Summary of Environmental Impacts and Mitigating Measures

All the impacts that are likely to be generated by the proposed Project is summarized in **Table N**. Mitigating measures specifically proposed for each of the impacts are also presented in a systematic manner in accordance to pre-construction, construction and operational phase. Hence, such data enable convenient identification of impacts along with their respective temporal (i.e., acute or residual) and spatial (i.e., magnitude) considerations.

Table N: Summary of Environmental Impacts and Mitigating Measures for the Proposed Project

PHASE OF DEVELOPMENT	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
A. <u>Pre-Construction Phase</u>						
Reconnaissance study of the Project Site. Detail study of the existing condition.	• Preparation of documentations and plans of the proposed development. • Field survey and site investigation by engineering and environmental consultants.	• The activity is rather localized and not expected to generate any disturbances to the existing environment. • Some form of beneficial impacts such as job opportunities (i.e., surveying works, associated labourers and analytical laboratories) may be possible.	None.	Short-term.	The pre-construction stage basically involves documentation, legal approval from the relevant authorities, building construction design and development planning, field survey as well as site investigation.	7-1 & 8-1

PHASE OF DEVELOPMENT	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
B. <u>Construction Phase</u>						
Construction of the access road Main Access route to Project Site	• Provision for proper transportation routes is given foremost consideration in any developmental project. This is to ensure convenience to the workers as well as enabling smooth transportation of construction materials and heavy machinery. • Transportation of machineries, equipment and construction material to the site is via FR4 Jalan Kulim – Gerik and BKE Highway before entering the Project Site	• Main impact is in terms of noise and dust disturbances. • Increment of traffic risks especially by heavy vehicles plying FR4 Jalan Kulim – Gerik and BKE Highway. • Spillage of raw construction material onto public roads.	• Regular sweeping / cleaning of access roads to ensure all fallen debris from construction vehicles (i.e. sand, aggregates, etc.) removed by workers to ensure traffic safety. • Installation of spillage boxes for all concrete trucks employed within the site; to prevent accidental spillage onto public roads. • Flagmen must be stationed at the access road junctions to control and direct traffic. • Vehicles will have to observe speed limits and any damage done to the transportation routes should be repaired. • Proper warning signs, signals or warning light and barricade are recommended to ensure safety and smooth flow of traffic.	Short-term within the duration of the proposed Project.	The contractor should ensure that the transportation of heavy machineries, equipments and construction material adhere to specific guidelines from relevant authorities.	7-2 & 8-2

Continue….

PHASE OF DEVELOPMENT	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
B. <u>Construction Phase</u>						
Access Route within project site	• Existing earthen routes within the project site.	• As the access route has been established within the Project area, the magnitude of disturbance unto the physical environment may be considered as nominal.	• Two (2) wash troughs will be constructed to avoid dirtying the public road. • Establishment of tarred road or compacted crusher run roads • Constant wetting of work tracks to minimize dust dispersion.	Short-term within the duration of the proposed Project.	The contractor should ensure that the transportation of heavy machineries, equipments and construction material adhere to specific guidelines from relevant authorities.	7-3 & 8-2
Site Clearing and Biomass Disposal.	• Site clearing involve the removal of mainly of oil palms. • Biomass generation is approximately: →~**14,797,44 tons (total 3 phases, 300 acres)**	• Loss of current vegetation and related habitats. • May lead to soil erosion and increase in surface runoff. • If not disposed off properly, can lead to water quality deterioration and attract unwanted pests • Open burning of biomass or solid waste shall generate soot and dust.	• Site clearing will be conducted in three (3) phases to allow faunal migration. • Implementation of best management practices (BMPs) on-site (i.e., turfing, temporary earth drains and sediment basin). • Mulching of undergrowth / small woody plants on the slope / bare area to reduce soil erosion. • Biomass will be stockpiled at the designated area for fuels for boilers in the operation stage. • The residual materials will to be disposed off to the legal dumpsite (i.e., Seberang Perai Selatan Sanitary Landfill).	Short-term within the duration of the proposed Project.		7-3 to 7-5 & 8-3 to 8-5

PHASE OF DEVELOPMENT	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
			• Stockpiled biomass must be covered so as to not leach TOC into the waterways. • Contractor should place heavy emphasis in soil conservation by adopting environmentally integrated measures to counter against soil erosion. • Sediment basin design must be based on "Urban Stormwater Manual for Malaysia, 2nd Edition or MASMA 2 (2012).			7-3 to 7-5 & 8-3 to 8-5
Mobilization on site	• Construction of workers camp. • Sewage to be generated during the construction stage is at 67,500 l/day[1] (~estimated 300 workers; which is equivalent to 300 PE).	• It is estimated that 300 workers shall be needed during construction stage. • Direct discharge of untreated sewage can cause water and air pollution.	• Workers quarters and the site office should be kept clean at all time. • Temporary toilets with septic tanks or SSTS (if PE>150) specified by SPAN (Suruhanjaya Perkhidmatan Air Negara) and should be desludged regularly. • Small Sewage Treatment System (SSTS) is required to contain the sewage discharge of 300PE at the site to the compliance limits. • No open-burning is allowed • Water logged areas at the base camps should be drained properly	Short-term within the duration of the proposed Project.		7-6 & 8-8 to 8-11

[1] Assumption during construction stage based on per worker with per capita discharge rate of 225l/day. Adapted from MS1228 Sewage Guidelines

PHASE OF DEVELOPMENT	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
	• Provision of maintenance yard/ workshop.	• Heavy machinery and equipment can generate oily waste. • Oil/ grease and hydraulic spill onto soil causing the soil and groundwater contamination.	• Maintenance yard located away from waterways / drainage system, must self-contained and well-bunded. • Proper skid tank storage to curtail the possibility of oil and grease contamination. • Generated spent oil and grease from the maintenance works have to be stored and handled as per the Environmental Quality (Scheduled Wastes) Regulations 2005.			7-6 & 8-8 to 8-11
Impact of earthworks.	• Cut and fill quantities for Phase 1 are approximated to cut **474,035 m^3** and total fill **474,035 m^3** respectively. • The earthworks quantities for Phase 2 and Phase 3 to be detailed in the EMP Phase 2 and EMP Phase 3 before the development.	• Main impact generated from earthworks activities is probably in the form of soil washout into the river especially during heavy rain. • Settlement of the underlying subsoil by the load imposed after filling. • If not properly compacted, fill areas is susceptible to erosion, slipping and subsidence. • If the cuttings are too steep and are not properly protected, stability problems may arise.	• Three (3) earthwork phases for entire development • Erosion control proposed is by work scheduling, turfing & hydroseeding. • Sediment Control proposed is sediment basin, sediment forebay and sediment fence/sand bag. • One (1) sediment basin with forebay is proposed. • Earth bund with sediment fence to be placed along the access road next to FR4 Jalan Kulim-Gerik. • Runoff Management controls are Temporary Earth Drain, Earth bund, Drainage Outlet Protection and Temporary Waterway Crossing (TWC).	Short term		7-7 to 7-11 & 8-11 to 8-24

PHASE OF DEVELOPMENT	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Impact of earthworks.	• Excavation of higher grounds to form platforms, roads and other areas as shown in design drawings. • Filling to lower area to form embankments and platform to design levels.	• Leveling of ground and the use of heavy machinery for the compaction of the fill material during land development and construction activities will give rise to dust and noise pollution. • Internal access road within the site will be used as main access for earth transport.	• Tracking control proposed is the use of hoarding, stabilized construction access, construction Road stabilization, entrance / outlet wash trough, and wetting of ground. • Two (2) wash troughs are proposed. • Any sediment generated from the site shall be retained in the silt structure before being discharged into existing earth drain which drains to Sg. Karangan and eventually flow into Sg. Muda.			7-7 to 7-11 & 8-11 to 8-24
Hydrology	• Site clearing and earthwork activities will have a significant impact on the hydrological regime.	• Clearing of the existing vegetation will increase in discharge into existing earth drain which drain into Sg. Karangan and eventually flow into Sg. Muda.	• For this proposed development, one (1) sediment basin proposed for the overall development area. • Surface drainage needs to be constructed in order to reduce the infiltration and erosion caused by surface runoff especially during heavy rainstorms.	Short term	Temporary drainage system will be designed to comply with the procedures as outlined in the MASMA manual.	7-9 to 7-10 & 8-25 to 8-27

PHASE OF DEVELOPMENT	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Soil Erosion	Site clearing and earthworks in the form of cut and fill activities. This activity will be only carried out at proposed built up area.	Under worst case scenario Soil Erosion rate for the overall earthworks Areas of the Project Site – 203.4 tons/ha/year. Total sediment yield for the overall Earthworks Areas of the Project Site - 16,579 tons per storm event (approximately 12 times higher than the existing condition of 1,395 tons per storm event) With these erosion control mitigation measures The average soil loss rate for the overall Earthworks Areas of the Project Site will be reduced to 3.0 tons/ha/year and the total sediment yield is 193 tons/year which is lower than the existing condition of 1,395 tons/year.	• Earthworks and construction works will be carried out in three (3) earthworks stage. • Provision of a sediment basin at appropriate location for sediment control purposes for overall Project Site. • Maintenance of the drainage network and sediment basin. • Biotechnical protection and mechanical practices to attend to the exposed soil. • Implementation of LD-P2M2.	Short term		7-34 to 7-41 & 8-11 to 8-27

PHASE OF DEVELOPMENT	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Air Pollution	• Improper storage of raw construction materials such as cement, sand, gravels.	• Increased level of TSP/PM10 due to spillage or wind-blown dust from uncovered material which may have some effects on aesthetic value and health aspects. • Leveling of ground and the use of heavy machinery for the compaction of the fill material during earthwork and construction activities will give rise to dust pollution. • Traffic movement on dirt road will churn up the surface and may incite hazy condition especially during dry and windy periods. • Based on on-site examination, prevailing shall be from the east direction. • Anticipated immediate receptors are Kg. Padang Meha, INOKOM, road users of FR4 Jalan Kulim - Gerik at the eastern, western and northern region of the Project Site.	• Provision of wash troughs. • Constant wetting and cleaning of roads connecting the Site to external public roads. • Proposed road network within the site to be constructed and tarred • Proper covering of raw materials and topsoil stockpiles. • Traffic management trough speed limits and regular maintenance of vehicles / machinery • To erect hoarding along the eastern, northern and western boundary of the Project Site.	Short-term within the duration of the proposed Project.	The air pollution problem is considered to be short-term problem and localised within the working areas.	7-129 to 7-133 & 8-28 to 8-31

PHASE OF DEVELOPMENT	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Noise Pollution	• Earthworks	• Nearest residential receptor shall experience minimal noise level emitted from tractors, scrappers, trucks and, jackhammer/rock drills.	• Noisy construction activities should be done only during day-time to preserve tranquility of night-time and reduce level of nuisance to surrounding population.	Similarly, with air pollution, noise pollution is also localized and short term.		7-60 to 7-163 & 8-32
Paper Plant and Infrastructural Works	• Piling Activities	• High noise level will create nuisance and pose psychological effect to the receptors, and to some extend may cause physiological effect. • Based on the simulation shown that by using jack in pile for STP/SSTS at the distance 59m from the receptors, the noise emission at 90 percentiles of the time is below than the limit of L_{90}=60. • Bored piling can be considered to be used for water treatment plant, pulping workshop, paper making workshop and IETS	• Jack in pile is recommended to use at the area next to the receptors as it offer advantages in terms of low noise and vibration during pile installation. • Bored piling can also be considered to be used at the proposed water treatment plant, pulping workshop, paper making workshop and IETS, i.e., 120m, 237m away from the project boundary as based on the simulation shows that the noise emission at 90 percentiles of the time is below than the limit of L_{90}=60.	Short-term within the duration of the proposed Project.		7-10 to 7-11, 7-160 to 7-163, 7-165 to 7-166 & 8-32 to 8-34, 8-39 to 8-40
	• Solid Waste	• Improper disposal of construction debris (cement, pebbles, tiles) can clog drain and could impact project site's safety.	• All domestic and building waste will be disposed off site to an approved dumpsite.			
	• Traffic and Transportation Impact	• During construction phase, lorries and trucks delivering building materials, aggregate, etc will increase traffic flow of the area especially at BKE and FR4 Jln Kulim-Gerik.	• Traffic management is necessary to control traffic movements especially during peak hours.			

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PHASE OF DEVELOPMENT	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
C. <u>Operational Phase</u>						
Transportation of raw materials and chemicals	• Transportation of raw materials and chemicals by vehicles.	• The risk of spillage / leakage due to leaking / damaged containers that causes contamination to the nearby water bodies. • Incompatible raw materials and chemicals transported in the same vehicle will cause reaction to take place creating fumes or fire. • Increased probability of road accident by using undedicated road networks.	• The transport of raw materials and chemicals must follow relevant transport codes. • The transporting vehicle shall be equipped with the necessary PPE and spillage clean-up kit at all times. • Proper transportation schedule and follow dedicated road networks. • Avoid any incompatible type of material transported in a same vehicle.	Long-term.		7-18 & 8-41

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PHASE OF OPERATION	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Handling of raw materials and chemicals	• Incoming chemicals. • Residue wastes or sludge generated from the operation process.	• Mislabeling or no labeling of residue waste or hazardous chemicals poses danger to the safety of the workers. • Direct impact towards worker's health when handling the hazardous chemicals.	• Recordkeeping should be maintained. • All drums and other storage containers must be properly and prominently labeled and tightly sealed. • Containers should be compatible with the stored material and free of leaks. • Suitable personal protective equipments (i.e., goggles, gloves and mask) have to be equipped all the time.	Long-term.		7-18 & 8-42

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PHASE OF OPERATION	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Storage of raw materials and chemicals	• Incoming of raw materials and chemicals.	• Leaking / damaged containers, accidental spills could cause adverse effects to the workers and contaminate the air while liquid chemicals contaminate the water bodies. • Leaching caused by inadequate protection against rain and the leachate may run off into surface waters or seep into groundwater.	• Centralize responsibility for storing and distributing the hazardous chemicals • Store hazardous chemicals in a cool, dry well-ventilated place and avoid any area where the fire hazard may be acute. • Maintaining monthly inventory of chemicals. • The storage area should have an impervious surface and must be paved. • Containers used to store hazardous chemicals must be in good condition and free of leaks.	Long-term.		7-19 & 8-42

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PHASE OF OPERATION	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Workers' Safety and Chemical Hazard	• Operation of machineries. • Maintenance of plant machineries. • Chemical hazard of the raw material.	• Accidents are prone to happen if without proper maintenance of the machinery and know-how skill of the workers for chemical hazards.	• Trainings cover emergency procedures should be provided to the workers. • The maintenance of plant machineries should also be conducted on a regular basis. • Material safety data sheet should be placed at the noticeable area when handling materials.	Long-term.		7-19 & 8-43

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PHASE OF OPERATION	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
C. <u>Operational Phase</u>						
Stormwater Management		• Without a proper drainage planning and stormwater management, water quality and surface runoff will be disturbed as the landuse constituent of the Project Site will have gone through a major alteration.	• Project site is within one (1) major catchment area (Sg. Karangan catchment, one of the tributaries of the larger Sg. Muda river basin) and the surface water will gradually flow into one (1) detention ponds • Drainage system shall be provided within the project site to channel the storm water into the detention pond which will eventually flow into existing external drains before discharging into Sg. Karangan and eventually discharges into Sg. Muda.	It is anticipated that there will be no localized flooding upon construction of an efficient drainage system.		7-19 to 7-20 & 8-44

PHASE OF OPERATION	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Hydrology	• During the operational phase, 22 MLD per phase of water will be abstracted from Sg Karangan for the plant processing purposes. • As the development is divided into 3 phases, the total abstraction will amount to 66 MLD with 95 % of the water will be used, treated and discharged back to Sg Karangan as treated effluent discharge. Therefore, the nett river abstraction will amount to 3.3 MLD (5% consumptive use) when the 3 phases of the development are in operation.	• Analysis was carried out to assess the impact on the river availability to the downstream water user. The assessment is focussed towards the Titi Karangan scheme (3.2 km downstream of the Project intake). • Currently, Titi Karangan diverts 27.6 MLD (0.32 m^3/s) of water by gravity from Sg Karangan to the irrigation scheme according to planting schedule. • From the water availability analysis, without the abstraction from the Project site, the water availability at Titi Karangan exceeds 27.6 m^3/s at 98% of the time in a year. With the nett abstraction by the Project, the water availability remains at the same percentile of time in a year for each phase. This shows that with the abstraction by the Project, there is no impact on the flow availability to the downstream user of Titi Karangan Irrigation Scheme.	• To comply with approval condition and requirement by JPS Kedah and MPKK.	Long-term.		7-20, 7-42 to 7-44

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PHASE OF OPERATION	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Water Pollution	• Wastewater from the human population at the dormitory. • Industrial effluent from paper plant IETS.	• **<u>Low Flow Scenario</u> -** Upon operation of the plant, effluent discharge will be released after the treatment from the IETS to Sg. karangan. Under the 7Q10 low flow condition, the summary of the simulated results for each parameter is shown in **Table N1** below. • BOD will deteriorate from baseline Class III to Class IV under Phase 1 operation and further deteriorates to Class V under Phase 1 & 2 operation. • COD will deteriorate from baseline Class II to Class III under Phase 1 and further deteriorate to Class IV under Phase 1 and 2 operation. • AN will deteriorate from baseline Class II to Class IV under Phase 1 and further deteriorate to Class V under Phase 1 and 2 operation.	• Proper maintenance of STP/SSTS is necessary to ensure its good operational • Effluent from the plant will be treated in the IETS to comply with Standard A limits under the Environmental Quality (Industrial Effluent) Regulations 2009. • In the event that the IETS fails, effluent will be contained in a Contingency Tank which has the capacity to retain the effluent up to 6.36 hours or 5,833 m3 capacity. The plant operation will be slow down until the IETS operation is resumed as normal. Usually the recovery should take 2 hours and operation will resume as normal. In the event that the IETS operation is unable to resume within the specified period and the storage of holding tank has reached 90% full, the whole production will be ceased.	Long-term.	• The design of sewage treatment plant or small sewerage treatment system (SSTS) shall comply to "Malaysian Sewerage Industry Guidelines –Volume IV – Sewage Treatment Plants (Third Edition SPAN 2009)". • The IETS design needs to comply to the requirements of the Environmental Quality Act, 1974.	7-45 to 7-103 & 8-45 to 8-57

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PHASE OF OPERATION	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Water Pollution	• Wastewater from the human population at the dormitory. • Industrial effluent from paper plant IETS.	• **Normal Flow Scenario** - Overall, WQ condition is better under the normal flow condition compared to low flow condition. The summary of the simulated results for each parameter is shown in **Table N2** below. • For Sg Karangan, most of the parameters will remain in the same WQ class except for BOD and AN. • BOD will change from baseline Class III to Class IV for all phases of operation • AN will change from baseline Class II to Class III for Phase I and Phase 1 & 2, and changes further to Class IV for Phase 1, 2 & 3 operation • For Sg Muda under the normal flow scenario, the WQ class of all the parameters remain unchanged between baseline and all phases of operation.		Long-term.	• The design of sewage treatment plant or small sewerage treatment system (SSTS) shall comply to "Malaysian Sewerage Industry Guidelines –Volume IV – Sewage Treatment Plants (Third Edition SPAN 2009)". • The IETS design needs to comply to the requirements of the Environmental Quality Act, 1974.	7-45 to 7-103 & 8-45 to 8-57

Table N1 (a): Summary of Simulated Results of WQ Parameters for Sg. Karangan under the 7Q10 Low Flow Condition

WQ Parameters	Class/ mg/L	Baseline	Operation Phase			
			Phase 1 only	Phase 1 + 2	Phase 1 + 2 + 3	Phase 1 + 2 + 3 (worst case)
pH	Class	I	II	II	II	III
DO	Class	II-III	III	III-IV	III-IV	V
BOD	Class	III	IV	V	V	V
COD	Class	II	III	IV	IV	V
AN	Class	II	IV-V	V	V	V
TSS	Class	I	I	I-II	II	V
NO_3	Class	2.0	3.6 - 3.7	5.4 - 5.6	5.6 - 6.0	5.6 - 6.0
TP	mg/L	8.3	6.7 - 7.0	5.2 - 5.8	4.8 - 5.0	4.8 - 5.0
Chloride	mg/L	7.0	45 - 50	85 - 100	100 - 110	236 - 285
TOC	mg/L	2.2	5.0 - 5.6	8.8 - 9.9	9.0 - 10.0	800 - 1000

Table N1(b): Summary of Simulated Results for each Parameter for Sg. Muda under the Low Flow Condition

WQ Parameters	Class/ mg/L	Baseline	Operational			
			Phase 1 only	Phase 1 + 2	Phase 1 + 2 + 3	Phase 1 + 2 + 3 (worst case)
pH	Class	II	II	II	II	II
DO	Class	II	II	II	II	II - III
BOD	Class	III	III	III	III	V
COD	Class	II	II	II	II	III- IV
AN	Class	III	III	III	III	III
TSS	Class	I	I	I	I	II
NO_3	Class	2.2	2.2	2.2	2.3	2.3
TP	mg/L	13.2	13.2	13.2	13.2	13.2
Chloride	mg/L	5.0	6.0	6.8	8.5	10.2
TOC	mg/L	3.0	3.0	3.0	3.0	19.4

Table N2(a): Summary of Simulated Results for each Parameter for Sg. Karangan under the Normal Flow Condition

WQ Parameters	Class/ mg/L	Baseline	Operational			
			Phase 1 only	Phase 1 + 2	Phase 1 + 2 + 3	Phase 1 + 2 + 3 (worst case)
pH	Class	I	I	I	I	II
DO	Class	II	II	II	II	V
BOD	Class	III	IV	IV	IV	V
COD	Class	II	II	II	II-III	V
AN	Class	II	III	III	IV	IV
TSS	Class	I	I	I	I	V
NO_3	Class	2.0	2.3	2.6	2.9	2.9
TP	mg/L	8.3	8.0	7.8	7.4	8.3
Chloride	mg/L	7.0	15.3-16.0	23-25	30-33	70-83
TOC	mg/L	2.0	2.8	3.4	3.9-4.2	220-270

Table N2(b): Summary of Simulated Results for each Parameter for Sg. Muda under the Normal Flow Condition

WQ Parameters	Class/ mg/L	Baseline	Operational			
			Phase 1 only	Phase 1 + 2	Phase 1 + 2 + 3	Phase 1 + 2 + 3 (worst case)
pH	Class	II	II	II	II	II
DO	Class	II	II	II	II	II
BOD	Class	III	III	III	III	IV-V
COD	Class	II	II	II	II	II-III
AN	Class	II	II	II	II	II
TSS	Class	II	II	II	II	II
NO_3	Class	2.2	2.2	2.2	2.2	2.2
TP	mg/L	13.6	12.9	12.9	12.9	12.9
Chloride	mg/L	5.0	5.4	5.4	5.7	7.3
TOC	mg/L	3.0	3.0	3.0	3.0	10

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PHASE OF OPERATION	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Water Pollution		• The additional WQ modelling was carried out to find out the threshold of concentration limit that could maintain the WQ class for BOD and AN under the operational phase 1 during 7Q10 low flow condition. • In order for BOD and AN to maintain as per baseline condition without affecting the current river class during low flow, the absolute concentration quality for BOD and AN is 7 mg/L and 2 mg/L respectively. • To achieve such condition, no water abstraction from Sg. Karangan and water quantity to be sourced from other alternative.	• Effluent monitoring programme for IETS is recommended to ensure the quality of effluent discharge is within the acceptable quality and quantity limit. It is crucial to conduct regular inspection and maintenance to detect early sign of failure or leakage if any. Preventive maintenance of the WWTP components with regular system checks should be conducted to detect early signs of system failure. • The online monitoring analyser is proposed at the final discharge point within the plant compound prior to discharging out to downstream river and the parameters to be monitored are COD, BOD and AN. The in-house laboratory testing will analyse the samples collected from primary clarifier, anaerobic treatment, aeration tank, secondary clarifier and tertiary clarifier for parameters of COD, BOD, AN and pH.			7-45 to 7-103 & 8-45 to 8-57

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PHASE OF OPERATION	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Water Pollution			• **Additional Option for Consideration during Operation Phase under the Low Flow Condition**- As the Project will cause impact to river WQ during low flow condition, additional mitigation measures proposed to abate WQ deterioration during low flow condition are: 1. Alternative discharge points; 2. Better treated effluent standard for selected parameters; 3. Monitoring of water level and flow meter at Sg. Karangan intake to monitor river water level and/or flow; and 4. reduce effluent discharge by recycling for internal plant usage.			7-45 to 7-103 & 8-45 to 8-57
Groundwater Quality		• Possibilities of groundwater contamination due to spillage or leakage oil/grease and scheduled waste from the paper mill.	• Proper handling of scheduled waste at site. • Additional monitoring well (MW3) to be constructed at the western portion of Project Site. • Groundwater sampling, and monitoring within the Project Site in accordance with the requirements of DOE Malaysia	Impacts can be managed.	Long-term groundwater monitoring reveal changes to the groundwater system which differs with those predicted by the re-calibrated groundwater model; the model should again be verified and re-calibrated with all available monitoring data.	7-104 to 7-128 & 8-58 to 8-60

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PHASE OF OPERATION	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Waste Management -Solid Waste	• Solid waste expected to be generated from the workers from office and dormitory on-site is **2,780 kg/day.** • Solid wastes such as plastic and metal generated from the stock preparation and pulping workshop.	• Improper disposal of solid waste may affect aesthetic quality, a source of water contamination and proliferation of disease vectors.	• Implementation of a proper and adequate waste collection system by the Local Authority. • Solid waste shall only be disposed at an approved dumpsite landfill under the jurisdiction of Majlis Perbandaran Kulim (MPKk). • The plastic and metal can be recycled and sell to the recycling contractors.	Long-term.	• Solid waste management is under the responsibility of local authority (Majlis Perbandaran Kulim)	7-21 to 7-23 & 8-60 to 8-63
-Sullage and Kitchen Waste Management		• All drainage systems and piping will be clogged if the sullage and kitchen wastes are discharged without a proper trap.	• Grease traps must to be prepared for all kitchens in the workers dormitory to trap the Fat, Oil and Grease (FOG).	Long-term.		7-21 & 8-48 to 8-57

PHASE OF OPERATION	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Scheduled Wastes	• Sludge generation from the proposed pulping workshop, water treatment plant (WTP) and industrial effluent treatment system (IETS). • Fly ash and slag (bottom ash) from boilers and ESP.	• Scheduled waste (SW 204 Water treatment residue) generated during the operation phase is 572 kg/day/phase based on the removal of 26mg/L (baseline TSS at W6) of solids from the raw river water pumping rate of 22MLD. • Scheduled waste (SW204 sludge from IETS) generated during the operation phase is 3.5 tons/day/phase. • Scheduled waste (fly ash and slag-bottom ash) generated during the operation phase is 43.2 tons/day/phase.	• Project Proponent has to apply for special management of scheduled wastes under Section 7, Environmental Quality (Scheduled Wastes) Regulations 2005. • Sludge or WTR from water treatment plant will be disposed of to the landfill. • Sludge of IETS will be reused for paper product and minimum sludge will be disposed to the landfill. • Ash and slag from APCS will be sold as fertilizer, if approved under special management of wastes.	Long-term.	The Project Proponent has to apply for special management of scheduled wastes under Section 7, Environmental Quality (Scheduled Wastes) Regulations 2005.	7-22 to 7-23 & 8-61 to 8-63

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PHASE OF OPERATION	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Air and Noise	• Operation of process equipment and pollution control system. • Traffic flow to and from the Paper Plant for material loading and unloading.	• Gas emission from the chimney during the operation. • Fugitive emissions from the storage area and process area. • Air-operated driven pumps and gear motor noise from the paper pulping and making process. • The traffic emission of obnoxious gasses and excessive noise are considered nominal. • For Air Quality modelling refer to **Table N3(a-d)**, during Normal Operation, the calculated Ground level Concentration (GLCs) for identified criteria pollutants at the identified off-site ASRs i.e. **ASR1**, **ASR2**, **ASR3** and **ASR4** met the Malaysian Ambient Air Quality Standards 2013 at 2020 except for the calculated of $PM_{2.5}$ at ASR2: Adjacent with Kg. Padang Meha on the Northeast for Phase 1 and 2 (36.9 µg/m^3) and Phase 1, 2 and 3 (37.7 µg/m^3) which had slightly exceeded the prescribed limit. During Abnormal Situation, the predicted 1-hour averaging time for PM_{10} and $PM_{2.5}$ is assessed to have impact to the surrounding areas.	• Flue gas of the boiler is treated with high-efficiency electrostatic precipitator (ESP). • Compliance to EQ (Clean Air) Regulations 2014. • Continuous emission monitoring system (CEMS) to be provided to monitor and record selected gas parameters to monitor the imminent breach of emission limit and is interlocked with control system to adjust various processes parameters to avoid such exceedance. • Regulatory procedures or control of traffic emissions to comply with the legislative limits. • Proposed heavy landscape buffer to be established at the eastern boundary next to Kg. Padang Meha as natural air and noise barrier.	Residual impacts	The air quality modeling showed most of the predicted Maximum Average Incremental Concentration for Identified pollutants (PM2.5, PM10, NOx, SOx) by normal scenario are within the Malaysian Air Quality Standards 2013 (Standard 2020)	7-134 to 7-164 & 8-64 to 8-67

Table N3(a): Predicted Maximum Average Incremental Concentration for Identified Pollutants (in μg/m³) Normal Scenario

Parameter	Averaging Time (Figure)	Baseline Level (μg/m³)	Phase	Highest MAIC	Off-site ASRs								MAAQS 2013 (Standard [2020])
					ASR1: Industrial Area near Inokom		ASR 2: Adjacent with Kg. Padang Meha on the Northeast		ASR 3: Adjacent to Kg. Padang Meha on Eastern Boundary		ASR4: Taman Desa Cinta Sayang		
					Predicted MAIC	GLC	Predicted MAIC	GLC	Predicted MAIC	GLC	Predicted MAIC	GLC	
Particulate matter sized 10 microns or less (PM_{10})	24-hours	**Off-site ASRs** A1: 47 A2: 55 A3: 53 A4: 52 (24-hours averaging time)	Phase 1	4.3	1.4	48.4	3.2	58.2	2.6	55.6	1.0	53.0	**100**
			Phase 1+2	6.6	2.5	49.5	5.6	60.6	3.6	56.6	1.5	53.5	
			Phase 1+2+3	7.5	3.0	54.5	6.4	61.4	3.9	56.9	1.8	53.8	
	Annual Average		Phase 1	0.8	0.18	-	0.66	-	0.38	-	0.15	-	**40**
			Phase 1+2	1.2	0.27	-	1.14	-	0.63	-	0.25	-	
			Phase 1+2+3	1.4	0.32	-	1.35	-	0.80	-	0.29	-	
Particulate matter sized 2.5 microns or less ($PM_{2.5}$)	24-hours	**Off-site ASRs** A1: 29 A2: 32 A3: 28 A4: 26 (24-hours averaging time)	Phase 1	3.8	1.3	30.3	2.8	34.8	2.3	30.3	0.8	26.8	**35**
			Phase 1+2	5.8	2.2	31.2	4.9	**36.9**	3.1	31.1	1.4	27.4	
			Phase 1+2+3	6.6	2.6	31.6	5.7	**37.7**	3.5	31.5	1.6	27.6	
	Annual Average (Plate 7.32)		Phase 1	0.7	0.16	-	0.58	-	0.34	-	0.13	-	**15**
			Phase 1+2	1.1	0.24	-	1.00	-	0.55	-	0.22	-	
			Phase 1+2+3	1.3	0.28	-	1.19	-	0.71	-	0.26	-	
Carbon Monoxide (CO)	1-hour	**Off-site ASRs** A1: 4.3 A2: 3.6 A3: 4.0 A4: 4.0 (8-hours averaging time)	Phase 1	362.6	101.9	-	106.4	-	123.4	-	95.4	-	**30 mg/m³ or 30,000 μg/m³**
			Phase 1+2	771.5	213.23	-	186.8	-	209.3	-	186.4	-	
			Phase 1+2+3	959.3	308.8	-	241.6	-	247.5	-	273.1	-	
	8-hours		Phase 1	88.7	38.8	43.1	60.6	64.2	51.1	55.1	17.5	21.5	**10 mg/m³ or 10,000 μg/m³**
			Phase 1+2	181.1	82.9	87.2	127.4	131.0	83.7	87.7	33.8	37.8	
			Phase 1+2+3	230.9	121.7	126.0	178.0	181.6	108.1	112.1	48.9	52.9	

Parameter	Averaging Time (Figure)	Baseline Level ($\mu g/m^3$)	Phase	Highest MAIC	Off-site ASRs								MAAQS 2013 (Standard [2020])
					ASR1: Industrial Area near Inokom		ASR 2: Adjacent with Kg. Padang Meha on the Northeast		ASR 3: Adjacent to Kg. Padang Meha on Eastern Boundary		ASR4: Taman Desa Cinta Sayang		
					Predicted MAIC	GLC	Predicted MAIC	GLC	Predicted MAIC	GLC	Predicted MAIC	GLC	
Nitrogen Oxides (NO_x) as 100% NO_2	1-hour	**Off-site ASRs** A1: ND A2: ND A3: ND A4: ND (24-hours averaging time)	Phase 1	145.2	40.8	-	42.6	-	49.4	-	38.2	-	**280**
			Phase 1+2	**0309. (Within Project Site)**	85.3	-	74.8	-	83.8	-	74.7	-	
			Phase 1+2+3	**384.2 (Within Project Site)**	123.7	-	96.8	-	99.1	-	109.4	-	
	24-hours		Phase 1	15.6	5.2	5.2	11.5	11.5	9.3	9.3	3.5	3.5	**70**
			Phase 1+2	27.9	11.1	11.1	24.3	24.3	15.1	15.1	6.6	6.6	
			Phase 1+2+3	37.8	16.3	16.3	33.8	33.8	19.6	19.6	9.6	9.6	
Sulphur Dioxide (SO_2)	1-hour	**Off-site ASRs** A1: ND A2: ND A3: ND A4: ND (24-hours averaging time)	Phase 1	145.2	40.8	-	42.6	-	49.4	-	38.2	-	**250**
			Phase 1+2	**309.0 (Within Project Site)**	85.3	-	74.8	-	83.8	-	74.7	-	
			Phase 1+2+3	**384.2 (Within Project Site)**	123.7	-	96.8	-	99.1	-	109.4	-	
	24-hours		Phase 1	15.6	5.2	5.2	11.5	11.5	9.3	9.3	3.5	3.5	**80**
			Phase 1+2	27.9	11.1	11.1	24.3	24.3	15.1	15.1	6.6	6.6	
			Phase 1+2+3	37.8	16.3	16.3	33.8	33.8	19.6	19.6	9.6	9.6	

Notes: MAAQS, 2013 (2020) = Malaysian Ambient Air Quality Standard, 2013 at 2020

ND – Not detected, ASRs – Air Sensitive Receptors

Ground Level Concentration = Baseline Level + Predicted MAIC

Baseline Ambient Air Quality Monitoring carried out from 11 to 15 March 2019

***BOLD** = Exceedance*

Table N3(b): Predicted Maximum Average Incremental Concentration for Identified Pollutants (in μg/m³) during Normal Scenario in Compliance of 25% Threshold

No.	Scenario	Identified Air Sensitive Receptor	Air Sensitive Receptor Incremental (μg/m³)			Compliance with 25% Threshold
			Phase 1	Phase 1+2	Phase 1+2+3	
1	Pollutant: PM_{10} 24-hours Average Limit: 100 mg/m³ (MAAQS 2013 [Standard 2020]) **25% Threshold: 25 μg/m³**	ASR1: Industrial Area near Inokom	1.4	2.5	3.0	**YES**
		ASR2: Adjacent with Kg. Padang Meha on the Northeast	3.2	5.6	6.4	**YES**
		ASR3: Adjacent to Kg. Padang Meha on Eastern Boundary	2.6	3.6	3.9	**YES**
		ASR4: Taman Desa Cinta Sayang	1.0	1.5	1.8	**YES**
2	Pollutant: PM_{10} Annual Average Limit: 40 mg/m³ (MAAQS 2013 [Standard 2020]) **25% Threshold: 10 μg/m³**	ASR1: Industrial Area near Inokom	0.18	0.3	0.3	**YES**
		ASR2: Adjacent with Kg. Padang Meha on the Northeast	0.66	1.1	1.4	**YES**
		ASR3: Adjacent to Kg. Padang Meha on Eastern Boundary	0.38	0.6	0.8	**YES**
		ASR4: Taman Desa Cinta Sayang	0.15	0.3	0.3	**YES**
3	Pollutant: $PM_{2.5}$ 24-hours Average Limit: 35 mg/m³ (MAAQS 2013 [Standard 2020]) **25% Threshold: 8.75 μg/m³**	ASR1: Industrial Area near Inokom	1.3	2.2	2.6	**YES**
		ASR2: Adjacent with Kg. Padang Meha on the Northeast	2.8	4.9	5.7	**YES**
		ASR3: Adjacent to Kg. Padang Meha on Eastern Boundary	2.3	3.1	3.5	**YES**
		ASR4: Taman Desa Cinta Sayang	0.8	1.4	1.6	**YES**
4	Pollutant: $PM_{2.5}$ Annual Average Limit: 15 mg/m³ (MAAQS 2013 [Standard 2020]) **25% Threshold: 3.75 μg/m³**	ASR1: Industrial Area near Inokom	0.16	0.2	0.3	**YES**
		ASR2: Adjacent with Kg. Padang Meha on the Northeast	0.58	1.0	1.2	**YES**
		ASR3: Adjacent to Kg. Padang Meha on Eastern Boundary	0.34	0.6	0.7	**YES**
		ASR4: Taman Desa Cinta Sayang	0.13	0.2	0.3	**YES**
5	Pollutant: CO 1-hour Average Limit: 30,000 mg/m³ (MAAQS 2013 [Standard 2020]) **25% Threshold: 7,500 μg/m³**	ASR1: Industrial Area near Inokom	101.9	213.2	308.8	**YES**
		ASR2: Adjacent with Kg. Padang Meha on the Northeast	106.4	186.8	241.6	**YES**
		ASR3: Adjacent to Kg. Padang Meha on Eastern Boundary	123.4	209.3	247.5	**YES**
		ASR4: Taman Desa Cinta Sayang	95.4	186.4	273.1	**YES**
6	Pollutant: CO 8-hours Average Limit: 10,000 mg/m³ (MAAQS 2013 [Standard 2020]) **25% Threshold: 2,500 μg/m³**	ASR1: Industrial Area near Inokom	38.8	82.9	121.7	**YES**
		ASR2: Adjacent with Kg. Padang Meha on the Northeast	60.6	127.4	178.0	**YES**
		ASR3: Adjacent to Kg. Padang Meha on Eastern Boundary	51.1	83.7	108.1	**YES**
		ASR4: Taman Desa Cinta Sayang	17.5	33.8	48.9	**YES**
7	Pollutant: SO_2 1-hour Average Limit: 250 mg/m³ (MAAQS 2013 [Standard 2020]) **25% Threshold: 62.5 μg/m³**	ASR1: Industrial Area near Inokom	40.8	85.3	123.7	**YES**
		ASR2: Adjacent with Kg. Padang Meha on the Northeast	42.6	74.8	96.8	**YES**
		ASR3: Adjacent to Kg. Padang Meha on Eastern Boundary	49.4	83.8	99.1	**YES**
		ASR4: Taman Desa Cinta Sayang	38.2	74.7	109.4	**YES**
8	Pollutant: SO_2 24-hours Average Limit: 80 mg/m³ (MAAQS 2013 [Standard 2020]) **25% Threshold: 20 μg/m³**	ASR1: Industrial Area near Inokom	5.2	11.1	16.3	**YES**
		ASR2: Adjacent with Kg. Padang Meha on the Northeast	11.5	24.3	33.8	**YES**
		ASR3: Adjacent to Kg. Padang Meha on Eastern Boundary	9.3	15.1	19.6	**YES**
		ASR4: Taman Desa Cinta Sayang	3.5	6.6	9.6	**YES**

Table N3(c): Predicted Maximum Average Incremental Concentration for NO_2 (in μg/m³) during Normal Scenario in Compliance of 25% Threshold

No.	Scenario	Identified Air Sensitive Receptor	Air Sensitive Receptor Incremental (μg/m³)- NOx as 100% NO_2			Air Sensitive Receptor Incremental (μg/m³)- NOx as 10% NO_2			Compliance with 25% Threshold	Air Sensitive Receptor Incremental (μg/m³)- NOx as 35% NO_2			Compliance with 25% Threshold
			Phase 1	Phase 1+2	Phase 1+2+3	Phase 1	Phase 1+2	Phase 1+2+3		Phase 1	Phase 1+2	Phase 1+2+3	
1	1-hour Average Limit: 280 μg/m³ (MAAQS 2013 [Standard 2020]) **25% Threshold: 70 μg/m³**	ASR1: Industrial Area near Inokom	40.8	85.3	123.7	4.08	8.53	12.37	**YES**				
		ASR2: Adjacent with Kg. Padang Meha on the Northeast	42.6	74.8	96.8	4.26	7.48	9.68	**YES**				
		ASR3: Adjacent to Kg. Padang Meha on Eastern Boundary	49.4	83.8	99.1	4.94	8.38	9.91	**YES**				
		ASR4: Taman Desa Cinta Sayang	38.2	74.7	109.4	3.82	7.47	10.94	**YES**				
2	24-hours Average Limit: 70 μg/m³ (MAAQS 2013 [Standard 2020]) **25% Threshold: 17.5 μg/m³**	ASR1: Industrial Area near Inokom	5.2	11.1	16.3					1.8	3.9	5.7	**YES**
		ASR2: Adjacent with Kg. Padang Meha on the Northeast	11.5	24.3	33.8					4.0	8.5	11.8	**YES**
		ASR3: Adjacent to Kg. Padang Meha on Eastern Boundary	9.3	15.1	19.6					3.3	5.3	6.9	**YES**
		ASR4: Taman Desa Cinta Sayang	3.5	6.6	9.6					1.2	2.3	3.36	**YES**

Table N3(d): Predicted Maximum Average Incremental Concentration for Identified Pollutants during Abnormal Situation (in μg/m³)

Parameter	Averaging Time	Baseline Level (μg/m³)	Highest MAIC	Off-site ASRs								MAAQS 2013 (Standard [2020])
				ASR1: Industrial Area near Inokom		ASR 2: Adjacent with Kg. Padang Meha on the Northeast		ASR 3: Adjacent to Kg. Padang Meha on Eastern Boundary		ASR4: Taman Desa Cinta Sayang		
				Predicted MAIC	GLC	Predicted MAIC	GLC	Predicted MAIC	GLC	Predicted MAIC	GLC	
Particulate matter sized 10 microns or less (PM_{10})	1-hour	**Off-site ASRs** A1: 47 A2: 55 A3: 53 A4: 52 (24-hours averaging time)	2,727.5	751.2	798.2	637.5	692.5	872.8	925.8	602.5	654.5	-
Particulate matter sized 2.5 microns or less ($PM_{2.5}$)	1-hour	**Off-site ASRs** A1: 29 A2: 32 A3: 28 A4: 26 (24-hours averaging time)	2,304.1	634.6	663.6	538.6	570.6	737.3	765.3	509.4	535.4	-

Notes: MAAQS, 2013 (2020) = Malaysian Ambient Air Quality Standard, 2013 at 2020

ASRs – Air Sensitive Receptors

Ground Level Concentration = Baseline Level + Predicted MAIC

Baseline Ambient Air Quality Monitoring carried out from 11 to 15 March 2019

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PHASE OF OPERATION	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Traffic	• Increase in traffic activities would be a source of impact on both the air and noise quality.	• FR4 Jalan Kulim-Gerik, BKE are expected to receive the increased traffic volume from the proposed development.	• Designing the facilities on the trucks/vehicles to minimize the likelihood of spillage occurring; • Scheduling of the transportation trucks to ensure the truck turn-around time is not delayed and to prevent truck-waiting within the site, which will lead to a line-up of truck along the internal road near INOKOM and along the FR 4 Jalan Kulim-Gerik. • Strict adherence to the relevant regulations pertaining to road transport.	Long-term.		7-165 to 7-172 & 8-75
Biological Environment	• Enhance the aesthetic value of the Project Site with landscape programme.	• Biological impacts are basically upon re-planting of greeneries by landscaping. • This activity could further attract some fauna species to the Project Site. • Loss of the existing terrestrial biological environment during the establishment of a built development. • There will be reduction in both fish and prawn catches by recreational fishermen from the river due to water quality in Sg. Karangan will be marginally impacted.	• Re-establish and diversify the flora and fauna species, albeit nominal in the Site. • Implementation of heavy landscape along the eastern boundary of the Project Site next to Kg. Padang Meha. • Final discharge of the IETS must comply with Standard A level for Environmental Quality (Industrial Effluent) Regulations 2009.	Long-term.		7-23 to 7-25 & 8-68 to 8-71

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PHASE OF OPERATION	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Socio-economic Environment	• Potential positive impacts on the socio-economic environment are evident with the implementation of the proposed Project. • Occupational hazard and residual impacts such as noise, air emission, industrial effluent discharge during the operational phase.	• Increase current status of living of the local population residing nearby in terms of infrastructures and increase employment opportunities. • Occupational hazard during operational stage is prevalent. • Fear of residual impacts from the operation of the paper plant, i.e., noise, air emission, industrial effluent discharge may cause anxiety amongst the surrounding population.	• Final discharge of the IETS must comply with Standard A level for Environmental Quality (Industrial Effluent) Regulations 2009. • Compliance to EQ (Clean Air) Regulations 2014. • Aspect of safety should be given prime attention especially with regard to safe handling of equipment, raw material, exposure and fire (refer mitigation measures during the construction stage where applicable)	Long-term.		7-25 to 7-29 & 8-71 to 8-73

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PHASE OF OPERATION	ACTIVITIES	POTENTIAL IMPACTS	MITIGATING MEASURES	SIGNIFICANCE	REMARKS	REFERENCE PAGE
Environmental Management Plan (EMP)	• Monitoring, Reporting & Auditing			Long-term.		9-1 to 9-24
Competent Persons	Environmental Officer, Competent person for Industrial Effluent Treatment System (IETS), Air Pollution Control System and CePSWaM.					9-1 to 9-24 5-70 to 5-71, 5-94
Abandonment						7-17