

Chapter 13

Socio-economic Impact Assessment and Mitigation

CONTENTS

13	SOCIO-ECONOMIC IMPACT ASSESSMENT AND MITIGATION	13-1
13.1	INTRODUCTION	13-1
13.2	PHYSICAL AND ECONOMIC DISPLACEMENT	13-2
13.2.1	<i>Overview</i>	13-2
13.2.2	<i>Loss of Land and Physical Infrastructure</i>	13-4
13.2.3	<i>Loss of Collective Natural Areas and Land-based Subsistence Livelihoods</i>	13-6
13.2.4	<i>Disruption of Marine-based Economic Livelihoods (Excluding Commercial Fishing)</i>	13-10
13.3	IMPACTS ON TOURISM	13-13
13.3.1	<i>Disruption and Loss of Attraction of Tourism Destinations</i>	13-13
13.3.2	<i>Increased Demand for Tourism Facilities (Accommodation and Leisure)</i>	13-16
13.4	IMPACTS RELATED TO PROJECT INDUCED IN-MIGRATION	13-17
13.4.1	<i>PIIM in the Project Context</i>	13-19
13.4.2	<i>Responsibilities for Addressing PIIM</i>	13-20
13.4.3	<i>Impact Assessment – Positive PIIM Impacts</i>	13-21
13.4.4	<i>Impact Assessment – Negative PIIM Impacts</i>	13-22
13.4.5	<i>Residual Impacts</i>	13-27
13.5	COMMUNITY HEALTH IMPACTS	13-28
13.5.1	<i>Communicable Diseases Linked to Overcrowding and Poor Environmental/ Socio-economic Conditions</i>	13-30
13.5.2	<i>Vector-related Diseases</i>	13-31
13.5.3	<i>Soil, Water and Waste-related Diseases</i>	13-33
13.5.4	<i>Sexually Transmitted Infections and High-risk Sexual Practices, Including HIV/AIDS</i>	13-35
13.5.5	<i>Food and Nutrition-related Issues</i>	13-37
13.5.6	<i>Accidents/Injuries</i>	13-39
13.5.7	<i>Social Determinants of Health</i>	13-41
13.5.8	<i>Healthcare Services and Infrastructure</i>	13-43
13.5.9	<i>Health Programmes and Systems</i>	13-45
13.6	ECONOMIC IMPACTS	13-46
13.6.1	<i>Increased Government Revenue</i>	13-47
13.6.2	<i>Employment, Training and Skills Development</i>	13-50
13.6.3	<i>Procurement of Local Goods and Services</i>	13-53
13.6.4	<i>Unmet Community Expectations for Employment and Procurement Opportunities</i>	13-55
13.6.5	<i>Economic Diversification</i>	13-56
13.7	SHIPPING AND NAVIGATION	13-58
13.7.1	<i>Impact of the Project Vessels and Activity on International Maritime Traffic</i>	13-58
13.7.2	<i>Disruption of Commercial Fishing Activities</i>	13-61
13.7.3	<i>Impact of the Project Vessels and Activity on National and Regional Cabotage</i>	13-63
13.8	ONSHORE ARCHAEOLOGY AND CULTURAL HERITAGE	13-66
13.8.1	<i>Impact of Disturbance of or Damage to Archaeological and Cultural Heritage Sites</i>	13-66
13.9	MARINE ARCHAEOLOGY AND CULTURAL HERITAGE	13-70

13.9.1	<i>Impact of Offshore and Near Shore Construction and Operational Activities on Marine Archaeology and Cultural Heritage</i>	13-70
13.10	<i>INDIRECT SOCIO-ECONOMIC IMPACTS AT PEMBA AND MOCIMBOA DA PRAIA</i>	13-72
13.10.1	<i>Impact Assessment Overview</i>	13-72
13.10.2	<i>Mitigation/ Enhancement Measures</i>	13-72

13.1 INTRODUCTION

This section provides a description of the socio-economic impacts associated with the Project. These impacts have been identified based on research (including the gathering of primary and secondary data), observation and professional judgement.

Impacts assessed in this chapter include:

- Physical and economic displacement (*Section 13.2*):
 - loss of land and physical infrastructure;
 - loss of collective natural resource areas;
 - disruption of land-based economic livelihoods; and
 - disruption of marine-based economic livelihoods.
- Impacts on tourism (*Section 13.3*):
 - disruption of tourism activities; and
 - increased demand for accommodation and leisure establishments.
- Project Induced In-migration (*Section 13.4*).
- Health and safety of the workers and communities (*Section 13.5*):
 - impacts related to communicable diseases; and
 - impacts related to the introduction of roads and road traffic.
- General economic impacts (*Section 13.6*):
 - increased government revenue;
 - employment, training and skills development;
 - procurement of local goods and services;
 - unmet expectations for local employment and procurement; and
 - economic development and economic diversification.
- Impacts to shipping and navigation (*Section 13.7*):
 - international maritime traffic;
 - disruption of commercial fishing activities; and
 - national and regional cabotage.
- Impacts to archaeology and cultural heritage (*Sections 13.8 and 13.9*):
 - onshore archaeology and cultural heritage sites; and
 - offshore archaeology and cultural heritage sites.

13.2 PHYSICAL AND ECONOMIC DISPLACEMENT

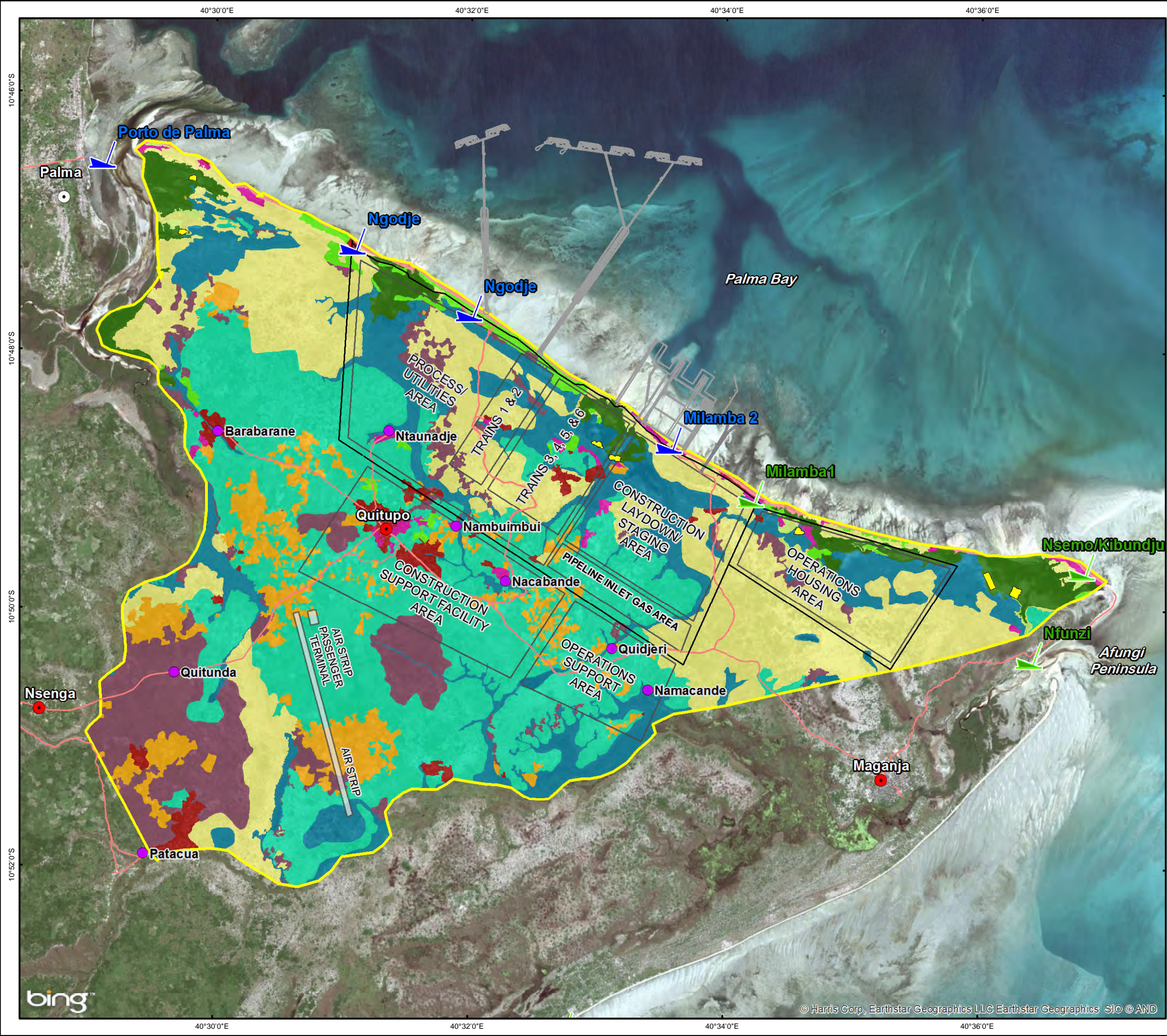
13.2.1 Overview

The Project has obtained a 7,000ha DUAT for development of the LNG Project and Associated Facilities. The need for this area stems from requests from the government for only one LNG site (Item 21 in MICOA's approval of the EPDA Report), as was confirmed by an ENH representative at the public meeting in Maputo on 9 September 2013 (see Public Participation Report, *Annex B*). *Figure 13.1* below illustrates where the layout of the Onshore Project Footprint in the Afungi Project Site Area and Surrounds (including Senga and Maganja) overlaps with existing villages, settlements, fishing zones and Fishing Centres, with existing land-use patterns. Securing the required land will most likely result in permanent physical displacement and both permanent and temporary economic displacement to several villages, as outlined in *Table 13.1* below.

All households in the Afungi Project Site and Surrounds (including Senga and Maganja) are primarily dependent on agricultural and fishing activities for their livelihoods. Permanent physical displacement from within the Onshore Project Footprint will impact land used for subsistence agriculture, and the Offshore exclusion areas will impact directly on subsistence and small-scale fishing activities, trading and transportation routes. Economic displacement occurs from the loss of productive land, dwellings and associated structures, and natural resources critical to the households' subsistence livelihoods, food security and income.

Table 13.1 *Summary of Communities Affected by Physical and Economic Displacement*

Impact	Affected Receptors	Village/Area
Physical displacement	Human settlements	Quitupo Village and surrounding areas
	Permanent and temporary settlements in and around Fishing Centres	Milamba 1, Milamba 2, N'semo and Ngodje
Natural resources	Forest areas	Forest areas around Ngodje, Milamba 1, Milamba 2, Ntaunadje, Nambuimbui within the Project Site
	Farming areas	Surrounding areas of Quitupo and Ntaunadje, Ngodje, Milamba 1, Milamba 2, Quidjeri, Nambuimbui, Nacabande
Economic displacement	Agricultural land	Quitupo Village and surrounding areas Milamba 1, Milamba 2, N'semo, Ngodje, and inland seasonal farmers
	Fishing Centres/zones	Milamba 1, Milamba 2, N'semo, Ngodje, and inland seasonal fishers

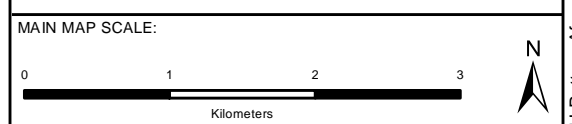


Legend

- District Centre
- Administrative Post Centre
- Villages
- Settlements
- ↘ Fishing Centre
- ↘ Settlement with Fishing Centre
- Local Roads
- Nearshore Components
- Onshore Project Footprint
- Afungi Project Site

Land Use

- Farming Areas
- Coconut Plantation
- Coconut Plantation with Human Occupation
- Forest
- Coastal Grassland
- Mangrove
- Settlements
- Wooded Grassland
- Mosaic of Floodplain and Farming Areas
- Sandy Beach
- Dune Shrub Vegetation
- Salt Pans



TITLE:
Figure 13.1:
Current Land Use Pattern in
Afungi Project Site

CLIENT:

Anadarko
 Moçambique Área 1, Lda

DATE: Oct 2013	CHECKED: IE	PROJECT: 0133576
DRAWN: AB	APPROVED: KG	SCALE: 1 : 52 000
DRAWING: Current LU Pattern Afungi Project Site.mxd		REV: A

ERM
 Great Westerford Building
 240 Main Road
 Rondebosch, 7725
 Cape Town, SOUTH AFRICA
 Tel: +27 21 681 5400
 Fax +27 21 686 073

Projection: UTM Zone 37 S Datum: WGS84
 Source: Bing Maps ©2010 Microsoft Corporation.
 Impacto, 2012. Inset Map: Esri Data & Maps

SIZE:
 A3

13.2.2

Loss of Land and Physical Infrastructure

Impact Assessment

The land described in the EIA as the Afungi Project Site is currently occupied by the villagers of Quitupo, surrounding smaller agricultural and production settlements, and Fishing Centres/zones ⁽¹⁾. The current population in the Afungi Project Site is 2,733, comprising 733 households. The majority (96 percent) of the Afungi Project Site population are permanent residents, while 4 percent reside in the area seasonally. The Project expects that everyone residing within the Afungi Project Site will be permanently displaced to enable development of the Afungi Project Site for the LNG Facility and associated infrastructure.

Physical displacement requires communities to move to a new location, re-establish livelihoods, and establish dwellings and associated infrastructure potentially within new or existing communities. The impacts of the Project's land acquisition, and the physical displacement of communities within the Afungi Project Site, will occur at a local and regional scale – locally in terms of displacement outside the Afungi Project Site, and regionally through linkages to the supporting livelihood activities (fisheries and agriculture) that households undertake outside the Afungi Project Site and which contribute to local and regional trade; for example, fishing activities and trading surplus agricultural produce. Permanent physical displacement includes the loss of all dwellings and infrastructure associated with the household, livelihood activities and community assets within the Afungi Project Site.

The loss of land and associated physical infrastructure will be permanent, occurring prior to the construction phase and extending throughout the life of the Project. The loss of land is a High intensity and High magnitude impact. The pre-mitigation significance is MAJOR for all phases of the Project.

Mitigation Measures

The Resettlement Action Plan (RAP) is the primary mitigation measure to address permanent physical displacement and temporary economic displacement associated with Project activity. The Project recognises that physical displacement associated with the acquisition of land for Project purposes involves the loss of dwellings, assets and land access, requiring directly affected people to move to another location.

The Project also recognises that economic displacement involves the loss of income streams or means of livelihood and food security resulting from land acquisition. This includes the restriction of access to land or the obstruction of

(1) Fishing zones are areas where some households reside on a permanent basis, engaging in agriculture and fishing, not solely fishing, whereas Fishing Centres are settlements of fishers, where fishers and fish traders live on a permanent or seasonal basis.

access to economic resources, including communal and natural resources (eg marine and aquatic resources, water or forest) resulting from the construction and operations of the Project and Associated Facilities.

The Project, in coordination and cooperation with the Mozambique government, will be responsible for the planning, communication and implementation of all resettlement activities, including physical relocation and the compensation of households directly impacted by the Project, in accordance with Mozambican legislative requirements and the Project's resettlement principles.

The Project's overarching objectives for resettlement are to develop and execute resettlement in a manner that gives physically and economically displaced persons the opportunity to at least restore their livelihoods and standards of living. The Project's Initial Resettlement Plan (IRP) is included in *Annex I*. It describes the approach, principles and procedures that will be followed to manage all unavoidable displacement. The IRP provides the framework for the future development of a full RAP. The RAP will be prepared in accordance with Mozambican legislation and the International Finance Corporation's Performance Standard 5: Land Acquisition and Involuntary Resettlement (IFC PS 5) in close consultation with the affected communities. As noted in Section 3.3 of the IRP, the Project is committed to exploring alternatives which avoid un-necessary resettlement and loss of access and productive land. However, this requires close cooperation and agreement with multiple ministries and departments within the Mozambique government (eg DINAPOT, MICOA, INP, ENH to name a few).

The RAP will be consistent with the goals, objectives, principles and processes described in the IRP and will be designed to address the specific conditions, characteristics and needs of the people and enterprises affected by physical and economic displacement.

The Project's resettlement principles include:

- avoiding and minimising the need for physical and/or economic displacement through alternatives analysis and siting, alignment and other design modifications;
- conducting consultation processes that achieve free, prior and informed participation of affected people and communities (including hosts) in decision-making related to resettlement, and continuing participation during implementation and monitoring/evaluation;
- involving representatives from Provincial and District government, directly impacted Administrative Posts, Localities and communities in the resettlement process;

- compensating affected parties at full replacement value for lost assets in cash or in kind, as per Mozambican practice and in line with Mozambican legislation;
- providing and funding opportunities to improve the living conditions of physically displaced households;
- designing and implementing in a timely manner culturally sensitive and economically sustainable income restoration measures;
- providing measures to support physical relocation and re-establishment;
- identifying and providing special assistance to people who are especially vulnerable to displacement impacts; and
- carefully monitoring and evaluating to ensure that resettlement measures are meeting the needs of affected people and to identify the need for (and implementing) corrective measures.

Residual Impacts

Impact significance will be reduced to MODERATE through participatory planning, communication and implementation of the RAP, guided by the objectives and principles outlined above.

Table 13.2 *Loss of Land and Physical Infrastructure*

Without Mitigation		Residual Impact (with Mitigation)
All Phases		
Duration	Permanent	Permanent
Extent	Local to regional	Local to regional
Intensity	High	Medium
Magnitude	High	Medium
Likelihood	Definite	Definite
Significance	MAJOR	MODERATE

13.2.3 *Loss of Collective Natural Areas and Land-based Subsistence Livelihoods*

The collective natural areas in the Afungi Project Site consist of forests, wooded grassland, floodplains/lowlands, dune shrub vegetation, fruit trees and coconut plantations ⁽¹⁾. These resources provide households with materials critical to supporting their livelihoods including construction of their housing, firewood (which is sometimes sold), materials for handcrafts and medicinal plants (see *Table 13.3* below).

(1) The coconut plantations are generally owned by individuals or companies. However, a specific situation was verified in the Afungi Project Site Area and Surrounds (including Senga and Maganja) where a portion of the coconut plantations are still owned by the State, when they were abandoned by their Portuguese owners after independence.

Table 13.3 *Natural Resources Available and Used by Communities in the Afungi Project Site*

Type of Resources	HH That Use (%)	HH That Consume (%)	HH That Sell (%)
Coconut palm fronds for construction	96.4	87.6	20.9
Coconut palm fronds for handicrafts	87.1	84.7	26.6
Wood poles for home construction	97.8	89.6	12.7
Firewood	94.9	87.8	13.1
Medicinal plants	73.0	89.3	13.7

Key:

HH= Households.

Source: Impacto, 2012.

Access to these natural resources will be permanently lost due to the acquisition of land required for the Project and related activities, including land clearance for the construction of Onshore Project Facilities. Most households residing within the Afungi Project Site have a high level of dependence on communal natural resources and have limited opportunities to find alternative communal assets. The loss of communal land within the Afungi Project Site will have a High magnitude and intensity impact on local residents, due to their dependence on these resources for subsistence livelihoods and income generation. The extent of the impact will be localised, and the duration of the impact will be permanent. The occurrence is definite and the overall impact is assessed as being of MAJOR significance.

In terms of land-based subsistence livelihoods, the households in the Afungi Project Site Area and Surrounds (including Senga and Maganja) are primarily dependent on agricultural activities. The majority of agricultural activities occur away from the settlements in the highland and lowland areas within the Afungi Project Site Area and Surrounds (including Senga and Maganja).

The predominant food crops grown are cassava (produced by 89 percent of households), rice (43 percent), beans (51 percent) and maize (29 percent). The loss of these agricultural areas, sustaining such food crops necessary for food security, will directly impact permanent households within the Afungi Project Site Area and Surrounds (including Senga and Maganja) and seasonal farmers. In addition, some households grow cash crops (eg coconuts and cashew nuts) and fruit trees (see Table 13.4 below). Cashews and coconuts are an important resource for both permanent and seasonal households, and provide an average annual income of 2,750 and 3,032MZN per household respectively.

Table 13.4 *Ownership of Fruit Trees Important to Income Generation*

Type of Tree	HH Ownership (%)	Average No. of Fruit Trees per HH
Cashew	63.6	94
Coconut	46.4	59

Type of Tree	HH Ownership (%)	Average No. of Fruit Trees per HH
Mango	45.0	7

Key:

HH= Households.

Source: Impacto, 2012.

The acquisition of the Afungi Project Site for Project purposes will result in disruption to and loss of land-based livelihoods, including subsistence crops, cash crops and fruit trees. The impact on the loss of livelihood activities will be both local and regional, as the loss will directly impact those living within the Afungi Project Site as well as seasonal farmers from inland Palma District.

This is a High intensity impact because households within the Afungi Project Site will permanently lose their cultivated and fallow lands. Households residing outside the Afungi Project Site but using and cultivating land and natural resources within the Afungi Project Site will permanently lose their land and any related infrastructure onsite.

The impact is long term and the magnitude High, as not all directly and indirectly impacted households will be able to continue pre-impact livelihood activities immediately on alternative sites. The occurrence is definite due to the permanent of the Project's land requirements. The impact is assessed to be of MAJOR significance.

On a smaller scale, the subsistence production of salt in small artisanal salt pans located in the Afungi peninsula (see *Section 9.14.8*) might also be affected. However, during fieldwork, it was indicated that these have not been operational for some time. On the Afungi Project Site, 1.5ha of land have been identified as being used for salt production in artisanal salt pans located close to Milamba II and to N'semo (*Figure 9.19*). Salt from these artisanal salt pans is used mostly for consumption and to sell in local markets. Salt is usually used for cooking and to preserve fish by drying and salting it. During fieldwork, it was indicated (via interviews with local people) that the salt pans were not operational for some time and that they hadn't employed many people when they were. Hence, any impact on salt pans are considered to be NEGLIGIBLE.

Mitigation Measures

As described above, the RAP is the primary mitigation measure to address permanent physical displacement and temporary economic displacement associated with Project activities. The RAP details the mitigations and compensation mechanisms that will be implemented in response to impacts associated with the loss of land-based subsistence livelihoods, including:

- recognising permanent and temporary losses and permanent and seasonal farmers by identifying the various livelihood activities and households impacted by Project activities, including loss of forest products (eg legal fruit trees and medicinal plants), households affected by the loss of livelihoods and loss of access to salt pans; and
- compensating impacted parties for temporary loss of agricultural harvests and cropping seasons lost due to construction activities. If compensation arrangements are not concluded prior to the next planting season, impacted parties should be compensated for the near-term crop cycles lost to enable households to achieve food security in the absence of a planned harvest.

As far as possible, permanently displaced households will be settled in areas where there is available land (including land for cashew and coconut plantations), and adequate seedlings will be provided to initiate agricultural activities.

Residual Impacts

Impact significance will be reduced to MODERATE through participatory planning, communication and implementation of the RAP. The implementation of RAP-based mitigation measures will reduce the intensity of the impact to Medium. However, affected people will find it difficult to resume pre-impact access to communal natural resources and land-based livelihoods immediately without support. As such, the residual impact is rated as Medium magnitude and will definitely occur. The significance of the residual impact will be MODERATE. With regards to the impact on salt pans, the impact significance will be NEGLIGIBLE.

Table 13.5 *Loss of Collective Natural Areas (Communal Natural Resources)*

Without Mitigation		Residual Impact (with Mitigation)
Construction Phase		
Duration	Permanent	Permanent
Extent	Local	Local
Intensity	High	Medium
Magnitude	High	Medium
Likelihood	Definite	Definite
Significance	MAJOR	MODERATE

Table 13.6 *Disruption/Loss of Land-based Subsistence Livelihoods*

Without Mitigation		Residual Impact (with Mitigation)
All Phases		
Duration	Permanent	Permanent
Extent	Local to regional	Local to regional
Intensity	High	Medium
Magnitude	High	Medium
Likelihood	Definite	Definite
Significance	MAJOR	MODERATE (NEGLIGIBLE for salt pans)

13.2.4 *Disruption of Marine-based Economic Livelihoods (Excluding Commercial Fishing)*

Impact Assessment

There are two marine-based livelihood categories undertaken by the population of the Afungi Project Site Area and Surrounds (including Senga and Maganja), namely fishing and sea-based transportation. The Project activities likely to affect the vessels and routes are:

- construction and operation of the Onshore and Near Shore Facilities (including dredging);
- the safety exclusion zones; and
- increased numbers of vessels (construction and operational) operating in Palma Bay.

Table 13.7 describes the size of the proposed safety exclusion zones for the Project, and the two categories of marine-based livelihood activities are explained below.

Table 13.7 *Safety Exclusion Zones*

Project Phase	Size	Type of Exclusion Zone
Construction	500m radius	Temporary – around construction vessels
	500m radius	Temporary – around construction areas and access corridors
	5,000m radius	Temporary – around offshore drill rigs
Operational	500m radius	Permanent – around all Near Shore Facilities
	1,000m radius	Moving exclusion zones – in front of LNG Carriers in motion
	500m radius	Moving exclusion zones – behind and aside LNG Carriers in motion
	1,000m radius	Temporary – around LNG Carriers during loading

Fishing Activities

Fishing is undertaken by both men and women in the Fishing Centres/zones identified in Figure 13.1. In addition, seasonal fishers from other parts of the District fish within Palma Bay and along the coastline of the Afungi Peninsula where Near Shore Project Facilities are proposed.

The impact on fishing activities will be felt by all fishers who use the coastline of the Afungi Project Site Area and Surrounds (including Senga and Maganja), the tidal areas, and the offshore areas facing the Afungi Project Site Area and Surrounds (including Senga and Maganja) and Palma Bay.

Disruption of Passenger and Cargo Sea Transport Vessels

There is a limited road network and few public or private transport services within the Palma District, while communities within the Afungi Project Site Area and Surrounds (including Senga and Maganja) are reliant on walking,

bicycles and sea-based modes of transportation. The existing transport vessels carry passengers and cargo along the coastline of Cabo Delgado Province while Mocímboa da Praia, Olumbe and Palma provide access via road to the rest of the Province and other provinces.

The construction activities of the Onshore, Near Shore and Offshore Facilities will disrupt traditional marine transport routes, as vessels ⁽¹⁾ will lose permanent access to landing sites and markets within communities along the coastline of the area around the Afungi Project Site. Transport operators will be required to identify and communicate alternative routes and destinations, and carriers may be required to use longer and possibly more dangerous routes further from the coastline and increase cargo and transport prices to accommodate the additional fuel costs.

If the people living along the coast of the Afungi Project Site are resettled away from the coast, this may also result in the loss of business and therefore income for carrier vessel operators. This would be exacerbated by the additional loss of income sources as a result of reduced access to fishing areas and relocation to environments where current productive skills may be less applicable and/or the competition for resources is greater.

The loss and disruption of fishing activities transport/cargo-based livelihoods along the coastline of the Afungi Project Site will be permanent. The impact on the affected people will occur at the local and regional levels for seasonal fishers and transport/cargo operators. The impact likelihood is definite, and the intensity of the impact will be High. Those affected may not have similar circumstances in which to replicate livelihood activities, and therefore may find it difficult to adapt to change or continue to maintain pre-impact livelihoods. The overall magnitude of this impact will be High during all phases of the Project, for both fishers and transport/cargo operators. As such, the pre-mitigation impact significance will be MAJOR for the fishermen, and the transport/cargo operators and their passengers.

Mitigation Measures

As described in *Sections 13.2.2 and 13.2.3* and above, the RAP is the primary mitigation measure to address permanent physical displacement and temporary economic displacement associated with Project activities. The RAP will detail mitigations and compensation mechanisms implemented in response to impacts associated with the loss of marine-based livelihoods, and will take the following into consideration.

(1) Sea carriers: passenger and cargo boats that are used to transport people and goods along the Afungi Project Site Area and Surrounds (including Senga and Maganja) coastline.

Fishing

- The Project will liaise with the government during the resettlement process to ensure that people living in the Fishing Centres/zones are relocated in/near the coast so as to continue their specific livelihood activities immediately.
- The Project will cooperate with the National Fisheries Administration (ADNAP) toward establishing agreed upon Grievance Procedures (grievances related to fishing activities).
- Where possible, the Project will enable fishing activities to continue in areas of Palma Bay not directly associated with Project activities and outside Project exclusion zones or restricted areas.
- The Project will develop and maintain positive working relationships with the fishing community and community leadership to raise awareness of Project activities directly and indirectly impacting fishing and intertidal gathering activities, and work with communities to develop appropriate mitigations and methods for communications.
- The Project will take into consideration the sociocultural, faith-based and ethnolinguistic sensitivities of the host communities, especially regarding the resettlement of fishing communities, which are composed of migrants from various parts of the region and country (eg Nacala and Nampula provinces).

Cargo/Transport Carriers

- The Project will identify all passenger and cargo vessels operating in the waters adjacent to the Afungi Project Site, in order to:
 - identify alternative routes/points of passage that can be used by the Project vessels or passenger and cargo vessels; and
 - if possible, plan Project activities to allow for the safe passage of carriers at identified times.
- The RAP will include provision for compensation measures associated with any damage and/or loss of cargo directly attributed to vessels engaged in Project activities.

Residual Impacts

Impact significance will be reduced to MODERATE through participatory planning, communication and implementation of the RAP, guided by the objectives and principles in *Sections 13.2.2 to 13.2.3* and additional mitigations described above.

Table 13.8 *Disruption of Marine-based Economic Livelihoods (Excluding Commercial Fishing)*

	Without Mitigation	Residual Impact (with Mitigation)
All Phases		
Duration	Permanent	Permanent
Extent	Local to regional	Local to regional
Intensity	High	Medium
Magnitude	High	Medium
Likelihood	Definite	Likely
Significance	MAJOR	MODERATE

13.3 *IMPACTS ON TOURISM*

In 2010, tourism contributed approximately 7 percent of the provincial GDP, and 10 percent of the provincial tax revenue. Almost all the tourism attractions in the Province are located on the 32 islands off the Cabo Delgado coast, although only four islands are located within 30km of the Onshore Project Footprint Area. Project activities that are likely to impact negatively on tourism activities on islands within proximity of the Afungi Project Site include:

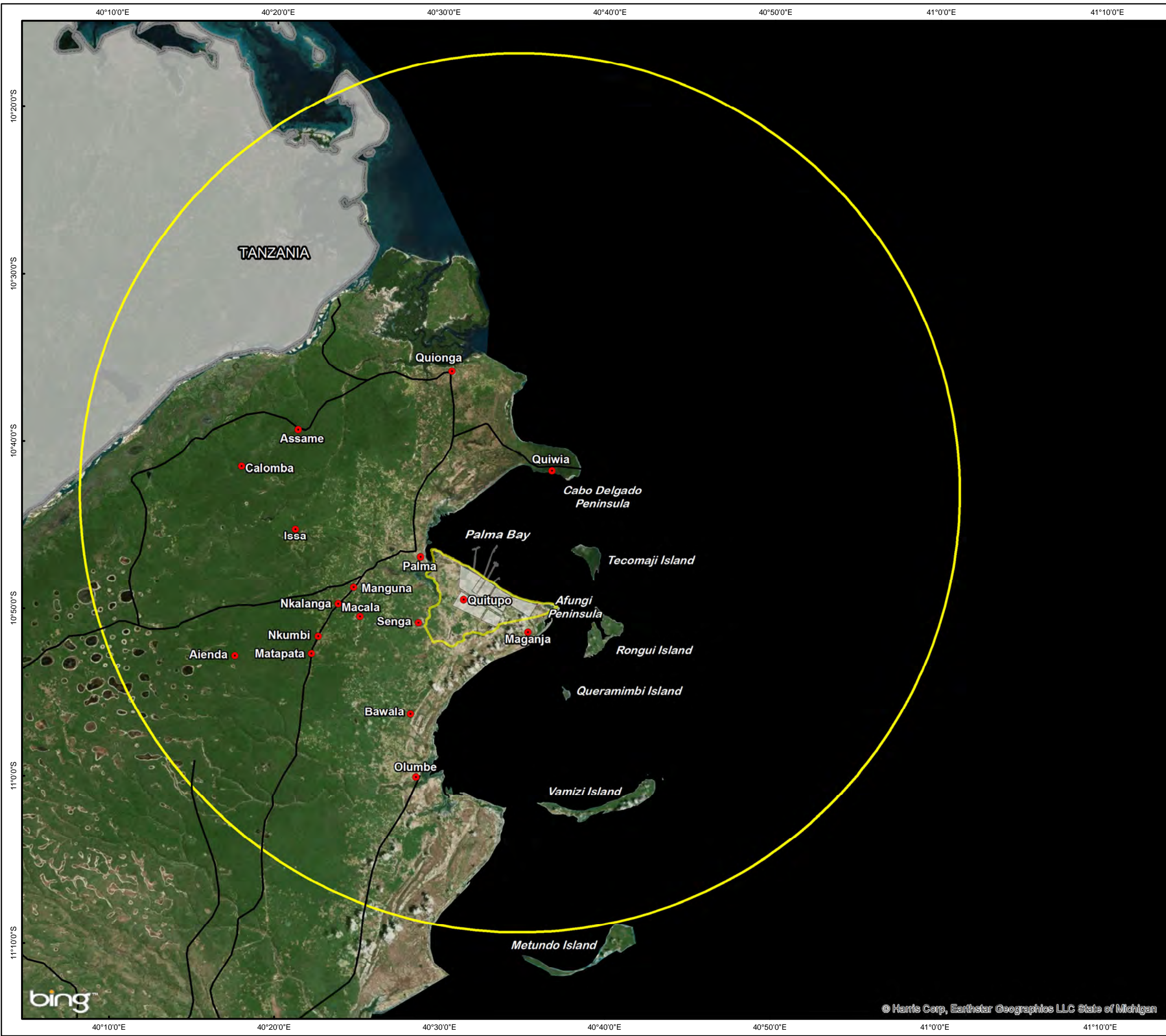
- noise, lights, vessel traffic and visual amenity impacts associated with the nature of construction and operation of the LNG Facility;
- environmental impacts associated with vessels involved in the installation of the subsea infrastructure;
- dredging activities that will disturb the quality of the sea water; and
- multiple safety exclusion and restricted zones for marine vessels, potentially encroaching on diving and other tourist activities.

However, positive tourism impacts are also expected, due to increased demand from Project workers and their families (see *Section 13.3.2* below).

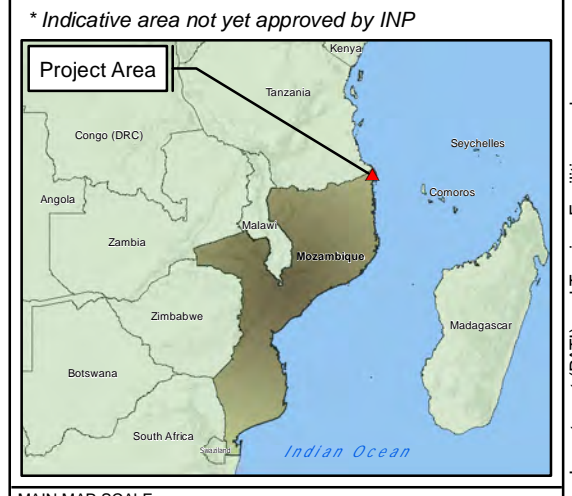
13.3.1 *Disruption and Loss of Attraction of Tourism Destinations*

Impact Assessment

The northern coast of Cabo Delgado has been identified by the Government of Mozambique as a PATI in the Strategic Plan for Tourism Development in Mozambique (2004–2013) as shown in *Figure 13.2*. The existing tourism attractions and facilities that are most likely to be impacted by Near Shore and Offshore Project activities are limited to established tourism ventures on the islands of Queramimbi, Tecomaji and Rongui. Other islands off the Cabo Delgado coast (eg Vamizi) are unlikely to be directly impacted because they are relatively far from the Onshore Project Footprint and the Near Shore and Offshore Project Area activities.



- ### Legend
- Villages / Settlements
 - Regional Roads
 - Jetty
 - Onshore Layout
 - Afungi Project Site
 - Priority Areas for Tourism Investment 2004 - 2013 Plan



TITLE:
Figure 13.2:
Priority Area for Tourism Investment (PATI) and Tourism Facilities

CLIENT:

DATE: Oct 2013	CHECKED: KG	PROJECT: 0133576
DRAWN: AB	APPROVED: KG	SCALE: 1 : 400 000

DRAWING: Priority Area for Tourism Investment (PATI) and Tourism Facilities.mxd	REV: A
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ERM
 Great Westerford Building
 240 Main Road
 Rondebosch, 7725
 Cape Town, SOUTH AFRICA
 Tel: +27 21 681 5400
 Fax +27 21 686 073

Projection: UTM Zone 37 S. Datum: WGS84	SIZE:
Source: Bing Maps ©2010 Microsoft Corporation AMA1, 2012. Inset Map: Esri Data & Maps	A3

The tourism establishments situated on the islands of Tecomaji, Rongui and Queramimbi will be most affected by the visual and noise impacts resulting from construction activities. This will impact the tranquillity and visual amenity in the area– factors that attract tourists to the island resorts.

The impact of the Project activities (in the construction phase) as it relates to tourism will be localised, but could also extend to the regional level in terms of contribution of tourism to regional and provincial GDP and tax revenue. The impact will be long term due to ongoing Project activities, and the potential for further LNG Facilities being developed in the broader area as a result of offshore exploration by other licence concessionaires. This will result in the impact magnitude being High. The intensity will be High for those relying on tourism for livelihoods (people working in tourism and potential investors), as well as for the Government, which has actively encouraged tourism investment in the Province. The impact likelihood is definite, and overall the impact significance is expected to be MAJOR.

It is envisaged that the impact significance will be reduced during the operational phase of the Project, as there will be a reduction in visual intrusion due to less infrastructure (eg rigs) and vessels engaged in Project construction activities. Even though the numbers of construction and support vessels may decrease during the operational phase, the number of LNG Carriers accessing the LNG Export Terminal Facilities will increase over time as additional LNG Trains are constructed, and maintenance dredging is undertaken when required. During operations, while the visual amenity impact is considered minor, the LNG Facility will be visible from Tecomaji and Rongui islands. The intensity of the operational phase impact is expected to be High and long term. Impact significance is expected to be MAJOR.

Mitigation Measures

- Where possible, the Project will design its facilities such that there is less visual intrusion on the tourism receptors.
- The Project will engage directly with tourism operators from Queramimbi, Tecomaji, Rongui and Vamizi islands regarding the potential disruption and loss of attraction resulting from Project construction and operations. The Project will communicate and maintain ongoing engagement with tourism operators regarding Project activities such as the parameters of safety exclusion zones, and implementation of a Grievance Mechanism for raising Project-related concerns. The Grievance Mechanism will outline procedures for the resolution of grievances such as holding discussions with the tourism operators to determine possible solutions, and an assessment of the tourism operator's satisfaction with the resolution or grievance closure.

Residual Impacts

Even with the implementation of the above mitigation, the residual impact will remain MODERATE for construction and operational activities.

Table 13.9 *Disruption and/or Loss of Attraction of Tourism Destinations*

Without Mitigation		Residual Impact (with Mitigation)
Construction Phase		
Duration	Short to long term	Short to long term
Extent	Local/regional	Local/regional
Intensity	High	Medium
Magnitude	High	Medium
Likelihood	Definite	Definite
Significance	MAJOR	MODERATE
Operational Phase		
Duration	Long term to permanent	Long term to permanent
Extent	Local/regional	Local/regional
Intensity	Medium	Low
Magnitude	High	Medium
Likelihood	Definite	Definite
Significance	MAJOR	MODERATE

13.3.2 *Increased Demand for Tourism Facilities (Accommodation and Leisure)*

Impact Assessment

The Government of Mozambique has identified the northern coast of Cabo Delgado as a PATI in the Strategic Plan for Tourism Development in Mozambique (2004–2013). The presence of the Project is likely to create a positive impact in terms of increasing demand for accommodation in the Palma District, due to a potential increase in business travel to northern Cabo Delgado in search of business opportunities. Visitors to the Palma District will require accommodation and may extend their stay for leisure purposes, creating opportunities for the development of tourism, hospitality and recreational amenities. This is likely to occur during the Project inception stages and throughout the construction and operational phases. Some expatriate workers may encourage their families to visit, thereby increasing the demand for accommodation, recreation and tourism activities within and around the Palma District and northern Cabo Delgado.

The impact of increased demand for leisure accommodation will likely peak during the Project’s construction phase, but may experience increase should other LNG Facilities be developed, and as business and economic development occur in the region. During the construction phase, the impact will be experienced at a local level over the medium term. The intensity and magnitude of impact could range from Low to Medium, with a Likely probability of occurrence. Thus, a MODERATE POSITIVE impact is expected during the construction phase.

During the operational phase, the impact is likely to be local and long term. The intensity of the impact would likely start at Low and increase to Medium should future tourism developments begin to cater for industry and business-related tourism. Thus, a MODERATE POSITIVE impact is expected during the operational phase.

Enhancement Measures

Economic development and enhancement of the tourism sector are the mandate of Government. As a good neighbour, the Project's enhancement measures may include facilitating engagement between key Government and private sector stakeholders regarding tourism, recreation and economic development opportunities for the region. These measures should be considered alongside those proposed in *Sections 13.6.1 to 13.6.5*. From a regional development perspective, the Project will support tourism initiatives by encouraging Government investment of Project revenue into Cabo Delgado Province, and specifically Palma District, to support Government's tourism and economic development policies and objectives. The Project will also raise awareness internally among Project staff on the available tourism facilities and excursions (including diving and fishing) in the area.

Residual Impacts

The residual impact will remain as MODERATE POSITIVE.

Table 13.10 *Impact of Increased Demand for Tourism Facilities (Accommodation and Leisure)*

Without Mitigation		Residual Impact (Enhancement Measures)
Construction Phase		
Duration	Long term	Long term
Extent	Regional	Regional
Intensity	Low	Low
Magnitude	Low	Low
Likelihood	Likely	Likely
Significance	MODERATE POSITIVE	MODERATE POSITIVE
Operational Phase		
Duration	Long term	Long term
Extent	Regional	Regional
Intensity	Low	Low
Magnitude	Low	Low
Likelihood	Likely	Likely
Significance	MODERATE POSITIVE	MODERATE POSITIVE

13.4

IMPACTS RELATED TO PROJECT INDUCED IN-MIGRATION

This section describes the characteristics and potential positive and negative impacts of Project Induced In-migration (PIIM), and describes how the Project will consider PIIM as a Project impact, namely to:

- assess the risks and impacts of PIIM on the ADI and AII; and
- develop PIIM-specific mitigations for incorporation into the relevant ESMPs.

In-migration is naturally occurring and can involve the domestic and cross-border movement of in-migrants motivated to enhance their quality of life, for example through improved access to education and healthcare services and infrastructure, greater employment opportunities, improved food security, proximity to family and faith-based or political communities, and more favourable trade and business opportunities.

A subset of in-migration is PIIM, involving *'the movement of people into an area in anticipation of, or in response to, economic opportunities associated with the development and/or operation of a new project'* (IFC, 2009). A Project's host communities often refer to in-migrants as 'outsiders' as they may not have any prior affiliation with communities; for example, in the context of the Project, prior affiliation with communities within the AII, ADI, Palma District or specifically the Afungi Project Site Area and Surrounds (including Senga and Maganja) and potential resettlement host communities.

In-migrant groups can include:

- labourers and their families;
- entrepreneurs/traders;
- opportunists looking to qualify for Project-related benefits, such as:
 - local employment (and the number of people supported by that employee's wage – known as the multiplier effect),
 - training opportunities, and
 - resettlement entitlements;
- informal money lenders;
- commercial sex workers; and
- camp followers.

Project motivated in-migrants may not only be outsiders – they may also be resettlers and their relatives moving within the Project area (eg within the AII and the Palma District) in order to position themselves to secure potential project benefits such as:

- resettlement and livelihood compensation entitlements;

- Project investments, such as improved healthcare facilities or community infrastructure;
- Project-initiated training and employment opportunities; and
- living with or nearby legitimate directly impacted community members to leverage Project benefits and entitlements.

13.4.1 *PIIM in the Project Context*

In-migration is a natural element of the Project's socio-economic, cultural and ethnolinguistic operating context, made up of interdependent components and influences including:

- historical trading back and forth along the East African coast, supporting temporary and permanent migration, using Swahili as a common southern East African coast lingua franca;
- entrenched trade and transport-related in-migration, with specific transport landing in Palma Bay and along the Afungi Project Site Area and Surrounds (including Senga and Maganja) coastline, and trading sites in Palma Town and the Afungi Project Site Area and Surrounds (including Senga and Maganja);
- historical coastal fishing grounds within the Palma District and along the Afungi Peninsula supporting informal employment, and small-scale trading opportunities among local communities and visiting regional and international fishers and traders;
- a vulnerable community in the Afungi Project Site Area and Surrounds (including Senga and Maganja), characterised by:
 - reliance on subsistence livelihoods,
 - low levels of educational attainment,
 - limited experience with a cash economy,
 - little or no formal employment/training opportunities and experience,
 - a rural lifestyle with limited exposure to sophisticated entrepreneurial behaviours,
 - limited awareness of land ownership and occupation rights, and
 - entrenched traditional leadership and cultural norms and practices;
- a border post in close proximity to the Tanzanian border, creating the first trading opportunity with local communities to secure local supplies or

trade imports. Conversely, the last opportunity for the procurement of good and services for traders and travellers moving north; and

- potential PIIM as awareness of Project activities increases through local, regional and provincial formal and informal information exchange and disclosure of Project activities.

13.4.2 *Responsibilities for Addressing PIIM*

The Project has requested 7,000ha for development of the LNG Project and Associated Facilities. As described in *Section 13.2.1*, acquisition of this site will involve the physical and economic displacement of all communities and livelihood assets from within the Afungi Project Site.

As such, PIIM will not occur within the Afungi Project Site or within the Onshore, Near Shore and Offshore Project Facilities and associated exclusion zones. PIIM impacts may instead occur outside the 7,000ha area requested by the Project, in communities within the ADI including the Palma District, communities within close proximity to the Afungi Project Site Area and Surrounds (including Senga and Maganja), potential resettlement host communities and those in nearby Administrative Posts and Localities within the Palma District.

The way in which the Project plans, communicates and delivers the LNG Plant and Associated Facilities can contribute to discouraging PIIMs from travelling to or settling near the Afungi Project Site or within nearby or directly impacted communities. As such, the Project will develop mitigation measures to address PIIM as a direct and indirect Project impact.

However, the Project will need the provincial and District government to deliver on mandated roles and responsibilities associated with spatial land-use planning, infrastructure development and maintenance, governance and robust fiscal management to create a platform from which the Project can implement successful mitigations and potentially collaborate with government to achieve positive impacts from PIIM.

While the Project is responsible for its implementation and delivery strategy (including environmental and social impacts both inside and outside the Onshore Project Footprint), there are other stakeholders with important roles in the management and implementation of PIIM mitigations. Outside the 7,000ha area requested by the Project, responsibility for environmental and social issues, land use and development, infrastructure development and maintenance is prescribed in Regional Plans, which in turn provide direction for District Plans, the responsibilities for which sit with provincial government and District Administrators respectively. As such, provincial and local government are important stakeholders in recognising the potential for, and developing management and mitigation measures to, discourage PIIM, and are primary stakeholders in PIIM management.

Impact Assessment – Positive PIIM Impacts

Positive impacts of PIIM can be difficult to achieve and are highly dependent on the proactive commitment of the host country's government. When planned in agreement with Project partners including the Project operator, central, provincial and local government, host communities, and with the support of the NGO and donor community, the positive impacts of PIIM on a Project's host communities may include:

- improved access to and opportunities for local employment;
- diversity of lifestyles and social experiences;
- changing attitudes towards vulnerable groups; and
- alternate livelihood opportunities.

Positive local and regional business development impacts for host communities associated with PIIM can include:

- development of supply chain links to mainstream economies;
- increased local skills base and local labour pool (when business development opportunities prioritise directly impacted communities);
- new markets for local products and services;
- increased diversity and availability of goods and services;
- improved local training and skills development opportunities;
- monetisation of remote rural economies, improving purchasing power and increasing trade; and
- potential improvement in opportunities for informal sector businesses (IFC, 2009).

Enhancement Measures

Creating positive PIIM impacts requires a participatory approach to planning and execution of community benefit initiatives and Project risk and impact mitigations, involving (but not limited to) provincial and district level government, civil society organisations, the NGO and donor community, public-private sector partnerships and direct and indirectly impacted communities within the Project's ADI. Enhancement measures may include:

- the Project working alongside Government and the NGO and donor community throughout the life of the Project to encourage revenue distribution to Cabo Delgado Province and Palma District, in support of regional and provincial government capacity building, governance and civil society empowerment.

- the Project facilitating representative local and regional development forums to identify potential economic and social development initiatives and potential implementing partners, driven by provincial and District-level development plans and objectives.
- the implementation of a Project National Content Strategy in alignment with central, provincial and District-level economic and social development objectives.

13.4.4 *Impact Assessment - Negative PIIM Impacts*

Those most negatively impacted by PIIM are the Project's host communities, including those within the Palma District, communities within close proximity to the Afungi Project Site Area and Surrounds (including Senga and Maganja), potential resettlement host communities and those in nearby Administrative Posts and Localities within the District.

In-migrants' presence and their activities can directly and indirectly impact the Project's host communities and can include the environmental, social and economic impacts associated with in-migration, which can lead to deterioration in the social context in which the Project's host communities reside.

If unmitigated and approached without the direct involvement and active engagement of provincial and District-level government, in-migrants may contribute an overall decline in the well-being and welfare of the resident population by threatening their way of life and the basis of existing livelihoods, and placing additional pressure on public infrastructure, services and utilities (IFC, 2009).

Examples of negative PIIM impacts on the Project's host community can include:

- the breakdown of traditional household and community institutions, traditional leadership structures and cultural norms leading to a loss of community identity and resilience;
- food scarcity through diminished communal and natural livelihood assets;
- competition for natural resources, land occupation and use, actual and perceived project benefits and entitlements;
- increased vulnerabilities associated with poverty, loss of livelihood assets and associated community status/perceived wealth and indebtedness, and domestic violence;
- increased pressure on existing infrastructure, such as inadequate schools, health centres and waste disposal facilities, and the limited formal water supply network.

- unplanned, unmanaged and spontaneous land occupation and construction of dwellings on private or government alienated land, placing stress on surrounding national resources and nearby communities;
- increased opportunities for the transmission of communicable diseases from in-migrant populations to local communities, with potential for epidemics;
- increased disposable income may result in increased incidences of prostitution and casual sexual relations. These sexual relations could lead to an increase in STIs and an increased incidence of HIV/ AIDS;
- in many cases, job-seeking in-migrants are male, who move into an area without their wives or partners. Some of the migrants start relationships with local women, which may lead to children being conceived with migrant workers, potentially out of wedlock. Given the temporary nature of the work, it is possible that both the women and children will be abandoned when the construction phase ends and the migrants move on, leaving single, vulnerable, female heads of households;
- rising crime, violence and tensions within and between host community and in-migrant populations, resulting in a breakdown of law and order (IFC, 2009);
- increased occurrence/practice of social vices as a result of increased disposable income, or in reaction to undue stresses and tensions associated with a breakdown in household dysfunction and social cohesion;
- increased consumption of alcohol (and drug use, should this occur) leading to an increase in the number of people indirectly affected by, or vulnerable to, alcohol and drug abuse; and
- a lack of knowledge of the local culture, beliefs, habits and rules of behaviour by outsiders may, intentionally or unintentionally, cause conflicts with members of the community. Examples are faith-based expectations regarding relationships with women and children, and traditional protocols for community engagement, raising grievances or engaging in community business (such as requesting allocation of land).

Mitigation Measures

Given the broad motivations and opportunities for in-migrants, preparation for the management and mitigation of PIIM needs to be equally broad. PIIM is a cross-cutting issue related to most social and environmental impacts associated with the Project's planning and construction phase strategies.

PIIM risks that the Project can manage actively relate to the Project execution strategy, behaviour of Contractors, management of environmental and social

impacts, careful planning and delivery of local employment, training and procurement opportunities, and selective community investment initiatives, as extrapolated below. The Project will undertake a PIIM Study and develop specific mitigations to reduce the likelihood, magnitude and intensity of PIIM-related negative impacts. These will be incorporated into the relevant Project and Contractor ESMPs and Project Design, and include but are not limited to:

Local Government Roles and Responsibilities

- Engage with relevant government departments and authorities to understand their mandated roles and responsibilities for land ownership, land occupation (including allocation) and land-use planning, specifically in the Palma District.
- Share with provincial and District-level government the mitigations that the Project can contribute to reducing the potential for PIIM, recognising the Project's specific responsibilities (ie no direct responsibility for land-use planning, infrastructure and maintenance outside the Afungi Project Site).
- Facilitate engagement with relevant government representatives at provincial, regional and District level and the NGO and donor community to help develop spatial land-use plans, land zoning and a Palma District master plan to assist government to plan effectively for:
 - future land use;
 - planning and infrastructure development and maintenance needs;
 - good governance and accountability in fiscal management;
 - revenue distribution from central and provincial government to deliver economic and social development benefits;
 - government and civil society organisation capacity building; and
 - capacity building within the law and order and border control sector and associated infrastructure.

Stakeholder Engagement and Sociocultural Awareness

- Develop relationships with and maintain ongoing engagement with directly impacted communities, aligned with the Stakeholder Engagement Plan (SEP), in a forum consistent with their cultural and traditional norms and practices.
- Develop representative community groups to discuss PIIM actively, and build capacity to identify culturally appropriate and traditional methods

for discouraging the arrival of outsiders into a community, including methods for land allocation and rights to engage in livelihood activities.

- Support community capacity building among traditional leadership to diffuse or resolve tensions within and between local and in-migrant communities using community police, traditional courts and dispute resolution mechanisms.
- Engage with local government to understand public and private sector roles and responsibilities associated with the management of direct and indirect impacts associated with PIIM.
- Work with village leadership and civil society organisations to develop capacity and support for vulnerable groups.

Resettlement

- Effective implementation of the RAP, including communication of resettlement eligibility criteria, cut-off dates for resettlement entitlements and disclosure of compensation criteria to discourage opportunist in-migration into areas identified for physical displacement.
- Through effective RAP implementation, identify risks to food scarcity and potential increased competition for livelihood assets between resettlement communities, host communities and potential in-migrant settlements.
- Engage with local government to encourage areas of unoccupied land and other buffers to surround Project resettled and host communities and minimise nearby uncontrolled and spontaneous land occupation.

Project Design and Facilities Access

- Operate a closed camp for the expatriate, third country national (TCN) and national workforce on rotational work schedules, with all accommodated contractors prohibited from direct engagement with local communities.
- Adopt a fly-in, fly-out transportation policy for rotational staff to limit communities' direct interaction with the Project workforce.
- Where possible, limit work vehicles and machinery to designated access and work site areas, and discourage the land-based transportation of Project equipment to limit vehicle traffic to the Afungi Project Site, thereby reducing the motivation for in-migrants to follow Project vehicles towards the Project Camp and work sites.
- Limit the movement of employees and contractors to within Project-defined areas, using designated transport (ie no walking outside the

Onshore Project Footprint) and transportation routes (ie designated Project roads).

Employment and Contractor Management

- Develop a recruitment strategy to focus local employment opportunities on directly impacted Project communities.
- Develop local workforce development strategies and provide guidance to contractors to prioritise local recruitment within the Palma District.
- Strictly prohibit the hiring of casual labour at the camp and work site entrances, through local recruitment agents, or by going directly to communities and/or local government.
- Implement the local labour recruitment procedure provided by the Project in a transparent manner and non-discriminatory fashion, providing equal opportunities regardless of political opinion, gender or religious affiliation.
- For the national rotational workforce, undertake recruitment and employment procedures, and provide transportation to and from the Project Camp from the point of recruitment.
- The Project will share information on employment and procurement processes to manage the expectations of local job seekers. These policies should be communicated at national (in conjunction with other Project announcements), provincial and local level.
- Establish online registration for employment opportunities for the skilled and semi-skilled workforce.

Local Procurement and Supply

- Communicate to contractors and local government and publicly disclose that Project goods and services will not be purchased informally at Project Camp sites or work locations, and that goods and services will only be procured through formal contracts via approved suppliers.

Community Health

- Strengthening of healthcare service capacity.
- Effective resettlement planning and implementation to include effective water and sanitation programmes.
- Implementing health, hygiene and sanitation, communicable disease, STI and HIV/AIDS education campaigns to raise awareness among

communities of the potential health impacts associated with increasing population, and pressure on water and waste disposal services.

- Raising awareness regarding alcohol abuse, drug dependency associated with a breakdown in household structures, community tensions and social dysfunction associated with the potential negative impacts of PIIM.

13.4.5 *Residual Impacts*

The impacts associated with PIIM are likely to develop during the construction phase when investment in employment and training, ongoing support for resettled and host communities, and potential benefits from impact mitigations are being provided, and community development initiatives are at their peak. However, during operations when fewer employment opportunities are available, some in-migrants forming the communities established during the construction phase may move on in anticipation of employment elsewhere, while others may remain as permanent residents and camp followers able to sustain a living from indirect Project employment, or potential employment from other LNG projects in the region.

As such, PIIM impacts can extend beyond the life of the Project, and become permanent. The effects of the increased population will be high, as people will continue to compete for land and other resources, creating ongoing tensions within and between in-migrants and local community members, leading to a breakdown in social cohesion and increased law and order issues.

Therefore, the impact magnitude and intensity will be High and permanent, the likelihood of occurrence definite, and the extent of the impact local and extending to regional. Overall, the impact is therefore of MAJOR significance.

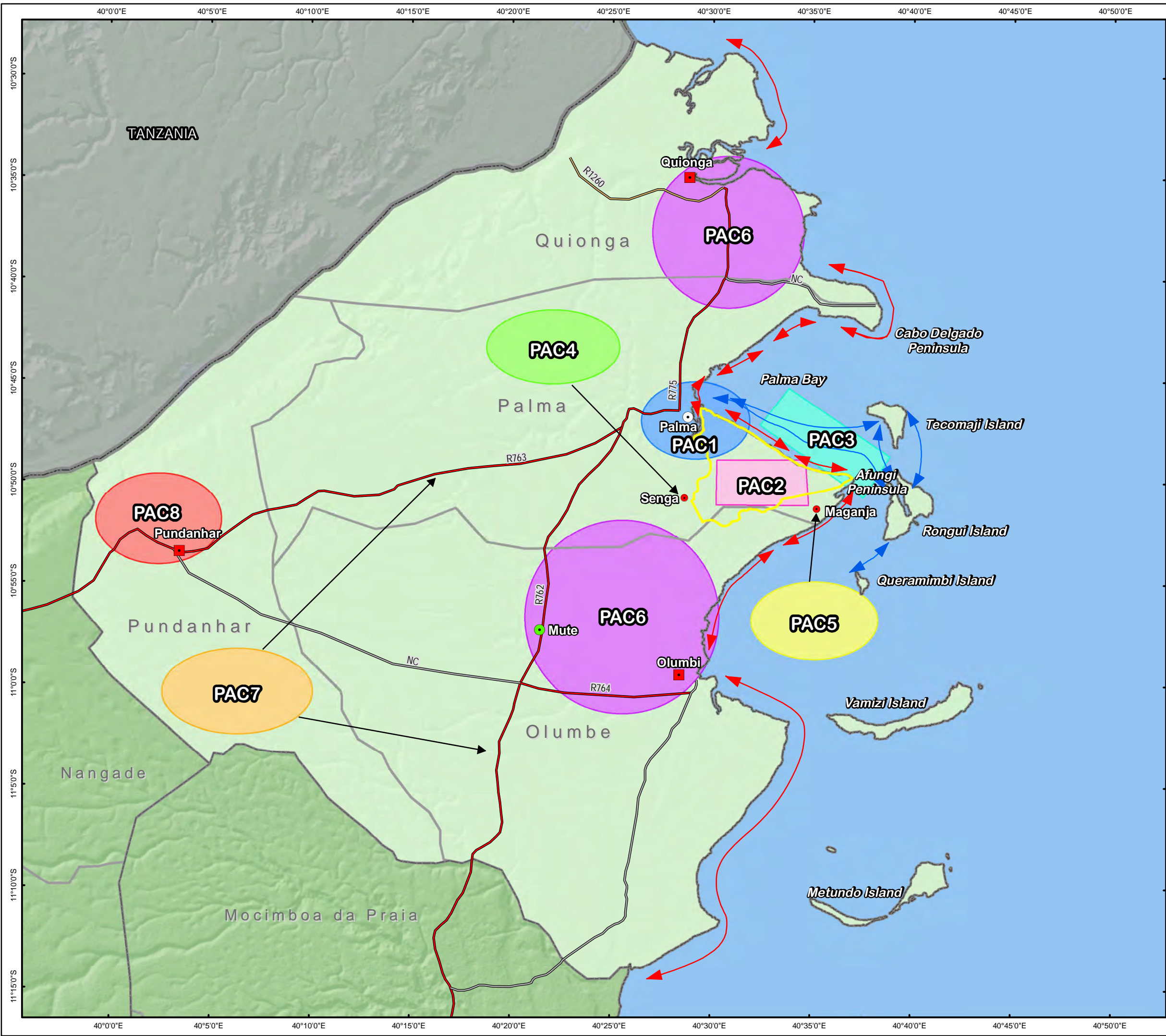
Following implementation of the above mitigation measures by the Project, and depending on the acceptance of provincial and District-level government roles and responsibilities, this impact may be reduced from MAJOR to MODERATE significance. PIIM is difficult for the Project to manage alone, as it is heavily reliant on the capacity, fiscal management and good governance of provincial and District-level government’s mandated responsibility to manage and implement key mitigations.

Table 13.11 *Impacts Related to Project Induced In-migration*

	Without Mitigation	Residual Impact (with Mitigation)
All Phases		
Duration	Permanent	Permanent
Extent	Local and regional	Local and regional
Intensity	High	High
Magnitude	High	Medium
Likelihood	Definite	Definite
Significance	MAJOR	MODERATE

This section is structured in terms of the environmental health areas (EHAs) used to provide the Socio-economic Baseline description in *Chapter 9*. The population potentially affected by the Project from a health perspective are considered by similar exposure groups, known as potentially affected communities (PACs), as shown in *Figure 13.3*. This section will address potential community health impacts for the following relevant EHAs:

- EHA 1: Communicable Diseases Linked to Overcrowding and Poor Environmental/Socio-economic Conditions;
- EHA 2: Vector-related Diseases;
- EHA 3: Soil, Water and Waste-related Diseases;
- EHA 4: Sexually Transmitted Infections and High-risk Sexual Practices, including HIV/AIDS;
- EHA 5: Food and Nutrition-related Issues;
- EHA 7: Accidents/Injuries;
- EHA 10: Social Determinants of Health;
- EHA 12: Healthcare Services and Infrastructure; and
- EHA 13: Health Programmes and Systems.



Legend

- Villages
- District Centre
- Locality Centre
- Administrative Post Centre

Roads

- Tertiary
- Local
- Non Classified

Province

- Cabo Delgado

District Boundary

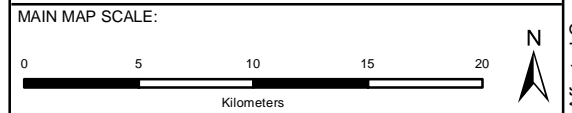
- Palma District

Administrative Post Boundary

-

Main Marine Access Routes

- Route for Tourism Operators
- Transportation of passenger and goods



TITLE:

**Figure 13.3:
Potentially Affected Communities (PAC) in Palma District**

CLIENT:

Anadarko
Moçambique Área 1, Lda

DATE: Oct 2013	CHECKED: IE	PROJECT: 0133576
DRAWN: AB	APPROVED: KG	SCALE: 1 : 330 000
DRAWING: Potentially Affected Communities in Palma District.mxd		REV: A

ERM
Great Westerford Building
240 Main Road
Rondebosch, 7725
Cape Town, SOUTH AFRICA
Tel: +27 21 681 5400
Fax +27 21 686 073

Impacto
Projetos e Estudos Ambientais

Projection: UTM Zone 37 S Datum: WGS84
Source: DIVA-GIS. Impacto, 2012.
Inset Map: Esri Data & Maps

SIZE:
A3

Communicable Diseases Linked to Overcrowding and Poor Environmental/ Socio-economic Conditions

Impact Assessment

The following factors have the potential to influence the transmission of communicable diseases related to housing, overcrowding and poor socio-economic conditions, with a resultant health impact.

- The Project is likely to be an attractor, with resulting in-migration likely to influence environmental health conditions and potentially play a role in increased disease transmission, as well as introducing diseases to which local communities have had little/no exposure.
- The origin of any incoming TCN workforce needs to be understood so that communicable diseases are not introduced to the area.
- TB may also present a risk among workers who originate from areas where TB is more prevalent, as this can increase local transmission.
- Adequate accommodation planning will need to be provided for the Project workforce, to prevent overcrowding and the potential for disease transmission in large groups of people.

Without mitigation, the intensity would be High and the extent local. The impacts would be of a long duration. It is likely that the impact may occur if not effectively mitigated and, coupled with the High magnitude, a MAJOR significance is expected. The impact can occur from construction into the closure phase, and chronic diseases such as TB may cause long-term health impacts.

Mitigation Measures

Proposed Project impact mitigations include, but are not limited to:

- operating a closed camp policy for expatriates, TCNs and the rotational national workforce to limit exposure of impacted communities to the Project workforce, and therefore to potential communicable diseases and potential transmission;
- implementing health service planning and strengthening to ensure adequate health service capacity for TB diagnosis and management in the Study Area; and
- designing and developing appropriate environmental health programmes to reduce the potential risk of airborne pollutants such as dust, which may impact on community health.

Proposed occupational health and safety mitigations will be outlined in an Occupational Health and Safety Management Plan, and include:

- developing a Project-based TB management policy and programme for the workforce. This would include screening employees for TB at the point of recruitment, providing adequate referrals and supporting ongoing treatment programmes from the workplace medical service to national treatment programmes;
- developing a vaccination programme for all employees, contractors and visitors against relevant vaccine-preventable diseases based on risk;
- contractor management and compliance with the TB and vaccination programmes will be developed and managed by the Project; and
- ensuring that adequate housing is available to the workforce so that overcrowding does not occur.

Residual Impacts

With effective and sustained mitigation, the intensity would be adjusted to Medium, with the local extent remaining. The impacts would be adjusted to shorter-term duration with a reduced likelihood to Unlikely. Thus, the residual impact would be MINOR.

Table 13.12 *Impacts on Overcrowding and Related Communicable Diseases*

	Without Mitigation	Residual Impact (with Mitigation)
Construction Phase		
Duration	Long term	Short term
Scale	Local	Local
Intensity	High	Medium
Magnitude	High	Medium
Likelihood	Likely	Unlikely
Significance	MAJOR	MINOR
Operational Phase		
Duration	Long term	Short term
Scale	Local	Local
Intensity	High	Medium
Magnitude	High	Medium
Likelihood	Likely	Unlikely
Significance	MAJOR	MINOR

13.5.2 *Vector-related Diseases*

Impact Assessment

The Project has the potential to influence the transmission of vector-related diseases in the Study Area in the following ways:

- During construction, the modification of the environment may result in an increased number of suitable breeding sites. Under new favourable environmental conditions, populations of the mosquito vectors could increase very quickly and increase the risk for disease transmission.
- The potential for PIIM into the area may also play an indirect role in increasing the malaria burden in the communities.
- The physical relocation must be managed, so as not to impact negatively on communities or host sites. The location of the resettlement sites and appropriate housing and town planning are important to consider with any relocation, so as not to increase the risks related to vector-borne disease transmission.
- The shipping of products and equipment from international destinations to support the Project has the theoretical potential to introduce arboviruses, such as dengue and chikungunya fever, into the Study Area. The area is reported to house the vector for human African trypanosomiasis. The disease is not reported in the area, but with increased wealth and a potential for increased animal husbandry with cattle, there is a risk of the disease being introduced.

Without mitigation, the intensity would be High and the extent would be local. The impacts would be felt more during construction, and would persist into the long term but at a lower magnitude. The impact likelihood is definite if not effectively mitigated and, coupled with the High magnitude, a MAJOR significance is expected. The impact can occur from construction into the closure phase.

Mitigation Measures

Proposed Project impact mitigations include, but are not limited to:

- developing a robust baseline to describe the malaria burden; and
- considering health systems strengthening (HSS) in the Palma District to extend the NMCP policies and activities into the Study Area and District to mitigate the effects of increased local disease patterns and PIIM mitigations.

Proposed occupational health and safety mitigations will be outlined in an Occupational Health and Safety Management Plan, and will include:

- developing an integrated malaria and vector control management plan that includes:
 - chemical control programmes, which should be based on integrated vector/pest management principles;

- effective case management of suspected and confirmed cases; and
- appropriate information, education and communication (IEC) programmes within the workforce mobilisation plan that occur prior to secondment and are ongoing at site.

Residual Impacts

With effective and sustained mitigation, the intensity will reduce to Medium, a Likely occurrence and with a Medium magnitude. The residual impact would be MODERATE.

Table 13.13 *Impacts on Vector-related Diseases*

Without Mitigation		Residual Impact (with Mitigation)
Construction Phase		
Duration	Short term	Short term
Scale	Local	Local
Intensity	High	Medium
Magnitude	High	Medium
Likelihood	Likely	Likely
Significance	MAJOR	MODERATE
Operational Phase		
Duration	Long term	Long term
Scale	Local	Local
Intensity	High	Medium
Magnitude	High	Medium
Likelihood	Likely	Likely
Significance	MAJOR	MODERATE

13.5.3 *Soil, Water and Waste-related Diseases*

Impact Assessment

The Project has the potential to influence the transmission of water and waste-related diseases within the Afungi Project Site Area and Surrounds (including Senga and Maganja) in the following ways:

- project-induced impacts may increase the risk of water-borne diseases through stress on already limited services. As such, the number of users per water source is an important determinant in overall water quality and a potential indicator of a system or resource suffering from overuse;
- mitigating physical displacement in terms of communities' access to improved water sources to ensure that communities have at least the same access to basic services; and

- the provision of sanitation services in host sites will also be important to consider, so that environmental health challenges in the host sites are not exacerbated by an increased population.

Without mitigation, the intensity would be Medium to High and the extent would be local. The impacts would be felt into the long term if not managed. It is definite that the impact may occur if not effectively mitigated and, coupled with the medium magnitude, a MODERATE significance is expected. The impact can occur from construction into the closure phase.

Mitigation Measures

Proposed Project impact mitigations include, but are not limited to:

- water management programmes and plans, as outlined in other sections of this EIA, to prevent pollution or the deterioration of water quality as a direct consequence of the Project's activities;
- evaluating opportunities to develop an effective surveillance system to monitor the impacts of water and sanitation conditions, in partnership with the local authorities; and
- effective RAP planning and implementation, which includes effective water and sanitation programmes and incorporates PIIM mitigations.

Proposed occupational health and safety mitigations will be outlined in an Occupational Health and Safety Management Plan, and will include:

- water management from the Project Site, including design elements for wastewater and sewerage treatment in the construction and operational phase;
- conducting IEC campaigns in the workforce on proper water use, hygiene and sanitation; and
- providing worker accommodation camps and work areas with sufficient potable water facilities, and conducting monitoring and surveillance activities to ensure water is potable.

Residual Impacts

With effective and sustained mitigation, the intensity would be adjusted to a MODERATE impact. This benefit would be felt at the local level and, if sustained, could be long term in nature, with Medium levels of benefit and would be Likely to occur. Thus, the residual impact would be MODERATE.

Table 13.14 *Impacts on Soil, Water and Waste-related Diseases*

Without Mitigation		Residual Impact (with Enhancement)
Construction Phase		
Duration	Short term	Short term
Scale	Local	Local
Severity	High	Medium
Magnitude	High	Medium
Likelihood	Likely	Likely
Significance	MAJOR	MODERATE
Operational Phase		
Duration	Long term	Long term
Scale	Local	Local
Severity	Medium	Medium
Magnitude	Medium	Medium
Likelihood	Likely	Likely
Significance	MODERATE	MODERATE

13.5.4 *Sexually Transmitted Infections and High-risk Sexual Practices, Including HIV/AIDS*

Impact Assessment

The Project has the potential to increase STI and HIV transmission in the Afungi Project Site Area and Surrounds (including Senga and Maganja) leading into Project construction, and along the transport corridors and Palma Town during construction and operations. The contributing factors will be summarised by way of the ‘four Ms’:

Mobility

- Access into the Afungi Project Site may increase in-migration from the Palma District, adjacent provinces and Tanzania, potentially with high prevalence rates of HIV/STIs, or at least higher than those in the local community.
- An enhanced transport corridor, including new and upgraded roads, will be developed to support Project needs.
- The establishment of mushrooming settlements comprised of camp followers or an in-migrant workforce may emerge in proximity to the Project. If unmanaged, spontaneous settlements can encourage the proliferation of social disharmony and increase the presence of commercial sex workers (CSWs), which may increase high-risk sexual behaviours.

Mixing

- Different population groups such as in-migrants, returning migrants and transport/short-term workers or traders, may arrive and mix with the Project's host communities, and introduce different STIs or viral strains.

Men

- Based on literature and from precedence in similar studies, men are likely to engage in high-risk sexual encounters, especially in a society where women are vulnerable or have limited access to information and health services supporting safe sexual practices and HIV/AIDS awareness.

Money

- Men are more likely to benefit from the direct and indirect opportunities of the Project, whereas women may be considered vulnerable due to limited access to information and education, and limited participation in a cash economy. This may give rise to forms of transactional sex, where women may be enticed into sexual encounters to supplement their household income. There is likely to be an increase in disposable income among the local workforce and in the Project's host communities as a result of Project activities, and this may support an increase in transactional sexual relations and the presence of CSWs.
- HIV/AIDS and associated wellness elements pose a well-known and described business risk in terms of long-term productivity and sustainability within the workforce. It is thus important that effective mitigation measures are developed.

Without mitigation, the intensity would be High and the extent would be regional. The impacts would be of a long-term duration, due to the chronic nature of diseases such as HIV/AIDS. The impact will definitely occur if not effectively mitigated and, coupled with the High magnitude, a MAJOR significance is expected. The potential impact will be highest in the construction phase, but will extend into the operational phase.

Mitigation Measures

Proposed Project impact mitigations include, but are not limited to:

- gathering key data on reproductive health and STIs in the Project area. This will assist to determine a baseline on current knowledge, practices and behaviours as well as prevalence rates;
- developing a clear HIV policy and programme in the workplace. It is important that this framework is established at an early stage, so that the programmes are functional prior to construction;

- preventing the development of spontaneous camps or the expansion of existing communities (camp-follower communities) that are close to the Afungi Project Site and specifically the temporary workers camp (TWC), by speculative migrants; and
- evaluating opportunities to support specific HSS activities in the District.

Proposed occupational health and safety mitigations will be outlined in an Occupational Health and Safety Management Plan, and will include:

- developing HIV and STI management programmes for the workforce, and ensuring that contractors are addressed under the workplace management programmes, with full access to IEC and care and treatment services; and
- encouraging widespread availability and social marketing of condoms in the workplace.

Residual Impacts

With effective and sustained mitigation, the intensity would be adjusted to Medium in the best-case scenario, due to the number of influences that may be beyond the Project’s control. The potential impacts may remain in the long term and, with a reduced likelihood and magnitude, may reduce to a moderate impact.

Table 13.15 *Impacts on Sexually Transmitted Infections and HIV/AIDS*

	Without Mitigation	Residual Impact (with Mitigation)
Construction Phase		
Duration	Long term	Long term
Scale	Regional	Regional
Intensity	High	Medium
Magnitude	High	Medium to High
Likelihood	Definite	Likely
Significance	MAJOR	MODERATE TO MAJOR
Operational Phase		
Duration	Long term	Long term
Scale	Regional	Local
Intensity	High	Medium
Magnitude	High	Medium to High
Likelihood	Definite	Likely
Significance	MAJOR	MODERATE TO MAJOR

13.5.5 *Food and Nutrition-related Issues*

Impact Assessment

The Project has the potential to impact on household nutrition in the Study Area in a number of ways.

- The loss of access to fishing grounds as a direct result of Project activities has the potential to reduce the current fishing production. This may reduce access to fishing grounds, thereby impacting food security through limited opportunities to accessible fishing areas. This can impact household consumption/access to fish at a household level. In addition, fishing forms an important cornerstone in local livelihoods, and reduced access to fish catching may reduce local income opportunities.
- Physical and economic displacement and disruptions will impact local livelihoods and food security, and may impact food availability in the wider Palma District. This may be exacerbated if communities are resettled to areas where there are limited opportunities to replicate their agricultural and fishing livelihood activities, eg if the land available is ineffective for agriculture, or where the soil fertility or access to water for irrigation is insufficient.
- Infectious diseases play a co-morbid role in malnutrition. Malaria and intestinal parasites are major contributors, and improvements in nutritional indicators will be reduced without supplementary programmes in these areas.
- In-migration may impact on nutrition in a number of ways, including:
 - supply and demand effects in the area may impact on food inflation.
 - Limited availability and access to land for subsistence agriculture, especially in areas of unplanned development.
- Change of livelihoods and practices are important, especially if the communities abandon farming in search of alternative sources of livelihoods, specifically employment with the Project. This may limit local food production and erode the practices of farming in the area.

Without mitigation, the impact intensity would be High and the extent would be regional. The impacts would be of a long duration, due to the chronic nature of malnutrition and its impacts on the cognitive development of children in particular. The impact will definitely occur if not effectively mitigated and, coupled with the High magnitude, a MAJOR significance is expected. The potential impact will initiate in the pre-construction phase and will extend into the operational and even closure phase.

Mitigation Measures

Project impact mitigations include, but are not limited to:

- undertaking a baseline nutritional and micronutrient deficiency survey in the Study Area;

- RAP monitoring of communities that have been physically relocated, to track potential challenges related to food production and food security;
- considering supporting IEC programmes in local communities as part of an integrated approach, together with water and sanitation and malaria programmes; and
- supporting programmes that promote local farming practices to increase yields through improved farming techniques. This can effectively promote sustainable livelihoods if supported by promoting access to markets.

The proposed occupational health and safety mitigations will be outlined in an Occupational Health and Safety Management Plan, and will include:

- IEC programmes and nutritional programmes in the workplace that promote proper feeding practices to prevent obesity and non-communicable diseases (NCD).

Residual Impacts

With effective and sustained mitigation, it is possible to achieve a positive impact. This benefit would be felt at the local and even regional level and, if sustained, could result in long-term benefits. There is a likelihood of positive benefits occurring, especially in the operational phase, and the residual impact is assessed to be of MAJOR positive, regarded as a benefit.

Table 13.16 *Impacts on Food and Nutrition*

	Without Mitigation	Residual Impact (with Mitigation)
Construction Phase		
Duration	Long term	Short term
Scale	Regional	Local and even regional
Intensity	High	Medium
Magnitude	High	Medium
Likelihood	Definite	Likely
Significance	MAJOR	MODERATE
Operational Phase		
Duration	Long term	Short term
Scale	Regional	Local and even regional
Intensity	High	Medium to high benefit
Magnitude	High	High
Likelihood	Definite	Likely
Significance	MAJOR	MAJOR BENEFIT

13.5.6 *Accidents/Injuries*

Impact Assessment

Potential Project impacts such as accidents and injuries within the Afungi Project Site result from:

- road traffic accidents;
- accidents from the increased transportation of equipment, goods and personnel within the Afungi Project Site and roads linking with the Afungi Project Site Area and Surrounds (including Senga and Maganja), and the wider Palma District via existing and new road networks. These will allow public and Project vehicles to drive at higher speeds and encourage a greater frequency and volume of traffic, thereby creating increased potential for road and pedestrian vehicle accidents; and
- increased levels of alcohol and substance abuse, which may occur in the area due to a number of factors, and may result in an increase in road traffic accidents should vehicles be operated under the influence of either.

Without mitigation, the intensity would be High and the scale would be regional, taking into account the transportation networks and corridors linking the Afungi Project Site with local and regional transport corridors. The impacts would be felt into the long term if not effectively managed. Impact likelihood is definite and, if not effectively mitigated, maintains a High magnitude, and a MAJOR significance is expected. The impact can occur from construction into the early closure phase.

Mitigation Measures

Proposed Project mitigations include, but are not limited to:

- developing and effectively communicating a policy for the management of emergencies or accidents in the community as a direct result of the Project's activities. This will be developed as part of the Project's community safety and security management plans and Emergency Response Plan.

Proposed occupational health and safety mitigations will be outlined in an Occupational Health and Safety Management Plan, and will include:

- managing mobile equipment and machinery, which will assessment of their fitness to work as drivers, supported by specific medical surveillance programmes;
- strictly enforcing drug and alcohol policies for all work-related vehicles, including contractor transport vehicles; and
- employee and contractor management for Project transport vehicles. These need to include specific requirements for driver training, rest periods, vehicle roadworthiness, speeding, etc.

Residual Impacts

With effective and sustained mitigation, the intensity would be adjusted to Medium in the best-case scenario, due to the number of influences that may be beyond the Project's control. The potential impacts may remain in the long term and with a reduced likelihood, and magnitude may reduce to Moderate.

Table 13.17 Impacts on Accidents and Injuries

Without Mitigation		Residual Impact (with Mitigation)
Construction Phase		
Duration	Short term	Short term
Scale	Regional	Regional
Intensity	High	High
Magnitude	High	High
Likelihood	Definite	Unlikely
Significance	MAJOR	MODERATE
Operational Phase		
Duration	Long term	Long term
Scale	Regional	Regional
Severity	High	High
Magnitude	High	High
Likelihood	Definite	Unlikely
Significance	MAJOR	MODERATE

13.5.7 Social Determinants of Health

Impact Assessment

The holistic model of health and well-being acknowledges that the health status of a population is affected by factors known as health determinants. These health determinants are many and varied, and are all closely interlinked. Areas that may induce negative health impacts include:

- the influence of PIIM on social determinants of health (SDoH) by impacting on local living conditions, increasing the potential for social disharmony, impacting social networks and placing stress on traditional values and conflict resolution. Competition for scarce resources such as housing, healthcare services, basic services (water and sanitation), food sources, education and potential employment opportunities may increase with in-migration. This may affect community security and contribute to a breakdown in law and order and household/community social norms;
- physical displacement from within the Afungi Project Site, which may alter the sense of place and identity, making social adaptation challenging; and
- the Project's presence may isolate some communities, with an erosion of traditional social networks and, potentially, trading areas.

The development of the Project may also bring about significant positive changes in the local SDoH dynamics, through:

- improved access to work opportunities. Research has shown that improvements in four sectors – namely housing, water/sanitation, transportation (roads) and communication (mobile phone coverage) – can produce a measurable and sustained health and social benefits of up to 50 percent;
- the Project likely supporting areas of improved access, with communication likely to improve as a result of the Project’s developments and requirements; and
- improvements in the local economy through increased local workforce opportunities and development. This will support improvements in other sectors, such as improved access to goods and services in the Palma District, improved transportation networks, enhanced communication opportunities through radio, mobile telephone coverage and access to credit.

The intensity of the impact is anticipated to be Medium, recognising a regional influence as development initiatives expand opportunities for residents of the Palma District. The impacts will continue long term, representing a Medium to High magnitude. It is likely that these impacts will occur, proving an overall MODERATE to MAJOR significance ranking. The impact can occur from construction and extend into operations. It is not clear how these may play out into closure, as the social dynamics in the areas are likely to have changed significantly over this period. The confidence is medium.

Mitigation Measures

Proposed Project impact mitigations include, but are not limited to:

- PIIM mitigation measures as part of multidisciplinary planning;
- the effective management of physical and economic displacement to maintain community security, social and cultural networks and promoting access to goods and services;
- evaluating opportunities for local development that support vulnerable groups; and
- effective communication programmes on the activities of the Project and management of expectations of what the Project will and will not do.

Residual Impacts

With effective and sustained mitigation, there is likely to be a positive impact. This benefit would be felt at the local and even regional level and, if sustained, could result in long-term benefits. The likelihood of positive benefits, especially in the operational phase, supports the modelling of residual impacts as a MODERATE POSITIVE.

Table 13.18 *Impacts on Social Determinants of Health*

Without Mitigation		Residual Impact (with Enhancement)
Construction Phase		
Duration	Short term	Short term
Scale	Regional	Regional
Intensity	High	Medium
Magnitude	High	Medium
Likelihood	Definite	Likely
Significance	MAJOR	MODERATE
Operational Phase		
Duration	Long term	Long term
Scale	Regional	Regional
Intensity	High	Medium benefit
Magnitude	High	Medium benefit
Likelihood	Likely	Likely
Significance	MAJOR	MODERATE POSITIVE

13.5.8 *Healthcare Services and Infrastructure*

Impact Assessment

Healthcare services and infrastructure in the Afungi Project Site Area and Surrounds (including Senga and Maganja) and the wider Palma District are limited, and the development of the Project may influence healthcare services negatively in a number of ways.

- The development of the Onshore and Near Shore components of the Project may limit access to healthcare services for those communities.
- Resettlement and the physical relocation to new resettlement host sites will need to consider the ability to access healthcare services, and that available facilities have adequate capacity to manage the increasing population size effectively. Referral networks will also need to be considered, to ensure that reduced access to healthcare services occur as a result of resettlement activities.
- PIIM and economic growth and development in the area may stretch the already limited healthcare services in the area, placing stress on the existing services and human resource capacities.

- The Palma District currently has limited healthcare personnel. The Project will require staff to support the occupational health and safety requirements, and care should be taken not to employ a host of medical staff from Palma District or provincial health services in the Project, as this could impact on the delivery to deliver public health services.

Conversely, improved access to rural areas may, in turn, create enhanced access to healthcare services. Better roads may allow entry of public transport and the development of transportation networks and services. Local economic development may also improve the availability of public transport and thus access to referrals health centres.

The intensity of the impact is anticipated to be High, with a regional influence. The impacts will continue into the long term, representing a High-level magnitude. Impact likelihood is definite, thereby creating an overall MAJOR significance ranking. The impact can occur from construction and extend into operations. Economic development and changes in demographics in the Afungi Project Site and wider ADI will likely change during the Project construction and operations, significantly altering the context for impact ranking at Project closure. Therefore, it is currently difficult to predict until further into the Project life cycle.

Mitigation Measures

Proposed Project impact mitigations include, but are not limited to:

- considering supporting access to healthcare services in the Study Area;
- considering the upgrading of Palma Hospital to the level of a district hospital, to cater for population growth in the area; and
- engaging and partnering with the Ministry of Health in these elements, so that the service delivery options are structured appropriately into the national and provincial models.

The proposed occupational health and safety mitigations will be outlined in an Occupational Health and Safety Management Plan, and include:

- developing and designing an appropriate site-based medical service that is managed by a reputable medical service provider; and
- planning and managing the recruitment strategies to employ staff in the workplace medical service so medical staff are not taken from local services within Mozambique.

Residual Impacts

With effective and sustained mitigation, there is likely to be a positive impact. This benefit would be felt at the local and even regional level and, if sustained, could result in long-term benefits. There is a likelihood of positive benefits, especially in the operational phase, which supports the modelling of residual impacts as a MODERATE POSITIVE.

Table 13.19 *Impacts on Healthcare Services and Infrastructure*

Without Mitigation		Residual Impact (with Enhancement)
Construction Phase		
Duration	Short term	Short term
Scale	Regional	Regional
Intensity	High	Low
Magnitude	High	Low to Medium
Likelihood	Definite	Likely
Significance	MAJOR	MODERATE
Operational Phase		
Duration	Long term	Long term
Scale	Regional	Regional
Intensity	High	Medium to High benefit
Magnitude	High	Medium to High benefit
Likelihood	Definite	Likely
Significance	MAJOR	MODERATE TO MAJOR POSITIVE

13.5.9 *Health Programmes and Systems*

Impact Assessment

There is currently limited ability to support effective health programmes in the ADI, due to the lack of capacity of local health services. Access plays a major role, in that the bulk of the communities in the ADI are located in remote rural areas.

There is currently no health-focused NGO or donor-funded activity in the Afungi Project Site. The development of the Project may reduce the future interest of agencies to work in the area, as there may be an assumption that the Project would fund any local development so that the NGOs can work elsewhere. This may limit the ability of the District to attract local support for health programmes from aid agencies.

The intensity of the impact is anticipated to be Low with a local influence. The impacts will be long term, representing a Low-level magnitude. It is likely that these impacts will occur, resulting in an impact of MINOR significance. The impact may occur during the construction phase and extend into operations. It is not clear how this may play out into the closure phase, as developments and demographics in the Study Areas are likely to change significantly over this period.

Mitigation Measures

Proposed Project impact mitigations include, but are not limited to:

- evaluating opportunities for HSS that will primarily mitigate impacts, as discussed in the previous sections; and
- supporting the RHMIS, which will allow the Project a mechanism to monitor and evaluate health trends in the Project Area more effectively. At present, the RHMIS is limited by human resource constraints, diagnostic deficiencies and a lack of electronic management systems, as well as poor access to healthcare and health-seeking behaviour in local communities. Supporting an upgrade in this system will provide the most accurate form of longitudinal surveillance mechanism to monitor local health trends. Other options for health monitoring can also be investigated, so that social and economic indicators can be monitored similarly.

Residual Impacts

With effective and sustained mitigation, there is likely to be a positive impact in health programmes in the area, although over the longer term. This benefit would be felt at a local level and, if sustained, could result in long-term benefits. There is a likelihood of positive benefits, especially in the operational phase, which supports the modelling of residual impacts as a MODERATE POSITIVE.

Table 13.20 *Impacts on Health Programmes and Services*

Without Mitigation		Residual Impact (with Mitigation)
Construction Phase		
Duration	Long term	Short term
Extent	Local	Local
Intensity	Low	Low
Magnitude	Low	Low
Likelihood	Likely	Likely
Significance	MINOR	MINOR
Operational Phase		
Duration	Long term	Long term
Extent	Local	Local
Intensity	Low	Medium positive
Magnitude	Low	Medium positive
Likelihood	Likely	Likely
Significance	MINOR	MODERATE POSITIVE

13.6 ECONOMIC IMPACTS

The Project will have a range of positive local, regional and national level economic impacts, including income growth (linked to employment and

procurement opportunities), capacity development and increased government revenue.

The key positive impacts assessed in this section include:

- increased government revenue;
- employment, training and skills development, including corporate social investment by the Project;
- procurement of local goods and services; and
- economic development and economic diversification.

A potential negative impact is associated with unmet community expectations regarding employment and local economic development.

13.6.1 *Increased Government Revenue*

Impact Assessment

Based on the Project's legal and regulatory framework, Government will receive revenue through mandatory income and discretionary revenue, as summarised below.

Mandatory Income

- Corporate income tax;
- royalties – gas production taxes;
- income from state equity stakes;
- dividend withholding tax;
- excise and sales tax on equipment and services (Mozambique exempt);
- import duties;
- VAT on imported equipment;
- employee taxes;
- social contributions – 1 percent of gas income is allocated to the local community;
- property tax and fee based on land area;

- additional taxes (company, personal and product-related) from links to local suppliers (backward/‘upstream’ linkages);
- additional taxes (company, personal, product-related) from increased local forward/‘downstream’ activities related to the gas project (eg local gas distribution, electricity generation, fertiliser manufacturing);
- additional taxes (company, personal and product) from general income increases, due to spending multiplier effects from income earned with direct (project-related) and indirect (supply-linked and downstream processing) activities, and
- payment of environmental licensing fees of 0.01 percent of the investment amount, as prescribed in the Environmental Regulations for Petroleum Operations (Decree No. 56/2010).

Discretionary Revenue

- Income from direct project-based employment;
- income from indirect employment created by suppliers (backward linkages) and newly created downstream processing (forward) activities;
- income from overall increases in income levels, due to spending multiplier effects;
- revenue spent in community/ social investment programmes related to the Project, and
- terms and conditions of Master Agreements and Production Sharing Agreements between the Government of Mozambique and the Project, yet to be finalised (Ernst & Young, 2012).

Government will be solely responsible for the allocation of revenue, based on internal Government policies and the country’s development needs. The indirect impacts related to Government spending cannot be assessed accurately at this stage, as the allocation of Government revenue to development locally, at provincial level and nationally is unknown.

As a direct result of the Project, Government revenue will continue to increase, and will have a direct positive impact on the national economy. Government spending will, in turn, be experienced as an indirect positive impact by the people of Mozambique. The Project will induce associated growth and development at a national, regional and local scale and the impacts will be felt throughout the Project’s lifespan (30 years). The impact will be long term, national in scale and have a High intensity. Given the scale and intensity, a

High magnitude is expected. Coupled with a definite probability of occurrence, a MAJOR POSITIVE impact significance is anticipated.

Enhancement Measures

Mozambique's ability to benefit from the economic opportunities that the Project offers at a national level will depend on good governance, revenue distribution and fiscal transparency. The Project will undertake a Revenue Management Study early in the Project to understand the Mozambican economy better. The Project will work alongside Government and the NGO and donor community throughout the life of the Project, to encourage accountability and revenue distribution to provincial and District-level government within the Project area; particularly in light of Mozambique recently being recognised as being compliant with EITI standards ⁽¹⁾.

The Project will facilitate ongoing engagement between relevant stakeholders aligned with the Project's SEP, to encourage revenue distribution to Cabo Delgado Province and Palma District in support of regional and provincial government capacity building, governance, revenue management and civil society empowerment. The Project will facilitate this engagement to enable Government to realise provincial and District-level development plans and objectives and enhance Government's capacity in the execution of its Project-related roles and responsibilities (eg renewal of permits, issuing of licences and approvals, law and order and border control, land-use planning and infrastructure investment, maintenance and budgeting), and to invest effectively in economic and social development initiatives.

Residual Impacts

Overall, the impact on Government revenue is predicted to be positive, long term and experienced at a national level, and will retain MAJOR POSITIVE impact significance.

Table 13.21 *Increased Government Revenue*

	Without Mitigation	Residual Impact (Enhancement Measures)
Construction and Operational Phases		
Duration	Long term	Long term
Extent	National/regional/local	National/regional/local
Intensity	Medium	Medium
Magnitude	High	High
Likelihood	Definite	Definite
Significance	MAJOR POSITIVE	MAJOR POSITIVE

(1) As of 26 October 2012. See www.itie-mozambique.org.

Impact Assessment

There are high expectations among the local communities in terms of Project employment and training opportunities. However, levels of education and schooling in the Palma District are low, with an estimated 88 percent of the population not achieving any level of educational attainment.

Highly skilled personnel required for the majority of the construction and operation of the Project are generally scarce in Mozambique. There are very limited professional training opportunities in the Province, with less than 3 percent of the District population engaged in formal employment activities, and formal salaried employment uncommon in the Project area. Over 87 percent of the local population relies on traditional agriculture and fishing subsistence livelihoods. The lack of other industries and formal employers across the District translates at present to an inexperienced local workforce with limited capacity.

The Project expects to provide local workforce training to fill the Project's unskilled labour requirements, while a limited number of people will be sufficiently trained to qualify for semi-skilled positions or skilled positions. Local workforce training will be provided by the Project and Contractors to improve skills levels as relevant for the Project, and to create opportunities for the development of local people to be employed in semi-skilled and skilled jobs over the Project's lifespan.

High-potential national candidates for skilled and highly skilled operations phase employment will be identified, and be required to undertake long-term formal education and training and achieve appropriate qualifications to secure operations phase employment. However, given the skilled labour requirements for the construction of the LNG Plant and Associated Onshore, Near Shore and Offshore Facilities, the majority of the skilled and highly skilled workforce is likely to be recruited internationally, with suitably qualified nationals also being considered for the skilled positions.

Employment as a positive impact can be achieved through:

- direct employment (unskilled, semi-skilled, skilled workforce);
- indirect employment with contractors and suppliers; and
- induced employment, as a result of increased spending in the local areas and along the supply chain.

Employment and training benefits will be felt locally (within the Palma District), within the wider Cabo Delgado Province, and nationally. Construction phase employment will be medium term, from 2014 through to 2019. For labour sourced within the Palma District, the impact intensity will

be High, due to an increase in disposable income and training/experience gained. The magnitude will be Medium, due to the limited employment for communities within the Palma District beyond unskilled and, over time, potential semi-skilled opportunities.

At a provincial and national level, the impact intensity is Medium, due to the limited semi-skilled and skilled national workforce, and the magnitude will be Medium, as the skilled national workforce is also limited. The impact occurrence is definite, and given that the Project will create employment and training opportunities for the population, the impact is of MODERATE POSITIVE significance.

During the Project's operations phase, a significantly lower number of direct employment opportunities will be available, due to the skilled and highly skilled workforce requirements of LNG Plant and Associated Facilities operations. Indirectly, there may be unskilled or semi-skilled employment opportunities, associated with economic development as a result of the Project's ongoing presence in the Palma District.

The extent of the impact will range from regional to national level (depending on where the operations phase skilled/trainee workforce is sourced), and employment will be long term. The impact intensity and magnitude will be Low, due to the limited opportunities available to directly impacted communities. The impact occurrence is definite. Overall, the impact is assessed as having MINOR POSITIVE significance.

Enhancement Measures

The Project will develop a National Content Strategy consistent with discussions with Government, which will detail specific employment, training and supplier development initiatives. Specifically, the strategy will determine the Project's objectives and activities to support the recruitment, training and career progression of Mozambican nationals to enable participation in supplier and workforce opportunities associated with the Project. This strategy will be aligned with the Government's economic development, education and workforce development objectives. The Project will provide guidelines regarding its expectations for employment and training to contractors, to encourage recruitment of a locally sourced workforce and the provision of training opportunities.

The following measures will be included in the Project's National Content Strategy and will contribute to employment, training and skills development opportunities:

- The Project will provide guidance to contractors on local labour recruitment procedures to prioritise local employment (including the Afungi Project Site Area and Surrounds) for unskilled labour and, where possible, semi-skilled labour. Unskilled local labour recruitment

procedures will be developed in alignment with Mozambican Labour Law and agreed with provincial and District-level government.

- The Project will provide guidance to contractors regarding labour recruitment, training and employment procedures, as indicated in *Section 13.6* above. This will prohibit the employment of casual workers at the Project site entrance or from village centres.
- The Project and contractors will be required to adhere to formal employment processes, such as registration and the contracting of national workforce at dedicated locations outside the Palma District (eg Pemba and Maputo); utilising online registration for employment for skilled work on the Project website; and clear communication through media (newspapers, online, radio, trade magazines) of recruitment and employment processes, qualifications and eligibility criteria.
- The Project will begin training potential Mozambican candidates as soon as possible for positions during the operational phase. The aim is to maximise the number of Mozambicans employed during the operational phase.

Mitigation measures to discourage an influx of experienced in-migrant workers include:

- the Project will discourage any form of local recruitment office or agency within the Palma District, and will not engage any such entity for workforce recruitment;
- the Project will work with District-level government to develop a local workforce database of directly impacted households and potential candidates for unskilled employment and training opportunities to prioritise local opportunities;
- the Project will develop a local labour recruitment procedure to ensure that contractors are responsible for the selection of their workforce, and that the Project and traditional and appointed village and community leadership will not be directly involved in the selection of local labour; and
- the Project recruitment and employment policies will encourage the employment of women as a means of ensuring gender equality and empowerment.

Residual Impacts

With the implementation of the above mitigation measures, the anticipated impact is likely to remain as MODERATE POSITIVE during the construction. Given the low number of operational phase employees, the operational phase impact would remain as MINOR POSITIVE.

Table 13.22 *Employment, Training and Development*

Pre-mitigation		Residual Impact (Enhancement and Mitigation Measures)
Construction Phase		
Duration	Medium term	Long term
Extent	National/regional/local	National/regional/local
Intensity	High (local), Medium (regional)	High (local), Medium (regional)
Magnitude	Medium	Medium
Likelihood	Definite	Definite
Significance	MODERATE POSITIVE	MODERATE POSITIVE
Operational Phase		
Duration	Long term	Long term
Extent	National/regional/local	National/regional/local
Intensity	Medium	Medium
Magnitude	Low	Low
Likelihood	Definite	Definite
Significance	MODERATE POSITIVE	MINOR POSITIVE

13.6.3 *Procurement of Local Goods and Services*

Impact Assessment

During construction, the Project will provide worker accommodation within the Onshore Project Footprint. The procurement of services and consumables will be managed to ensure that international standards for quality, health and safety are maintained. Consumables (eg food) will need to be purchased in large quantities while meeting stringent quality, health and safety standards. Potential suppliers will have to demonstrate and continue to meet stringent health and safety, quality and other standards and criteria to be considered, and secure Project supplier contracts. To achieve these standards, the Project will support supplier development through the National Content Strategy.

The direct procurement opportunities for district, provincial and national levels will be developed over time. For those companies that meet eligibility criteria, become approved suppliers and get the opportunity to be part of the supply chain, there will be long-lasting and sustained benefits to the businesses and their employees through increased experience, capacity and training, particularly in having to meet more stringent international requirements.

Over time, the potential exists for businesses to develop to meet the procurement needs during the construction and operational phases. The operational phase activities associated with the Facility may provide opportunities for local business growth and development.

Given the current scarcity of suitably resourced and qualified local businesses, the positive impact associated with procurement will be experienced primarily at the regional, national and international level at first. Procurement opportunities during the construction phase will be medium term, and during the operations phase the impact will be long term. This impact will definitely

occur through all Project phases. The magnitude of this impact would be Low at first but has the potential to increase to Medium over the life of the Project, but will be dependent on the successful capacity building of potential suppliers.

The impact is rated as of MINOR POSITIVE significance during the construction phase, with the potential to increase to MODERATE POSITIVE in the long term. While it will be of moderate positive significance during operations, the supply chain will have developed during the construction phase and some businesses will have built the capacity to supply goods and services to the Project and other future projects.

Enhancement Measures

With regard to procurement and supplier development, the Project's National Content Strategy will support capacity building to support Mozambican company participation in securing and successfully delivering Project-related contracts and procurement opportunities, and will be aligned with the Government's economic development objectives. The Project will provide guidelines regarding the Project's expectations for employment and training to contractors, to encourage recruitment of a locally sourced workforce and the provision of training opportunities. The following measures will align with the National Content Strategy and help to contribute to managing supplier and procurement development opportunities:

- The Project will research the capacity and capability of local and national suppliers, and determine supplier development opportunities.
- The Project will develop and make available to potential suppliers information regarding eligibility criteria, requirements and expectations as early as possible to enable potential suppliers to understand Project's procurement expectations.
- With the support of the wider extractives industry sector, the Project will facilitate engagement with industry, educational and training institutions, central, provincial and District-level government to identify supplier development and capacity-building opportunities, training and qualifications to establish an approved national supplier database.

Residual Impacts

Assuming that the above enhancement measures are implemented, the anticipated impact on procurement is likely to increase over time to MODERATE POSITIVE significance during the construction phase. During the operational phase, the impact significance would continue to MODERATE POSITIVE.

Table 13.23 Procurement of Local Goods and Services

	Without Enhancement	With Enhancement
Construction Phase		
Duration	Long term	Long term
Extent	National/regional/local	National/regional/local
Intensity	Low	Medium
Magnitude	Low	Medium
Likelihood	Definite	Definite
Significance	MINOR POSITIVE	MODERATE POSITIVE
Operational Phase		
Duration	Long term	Long term
Extent	National/regional/local	National/regional/local
Intensity	Medium	Medium
Magnitude	Medium	Medium
Likelihood	Definite	Definite
Significance	MODERATE POSITIVE	MODERATE POSITIVE

13.6.4 Unmet Community Expectations for Employment and Procurement Opportunities

Impact Assessment

There are high expectations around the employment opportunities associated with the Project. In the context of employment and the limited skills, experience and opportunities for local communities, there will likely be unmet expectations. There are also expectations for the procurement of goods and services locally and regionally. If these opportunities are not available because suppliers are unable to meet eligibility criteria or do not have the experience and capacity to compete for opportunities, there may be disappointment, anger and resentment towards the Project due to unmet expectations and the limited capacity to participate in Project opportunities.

The impact will be mainly localised to the communities around the Afungi Project Site. This will be a short to medium-term impact. The intensity of the impact will be Medium to High, as people might feel that the Project has not benefited them. The impact will definitely occur, and the magnitude rating is expected to be moderate. Overall, the impact is rated as being of a MODERATE significance.

Mitigation Measures

- The Project will develop a National Content Strategy consistent with discussions with Government and will communicate its strategies and objectives at local, regional and national level to reinforce realistic expectations around employment and procurement opportunities.
- The Project will develop and make available to potential suppliers information regarding eligibility criteria, requirements and expectations to enable potential suppliers to understand the Project’s procurement expectations.

- The Project will report on local workforce recruitment, training and employment data and local procurement activities to District-level and provincial government, to document local capacity-building achievements and contributions to local economic development.
- A SEP will be implemented to ensure fair recruitment from different communities.
- The Project will maintain a Grievance Mechanism to address community grievances around local employment and procurement. The Grievance Mechanism will outline procedures for the resolution of grievances such as holding discussions with the communities to determine possible solutions, and will ensure an assessment of the community's satisfaction with the resolution or grievance closure takes place.

Residual Impacts

The magnitude of the impact is expected to be Medium post-mitigation. The residual impact will have MODERATE significance.

Table 13.24 *Impacts on Unmet Expectations for Employment*

Impact	Pre-mitigation	Residual (Post-mitigation)
All Phases		
Duration	Long term	Long term
Extent	Local to regional	Local to regional
Intensity	Low	Low
Magnitude	High	Medium
Likelihood	Definitely	Likely
Significance	MODERATE	MODERATE

13.6.5 *Economic Diversification*

Impact Assessment

As the Project develops, the increased demand for goods and services from the Project, employees and immigrants may create commercial opportunities for local businesses. This may then result in diversification of the economy of the broader Project area, its supply chain and in the businesses providing goods and services to the growing population.

Over the medium term, however, larger enterprises may to be established in the District and region to provide goods and services. Although construction activities will provide much opportunity for economic and business development, other constraints such as access to finance, limited infrastructure and skills, a limited private sector in the area and the current prevalence of subsistence farming, will continue to constrain the level and sophistication of local development.

As summarised in *Section 13.4* PIIM may bring people with different experiences, knowledge and demands that will supplement the existing economic and livelihood activities and offer additional activities that serve to diversify the local economy. However, much of the income earned by in-migrant populations is likely to leave the Project area in the form of remittances to their families.

Economic development and diversification will mostly be experienced as a positive impact for some stakeholders (ie those who understand and value the change and development, including those participating in a cash economy and therefore able to participate effectively). However, economic development and diversification is less accessible for those reliant on subsistence livelihoods, not participating actively in a cash economy, vulnerable and/or excluded from participation for various socio-economic reasons including capacity/education or experience.

This impact will be direct as it is related to the Project's activities and demands, and indirect as it is related to improvements to local infrastructure associated with District-level government revenue management and investment associated with increased economic development in the District.

The impact will begin during the construction phase and will continue for the duration of the Project and potentially beyond (where linked to other resource development initiatives in the District/regional and associated sustainable business and economic development initiatives). Therefore, the impact duration is potentially permanent. The potential for economic diversification can occur at the local and regional level. The impact will definitely occur. The overall magnitude of this impact will be Medium for the life of the Project. The significance level of the impact will be MODERATE POSITIVE for all phases of the Project.

It has been noted that areas in Palma Bay have been designated as marine reserves for aquaculture in cages and seaweed production in terms of Decree no. 71/2011 of 30 December. However, there is currently no seaweed production or aquaculture in Palma Bay and we are not aware of imminent plans to begin such. The construction and operation of the Project will likely preclude the use of the bay for aquaculture. This is not considered significant as the Decree allows for other socio-economic projects to be undertaken within these reserves if they present comparative advantages. The economic benefit of the Project is considered to be more beneficial than the potential future use of the bay for aquaculture.

Enhancement Measures

The main objective of these enhancement measures is to support economic diversification in the District and region through:

- recognising public sector leadership and mandated responsibilities for economic development and diversification, and facilitating engagement

with central, provincial and District-level representatives to understand the private sector role in supporting achievement in government policies, plans and objectives;

- aligning the Project’s national content initiatives with national policy and facilitating engagement with provincial and District-level government to align Project activities with the regional and District-level economic and social development objectives outlined in provincial and District Development Plans;
- effective implementation of the Project’s National Content Strategy supporting employment and procurement opportunities (*Sections 13.6.2 and 13.6.3*); and
- encouraging transparency and accountability in the management and distribution of Project revenue to support District and regional initiatives.

Residual Impacts

With the implementation of the above enhancement measures, the anticipated impact will remain as MODERATE POSITIVE significance during all phases of the Project.

Table 13.25 Economic Development and Economic Diversification

	Pre-mitigation	Residual Impact (Enhancement Measures)
All Phases		
Duration	Long term to permanent	Long term to permanent
Extent	National	National/regional/local
Intensity	Medium	Medium
Magnitude	Low	Medium
Likelihood	Likely	Likely
Significance	MODERATE POSITIVE	MODERATE POSITIVE

13.7 SHIPPING AND NAVIGATION

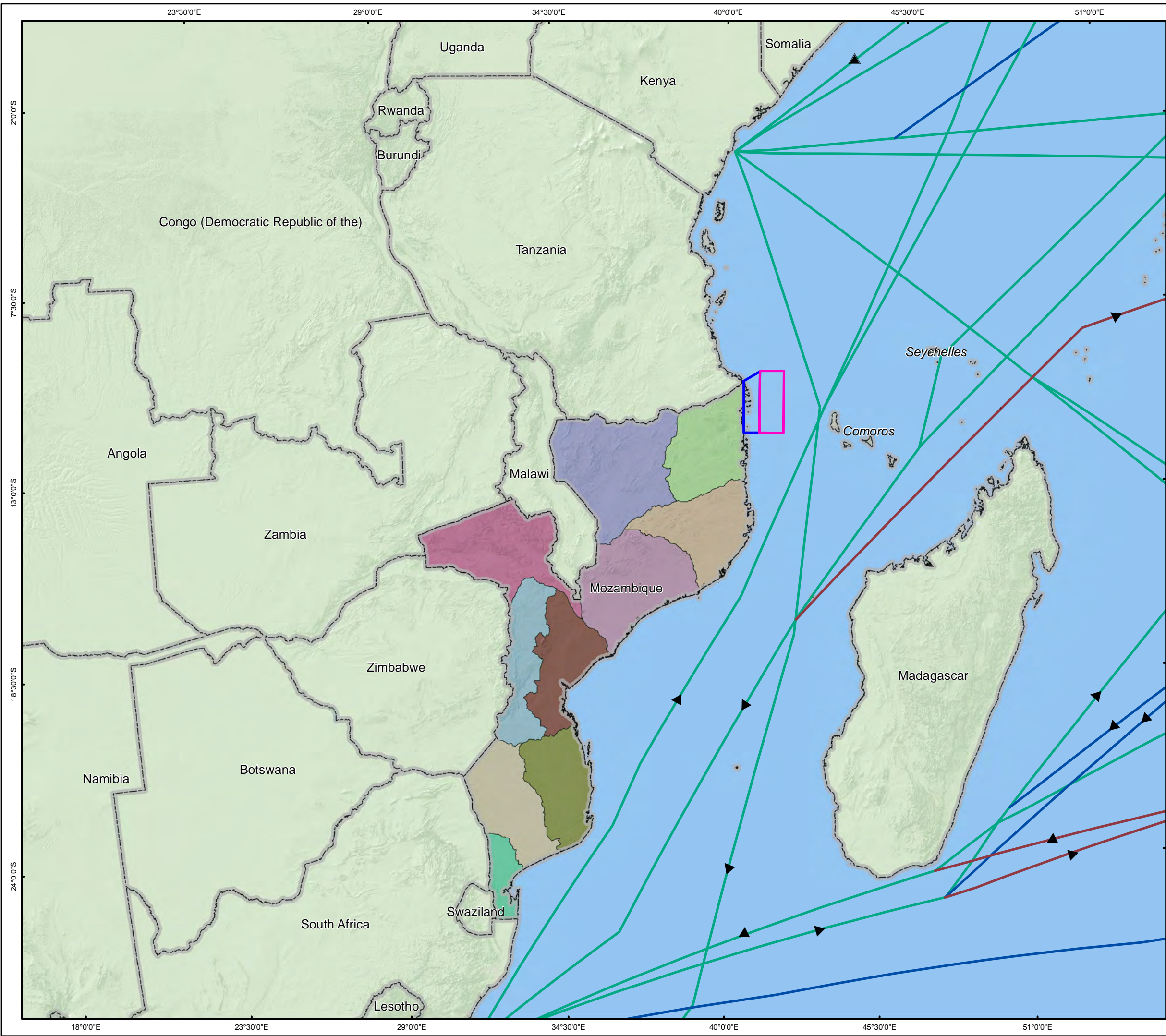
13.7.1 Impact of the Project Vessels and Activity on International Maritime Traffic

Impact Assessment

The Mozambique Channel is an international waterway with no fixed, formally established sea lanes. All international traffic passes outside the Project Offshore Area.

During the construction phase, the subsea infrastructure will be laid within the Golfinho, Prosperidade and Mamba gas fields. As these fields do not cross international maritime routes (see *Figure 13.4*), it is expected that there will be no interference with international maritime traffic. The impact during the construction phase is, therefore, expected to be local and temporary, with a

Negligible intensity. Impact magnitude is expected to be Negligible. The Negligible magnitude and unlikely probability of occurrence results in a NEGLIGIBLE significance impact during the construction phase.

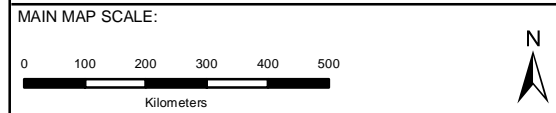
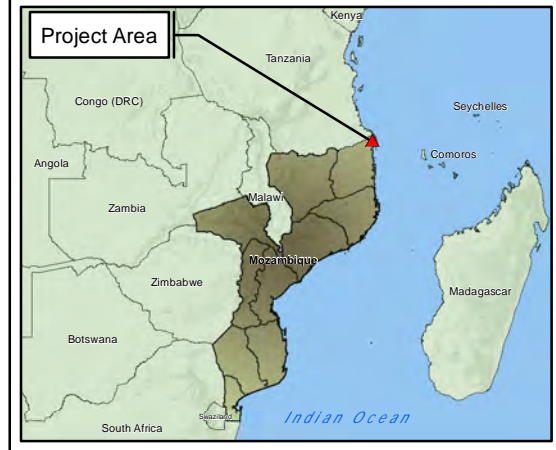


- Legend**
- Maritime Traffic Distribution Routes**
- Traffic from Persia Gulf to Africa, Americas and Europe
 - Traffic of trans-shipments of Oil
 - Trans-shipments of general cargo

- Area 1
- Area 4

Mozambique Provincial Boundary

- Inhambane
- Manica
- Sofala
- Maputo
- Tete
- Gaza
- Cabo Delgado
- Niassa
- Nampula
- Zambezia



TITLE:
**Figure 13.4:
 Present Maritime Traffic Distribution
 Routes in the Mozambique Channel**

CLIENT:

Anadarko
 Moçambique Área 1, Lda

DATE: Oct 2013	CHECKED: IE	PROJECT: 0133576
DRAWN: AB	APPROVED: KG	SCALE: 1 : 12 400 000
DRAWING: Maritime Traffic Distribution Routes Moz Channel.mxd		REV: A

ERM
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Projection: UTM Zone 37 S Datum: WGS84
 Source: DIVA-GIS. Impacto, 2012.
 Inset Map: Esri Data & Maps

SIZE:
 A3

During the operational phase, LNG Carriers servicing the LNG Facility will contribute to the international traffic, but will not create traffic congestion in the international maritime routes. The extent of the impact is expected to be local with a long-term duration, but Low intensity. The magnitude of the impact is thus expected to be Negligible to Low during the operational phase. Coupled with a likely probability of occurrence, the significance is expected to be MINOR.

Mitigation Measures

The Project supports the implementation of good international industry practice and compliance with national and international maritime legislation. The Project will develop a Traffic and Transport Procedure for all phases of the Project, in liaison with the relevant maritime authority. This plan will include a Navigation Warning Scheme, the schedule of vessel movements, speed limits as well as the size and duration of the exclusion zones. The management plan will ensure clear communication of activities, especially during the operations phase, due to the nature of the LNG Carrier cargo and industry maritime pollution, health and safety performance expectations.

Residual Impacts

The residual impact is likely to be NEGLIGIBLE during construction and MINOR during the operational phase.

Table 13.26 *Impact of the Project Vessels and Activity on International Maritime Traffic*

Without Mitigation		Residual Impact (with Mitigation)
Construction Phase		
Duration	Temporary	Temporary
Extent	Local	Local
Intensity	Negligible	Negligible
Magnitude	Negligible	Negligible
Likelihood	Unlikely	Unlikely
Significance	NEGLIGIBLE	NEGLIGIBLE
Operational Phase		
Duration	Short term	Short term
Extent	Local	Local
Intensity	Low	Low
Magnitude	Low	Low
Likelihood	Likely	Likely
Significance	MINOR	MINOR

13.7.2 *Disruption of Commercial Fishing Activities*

Impact Assessment

In the areas where the Offshore Project activities take place, there is low commercial fishing activity. The Offshore Project activities will be primarily focused in the vicinity of Golfinho, Prosperidade gas fields in Area 1 and Mamba Gas Field in Area 4, between 50 and 70km from the coast in deepwaters. Commercial fishing efforts are limited within Area 1 and 4, and

mostly occur in the south-west around the Bank of São Lázaro. Commercial fishing is seasonal and the position of the fishing grounds is dependent on the main concentrations of sighted species, which varies throughout the year. Commercial vessels do pass through the Area 1 and Area 4 en route to fishing locations.

Commercial fishing vessels may be affected by Offshore Project activities, including vessels associated with the drilling of offshore wells, installation of the subsea infrastructure and the movement of service vessels (construction and operational). In addition, a 5km radius safety exclusion zone around drill rigs impede access to desired commercial fishing grounds. This impact will be a short to medium-term regional impact. During construction, there will be a high number of vessels traversing the area, thus the intensity will be Low, as the levels of adaptability will be dependent on effective communication between the Project and the Maritime Authority (INAMAR). The impact is of Likely occurrence and of Low magnitude. The impact is rated as being of MINOR significance during the construction phase.

During operations, the number of Project-related vessels will be reduced and will likely cause a limited disruption for other vessels. Construction safety exclusion zones will be removed, while the mobile safety exclusion zones supporting vessel movement will remain, as will specific exclusion zones around Offshore Facilities. During the operational phase, the impact will be long term with a Negligible to Low intensity. The impact is unlikely to occur, and it will be of NEGLIGIBLE significance.

Mitigation Measures

The Project will develop a Traffic and Transport Procedure for all phases of the Project, with the objectives of minimising damage to fishing equipment (such as fishing nets) and maintaining engagement between the Project, Maritime Authorities, National Fisheries Administration (ADNAP) ⁽¹⁾ and operators of international fishing vessels. This plan will outline procedures to undertake the following activities.

- The Project will engage with the Maritime Authority and provide relevant information to maintain awareness of the Project and commercial fishing activities in Area 1 and Area 4 among relevant stakeholders.
- The Project will ensure that all its service and construction vessels are equipped with functional radar equipment, and that the radar system is continuously monitored.
- Where possible, safety exclusion zones shall be clearly noted and/or monitored, to enable vessels to be aware when they are close to the safety

(1) Agency responsible for implementing the commercial and licensing agreements of the fleets

zones, and appropriate pilot vessels, coastguards and maritime support agreed between the Project, Maritime Authorities and ADNAP.

- The Project will collaborate with Maritime Authorities and ADNAP to establish a Grievance Procedure for reporting grievances related to maritime activities through appropriate communication and engagement with relevant stakeholders.
- The Project shall take into account the actions defined in the *Plano Estratégico de Desenvolvimento da Pescaria de Atum em Moçambique* (PEDPA) (Strategic Development Plan for Tuna Fisheries) as discussed in Section 9.7.6.

Residual Impacts

Implementation of the above-mentioned mitigation measures will enable the residual impact significance to reduce from MINOR to NEGLIGIBLE during the construction phase, as commercial fishers are made aware of the presence of Project vessels and the exclusion zones, allowing them to fish elsewhere. During operations, the significance will remain as NEGLIGIBLE.

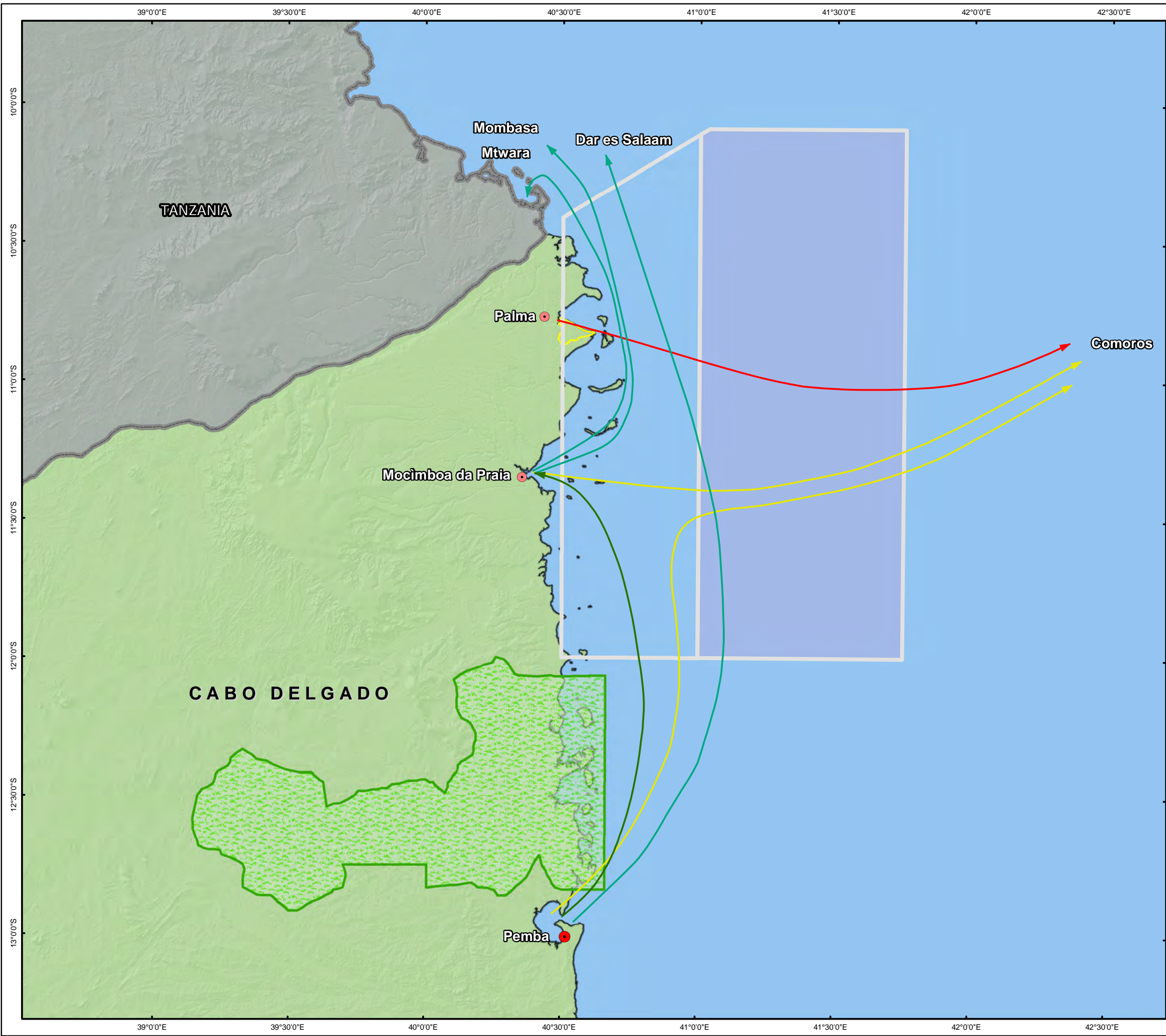
Table 13.27 *Disruption of Commercial Fishing Activities*

	Without Mitigation	Residual Impact (with Mitigation)
Construction Phase		
Duration	Short to medium term	Long term
Extent	International to regional	Regional
Intensity	Low	Low
Magnitude	Low	Low
Likelihood	Likely	Unlikely
Significance	MINOR	NEGLIGIBLE
Operational Phase		
Duration	Long term	Long term
Extent	Regional	Regional
Intensity	Negligible	Negligible
Magnitude	Low	Low
Likelihood	Unlikely	Unlikely
Significance	NEGLIGIBLE	NEGLIGIBLE

13.7.3 *Impact of the Project Vessels and Activity on National and Regional Cabotage*

Impact Assessment

Area 1 and Area 4 are used by national and regional cabotage and shipping, and comprises low-intensity traffic to and from Madagascar, Comoros, Tanzania and Kenya, connecting the ports of Pemba and Mocímboa da Praia as shown in Figure 13.5.

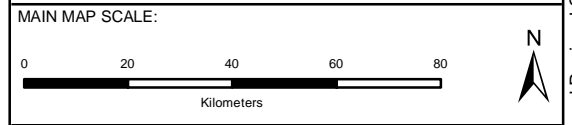
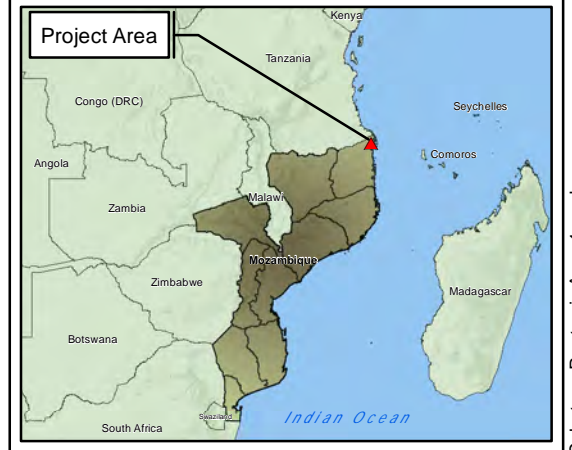


Legend

- Capital City of Cabo Delgado
- Town
- Afungi Project Site
- Boundary with Tanzania
- Cabo Delgado Province
- Quirimbas National Park
- Area 1
- Area 4

Cabotage Routes

- Domestic Cabotage
- Regional Cabotage: Comoros
- Regional Cabotage: Tanzania and Kenya
- Informal Traffic: Mozambique-Comoros



TITLE:
**Figure 13.5:
 National and Regional Cabotage
 Routes**

CLIENT:

Anadarko
 Moçambique Área 1, Lda

DATE: Oct 2013	CHECKED: IE	PROJECT: 0133576
DRAWN: AB	APPROVED: KG	SCALE: 1 : 1 450 000
DRAWING: National and Regional Cabotage Routes in Area 1.mxd		REV: A

ERM
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 Tel: +27 21 681 5400
 Fax +27 21 686 073

Projection: UTM Zone 37 S Datum: WGS84
 Source: DIVA-GIS. Impacto, 2012.
 Inset Map: Esri Data & Maps

SIZE:
A3

During the construction phase, there will be safety and security exclusion zones around Project vessels undertaking drilling and subsea infrastructure placement. Maritime traffic in the Offshore Project Footprint Area will continue, but will need to avoid these exclusion zones. In Palma Bay, laying of the pipeline and dredging activities may delay cabotage vessels wanting to enter the bay, as will the arrival of vessels transporting construction material and equipment, which will be brought to the Pioneer Dock and MPD by sea. As such, access will be impeded at times, resulting in increased travel distance by vessels to traverse around exclusion zones, delays to access the bay/landing sites due to mobile exclusion zones, and waiting time to access areas to avoid crossing into exclusion zones.

Given the volume of cabotage traffic, the impact of loss of access to traversing/landing sites and the duration of the construction activities, a site-specific, temporary and Medium intensity and Medium magnitude impact is expected, with a Likely occurrence. This results in a MODERATE significance impact.

During the operational phase, LNG Carriers will be entering the bay and there will be various support vessels (eg pilot vessels and coastguards) guiding the carriers into and out of the Export Terminal and to manage the safety and security exclusion zones that will be maintained around vessels and Near Shore Project infrastructure. Cabotage into and around Palma Bay can continue, although vessels will need to avoid the exclusion zones. The Project support vessels and the LNG Carriers will operate according to conditions set by the Maritime Authority.

The impact is site-specific and long term, and intensity would range from Low during operation of two LNG trains, increasing to Medium as the number of LNG Trains increases to six later in the life of the Project. The magnitude of the impact is Medium with a Definite probability of occurrence. The significance of the impact during the operational phase is, therefore, expected to be MODERATE.

Mitigation Measures

- The vessels involved in dredging and other construction-related activities must be equipped with navigation equipment and suitable aids (such as buoys and lights) to minimise interference with other vessels and to maintain high visibility at all times.
- Appropriate marine terminal systems, protocols and procedures aligned with national and international industry standards and maritime legislation will be developed for the life of the Project and adapted when operating circumstances change (ie as more LNG Trains become operational and increased LNG Carrier traffic into the Export Terminal facilities is planned), in collaboration with the Maritime Authority (INAMAR) and INAHINA.

- There will be ongoing engagement with stakeholders from the shipping national and regional cabotage sector regarding maritime activities, and to communicate specific Project information, eg exclusion zones.
- The Project and INAMAR will develop mechanisms for regular Project communication regarding information exchange and the adoption of adjustments on safety procedures that may be deemed necessary.

Residual Impacts

During all phases of the Project, the residual impact on marine traffic is expected to be MINOR. The proposed mitigation measures will help to manage the operational phase impact on current traffic and, over time, cabotage routes will be adapted to accommodate maritime traffic associated with the Project. This will reduce the probability of the impact occurring, but expected to be MINOR.

Table 13.28 *Impacts of the Project Vessels and Activity on National and Regional Cabotage*

Without Mitigation		Residual Impact (with Mitigation)
Construction Phase		
Extent	Site-specific	Site-specific
Duration	Temporary	Temporary
Intensity	Medium	Low
Magnitude	Medium	Low
Likelihood	Likely	Likely
Significance	MODERATE	MINOR
Operational Phase		
Extent	Site-specific	Site-specific
Duration	Long term	Long term
Intensity	Medium	Low
Magnitude	Medium	Low
Likelihood	Likely	Likely
Significance	MINOR	MINOR

13.8 *ONSHORE ARCHAEOLOGY AND CULTURAL HERITAGE*

This section identifies potential Project impacts on onshore archaeological and cultural heritage sites; offshore sites are discussed in *Section 13.9*. Cultural heritage sites are those that represent a record of past or present human activity and which are finite, irreplaceable and non-renewable.

13.8.1 *Impact of Disturbance of or Damage to Archaeological and Cultural Heritage Sites*

Impact Assessment

The archaeology and cultural heritage of Afungi Peninsula, where the Onshore Project Footprint Area is located, is strongly influenced by a number of cultures, including Swahili culture from the 10th century and the Sultanate of Tungi from the 18th century to late 19th century. Important sites in the

region are Tungi, Kiwiya and Mbuizi, located on Cabo Delgado Peninsula, approximately 12km north of the Afungi Project Site Area and Surrounds (including Senga and Maganja).

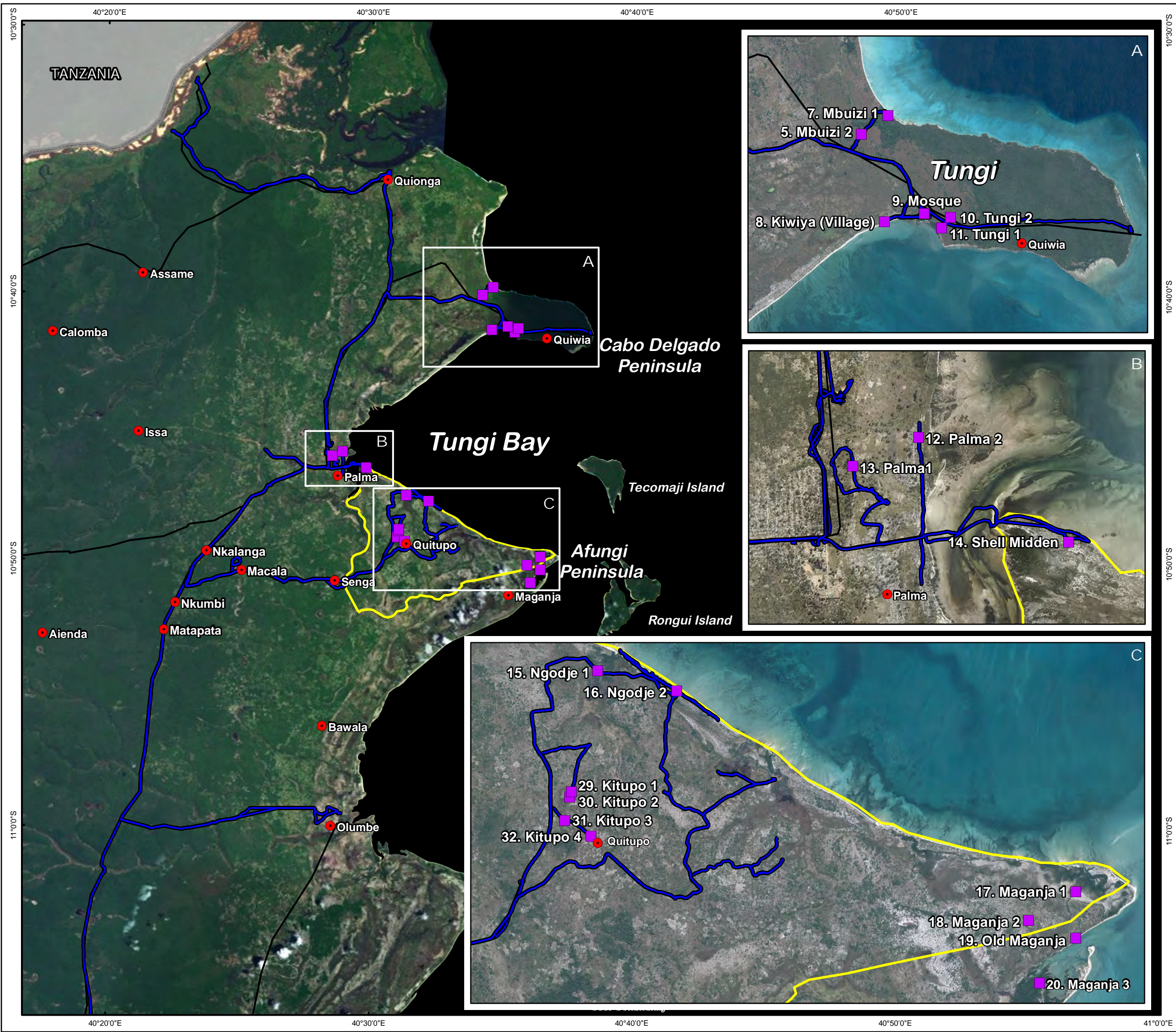
The Kiwiya settlement on Cabo Delgado Peninsula consists of land holdings of the former Sultanate of Tungi families that date back to the late 19th century. The greater part of them were expropriated during colonial times and families moved to Afungi Peninsula (Quitupo and Maganja). Most families currently remaining on Afungi Peninsula retain a very strong historical and cultural bond with the land. Inhabitants within the 7,000ha Afungi Project Site Area and Surrounds (including Senga and Maganja) will be permanently displaced, resulting in a permanent loss of land and leading to the loss of historical and cultural links to the area.

Ten archaeological sites were recorded within Afungi Peninsula, as well as one abandoned sacred place and several burial sites – see *Figure 13.6*. Most of these sites have been affected by extensive cultivation, and those closer to the coast have been influenced by sea erosion. Sites 15 (Ngodje 1) and 18 (Maganja 2) are considered to be of high heritage significance. Of these two sites of high heritage significance, only site 15 (Ndogje 1) falls within the Onshore Project Footprint Area.

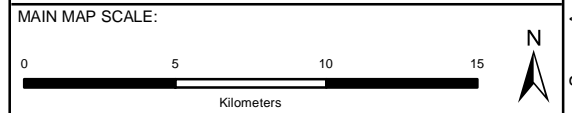
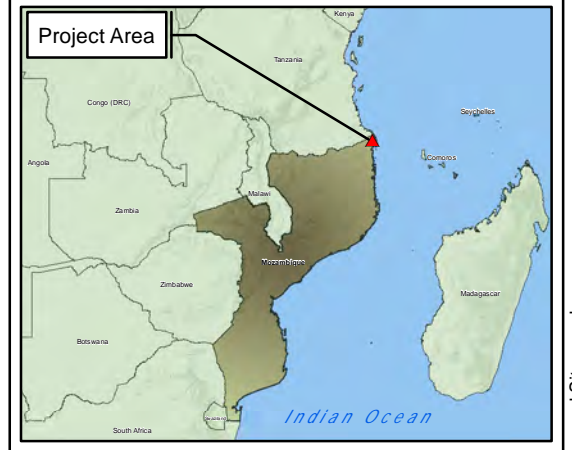
During the construction phase, site clearance activities within the Onshore Project Footprint will include vegetation clearing, de-mining and site levelling, and in the wider Afungi Project Site will interfere with or destroy archaeological resources (most of which have low heritage significance). Most of the archaeological sites within the Afungi Project Site Area and Surrounds (including Senga and Maganja) consist of surface or very shallow deposits of artefacts, which will be exposed to irreversible fragmentation and destruction during construction activities.

It is unlikely that de-mining or construction vehicle operators will notice or avoid scattered potsherds when driving in the area. The impact is expected to be concentrated onsite and will be permanent, with a Medium magnitude and Definite likelihood of occurrence. Consequently, without mitigation, this impact is expected to be of MINOR to MODERATE significance.

Leading into the operational phase, the Onshore Project Footprint will have been cleared and excavated, and the LNG Plant and Associated Facilities constructed on the site. Any artefacts of cultural or heritage significance uncovered during these activities would be removed from the site, and those with low or negligible heritage significance destroyed during construction activities. As such, during the operations phase, the impact significance will be NEGLIGIBLE.



- Legend**
- Villages / Settlements
 - Sites of Archaeological Importance
 - Survey Tracks
 - Regional Roads
 - Afungi Project Site



TITLE:
**Figure 13.6:
 Archaeology Survey Area and
 Location of Sites**

CLIENT:

Anadarko
 Moçambique Área 1, Lda

DATE: Oct 2013	CHECKED: IE	PROJECT: 0133576
DRAWN: AB	APPROVED: KG	SCALE: 1 : 250 000
DRAWING: Archaeology Survey Area and Sites.mxd		REV: A

ERM
 Great Westerford Building
 240 Main Road
 Rondebosch, 7725
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 Tel: +27 21 681 5400
 Fax +27 21 686 073

Projection: UTM Zone 37 S. Datum: WGS84
 Source: Bing Maps ©2010 Microsoft Corporation.
 Promap, 2012. Impacto, 2012
 Inset Map: Esri Data & Maps

SIZE:
 A3

Mitigation Measures

The mitigation measures proposed below focus on the construction phase as site clearances, excavation and construction activities would disturb the land insofar as required to construct the LNG Plant and Associated Facilities. As such, any cultural heritage and archaeological artefacts will be uncovered during this process. However, some are also applicable to the operational phase.

- Adopt a participatory approach with communities directly impacted by Project activities to agree how archaeological and cultural heritage sites will be identified, sites such as burial grounds or areas with intangible but traditional significance are appropriately blessed before physical displacement, and chance finds communicated to traditional and appointed village leadership and religious leaders to respect sociocultural and faith-based traditions.
- The Project will develop a Chance Finds Procedure to define the processes aligned with relevant national laws and regulations, local customs and traditional norms that must be followed to ensure appropriate treatment of a chance find, and to minimise disruption to construction activities, including:
 - developing training and awareness material to educate Project staff and contractors in the identification of archaeological material; and
 - developing procedures for contractors to report chance finds to the Project.
- Undertake a detailed archaeological rescue investigation of Ngodje 1 (site 15) to determine the future archaeological management of the site. This should include the development of a 50m-perimeter fence around the site, given its high archaeological significance.
- The Project will have an experienced archaeologist present for the duration of the construction period to advise on and monitor construction activities, to avoid damage to cultural sites and undertake training for all contractors regarding implementation of the Chance Finds Procedure.
- Create an awareness programme for Project staff regarding tangible and intangible cultural heritage, to raise awareness of how to interact with different cultural environments within the Project context, thereby reducing the probability of conflict and cultural heritage destruction.

The Project will investigate methods for commemorating any artefacts or sites identified, including erecting and maintaining plaques with information on the sites.

Residual Impacts

The residual impact significance is likely to be reduced to MINOR in the construction phase, if appropriate mitigation measures are implemented. During operations, the impact will be NEGLIGIBLE, as it can be expected that any activities that could have an impact on the archaeological sites would have ceased.

Table 13.29 *Impact of Disturbance of or Damage to Archaeological and Cultural Heritage Sites*

Without Mitigation		Residual Impact (with Mitigation)
Construction Phase		
Duration	Permanent	Permanent
Extent	Onsite	Onsite
Intensity	Medium	Low
Magnitude	Medium	Low
Likelihood	Definite	Definite
Significance	MODERATE	MINOR
Operational Phase		
Duration	Permanent	Permanent
Extent	Onsite	Onsite
Intensity	Low	Low
Magnitude	Low	Low
Likelihood	Unlikely	Unlikely
Significance	NEGLIGIBLE	NEGLIGIBLE

13.9 MARINE ARCHAEOLOGY AND CULTURAL HERITAGE

13.9.1 *Impact of Offshore and Near Shore Construction and Operational Activities on Marine Archaeology and Cultural Heritage*

Impact Assessment

Palma (or Tungi) Bay was used as an important natural harbour for the anchorage of vessels travelling to the old trading centre located on Vamizi Island ⁽¹⁾. Therefore, it is quite possible that there are ship remains within the Offshore Project Footprint Area, or archaeological anomalies of anthropogenic origin lying on the seafloor.

Marine geophysical and Autonomous Underwater Vehicle (AUV) data along the pipeline route have shown that no large man-made structures are apparent in the survey data. Based on investigations to date, there are no known archaeological or cultural heritage sites along the pipeline corridor or in the region of any subsea infrastructure.

The proposed construction phase activities (eg pipeline laying, anchoring of lay barges and support vessels, seabed interventions such as dredging and trenching) will impact the seabed. During the operational phase, any

(1) As described by Ahmad bin Majid in the 15th century.

intermittent maintenance activities to ensure pipeline integrity are likely to cause similar impacts. During construction, the use of DP rigs and ROV surveys reduce the likelihood of damaging sites of cultural heritage in the Offshore gas fields. Increased vessel traffic in Palma Bay during the operational phase is not expected to impact cultural heritage, as these vessels will be anchoring in surveyed territory.

Should an artefact of potential cultural value be discovered, it is expected that impact significance will be Negligible. The extent would be local, and permanent. Impact magnitude is expected to be Medium. Since the probability of this impact occurring is rated as Unlikely, impact significance will be MINOR.

Mitigation Measures

In the deepwater offshore, the Project will use an AUV to examine the seabed prior to drilling or laying of the subsea infrastructure or pipelines. Similarly, in the shallower waters of the near shore, from the continental shelf to Afungi Peninsula, an ROV will be used to examine the seabed. During these surveys, if an artefact of potential cultural value is detected then the Chance Finds Procedure described in *Section 13.8* will apply, and the following mitigations implemented:

- The location of the artefact will be mapped and, if necessary, the object will be scanned and visually inspected by AUV or ROV.
- Where possible, the Project will avoid the cultural heritage artefact so that it is not damaged by construction or operations activities.
- The Project will engage an experienced archaeologist to advise on and monitor offshore construction activities to avoid damage to cultural sites and undertake training for all contractors regarding implementation of the Chance Finds Procedure for offshore activities.

Residual Impacts

In the unlikely case that previously unidentified artefacts are damaged by the Project during construction and operations, the Chance Finds Procedure will be implemented. Impact intensity and magnitude will be Low, with an Unlikely occurrence, and significance will be NEGLIGIBLE.

Table 13.30 *Impact of Offshore and Near Shore Construction and Operational Activities (Including Drilling) on Marine Archaeology and Cultural Heritage Sites*

Without Mitigation		Residual Impact (with Mitigation)
Construction Phase		
Duration	Permanent	Permanent
Extent	Local	Local
Intensity	Medium	Low
Magnitude	Medium	Low
Likelihood	Unlikely	Unlikely

	Without Mitigation	Residual Impact (with Mitigation)
Significance	MINOR	NEGLIGIBLE
Operational Phase		
Duration	Permanent	Permanent
Extent	Local	Local
Intensity	Medium	Low
Magnitude	Medium	Low
Likelihood	Unlikely	Unlikely
Significance	MINOR	NEGLIGIBLE

13.10 *INDIRECT SOCIO-ECONOMIC IMPACTS AT PEMBA AND MOCIMBOA DA PRAIA*

13.10.1 *Impact Assessment Overview*

The focus of the Project activities will take place in the Afungi Project Site and Palma District. Hence, this is where the impacts will be predominantly experienced. Indirect impacts at Pemba (being the closest port to Palma) and Mocimboa da Praia (MdP) are nonetheless acknowledged. AMA1 and eni currently make use of existing port facilities to support the Project in Palma and are likely to continue to do so for drilling operations, and some initial import of materials and equipment. AMA1 currently has a camp at MdP. The Project's activities at Pemba are expected to decrease over time once the port facilities (including customs operations) at Palma are constructed. There is also the potential for future industrial or other services to establish themselves at Pemba to support the Project. This is an indirect impact that the Project cannot directly control.

Due to the unquantifiable nature of future growth of Pemba town and port and MdP, potential impacts at Pemba and MdP are described qualitatively at a high level. Future growth may take the form of an expansion to Pemba Port, expansion of the Pemba town or MdP town (hotels, houses, etc) and expansion of infrastructure and services (eg roads, water, waste, electricity, etc). The population of Pemba and MdP may increase as more people move there seeking employment or related economic opportunity. As this and other projects are developed in northern Mozambique, Pemba and MdP are likely to see growth resulting in both positive and negative impacts. On the positive side, Pemba and MdP may experience economic growth, increase in tourism and infrastructure development. On the negative side, existing social infrastructure (eg health care) and physical infrastructure (eg electricity, transport routes, the port) may come under increased pressure.

13.10.2 *Mitigation/ Enhancement Measures*

The Project will comply with the relevant laws and regulations (including EIA regulations) when undertaking any new activity in Pemba or MdP. The Project will also abide by any spatial development plan or strategy developed by the Government of Mozambique for Cabo Degado Province's future growth.