



Rovuma
LNG

**ENVIRONMENTAL AND SOCIAL
REQUIREMENTS FOR CONTRACTORS:
ANNEX 12 – BALLAST WATER AND
BIOFOULING**

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 Ballast Water and Biofouling.

1.2. Scope

For the purposes of this document, Ballast Water and Biofouling encompasses the following activities: the management of ballast water used by Project-related vessels; the control of biofouling on/in Project-related vessels and the management of all wastes, effluents, intakes, discharges and disposals associated with ballast water and biofouling on/in Project-related vessels.

The term “vessels” in this document refers to self-propelled and towed seagoing and coastal vessels, including but not limited to barges, LNG carriers, tankers, ships and smaller craft.


The term “Project related vessels” in this document refers to all vessels engaged in activities and support functions for the Project including but not limited to those owned, leased, hired and directly or indirectly contracted by Company or the EPC Contractor and its associated/affiliated organisations and subcontractors, and whether working on a full-time, part-time, occasional, one-off or on-call basis.

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 Marine Operations annex, which relates to vessel management and navigation, and the Dredging annex, which relates

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to dredging for the construction of and vessel access to coastal facilities and the management of dredged material.

1.4. Background Context

The Project is committed to minimising the risk of introductions of Invasive Alien Species (IAS), which are viewed as one of the key threats to global biodiversity¹. The effects of IAS that are accidentally or deliberately introduced into a new environment can be catastrophic not just for indigenous species they may prey on or out-compete but at an ecosystem level due for instance to the impact they may have on important habitat and/or the imbalances they may create in the entire food chain. Dealing with the effects of IAS on biodiversity and livelihoods dependent on the natural environment can also have punitive financial consequences.

In the marine context the two main vectors for IAS are (a) ballast water and associated sediments; and (b) biofouling.

Ballast water can be used for a number of purposes on a vessel such as adding stability, altering draft and optimising trim. If ballast water is pumped on-board from water around a vessel it can also take up organisms within the water. These organisms may then remain viable during subsequent transit to another location where they may be released when the ballast is exchanged or discharged.

Biofouling is the colonisation of vessels by marine life. Both sessile and associated mobile organisms can colonise and grow on any wetted surface of a vessel, such as hulls, anchors, niche spaces and other colonisable locations. Biofouling colonisers can include crustaceans (e.g., barnacles, crabs and amphipods), molluscs (such as gastropods, bivalves and sea slugs), sponges, sea squirts, bryozoans, jellyfish, anemones, fish and seaweeds.

Both biofouling and ballast water can therefore lead to the artificial transfer of IAS between locations as a result of shipping movements. The starting point for addressing these risks is compliance with the following regulations/guidance initiated by the International Maritime Organization (IMO):

- International Convention for the Control and Management of Ships' Ballast Water and Sediments (2004) and associated Guidelines G1 – G14. This is generally referred to as the BWM Convention and entered into force in September 2017
- Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species (Biofouling Guidelines, 2011) (IMO Resolution MEPC.207(62))

The risks associated with IAS introductions are heightened by the sensitivity of the receiving environment in Palma Bay and the wider region.

Palma Bay is located towards the northern end of the Quirimbas Archipelago which extends for some 400 km parallel to the Mozambican coast and comprises 32 islands with associated coral reefs, seagrass beds, mangroves, sandy beaches and mudflats. Quirimbas is part of the wider East African Marine Ecoregion. It is of global importance for biodiversity and has the highest recorded diversity of corals in the Western Indian Ocean.

Key biodiversity features in Palma Bay include coral, seagrass and coastal mangroves, all of which support a wide range of fauna. These are highly threatened habitats at a global level

¹ IFC Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources (2012). Para. 6.

and the places they occur in Palma Bay have therefore been assessed as Critical Habitat² according to the definitions in IFC Performance Standard 6 (PS6): Biodiversity Conservation and Sustainable Management of Living Natural Resources. In addition Critically Endangered and Endangered species are present in the bay including several turtle and one dolphin species. There is also extensive use of Palma Bay by small-scale fisheries providing income and subsistence to local communities who are therefore dependent on the quality of the marine and coastal habitat.

1.5. E&S Risks and Potential Impacts

Table 1-1 outlines the E&S risks and potential impacts identified to date associated with Ballast Water and Biofouling. 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 2-2).

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

ACTIVITY	POTENTIAL CONSEQUENCE	RISKS AND POTENTIAL IMPACTS
Marine transport and associated use of ballast water (including ballast water exchange, discharge of ballast water and associated sediments)	Accidental introduction of (invasive) alien marine species	Reduced population numbers and viability of native plants and animals, including listed species (NR1)
		Reduced ecological function and diminished quality of ecosystem services (NR13)
		Pollution of marine environment (P4)
		Fragmentation / Partitioning of habitat (physical barrier) (NR2)
		Livelihood impacts on fisheries (LH4)
		Detrimental impacts on local economy or livelihoods (LH2)
	Release of contaminants during discharges to the marine environment	Pollution of marine environment (P4)
		Livelihood impacts on fisheries (LH4)
		Pollution of marine environment (P4)
Marine transport and associated biofouling of vessel surfaces	Accidental introduction of (invasive) alien marine species	Reduced population numbers and viability of native plants and animals, including listed species (NR1)
		Reduced ecological function and diminished quality of ecosystem services (NR13)
		Pollution of marine environment (P4)
		Fragmentation / Partitioning of habitat (physical barrier) (NR2)
		Livelihood impacts on fisheries (LH4)
		Detrimental impacts on local economy or livelihoods (LH2)

² Mozambique Program. Mozambique Straddling Resources. *Critical Habitat Screening and Assessment Using IFC PS6 Criteria – Interim Report*. CH2M Hill Mozambique Lda for Eni S.p.A. March 2018.



ACTIVITY	POTENTIAL CONSEQUENCE	RISKS AND POTENTIAL IMPACTS
	Release of contaminants as a result of any use of toxic anti-fouling paints/coatings	Pollution of marine environment (P4)
		Livelihood impacts on fisheries (LH4)
		Pollution of marine environment (P4)
Onshore disposal of wastes/effluents from ballast water tanks and de-fouling / cleaning of vessel surfaces	Release of contaminants into surrounding environment in the event of any inadequate waste management practices	Reduced water quality in local waterways due to increased turbidity and sediment loading; fish kills; reduced ecological function (P6)
		Contamination of surface water (P5)

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 1.1), 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 Ballast Water and Biofouling, only stages 2 and 3 are required, due to the fact that the final design basis and execution strategy has been identified as compliant with the relevant IMO Conventions and guidance. This is therefore the Project base case.

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

The actions outlined in Table 2-1 are required in order to refine the preliminary E&S control measures outlined in Section 2.2.

Table 2-1: Process for Risk and Impact Assessment of Project Base Case

NO	SPECIFIC REQUIREMENTS	RESPONSIBILITY
1	Determine the status of existing and planned port facilities in Mozambique (and South Africa as applicable) in respect of ballast water reception / treatment, hull inspection / quarantine and the management of associated wastes. <i>[Part of wider study on shipping reception / repair / maintenance facilities and MARPOL compliant waste / effluent management facilities in and associated with Mozambique/regional ports – refer to Marine Operations E&S Requirements Plan]</i>	Contractor
2	Analyse the IMO regulations for ballast water management and associated good practice guidance to determine the specific implications for the Project.	Contractor
3	Analyse the IMO guidelines for biofouling controls to determine the specific implications for the Project.	Contractor
4	Take into account the potential for cumulative impacts and the benefits of joint action with other developers, government agencies, ports and other stakeholders as required.	Company
5	Taking the findings of the above steps into account, assess whether there are sufficient / appropriate design and execution control measures to mitigate the identified impacts and risks and update if necessary	Contractor

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2.1.2. Stage 3 – Contractor Implementation Plan

The Contractor shall develop a CIP which outlines how they propose to implement the control measures in the Table 2-2 (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 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 2-2 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 2-2: E&S Control Measures

ACTIVITY / SOURCE OF POTENTIAL IMPACT	CONTROL MEASURE	IMPACT / RISK BEING ADDRESSED	SOURCE			Notes
			EIA	EMP	Other	
Overarching Requirements						
General	Strict compliance with the guidelines of the International Maritime Organization concerning the treatment of ballast waters		LNG EIA Approval Letter S10 23	LNGMT ME 36 MOF ME 36		
	Ensure compliance with the IMO Guidelines for the Control and Management of Ships' Biofouling to Minimize the Transfer of Invasive Aquatic Species			LNGMT ME 35 MOF ME 35		
Execution Requirements						
Auditing	Conduct pre-mobilisation audits and verifications for vessels, including: <ul style="list-style-type: none"> ballast water management biofouling controls port reception facilities to be used in Mozambique and wider East Africa region 	P4, LH4, NR1, NR13			A	
Ballast water management / biofouling controls	The Contractor is responsible for regular monitoring and verification of the implementation by Masters and crews of Project-related vessels of the vessel-specific Ballast Water and Biofouling Management Plans including the maintenance of the Ballast Water Management Log Book and the Biofouling Record Book.	P4, LH4, NR1, NR13			A	

ACTIVITY / SOURCE OF POTENTIAL IMPACT	CONTROL MEASURE	IMPACT / RISK BEING ADDRESSED	SOURCE			Notes
			EIA	EMP	Other	
	Ballast Water Management Log Books and Biofouling Record Books from Project-related vessels shall be: <ul style="list-style-type: none"> Maintained for a period of 2 years after the last entry has been made; and Made available to the Company on request 	P4, LH4, NR1, NR13			A	
	In addition pertinent environmental information from the different vessel Log/Record Books shall be collated by the Contractor and included in Monthly Environment Reports to the Company.					
	All Project-related shipping shall carry and implement International Maritime Organization (IMO) compliant management plans and procedures aimed at preventing the introduction of Invasive Alien Species (IAS) into Mozambican or other waters via ballast water or biofouling (the colonisation of vessels by marine life). It is Contractor's responsibility to ensure and monitor compliance with this and the following related ballast water and biofouling control measures.	P4, LH4, NR1, NR13, O1			A	
	The vessel-specific Ballast Water and Biofouling Management Plans will include Procedures for the timely and accurate maintenance of ballast water and biofouling records:	P4, LH4, NR1, NR13			A	
	<ul style="list-style-type: none"> A Ballast Water Management Log Book Procedure that describes how information is recorded relating to ballast water management for each and every journey for all vessels used by the Project. The Log Book should describe the identification and implementation of control measures for uptake/discharge of ballast water prior to each journey, storage during the journey, uptake/discharge of ballast water along the journey and discharge/uptake of ballast water at the end point destination 					

ACTIVITY / SOURCE OF POTENTIAL IMPACT	CONTROL MEASURE	IMPACT / RISK BEING ADDRESSED	SOURCE			Notes
			EIA	EMP	Other	
	<ul style="list-style-type: none"> A Biofouling Record Book Procedure that describes how information is recorded relating to all inspections and biofouling management measures undertaken on the vessel before, during and after vessel journeys. It will include as a minimum: diagram of vessel; anti-fouling paint/coating details; internal seawater system de-fouling measures; inspection regime/schedule; records of inspection, maintenance, treatment and cleaning measures; and associated waste management details 					
Ballast water management	Prior to the establishment of the Port Reception Facilities in Palma Bay (ie during the construction phase) vessels associated with the EPC Contractor will comply with MARPOL 73/78 at a minimum and utilise MARPOL compliant waste facilities elsewhere for offloading wastes	P4, LH4, NR1, NR13, O1	EIA 11.24.2	LNGMT ME 38 MOF ME 38		
	As per the Ballast Water Management Plan, all vessels entering Palma Bay that are linked in any way to the Project are to comply with current IMO regulations concerning ballast water discharge and treatment.			LNGMT ME 34		
	Design journey plans to minimise the need for time spent in non-destination shallow coastal waters and the need for stop overs at other harbours or ports.	P4, LH4, NR1, NR13			A	
	The BWMP, BWM Log Book, Biofouling MP and Biofouling Record Book shall be made available in the working language of the vessel and at least English or Portuguese as applicable.	P4, LH4, NR1, NR13			A	
	In general, ballast water shall be managed to avoid or minimise the need for discharge.	P4, LH4, NR1, NR13			A	

ACTIVITY / SOURCE OF POTENTIAL IMPACT	CONTROL MEASURE	IMPACT / RISK BEING ADDRESSED	SOURCE			Notes
			EIA	EMP	Other	
	Ballast operations involving water that may be cold, turbid, fresh or brackish shall be by Ballast Water Treatment Systems that have type approval for such conditions under IMO Regulation D3 or US Coast Guard (USCG) Type Approval, as appropriate.	P4, LH4, NR1, NR13			A	
Biofouling controls	All Project vessels shall comply with the Contractor's Ballast Water and Biofouling CIP.	P4, LH4, NR1, NR13			A	
	All Project-related shipping shall comply with the International Convention on the Control of Harmful Anti-fouling Systems on Ships (2001) and amendments, which prohibits the use of harmful organotins in anti-fouling paints used on vessels.	P4, LH4, NR1, NR13, O1			A	
	For slow moving vessels (such as barges) give preference to vessels already present on the African east coast.	P4, LH4, NR1, NR13			A	
	On arrival in coastal waters, internal waters and in Palma Bay, avoid unnecessary disposal of ballast water.	P4, LH4, NR1, NR13			A	
Training	The Contractor shall ensure that key personnel such as Masters, Crew Managers and Environmental Managers are trained and competent with regard to their roles in the management of IAS risks (e.g., introductions via ballast water or hulls).	P4, LH4, NR1, NR13			A	

2.3. Pre-Construction Surveys

Contractor shall carry out the pre-construction surveys outlined in Table 2-3 as well as any other pre-construction survey requirements identified through the impact assessment process.

Table 2-3: Pre-Construction Surveys

NO	SPECIFIC REQUIREMENTS	RESPONSIBILITY	DELIVERABLE
1	Confirm that all Project-related vessels using ballast water have a vessel-specific Ballast Water Management Plan with associated procedures and up to date Log Book and an international ballast water management certificate.	Contractor	Pre-construction audit for ballast water management <ul style="list-style-type: none"> methodology report
2	Confirm that all Project-related vessels have a vessel-specific Biofouling Management Plan with associated procedures and up to date Record Book and can provide evidence that hulls and other vessel surfaces prone to biofouling have been inspected and if necessary cleaned prior to entering Mozambican waters.	Contractor	Pre-construction audit for biofouling controls <ul style="list-style-type: none"> methodology report
3	Confirm location and status of port facilities in Mozambique and wider East Africa region that will be used for vessel inspections / quarantines, hull cleaning, and reception/treatment of ballast water and associated wastes during construction period.	Contractor	Pre-construction audit of port reception facilities to be used in Mozambique and wider East Africa region <ul style="list-style-type: none"> methodology report photo/film record of facilities audited
4	Conduct a risk-based Pre-construction audit for ballast water management	Contractor	Pre-construction audit for ballast water management <ul style="list-style-type: none"> methodology report
5	Conduct a risk-based Pre-construction audit for biofouling controls	Contractor	Pre-construction audit for biofouling controls <ul style="list-style-type: none"> methodology report



NO	SPECIFIC REQUIREMENTS	RESPONSIBILITY	DELIVERABLE
6	Conduct a Pre-construction audit of port reception facilities to be used in Mozambique and wider East Africa region	Contractor	Pre-construction audit of port reception facilities to be used in Mozambique and wider East Africa region <ul style="list-style-type: none">• methodology• report• photo/film record of facilities audited

3. DELIVERABLES

The following deliverables are associated with Ballast Water and Biofouling. Contractor deliverables shall be submitted to the Company for Company approval.

Table 3-1: Summary of Deliverables

SECTION REFERENCE	DELIVERABLE	RESPONSIBILITY	DELIVERABLE DATE
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 2.1.2	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 2-3	Risk-based pre-construction audit for ballast water management: <ul style="list-style-type: none"> • methodology • report 	Contractor	To be agreed on contract award
Table 2-3	Risk-based pre-construction audit for biofouling controls: <ul style="list-style-type: none"> • methodology • report 	Contractor	To be agreed on contract award



SECTION REFERENCE	DELIVERABLE	RESPONSIBILITY	DELIVERABLE DATE
Table 2-3	<p>Pre-construction verification audit of port reception facilities, not already audited by Company) to be used in Mozambique and wider East Africa region:</p> <ul style="list-style-type: none">• methodology• report• photo/film record of facilities audited	Contractor	To be agreed on contract award