fumes to be implemented.
- Safety and Health Officer (SHO) to conduct regular safety and health training/briefings.
- Undertake daily housekeeping and inspections.
- Proper traffic management plan to be implemented.

Operations Phase:

- Implement all BMPs.
- Wildlife crossing to be implemented.

Environmental Monitoring and Surveillance Plan – IMPACT MONITORING (IM)

Construction and Operations Phases

River Water Quality

Location of Monitoring

W1 – W28

Parameter

pH, Temperature, Dissolved Oxygen, Conductivity, Salinity, Turbidity, BOD, COD, TSS, Arsenic, Manganese, Iron, Aluminium, O&G, AN, Faecal Coliform, Total Coliform & Water Flow Rate

Standards

National Water Quality Standards (NWQS), Class IIA/B

Frequency

Monthly

Lake Water Quality

Location of Monitoring

L1, L2, L3

Parameter

Conductivity, DO, DO Percentage Saturation, pH, Temperature, TSS, Transparency, O&G, AN, Nitrate, Total Phosphorus, Chlorophyll-a, BOD, COD, Total Coliform & E.Coli

Standards

National Lake Water Quality Criteria and Standards (NLWQS), Class A

Frequency

Monthly

Ambient Noise & Vibration Level

Location of Monitoring

NV1, NV2, NV3, NV4, NV5, NV6

Parameter

Noise: LAeq, L10, L90, Lmin, Lmax
Vibration: Velocity (mm/s), Frequency (Hz)

Standards

- Schedule 1 of *Guidelines for Environmental Noise Limits and Control, Third Edition 2019* (DOE, Reprint 2021).
- Relevant Schedules in the Guidelines for Environmental Vibration Limits and Control, Third Edition (DOE, 2021)
- COAs (if any).

Frequency

Quarterly

Air Quality

Location of Monitoring

A1, A2, A3, A4, A5, A6

Parameter

Weather conditions, $PM_{2.5}$, PM_{10}, NO_2, SO_2, CO, O_3

Standards

- *Malaysia Ambient Air Quality Standards (EQR 2020, DOE 2020)*
- *Environmental Quality (Clean Air) Regulations 2014*
- *Environmental Quality (Control of Emission from Petrol Engines) Regulations 1996*
- *Environmental Quality (Control of Emission from Diesel Engines) Regulation 1996*

Frequency

Quarterly

Environmental Monitoring and Surveillance Plan – COMPLIANCE MONITORING (CM)

Component	Compliance Requirement	No. of Points/ Location	Frequency
Construction Phase			
Discharge Quality from Sediment Basin	• COAs (if any).	• Outlets of proposed sediment basins.	• After every rain event ≥ 12.5 mm, by EO. • Monthly by EnvMC.
Functionality of the BMPs for Erosion and Sediment Control	• ESCP layout and report approved by DID Negeri Perak. • LD-P2M2. • COAs (if any).	• Abide by all BMPs proposed in the LD-P2M2 and ESCP approved by DID.	• Weekly and after every heavy rain event by EO. • Monthly & checking by EnvMC.
Solid Waste Management (i.e., Biomass, Construction, Domestic Wastes)	• *Environmental Quality Act 1974.* • *Solid Waste and Public Cleansing Management Act 2007.* • *Local Government Act 1976, Sections 69 – 71.* • COAs (if any).	• Within the Project site.	• Daily by EO. • Monthly by EnvMC.
Scheduled Waste Management	• *Environmental Quality Act 1974.* • *Environmental Quality (Scheduled Wastes) Regulations 2005*. • *Guidelines for Packaging, Labelling and Storage of Scheduled Wastes in Malaysia* (DOE, 2014). • COAs (if any).	• Storage areas for scheduled wastes. • Workshop. • Active work areas.	• Daily by EO. • Monthly by EnvMc.
Sewage effluent (Note: If the cumulative P.E. ≥ 150)	• Standard A, Second Schedule, *Environmental Quality (Sewage) Regulations 2009*. • COAs (if any).	• Cumulative septic tank's effluent discharge point.	• Monthly by EnvMC.

Environmental Monitoring and Surveillance Plan – PERFORMANCE MONITORING (PM)

Operations Phases

Ecology

Location of Monitoring

Forested areas along Project alignment & Perimeter/ Boundary of working ROW

Parameter

- Flora and Fauna

Standards

- Compare with baseline in **Section 6.10:** *Biological Resources*

Frequency

Annually by Specialist

Slope

Location of Monitoring

Project alignment where cut and fill slopes formed, including critical natural slopes

Parameter

- Stability of slope, signs of slumping & erosion

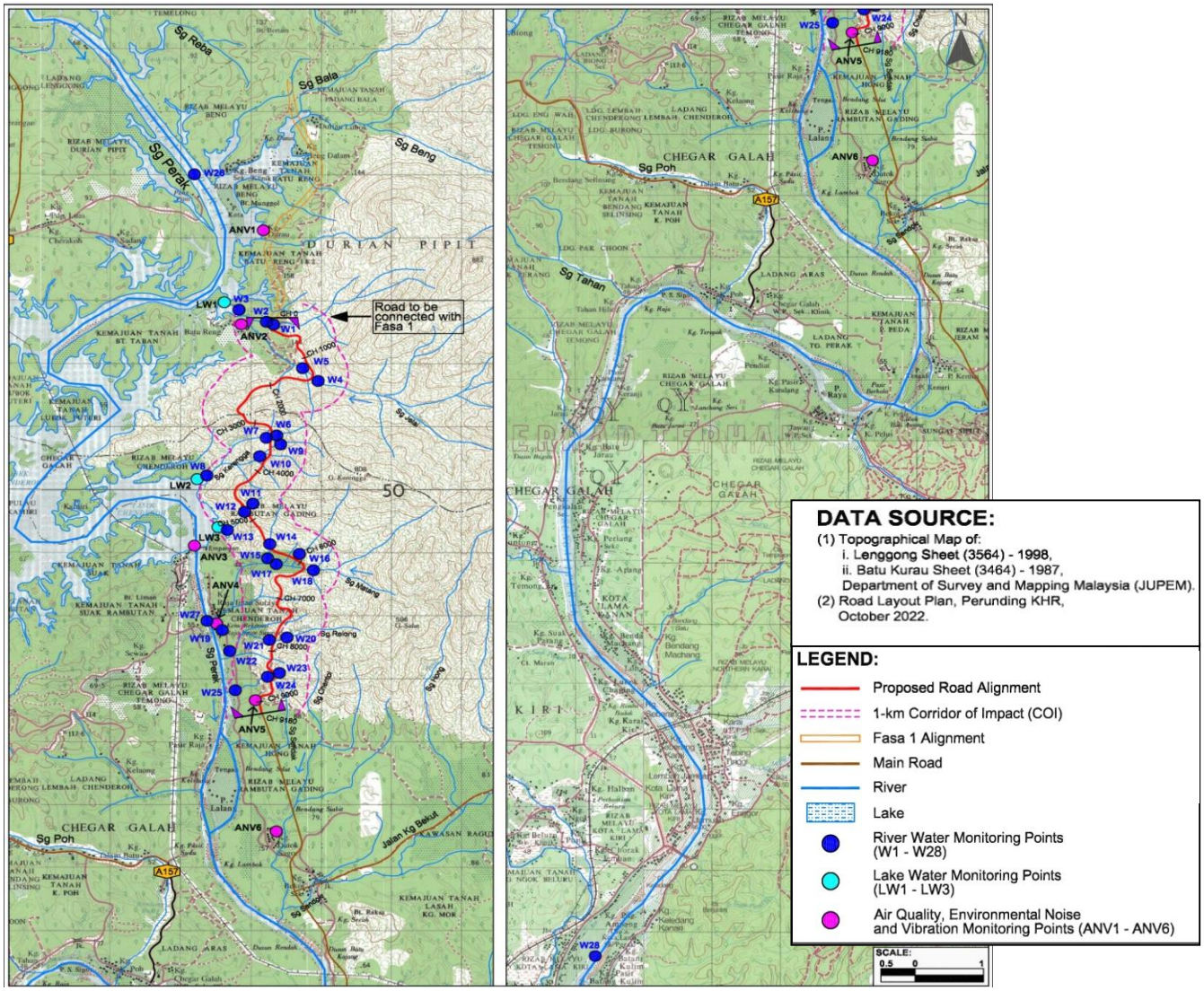
Standards

- JKR requirement

Frequency

Annually

Proposed Monitoring Points – RIVER WATER, AIR QUALITY, NOISE AND VIBRATION MONITORING



Study Findings

Potential Environmental Impacts

Construction Phase:

- Soil erosion and sedimentation
- Water quality pollution
- Geotechnical issues
- Air quality pollution
- Loud noise and vibration levels
- Landuse change and socio-economy

Operations Phase:

- Slope stability
- Air quality pollution due to vehicular emissions
- Growth in socio-economic status
- Roadkills and human-wildlife conflict (HWC)

Pollution Prevention Mitigation Measures (P2M2s)

- Mitigation measures, best technological and management practices were proposed to mitigate the adverse impacts. Minimal residual impacts are expected.