EXECUTIVE SUMMARY

ENVIRONMENTAL IMPACT ASSESSMENT (FIRST SCHEDULE)

PROPOSED 60,000 P.E. CENTRALISED SEWAGE TREATMENT PLANT UNDER TUARAN SEWERAGE SCHEME PHASE 1(A) AT CL.045316961, CL.045316970, CL.045316989, CL.045316998 AND CL.045079481, KG. DUNGANG, TUARAN, SABAH

PROJECT PROPONENT

JABATAN PERKHIDMATAN PEMBETUNGAN SABAH
Tingkat 3, 4, 9, 10 & 11 Menara C,
Wisma Tun Fuad Stephens, KM 2.4,
Jalan Tuaran, Karamunsing,
88300 Kota Kinabalu, Sabah.
Tel: 088-215 214 Fax: 088-215 652

Contact Persons:
- **Ir. Ts. Hj. Mohd Nadzree Imran** [Director]

Email:
jpps@sabah.gov.my

DESIGN & BUILD CONTRACTOR

BORNEAST GROUP SDN. BHD.
No. 1119, 3rd Floor,
Sunny Garden, Mile 1.5,
Jalan Tuaran,
88300 Kota Kinabalu.
Tel: 088-381 739 Fax: 088-385 569

Contact Persons:
- **Ir. Lee Chen Yen** [Project Manager]

Email:
borneastgroup@gmail.com

EIA CONSULTANT

ENVSOLVE SDN. BHD.
1st Floor, No. 3,
Lorong Kilang F, Kolombong,
88450 Kota Kinabalu, Sabah.
Tel: 088-388 791
Fax: 088-388 792

Contact Persons:
- **Ir. Ts. Burhanudin bin Abu Bakar** [EIA Team Leader]
- **ChM. Lo Su Mui** [Assistant Consultant]

Email:
envsolve@gmail.com; info@envsolve.com

QUALIFIED PERSON

1. **IR. TS. BURHANUDIN BIN ABU BAKAR** – EIA Consultant [CS0168]
2. **MR. LIM SZE FOOK** – EIA Consultant [CS0126]
3. **MR. TSEN KING FOH** – EIA Consultant [C0106]
4. **MR. AHMAD FAEZ BIN WANDI SALLEM** – EIA Consultant [C0681]
5. **ChM. LO SU MUI** – Assistant Consultant [AC0923]

LEGISLATIVE REQUIREMENTS

Section 34A, Environmental Quality Act, 1974
Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 2015

First Schedule

14. Waste Treatment and Disposal
(c) Sewage
(i) Construction of sewage treatment plant with 20,000 population equivalent or more

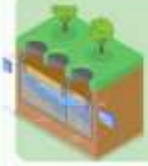
EIA report is therefore required for DOE approval prior to Project implementation.

LOCATION & ZONING PLAN

Location
CL.045316961, CL.045316970, CL.045316989, CL.045316998, and CL.045079481, Kg. Dungang, Tuaran

Zoning
Public Utility (PU) - by Sabah Town & Regional Planning Department

STATEMENT OF NEED



- Support Growth – Provide sewerage capacity for current and future development.
- Centralise Treatment – Establish a 60,000 P.E. CSTP for Laya-Laya and Tambalang.
- Improve Treatment – Achieve treated effluent quality in line with Standard A.
- Reduce Pollution – Minimise sewage impacts on Sungai Tuaran and drainage networks.
- Enhance Efficiency – Rationalise decentralised systems and improve long-term operation & maintenance.

PROJECT CONCEPT



Sewerage Catchment Area
Laya-Laya and Tambalang Sub-Catchment Area (Phase 1a of Tuaran Sewerage Scheme)

CSTP Design Basis
- Design Requirement: JPP Sabah requirements, MSIG and other applicable standards.
- Treatment Process: Sequencing Batch Reactor (SBR) system.
- Design Capacity: 60,000 P.E. (civil and structural).



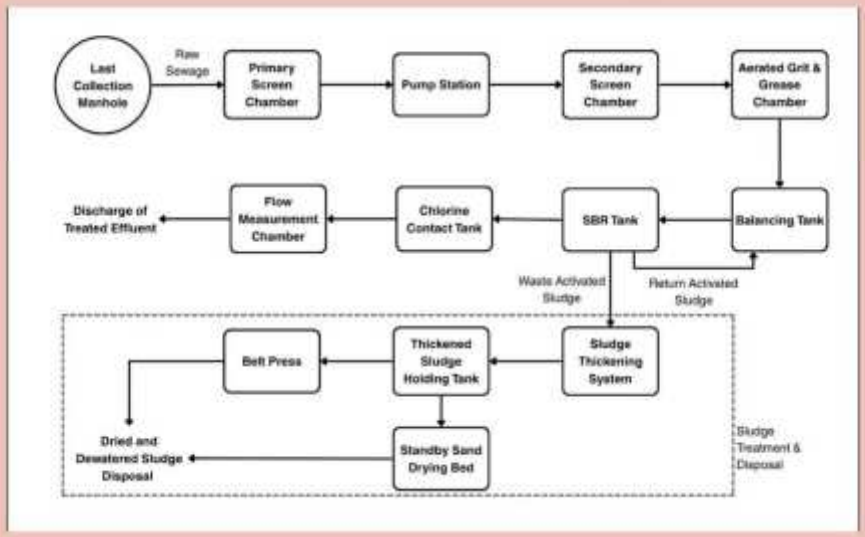


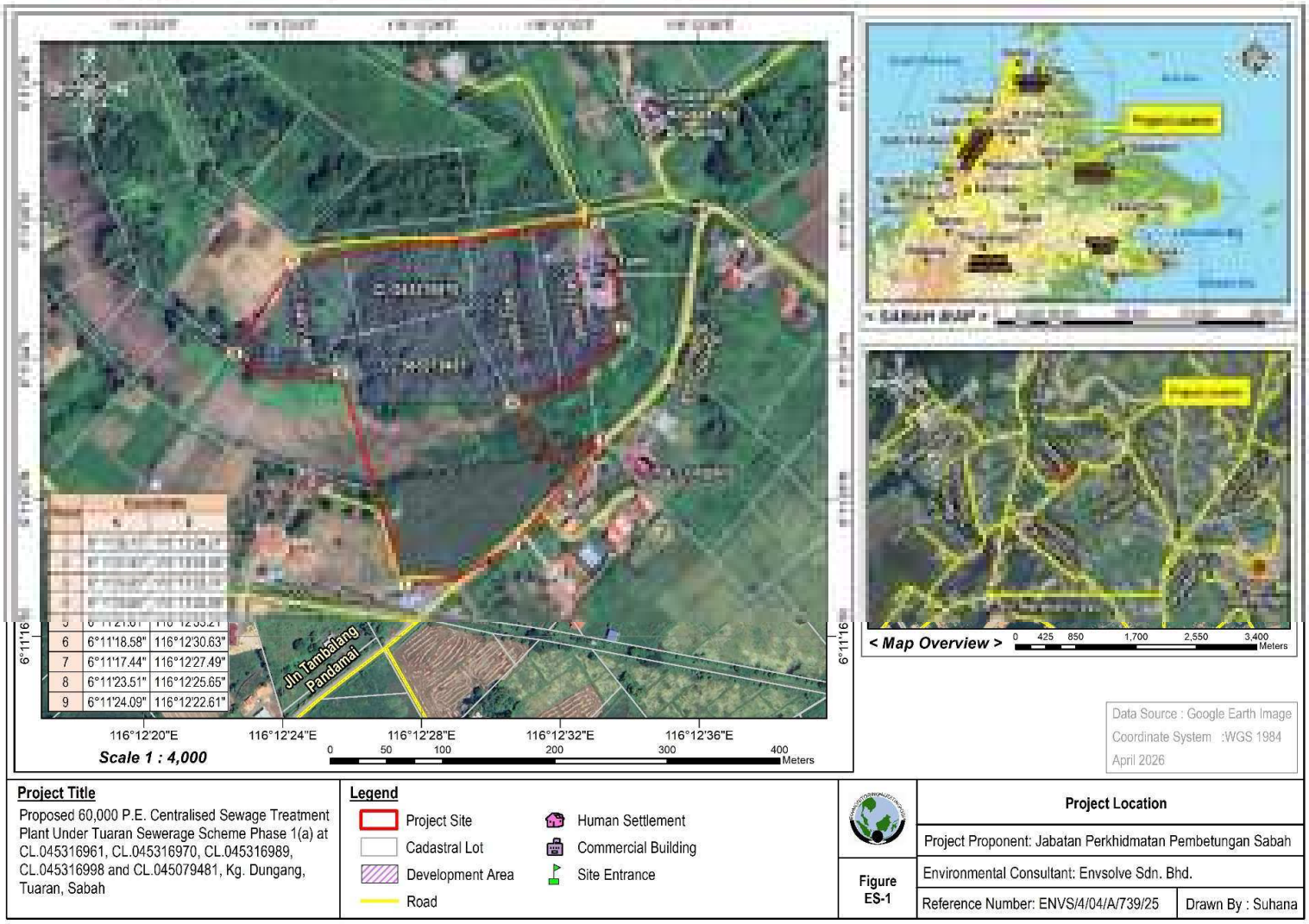
Project Component
- Preliminary Treatment: Inlet Chamber, Primary Screen, Pump Station, Secondary Screen, Aerated Grit & Grease Chamber, Balancing Tank
- Biological Treatment Systems: SBR
- Disinfection Sysem: Chlorine Contact Tank
- Supporting Facilities: Reuse effluent facilities and biosolids handling

Effluent Treatment and Discharge
- Treated to Standard A requirements under the **Second Schedule of the Environmental Quality (Sewage) Regulations 2009**.
- Treated effluent will be discharged to Sg. Tuaran via a 2.2 km long, 500 mm diameter D.I. pipeline.



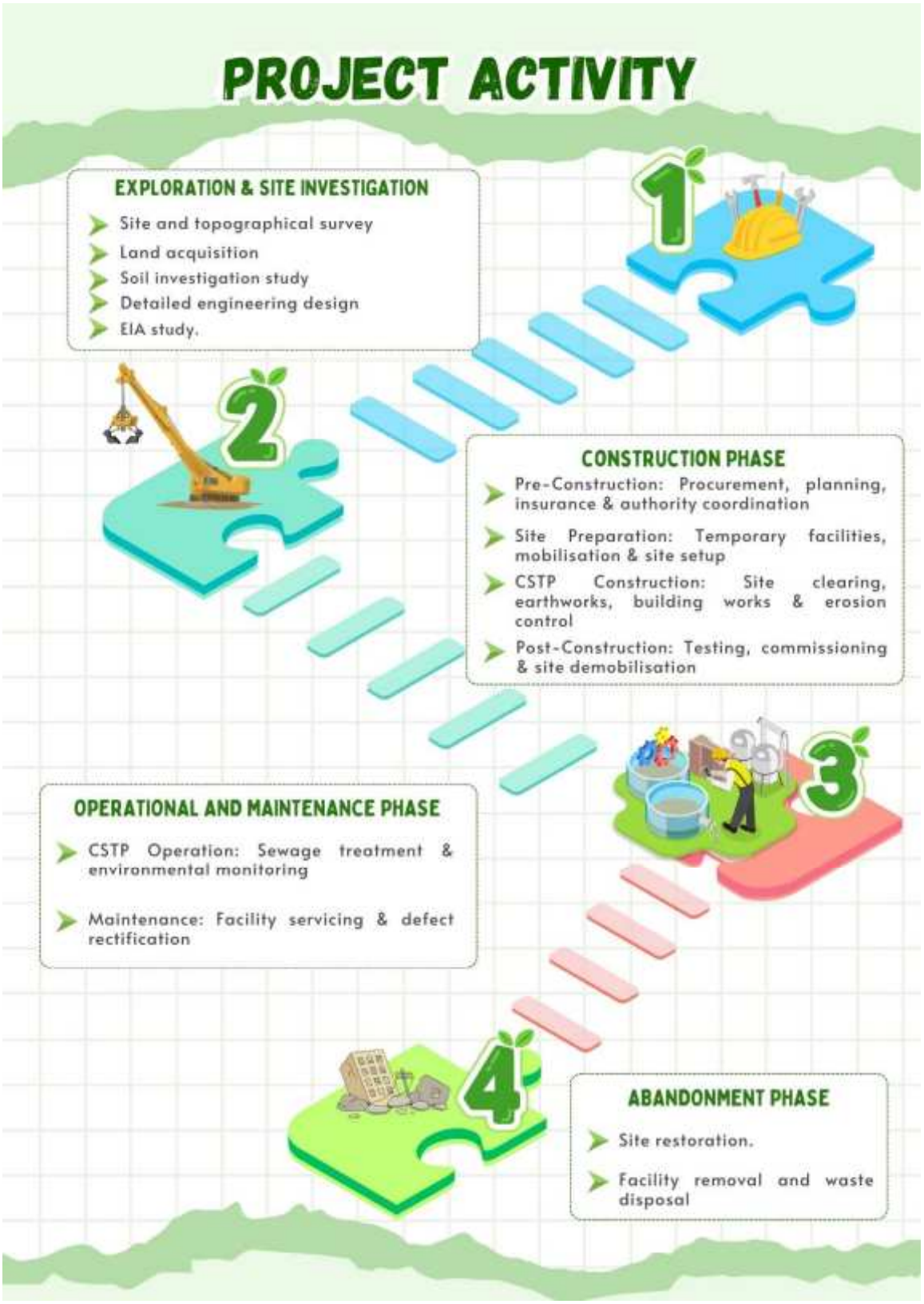
PROCESS FLOWCHART

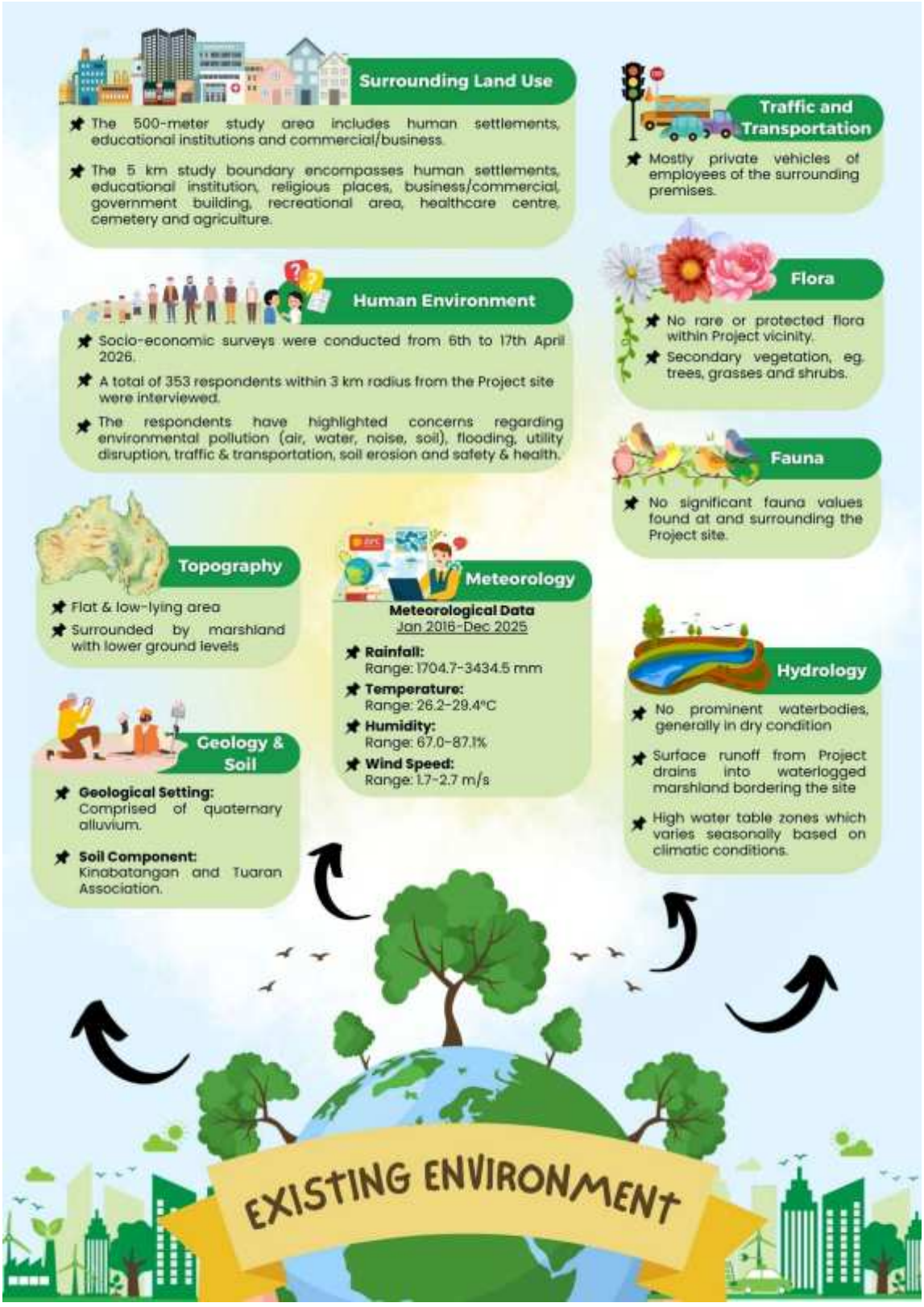



6 6°11'18.58" 116°12'30.63"
7 6°11'17.44" 116°12'27.49"
8 6°11'23.51" 116°12'25.65"
9 6°11'24.09" 116°12'22.61"
Jln Tambisilang Pandamai
6°11'16
116°12'20"E
116°12'24"E
116°12'28"E
116°12'32"E
116°12'36"E
Scale 1 : 4,000
0 50 100 200 300 400 Meters
< Map Overview >
0 425 850 1,700 2,550 3,400 Meters
Data Source : Google Earth Image
Coordinate System :WGS 1984
April 2026
Project Title
Proposed 60,000 P.E. Centralised Sewage Treatment Plant Under Tuaran Sewerage Scheme Phase 1(a) at CL.045316961, CL.045316970, CL.045316989, CL.045316998 and CL.045079481, Kg. Dungang, Tuaran, Sabah
Legend
Project Site
Cadastral Lot
Development Area
Road
Human Settlement
Commercial Building
Site Entrance
Project Location
Project Proponent: Jabatan Perkhidmatan Pembetungan Sabah
Environmental Consultant: Envsolve Sdn. Bhd.
Figure ES-1
Reference Number: ENVS/4/04/A/739/25
Drawn By : Suhana



Project Title Proposed 60,000 P.E. Centralised Sewage Treatment Plant Under Tuaran Sewerage Scheme Phase 1(a) at CL.045316961, CL.045316970, CL.045316989, CL.045316998 and CL.045079481, Kg. Dungang, Tuaran, Sabah	**Legend** Project Site Road	**Figure ES-2**	**Development Plan** Project Proponent: Jabatan Perkhidmatan Pembetungan Sabah Environmental Consultant: Envsolve Sdn. Bhd. Reference Number: ENVS/4/04/A/739/25 — Drawn By : Suhana


PROJECT ACTIVITY
EXPLORATION & SITE INVESTIGATION
Site and topographical survey
Land acquisition
Soil investigation study
Detailed engineering design
EIA study.
1
2
CONSTRUCTION PHASE
Pre-Construction: Procurement, planning, insurance & authority coordination
Site Preparation: Temporary facilities, mobilisation & site setup
CSTP Construction: Site clearing, earthworks, building works & erosion control
Post-Construction: Testing, commissioning & site demobilisation
3
OPERATIONAL AND MAINTENANCE PHASE
CSTP Operation: Sewage treatment & environmental monitoring
Maintenance: Facility servicing & defect rectification
4
ABANDONMENT PHASE
Site restoration.
Facility removal and waste disposal


Surrounding Land Use
The 500-meter study area includes human settlements, educational institutions and commercial/business.
The 5 km study boundary encompasses human settlements, educational institution, religious places, business/commercial, government building, recreational area, healthcare centre, cemetery and agriculture.
Traffic and Transportation
Mostly private vehicles of employees of the surrounding premises.
Human Environment
Socio-economic surveys were conducted from 6th to 17th April 2026.
A total of 353 respondents within 3 km radius from the Project site were interviewed.
The respondents have highlighted concerns regarding environmental pollution (air, water, noise, soil), flooding, utility disruption, traffic & transportation, soil erosion and safety & health.
Flora
No rare or protected flora within Project vicinity.
Secondary vegetation, eg. trees, grasses and shrubs.
Fauna
No significant fauna values found at and surrounding the Project site.
Topography
Flat & low-lying area
Surrounded by marshland with lower ground levels
Meteorology
Meteorological Data
Jan 2016-Dec 2025
Rainfall:
Range: 1704.7-3434.5 mm
Temperature:
Range: 26.2-29.4°C
Humidity:
Range: 67.0-87.1%
Wind Speed:
Range: 1.7-2.7 m/s
Hydrology
No prominent waterbodies, generally in dry condition
Surface runoff from Project drains into waterlogged marshland bordering the site
High water table zones which varies seasonally based on climatic conditions.
Geology & Soil
Geological Setting:
Comprised of quaternary alluvium.
Soil Component:
Kinabatangan and Tuaran Association.
EXISTING ENVIRONMENT

ENVIRONMENTAL BASELINE SAMPLING

Surface Water Quality Monitoring



- A total of ten (10) surface water sampling points were proposed (W1 - W10). No water samples were collected at W1 & W4 due to dry condition.
- Most of the measured parameters comply with the **National Water Quality Standards Malaysia - Class IIB**. Non-compliance was recorded for parameters:

SAMPLING LOCATION	PARAMETER
W2	Turbidity, BOD, TCC, FC, DO, Nitrite, AN, CCE, Mn, Fe
W3	Turbidity, BOD, COD, TCC, FC, DO, Nitrite, Phosphorus, TSS, AN, CCE, Mn, Fe, Cu
W5	BOD, TCC, FC
W6	TCC, FC
W7	BOD, TCC, FC
W8	TCC, FC
W9	TCC, FC
W10	TCC, FC, Chloride, Mn

Note: BOD - Biochemical Oxygen Demand; COD - Chemical Oxygen Demand; TCC - Total Coliform Count; FC - Faecal Coliform; DO - Dissolved Oxygen; AN - Ammoniacal Nitrogen; CCE - Carbon Chloroform Extract; TSS - Total Suspended Solids; Mn - Manganese; Fe - Iron; Cu - Copper

Air Quality Monitoring



- Baseline air quality monitoring was conducted at four (4) sampling points (A1-A4) for PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, O_3, H_2S and odour. All parameters complied with the applicable **MAAQS** and **AAAQGs** limits.
- Odour levels ranged from 82-138 OU/m³. No applicable ambient odour standard is currently available.

Noise Level Monitoring



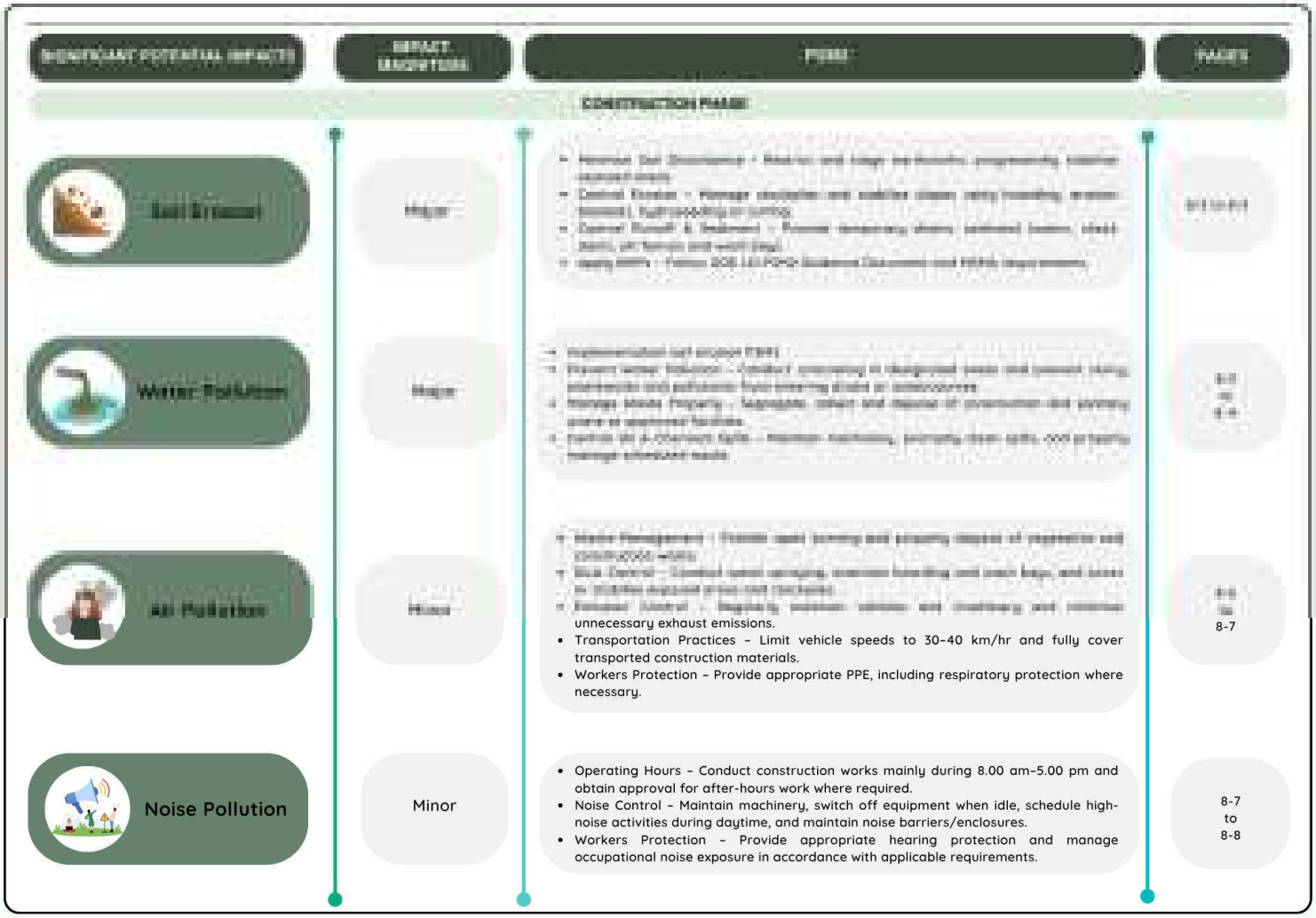
- Baseline noise level monitoring was conducted at four (4) sampling points (N1 - N4).
- Existing noise levels for both day-time and night-time were measured and all the results complied with the recommended levels specified by DOE in the **Guidelines for Environmental Noise Limits and Control (First Schedule of the Permissible Sound Levels by Receiving Land Use for Suburban Residential)**.

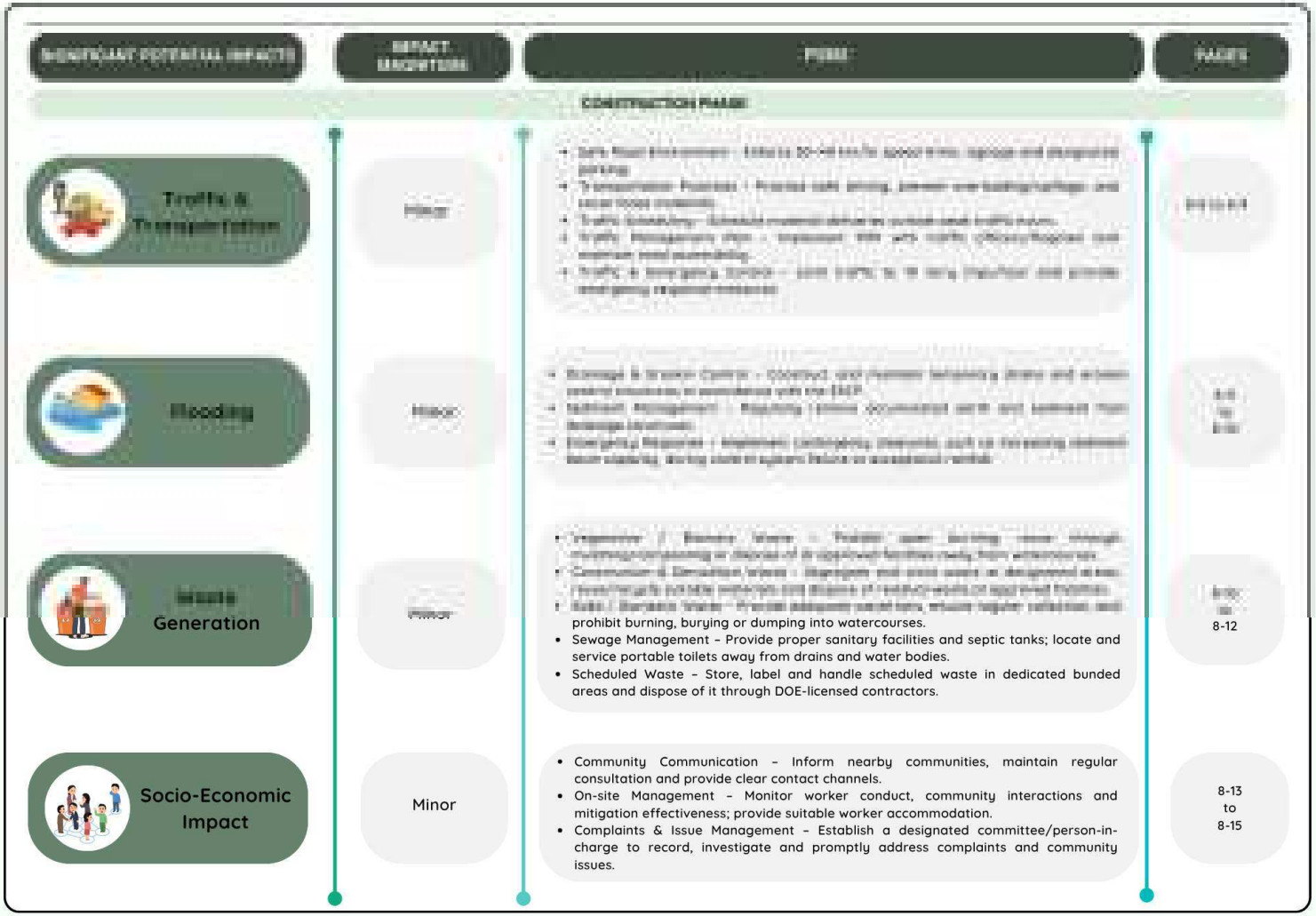
Noise level limit:

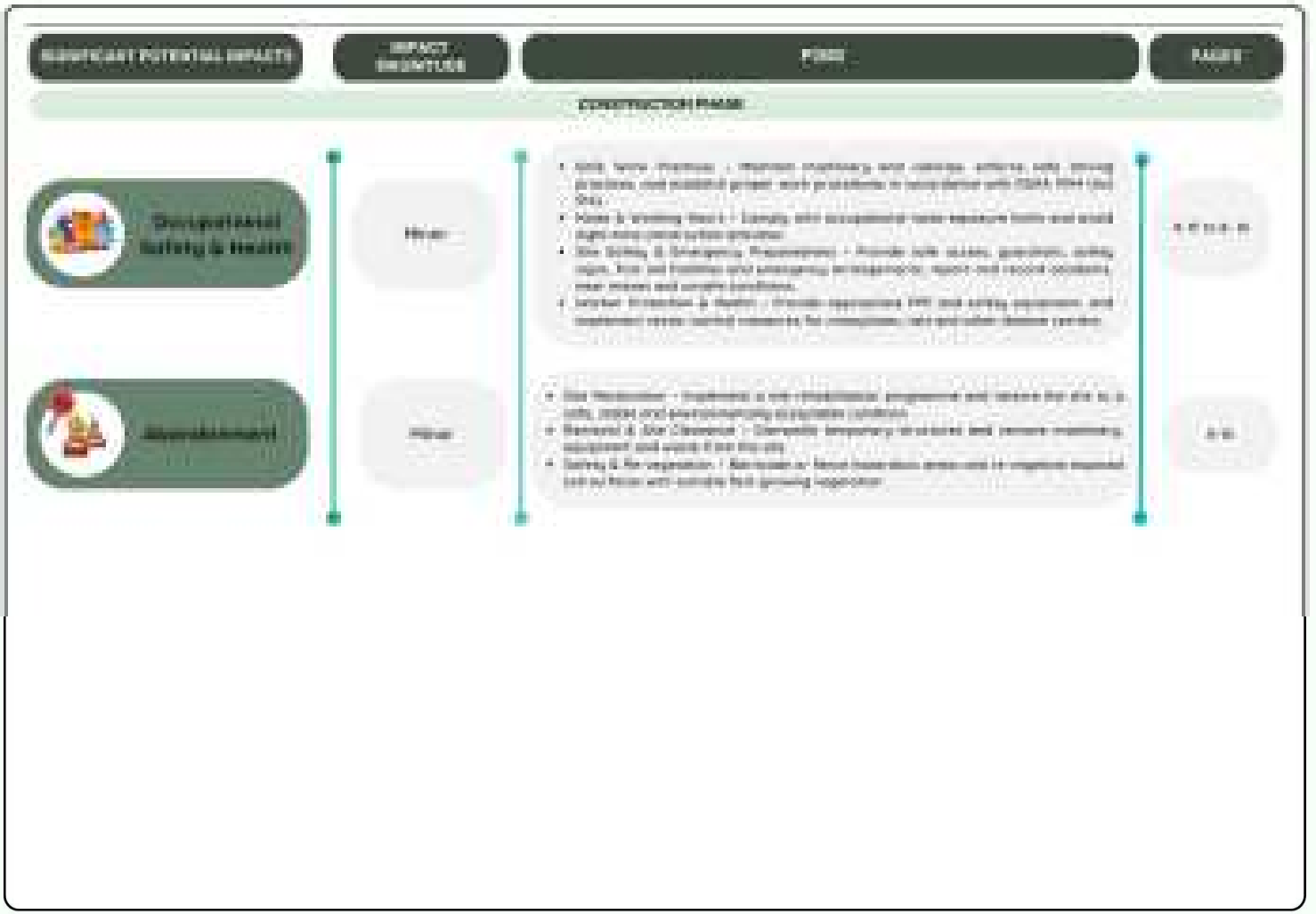
- Day-time = 60 dB(A)
- Night-time = 55 dB(A)

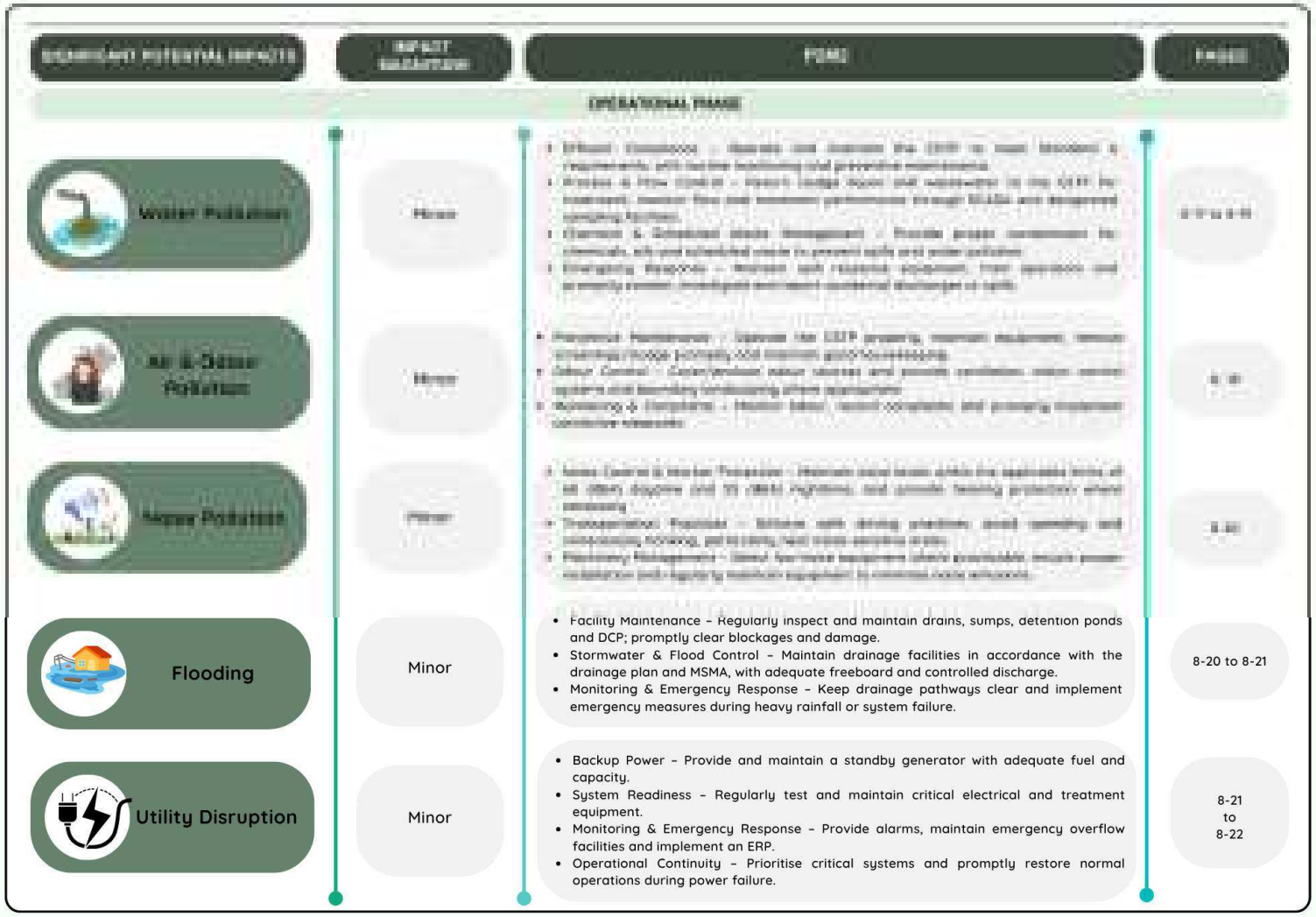

8 Taska ABIM Sinar Jaya Tuaran
1 Majlis Daerah Tuaran
2 Makamah Anak Negeri Tuaran
3 Road Transport Department, Tuaran Branch
27
28 Villa Sri Aman
1 Kompleks Sukan Tuaran
2 Linangkit Cultural Village
3 Royal Sabah Turf Club Tuaran
Jln Lama Tuaran
6°10'0"N
116°10'0"E
116°12'0"E
N
W
E
S
Scale 1 : 30,000 (A3)
0 600 1,200 2,400 3,600 4,800 Meters
Data Source : Google Earth Image
: GPS Data on Site
Coordinate System : WGS 1984
April 2026
Project Title
Proposed 60,000 P.E. Centralised Sewage Treatment Plant Under Tuaran Sewerage Scheme Phase 1(a) at CL.045316961, CL.045316970, CL.045316989, CL.045316998 and CL.045079481, Kg. Dungang, Tuaran, Sabah
Legend
Project Boundary
Buffer Area
Road
Gravel Road
Earth Road
River
Pipeline
Human Settlements
Commercial Buildings
Educational Institutions
Recreational Area
Government Buildings
Healthcare Center
Figure ES-3
Surrounding Land Use within 3 km
Project Proponent: Jabatan Perkhidmatan Pembetungan Sabah
Environmental Consultant: Envsolve Sdn. Bhd.
Reference Number: ENVS/4/04/A/739/25
Drawn By : Suhana

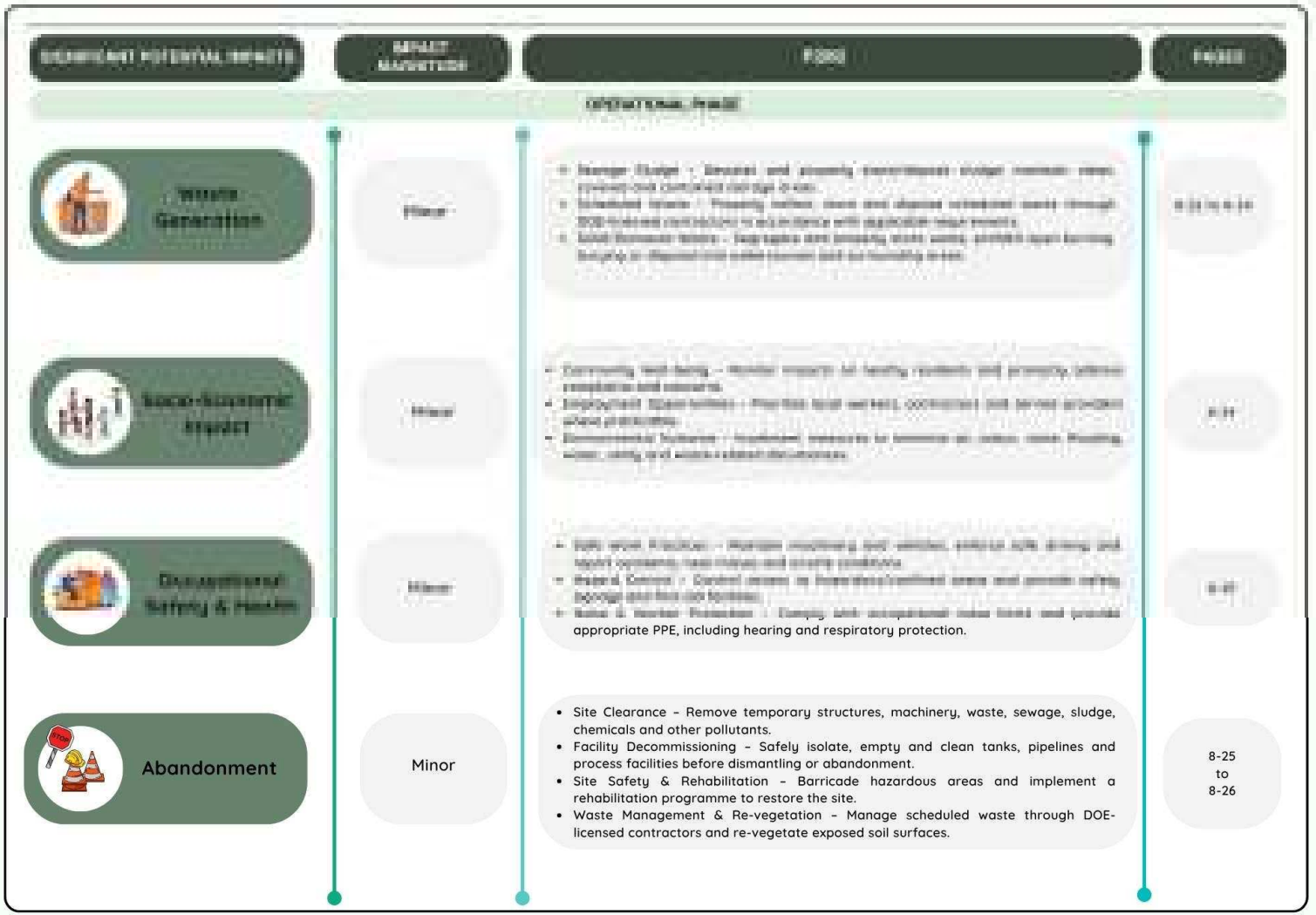

W5
W7
116°11'30"E
116°12'0"E
116°12'30"E
116°13'0"E
116°13'30"E
N
W
E
S
Scale 1 : 21,000
0 275 550 1,100 1,650 2,200
Meters
Data Source : Google Earth Image
Coordinate System : WGS 1984
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Legend
Project Site
Development Area
Road
River
Pipeline
Human Settlement
Figure ES-4
Baseline Sampling Locations
Project Proponent: Jabatan Perkhidmatan Pembetungan Sabah
Environmental Consultant: Envsolve Sdn. Bhd.
Reference Number: ENVS/4/04/A/739/25
Drawn By : Suhana


Noise Pollution
Minor
• Operating Hours – Conduct construction works mainly during 8.00 am–5.00 pm and obtain approval for after-hours work where required.
• Noise Control – Maintain machinery, switch off equipment when idle, schedule high-noise activities during daytime, and maintain noise barriers/enclosures.
• Workers Protection – Provide appropriate hearing protection and manage occupational noise exposure in accordance with applicable requirements.
8-7 to 8-8
unnecessary exhaust emissions.
• Transportation Practices – Limit vehicle speeds to 30–40 km/hr and fully cover transported construction materials.
• Workers Protection – Provide appropriate PPE, including respiratory protection where necessary.
8-7


Traffic & Transportation
Minor
Flooding
Minor
Waste Generation
Minor
prohibit burning, burying or dumping into watercourses.
• Sewage Management – Provide proper sanitary facilities and septic tanks; locate and service portable toilets away from drains and water bodies.
• Scheduled Waste – Store, label and handle scheduled waste in dedicated bunded areas and dispose of it through DOE-licensed contractors.
8-12
Socio-Economic Impact
Minor
• Community Communication – Inform nearby communities, maintain regular consultation and provide clear contact channels.
• On-site Management – Monitor worker conduct, community interactions and mitigation effectiveness; provide suitable worker accommodation.
• Complaints & Issue Management – Establish a designated committee/person-in-charge to record, investigate and promptly address complaints and community issues.
8-13
to
8-15




[illegible]
[illegible]
[illegible]
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OPERATIONAL PHASE
Water Pollution
Minor
Air & Odour Pollution
Noise Pollution
Flooding
Minor
8-20 to 8-21
Utility Disruption
Minor
8-21 to 8-22
• Facility Maintenance – Regularly inspect and maintain drains, sumps, detention ponds and DCP; promptly clear blockages and damage.
• Stormwater & Flood Control – Maintain drainage facilities in accordance with the drainage plan and MSMA, with adequate freeboard and controlled discharge.
• Monitoring & Emergency Response – Keep drainage pathways clear and implement emergency measures during heavy rainfall or system failure.
• Backup Power – Provide and maintain a standby generator with adequate fuel and capacity.
• System Readiness – Regularly test and maintain critical electrical and treatment equipment.
• Monitoring & Emergency Response – Provide alarms, maintain emergency overflow facilities and implement an ERP.
• Operational Continuity – Prioritise critical systems and promptly restore normal operations during power failure.


Waste Generation
Abandonment
Minor
Minor
Minor
Minor
Site Clearance – Remove temporary structures, machinery, waste, sewage, sludge, chemicals and other pollutants.
Facility Decommissioning – Safely isolate, empty and clean tanks, pipelines and process facilities before dismantling or abandonment.
Site Safety & Rehabilitation – Barricade hazardous areas and implement a rehabilitation programme to restore the site.
Waste Management & Re-vegetation – Manage scheduled waste through DOE-licensed contractors and re-vegetate exposed soil surfaces.
appropriate PPE, including hearing and respiratory protection.
8-25 to 8-26

ENVIRONMENTAL MONITORING PLAN

PERFORMANCE MONITORING (PM)

Performance monitoring is conducted regularly to minimise environmental impacts and ensure effective STP operation and compliance.

SYSTEM	PARAMETER	FREQUENCY
Inlet & Screens	Screen condition, debris	Daily
Pump Station	Wet well level, pump status	Continuous/Daily
Balancing Tank	Level, mixing, odour/septicity	Daily
RAS System	Pump status, process response	As and when required
SBR Tanks	Phase sequence, aeration	Daily
Settling/Decant	Sludge settling, effluent clarity	Daily
Effluent	Flow, visual quality	Continuous/Daily
Disinfection	Chlorine dosing (if used)	During operation
Sludge Handling	Dewatering performance	During operation

COMPLIANCE MONITORING (CM)

PHASE	ASPECT	LOCATION	COMPLIANCE STANDARD / GUIDELINE	MONITORING FREQUENCY
Construction	Water Quality (1 monitoring station)	Discharge outlet from sediment basin	**Turbidity: <250 NTU TSS: <50 mg/L**	Monthly or after every heavy rainfall event (>1.25 mm)
Operation	Effluent Quality (1 monitoring station)	Treated effluent at final discharge point	**Standard A, Environmental Quality (Sewage) Regulations 2009**	Monthly

ENVIRONMENTAL MONITORING PLAN

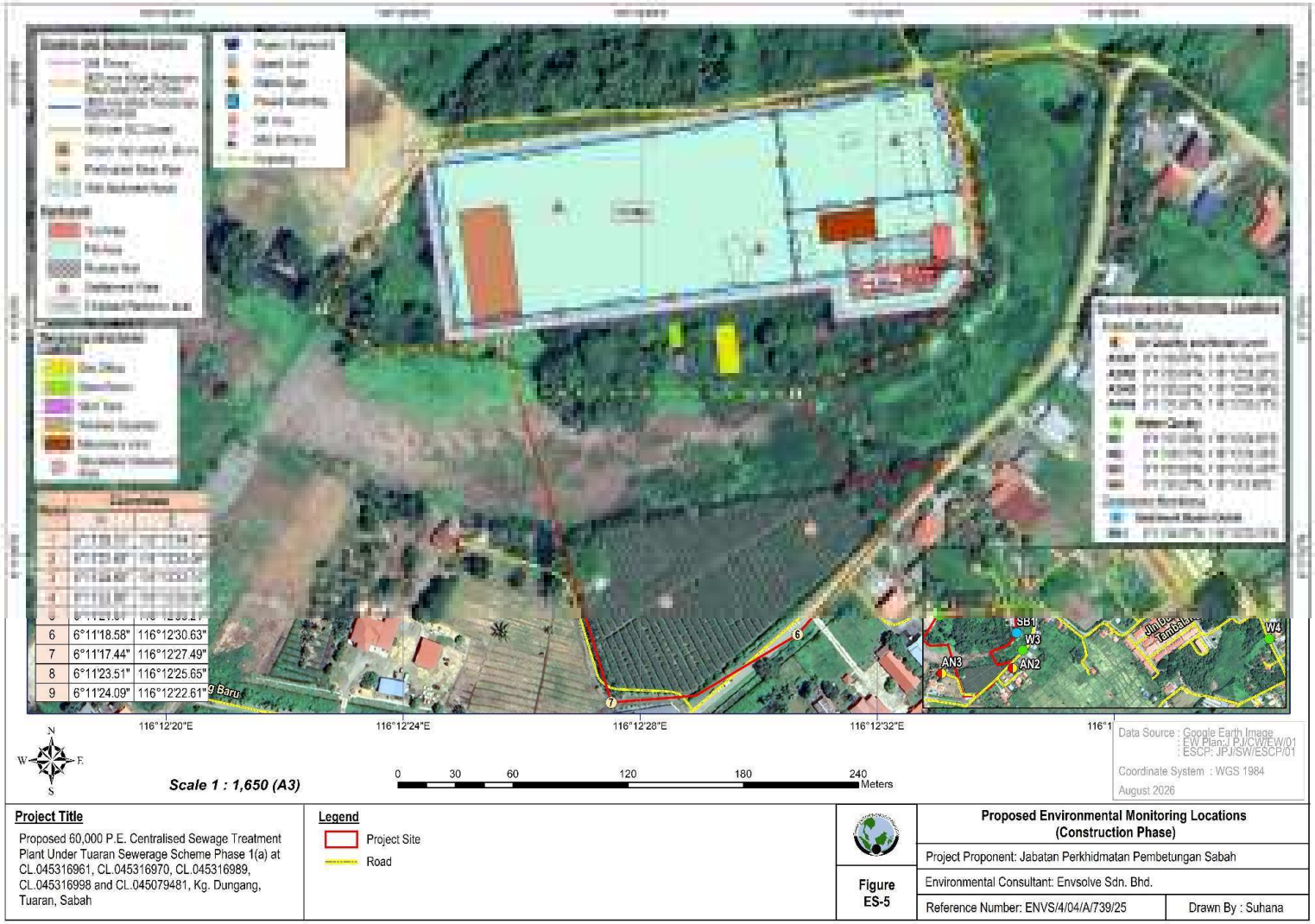
IMPACT MONITORING (IM)

CONSTRUCTION PHASE

ASPECT	COMPLIANCE STANDARD / GUIDELINE	MONITORING FREQUENCY
Surface Water Quality (3 monitoring station)	**Class IIB of National Water Quality Standards for (NWQSM)**	Monthly
Air Quality (3 monitoring station)	**Malaysian Ambient Air Quality Standard (MAAQS)**	Quarterly
Noise Level (3 monitoring station)	**First Schedule of Guidelines for Environmental Noise Limits and Control, Third Edition 2019**	Quarterly

OPERATIONAL PHASE

ASPECT	COMPLIANCE STANDARD / GUIDELINE	MONITORING FREQUENCY
Surface Water Quality (2 monitoring station)	**Class IIB of National Water Quality Standards for (NWQSM)**	Quarterly
Air Quality (3 monitoring station)	**Malaysian Ambient Air Quality Standard (MAAQS)**	Quarterly
Noise Level (3 monitoring station)	**First Schedule of Guidelines for Environmental Noise Limits and Control, Third Edition 2019**	Quarterly



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RINGKASAN EKSEKUTIF

PENILAIAN IMPAK ALAM SEKITAR (JADUAL PERTAMA)

PROPOSED 60,000 P.E. CENTRALISED SEWAGE TREATMENT PLANT UNDER TUARAN SEWERAGE SCHEME PHASE 1(A) AT CL.045316961, CL.045316970, CL.045316989, CL.045316998 AND CL.045079481, KG. DUNGANG, TUARAN, SABAH

PENGGERAK PROJEK

JABATAN PERKHIDMATAN PEMBETUNGAN SABAH
Tingkat 3, 4, 9, 10 & 11 Menara C, Wisma Tun Fuad Stephens, KM 2.4, Jalan Tuaran, Karamunsing, 88300 Kota Kinabalu, Sabah.
Tel: 088-215 214 Faks: 088-215 652

Pegawai Untuk Dihubungi:
Ir. Ts. Hj. Mohd Nadzree Imran [Pengarah]

- Emel:
jps@sabah.gov.my

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88300 Kota Kinabalu.
Tel: 088-381 739 Faks: 088-385 569

Pegawai Untuk Dihubungi:
Ir. Lee Chen Yen [Pengurus Projek]

Emel:
borneastgroup@gmail.com

PERUNDING EIA

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Lorong Kilang F, Kolombong,
88450 Kota Kinabalu, Sabah.
Tel: 088-388 791 Faks: 088-388 792

Pegawai Untuk Dihubungi :
- Ir. Ts. Burhanudin bin Abu Bakar [Ketua Pasukan EIA]
- ChM. Lo Su Mui [Penolong Perunding]

- **Emel:**
envsolve@gmail.com; info@envsolve.com

ORANG BERKELAYAKAN

1. **IR. TS. BURHANUDIN BIN ABU BAKAR**
Perunding EIA [CS0168]
2. **EN. LIM SZE FOOK**
Perunding EIA [CS0126]
3. **EN. TSEN KING FOH**
Perunding EIA [CG106]
4. **EN. AHMAD FAEZ BIN WANDI SALLEM**
Perunding EIA [CG681]
5. **ChM. LO SU MUI**
Penolong Perunding [AC0923]

KEPERLUAN PERUNDANGAN

Seksyen 34A, Akta Kualiti Alam Sekeliling 1974
Perintah Kualiti Alam Sekeliling (Aktiviti yang Ditetapkan) (Penilaian Impak Alam Sekitar) 2015

Jadual Pertama

14. Pengolahan dan Pelupusan Buangan
(c) Kumbahan
(i) Pembinaan loji pengolahan kumbahan dengan 20,000 kesetaraan populasi atau lebih.

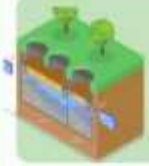
Oleh itu, laporan EIA perlu diserahkan kepada JAS untuk kelulusan sebelum pelaksanaan Projek.

LOKASI & PELAN ZON

Lokasi
CL045316961, CL045316970, CL045316989, CL045316998, dan CL045079481, Kg. Dungang, Tuaran

Pengezonan
Utiliti Awam (PU) - oleh Jabatan Perancang Bandar & Wilayah Negeri Sabah

PERNYATA KEPERLUAN



- Menyokong Pertumbuhan – Menyediakan kapasiti pembetungan bagi pembangunan semasa dan akan datang.
- Rawatan Berpusat – Mewujudkan CSTP berkapasiti 60,000 P.E. untuk Laya-Laya dan Tambalang.
- Meningkatkan Rawatan – Memastikan kualiti efluen terawat memenuhi Standard A.
- Mengurangkan Pencemaran – Meminimumkan kesan kumbahan terhadap Sungai Tuaran dan rangkaian saliran.
- Meningkatkan Kecekapan – Merasionalisasikan sistem rawatan berpusat serta meningkatkan kecekapan operasi dan penyelenggaraan.

KONSEP PROJEK

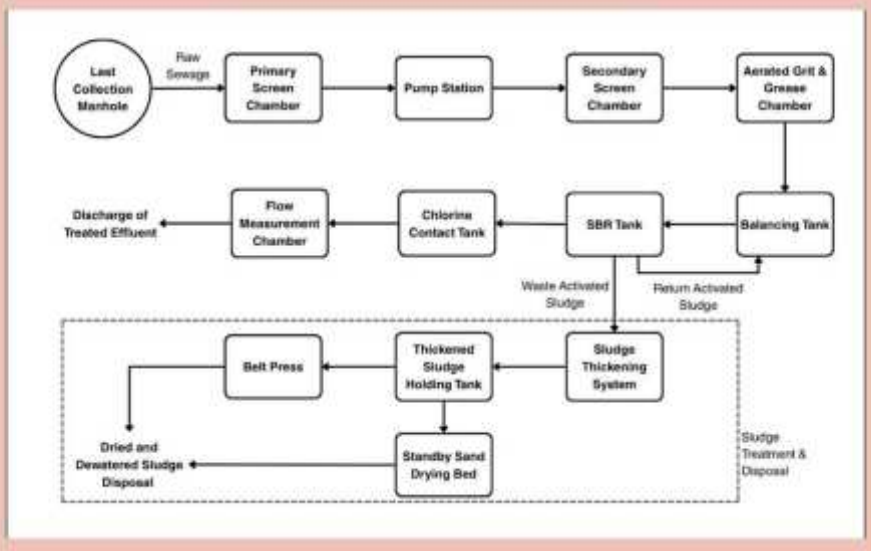
Kawasan Tadahan Pembetungan
Kawasan Tadahan Kecil Laya-Laya dan Tambalang (Fasa 1a Skim Pembetungan Tuaran)

Asas Reka Bentuk CSTP
- Keperluan Reka Bentuk: Keperluan JPP Sabah, MSIG dan piawaian lain yang berkenaan.
- Proses Rawatan: *Sequencing Batch Reactor System (SBR).*
- Kapasiti Reka Bentuk: 60,000 P.E. (*civil and structural*).

Komponen Projek
- Rawatan Awal: Kebuk Salur Masuk, Skrin Utama, Stesen Pam, Skrin Sekunder, Kebuk Grit & Gris Berudara, Tangki Pengimbang
- Sistem Rawatan Biologi: SBR
- Sistem Pembasmian Kuman: Tangki Sentuh Klorin
- Kemudahan Sokongan: Guna semula kemudahan efluen dan pengendalian biopepejal

Rawatan dan Pelepasan Efluen
- Diperlakukan mengikut keperluan Piawaian A di bawah **Jadual Kedua Peraturan-Peraturan Kualiti Alam Sekeliling (Kumbahan) 2009**.
- Efluen yang dirawat akan dilepaskan ke Sg. Tuaran melalui saluran paip D.I. sepanjang 2.2 km dan berdiameter 500 mm.

CARTA ALIR PROSES




6°11'16"
6°11'18.58" 116°12'30.63"
6°11'17.44" 116°12'27.49"
6°11'23.51" 116°12'25.65"
6°11'24.09" 116°12'22.61"
Jln Tambatang Pandamai
116°12'20"E
116°12'24"E
116°12'28"E
116°12'32"E
116°12'36"E
Scale 1 : 4,000
0 50 100 200 300 400 Meters
< Map Overview >
0 425 850 1,700 2,550 3,400 Meters
Data Source : Google Earth Image
Coordinate System :WGS 1984
April 2026
Project Title
Proposed 60,000 P.E. Centralised Sewage Treatment Plant Under Tuaran Sewerage Scheme Phase 1(a) at CL.045316961, CL.045316970, CL.045316989, CL.045316998 and CL.045079481, Kg. Dungang, Tuaran, Sabah
Legend
Project Site
Cadastral Lot
Development Area
Road
Human Settlement
Commercial Building
Site Entrance
Figure RE-1
Project Location
Project Proponent: Jabatan Perkhidmatan Pembetungan Sabah
Environmental Consultant: Envsolve Sdn. Bhd.
Reference Number: ENVS/4/04/A/739/25
Drawn By : Suhana



Project Title Proposed 60,000 P.E. Centralised Sewage Treatment Plant Under Tuaran Sewerage Scheme Phase 1(a) at CL.045316961, CL.045316970, CL.045316989, CL.045316998 and CL.045079481, Kg. Dungang, Tuaran, Sabah	**Legend** Project Site Road	**Figure RE-2**	**Development Plan** Project Proponent: Jabatan Perkhidmatan Pembetungan Sabah Environmental Consultant: Envsolve Sdn. Bhd. Reference Number: ENVS/4/04/A/739/25 — Drawn By : Suhana

AKTIVITI PROJEK

PENEROKAAN & PENYIASATAN TAPAK

- Tinjauan tapak dan topografi
- Pengambilan tanah
- Kajian penyiasatan tanah
- Reka bentuk kejuruteraan terperinci
- Kajian EIA.



FASA PEMBINAAN

- Pra-Pembinaan: Penyelarasan perolehan, perancangan, insurans & pihak berkuasa
- Persediaan Tapak: Kemudahan sementara, mobilisasi & persediaan tapak
- Pembinaan CSTP: Pembersihan tapak, kerja tanah, kerja bangunan & kawalan hakisan
- Pasca Pembinaan: Pengujian, pentauliahan & penyahmobilan tapak



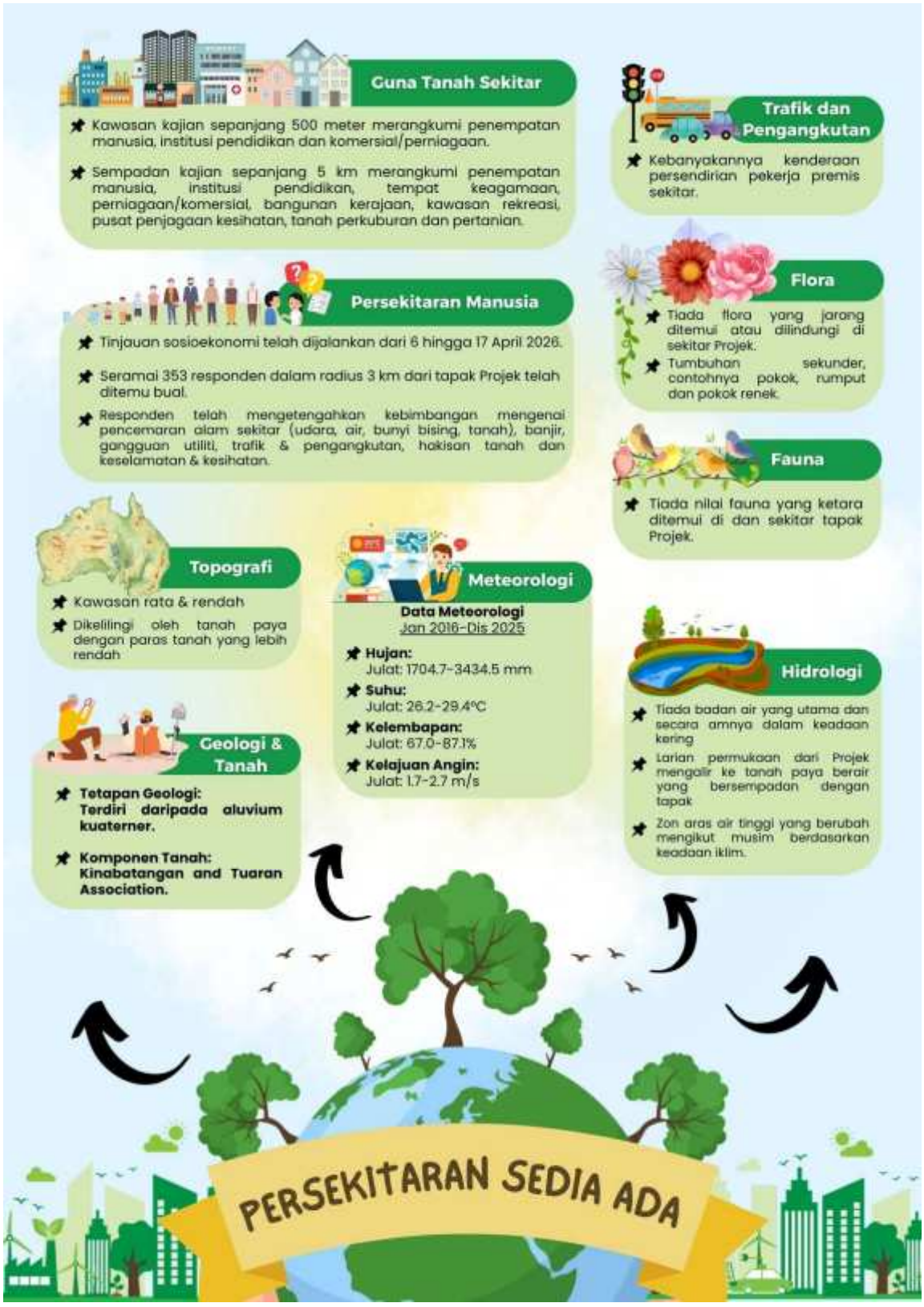
FASA OPERASI DAN PENYELENGGARAAN

- Operasi CSTP: Rawatan kumbahan & pemantauan alam sekitar
- Penyelenggaraan: Servis kemudahan & pembetulan kerosakan



FASA PEMBERHENTIAN PROJEK

- Pemulihan tapak.
- Pembuangan kemudahan dan pelupusan sisa


Guna Tanah Sekitar
Kawasan kajian sepanjang 500 meter merangkumi penempatan manusia, institusi pendidikan dan komersial/perniagaan.
Sempadan kajian sepanjang 5 km merangkumi penempatan manusia, institusi pendidikan, tempat keagamaan, perniagaan/komersial, bangunan kerajaan, kawasan rekreasi, pusat penjagaan kesihatan, tanah perkuburan dan pertanian.
Trafik dan Pengangkutan
Kebanyakannya kenderaan persendirian pekerja premis sekitar.
Persekitaran Manusia
Tinjauan sosioekonomi telah dijalankan dari 6 hingga 17 April 2026.
Seramai 353 responden dalam radius 3 km dari tapak Projek telah ditemu bual.
Responden telah mengetengahkan kebimbangan mengenai pencemaran alam sekitar (udara, air, bunyi bising, tanah), banjir, gangguan utiliti, trafik & pengangkutan, hakisan tanah dan keselamatan & kesihatan.
Flora
Tiada flora yang jarang ditemui atau dilindungi di sekitar Projek.
Tumbuhan sekunder, contohnya pokok, rumput dan pokok renek.
Fauna
Tiada nilai fauna yang ketara ditemui di dan sekitar tapak Projek.
Topografi
Kawasan rata & rendah
Dikelilingi oleh tanah paya dengan paras tanah yang lebih rendah
Meteorologi
Data Meteorologi
Jan 2016-Dis 2025
Hujan:
Julat: 1704.7~3434.5 mm
Suhu:
Julat: 26.2~29.4°C
Kelembapan:
Julat: 67.0~87.1%
Kelajuan Angin:
Julat: 1.7~2.7 m/s
Hidrologi
Tiada badan air yang utama dan secara amnya dalam keadaan kering
Larian permukaan dari Projek mengalir ke tanah paya berair yang bersempadan dengan tapak
Zon aras air tinggi yang berubah mengikut musim berdasarkan keadaan iklim.
Geologi & Tanah
Tetapan Geologi:
Terdiri daripada aluvium kuaterner.
Komponen Tanah:
Kinabatangan and Tuaran Association.
PERSEKITARAN SEDIA ADA

KAJIAN DASAR ALAM SEKITAR

Pemantauan Kualiti Air Permukaan



- Sebanyak sepuluh (10) titik persampelan air permukaan telah dicadangkan (W1 - W10). Tiada sampel air diambil di W1 & W4 disebabkan oleh keadaan kering.
- Kebanyakan parameter yang diukur mematuhi **National Water Quality Standards Malaysia - Class IIB**. Ketidakpatuhan telah direkodkan untuk parameter:

LOKASI PERSAMPELAN	PARAMETER
W2	Turbidity, BOD, TCC, FC, DO, Nitrit, AN, CCE, Mn, Fe
W3	Turbidity, BOD, COD, TCC, FC, DO, Nitrit, Fosforus, TSS, AN, CCE, Mn, Fe, Cu
W5	BOD, TCC, FC
W6	TCC, FC
W7	BOD, TCC, FC
W8	TCC, FC
W9	TCC, FC
W10	TCC, FC, Klorida, Mn

Note: BOD - Biochemical Oxygen Demand; COD - Chemical Oxygen Demand; TCC - Total Coliform Count; FC - Faecal Coliform; DO - Dissolved Oxygen; AN - Ammoniacal Nitrogen; CCE - Carbon Chloroform Extract; TSS - Total Suspended Solids; Mn - Manganese; Fe - Iron; Cu - Copper

Pemantauan Kualiti Udara



- Pemantauan kualiti udara garis dasar telah dijalankan di empat (4) titik persampelan (A1–A4) untuk PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO, O_3, H_2S dan bau. Semua parameter mematuhi had MAAQS dan AAAQG yang berkenaan.
- Tahap bau adalah antara 82–138 OU/m³. Tiada piawaian bau ambien yang berkenaan tersedia pada masa ini.

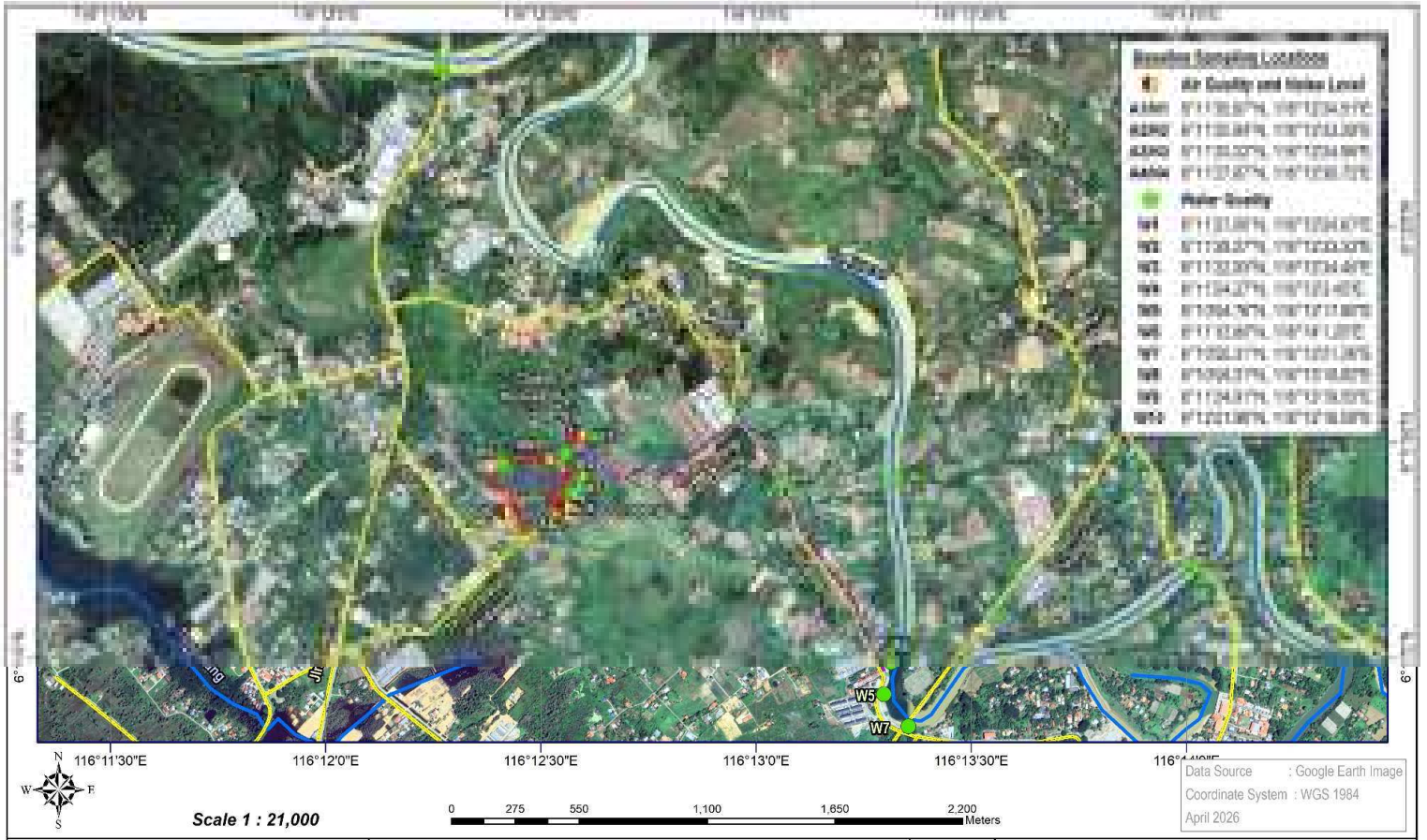
Pemantauan Tahap Bunyi

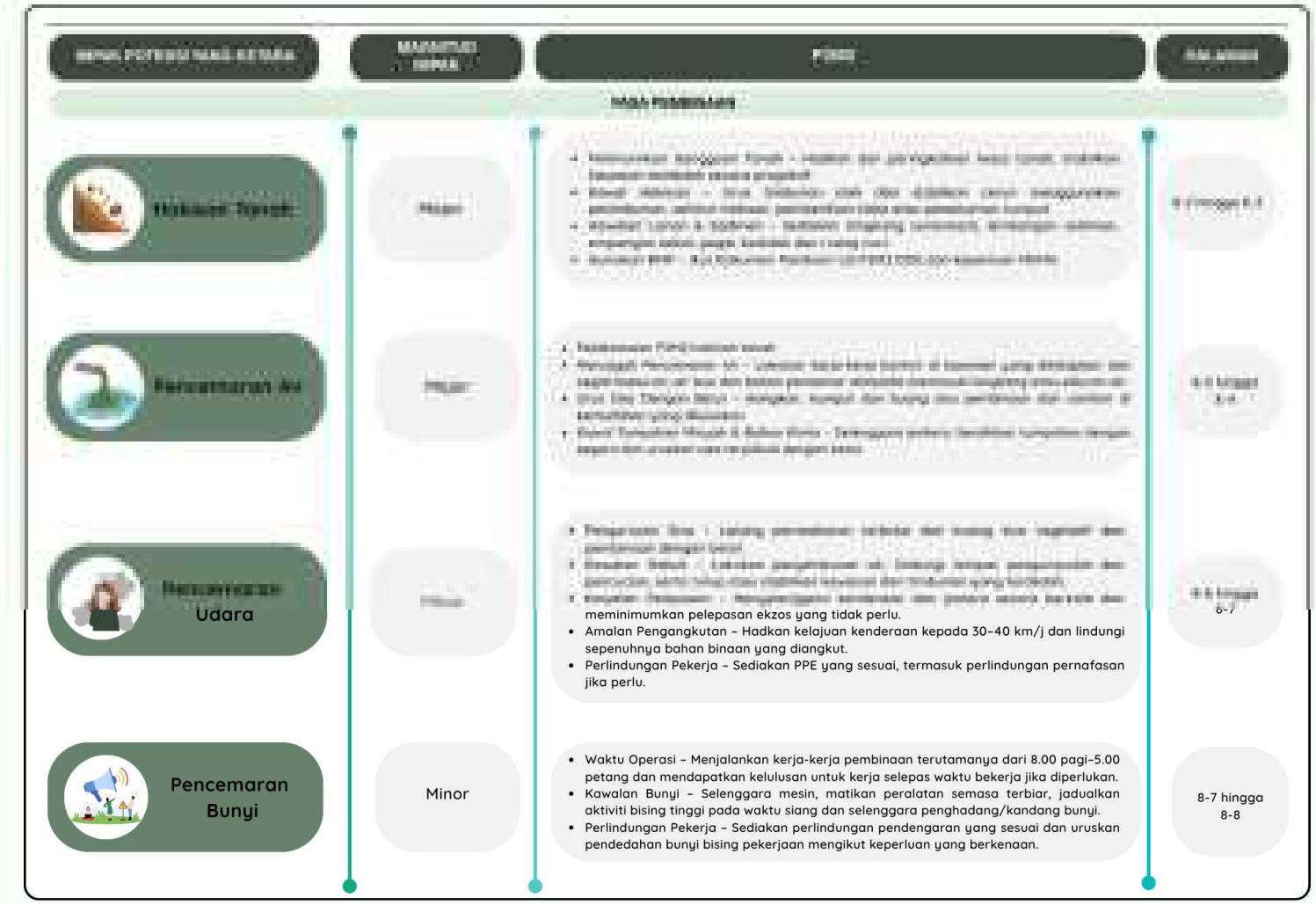


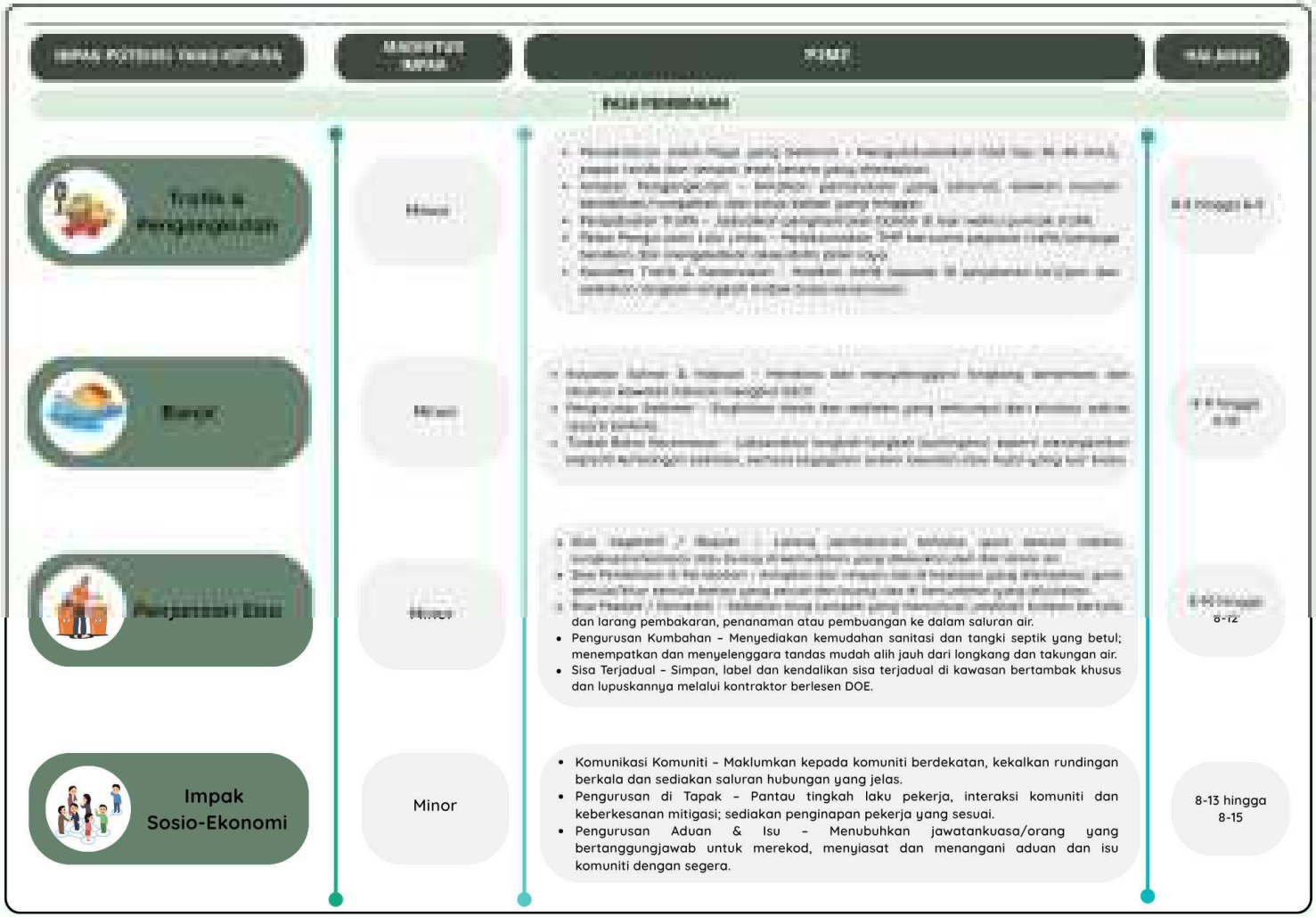
- Pemantuan tahap bunyi garis dasar telah dijalankan di empat (4) titik persampelan (N1 - N4)
- Tahap bunyi sedia ada bagi waktu siang dan malam telah diukur dan semua keputusan mematuhi tahap yang ditetapkan oleh JAS dalam **Guidelines for Environmental Noise Limits and Control (First Schedule of the Permissible Sound Levels by Receiving Land Use for New Development for Suburban Residential)**.

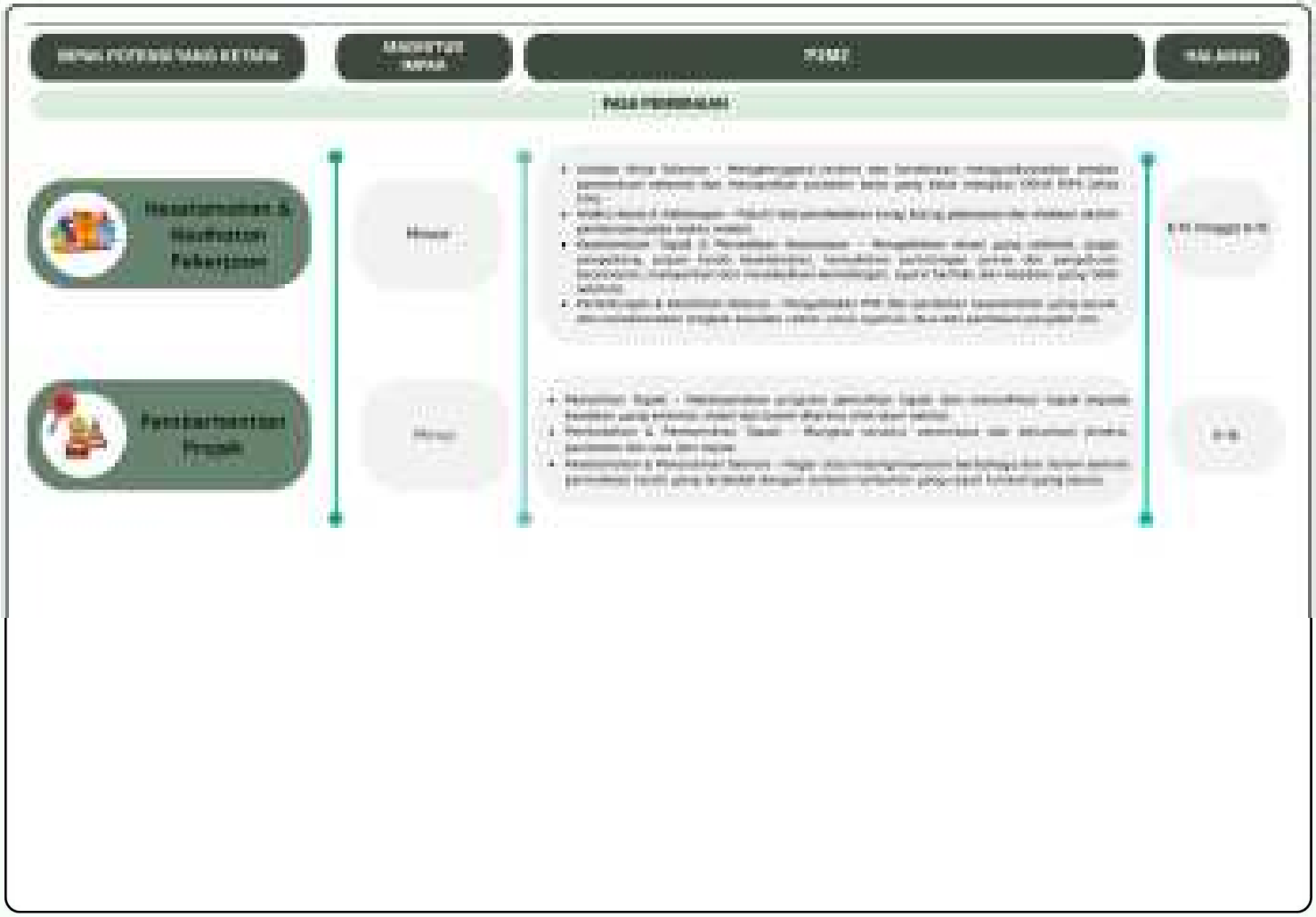
  Had tahap bunyi:
  - Waktu siang = 60 dB(A)
  - Waktu malam = 55 dB(A)

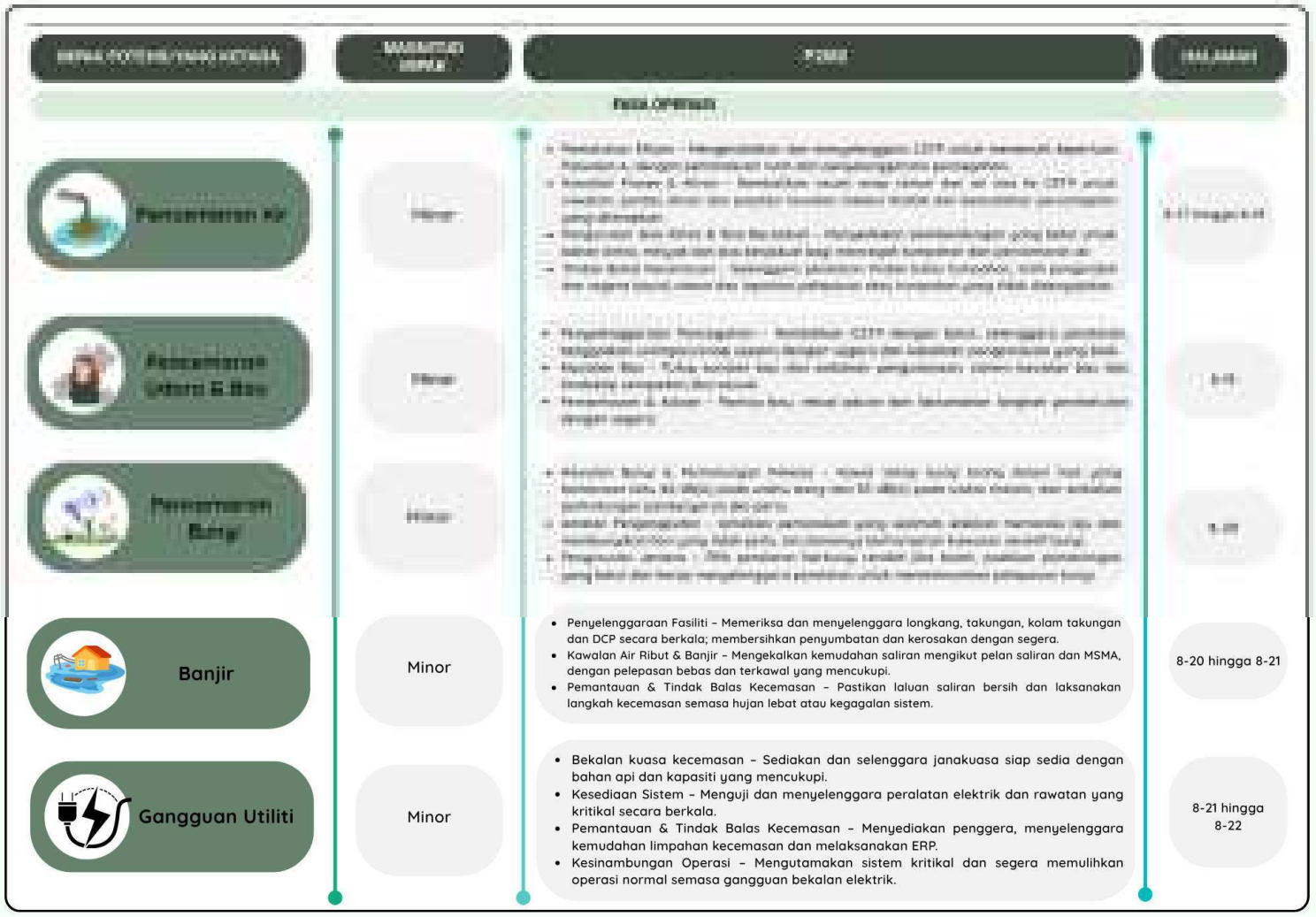

8 Taska ABIM Sinar Jaya Tuaran
1 Majlis Daerah Tuaran
2 Makamah Anak Negeri Tuaran
3 Road Transport Department, Tuaran Branch
28 Villa Sri Aman
1 Kompleks Sukan Tuaran
2 Linangkit Cultural Village
3 Royal Sabah Turf Club Tuaran
Jln Lama Tuaran
6°1'0"N
116°10'0"E
116°12'0"E
N
W
E
S
Scale 1 : 30,000 (A3)
0 600 1,200 2,400 3,600 4,800 Meters
Data Source : Google Earth Image
: GPS Data on Site
Coordinate System : WGS 1984
April 2026
Project Title
Proposed 60,000 P.E. Centralised Sewage Treatment Plant Under Tuaran Sewerage Scheme Phase 1(a) at CL.045316961, CL.045316970, CL.045316989, CL.045316998 and CL.045079481, Kg. Dungang, Tuaran, Sabah
Legend
Project Boundary
Buffer Area
Road
Gravel Road
Earth Road
River
Pipeline
Human Settlements
Commercial Buildings
Educational Institutions
Recreational Area
Government Buildings
Healthcare Center
Figure RE-3
Surrounding Land Use within 3 km
Project Proponent: Jabatan Perkhidmatan Pembetungan Sabah
Environmental Consultant: Envsolve Sdn. Bhd.
Reference Number: ENVS/4/04/A/739/25
Drawn By : Suhana

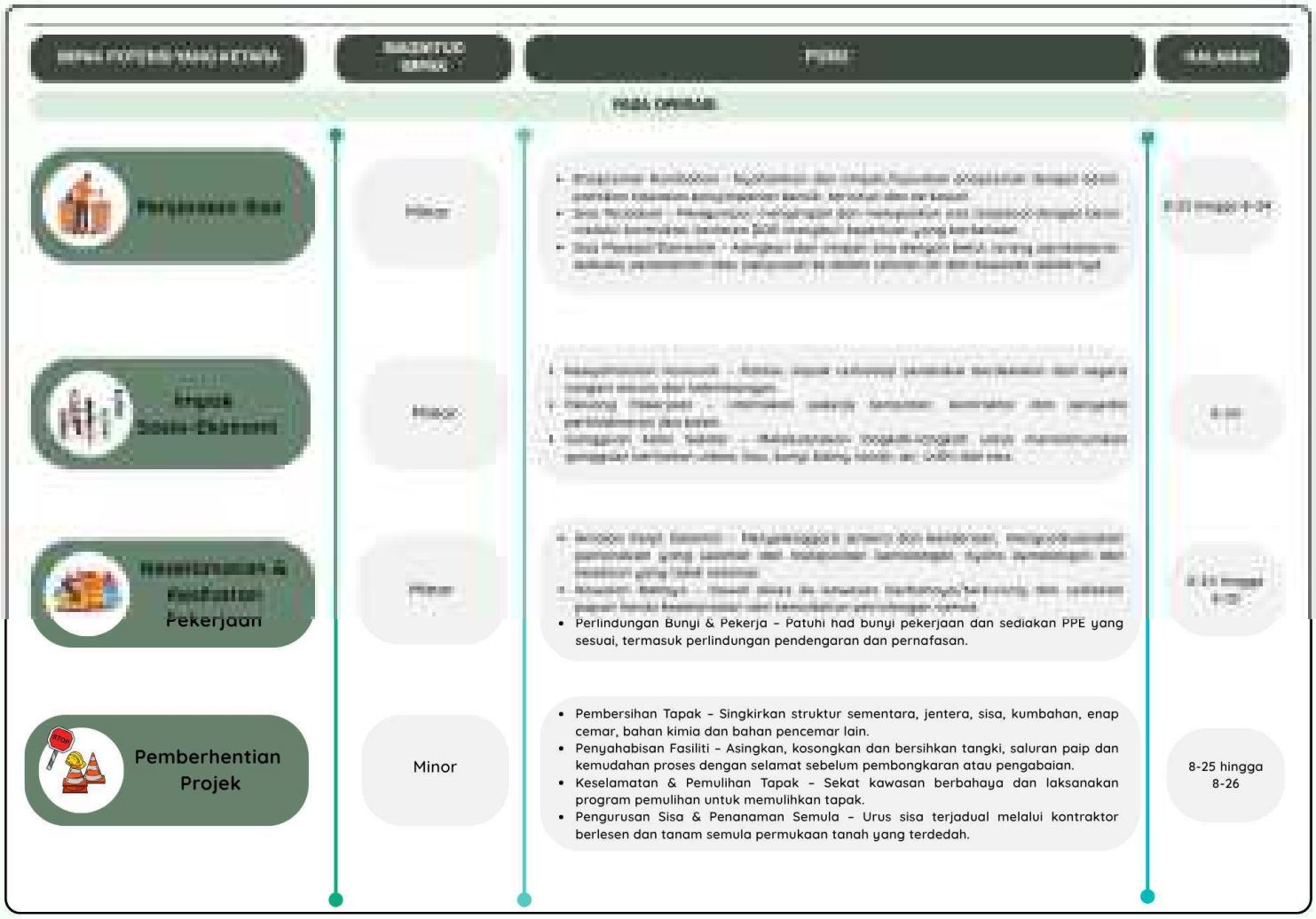

W5
W7
116°11'30"E
116°12'0"E
116°12'30"E
116°13'0"E
116°13'30"E
N
S
W
E
Scale 1 : 21,000
0 275 550 1,100 1,650 2,200
Meters
Data Source : Google Earth Image
Coordinate System : WGS 1984
April 2026
Project Title
Proposed 60,000 P.E. Centralised Sewage Treatment Plant Under Tuaran Sewerage Scheme Phase 1(a) at CL.045316961, CL.045316970, CL.045316989, CL.045316998 and CL.045079481, Kg. Dungang, Tuaran, Sabah
Legend
Project Site
Development Area
Road
River
Pipeline
Human Settlement
Figure RE-4
Baseline Sampling Locations
Project Proponent: Jabatan Perkhidmatan Pembetungan Sabah
Environmental Consultant: Envsolve Sdn. Bhd.
Reference Number: ENVS/4/04/A/739/25
Drawn By : Suhana


Pencemaran Udara
Minor
Pencemaran Bunyi
Minor
• Amalan Pengangkutan – Hadkan kelajuan kenderaan kepada 30-40 km/j dan lindungi sepenuhnya bahan binaan yang diangkut.
• Perlindungan Pekerja – Sediakan PPE yang sesuai, termasuk perlindungan pernafasan jika perlu.
• Waktu Operasi – Menjalankan kerja-kerja pembinaan terutamanya dari 8.00 pagi-5.00 petang dan mendapatkan kelulusan untuk kerja selepas waktu bekerja jika diperlukan.
• Kawalan Bunyi – Selenggara mesin, matikan peralatan semasa terbiar, jadualkan aktiviti bising tinggi pada waktu siang dan selenggara penghadang/kandang bunyi.
• Perlindungan Pekerja – Sediakan perlindungan pendengaran yang sesuai dan uruskan pendedahan bunyi bising pekerjaan mengikut keperluan yang berkenaan.
8-7 hingga 8-8


Trafik & Pengangkutan
Minor
Pengurusan Enjin
Minor
Impak Sosio-Ekonomi
Minor
• Pengurusan Kumbahan – Menyediakan kemudahan sanitasi dan tangki septik yang betul; menempatkan dan menyelenggara tandas mudah alih jauh dari longkang dan takungan air.
• Sisa Terjadual – Simpan, label dan kendalikan sisa terjadual di kawasan bertambak khusus dan lupuskannya melalui kontraktor berlesen DOE.
• Komunikasi Komuniti – Maklumkan kepada komuniti berdekatan, kekalkan rundingan berkala dan sediakan saluran hubungan yang jelas.
• Pengurusan di Tapak – Pantau tingkah laku pekerja, interaksi komuniti dan keberkesanan mitigasi; sediakan penginapan pekerja yang sesuai.
• Pengurusan Aduan & Isu – Menubuhkan jawatankuasa/orang yang bertanggungjawab untuk merekod, menyiasat dan menangani aduan dan isu komuniti dengan segera.
8-13 hingga 8-15




Banjir
Minor
• Penyelenggaraan Fasiliti – Memeriksa dan menyelenggara longkang, takungan, kolam takungan dan DCP secara berkala; membersihkan penyumbatan dan kerosakan dengan segera.
• Kawalan Air Ribut & Banjir – Mengekalkan kemudahan saliran mengikut pelan saliran dan MSMA, dengan pelepasan bebas dan terkawal yang mencukupi.
• Pemantauan & Tindak Balas Kecemasan – Pastikan laluan saliran bersih dan laksanakan langkah kecemasan semasa hujan lebat atau kegagalan sistem.
8-20 hingga 8-21
Gangguan Utiliti
Minor
• Bekalan kuasa kecemasan – Sediakan dan selenggara janakuasa siap sedia dengan bahan api dan kapasiti yang mencukupi.
• Kesediaan Sistem – Menguji dan menyelenggara peralatan elektrik dan rawatan yang kritikal secara berkala.
• Pemantauan & Tindak Balas Kecemasan – Menyediakan penggera, menyelenggara kemudahan limpahan kecemasan dan melaksanakan ERP.
• Kesinambungan Operasi – Mengutamakan sistem kritikal dan segera memulihkan operasi normal semasa gangguan bekalan elektrik.
8-21 hingga 8-22


Pemberhentian Projek
Minor
• Pembersihan Tapak – Singkirkan struktur sementara, jentera, sisa, kumbahan, enap cemar, bahan kimia dan bahan pencemar lain.
• Penyahabisan Fasiliti – Asingkan, kosongkan dan bersihkan tangki, saluran paip dan kemudahan proses dengan selamat sebelum pembongkaran atau pengabaian.
• Keselamatan & Pemulihan Tapak – Sekat kawasan berbahaya dan laksanakan program pemulihan untuk memulihkan tapak.
• Pengurusan Sisa & Penanaman Semula – Urus sisa terjadual melalui kontraktor berlesen dan tanam semula permukaan tanah yang terdedah.
8-25 hingga 8-26
• Perlindungan Bunyi & Pekerja – Patuhi had bunyi pekerjaan dan sediakan PPE yang sesuai, termasuk perlindungan pendengaran dan pernafasan.

PELAN PEMANTAUAN ALAM SEKITAR

PEMANTAUAN PRESTASI (PM)

Pemantauan prestasi dijalankan secara berkala untuk meminimumkan impak alam sekitar dan memastikan operasi dan pematuhan STP yang berkesan.

SISTEM	PARAMETER	KEKERAPAN
Saluran Masuk & Skrin	Keadaan skrin, serpihan	Harian
Stesen Pam	Paras perigi basah, status pam	Berterusan/Harian
Tangki Pengimbang	Aras, pencampuran, bau/septisiti	Harian
Sistem RAS	Status pam, tindak balas proses	Apabila diperlukan
Tangki SBR	Urutan fasa, pengudaraan	Harian
Mendapan	Penendapan enap cemar, kejelasan efluen	Harian
Efluen	Aliran, kualiti visual	Berterusan/Harian
Pembasmian kuman	Dos klorin (jika digunakan)	Semasa operasi
Pengendalian Enapcemar	Prestasi penyahairan	Semasa operasi

PEMANTAUAN PEMATUHAN (CM)

FASA	ASPEK	LOKASI	PIAWAIAN/GARIS PANDUAN PEMATUHAN	KEKERAPAN PEMANTAUAN
Pembinaan	Kualiti Air (1 stesen pemantauan)	Saluran keluar pelepasan dari lembangan sedimen	**Kekeruhan: <250 NTU TSS: <50 mg/L**	Bulanan atau selepas setiap kejadian hujan lebat (>1.25 mm)
Operasi	Kualiti Efluen (1 stesen pemantauan)	Efluen yang dirawat di takat pelepasan akhir	**Piawaian A, Peraturan - Peraturan Kualiti Alam Sekeliling (Kumbahan) 2009**	Bulanan

PELAN PEMANTAUAN ALAM SEKITAR



PEMANTAUAN IMPAK (IM)

FASA PEMBINAAN

ASPEK	PIAWAIAN/GARIS PANDUAN PEMATUHAN	KEKERAPAN PEMANTAUAN
Kualiti Air Permukaan (3 stesen pemantauan)	**Class IIB of National Water Quality Standards for (NWQSM)**	Bulanan
Kualiti Udara (3 stesen pemantauan)	**Malaysian Ambient Air Quality Standard (MAAQS)**	Suku Tahunan
Tahap Bunyi (3 stesen pemantauan)	**First Schedule of Guidelines for Environmental Noise Limits and Control, Third Edition 2019**	Suku Tahunan

FASA OPERASI

ASPEK	PIAWAIAN/GARIS PANDUAN PEMATUHAN	KEKERAPAN PEMANTAUAN
Kualiti Air Permukaan (2 stesen pemantauan)	**Class IIB of National Water Quality Standards for (NWQSM)**	Suku Tahunan
Kualiti Udara (3 stesen pemantauan)	**Malaysian Ambient Air Quality Standard (MAAQS)**	Suku Tahunan
Tahap Bunyi (3 stesen pemantauan)	**First Schedule of Guidelines for Environmental Noise Limits and Control, Third Edition 2019**	Suku Tahunan



Project Title

Proposed 60,000 P.E. Centralised Sewage Treatment Plant Under Tuaran Sewerage Scheme Phase 1(a) at CL.045316961, CL.045316970, CL.045316989, CL.045316998 and CL.045079481, Kg. Dungang, Tuaran, Sabah

Legend

Project Site

Road

Figure RE-5

Proposed Environmental Monitoring Locations (Construction Phase)

Project Proponent: Jabatan Perkhidmatan Pembetungan Sabah

Environmental Consultant: Envsolve Sdn. Bhd.

Reference Number: ENVS/4/04/A/739/25 | Drawn By : Suhana



Project Title

Proposed 60,000 P.E. Centralised Sewage Treatment Plant Under Tuaran Sewerage Scheme Phase 1(a) at CL.045316961, CL.045316970, CL.045316989, CL.045316998 and CL.045079481, Kg. Dungang, Tuaran, Sabah

Legend

Project Site

Road

Figure RE-6

Proposed Environmental Monitoring Locations (Operational Phase)

Project Proponent: Jabatan Perkhidmatan Pembetungan Sabah

Environmental Consultant: Envsolve Sdn. Bhd.

Reference Number: ENVS/4/04/A/739/25 Drawn By : Suhana