



Rovuma
LNG

**ENVIRONMENTAL AND SOCIAL
REQUIREMENTS FOR CONTRACTORS:
ANNEX 9 - RAW MATERIALS AND
AGGREGATES**

ROVUMA LNG PROJECT


MZLN-EL-RBENV-00-0001

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1. PURPOSE AND SCOPE

This document is one of a series of topic-specific supporting annexes contained in the overarching document: Environmental and Social Requirements for Contractors: Environmental and Social Management System (ESMS).

These annexes define the processes that need to be followed and the control measures that must be applied to ensure the delivery and approval of a topic-specific Contractor Implementation Plan (CIP) and other implementation deliverables ahead of commencing activity.

Where the final design basis or execution strategy has not been determined and alternatives exist, an analysis of alternatives (taking environmental and social (E&S) factors into account) shall be undertaken. This analysis shall be based on an accurate characterisation of the local setting using up-to-date baseline data and an assessment of the risks and impacts related to each alternative.

Where the project base case has already been determined, additional baseline information may be required to inform an up-to-date / site-specific E&S risks and impacts evaluation. This evaluation may result in a refinement of control measures relative to the local conditions and licensing requirements.

1.1. Objectives

The overall objective of this document is to set out all the E&S requirements that need to be fulfilled in order to prevent and manage potential E&S risks and impacts associated with Raw Materials and Aggregates.

1.2. Scope

For the purposes of this document, Raw Materials and Aggregates encompasses the assessment and management of E&S impacts and risks associated with the following activities: supply of aggregates (whether subcontracted or procured), the production of concrete at project associated batch plants, and the supply of timber.

This document follows the overall Scope definition outlined in the E&S Management System Requirements for Contractors described in Section 2.2 of that document.

1.3. Linkage to Other Contractor Requirements

This document is an overarching document which is supported by a number of topic-specific annexes. It also needs to be read in conjunction with Section D (Scope of Work) and Section F (Coordination Procedure) to provide a holistic view of E&S requirements.

This document should be read specifically in conjunction with the Hazardous Materials Annex and the Road Traffic and Transport Annex. Where additional land is required, the requirements in the Additional Land Access Protocol document shall be followed.

1.4. Background Context

This document assumes that aggregates and other materials will be delivered to site either by road or sea and that the impact and risk assessments required by transport are covered elsewhere. The Contractor will need to determine the volume and types of materials required and source from either subcontractors or suppliers. It is assumed that the Contractor will

favour a local supply strategy for aggregates and concrete if possible. It is also assumed that the availability and suitability of local suppliers of raw materials and aggregates covered in this plan will be determined by the Contractor.

1.5. E&S Risks and Potential Impacts

Table 1-1 outlines the E&S risks and potential impacts identified to date associated with Raw Materials and Aggregates. This table is meant to provide insight to the risks and potential impacts which are possible and a guide for additional assessment activities required by Section 2.1 of this document. It also provides a reference to the control measures tables (Table 2-3).

Table 1-1: A Guide to Activities, Consequences, Risks and Potential Impacts

Activity	Potential Consequence	Risks And Potential Impacts
Development of new or expansion of existing quarries or borrow pits / aggregate	Infrastructure creation	Reduced population numbers and viability of native plants and animals, including listed species (NR1)
		Altered hydrological regimes to wetlands (increased or diminished flows and accumulations) (NR6)
		Positive economic or livelihood benefits (LH3)
		Exploitative working conditions (LAB1)
	Noise generation (Blasting)	Disturbance of important environmentally sensitive receptors (NR7)
Imported aggregate / fill materials	Soil Contaminated materials	Increased prevalence of alien and / or invasive species (NR12)
Operation of concrete batch plants	Dust generation	Dust deposition on important plants restricting growth (P7)
		Community disturbance / nuisance (C1)
		Detrimental impact on community health (C2)
	Spills	Contamination of surface and groundwater (P5)
	Disposal of waste water	Contamination of surface and groundwater (P5)
Timber supply	Local (non-sustainable) timber used	Reduced population numbers and viability of native plants and animals, including listed species (NR1)
		Depletion of a scarce resource (NR5)
		Erosion and sedimentation along new flow-lines (NR16)

2. REQUIREMENTS

2.1. E&S Assessment and Evaluation and CIP Development

As discussed in the overarching Environmental and Social Requirements for Contractors: Environmental and Social Management System (Section 2), due to the further refinement of the design since the EIA was prepared, and due to the Project seeking finance (which requires compliance with the International Finance Corporation (IFC) E&S requirements), it is anticipated that additional E&S assessment will be required for some topics which may result in the addition or refinement of E&S controls specified to date. This assessment, as outlined in the overarching ESMS document, includes three stages:

- Stage 1: Analysis of Alternatives
- Stage 2: E&S risk and impact evaluation of the project base case and refinement of control measures
- Stage 3: CIP development (based on the refined control measures).

For Raw Materials and Aggregates, all 3 stages are required.

Stage 1 – Assessing Alternatives to Develop a Project Base Case

The requirements outlined in Table 2-1 must be completed in order to assess alternatives and determine the Project base case.

Table 2-1: Process for Analysis of Alternatives

Step	Specific Requirements	Responsibility
1	Collect relevant environmental and social baseline for potential local sites that may be constructed or expanded to support Project activities, including (but not limited to) the following: <i>Environmental:</i> location of any areas of environmental significance such as protected areas, streams, wetlands, important trees (as identified in the EIA). <i>Socio-economic:</i> location and population of communities, agriculture / livelihoods, proximity, cultural heritage features, current employment practices (for existing sites or sites run by subcontractors being contemplated)	Contractor
2	Outline what is planned: aggregates, fill material and concrete is required and where the likely sources (sites / suppliers). (Consider in conjunction with traffic routes)	Contractor
3	Carry out and document an alternatives analysis on all traffic routes being contemplated considering E&S risks and impacts identified in Table 1-1 as well as supply considerations including availability of raw material, transport distance and cost, and select final sites and suppliers (consider in conjunction with traffic routes). The documentation shall include description of site alternatives, environmental and social baseline, methodology for collection of baseline, impact / risk assessment method, results of the risk / impact assessments, assessment of alternatives and final decision on agreed sites.	Company

Stage 2 – Assessing the Project Base Case and Refining Control Measures


Once final sites and suppliers have been determined, the actions outlined in Table 2-2 are required in order to refine the preliminary E&S control measures outlined in Table 2-3.

Table 2-2 : Process for Risk and Impact Assessment of Project Base Case

No	Specific Requirements	Responsibility
1	Update (as required): what aggregates / fill material is required and where are the likely sources (sites / suppliers) of those materials located; the footprint; the number of transport trucks; manpower requirements; logistical support required; timing (season and time of day); duration of works; who will be carrying out the work (i.e. is it subcontracted?). (Do this in conjunction with a traffic routes assessment, as per Traffic and Transport Annex 10)	Contractor
2	Once the project base case is defined, evaluate if additional baseline data is needed. (Note that for Raw Materials and Aggregates this step may have already been undertaken in sufficient detail during alternatives assessment)	Contractor
3	Collect additional environmental and social baseline study information on selected locations and transport routes as required considering the following: <i>Environmental:</i> location of any areas of environmental significance such as protected areas, streams, wetlands, important trees <i>Social:</i> location and population of communities, agriculture / livelihoods, proximity, cultural heritage features, current employment practices (for existing sites or sites run by subcontractors being contemplated)	Contractor
3	Refine E&S impact / risk assessment on final sites considering risks and impacts identified in Table 1-1 (Consider in conjunction with Traffic Routes)	Contractor
4	Carry out or refine cumulative impact assessment as required.	Company
5	Assess whether the execution strategy needs to be modified or optimised in the light of knowledge gained from steps (3) (4) and (5)	Contractor
7	Assess whether there are sufficient / appropriate execution control measures in Table 2-3 to mitigate the identified impacts and risks and update if necessary	Contractor
8	Document results including a summary of project description (execution strategy), summary of the environmental and social baseline, risk / impact assessment method, results of the risk / impact assessments, including the proposed list of control measures to be applied	Contractor

Stage 3 – Contractor Implementation Plan

The Contractor shall develop a CIP which outlines how they propose to implement the control measures in the Table 2-3 (including any proposed additions or refinements as applicable to the update and finalisation of the design and execution strategy), and how they propose to implement the management system requirements (as outlined in the E&S Management

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System Requirements for Contractors) which relate specifically to the topic of this document, in a way that conforms to E&S requirements. The CIP shall include the refined control measures developed in Stage 2.

2.2. E&S Control Measures

The control measures in Table 2-3 have been defined ahead of the site-specific risk / impact evaluations defined in Section 2.1. The Contractor shall apply these or seek agreement to apply a refined list, with justification for all changes based on the outcomes of assessments described in Section 2.1.

Where these requirements originate from the Anadarko / Eni EIA (2014), henceforth called the EIA, the EIA section reference is included. Similarly, the Government-approved Environmental Management Plans (EMPs) references are included for those relevant controls. As noted in the overarching ESMS requirements document, a number of additional controls have been identified as being required to meet lender expectations. As such, the EIA / EMP controls have been supplemented by good practice design and control requirements where practicable and appropriate, however, where any overlap is present, the EMP (and EIA) commitments should be considered paramount over good practice guidance in the hierarchy of adoption of such controls.

Table 2-3: E&S Control Measures

ACTIVITY / SOURCE OF POTENTIAL IMPACT	CONTROL MEASURE	IMPACT / RISK BEING ADDRESSED	SOURCE			Notes
			EIA	EMP	Other	
Overarching Requirements						
General	Assess aggregate requirements (quality and quantity).				A	
	Avoid establishing quarries / borrow pits which are ecologically or culturally sensitive, inside river beds or adjacent to existing communities.				A	
	Establish adequate buffer areas where quarries / borrow pits are adjacent to sensitive areas to the extent reasonably practicable				A	
	Avoid resettlement of individuals, households and communities, and disturbance or damage to their assets in relation to quarries and borrow pits (outside the DUAT).				A	
	Minimise project footprint and the associated raw materials usage to the extent reasonably practicable by accurately estimating the land required for different project facilities and infrastructure, and optimizing site configuration.				A	
	Use sites that are close or adjacent to existing and planned facilities and infrastructure to minimise access requirements.				A	
	Preferentially use disturbed areas over non-disturbed areas.				A	
	Where reasonably practicable, use material generated by construction activities to reduce the volume of material extracted and imported from quarries and borrow pits.				A	
Execution Requirements						
Development of new or expansion of existing quarries or borrow pits / aggregate	Clearly identify boundaries of areas to be disturbed at each quarry project site prior to works commencing.	NR1, NR6 C1			A	
	The quarry work site shall be opened, operated and closed such that it avoids or reduces potential impacts to the workforce or local community or damage to neighbouring environmental resources or receptors.	C1, C2			A	
	A Reinstatement/closure plan shall be developed prior to opening a new site which includes the following:	C1, C2, NR7, NR16			A	
	· Achieve stable and safe faces and benches.					



	<ul style="list-style-type: none"> Once extraction activities have ceased and sites made safe, discourage further unregulated activities by closing access roads. Promotion of natural revegetation by ripping the base of the quarry. Plan to communicate with the community to inform of closure 					
	Where noise sensitive protected species have been identified, prohibit blasting within 100 m of known mating or nesting sites	NR7			A	
Aggregate materials	All imported fill material is inert and free from any contamination by undertaking periodic due diligence checks at the source (supplier) and also when the material is delivered to site. Any fill suspected of being contaminated should be identified and quarantined and Company shall be notified immediately. This fill material shall not be used by Contractor and shall be returned to supplier unless soil analysis testing indicates it is inert	NR12			A	
	Natural materials to be used as construction aggregate (such as sands, gravels, pebbles, cobbles, boulders) shall not be extracted from riverbeds and floodplain areas.	C1, NR5, NR16			A	
Batch plants	Cement silos must be fitted with dust controls such as multibag pulse jet filters, airtight inspection hatches and automatic cut-off switches on the filler lines.	P7, C1, C2			A	
	Fine aggregate materials such as cement or bentonite must be contained and stored in such a manner as to minimise dust generation.	P7, C1, C2			A	
	Control drop heights (e.g. from haulage trucks into bins and conveyors) through use of telescopic chutes, where appropriate.	P7, C1, C2			A	
	Design conveyor belts and hoppers to be covered or enclosed where reasonably practicable.	P7, C1, C2			A	
	Ensure daily housekeeping practices are maintained, including keeping work areas and surfaces clean.	P7, C1, C2			A	
	Ensure hard surfaces are used for loading and vehicle movement areas, such as paving, for spill containment and clean-up.	P7, C1, C2			A	
	Material should be removed from the bottom of piles to minimize the suspension of dust.	P7, C1, C2			A	
Measures shall be taken to avoid contamination of soil or groundwater with wash water from washing out of vehicles and other equipment by use of designated washdown areas.	P7, C1, C2, P5			A		

Timber Supply	Require that in-country timber is acquired from legal Company approved sources.	NR1, NR5, NR16			A	
Borrow Pits	Reduce the impact on ecological receptors generated by the presence and use of borrow pits by adopting the following measures:		Shared BP 1			
	1. Vegetation clearance will be limited to the minimum necessary to accommodate construction within the Project Footprint Area in accordance with a Soils, Erosion Control and Reinstatement Management Plan		Shared BP 2			
	2. Restrict extent of disturbance within the Project Site to the extent practicable		Shared BP 3			
	3. Establish temporary construction and laydown sites in areas of Low herpetofauna, avifaunal and mammalian sensitivities		Shared BP 4			
	4. Strip top soil and store for later use in reinstatement of construction activities worksites		Shared BP 5			
	5. Stockpiles are to be protected from erosion by stormwater		Shared BP 6			
	6. Stockpiled soil is not to be compacted		Shared BP 7			
	7. Necessary erosion and sedimentation control (such as temporary drainage system including sedimentation basin, silt fences, and slope protection by sheeting, etc.) will be implemented.		Shared BP 8			
	8. Dust suppression procedures will be implemented as per the Soils, Erosion Control and Reinstatement Management Plan.		Shared BP 9			
	9. Where practicable borrow pits will be backfilled with appropriate and compatible material. Allowance will be made for natural settlement/subsidence.		Shared BP 10			
	10. Borrow pits will treated as temporary use areas and will be revegetated /rehabilitated as soon as practicable after sections of work are complete in accordance with a Soils, Erosion Control and Reinstatement Management Plan.		Shared BP 11			
11. Landscaping and rehabilitation should be restricted to the use of indigenous species and species that are known to be non-invasive in tropical climates in accordance with the Projects landscaping plan		Shared BP 12				



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12. A monitoring program will be implemented throughout the life of the Project to control alien/invasive plant species within areas under Project control, with special attention given to devil's weed, castor oil bush, horsetail tree and sisal. A qualified botanist should be contracted to oversee regular site surveys for non-native floral species, as part of this program.

Shared BP
13

2.3. Pre-Construction Surveys

Contractor shall carry out the pre-construction surveys outlined in Table 2-4 as well as any other pre-construction survey requirements identified through the impact assessment process.

Table 2-4: Pre-Construction Surveys


No	Specific Requirements	Responsibility	Deliverable
1	Site condition (photo/video)	Contractor	Pre-construction site condition survey a. Methodology b. report
2	Identification and field marking of all trees or other flora, important cultural heritage to be protected during expansion of sites	Contractor	a. Constraints map b. photo evidence of field marking

3. DELIVERABLES

The following deliverables are associated with Raw Materials and Aggregates. Contractor deliverables shall be submitted to the Company for Company approval.

Table 3-1: Summary of Deliverables

Section Reference	Deliverable	Responsibility	Deliverable Date
STAGE 1			
Table 2-1	Topic-specific Alternatives Analysis Report, which as a minimum includes: <ol style="list-style-type: none"> 1) Overview of E&S baseline relevant to the options assessment screening 2) Alternatives analysis review, including details of E&S risks and impacts evaluation, as well as other relevant drivers for the decision-making process 3) Final recommendation on the Project base case. 	Company	To be agreed on contract award
STAGE 2			
Table 2-2	Topic-specific E&S Report, which as a minimum includes: <ol style="list-style-type: none"> 1) Definition of the approved Project base case 2) Updated/refined baseline description, as applicable to the base case 3) Updated E&S risks and impacts evaluations 4) Refined list of E&S control measures. 	Contractor	To be agreed on contract award
STAGE 3			
Section 2.2	Topic-Specific CIP, which as a minimum includes: <ol style="list-style-type: none"> 1) Approved list of E&S control measures 2) Details of how the approved control measures will be implemented (including linkage to other Project plans and procedures, where necessary, to demonstrate the implementation of the E&S controls committed to) 3) Details of the monitoring, reporting and assessment. 	Contractor	To be agreed on contract award
Table 2-4	Pre-construction survey report including methodology and results	Contractor	To be agreed on contract award

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Section Reference	Deliverable	Responsibility	Deliverable Date
Table 2-4	Constraints map and photo evidence of field marking	Contractor	To be agreed on contract award