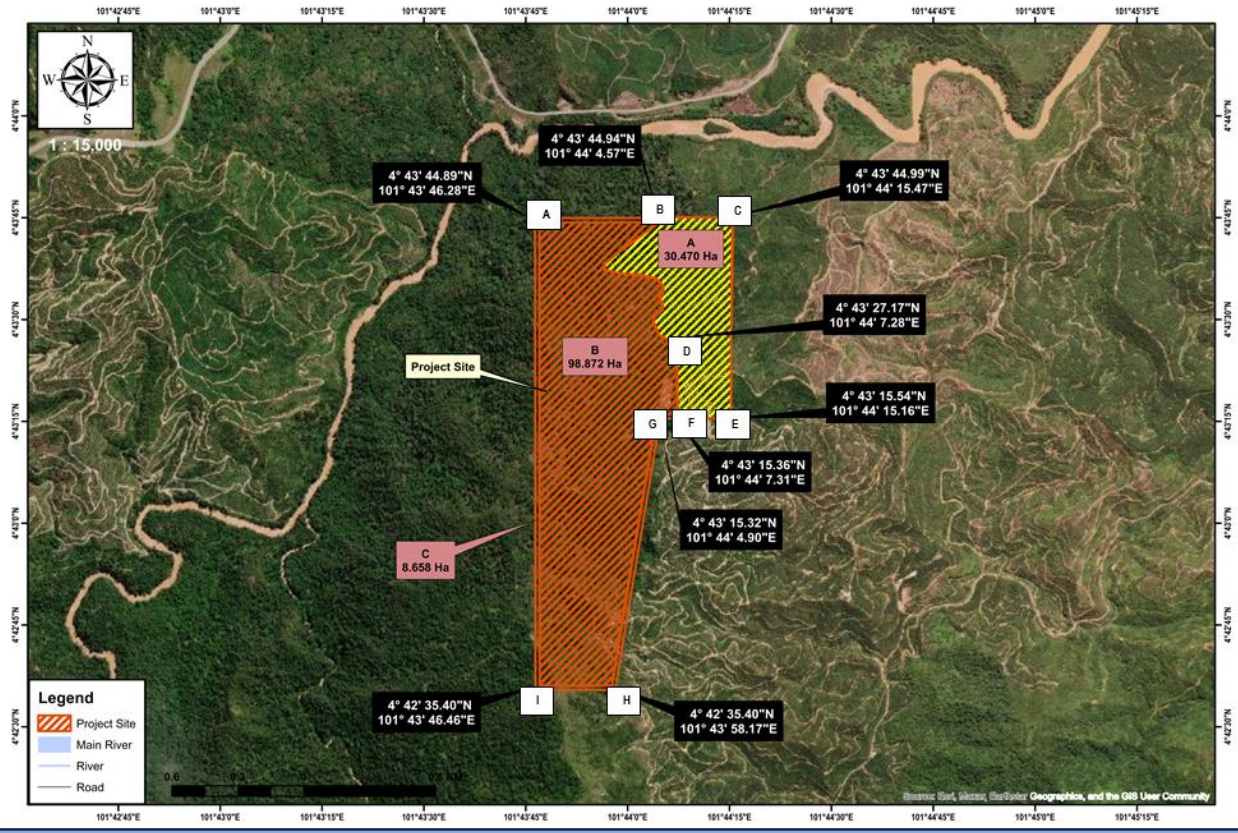
FIRST SCHEDULE ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

for

THE PROPOSED SILICA QUARRY & PROCESSING ACTIVITY UNDER YAYASAN KELANTAN DARULNAIM (YAKIN), MINING LEASE ML 1/2021 ON LOT 46 WITH A TOTAL AREA OF APPROXIMATELY 138 HECTARES (HA), MUKIM BLAU, DAERAH HAU, JAJAHAN KECIL LOJING. KELANTAN DARUL NAIM.

EXECUTIVE SUMMARY



PROJECT BRIEF

- The proposed project involves the development of a silica quarry and processing plant on a 138-hectare site within Lot 46, Mukim Blau, Daerah Hau, Kelantan.
- The project proponent, **BB Wista Sdn. Bhd.**, operates under a mining lease granted to **Yayasan Kelantan Darulnaim (YAKIN)**.
- The quarry will adopt an **open-pit mining method**, involving drilling, blasting, crushing, and processing to produce silica for downstream industries.
- The anticipated operational lifespan is **over 100 years**, with an initial production target of 20,000 tonnes per month, scaling up to 100,000 tonnes per month once fully operational

Project Proponent

BB WISTA SENDIRIAN BERHAD
COMPANY NO. 1018884-X

EIA Consultant

AES
ASIAN ENVIRONMENTAL SOLUTIONS SDN. BHD. (741262 - A)
" Sustainable Environmental Solutions "

POLICY CONFORMANCE

- ***Rancangan Struktur Negeri Kelantan 2040***, which emphasizes mineral sector growth as a key economic driver.
- **National Mineral Industry Transformation Plan 2020–2030**, which recognizes silica as one of five strategic minerals.
- Land use zoning under the ***Rancangan Tempatan Jajahan Gua Musang 2020*** permits mining activity with State approval.

STATUTORY REQUIREMENTS

First Schedule of the Environmental Quality (Prescribed Activities) EIA Order

Activity 19: Quarry	Quarrying of rock material
Activity 5: Forestry	(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.

Compliance will also be maintained with:

- *Mineral Development Act 1994*
- *Mineral (Kelantan) Enactment 2001*
- *Quarry Rules Kelantan 1997*
- *Mineral Development (Effluent) Regulations 2016*
- *National Land Code 1965*

STATEMENT OF NEED

Geological & Resource Availability

- Project site lies within Mukim Blau, Kelantan, an area rich in **silica bearing rocks** (granite, quartz veins, chert, siliceous mudstone).

National & State Strategic Importance

- Silica is one of **five critical minerals** highlighted in the **National Mineral Industry Transformation Plan 2020–2030** and **key driver of economic growth** under *Rancangan Struktur Negeri Kelantan 2040*.

Industrial Demand (Malaysia & Global)

- Malaysia has **148.4 million tonnes** of high-grade silica reserves (>95% SiO_2).
- Imports still required (81,000 tonnes in 2023 from China & Vietnam), showing **domestic shortfall** and opportunity for local supply.

Potential Socio-Economic Benefits

- Generates **employment opportunities** and **business opportunities** for local
- Enhances **state revenue** through royalties, taxes, and etc.
- Supports **Orang Asli communities** nearby through job creation and CSR initiatives.

PROJECT CONCEPT

Overall Approach

- The project is designed as an **open-pit silica quarry and processing plant**.
- Operations will prioritize **sustainability and environmental safeguards** through strict compliance with DOE requirements and **LD-P2M2 (Land Disturbance Pollution Prevention & Mitigation Measures)**.
- The quarry and plant will operate under a **zero-discharge concept**, ensuring no untreated effluent is released into the surrounding environment.

Quarrying Method

- **Open-pit mining** involving:
  - **Drilling & controlled blasting** of silica-bearing rock.
  - **Excavation & hauling** of blasted materials using heavy machinery.
  - **Crushing & screening** at the processing plant to achieve required sizes and grades.
- Extraction begins with **overburden removal**, followed by sequential bench development.
- Progressive quarry development allows concurrent **extraction and rehabilitation** of exhausted benches.

Processing Plant Concept

- **Silica processing plant** to crush, screen, and grade materials for downstream uses.
- **System with proper BMP's**:
  - Sediment ponds, silt traps, and recycling of process water.
  - Effluent treated to comply with *Mineral Development (Effluent) Regulations 2016*.
- Stockpiles for different grades of silica will be managed to ensure consistent quality supply to industries (glass, foundry, ceramics, electronics).

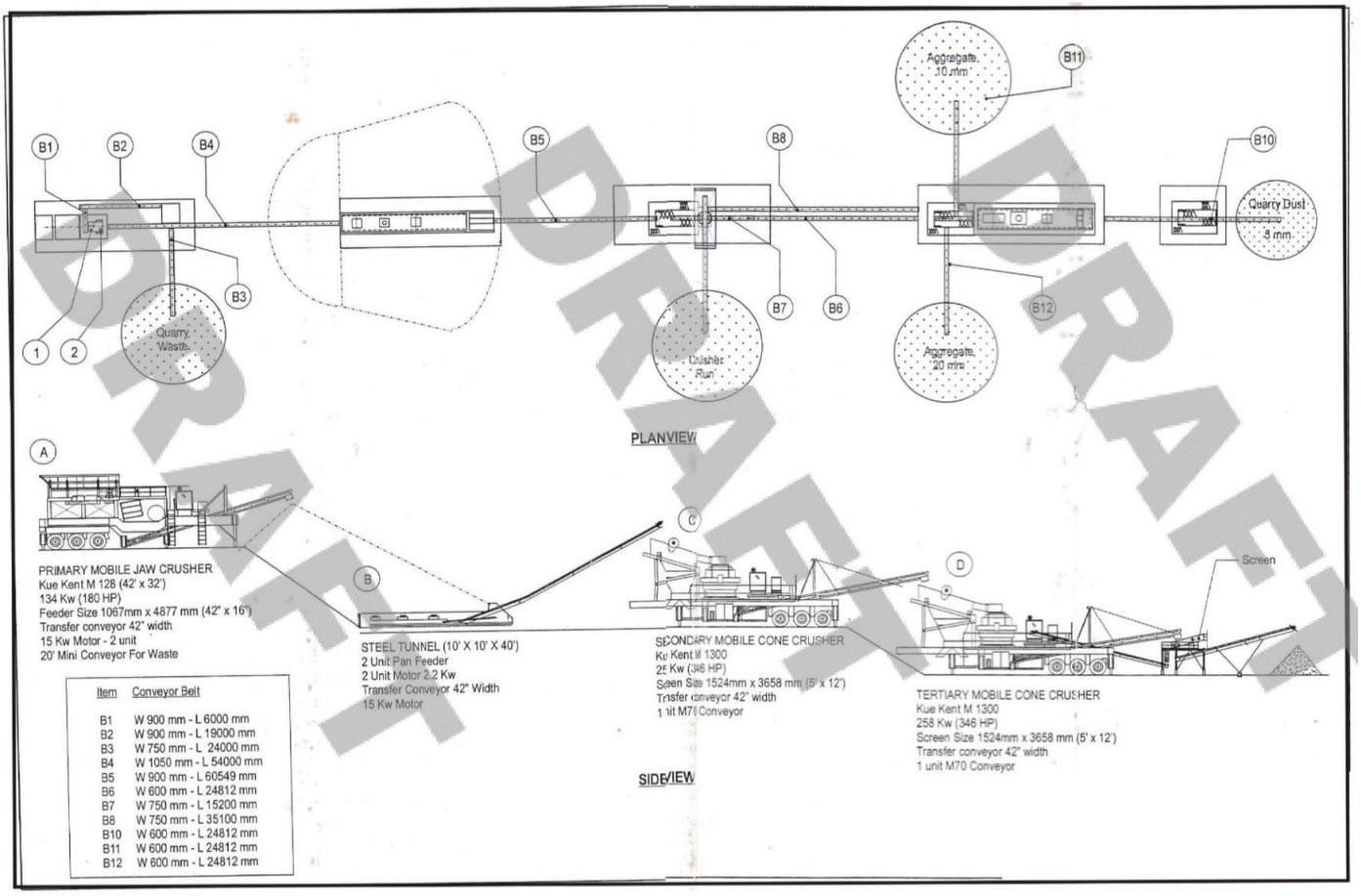
Infrastructure & Support Facilities	
Site Facilities	Site office & guardhouse.
	Workshop & storage facilities
	Weighbridge & sale cabin.
	Scheduled waste store, fuel tanks, and stockpiles.
Utilities:	Water supply (collected from onsite harvesting & approved sources).
	Power supply for machinery and processing.
	Sewage & solid waste management systems
Access Road	8 km laterite road linking site to Jalan Lojing–Cameron Highlands, connected to Gua Musang town.

Production Concept

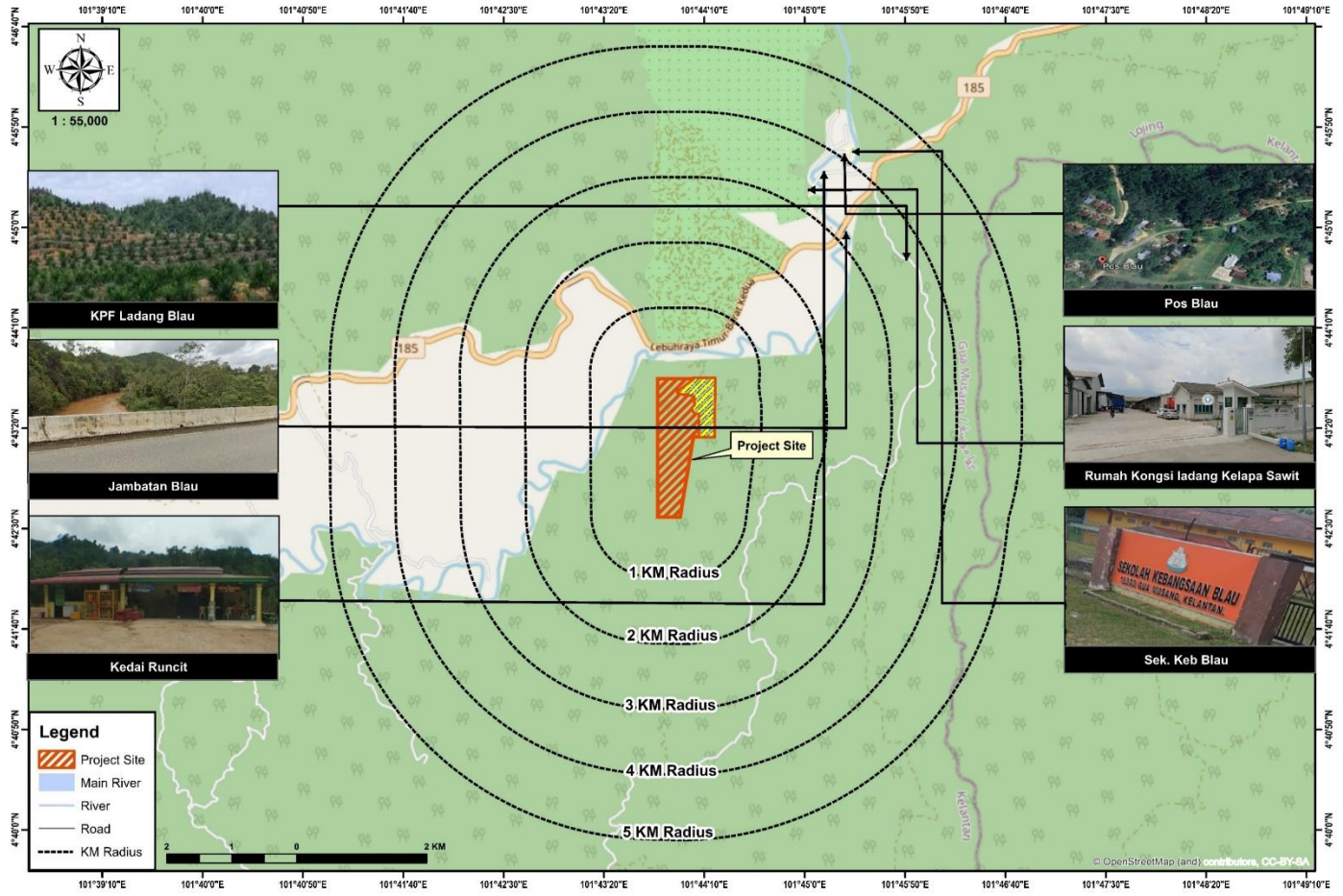
- Phased production strategy to gradually ramp up output:
  - **Start-up**: 20,000 tonnes per month (TPM).
  - **After 1 month**: 40,000 TPM.
  - **After 3 months**: 60,000 TPM.
  - **Full production**: 100,000 TPM.
- Expected operational lifespan: **over 100 years**, based on reserve estimates.

Crushing and Screening Production Rate

Sizing of Aggregate	Percentage of Aggregate Produce (%)	Product (TPM)
0 to 5 mm Crushed Rock	20	20,000
5 to 10 mm Crushed Rock	5	5,000
10 to 20 mm Crushed Rock	35	35,000
0 to 50 mm Crushed Rock	40	40,000
Waste Material	10	10,000
TOTAL	100	100,000



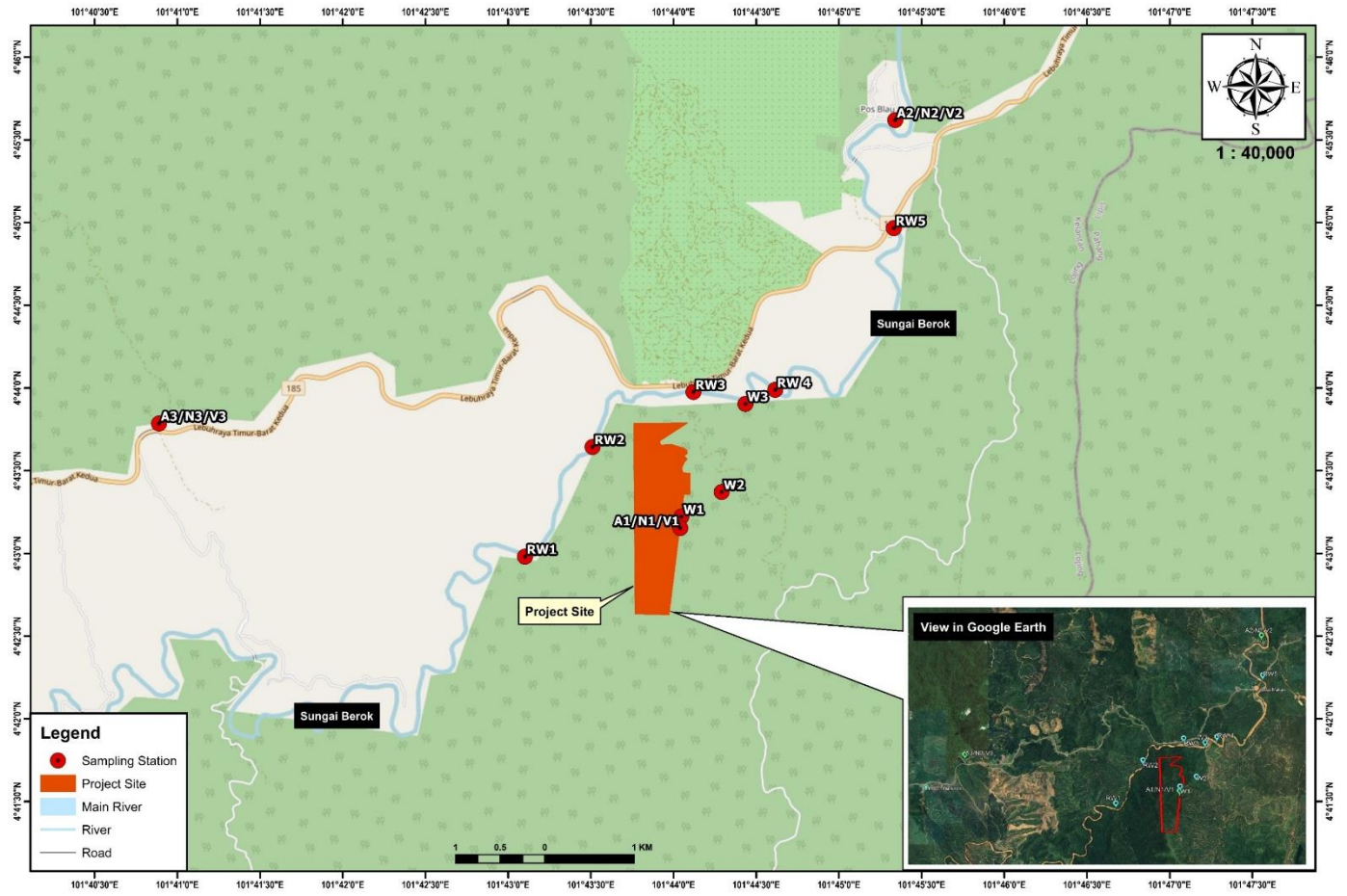
SURROUNDING LANDUSE



Distance (km)	Direction			
	North	East	South	West
0-1	**Green Area** Forest Plantation	**Green Area** Forest Plantation	**Green Area** Forest Plantation	**Green Area** Forest Plantation
1-2	**Green Area** Forest Plantation	**Green Area** Forest Plantation	**Green Area** Forest Plantation	**Green Area** Forest Plantation
2-3	**Green Area** Forest Plantation	**Green Area** Forest Plantation **Commercial** Kedai Makan	**Green Area** Forest Plantation	**Green Area** Forest Plantation
3-4	**Green Area** Forest Plantation	**Village/Residential** Rumah Kongsi Ladang Kelapa Sawit **Commercial** Kedai Runcit **Green Area** Forest KPF Ladang Blau	**Green Area** Forest Plantation	**Green Area** Forest Plantation
4-5	**Green Area** Forest Plantation	**Village/Residential** Kampung Orang Asli Pos Blau **Institutional** Sek Keb Blau **Commercial** Kedai Makan **Green Area** Forest	**Green Area** Forest Plantation	**Green Area** Forest Plantation

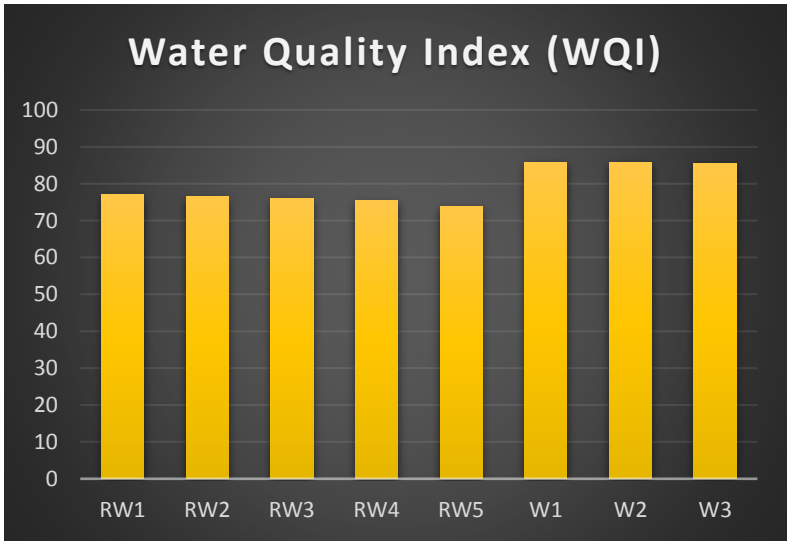
Surrounding Photos of the Project Site

BASELINE ENVIRONMENTAL QUALITY MONITORING



WATER QUALITY

- **Water Quality Index (WQI):** Ranged between **73.90 – 85.79**, corresponding to **Class II (clean to slightly polluted)** and **Class III (slightly polluted)**. Upstream tributaries generally indicated cleaner conditions compared to Sg. Berok.
- Water quality is generally good with localized slight pollution in Sg. Berok, mainly due to organic enrichment.



RW1 **RW2** **RW3** **RW4** **RW5** **W1** **W2** **W3**

19th March 2025

AMBIENT AIR QUALITY

- Three monitoring stations were set up (project entrance, Pos Blau, and oil palm workers' housing).
- Ambient air quality was compliant with Malaysian Ambient Air Quality Standards (MAAQS 2020), indicating clean background conditions.

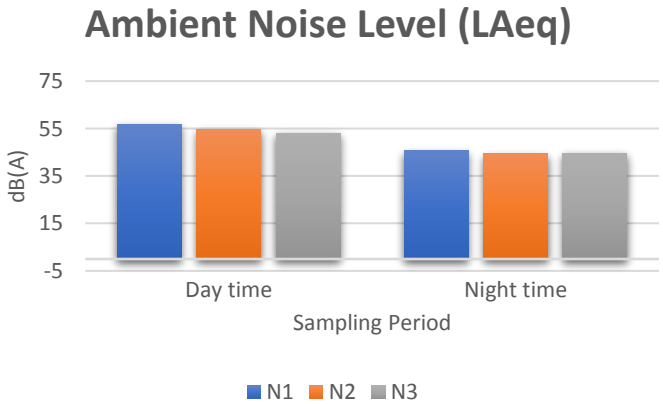
Parameter	Unit	Results		
		A1	A2	A3
PM_{10}	µg/m³	39	34	36
$PM_{2.5}$	µg/m³	14	10	11
SO_2	µg/m³	ND	ND	ND
NO_2	µg/m³	ND	ND	ND
CO	mg/m³	ND	ND	ND
O_3	µg/m³	ND	ND	ND

19th - 22nd March 2025

A1 **A2** **A3**

AMBIENT NOISE LEVEL

- Three monitoring stations were set up (project entrance, Pos Blau, and oil palm workers' housing).
- All results were below the recommended permissible limits (55–70 dBA depending on land use).
- Sources of noise were primarily vehicular traffic and communal activities.



19th - 22nd March 2025

N1 **N2** ***N3***

AMBIENT NOISE LEVEL

- Three monitoring stations were set up (project entrance, Pos Blau, and oil palm workers' housing).
- V1 complied; V2 and V3 recorded daytime values slightly above the residential reference limit but remained below levels associated with structural damage.

Station	Peak Vektor Sum (mm/s)		2nd Schedule for Human Response and from Stady State Continuous Vibrations (mm/s)	
	Day time	Night time	Day time	Night time
V1	0.857	0.172	0.8 mm/s to 1.6 **(Industrial)**	0.8 mm/s to 1.6 **(Industrial)**
V2	**0.489**	0.132	0.2 mm/s to 0.4 **(Residential)**	0.22 **(Residential)**
V3	**0.558**	0.196		

19th - 22nd March 2025

V1

V2

V3

ENVIRONMENTAL IMPACT ASESSMENT

SOIL EROSION & SEDIMENTATION

Construction Phase:

- Land clearing, road building, and overburden removal expose soil, increasing erosion risk and sedimentation into nearby streams. Without control, soil loss may exceed 4,209 t/ha/yr; with BMPs (silt traps, drains, mulching), losses reduce to ~42 t/ha/yr.

Operational Phase:

- Continued risk from stockpiles and haul roads, but manageable with vegetation cover, terracing, and sediment basins.

SLOPE STABILITY

Construction Phase:

- Earthworks and temporary cuts may destabilize slopes.

Operational Phase:

- Quarry benches and final slopes risk failures (planar, wedge, toppling, circular) due to blasting and weathering. Requires ongoing monitoring and stabilization (drainage, slope design, maintenance).

OVERBURDEN MANAGEMENT

Construction Phase:

- Large-scale stripping and stockpiling may cause erosion, landslides, and dust if unmanaged.

Operational Phase:

- Long-term stockpiles can affect drainage and visual quality. Proper siting, compaction, turfing, and progressive reuse for rehabilitation are essential.

WATER QUALITY

Construction Phase:

- Runoff with high TSS, sewage effluent from workers, and oil/grease leaks pose risks. With BMPs, TSS kept within NWQS Class III limits.

Operational Phase:

Sediment runoff and oil leaks remain concerns. Processing plant adopts a **system with BMP's practices**, with water recycled via tailing ponds, minimizing pollution

HYDROLOGY (FLOOD)

Construction Phase:

- Clearing increases runoff, peak flows, and potential downstream siltation.

Operational Phase:

- Quarry voids alter drainage; overflow or pond failure during storms could exacerbate flood risks. Hydrological controls (sediment basins, drains) are critical

GROUNDWATER QUALITY

Construction & Operational Phases:

- Limited impact expected. Risks include infiltration of fuel/oil spills and altered recharge patterns due to land clearance. Mitigation: lined storage, spill containment, and proper drainage,

AIR QUALITY

Construction Phase:

- Dust from earthworks, haul roads, and equipment emissions.

Operational Phase:

- Dust from blasting, crushing, and stockpiles; exhaust emissions from machinery. Localized but controllable with water spraying, enclosures, and vehicle maintenance.

ROCK BLASTING

Construction Phase:

- Minimal (only initial preparation).

Operational Phase:

- Main source of vibration, fly-rock, and air overpressure. Impacts localized; safety protocols and controlled blasting reduce risks.

NOISE

Construction Phase:

- Machinery and transport create intermittent noise; impacts localized.

Operational Phase:

- Continuous operations (crushing, blasting, vehicles) generate higher levels. Impacts manageable with buffer zones, scheduling, and equipment maintenance.

WASTE MANAGEMENT

Construction Phase:

- Biomass, construction debris, and sewage. Requires segregation, proper disposal, and licensed contractors.

Operational Phase:

- Domestic waste, scheduled waste (oil, filters), and overburden. Managed via 3R practices, scheduled waste storage, and periodic licensed disposal.

TRAFFIC & TRANSPORTATION

Construction Phase:

- Increased movement of machinery and materials may burden access roads.

Operational Phase:

- Haulage of silica rock increases heavy vehicle traffic; risks of congestion, accidents, and road degradation. Traffic management plans required.

SOCIO-ECONOMIC ASSESSMENT

Construction Phase:

- Short-term employment and local supply opportunities.

Operational Phase:

- Long-term positive benefits from jobs, business opportunities, and local economic growth. Minor negatives: visual intrusion and potential health nuisance from dust/noise.

ECOLOGY

Construction Phase:

- Forest clearing causes habitat loss and fauna disturbance.

Operational Phase:

- Long-term impacts on biodiversity and habitat fragmentation. Rehabilitation and buffer zones help mitigate losses.

RESIDUAL IMPACTS

- Even with mitigation, residual impacts include permanent landform changes, loss of natural forest habitats, visual intrusion, and potential long-term slope instability. However, socio-economic benefits and rehabilitation programs can offset some adverse outcomes.

MITIGATION MEASURE

SOIL EROSION & SEDIMENTATION

Construction:

- Implement ESCP and BMPs including phased clearing, hydro-seeding, mulching, silt fences, check dams, sediment basins, and perimeter drains.

Operation:

- Maintain LDP2M2 controls, revegetate exposed areas, and ensure regular inspection, maintenance, and monitoring to prevent sediment discharge

SLOPE STABILITY

Construction & Operation:

- Safe slope designs with benches, catch bunds, proper drainage, compaction, and immediate turfing. Regular geotechnical monitoring and inspections will minimize risk of failure

OVERBURDEN MANAGEMENT

Construction & Operation:

- Reuse for bunds, compacted stockpiles >30 m from waterways, covered transport, proper drainage around dumps, and silt fences at mound bases

SLOPE STABILITY

Construction & Operation:

- Safe slope designs with benches, catch bunds, proper drainage, compaction, and immediate turfing. Regular geotechnical monitoring and inspections will minimize risk of failure

WATER QUALITY

Construction:

- Sediment basins, bunded fuel storage, spill kits, scheduled waste compliance, septic tanks, and oil traps.

Operation:

- Controlled runoff to silt ponds, stormwater diversion, riparian monitoring, progressive restoration, and strict prohibition of open burning

GROUNDWATER QUALITY

Construction & Operation:

- Sequential excavation, backfilling, bunded chemical storage, properly lined ponds, and continuous monitoring to prevent infiltration of contaminants

HYDROLOGY (FLOOD)

Construction & Operation:

- Adequate detention ponds, perimeter drains, desilting, flood bunds, and pond storage designed for 50-year ARI. Post-closure rehabilitation to restore natural drainage

ROCK BLASTING

Operation:

- Controlled blasting with MIC limits, blast design optimization, timing announcements, buffer zones, use of nets/barriers, weather considerations, vibration monitoring, and strict safety protocols

NOISE

Construction & Operation:

- Limit to daytime (7am–7pm), maintain machinery, fit silencers, impose vehicle speed limits, phased operations, and provide PPE (earplugs/earmuffs). Comply with OSHA and DOE noise regulations

Waste Management

Construction & Operation:

- Good housekeeping, recycling/reuse, designated disposal sites, composting of vegetation, no open burning, and DOE-compliant scheduled waste storage/handling with licensed contractors

SOCIO-ECONOMIC ASSESSMENT

Construction & Operation:

- Legal recruitment of foreign workers, health screenings, proper offsite accommodation, community liaison, complaint handling, awareness of socio-cultural norms, and disease prevention programs

TRAFFIC & TRANSPORTATION

Construction & Operation:

- Use designated routes, avoid peak hours, enforce speed limits, provide signage and flagmen, cover loads, trim roadside vegetation, maintain vehicles, and keep accident record

OCCUPATIONAL SAFETY & HEALTH

Construction & Operation:

- Compliance with OSHA 1994, worker health checks, PPE provision, first aid and ERP, safety briefings, fencing and guards, supervised vehicle movement, and COVID-19 SOP adherence

ECOLOGY

Flora:

- Progressive rehabilitation with native species, brownfield to greenfield restoration, and long-term reclamation for agriculture/plantation.

Fauna:

- Enforce Wildlife Conservation Act 2010, prohibit poaching, conduct wildlife studies, awareness campaigns, human–wildlife conflict reporting, and Wildlife Management Plan (WMP) implementation

ABANDONMENT

Closure Phase:

- Backfilling pits, revegetation, rehabilitation of forest cover, conversion to plantation/agriculture, restoration of natural hydrology and groundwater, and long-term ecological monitoring

MONITORING PROGRAMS DURING CONSTRUCTION PHASE

COMPLIANCE MONITORING

Compliance Monitoring (CM) is done to ensure that the discharge from the site complies with the standards. This is to safeguard that the discharge from the site does not contaminate the ambient in the vicinity of the site. The item for the CM is the final discharge point from the silt trap/sediment basin outlet within the project site. The parameters involved are Total Suspended Solids and Turbidity. The limit for both parameters is 50mg/L and 250 NTU respectively

PERFORMANCE MONITORING

The Performance Monitoring (PM) will be based on the assessment of the Pollution Prevention and Mitigation Measures (P2M2) taken for this Project. Environmental Officer (EO) or Certified Competent Person shall carry out on-site performance monitoring.

No.	Performance Monitoring Items	Remarks	Frequencies
1.	Temporary earth drains	To ensure that the surface runoff flows smoothly in the drain. To ensure that the drain is channelised to the sediment basin.	Daily
2.	Wash trough	The wash-off from the wash trough must be channelled into the drainage. To maintain the workability of the facility. To desilt sediment and silt in the wash trough.	Weekly
3.	Silt trap/Sediment Basins	To remove accumulated silt / sediment to maintain at least ⅓ of the design capacity of the basin.	When necessary
4.	Fuel, grease, engine oil storage facilities, raw materials storage	Fuel, grease, engine oil storage and raw materials storage (chemicals, etc.) area must be covered and carefully sited and to avoid contamination of the surface waters. All storage of chemicals should be in bunded areas.	Daily
5.	Waste management system	Properly managed central waste collection system.	When necessary
6.	Vehicles emissions	All vehicles involved with the Project must be regularly maintained and ensured they are in good condition.	When necessary
7.	Noise source from machinery and vehicles	Machines and vehicles (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum.	When necessary

IMPACT MONITORING

Station	Coordinates	Description of Location	Parameters Monitored	Standards	Frequency
Water Quality					
RW1	4°42'58.82"N 101°43'6.11"E	Upstream of Sg Berok	pH, Temperature, DO DOsat, Conductivity, Turbidity, BODs, COD , TSS, Oil & Grease, Ammoniacal Nitrogen (NH3-, Phenol , Nitrate, Phosphate, Faecal Coliform, Total Coliform, Hg, Cd, Pb, Cr3+, Fe, Sn, B, Cu, As, Cr6+, Mn, Ni, Zn	National Water Quality Standard (NWQS)	Monthly or as required by DOE Negeri Kelantan
RW2	4°43'38.60"N 101°43'30.61"E	Mid stream of Sg.Berok			
RW3	4°43'58.57"N 101°44'7.23"E	Midstream of Sg.Berok			
RW4	4°43'59.34"N 101°44'36.89"E	Midstream of Sg. Berok			
RW5	4°44'57.97"N 101°45'19.91"E	Downstream of Sg. Berok			
W1	4°43'13.34"N 101°44'2.86"E	Upstream of unnamed tributary			
W2	4°43'22.30"N 101°44'17.48"E	Mid-stream of unnamed tributary			
W3	4°43'54.23"N 101°44'26.08"E	Downstream of unnamed tributary			
Ambient Air Quality					
A1	4°43'9.17"N 101°44'2.45"E	Within the entrance of the Project Site	PM_{10}, $PM_{2.5}$,	Malaysia Ambient Air Quality Standard(MAAQS)	Quarterly or as required by DOE Kelantan
A2	4°45'37.18"N 101°45'20.42"E	Within Pos Blau (near to school and houses)			
A3	4°43'47.12"N 101°40'53.35"E	Near to oil palm plantation workers house			
Noise Level					
N1	4°43'9.17"N 101°44'2.45"E	Within the entrance of the Project Site	LAeq, Lmin, Lmax, L10, L90	Second Schedule: Receiving Land Use for Industrial Zones and Low Density Residential, Noise Sensitive Receptors, Institutional (School, Hospital, Worship)	Quarterly or as required by DOE Kelantan
N2	4°45'37.18"N 101°45'20.42"E	Within Pos Blau (near to school and houses)			
N3	4°43'47.12"N 101°40'53.35"E	Near to oil palm plantation workers house			
Vibration and airblast					
V1	4°43'9.17"N 101°44'2.45"E	Within the entrance of the Project Site	Vibration and airblast	Second Schedule Recommended Vibration Limits for Human Response and Annoyance from Steady State Continuous Vibration	Every Major Blast Activity
V2	4°45'37.18"N 101°45'20.42"E	Within Pos Blau (near to school and houses)			
V3	4°43'47.12"N 101°40'53.35"E	Near to oil palm plantation workers house			

MONITORING PROGRAMS DURING CONSTRUCTION PHASE

The EIA concludes that the proposed project is environmentally feasible provided that all recommended mitigation and monitoring measures are effectively implemented. With strict adherence to statutory requirements, BMPs (Best Management Practices), and continuous environmental surveillance, the project's residual impacts are expected to be minor and manageable. Furthermore, the project is anticipated to deliver significant socio-economic benefits, aligning with national and state development objectives.

FIRST SCHEDULE ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

for

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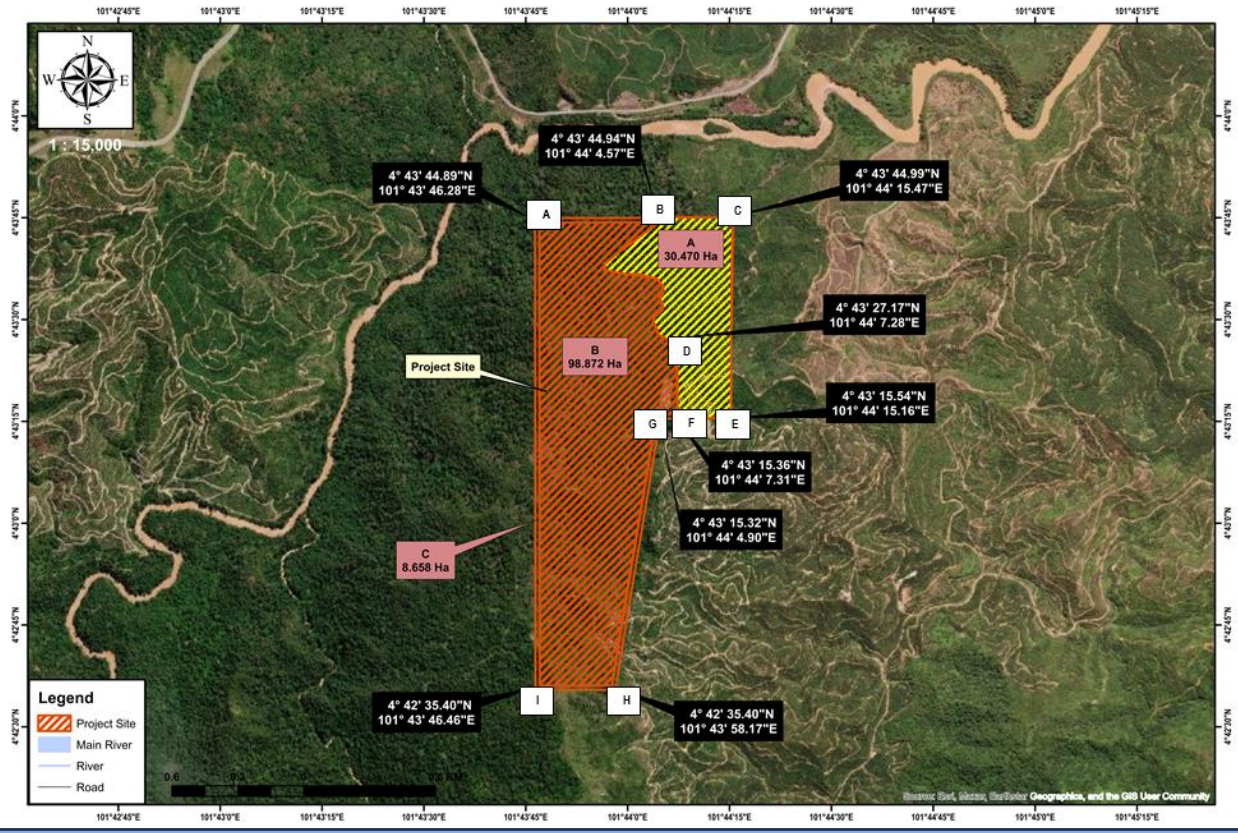
RINGKASAN EKSEKUTIF



RINGKAS PROJEK

- Projek yang dicadangkan melibatkan pembangunan kuari silika dan loji pemprosesan di tapak seluas 138 hektar dalam Lot 46, Mukim Blau, Daerah Hau, Kelantan.
- Pemaju projek, **BB Wista Sdn. Bhd.,** beroperasi di bawah pajakan perlombongan yang diberikan kepada **Yayasan Kelantan Darulnaim (YAKIN).**
- Kuari akan menggunakan **kaedah perlombongan terbuka,** melibatkan penggerudian, letupan, penghancuran, dan pemprosesan untuk menghasilkan silika untuk industri hiliran.
- Jangka hayat operasi yang dijangkakan adalah melebihi 100 tahun, dengan sasaran pengeluaran awal sebanyak 20,000 tan sebulan, berskala sehingga 100,000 tan sebulan setelah beroperasi sepenuhnya

Penggerak Projek

BB WISTA SENDIRIAN BERHAD
COMPANY NO. 1018884-X

Konsultan EIA

AES
ASIAN ENVIRONMENTAL SOLUTIONS SDN. BHD. (741262 - A)
" Sustainable Environmental Solutions "

DASAR PEMATUHAN

- **Rancangan Struktur Negeri Kelantan 2040,** *yang menekankan pertumbuhan sektor mineral sebagai pemacu ekonomi utama.*
- **Pelan Transformasi Industri Mineral Negara 2020–2030,** yang mengiktiraf silika sebagai salah satu daripada lima mineral strategik.
- Pengezonan guna tanah di bawah **Rancangan Tempatan Jajahan Gua Musang 2020** membenarkan aktiviti perlombongan dengan kelulusan Negeri.

KEPERLUAN BERKANUN

Jadual Pertama Perintah EIA Kualiti Alam Sekitar (Aktiviti Ditetapkan) 2015

Aktiviti 19: Kuari	Penggalian bahan batuan
Aktiviti 5: Perhutanan	(a) Penukaran hutan pada ketinggian 300 meter atau lebih dari paras purata laut kepada guna tanah lain yang meliputi kawasan seluas 20 hektar atau lebih tetapi kurang daripada 100 hektar.

Pematuhan juga akan dikekalkan dengan:

- *Akta Pembangunan Mineral 1994*
- *Enakmen Mineral (Kelantan) 2001*
- *Kaedah Kuari Kelantan 1997*
- *Peraturan Pembangunan Mineral (Efluen) 2016*
- *Kanun Tanah Negara 1965*

PENYATA KEPERLUAN

Ketersediaan Geologi & Sumber

- Tapak projek terletak di dalam Mukim Blau, Kelantan, kawasan yang kaya dengan batuan yang mengandungi silika (granit, urat kuarza, chert, batu lumpur silika).

Dasar Kepentingan Strategik Negara & Negeri

- Silika adalah salah satu daripada lima mineral kritikal yang diketengahkan dalam Pelan Transformasi Industri Mineral Negara 2020–2030 dan pemacu utama pertumbuhan ekonomi di bawah Rancangan Struktur Negeri Kelantan 2040.

Permintaan Perindustrian (Malaysia & Global)

- Malaysia mempunyai 148.4 juta tan rizab silika gred tinggi (>95% SiO_2).
- Import masih diperlukan (81,000 tan pada 2023 dari China & Vietnam), menunjukkan kekurangan domestik dan peluang untuk bekalan tempatan.

Potensi Faedah Sosio-Ekonomi

- Menjana peluang pekerjaan dan peluang perniagaan untuk tempatan
- Meningkatkan hasil negeri melalui royalti, cukai, dan lain-lain.
- Menyokong komuniti Orang Asli berhampiran melalui penciptaan pekerjaan dan inisiatif CSR.

KONSEP PROJEK

Pendekatan Keseluruhan

- Projek ini direka bentuk sebagai loji pemprosesan dan kuari silika terbuka.
- Operasi akan mengutamakan kelestarian dan perlindungan alam sekitar melalui pematuhan ketat terhadap keperluan JAS dan LD-P2M2 (Langkah-langkah Pencegahan & Tebatan Pencemaran Gangguan Tanah).
- Kuari dan loji akan beroperasi di bawah konsep pelepasan sifar, memastikan tiada efluen yang tidak dirawat dilepaskan ke persekitaran sekitar.

Kaedah Kuari

- Perlombongan terbuka yang melibatkan:
  - Penggerudian & letupan terkawal bagi batu yang mengandungi silika.
  - Penggalian & pengangkutan bahan yang diletupkan menggunakan jentera berat.
  - Menghancurkan & menyaring di kilang pemprosesan untuk mencapai saiz dan gred yang diperlukan.
- Pengekstrakan bermula dengan lebihan beban penyingkiran, diikuti dengan pembangunan bangku berurutan.
- Pembangunan kuari progresif membolehkan pengekstrakan serentak dan pemulihan bangku-bangku yang habis.

Konsep Loji Pemprosesan

- Loji pemprosesan silika untuk menghancurkan, menyaring dan menggred bahan untuk kegunaan hiliran.
- Sistem dengan BMP yang betul:
  - Kolam sedimen, perangkap kelodak, dan kitar semula air proses.
  - Efluen dirawat untuk mematuhi Peraturan Pembangunan Mineral (Efluen) 2016.
- Stok untuk gred silika yang berbeza akan diuruskan untuk memastikan bekalan kualiti yang konsisten kepada industri (kaca, faundri, seramik, elektronik).

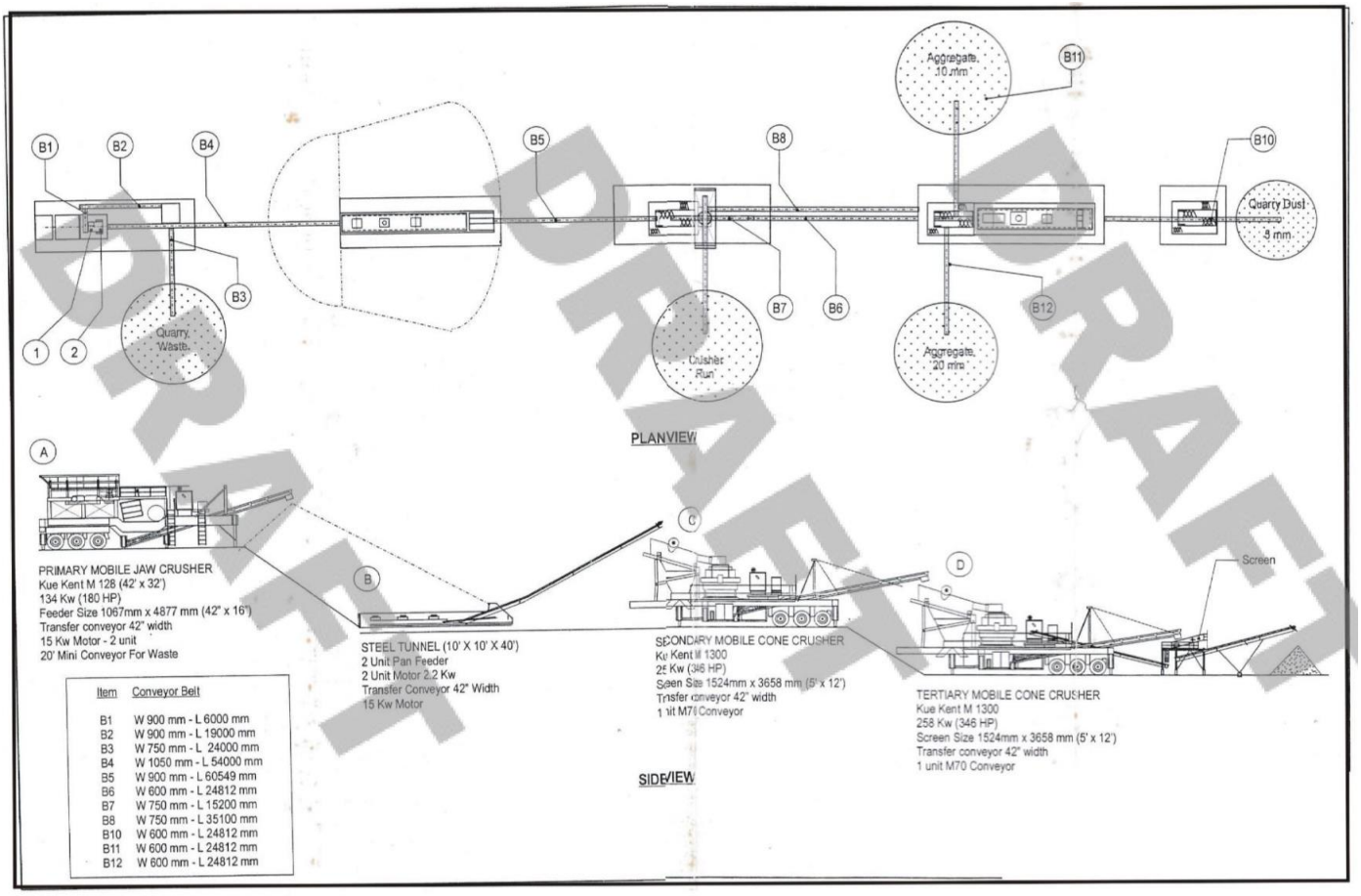
Infrastruktur & Kemudahan Sokongan	
Kemudahan Tapak	Pejabat tapak & rumah pengawal.
	Bengkel & kemudahan penyimpanan
	Timbang timbang & kabin jualan.
	Stor buangan terjadual, tangki bahan api, dan simpanan stok.
Utiliti:	Bekalan air (dikumpul daripada penuaian di tapak & sumber yang diluluskan).
	Bekalan kuasa untuk mesin dan pemprosesan.
	Sistem pengurusan kumbahan & sisa pepejal
Jalan Masuk	Tapak penghubung jalan laterit 8 km ke Jalan Lojing–Cameron Highlands, disambungkan ke bandar Gua Musang.

Konsep Pengeluaran

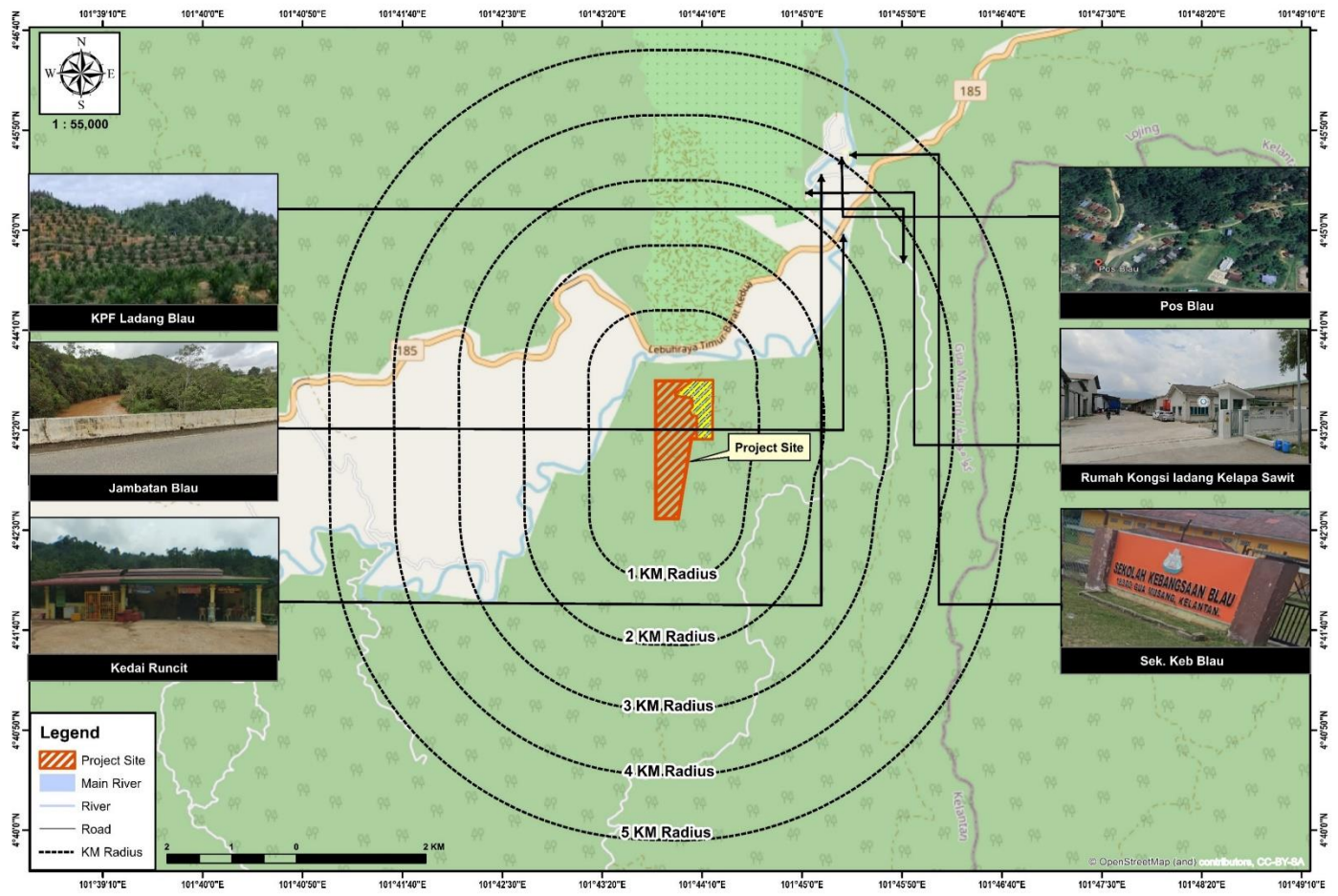
- Strategi pengeluaran berperingkat untuk meningkatkan pengeluaran secara beransur-ansur:
  - Permulaan: 20,000 tan sebulan (TPM).
  - Selepas 1 bulan: 40,000 TPM.
  - Selepas 3 bulan: 60,000 TPM.
  - Pengeluaran penuh: 100,000 TPM.

Penghancuran dan Kadar Pengeluaran Saringan

Sizing of Aggregate	Percentage of Aggregate Produce (%)	Product (TPM)
0 to 5 mm Crushed Rock	20	20,000
5 to 10 mm Crushed Rock	5	5,000
10 to 20 mm Crushed Rock	35	35,000
0 to 50 mm Crushed Rock	40	40,000
Waste Material	10	10,000
JUMLAH	100	100,000



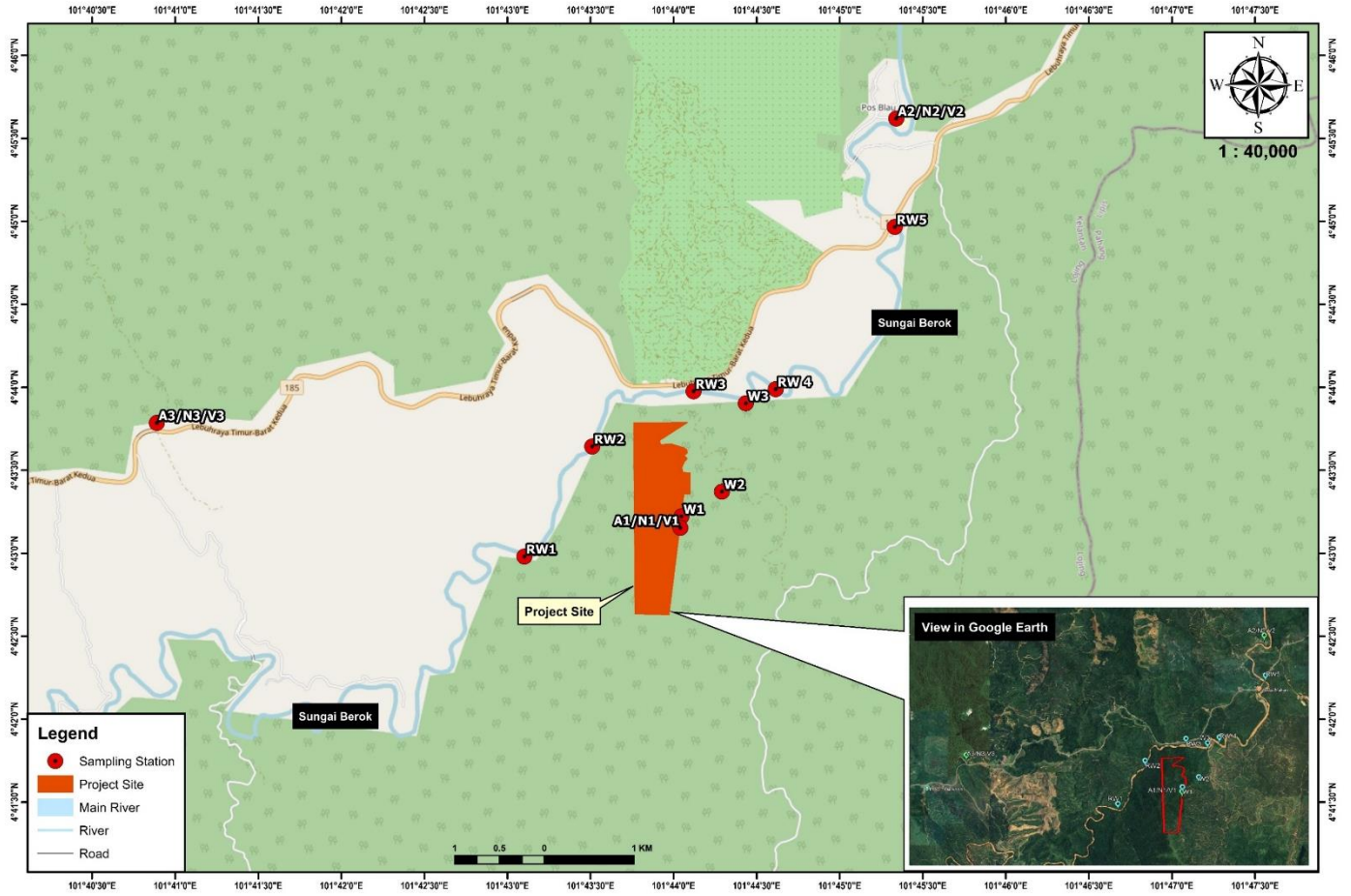
GUNA TANAH SEKITAR



Distance (km)	Direction			
	North	East	South	West
0-1	**Green Area** Forest Plantation	**Green Area** Forest Plantation	**Green Area** Forest Plantation	**Green Area** Forest Plantation
1-2	**Green Area** Forest Plantation	**Green Area** Forest Plantation	**Green Area** Forest Plantation	**Green Area** Forest Plantation
2-3	**Green Area** Forest Plantation	**Green Area** Forest Plantation **Commercial** Kedai Makan	**Green Area** Forest Plantation	**Green Area** Forest Plantation
3-4	**Green Area** Forest Plantation	**Village/Residential** Rumah Kongsi Ladang Kelapa Sawit **Commercial** Kedai Runcit **Green Area** Forest KPF Ladang Blau	**Green Area** Forest Plantation	**Green Area** Forest Plantation
4-5	**Green Area** Forest Plantation	**Village/Residential** Kampung Orang Asli Pos Blau **Institutional** Sek Keb Blau **Commercial** Kedai Makan **Green Area** Forest	**Green Area** Forest Plantation	**Green Area** Forest Plantation

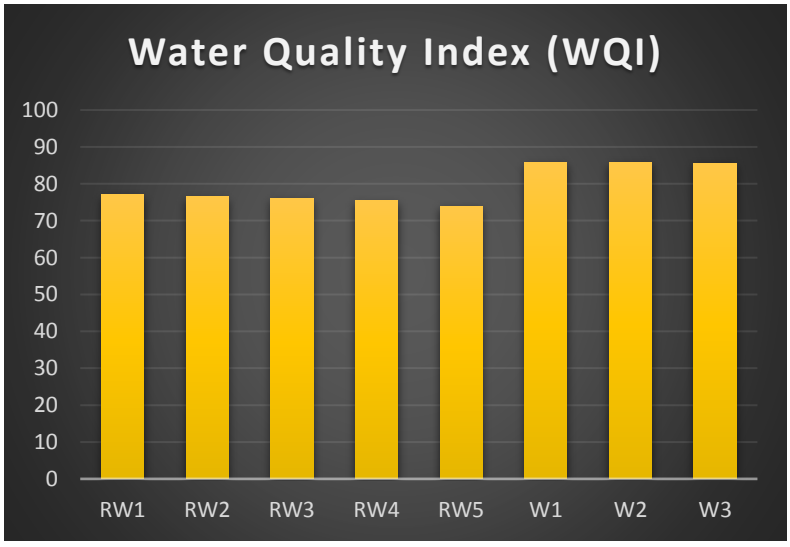
Foto Sekitar Tapak Projek

GARIS DASAR PEMANTAUAN KUALITI ALAM SEKITAR



KUALITI AIR

- Indeks Kualiti Air (WQI): Berjulat antara 73.90 – 85.79, sepadan dengan Kelas II (bersih hingga sedikit tercemar) dan Kelas III (sedikit tercemar). Anak sungai di hulu umumnya menunjukkan keadaan yang lebih bersih berbanding Sg. Berok.
- Kualiti air secara amnya baik dengan sedikit pencemaran setempat di Sg. Berok, terutamanya disebabkan oleh pengayaan organik. Anak sungai kekal



RW1 RW2 RW3 RW4 RW5 W1 W2 W3

19th Mac 2025

KUALITI UDARA AMBIEN

- Tiga stesen pemantauan telah disediakan (pintu masuk projek, Pos Blau, dan perumahan pekerja kelapa sawit).
- Kualiti udara ambien mematuhi Piawaian Kualiti Udara Ambien Malaysia (MAAQS 2020), yang menunjukkan keadaan latar belakang yang bersih.

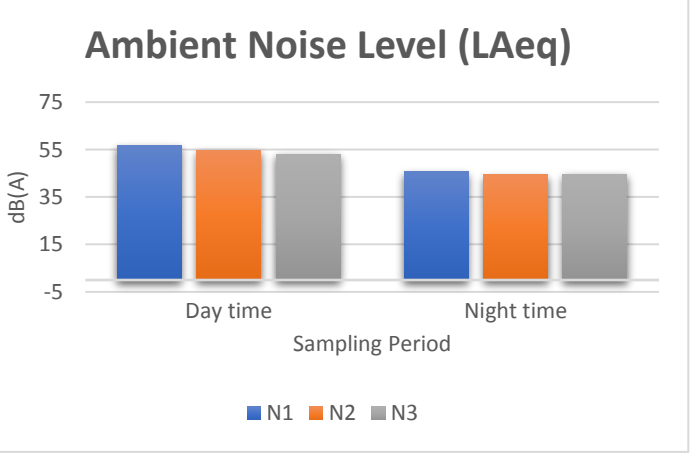
Parameter	Unit	Results		
		A1	A2	A3
PM_{10}	µg/m³	39	34	36
$PM_{2.5}$	µg/m³	14	10	11
SO_2	µg/m³	ND	ND	ND
NO_2	µg/m³	ND	ND	ND
CO	mg/m³	ND	ND	ND
O_3	µg/m³	ND	ND	ND

19th - 22nd Mac 2025

A1 **A2** **A3**

TAHAP BUNYI AMBIEN

- Tiga stesen pemantauan telah disediakan (pintu masuk projek, Pos Blau, dan perumahan pekerja kelapa sawit).
- Semua keputusan adalah di bawah had dibenarkan yang disyorkan (55–70 dBA bergantung pada penggunaan tanah).
- Punca bunyi bising adalah terutamanya lalu lintas kenderaan dan aktiviti komunal.



19th - 22nd Mac 2025

N1 **N2** **N3**

TAHAP BUNYI AMBIEN

- Tiga stesen pemantauan telah disediakan (pintu masuk projek, Pos Blau, dan perumahan pekerja kelapa sawit).
- V1 dipatuhi; V2 dan V3 merekodkan nilai siang hari sedikit melebihi had rujukan kediaman tetapi kekal di bawah paras yang dikaitkan dengan kerosakan struktur.

Station	Peak Vektor Sum (mm/s)		2nd Schedule for Human Response and from Stady State Continuous Vibrations (mm/s)	
	Day time	Night time	Day time	Night time
V1	0.857	0.172	0.8 mm/s to 1.6 **(Industrial)**	0.8 mm/s to 1.6 **(Industrial)**
V2	**0.489**	0.132	0.2 mm/s to 0.4 **(Residential)**	0.22 **(Residential)**
V3	**0.558**	0.196		

19th - 22nd Mac 2025

V1

V2

V3

PENILAIAN IMPAK ALAM SEKITAR

HAKISAN TANAH & PEMENDAPAN

Fasa Pembinaan:

- Pembersihan tanah, pembinaan jalan, dan penyingkiran timbunan mendedahkan tanah, meningkatkan risiko hakisan dan pemendapan ke dalam sungai berdekatan. Tanpa kawalan, kehilangan tanah mungkin melebihi 4,209 t/ha/th; dengan BMP (perangkap kelodak, longkang, sungkupan), kerugian berkurangan kepada ~42 t/ha/th.

Fasa Operasi:

- Risiko berterusan daripada stok simpanan dan jalan pengangkutan, tetapi boleh diurus dengan penutupan tumbuh-tumbuhan, teres dan lembangan sedimen.

KESTABILAN CERUN

Fasa Pembinaan:

- Kerja tanah dan pemotongan sementara boleh menjejaskan kestabilan cerun.

Fasa Operasi:

- Bangku kuari dan cerun akhir berisiko kegagalan (planar, baji, tumbang, bulat) akibat letupan dan luluhawa. Memerlukan pemantauan dan penstabilan berterusan (saliran, reka bentuk cerun, penyelenggaraan).

PENGURUSAN LEBIHAN BEBAN

Fasa Pembinaan:

- Pelucutan dan penimbunan berskala besar boleh menyebabkan hakisan, tanah runtuh dan habuk jika tidak diurus.

Fasa Operasi:

- Stok simpanan jangka panjang boleh menjejaskan kualiti saliran dan visual. Penempatan yang betul, pemadatan, turfing, dan penggunaan semula progresif untuk pemulihan adalah penting.

KUALITI AIR

Fasa Pembinaan:

- Larian dengan TSS yang tinggi, efluen kumbahan daripada pekerja, dan kebocoran minyak/gris menimbulkan risiko. Dengan BMP, TSS disimpan dalam had Kelas III NWQS.

Fasa Operasi:

- Larian sedimen dan kebocoran minyak kekal menjadi kebimbangan. Loji pemprosesan menggunakan sistem dengan amalan BMP, dengan air dikitar semula melalui kolam tailing, meminimumkan pencemaran

HIDROLOGI (BANJIR)

Fasa Pembinaan:

- Pembersihan meningkatkan air larian, aliran puncak dan potensi kelodak hiliran.

Fasa Operasi:

- Lompang kuari mengubah saliran; limpahan atau kegagalan kolam semasa ribut boleh memburukkan lagi risiko banjir. Kawalan hidrologi (lembangan sedimen, longkang) adalah kritikal

KUALITI AIR TANAH

Fasa Pembinaan & Operasi:

- Kesan terhad dijangka. Risiko termasuk penyusupan tumpahan bahan api/minyak dan pola cas semula yang diubah akibat pembersihan tanah. Mitigasi: penyimpanan berlapis, pembendungan tumpahan, dan saliran yang betul.

KUALITI UDARA

Fasa Pembinaan:

- Habuk daripada kerja tanah, jalan pengangkutan, dan pelepasan peralatan.

Fasa Operasi:

- Habuk daripada letupan, penghancuran, dan simpanan; pelepasan ekzos daripada jentera. Disetempat tetapi boleh dikawal dengan penyemburan air, penutup dan penyelenggaraan kenderaan.

LETUPAN BATU

Fasa Pembinaan:

- Minimum (hanya persediaan awal).

Fasa Operasi:

- Sumber utama getaran, fly-rock, dan tekanan udara yang berlebihan. Kesan setempat; protokol keselamatan dan letupan terkawal mengurangkan risiko.

BISING

Fasa Pembinaan:

- Jentera dan pengangkutan mencipta bunyi sekejap-sekejap; kesan setempat.

Fasa Operasi:

- Operasi berterusan (menghancurkan, letupan, kenderaan) menjana tahap yang lebih tinggi. Kesan boleh diurus dengan zon penampan, penjadualan dan penyelenggaraan peralatan.

PENGURUSAN SISA

Fasa Pembinaan:

- Biojisim, serpihan pembinaan, dan kumbahan. Memerlukan pengasingan, pelupusan yang betul dan kontraktor berlesen.

Fasa Operasi:

- Sisa domestik, sisa terjadual (minyak, penapis), dan beban lebih. Diuruskan melalui amalan 3R, penyimpanan sisa berjadual dan pelupusan berlesen berkala.

TRAFIK & PENGANGKUTAN

Fasa Pembinaan:

- Peningkatan pergerakan jentera dan bahan boleh membebankan jalan masuk.

Fasa Operasi:

- Pengangkutan batu silika meningkatkan trafik kenderaan berat; risiko kesesakan, kemalangan, dan kemerosotan jalan raya. Pelan pengurusan trafik diperlukan.

PENILAIAN SOSIO-EKONOMI

Fasa Pembinaan:

- Peluang pekerjaan jangka pendek dan bekalan tempatan.

Fasa Operasi:

- Manfaat positif jangka panjang daripada pekerjaan, peluang perniagaan dan pertumbuhan ekonomi tempatan. Negatif kecil: pencerobohan visual dan potensi gangguan kesihatan daripada habuk/bunyi.

EKOLOGI

Fasa Pembinaan:

- Pembersihan hutan menyebabkan kehilangan habitat dan gangguan fauna.

Fasa Operasi:

- Kesan jangka panjang terhadap biodiversiti dan pemecahan habitat. Zon pemulihan dan penampan membantu mengurangkan kerugian.

IMPAK RESIDUAL

- Walaupun dengan mitigasi, kesan sisa termasuk perubahan bentuk muka bumi yang kekal, kehilangan habitat hutan semula jadi, pencerobohan visual, dan potensi ketidakstabilan cerun jangka panjang. Walau bagaimanapun, faedah sosio-ekonomi dan program pemulihan boleh mengimbangi beberapa hasil yang buruk.

LANGKAH MITIGASI

HAKISAN TANAH & PEMENDAPAN

Pembinaan:

- Melaksanakan ESCP dan BMP termasuk pembersihan berperingkat, pembenihan hidro, sungkupan, pagar kelodak, empangan cek, lembangan sedimen, dan longkang perimeter.

Operasi:

- Mengekalkan kawalan LDP2M2, menanam semula kawasan terdedah, dan memastikan pemeriksaan, penyelenggaraan dan pemantauan berkala untuk mengelakkan pelepasan sedimen.

KESTABILAN CERUN

Pembinaan & Operasi:

- Reka bentuk cerun selamat dengan bangku, tali tangkapan, saliran yang betul, pemadatan, dan turfing segera. Pemantauan dan pemeriksaan geoteknikal yang kerap akan meminimumkan risiko kegagalan

PENGURUSAN LEBIHAN BEBAN

Pembinaan & Operasi:

- Guna semula untuk bund, stockpile padat >30 m dari laluan air, pengangkutan berbumbung, saliran yang betul di sekitar tapak pelupusan, dan pagar kelodak di pangkalan busut
-

KESTABILAN CERUN

Pembinaan & Operasi:

- Reka bentuk cerun selamat dengan bangku, tali tangkapan, saliran yang betul, pemadatan, dan turfing segera. Pemantauan dan pemeriksaan geoteknikal yang kerap akan meminimumkan risiko kegagalan.

KUALITI AIR

Pembinaan:

- Besen sedimen, simpanan bahan api berikat, kit tumpahan, pematuhan sisa terjadual, tangki septik, dan perangkap minyak.

Operasi:

- Larian terkawal ke kolam kelodak, lencongan air ribut, pemantauan riparian, pemulihan progresif, dan larangan ketat pembakaran terbuka

KUALITI AIR TANAH

Pembinaan & Operasi:

- Penggalian berurutan, penimbusan semula, penyimpanan bahan kimia berikat, kolam berbaris dengan betul, dan pemantauan berterusan untuk mengelakkan penyusupan bahan cemar

HIDROLOGI (BANJIR)

Pembinaan & Operasi:

- Kolam penahanan yang mencukupi, longkang perimeter, desilting, bund banjir, dan simpanan kolam yang direka untuk ARI selama 50 tahun. Pemulihan selepas penutupan untuk memulihkan saliran semula jadi

LETUPAN BATU

Operasi:

- Peletupan terkawal dengan had MIC, pengoptimuman reka bentuk letupan, pengumuman masa, zon penampan, penggunaan jaring/penghalang, pertimbangan cuaca, pemantauan getaran dan protokol keselamatan yang ketat

BISING

Pembinaan & Operasi:

- Hadkan pada waktu siang (7 pagi–7 malam), menyelenggara jentera, penyenyap yang sesuai, mengenakan had laju kenderaan, operasi berperingkat, dan sediakan PPE (penyumbat telinga/penutup telinga). Mematuhi peraturan bunyi OSHA dan DOE

Pengurusan Sisa

Pembinaan & Operasi:

- Pengemasan yang baik, kitar semula/guna semula, tapak pelupusan yang ditetapkan, pengkomposan tumbuh-tumbuhan, tiada pembakaran terbuka, dan penyimpanan/pengendalian sisa berjadual mematuhi JAS dengan kontraktor berlesen

PENILAIAN SOSIO-EKONOMI

Pembinaan & Operasi:

- Pengambilan pekerja asing secara sah, pemeriksaan kesihatan, penginapan luar tapak yang betul, perhubungan komuniti, pengendalian aduan, kesedaran tentang norma sosiobudaya, dan program pencegahan penyakit.

TRAFIK & PENGANGKUTAN

Pembinaan & Operasi:

- Gunakan laluan yang ditetapkan, elakkan waktu puncak, kuatkuasakan had laju, sediakan papan tanda dan penanda bendera, tutup muatan, potong tumbuh-tumbuhan di tepi jalan, selenggara kenderaan, dan simpan rekod kemalangan

KESELAMATAN & KESIHATAN PEKERJAAN

Pembinaan & Operasi:

- Pematuhan dengan OSHA 1994, pemeriksaan kesihatan pekerja, penyediaan PPE, pertolongan cemas dan ERP, taklimat keselamatan, pagar dan pengawal, pergerakan kenderaan yang diawasi, dan pematuhan SOP COVID-19

EKOLOGI

Flora:

- Pemulihan progresif dengan spesies asli, pemulihan padang coklat ke padang hijau, dan penambakan jangka panjang untuk pertanian/perladangan.

Fauna:

- Menguatkuasakan Akta Pemuliharaan Hidupan Liar 2010, melarang pemburuan haram, menjalankan kajian hidupan liar, kempen kesedaran, pelaporan konflik manusia-hidupan liar, dan pelaksanaan Pelan Pengurusan Hidupan Liar (WMP)

PENINGGALAN

Fasa Penutupan:

- Lubang penimbunan semula, penanaman semula, pemulihan tutupan hutan, penukaran kepada perladangan/pertanian, pemulihan hidrologi semula jadi dan air bawah tanah, dan pemantauan ekologi jangka panjang.

PROGRAM PEMANTAUAN SEMASA FASA PEMBINAAN

PEMANTAUAN PEMATUHAN

Pemantauan Pematuhan (CM) dilakukan untuk memastikan pelepasan dari tapak mematuhi piawaian. Ini adalah untuk melindungi bahawa pelepasan dari tapak tidak mencemarkan ambien di sekitar tapak. Item untuk CM ialah titik pelepasan akhir dari perangkap kelodak/alur keluar lembangan enapan dalam tapak projek. Parameter yang terlibat ialah Jumlah Pepejal Terampai dan Kekeruhan. Had untuk kedua-dua parameter ialah 50mg/L dan 250 NTU masing-masing.

PEMANTAUAN PRESTASI

Pemantauan Prestasi (PM) akan berdasarkan penilaian Pencegahan Pencemaran dan Langkah Tebatan (P2M2) diambil untuk Projek ini. Pegawai Alam Sekitar (EO) atau Certified Competent Orang hendaklah menjalankan pemantauan prestasi di tapak.

No.	Performance Monitoring Items	Remarks	Frequencies
1.	Temporary earth drains	To ensure that the surface runoff flows smoothly in the drain. To ensure that the drain is channelised to the sediment basin.	Daily
2.	Wash trough	The wash-off from the wash trough must be channelled into the drainage. To maintain the workability of the facility. To desilt sediment and silt in the wash trough.	Weekly
3.	Silt trap/Sediment Basins	To remove accumulated silt / sediment to maintain at least ⅓ of the design capacity of the basin.	When necessary
4.	Fuel, grease, engine oil storage facilities, raw materials storage	Fuel, grease, engine oil storage and raw materials storage (chemicals, etc.) area must be covered and carefully sited and to avoid contamination of the surface waters. All storage of chemicals should be in bunded areas.	Daily
5.	Waste management system	Properly managed central waste collection system.	When necessary
6.	Vehicles emissions	All vehicles involved with the Project must be regularly maintained and ensured they are in good condition.	When necessary
7.	Noise source from machinery and vehicles	Machines and vehicles (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum.	When necessary

PEMANTAUAN IMPAK

Station	Coordinates	Description of Location	Parameters Monitored	Standards	Frequency
Water Quality					
RW1	4°42'58.82"N 101°43'6.11"E	Upstream of Sg Berok	pH, Temperature, DO DOsat, Conductivity, Turbidity, BODs, COD , TSS, Oil & Grease, Ammoniacal Nitrogen (NH3-, Phenol , Nitrate, Phosphate, Faecal Coliform, Total Coliform, Hg, Cd, Pb, Cr3+, Fe, Sn, B, Cu, As, Cr6+, Mn, Ni, Zn	National Water Quality Standard (NWQS)	Monthly or as required by DOE Negeri Kelantan
RW2	4°43'38.60"N 101°43'30.61"E	Mid stream of Sg.Berok			
RW3	4°43'58.57"N 101°44'7.23"E	Midstream of Sg.Berok			
RW4	4°43'59.34"N 101°44'36.89"E	Midstream of Sg. Berok			
RW5	4°44'57.97"N 101°45'19.91"E	Downstream of Sg. Berok			
W1	4°43'13.34"N 101°44'2.86"E	Upstream of unnamed tributary			
W2	4°43'22.30"N 101°44'17.48"E	Mid-stream of unnamed tributary			
W3	4°43'54.23"N 101°44'26.08"E	Downstream of unnamed tributary			
Ambient Air Quality					
A1	4°43'9.17"N 101°44'2.45"E	Within the entrance of the Project Site	PM_{10}, $PM_{2.5}$,	Malaysia Ambient Air Quality Standard(MAAQS)	Quarterly or as required by DOE Kelantan
A2	4°45'37.18"N 101°45'20.42"E	Within Pos Blau (near to school and houses)			
A3	4°43'47.12"N 101°40'53.35"E	Near to oil palm plantation workers house			
Noise Level					
N1	4°43'9.17"N 101°44'2.45"E	Within the entrance of the Project Site	LAeq, Lmin, Lmax, L10, L90	Second Schedule: Receiving Land Use for Industrial Zones and Low Density Residential, Noise Sensitive Receptors, Institutional (School, Hospital, Worship)	Quarterly or as required by DOE Kelantan
N2	4°45'37.18"N 101°45'20.42"E	Within Pos Blau (near to school and houses)			
N3	4°43'47.12"N 101°40'53.35"E	Near to oil palm plantation workers house			
Vibration and airblast					
V1	4°43'9.17"N 101°44'2.45"E	Within the entrance of the Project Site	Vibration and airblast	Second Schedule Recommended Vibration Limits for Human Response and Annoyance from Steady State Continuous Vibration	Every Major Blast Activity
V2	4°45'37.18"N 101°45'20.42"E	Within Pos Blau (near to school and houses)			
V3	4°43'47.12"N 101°40'53.35"E	Near to oil palm plantation workers house			

PROGRAM PEMANTAUAN SEMASA FASA PEMBINAAN

EIA menyimpulkan bahawa projek yang dicadangkan itu boleh dilaksanakan secara alam sekitar dengan syarat semua langkah mitigasi dan pemantauan yang disyorkan dilaksanakan dengan berkesan. Dengan pematuhan ketat kepada keperluan berkanun, BMP (Amalan Pengurusan Terbaik), dan pengawasan alam sekitar yang berterusan, kesan sisa projek dijangka kecil dan boleh diurus. Tambahan pula, projek itu dijangka memberikan faedah sosio-ekonomi yang ketara, sejajar dengan objektif pembangunan negara dan negeri.