

RINGKASAN EKSEKUTIF



PEMILIK PROJEK



Jabatan Kerja Raya (JKR) Malaysia

PENGERAK PROJEK



MCS Management Sdn Bhd

KONSULTAN EIA



AK Progresif Sdn Bhd

RINGKASAN EKSEKUTIF

KEPERLUAN UNDANG-UNDANG

Projek yang dicadangkan ini terletak di bawah Jadual Pertama Perintah Kualiti Alam Sekitar (Aktiviti Ditetapkan) (Penilaian Kesan Alam Sekitar) 2015 sepertiberikut di bawah Seksyen 34A Akta Kualiti Alam Sekitar 1974 dan Garis Panduan Penilaian Kesan Alam Sekitar (EIA) di Malaysia oleh Jabatan Alam Sekitar (2016). Aktiviti 20(c): "Pembinaan jalan, terowong atau jambatan yang melintasi atau bersebelahan atau berdekatan dengan kawasan sensitif alam sekitar."

Aktiviti 13: Pembangunan atau pembersihan tanah yang meliputi kawasan yang kurang daripada 50 peratus cerun yang berkecerunan melebihi atau sama dengan 25° tetapi kurang daripada 35°.

DESKRIPSI PROJEK

- Projek yang dicadangkan melibatkan pembinaan infrastruktur jalan baharu iaitu Membina Jalan Menghubungkan Jalan Muka Sauk Petaseh (N62) dengan Simpang Durian, Jelebu, Negeri Sembilan No. Kontrak: JKR/PER/IP/CKUB/121/2025.
- Infrastruktur ini bertujuan meningkatkan tahap keterhubungan rangkaian jalan raya melalui kerja-kerja naik taraf dan pembinaan jalan dengan jumlah panjang kira-kira 14 km.
- Skop kerja merangkumi pembinaan laluan jalan baharu bagi mempertingkatkan kebolehcapaian serantau di Daerah Jelebu, di samping pembinaan *reinforced concrete pipes*, *drainage box culverts* dan sebuah jambatan merentasi Sungai Petaseh.
- Peringkat kritikal termasuk aktiviti pembersihan tapak, kerja tanah, kerja geoteknik dan kerja struktur.

AKTIVITI PROJEK

Fasa Pra-Pembinaan

Kajian Tanah dan Geoteknik

Pemerolehan Pembangunan

Penilaian Kesan Alam Sekitar

Perolehan Utiliti

Fasa Pembinaan

Pembersihan Tapak

Kerja-Kerja tanah

Penyediaan Tapak

Penyingkiran Bahan yang tidak sesuai

Kerja Potong dan Tambak

Pembinaan Pejabat Tapak

Kerja Cerucuk

Pengurusan Trafik

Fasa Operasi

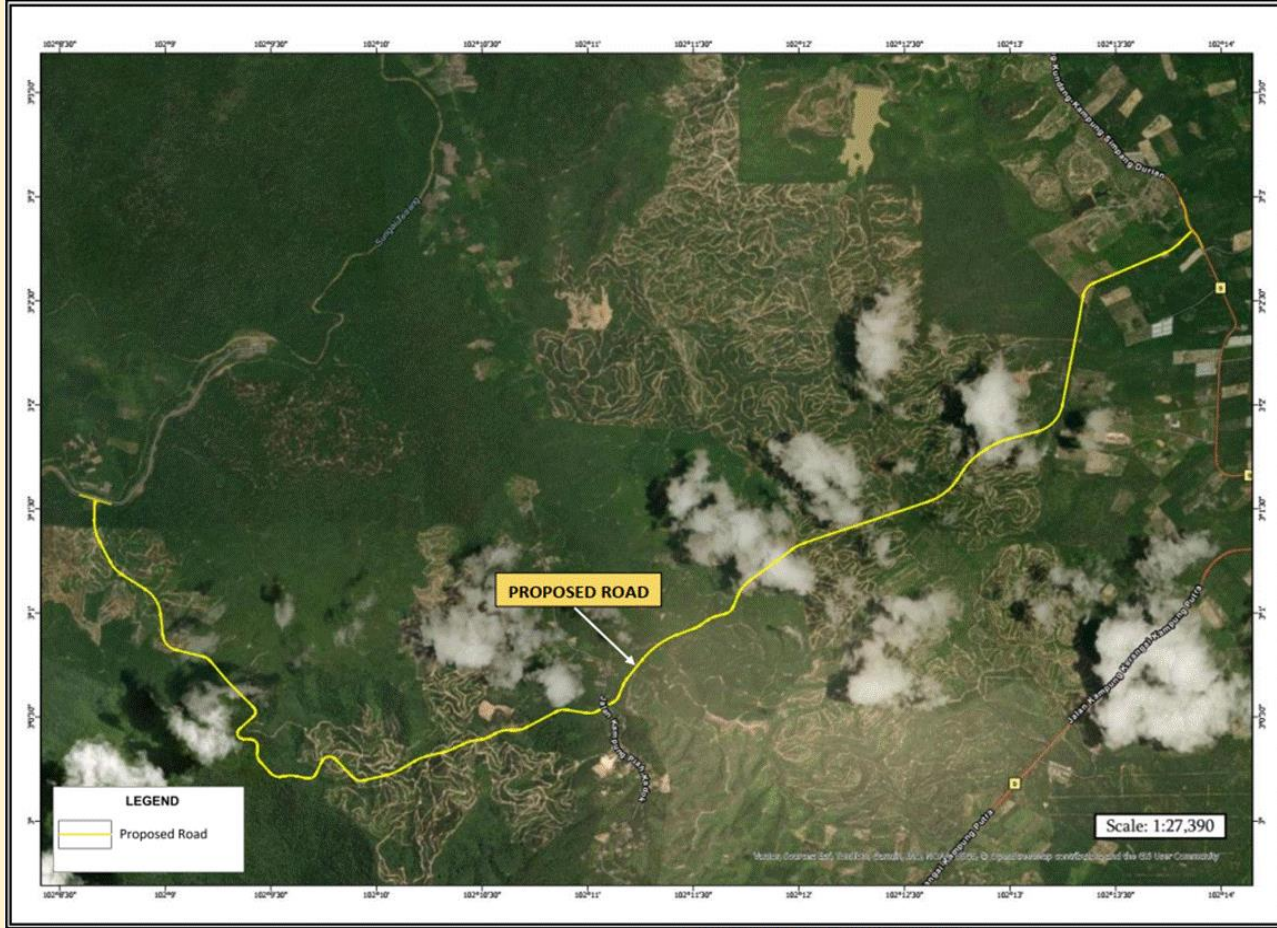
Trafik

Sistem Perparitan

Elektrik

Penyelenggaraan Jalan

KOMPONEN PERSEKITARAN



TITLE:
MEMBINA JALAN MENGHUBUNGAN JALAN MUKA SAUK PETASEH (N62) DENGAN SIMPANG DURIAN, JELEBU, NEGERI SEMBILAN

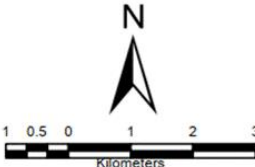
PROJECT PROPONENT:


JABATAN KERJA RAYA (JKR) MALAYSIA
Bahagian Pengurusan Projek Zon Luar Bandar,
Cawangan Jalan,
Tingkat 10, Blok F, Ibu Pejabat JKR Malaysia,
Jalan Sultan Salahuddin,
50582 Kuala Lumpur

ENVIRONMENT CONSULTANT:


AK PROGRESIF SDN. BHD.
No. 30-1A, Tingkat 1, Blok 12,
Jalan Pahat J15/J Dataran Otomobil,
Seksyen 15, 40200 Shah Alam,
Selangor Darul Ehsan.

SCALE:


1 0.5 0 1 2 3
Kilometers

SOURCE: DEPARTMENT OF SURVEY AND MAPPING MALAYSIA (JUPEM)

Komponen	Deskripsi
Umum	- Tapak projek yang dicadangkan terletak di Daerah Jelebu, Negeri Sembilan, kira-kira 16 km dari bandar Kuala Klawang. - Sebanyak tiga jenis guna tanah telah dikenalpasti dalam koridor sejauh 1 km (500 m di kedua-dua belah ROW) dari sempadan tapak projek. - Kawasan ini dikelilingi oleh Hutan Simpan Teriang, Sungai Teriang dan Sungai Petaseh.
Kualiti Air	- Sampel air telah diambil dari Stesen WQ1, WQ2, WQ3, WQ4, WQ6, WQ7, WQ8, WQ9, WQ10, WQ13, WQ14 dan WQ15 bagi mewakili kualiti air sedia ada di kawasan berhampiran tapak projek. - Berdasarkan <i>National Water Quality Standard</i> (NWQS), semua parameter bagi setiap stesen berada dalam had yang dibenarkan kecuali DO di Stesen WQ1, WQ2, WQ3 dan WQ8, serta TSS dan Ammoniacal Nitrogen di Stesen WQ9. - Nilai WQI adalah antara 69.17 ke 94.28. Kesemua stesen berada di bawah Kelas II, kecuali Stesen WQ8 (Kelas I) dan Stesen WQ9 (Kelas III).
Kualiti Udara Persekitaran	- Stesen A1 dan A2 berhampiran tapak projek telah dipantau. - Berdasarkan <i>New Malaysian Ambient Air Quality Standard</i> (MAAQS) 2020, semua keputusan pemantauan bagi kedua-dua stesen berada dalam had yang dibenarkan.
Kawalan Bunyi Bising	- Stesen N1 dan N2, yang masing-masing terletak di titik permulaan dan penghujung tapak projek yang dicadangkan, telah diapntau. - Berdasarkan <i>Guidelines for Environmental Noise Limits and Control, Third Edition</i> (2019), semua keputusan pemantauan bagi kedua-dua stesen adalah mematuhi had yang ditetapkan, kecuali tahap bunyi purata pada waktu siang dan malam di Stesen N2.
Pengukuran Getaran	- Stesen V1 dan V2 telah dipantau termasuklah penerima sensitif terdekat. - Berdasarkan <i>Guidelines for Environmental Vibration Limits and Control, Third Edition</i> (2021), semua keputusan pemantauan bagi kedua-dua stesen adalah mematuhi had yang ditetapkan.
Sosioekonomi	- Berdasarkan tinjauan, 97% bersetuju dengan projek yang dicadangkan, menunjukkan tahap penerimaan awam yang tinggi. - Majoriti responden (98%) menjangkakan peningkatan peluang perniagaan manakala 97% percaya projek ini akan mewujudkan lebih banyak peluang pekerjaan dalam sektor pembinaan.

IMPAK DAN MITIGASI			PROGRAM PEMANTAUAN ALAM SEKITAR	
Komponen	Impak	Mitigasi	Komponen	Penerangan
Hakisan tanah	Peningkatan pemendapan dan kekeruhan air mengurangkan kejernihan, menyebabkan kehilangan permukaan tanah yang subur, serta kualiti air berubah termasuk pH dan kandungan oksigen terlarut (<i>DO</i>).	- Penggunaan Amalan Pengurusan Terbaik (<i>BMP</i>) yang sesuai. - Pelaksanaan <i>LD-P2M2</i>.	Pemantauan Prestasi	Perangkap Kelodak - Untuk memantau prestasi dan fungsi struktur. - Kekerapan – Mingguan
Hidrologi/ Risiko Banjir	- Hakisan tanah dan pemendapan menyebabkan pengurangan kapasiti saluran sungai dan kemusnahan habitat akuatik. - Kejadian banjir kilat akibat kapasiti saluran berkurang dan peningkatan kawasan tak telap bersambung, mengakibatkan kerosakan harta dan kehilangan nyawa.	- Meminimumkan kerja pemotongan dan timbun bagi mengurangkan impak kerja tanah. - Melaksanakan pembukaan lahan secara berperingkat untuk mengehadkan larian permukaan dan hakisan. - Menyediakan sistem saliran, empangan semak, dan perangkap sedimen bagi mengawal larian permukaan. - Membersihkan sedimen dan serpihan daripada saliran secara berkala.		Dinding Penghadang, Longkang Tanah, Palung Basuh, Pagar Mendapan, Empangan Pemeriksa, Kawasan Penyimpanan dan Penanaman Rumput. - Untuk memantau prestasi dan fungsi struktur. - Kekerapan – Mingguan
Kualiti Air	- Pengurangan kapasiti aliran sungai menyebabkan banjir setempat, peningkatan kekeruhan, dan pencemaran air. - Pengurangan penembusan cahaya matahari menjejaskan fotosintesis akuatik dan menyebabkan kematian ikan. - Pencemaran daripada timbunan bahan yang diurus secara tidak betul. - Pencemaran minyak dan gris akibat kebocoran dan tumpahan. - Pencemaran air akibat pelupusan kumbahan yang tidak betul.	- Pasang perangkap kelodak dan takungan sedimen, laksanakan penyelenggaraan secara berkala. - Melaksanakan pembukaan lahan secara berperingkat untuk meminimumkan permukaan tanah terdedah. - Kawal pelepasan air mengikut piawaian; kandungi larian air di tapak menggunakan longkang dan empangan semak. - Jalankan pemeriksaan rutin, pembuangan sedimen, dan pemantauan kualiti air.	Pemantauan Pematuhan	Kualiti Air - Lokasi – 12 stesen (WQ1, WQ2, WQ3, WQ4, WQ6, WQ7, WQ8, WQ9, WQ10, WQ13,WQ14, and WQ15) - Parameter – pH, Suhu, DO, BOD, COD, TSS, Kekeruhan, O & G, AN, E.Coli - Tahap Pematuhan – <i>National Water Quality Standard (NWQS)</i> - Kekerapan – Bulanan
Kualiti Udara	Pencemar udara seperti asap, jerebu, karbon monoksida, dan zarah halus menyebabkan kegatalan mata, sakit kepala, masalah pernafasan, serta mengurangkan penglihatan dan kualiti estetik.	- Sentiasa selenggara semua kenderaan dan mesin pembinaan untuk mengurangkan pelepasan asap. - Sembur air pada tanah terdedah dan jalan pengangkutan 2–3 kali sehari bagi mengawal habuk. - Larang pembakaran terbuka bagi biomass dan sisa pepejal.		Perangkap Kelodak - Parameter – TSS & Kekeruhan - Tahap Pematuhan – 50 mg/L, 250 NTU - Kekerapan – Bulanan, dan selepas kejadian ribut (> 12.5 mm)
Pengurusan Sisa	- Penghasilan sisa pepejal menyebabkan bau, sampah berselerak, pencemaran air, kesan pemandangan, dan tarikan perosak. - Sisa biomass dan vegetasi menimbulkan risiko kebakaran, penyumbatan saliran, banjir, dan pencemaran air.	- Simpan sisa pepejal biasa dalam tong tertutup, dipisahkan daripada sisa terkawal, dan kurangkan penghasilan dengan penggunaan semula. - Pastikan semua sisa dilabel, disimpan, diangkut dan dilupuskan mengikut peraturan yang betul.		Kualiti Udara Ambien - Lokasi – 2 stesen (A1 dan A2) - Parameter – PM2.5, PM10, SO₂, NO₂, CO - Tahap Pematuhan – Malaysian <i>Ambient Air Quality Standard (2020)</i> - Kekerapan – Bulanan
Bunyi Bising /Getaran	- Bunyi dari pembinaan dan kenderaan menyebabkan gangguan dan kesukaran komunikasi. - Pendedahan bunyi boleh menyebabkan kerosakan pendengaran, gangguan tidur, dan tekanan. - Melebihi had bunyi di kawasan sensitif meningkatkan risiko kehilangan pendengaran. - Bunyi operasi kenderaan menyumbang kepada gangguan jangka panjang. - Getaran daripada penombakan dan jentera berat memberi kesan terhadap struktur dan alam sekitar.	- Gunakan peralatan senyap, penapis bunyi (muffler), dan penyelenggaraan yang betul untuk mengurangkan bunyi dan getaran. - Hadkan aktiviti bising dan bergetar pada waktu siang serta elakkan operasi serentak beberapa jentera.		Tahap Bunyi - Lokasi – 2 stesen (N1 dan N2) - Parameter – Leq, Lmax, Lmin, L05, L50, L90, L95 - Tahap Pematuhan – <i>The Planning Guidelines for Environmental Noise Limits and Control, 3rd Edition 2019 (Reprint 2021)</i> - Kekerapan – Bulanan
Flora dan Fauna	- Kesan minimum terhadap pokok bakau dan flora lain, dengan hanya sebahagian kecil habitat terjejas. - Kesan terhad terhadap fauna biasa, tiada spesies terancam atau besar terjejas. - Kesan tidak langsung ke atas hidupan akuatik akibat hakisan dan sedimen diurus melalui langkah pengurusan. - Haiwan mungkin tertarik sementara akibat sisa makanan, perlu dipantau untuk mengelak pemakanan pasif.	- Pembersihan tapak dijalankan secara berperingkat dan kumpul bahan organik; larang pembakaran terbuka. - Hadkan aktiviti pembersihan tapak hanya kepada kawasan dalam laluan '<i>right-of-way (ROW)</i>'. - Laksanakan Pelan Pengurusan Hidupan Liar (<i>Wildlife Management Plan - WMP</i>). - Bekerjasama dengan Jabatan PERHILITAN untuk menyelamatkan dan memindahkan haiwan liar yang tercedera, terperangkap atau kehilangan habitat.		Pengukuran Getaran - Lokasi – 2 stesen (V1 dan V2) - Parameter – Puncak Getaran Menegak Vmax (mm/s) - Tahap Pematuhan – <i>The Planning Guidelines for Vibration Limits and Control, Third Edition (2021)</i> - Kekerapan – Bulanan
Sosio-ekonomi	- Kesan positif terhadap ekonomi tempatan melalui peluang perniagaan dan pekerjaan. - Peningkatan kesalinghubungan dan aksesibiliti, mengurangkan masa perjalanan serta memperbaiki perkhidmatan pengangkutan. - Gangguan terhadap kehidupan harian semasa pembinaan akibat bunyi, habuk, getaran, dan kesesakan lalu lintas.	- Kekalkan manfaat pekerjaan dan perniagaan untuk penduduk tempatan. - Pastikan penyelenggaraan saliran dan terusan yang betul bagi mengelakkan banjir. - Sediakan papan tanda dan kawalan trafik untuk meningkatkan keselamatan jalan raya. - Pantau dan patuhi Pelan Pengurusan Alam Sekitar (<i>EMP</i>) serta peraturan alam sekitar.	Pemantauan Impak	Kualiti Air - Pemeriksaan visual, analisis kekeruhan - Pemerhatian/tinjauan kehadiran/ketiadaan spesies akuatik - Pengukuran menggunakan tolok kedalaman atau tolok aras air - Rekod aduan, penglibatan komuniti
Trafik	- Pemodelan trafik menyediakan asas untuk menganggar corak perjalanan semasa dan masa depan. - Simulasi mengenal pasti keperluan infrastruktur dan menilai kesan pembangunan jalan yang dicadangkan. - Senario masa depan (2038 dan 2048) menilai trafik di bawah keadaan “tiada tindakan” dan “dengan pembangunan”.	- Sediakan Pelan Pengurusan Trafik (<i>TMP</i>) yang terperinci. - Pasang papan tanda had laju dan amaran yang jelas di kawasan tapak kerja. - Perjalanan pengangkutan hendaklah mengelakkan daripada waktu puncak dan dihadkan kepada waktu siang sahaja. - Tubuhkan '<i>Emergency Response Team (ERT)</i>' bagi penyelarasan trafik semasa kecemasan		Kualiti Udara Ambien - Pemeriksaan tapak, rekod gambar - Pemeriksaan visual, bacaan meter habuk - Rekod aduan, penglibatan komuniti
Geobencana	- Tanah runtuh dan kegagalan cerun yang membahayakan jalan serta infrastruktur - Kerosakan struktur, bahaya keselamatan, dan peningkatan kos penyelenggaraan - Pemendapan sungai, kemerosotan kualiti air, dan kehilangan lapisan tanah atas - Banjir di jalan, gangguan lalu lintas, dan kerosakan infrastruktur - Mendapan tanah, ketidakstabilan asas, dan risiko kegagalan struktur - Peningkatan aliran permukaan yang menyebabkan banjir setempat dan hakisan hilir - Perubahan morfologi sungai yang meningkatkan risiko banjir	- Mengoptimumkan jajaran dan mengelakkan kawasan sensitif atau berisiko banjir - Menstabilkan cerun dan melindungi permukaan - Menjalankan penyiasatan geoteknikal serta memastikan reka bentuk asas yang sesuai - Melaksanakan langkah kawalan hakisan dan pemendapan - Menyediakan sistem saliran yang mencukupi serta mengekalkan aliran semula jadi - Melaksanakan pemantauan dan penyelenggaraan secara berkala - Menggunakan kaedah pembinaan yang sesuai untuk meminimumkan gangguan - Melaksanakan kawalan pengurusan air larian hujan yang berkesan		Tahap Bunyi Rekod aduan, penglibatan komuniti
Pengabaian projek	- Kerugian kewangan bagi pemaju, kerajaan, dan komuniti akibat pembatalan projek. - Bahaya keselamatan daripada struktur yang tidak lengkap, peralatan terdedah, dan serpihan. - Kemerosotan keadaan jalan semasa fasa operasi, menyebabkan perjalanan tidak selamat, aliran trafik terganggu, dan impak alam sekitar jangka panjang. - Tapak pembinaan terbengkalai menimbulkan risiko keselamatan. - Isu alam sekitar mungkin timbul akibat bahan pembinaan terdedah atau sistem saliran yang rosak.	- Laksanakan pemulihan tapak. - Pastikan pengurusan dijalankan dengan betul. - Libatkan komuniti untuk menangani kebimbangan berkaitan penggunaan tanah, keselamatan, dan impak jangka panjang.		Kaedah Pengukuran Getaran Pemeriksaan visual, rekod gambar, maklum balas penduduk

EXECUTIVE SUMMARY



PROJECT OWNER



Jabatan Kerja Raya
(JKR) Malaysia

PROJECT PROPONENT



MCS Management
Sdn Bhd

EIA CONSULTANT



AK PROGRESIF SDN BHD
(12554634-U)

AK Progresif Sdn Bhd

EXECUTIVE SUMMARY

LEGAL REQUIREMENT

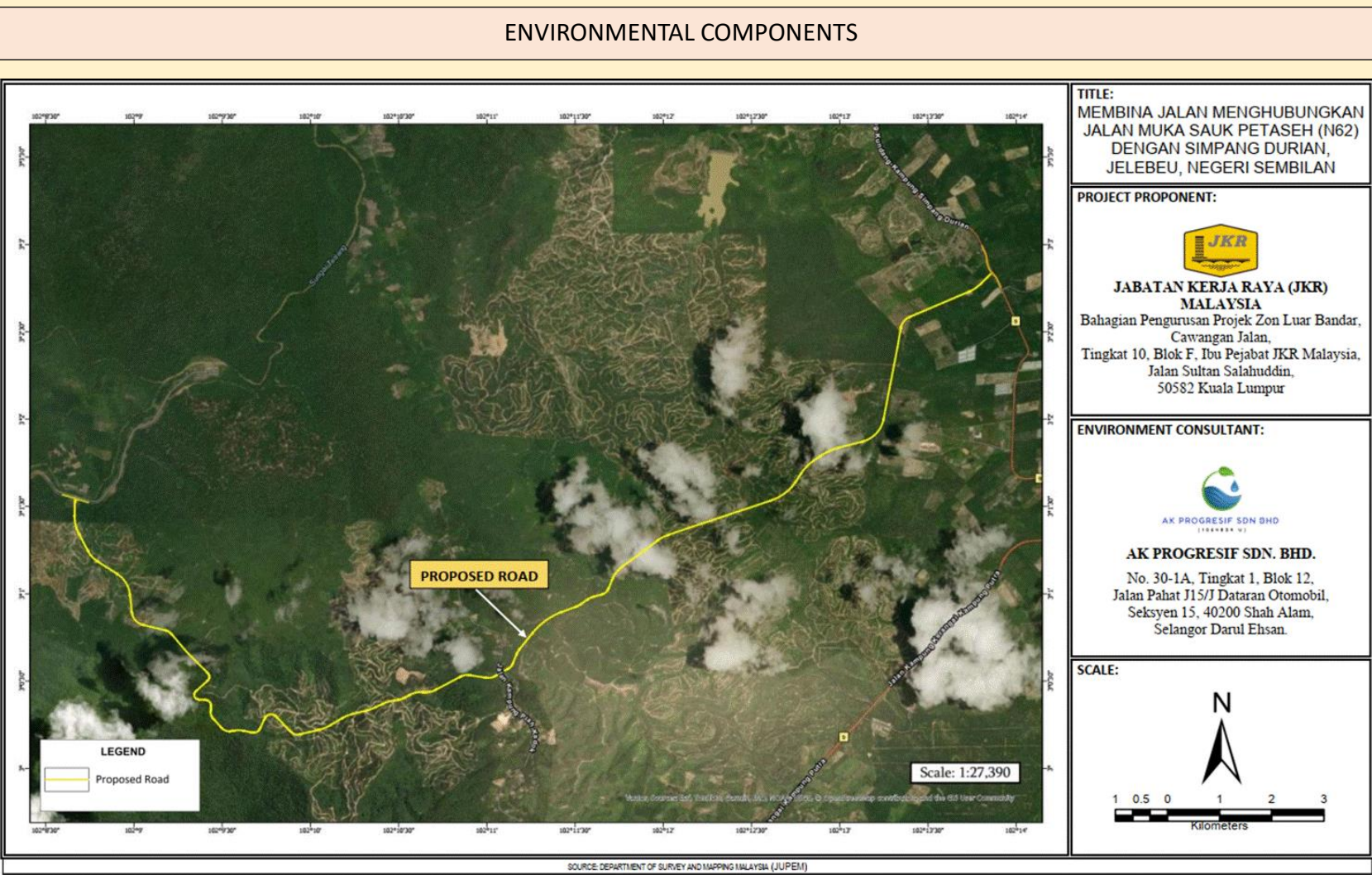
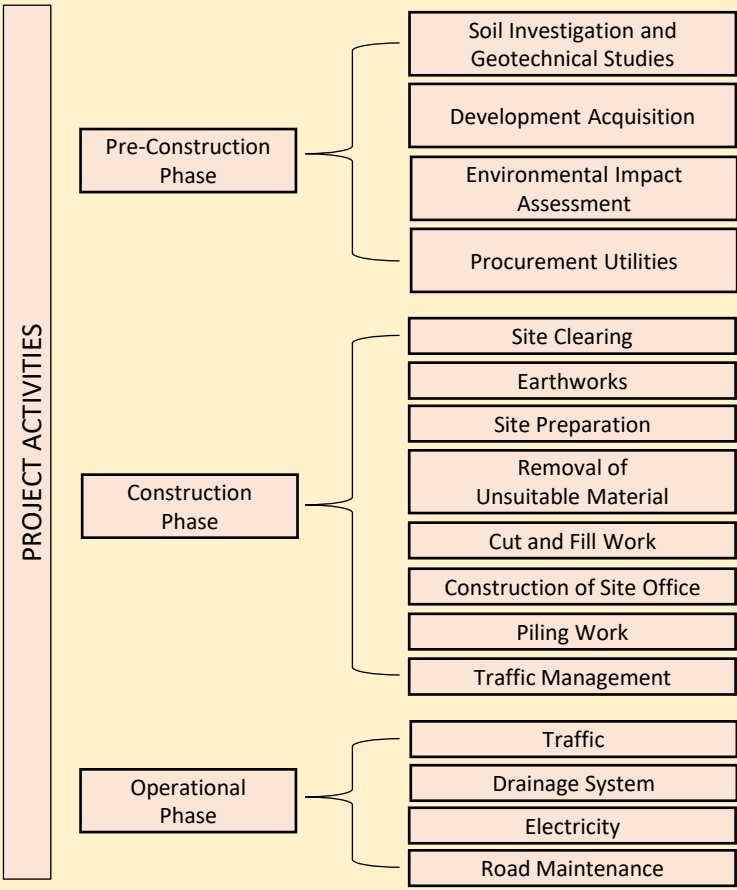
This proposed project falls under the First Schedule of the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015 as follows under Section 34A of the Environmental Quality Act 1974 and the Environmental Impact Assessment (EIA) Guidelines in Malaysia by the Department of Environment (2016).

Activity 20 (c): Road, “Construction of road, tunnel or bridge traversing or adjacent or near to environmentally sensitive areas.”

Activity 13 – Development or land clearing less than 50 percent of an area with slope greater than or equal to 25° but less than 35°

PROJECT DESCRIPTION

- The proposed project involves constructing a new road infrastructure named *Memina Jalan Menghubungkan Jalan Muka Sauk Petaseh (N62) dengan Simpang Durian, Jelevu, Negeri Sembilan* No. Kontrak: *JKR/PER/IP/CKUB/121/2025*.
- The infrastructure is to enhance road connectivity by upgrading and constructing a total stretch of 14 km of roadway.
- The scope of works includes the construction of a new road link to improve regional accessibility within the District of Jelevu, Negeri Sembilan, as well as the construction of reinforced concrete pipes, drainage box culverts and a bridge across Sungai Petaseh.
- The critical stages include site clearing activities, earthworks, geotechnical works and structural works.



Component	Description
General	- The proposed project site is located in Jelevu district, Negeri Sembilan, about 16 km away from Kuala Klawang city. - There are three land use types within the 1 km corridor (500 m on either side of the ROW) from the project site boundary. - The project area is surrounded by Teriang Forest Reserve, <i>Sungai Teriang</i> and <i>Sungai Petaseh</i>.
Water Quality	- Water samples taken at Stations WQ1, WQ2, WQ3, WQ4, WQ6, WQ7, WQ8, WQ9, WQ10, WQ13, WQ14, and WQ15 representing the existing water quality near the project area. - Based on the National Water Quality Standard (NWQS), all the results for each station were within the permissible limit except for DO at Stations WQ1, WQ2, WQ3 and WQ8, TSS and Ammoniacal Nitrogen at Station WQ9. - WQI ranged from 69.17 to 94.28. All sampling stations classified as Class II, except for Station WQ8 (Class I) and Station WQ9 (Class III).
Ambient Air Quality	- Stations A1 and A2 were monitored which near the project site. - Based on the New Malaysian Ambient Air Quality Standards (MAAQs) 2020, all the results for both stations were within the permissible limit.
Noise Level	- Stations N1 and N2, located at the starting and end points of the proposed project, respectively, were monitored. - Based on the Guidelines for Environmental Noise Limits and Control, Third Edition (2019), all the monitoring results for both stations were in compliance with the stipulated limits, except for mean noise level during day and night time at Station N2.
Vibration Measurement	- Stations V1 and V2 were monitored which include the nearest sensitive receptors. - Based on the Guidelines for Environmental Vibration Limits and Control, Third Edition 2021, all the monitoring results for both stations were in compliance with the stipulated limits.
Socio-economic	- According to the survey, 97% agree with the proposed project, indicating a high level of public acceptance. - Majority of respondents (98%) anticipate an increase in business opportunities and 97% believe it will create more job openings in the construction sector.

IMPACT AND MITIGATION MEASURES

Component	Impact	Mitigation
Soil erosion	Sedimentation and turbidity levels increasing, reducing water clarity, causing loss of fertile topsoil, and altering water quality, including pH and dissolved oxygen levels.	- Utilization of appropriate Best Management Practice (BMPs). - Implementation of LD-P2M2.
Hydrology/ Flood Risk	- Soil erosion and sedimentation causing reduced river conveyance capacity and destruction of aquatic habitats. - Flash flood occurrences due to reduced conveyance capacity and increased connected impervious areas, resulting in property damage and loss of life.	- Optimize cut and fill to reduce earthwork impact. - Phase land clearing to limit runoff and erosion. - Use drains, check dams, and silt traps to control runoff. - Regularly remove silt and debris from drains.
Water Quality	- Reduction in river flow capacity causing localized flooding, turbidity, and water pollution. - Reduced sunlight penetration affecting aquatic photosynthesis and causing fish mortality. - Pollution from poorly managed stockpiles. - Oil and grease contamination from leaks and spills. - Water pollution from improper sewage disposal.	- Install silt traps and sediment basins, maintain regularly. - Phase land clearing to minimize exposed soil. - Control water discharge to meet standards; contain runoff on-site with drains and check dams. - Conduct routine inspections, sediment removal, and water quality monitoring.
Air Quality	Air pollutants such as smoke, haze, carbon monoxide, and particulate matter causing eye irritation, headaches, respiratory problems, and reducing visibility and aesthetic quality.	- Maintain all construction vehicles and machinery to reduce exhaust emissions. - Spray water on exposed soil and haulage roads 2–3 times daily to control dust. - Prohibit open burning of biomass and solid waste.
Waste Management	- Solid waste generation causing odor, litter, water contamination, visual impacts, and pest attraction. - Biomass and vegetation waste causing fire risk, drainage clogging, flooding, and water pollution.	- Store general solid waste in closed bins, segregated from scheduled waste, and minimize generation through reuse. - Ensure proper labeling, inventory, transport, and disposal of all wastes.
Noise/ Vibration	- Noise from construction and vehicles causing nuisance and communication disturbance. - Noise exposure leading to hearing impairment, sleep disturbance, and stress. - Exceedance of noise limits in sensitive areas raising risk of hearing loss. - Operational vehicle noise contributing to long-term disturbance. - Vibration from piling and heavy machinery causing structural and environmental impacts.	- Use quiet equipment, mufflers, and proper maintenance to reduce noise and vibration. - Confine noisy and vibrating activities to daytime and avoid simultaneous operation of multiple machines.
Flora and Fauna	- Minimal impact on mangrove trees and other flora, with only a small portion of habitat affected. - Limited impact on common fauna, with no endangered or large species affected. - Potential indirect effects on aquatic life from erosion and sedimentation mitigated through management measures. - Temporary attraction of animals due to food waste, requiring monitoring to prevent passive feeding.	- Clear vegetation in stages; collect biomass; no open burning. - Limit clearing activities strictly to areas within the Project's right-of-way (ROW). - Implement a Wildlife Management Plan (WMP). - Collaborate with Jabatan PERHILITAN for rescue and relocation of any displaced, trapped or injured wildlife.
Socio-economic	- Positive impact on local economy through business and employment opportunities. - Enhanced connectivity and accessibility, reducing travel time and improving transport services. - Disruption to daily life during construction from noise, dust, vibrations, and traffic congestion.	- Maintain local employment and business benefits. - Ensure proper drainage and culvert maintenance to prevent flooding. - Provide signage and traffic controls to enhance road safety. - Monitor and comply with EMP and environmental regulations.
Traffic	- Traffic modeling provides a baseline to estimate current and future travel patterns. - Simulation identifies infrastructure needs and evaluates the impact of proposed road development. - Future scenarios (2038 and 2048) assess traffic under “do nothing” and “with development” conditions.	- Prepare a detailed Traffic Management Plan (TMP). - Install clear speed limit and warning signs beside the worksite areas. - Transport trips shall avoid peak hours and restrict to day-time only. - Establish Emergency Response Team (ERT) - Ensure vehicles comply with tonnage limits
Geohazard	- Landslides and slope failure risking roads and infrastructure - Structural damage, safety hazards, higher maintenance costs - River sedimentation, poorer water quality, loss of topsoil - Road flooding, traffic disruption, infrastructure damage - Ground settlement, unstable foundations, risk of structural failure - Increased runoff causing local flooding and downstream erosion - Changes in river flow leading to higher flood risk	- Optimize alignment and avoid sensitive or flood-prone areas - Stabilize slopes and protect surfaces - Conduct geotechnical investigation and ensure proper foundation design - Implement erosion and sediment control measures - Provide adequate drainage and maintain natural flow - Carry out regular monitoring and maintenance - Use proper construction methods to minimize disturbance - Implement proper stormwater management controls
Project Abandonment	- Financial losses for the proponent, government, and community due to project cancellation. - Safety hazards from incomplete or abandoned structures, exposed equipment, and debris. - Deterioration of road conditions during operational stage, causing unsafe travel, poor traffic flow, and long-term environmental impacts. - Abandoned construction sites pose safety hazards. - Environmental issues may arise due to exposed construction materials or malfunctioning drainage systems	- Execute site rehabilitation. - Ensure proper management. - Public engagement to address concerns related to land use, safety and long-term impacts.

ENVIRONMENTAL MONITORING PROGRAM

Component	Description
Performance Monitoring	Silt Trap - To monitor performance and structure functionality. - Frequency – Weekly
	Hoarding Wall, Earth Drain, Wash Trough, Sediment Fence, Check Dam, Storage Area and Turfing - To monitor performance and structure functionality. - Frequency – Weekly
Compliance Monitoring	Water Quality - Location – 12 stations (WQ1, WQ2, WQ3, WQ4, WQ6, WQ7, WQ8, WQ9, WQ10, WQ13,WQ14, and WQ15) - Parameter – pH, Temperature, DO, BOD, COD, TSS, Turbidity, O & G, AN, E.Coli - Compliance Level – National Water Quality Standard (NWQS) - Frequency – Monthly
	Silt Trap - Parameter - TSS & Turbidity - Compliance Level – 50 mg/L 250 NTU - Frequency – Monthly, and after storm event (> 12.5 mm)
	Ambient Air Quality - Location – 2 stations (A1 and A2) - Parameter – PM2.5, PM10, SO2, NO2, CO - Compliance Level – Malaysian Ambient Air Quality Standard (2020) - Frequency – Monthly
	Noise Level - Location - 2 stations (N1 and N2) - Parameter – Leq, Lmax, Lmin, L05, L50, L90, L95 - Compliance Level – The Planning Guidelines for Environmental Noise Limits and Control, 3rd Edition 2019 (Reprint 2021) - Frequency – Monthly
	Vibration Measurement - Location - 2 stations (V1 and V2) - Parameter – Vertical Vibration Peak Vmax (mm/s) - Compliance Level – The Planning Guidelines for Vibration Limits and Control, Third Edition (2021) - Frequency – Monthly
Impact Monitoring	Water Quality - Visual inspection, laboratory analysis of turbidity - Observation/ survey of aquatic species presence/absence - Measurement using depth gauge or staff gauge - Complaint records, community engagement
	Ambient Air Quality - Site inspection, photographic records - Visual inspection, dust meter readings - Complaint records, community engagement
	Noise Level Complaint records, community engagement
	Vibration Measurement Visual inspection, photographic records, resident feedback