



## **1.0 OVERVIEW**

Environmental Management Plan (EMP) provides a management framework for implementing measures recommended in the Social Environmental Impact Assessment (SEIA) and other studies. Designed to manage the environmental impacts of the overall Baleh HEP, the EMP ensures compliances with environmental legislative requirements and conformance with International Standards, i.e Hydropower Sustainability Standards (HSS).

## **2.0 SCOPE**

The requirements outlined within the EMP are applicable to all stages of project and activities undertaken during project planning, implementation, and operating stage of the Project and are required to be adopted across all components of the Project

## **3.0 OBJECTIVES**

The EMP will provide guidance and systematic approach in formulating action plan and management plan to address risk and opportunities identified from the SEIA, to ensure:

- Compliance to the relevant local environmental requirements and conformance to international requirements
- Potential environmental impacts due to construction of Baleh HEP are assessed and to recommend mitigating measures
- Documented system for sound management and enhancement of the development is available
- Well-managed and controlled site activities and development
- Recommended mitigation measures are implemented on the identified adverse impacts to the environment due to the project activities
- Systematic documentation and reporting through proper monitoring programs which include impact mitigation and response procedures
- Timely identification of variations and new impacts to allow rectification to be made

#### 4.0 ENVIRONMENTAL IMPACTS AND MITIGATIONS

The environmental aspects and potential impacts arising from the Project activities were identified and the mitigation measures were assessed. Essentially, the responsibilities for ensuring implementation of mitigation, monitoring and supervision as well as the reporting and legal requirements involved are outlined as follows:

Project Activities	Environmental Aspects/ Potential Impacts	Mitigation Measures <sup>1</sup>	Responsibility for Ensuring Implementation of Mitigation	Means of Verification that Mitigation has been Met	Timing and Frequency of Monitoring	Monitoring Responsibility/ Competency	Supervision Responsibility	Reporting Requirements	Legal Requirements
<b>PRE-CONSTRUCTION STAGE</b>									
<ul style="list-style-type: none"> <li>Removal of ground cover/ biomass removal</li> <li>Earthworks (cutting and filling)</li> </ul>	<b>Soil</b> <ul style="list-style-type: none"> <li>Soil erosion and sedimentation</li> <li>Decreased slope stability and increased risk of slope failure</li> </ul>	<ul style="list-style-type: none"> <li>Site clearing shall be undertaken in stages [Clause 1.2(a)]</li> <li>Erosion control and sediment control are the first and the last line of defence respectively against erosion and sedimentation [Clause 1.2(b) &amp; 1.2(d)]</li> <li>Runoff from the project site shall be routed to point discharge areas equipped with silt trap [Clause 1.2(c)]</li> <li>Implement soil nailing and cascading drain method at slope [Clause 1.2(e)]</li> <li>Minimum river buffer zone to be provided on both sides of the riverbank [Clause 1.2(f)]</li> <li>Limit site clearing within road corridor and progress gradually to avoid patch clearing [Clause 1.2(g)]</li> <li>Internal road alignment to avoid steep slopes [Clause 1.2(h)]</li> <li>Earthworks planned to avoid rainy season [Clause 1.2(i)]</li> <li>Major cut slopes shall be compacted and benched [Clause 1.2(j)]</li> <li>Benched slopes provided with proper drainage [Clause 1.2(k)]</li> <li>Temporary slope protection to be executed after earthworks [Clause 1.2(l)]</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>SEB</li> </ul>	Periodic monitoring through monitoring, audit and review of contractors  Completion and submission of ESCP	Upon commencement of site preparation works (Weekly)  ESCP needs to be prepared prior to commencement of ground works	<ul style="list-style-type: none"> <li>Contractor</li> </ul> <b>ESCP</b> <ul style="list-style-type: none"> <li>Certified Erosion and Sediment in Storm Water Inspector (CESSWI)</li> <li>Malaysian Certified Inspector Sediment and Erosion Control (MY-CISEC)</li> <li>Certified Professional in Erosion and Sediment Control (CPESC)</li> </ul> <b>EMR</b> <ul style="list-style-type: none"> <li>Registered Environmental Consultant (NREB)</li> <li>Registered Environmental Auditor (NREB)</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>NREB</li> </ul>	<ul style="list-style-type: none"> <li>Erosion and Sediment Control Plan (ESCP)</li> <li>Biomass Removal Plan (BRP)</li> <li>Periodical internal ESC report (contractual requirement)</li> <li>Periodical internal/ external ECA report</li> <li>Quarterly EMR report</li> </ul>	<ul style="list-style-type: none"> <li>Sarawak Forest Ordinance 1958/2015</li> <li>SEIA Specific Terms and Conditions</li> <li>Natural Resources and Environment (Audit) Rules, 2008</li> </ul>
<ul style="list-style-type: none"> <li>Biomass removal</li> <li>Construction of site facilities</li> </ul>	<b>Ecology</b> <ul style="list-style-type: none"> <li>Loss of vegetative species, hence biodiversity</li> <li>Death and injury of migrating wildlife and habitat, especially to</li> </ul>	<ul style="list-style-type: none"> <li>Minimise stream disturbance in the areas not inundated [Clause 1.3(a)]</li> <li>Remove biomass along potential reservoir littoral zones [Clause 1.3(b)]</li> <li>Rehabilitate riverbanks immediately below the proposed dam site [Clause 1.3(c)]</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>SEB</li> </ul>	Periodic monitoring through monitoring, audit and review of contractors	Upon commencement of site preparation works (Weekly)	<ul style="list-style-type: none"> <li>Contractor</li> <li>SEB</li> </ul> <b>EMR</b> <ul style="list-style-type: none"> <li>Registered Environmental Consultant (NREB)</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>FDS</li> <li>SFC</li> <li>SBC</li> <li>DoA</li> <li>NREB</li> </ul>	<ul style="list-style-type: none"> <li>Reservoir Management Plan (RMP)</li> <li>Biomass Removal Plan (BRP)</li> <li>Biodiversity Management Plan (BMP)</li> <li>Biodiversity Monitoring and Evaluation Programme (BMEP)</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> <li>Sarawak Forest Ordinance 1958/2015</li> <li>Sarawak Forestry Corporation Ordinance 1993</li> </ul>

Project Activities	Environmental Aspects/ Potential Impacts	Mitigation Measures <sup>1</sup>	Responsibility for Ensuring Implementation of Mitigation	Means of Verification that Mitigation has been Met	Timing and Frequency of Monitoring	Monitoring Responsibility/ Competency	Supervision Responsibility	Reporting Requirements	Legal Requirements
	fish fauna and macroinvertebrates	<ul style="list-style-type: none"> <li>To develop <b>Catchment Management Plan</b> [Clause 1.3(d)]</li> </ul>				<ul style="list-style-type: none"> <li>Registered Environmental Auditor (NREB)</li> </ul>		<ul style="list-style-type: none"> <li>Biodiversity Action Plan (BAP)/ Wildlife Monitoring Report (WiMoR)</li> <li>Periodical internal ESC report (contractual requirement)</li> <li>Periodical internal/ external ECA report</li> <li>Quarterly EMR report</li> </ul>	<ul style="list-style-type: none"> <li>Sarawak Wildlife Protection Ordinance 1998</li> <li>Sarawak Biodiversity Centre Ordinance 1997</li> </ul>
<ul style="list-style-type: none"> <li>Investigation activity</li> <li>Biomass removal</li> <li>Presence of workers on-site</li> <li>Earthworks</li> <li>Construction of site facilities</li> </ul>	<b>Waste</b> <ul style="list-style-type: none"> <li>Generation of biomass waste</li> <li>Generation of earth waste</li> <li>Generation of municipal waste</li> <li>Generation of sewage and domestic wastewater</li> <li>Generation of scheduled waste</li> <li>Generation of construction waste</li> </ul>	<ul style="list-style-type: none"> <li>To establish waste management protocols [Clause 1.1(a)]</li> </ul> <b>Biomass Waste</b> <ul style="list-style-type: none"> <li>Biomass matter to be used as mulches for temporary soil erosion protection [Clause 1.4(m)]</li> <li>Biomass materials to be stacked at designated dump site at the Project area at least 5 m away from the water bodies [Clause 1.4(n)]</li> <li>Open burning is prohibited unless with written permission from NREB [Clause 1.4(o)]</li> </ul> <b>Earth Waste</b> <ul style="list-style-type: none"> <li>Excavated earth waste to be deposited at designated area [Clause 1.4(p)]</li> <li>Suitable excavated earth material shall be used as fill material for the Project [Clause 1.4(q)]</li> <li>Stockpile of earth material to be located at least 50 m from existing vegetation, concentrated water flows, roads and hazard areas [Clause 1.4(r)]</li> <li>Slope of earth stockpiles shall not exceed 2(H):1(V) gradient [Clause 1.4(s)]</li> <li>Earth stockpiles established on slopes shall be in the form of low, flat, elongated mounds [Clause 1.4(t)]</li> <li>Earth bank shall be constructed on the upslope side whereas sediment fence shall be installed 1 or 2 m downslope of an earth stockpile [Clause 1.4(u)]</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>SEB</li> </ul>	Periodic monitoring through monitoring, audit and review of contractors	Upon commencement of site preparation works (Weekly)	SEB  <b>Scheduled Waste</b> <ul style="list-style-type: none"> <li>Certified Environmental Professional in Scheduled Waste Management (CePSWaM)</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>NREB</li> <li>DoE</li> <li>Local council</li> </ul>	<ul style="list-style-type: none"> <li>Periodical internal ESC report (contractual requirement)</li> <li>Periodical internal/ external ECA report</li> <li>Quarterly EMR report</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> </ul> <b>Municipal Waste</b> <ul style="list-style-type: none"> <li>Solid Waste and Public Cleansing Management (Licensing)(Undertaking or Provision of Collection Services for Household Solid Waste, Public Solid Waste, Public Institutional Solid Waste and Solid Waste Similar to Household Solid Waste) Regulations 2011</li> </ul> <b>Sewage and Domestic Wastewater</b> <ul style="list-style-type: none"> <li>Environmental Quality (Sewage) Regulations 2009</li> <li>Sewerage Services Acts, 1993</li> <li>Sewerage Systems and Services Ordinance, 2005</li> </ul> <b>Scheduled Waste</b> <ul style="list-style-type: none"> <li>Environmental Quality (Scheduled Waste) Regulations 2005</li> </ul>

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		<ul style="list-style-type: none"> <li>• Stabilize bare earth with woody debris and/or cover crops [Clause 1.4(v)]</li> <li>• Neatly stack construction wastes in designated areas [Clause 1.4(w)]</li> <li>• Recyclable and reusable construction wastes to be segregated [Clause 1.4(x)]</li> </ul> <p><b>Municipal Waste</b></p> <ul style="list-style-type: none"> <li>• A landfill should be set up to cater for the population at the site [Clause 1.4(a)]</li> <li>• Temporary dumping ground should be prepared before the setup of landfill [Clause 1.4(b)]</li> <li>• Approved landfill (with NREB EIA Approval) has to be ready within six months of major works [Clause 1.4(c)]</li> <li>• Waste generated must be recorded by contractors [Clause 1.4(d)]</li> <li>• Preparation of a <b>Waste Management Plan</b> [Clause 1.4(e)]</li> <li>• To include contractor's waste management commitment in contractual agreement [Clause 1.4(f)]</li> </ul> <p><b>Sewage and Domestic Wastewater</b></p> <ul style="list-style-type: none"> <li>• Provision of adequately sized septic tanks or portable toilets [Clause 1.4(g)]</li> <li>• Canteen and kitchen wastewater should be channelled through physical screens and oil and grease traps [Clause 1.4(h)]</li> <li>• Wastewater must be properly contained and treated at the site to meet Standard B of the Malaysian Environmental Quality (Sewage) Regulations 2009 [Clause 1.4(i)]</li> </ul> <p><b>Scheduled Wastes</b></p> <ul style="list-style-type: none"> <li>• Proper designed shelter for scheduled waste [Clause 1.4(j)]</li> </ul>							

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		<ul style="list-style-type: none"> <li>Only DoE approved transporters shall transport processed or scheduled waste [Clause 1.4(k)]</li> <li>Dedicated containers shall be provided to collect the scheduled waste [Clause 1.4(l)]</li> </ul>							
<b>CONSTRUCTION STAGE</b>									
<ul style="list-style-type: none"> <li>Major construction works</li> <li>Earthworks (cutting and filling)</li> </ul>	<b>Soil</b> <ul style="list-style-type: none"> <li>Soil erosion and sedimentation</li> <li>Decreased slope stability and increased risk of slope failure</li> </ul>	<ul style="list-style-type: none"> <li>Erosion and Sedimentation Plan (ESCP) shall be prepared for the major construction areas of the Baleh HEP Project [Clause 2.1(a)]</li> <li>ESCP shall be prepared prior to the commencement of works and shall be included in the site-specific plans prepared for each major construction sites [Clause 2.1(b)]</li> <li>Proper muck disposal sites have been identified to avoid muck going into the river [Clause 2.1(c)]</li> <li>Maintain a natural green belt around the reservoir periphery is recommended [Clause 2.1(d)]</li> <li>Slopes on both banks above the maximum flood level shall be maintained with the existing vegetation for the creation of a green belt around the reservoir rim [Clause 2.1(e)]</li> <li>Soil erosion control measures will include bio-engineering measures, vegetative measures, reduction in use of fuel wood and management measures [Clause 2.1(f)]</li> <li>Mixed plantation of coniferous and broadleaf trees, in combination with bushes and grasses, suited to the characteristics of a particular site shall be planted [Clause 2.1(g)]</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>SEB</li> </ul>	Periodic monitoring through monitoring, audit and review of contractors  Completion and submission of ESCP	Upon commencement of site construction works (Weekly)  ESCP needs to be prepared prior to commencement of ground works	<ul style="list-style-type: none"> <li>SEB</li> </ul> <b>ESCP</b> <ul style="list-style-type: none"> <li>Certified Erosion and Sediment in Storm Water Inspector (CESSWI)</li> <li>Malaysian Certified Inspector Sediment and Erosion Control (MY-CISEC)</li> <li>Certified Professional in Erosion and Sediment Control (CPESC)</li> </ul> <b>EMR</b> <ul style="list-style-type: none"> <li>Registered Environmental Consultant (NREB)</li> <li>Registered Environmental Auditor (NREB)</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>NREB</li> </ul>	<ul style="list-style-type: none"> <li>Erosion and Sediment Control Plan (ESCP)</li> <li>Biomass Removal Plan (BRP)</li> <li>Periodical internal ESC report (contractual requirement)</li> <li>Periodical internal/ external ECA report</li> <li>Quarterly EMR report</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> </ul>
<ul style="list-style-type: none"> <li>Major construction works</li> </ul>	<b>Ecology</b>	<b>Aquatic Flora</b> <ul style="list-style-type: none"> <li>An environmental flow is recommended to maintain the</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>SEB</li> </ul>	Periodic monitoring through	Upon commencement of site	<ul style="list-style-type: none"> <li>SEB</li> </ul> <b>EMR</b>	<ul style="list-style-type: none"> <li>SEB</li> <li>FDS</li> <li>SFC</li> </ul>	<ul style="list-style-type: none"> <li>Biomass Removal Plan (BRP)</li> <li>Biodiversity Management Plan (BMP)</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> </ul>

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	<ul style="list-style-type: none"> <li>Impact to aquatic flora of Baleh river downstream</li> <li>Impact to fish and riverine fisheries</li> <li>Impact to wildlife</li> </ul>	<p>continuum of river downstream [Clause 2.4(a)]</p> <ul style="list-style-type: none"> <li>Minimize soil erosion using soil protection measures [Clause 2.4(b)]</li> <li>Installation of silt traps at strategic slope at the construction site [Clause 2.4(c)]</li> </ul> <p><b>Fish and Riverine Fisheries</b></p> <ul style="list-style-type: none"> <li>Conservation of upstream watershed via a State managed mechanism [Clause 2.4(d)]</li> </ul> <p><b>Wildlife</b></p> <ul style="list-style-type: none"> <li>Habitat restoration [Clause 2.4(e)]</li> <li>No capturing and domestication of protected species [Clause 2.4(f)]</li> <li>Preparation and submission of a <b>Wildlife Rescue and Monitoring Plan</b> before commencement of major construction work [Clause 2.4(g)]</li> <li>Preparation and submission of a detailed <b>Biomass Removal Plan</b> [Clause 2.4(h)]</li> </ul>		monitoring, audit and review of contractors	construction works (Weekly)	<ul style="list-style-type: none"> <li>Registered Environmental Consultant (NREB)</li> <li>Registered Environmental Auditor (NREB)</li> </ul>	<ul style="list-style-type: none"> <li>SBC</li> <li>DoA</li> <li>NREB</li> </ul>	<ul style="list-style-type: none"> <li>Biodiversity Monitoring and Evaluation Programme (BMEP)</li> <li>Biodiversity Action Plan (BAP)/ Wildlife Monitoring Report (WiMoR)</li> <li>Biomass Removal Plan (BRP)</li> <li>Periodical internal ESC report (contractual requirement)</li> <li>Periodical internal/ external ECA report</li> <li>Quarterly EMR report</li> </ul>	<ul style="list-style-type: none"> <li>Sarawak Forest Ordinance 1958/2015</li> <li>Sarawak Forestry Corporation Ordinance 1993</li> <li>Sarawak Wildlife Protection Ordinance 1998</li> <li>Sarawak Biodiversity Centre Ordinance 1997</li> </ul>
<ul style="list-style-type: none"> <li>Quarry establishment and operations</li> </ul>	<p><b>Soil</b></p> <ul style="list-style-type: none"> <li>Soil erosion and sedimentation</li> <li>Decreased slope stability and increased risk of slope failure</li> </ul> <p><b>Blasting vibration</b></p> <ul style="list-style-type: none"> <li>Generation of vibration and seismic waves</li> </ul> <p><b>Noise quality</b></p> <ul style="list-style-type: none"> <li>Generation of noise</li> </ul>	<ul style="list-style-type: none"> <li>An <b>Explosive Storage Magazine Plan</b> shall be developed to ensure proper handling and storage of magazine by the quarry operator [Clause 2.6(a)]</li> <li>Restrict clearing of quarry site shall to necessary area of rock extraction [Clause 2.6(b)]</li> <li>Sedimentation ponds are recommended for the retention of eroded particles from the quarry. Establishment of proper drainage to channel the runoff to the sedimentation ponds before final discharge into the waterway, i.e. Putai river and tributary of Baleh river [Clause 2.6(c)]</li> <li>Regular desilting of the sedimentation ponds [Clause 2.6(d)]</li> <li>Utilise an environmental friendly blast initiation system in blasting operation [Clause 2.6(e)]</li> <li>The initiation system recommended for primary blasting is Nonel or</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>SEB</li> </ul>	<p>Total Suspended Solids (TSS) content in the final discharge not exceeding 100 mg/l</p> <p>Periodic monitoring through monitoring, audit and review of contractors</p>	Upon commencement of construction works (Weekly)	<ul style="list-style-type: none"> <li>Contractor</li> </ul> <p><b>EMR</b></p> <ul style="list-style-type: none"> <li>Registered Environmental Consultant (NREB)</li> <li>Registered Environmental Auditor (NREB)</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>NREB</li> <li>JMG</li> <li>RMP</li> </ul>	<ul style="list-style-type: none"> <li>Periodical internal ESC report (contractual requirement)</li> <li>Periodical internal/ external ECA report</li> <li>Quarterly EMR report</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> <li>Section 23 under the Environmental Quality Act 1973</li> <li>Environmental Quality (Motor Vehicle Noise) Regulations 1987</li> <li>Standard B of the Environmental Quality (Industrial Effluent) Regulations 2009</li> <li>Natural Resources and Environment (Audit) Rules, 2008</li> <li>Sarawak Minerals Ordinance 2004</li> <li>Police Act 1967</li> </ul>

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		electrical system with minimal holes per delay design, to minimise ground vibrations, air blast, flyrock and increase fragmentation [Clause 2.6(f)] <ul style="list-style-type: none"> <li>Utilise staggered/ rectangular drill pattern to reduce the risk of flyrock [Clause 2.6(g)]</li> <li>Plan direction of rock motion and rock face to ensure that should any flyrock generated from the blasting operation, it will not endanger any adjacent interests [Clause 2.6(h)]</li> <li>Buffer zones shall be available to ensure that there is always sufficient distance between blasting activities and adjacent environment [Clause 2.6(i)]</li> <li>Competent personnel (shotfirer) handling the blasting operation shall have the qualification in term of certificates from the Mineral and Geoscience Department and the Royal Malaysian Police [Clause 2.6(j)]</li> <li>The quarry sites shall be rehabilitated and replanted with species indigenous to the area [Clause 2.6(o)]</li> </ul>							
<ul style="list-style-type: none"> <li>Major construction works</li> </ul>	<b>Air quality</b> <ul style="list-style-type: none"> <li>Generation of total suspended particulate, sulphur dioxide, nitrogen dioxide, carbon monoxide and ozone</li> </ul>	<ul style="list-style-type: none"> <li>Soil loads on construction vehicles, particularly during excavation activities be kept covered during transit on public roads [Clause 2.7(a)]</li> <li>Topsoil stockpiles must be kept covered or have a suitable dust palliative applied [Clause 2.7(b)]</li> <li>A suitable dust palliative should be applied to unsealed roads if dust rises above acceptable levels [Clause 2.7(c)]</li> <li>Dust deposition monitoring should be conducted during construction [Clause 2.7(d)]</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>SEB</li> </ul>	Periodic monitoring through monitoring, audit and review of contractors	Upon commencement of construction works (Weekly)	<ul style="list-style-type: none"> <li>SEB</li> </ul> <b>EMR</b> <ul style="list-style-type: none"> <li>Registered Environmental Consultant (NREB)</li> <li>Registered Environmental Auditor (NREB)</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>NREB</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly EMR report</li> <li>Periodical internal ESC report (contractual requirement)</li> <li>Periodical internal/ external ECA report</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> <li>Environmental Quality (Clean Air) Regulations 2014</li> </ul>

Project Activities	Environmental Aspects/ Potential Impacts	Mitigation Measures <sup>1</sup>	Responsibility for Ensuring Implementation of Mitigation	Means of Verification that Mitigation has been Met	Timing and Frequency of Monitoring	Monitoring Responsibility/ Competency	Supervision Responsibility	Reporting Requirements	Legal Requirements
<ul style="list-style-type: none"> <li>Major construction works</li> <li>Earthworks</li> <li>Presence of workers on-site</li> </ul>	<p><b>Surface Water Quality</b></p> <ul style="list-style-type: none"> <li>Deterioration of surface water quality</li> </ul> <p><b>Waste</b></p> <ul style="list-style-type: none"> <li>Generation of biomass waste</li> <li>Generation of earth waste</li> <li>Generation of municipal waste</li> <li>Generation of sewage and domestic wastewater</li> <li>Generation of scheduled waste</li> <li>Generation of construction waste</li> </ul>	<ul style="list-style-type: none"> <li>No waste of any kind should be disposed of directly into any of the rivers [Clause 2.8(a)]</li> <li>Base camp, workers' quarters and site offices shall be provided with individual septic tanks capable of treating the sewage to Standard B under the Second Schedule of the Environmental Quality (Sewage) Regulations 2009 [Clause 2.8(b)]</li> <li>Construction wastes and earth stockpiles shall be located away from waterways [Clause 2.8(c)]</li> <li>Scheduled wastes shall be properly stored and contained [Clause 2.8(d)]</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>SEB</li> </ul>	Periodic monitoring through monitoring, audit and review of contractors	Upon commencement of site construction works (Weekly)	<ul style="list-style-type: none"> <li>SEB</li> </ul> <p><b>EMR</b></p> <ul style="list-style-type: none"> <li>Registered Environmental Consultant (NREB)</li> <li>Registered Environmental Auditor (NREB)</li> </ul> <p><b>Scheduled Waste</b></p> <ul style="list-style-type: none"> <li>Certified Environmental Professional in Scheduled Waste Management (CePSWaM)</li> </ul>	<p>SEB</p> <p>NREB</p> <p>DoE</p> <p>Local council</p>	<ul style="list-style-type: none"> <li>Water Quality Continuous Monitoring System (CMS)</li> <li>Quarterly EMR report</li> <li>Periodical internal ESC report (contractual requirement)</li> <li>Periodical internal/ external ECA report</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> </ul> <p><b>Municipal Waste</b></p> <ul style="list-style-type: none"> <li>Solid Waste and Public Cleansing Management (Licensing)(Undertaking or Provision of Collection Services for Household Solid Waste, Public Solid Waste, Public Institutional Solid Waste and Solid Waste Similar to Household Solid Waste) Regulations 2011</li> </ul> <p><b>Sewage and Domestic Wastewater</b></p> <ul style="list-style-type: none"> <li>Environmental Quality (Sewage) Regulations 2009</li> <li>Sewerage Services Acts, 1993</li> <li>Sewerage Systems and Services Ordinance, 2005</li> </ul> <p><b>Scheduled Waste</b></p> <ul style="list-style-type: none"> <li>Environmental Quality (Scheduled Waste) Regulations 2005</li> </ul>
<ul style="list-style-type: none"> <li>Major construction works</li> <li>Earthworks</li> </ul>	<p><b>Noise Quality</b></p> <ul style="list-style-type: none"> <li>Generation of noise</li> </ul>	<ul style="list-style-type: none"> <li>Site offices shall be insulated and fully air-conditioned</li> <li>No employee shall be exposed to noise levels exceeding 115 dBA at any one time [Clause 2.9(a)]</li> <li>The management is required to provide workers who work in high noise level areas with adequate protective devices such as earmuffs or earplugs [Clause 2.9(b)]</li> <li>Work shifts shall be introduced for workers manning noisy equipment [Clause 2.9(c)]</li> <li>Environmental specifications are to be included in contract documents</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> <li>SEB</li> </ul>	Periodic monitoring through monitoring, audit and review of contractors	Upon commencement of construction works (Weekly)	<ul style="list-style-type: none"> <li>SEB</li> </ul> <p><b>EMR</b></p> <ul style="list-style-type: none"> <li>Registered Environmental Consultant (NREB)</li> <li>Registered Environmental Auditor (NREB)</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>NREB</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly EMR report</li> <li>Periodical internal ESC report (contractual requirement)</li> <li>Periodical internal/ external ECA report</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> <li>Section 23 under the Environmental Quality Act 1973</li> <li>Environmental Quality (Motor Vehicle Noise) Regulations 1987</li> </ul>

Project Activities	Environmental Aspects/ Potential Impacts	Mitigation Measures <sup>1</sup>	Responsibility for Ensuring Implementation of Mitigation	Means of Verification that Mitigation has been Met	Timing and Frequency of Monitoring	Monitoring Responsibility/ Competency	Supervision Responsibility	Reporting Requirements	Legal Requirements
		for contractors and machine operators [Clause 2.9(d)]							
<ul style="list-style-type: none"> <li>Decommissioning of site installations</li> </ul>	<b>Waste</b> <ul style="list-style-type: none"> <li>Generation of construction waste</li> </ul>	<ul style="list-style-type: none"> <li>Decommissioned parts shall be placed at designated temporary sites [Clause 2.11(a)]</li> <li>The area of decommissioned installations shall be cleaned up [Clause 2.11(b)]</li> <li>Where possible sell, recycle and reuse the waste materials [Clause 2.11(c)]</li> <li>Landfill(s) shall be closed as per the closure plan approved by the Natural Resources and Environment Board [Clause 2.11(d)]</li> <li>A <b>Decommissioning and Rehabilitation Plan</b> is recommended to be prepared and submitted to NREB in advance for approval and full pull-out of contractor. (This applies in the event of any decommissioning of the dam and its ancillary facilities) [Clause 2.11(e)]</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	Site verification/ meeting	During decommissioning stage (Periodically)	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>NREB</li> </ul>	<ul style="list-style-type: none"> <li>Rehabilitation and Abandonment Plan (RAP)</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> </ul>
<b>RESERVOIR IMPOUNDMENT STAGE</b>									
<ul style="list-style-type: none"> <li>Water release from reservoir</li> </ul>	<b>Hydrology</b> <ul style="list-style-type: none"> <li>Impact to environmental flow</li> <li>Impact to the downstream users and the river ecosystem health</li> </ul>	<ul style="list-style-type: none"> <li>During the impoundment period, a controlled discharge equivalent to environmental flow is recommended to be released from the reservoir. The recommended environmental flow is within the 90<sup>th</sup> percentile flow (or 10% natural low flow), which is equivalent to about 250 m<sup>3</sup>/s [Clause 3.1(a)]</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> </ul>	Environmental flow of 250 m <sup>3</sup> /s	During water release (Periodically)	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>MUT</li> </ul>	<ul style="list-style-type: none"> <li>Hydrometrics Monitoring Report (for downstream flow. Eg: minimum 250 m<sup>3</sup>/s)</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> </ul>
<ul style="list-style-type: none"> <li>Water release from reservoir</li> </ul>	<b>Riverine Traffic</b> <ul style="list-style-type: none"> <li>Impact on riverine navigation and accessibility of Baleh river</li> </ul>	<ul style="list-style-type: none"> <li>The environmental flow be set at 250 m<sup>3</sup>/s [Clause 3.2(a)]</li> <li>Gauging stations be set up at strategic locations such as Ng. Entawau to ensure that the water levels do not drop to a point affecting river navigation [Clause 3.2(b)]</li> <li>Regular dialogues with cargo vessel and express boat operators to ensure their needs are met [Clause 3.2(c)]</li> <li>Vegetation shall be cleared at strategic areas for navigation and</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>Contractor</li> </ul>	Monitoring of water level of Baleh river	During water release (Periodically)	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>SRB</li> </ul>	<ul style="list-style-type: none"> <li>Periodic dialogues with cargo vessel and boat operators</li> <li>Quarterly EMR report</li> <li>Periodical internal ESC report (contractual requirement)</li> <li>Periodical internal/ external ECA report</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> <li>Sarawak Rivers Ordinance, 1993</li> </ul>

Project Activities	Environmental Aspects/ Potential Impacts	Mitigation Measures <sup>1</sup>	Responsibility for Ensuring Implementation of Mitigation	Means of Verification that Mitigation has been Met	Timing and Frequency of Monitoring	Monitoring Responsibility/ Competency	Supervision Responsibility	Reporting Requirements	Legal Requirements
		other essential areas identified by the Biomass Removal Plan prior to dam impoundment. Post impoundment surveillance or monitoring shall be undertaken for areas identified for safe navigation [Clause 3.2(d)]							
	<b>Ecology</b> <ul style="list-style-type: none"> <li>Impact to aquatic fauna and riverine fisheries downstream of the dam and in the reservoir</li> <li>Impact to wildlife and its habitat</li> </ul>	<ul style="list-style-type: none"> <li>Maintenance of constant minimum residual flow (downstream) [Clause 3.3(a)]</li> <li>Preserve existing key features of the river's natural hydrograph [Clause 3.3(b)]</li> <li>Minimum clearance for access roads, jungle trails and for other construction purposes outside the reservoir [Clause 3.3(c)]</li> <li>Carry out re-vegetation and landscaping of the slopes in pace with the progress of the project [Clause 3.3(d)]</li> <li>Clearing of vegetation during dry season in the impoundment site. For areas within the 50 m from the river banks, clearing activity shall be done right before the dam is impounded [Clause 3.3(e)]</li> <li>Controlled fishing activities [Clause 3.3(f)]</li> <li>Ensure available manpower requirement for enforcement of fishing regulations and strict enforcement from relevant agencies [Clause 3.3(g)]</li> <li>Conserve catchment areas as totally protected areas from commercial fishing [Clause 3.3(h)]</li> <li>Conservation of upstream watershed [Clause 3.3(i)]</li> <li>Development of hatchery for restocking of native species [Clause 3.3(j)]</li> <li><b>Wildlife Rescue and Monitoring Plan</b> must be ready during impoundment so that rescue can commence properly. For wildlife rescue, the relevant agency and expert should be consulted (ie. SFC,</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>Contractor</li> </ul>	Environmental flow of 250 m <sup>3</sup> /s	During water release (Periodically)	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>Wildlife Rescue Plan</li> <li>Biodiversity Management Plan (BMP)</li> <li>Biodiversity Monitoring and Evaluation Programme (BMEP)</li> <li>Biodiversity Action Plan (BAP)/ Wildlife Monitoring Report (WiMoR)</li> <li>Downstream Flow Monitoring Plan</li> <li>Quarterly EMR report</li> <li>Periodical internal ESC report (contractual requirement)</li> <li>Periodical internal/ external ECA report</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> </ul>

Project Activities	Environmental Aspects/ Potential Impacts	Mitigation Measures <sup>1</sup>	Responsibility for Ensuring Implementation of Mitigation	Means of Verification that Mitigation has been Met	Timing and Frequency of Monitoring	Monitoring Responsibility/ Competency	Supervision Responsibility	Reporting Requirements	Legal Requirements
		<p>DoA (Veterinary Section)). Mitigation measures should also include briefing the construction workers on the Sarawak Wildlife Protection Ordinance 1998 and the protection status of various wildlife species [Clause 3.3(k)]</p> <ul style="list-style-type: none"> <li>Start clearing from the lowest elevation near the river bank and proceed towards the higher ground. Clearing of land in a manner so as to create a forest island should not be done. Any injured animals or birds found should be given proper veterinary care and then released into the adjacent forest or surrendered to the appropriate agency (SFC) for keeping in their zoo [Clause 3.3(l)]</li> <li>Wildlife Rescue shall be carried out for any animal trapped on temporary islands. This rescue operation should be carried out and supervised by relevant officers from the SFC and/or SFD [Clause 3.3(m)]</li> </ul>							
<ul style="list-style-type: none"> <li>Biomass residual</li> </ul>	<p><b>Atmosphere</b></p> <ul style="list-style-type: none"> <li>Emission of greenhouse gases as biomass decomposes</li> </ul>	<ul style="list-style-type: none"> <li>Remove forest biomass from the prior to reservoir impoundment [Clause 3.4(a)]</li> <li>Harvest all commercial timber from the reservoir to avoid loss of potential economic benefit from this resource [Clause 3.4(b)]</li> <li>Residual non-commercial forest biomass shall be removed from the periodically inundated reservoir shoreline at strategic and essential areas [Clause 3.4(c)]</li> <li>Biomass shall be cleared from 5 to 10 m below the minimum operating level [Clause 3.4(d)]</li> <li>All remaining non-commercial forest biomass below the 195 m elevation shall be left <i>in situ</i>, to be inundated under the reservoir where its value as a carbon sink will be preserved [Clause 3.4(e)]</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> </ul>	Conformance to GHG emission, 100 g CO <sub>2</sub> e/kWh	Upon biomass removal (Periodically)	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>GHG Emission Reporting</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> </ul>

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• Biomass removal	<b>Soil</b> Soil erosion and sedimentation of the reservoir	<ul style="list-style-type: none"> <li>Limit area of biomass removal [Clause 3.6(a)]</li> <li>Biomass removal at shoreline strip to be done just before inundation, i.e. start clearing from lower elevation then to higher elevation [Clause 3.6(b)]</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>Contractor</li> </ul>	Periodic monitoring through monitoring, audit and review of contractors	Upon biomass removal (Weekly)	• SEB	<ul style="list-style-type: none"> <li>SEB</li> <li>NREB</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly EMR report</li> <li>Periodical internal ESC report (contractual requirement)</li> <li>Periodical internal/ external ECA report</li> </ul>	• SEIA Specific Terms and Conditions
• Biomass removal	<b>Surface Water Quality</b> <ul style="list-style-type: none"> <li>Deterioration of surface water quality due to: <ul style="list-style-type: none"> <li>consumption of dissolved oxygen</li> <li>production and emission of noxious gases and chemicals</li> </ul> </li> <li>Enriched water quality which may lead to production of invasive aquatic plants</li> </ul>	<ul style="list-style-type: none"> <li>Maximize harvest and utilization of commercial forest biomass [Clause 3.7(a)]</li> <li>Limit non-commercial forest biomass removal to a relatively narrow, strip of shallow, periodically inundated shoreline, where, if biomass is left to decompose [Clause 3.7(b)]</li> <li>Removal of non-commercial forest biomass from the reservoir shoreline [Clause 3.7(c)]</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>Contractor</li> </ul>	Periodic monitoring through monitoring, audit and review of contractors	Upon biomass removal (Weekly)	• SEB	<ul style="list-style-type: none"> <li>SEB</li> <li>NREB</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly EMR report</li> <li>Periodical internal ESC report (contractual requirement)</li> <li>Periodical internal/ external ECA report</li> </ul>	• SEIA Specific Terms and Conditions
• Biomass removal	<b>Air Quality</b> <ul style="list-style-type: none"> <li>Potential degradation of air quality due to: <ul style="list-style-type: none"> <li>Disposal of forest biomass increases atmospheric CO<sub>2</sub></li> <li>Smoke / Haze from biomass disposal during drier months when most forest burning/ clearing occurs</li> </ul> </li> <li>Emission of methane, hydrogen sulphide and other greenhouse gases from inundated biomass</li> </ul>	<ul style="list-style-type: none"> <li>Maximize recovery and utilization of commercial biomass [Clause 3.8(a)]</li> <li>Natural decomposition for biomass removal [Clause 3.8(b)]</li> <li>Conduct controlled burning (subject to approval from NREB) [Clause 3.8(c)]</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>Contractor</li> </ul>	Periodic monitoring through monitoring, audit and review of contractors	Upon biomass removal (Weekly)	• SEB	<ul style="list-style-type: none"> <li>SEB</li> <li>NREB</li> </ul>	<ul style="list-style-type: none"> <li>Quarterly EMR report</li> <li>Periodical internal ESC report (contractual requirement)</li> <li>Periodical internal/ external ECA report</li> </ul>	• SEIA Specific Terms and Conditions
<b>DAM OPERATION STAGE</b>									
• Dam and reservoir operation	<b>Hydrology</b> <ul style="list-style-type: none"> <li>Reduction in flood flows and flood levels to the downstream areas</li> </ul>	<ul style="list-style-type: none"> <li>For water levels greater than MOL: Normal operations, with discharges always greater than the environmental flow [Clause 4.1(a)]</li> </ul>	• SEB	Periodic monitoring	Upon operation (Periodically)	• SEB	• SEB	• Hydrology Monitoring Plan	• SEIA Specific Terms and Conditions

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	<ul style="list-style-type: none"> <li>Higher low flows during the dry seasons</li> <li>Reduction in the fluctuations of downstream river discharge and water levels</li> <li>Loss of connectivity between the main channel and important floodplains, wetlands and lakes.</li> </ul>	<ul style="list-style-type: none"> <li>For water levels below MOL: Observation of an environmental flow release structure to maintain a discharge at least 250 m<sup>3</sup>/s downstream [Clause 4.1(b)]</li> </ul>							
<ul style="list-style-type: none"> <li>Dam and reservoir operation</li> </ul>	<b>Downstream Water quality</b> <ul style="list-style-type: none"> <li>Erosion and sedimentation along river channels downstream of the dam</li> </ul>	<ul style="list-style-type: none"> <li>A <b>Detailed Sediment Transport Modeling</b> is recommended for the Baleh River downstream of the proposed dam so that locations that are subjected to erosion, transport or deposition can be identified, and appropriate mitigation measures can be formulated for better environmental management [Clause 4.2(a)]</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> </ul>	Periodic monitoring through monitoring, audit and review of SEB	Upon operation (Periodically)	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>Water Quality Monitoring Program</li> <li>Detailed Sediment Transport Modeling (Sediment Control Plan)</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> </ul>
<ul style="list-style-type: none"> <li>Dam and reservoir operation</li> </ul>	<b>Reservoir Water Quality</b> Degradation of reservoir water quality due to pollution sources from within the Baleh dam catchment entering the reservoir  Erosion and sedimentation in the dam reservoir	<ul style="list-style-type: none"> <li>The dam operator should consider draw offs from the top 10m in order to ensure that the DO level in the discharge is suitable [Clause 4.3(a)]</li> <li>To ensure the DO level in the draw off water is suitable, the dam operator should consider a draw off, ideally at 5m interval from FSL up to just the hypolimnion, or anoxic zone in order to allow flexibility in draw off depths, depending on the actual temperature and DO profile in the reservoir as the levels rise fluctuates [Clause 4.3(b)]</li> <li>A 100m buffer zone around the reservoir boundary to minimize sediment run-off to the reservoir [Clause 4.4(a)]</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> </ul>	Periodic monitoring through monitoring, audit and review of SEB	Upon operation (Periodically)	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>Water Quality Continuous Monitoring System (CMS)</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> </ul>
<ul style="list-style-type: none"> <li>Dam and reservoir operation</li> </ul>	<b>Ecology</b> <ul style="list-style-type: none"> <li>Impact to fish and riverine fisheries (reservoir area)</li> <li>Impact to macroinvertebrates due to change of natural</li> </ul>	<ul style="list-style-type: none"> <li>Upstream habitats (not inundated areas) should be considered for conservation. The potentially important areas include the upper sections of the Baleh River, the Balang River, the upper section of the Mengiong River and the Entalawan River [Clause 4.5(a)]</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> </ul>	Periodic monitoring through monitoring, audit and review of contractors	Post-impoundment (Periodically)	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>Wildlife Monitoring Report (WiMoR)</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> </ul>

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	<p>habitat, which might result in disappearance of some species</p> <ul style="list-style-type: none"> <li>Impact to aquatic flora</li> <li>Impact to wildlife, likely due to hunting and fragmentation at operational phase</li> </ul>	<ul style="list-style-type: none"> <li>Discharge to maintain environmental flow at 250 m<sup>3</sup>/s so that downstream river flow and its ecological functions are less affected [Clause 4.5(b)]</li> <li>Construction of aeration weir and riffle structure in the downstream river of the dam is recommended [Clause 4.5(c)]</li> <li>The flow should be maintained at optimum level at downstream of dam reservoir to minimize the effects on aquatic life downstream [Clause 4.5(d)]</li> <li>Nuisance phytoplankton growth at the reservoir especially some blue green algae and green algae should be monitored by the plant operator [Clause 4.5(e)]</li> <li>Ban on hunting by workers of the local wildlife [Clause 4.5(f)]</li> <li>Wildlife rescue based on the approved Wildlife Rescue Plan to be carried out [Clause 4.5(g)]</li> <li>Establishment of totally protected area at Baleh's upper catchment [Clause 4.5(h)]</li> </ul>							
<ul style="list-style-type: none"> <li>Dam and reservoir operation</li> </ul>	<p><b>Road Traffic</b></p> <p>Traffic impact upon completion of proposed road as it would serve as main access to Baleh Dam as well as access for surrounding residents</p>	<ul style="list-style-type: none"> <li>Logging trucks to be discouraged from using the proposed Baleh road for safety and road maintenance reasons [Clause 4.6(a)]</li> <li>Overtaking lanes along the Baleh road may also be required to allow safe overtaking opportunities for smaller vehicles [Clause 4.6(b)]</li> <li>Proper signages to be erected at approaching junctions to alert drivers to take precautionary actions [Clause 4.6(c)]</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> </ul>	Once action taken and issue resolved	Upon completion of access road (If any complaint arises)	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> </ul>		<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> </ul>
<ul style="list-style-type: none"> <li>Dam and reservoir operation</li> </ul>	<p><b>River Traffic</b></p> <ul style="list-style-type: none"> <li>Impact on river navigation</li> <li>Lower water depth especially at Nanga Entawau, Rumah Jamit, Rumah John, Sek</li> </ul>	<ul style="list-style-type: none"> <li>Gauging stations be set up at strategic locations downstream of the proposed dam [Clause 4.7(a)]</li> <li>A river alarm system should be installed downstream of the proposed dam site at all the various kampongs so that it will be active in the event of an imminent danger [Clause 4.7(b)]</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> </ul>	Once action taken and issue resolved	Upon completion of access road (If any complaint arises)	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>SRB</li> </ul>	<ul style="list-style-type: none"> <li>Periodic dialogues with cargo vessel and boat operators</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> <li>Sarawak Rivers Ordinance, 1993</li> </ul>

Project Activities	Environmental Aspects/ Potential Impacts	Mitigation Measures <sup>1</sup>	Responsibility for Ensuring Implementation of Mitigation	Means of Verification that Mitigation has been Met	Timing and Frequency of Monitoring	Monitoring Responsibility/ Competency	Supervision Responsibility	Reporting Requirements	Legal Requirements
	Kalangan Ara and Rumah Sumbang	<ul style="list-style-type: none"> <li>To conduct a thorough hydrographic survey of the area from Kanowit to Baleh [Clause 4.7(c)]</li> </ul>							
<ul style="list-style-type: none"> <li>Dam and reservoir operation</li> </ul>	<b>Structural Safety</b> <ul style="list-style-type: none"> <li>Possible incident of dam breach</li> </ul>	<ul style="list-style-type: none"> <li>Development of an <b>Emergency Action Plan (EAP)</b> in case of dam break, with a methodology for warning for an evacuation of downstream communities at risk [Clause 4.8(a)]</li> <li>Formulation of an <b>Emergency Response Plan (ERP)</b> for both construction and operation stages of the dam [Clause 4.8(b)]</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> </ul>	Completion and submission of DSEP	DSEP needs to be prepared prior to impoundment stage	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>SEB</li> <li>SDMC</li> <li>NSC</li> <li>DID</li> </ul>	<ul style="list-style-type: none"> <li>Dam Safety and Emergency Plan (DSEP)</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> </ul>
<b>ABANDONMENT STAGE</b>									
<ul style="list-style-type: none"> <li>Abandonment</li> </ul>	<ul style="list-style-type: none"> <li><b>Overall environmental aspects</b></li> </ul>	<ul style="list-style-type: none"> <li>The safety of all communities downstream of the proposed dam shall be maintained at all times during demolition [Clause 5(a)]</li> <li>The environmental effect of releasing large quantities of oxygen deprived water shall be mitigated to the fullest [Clause 5(a)]</li> <li>Slopes shall be secured after demolition of the dam structure and after emptying the reservoir [Clause 5(c)]</li> <li>The reservoir shall be re-vegetated [Clause 5(d)]</li> </ul>	<ul style="list-style-type: none"> <li>Contractor</li> </ul>	Completion and submission of RAP and project handover	RAP needs to be prepared prior to project handover	<ul style="list-style-type: none"> <li>SEB</li> </ul>	<ul style="list-style-type: none"> <li>NREB</li> </ul>	<ul style="list-style-type: none"> <li>Rehabilitation and Abandonment Plan (RAP)</li> </ul>	<ul style="list-style-type: none"> <li>SEIA Specific Terms and Conditions</li> </ul>

### 3.0 ENVIRONMENTAL MONITORING, EVALUATION AND REPORTING MECHANISM

Figure 1 below shows the summary of the environmental monitoring, evaluation and reporting that are done at different intervals.



Figure 1: Summary of Environmental Monitoring, Evaluation and Reporting Mechanism