PAPUA LNG PROJECT

UPSTREAM ENVIRONMENTAL IMPACT STATEMENT

EXECUTIVE SUMMARY

TOTAL E&P PNG LIMITED

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Executive Summary

1. Proposed Development

Total E&P PNG Limited (TEP PNG) and its joint venture partners propose to develop the Papua LNG Project. The Project is a joint venture between TEP PNG (40.13 %), ExxonMobil PNG Antelope Limited and ExxonMobil PNG Elk Limited (37.03%), and PAC LNG Assets Limited, PAC LNG International Limited, PAC LNG Investments Limited, PAC LNG Overseas Holding Limited and PAC LNG Holdings Limited (22.84%). The Project separates operatorship of what are referred to as the 'upstream' and 'downstream' facilities, delimited in Caution Bay by the PNG LNG facility lease boundary. TEP PNG is the proponent, and will be the operator, of the upstream facilities for the Project.

The Project will involve producing and processing the gas and condensate from the Elk-Antelope gas reserves in Petroleum Retention License 15 (PRL-15), located in Gulf Province, Papua New Guinea and then piping them overland, and then offshore in the Gulf of Papua, to the existing PNG LNG producing and exporting facility (PNG LNG Facilities) in Caution Bay, Central Province, 20 km northwest of Port Moresby (Figure ES1.1). Key Project components include:

- Wellpads and wells where the reservoir fluids will be produced and the buried flowlines and trunklines that will transport the reservoir fluids to a central processing facility (CPF).
- The CPF where the reservoir fluids will be separated into gas and condensate, and processed.
- Export pipelines, which will comprise a 40-inch diameter gas pipeline and a 10-inch diameter condensate pipeline to transport the gas and condensate products from the CPF to the PNG LNG Facilities at Caution Bay.
- Infrastructure, which includes the new Logistics Base, the construction and operations accommodation camps, the access road network, the Purari Airstrip extension, landfills and quarries.

An overview of key project development facts is provided in Table ES1.1

A decommissioning plan will be developed at the end of operations that identifies decommissioning options for all equipment and materials, including products used and wastes generated on site.

The Project intends to move into the Basic Engineering[1] phase.

The Project objective is to develop the gas and condensate resources in the Elk-Antelope gas field in PRL-15 and export petroleum primarily internationally but also domestically, while considering the environmental, social, political and commercial constraints.

1 This is equivalent to the front-end engineering and design (FEED) phase of a project.

PROJECT LOCATION

Papua LNG Project | Environmental Impact Statement

FIGURE ES1.1

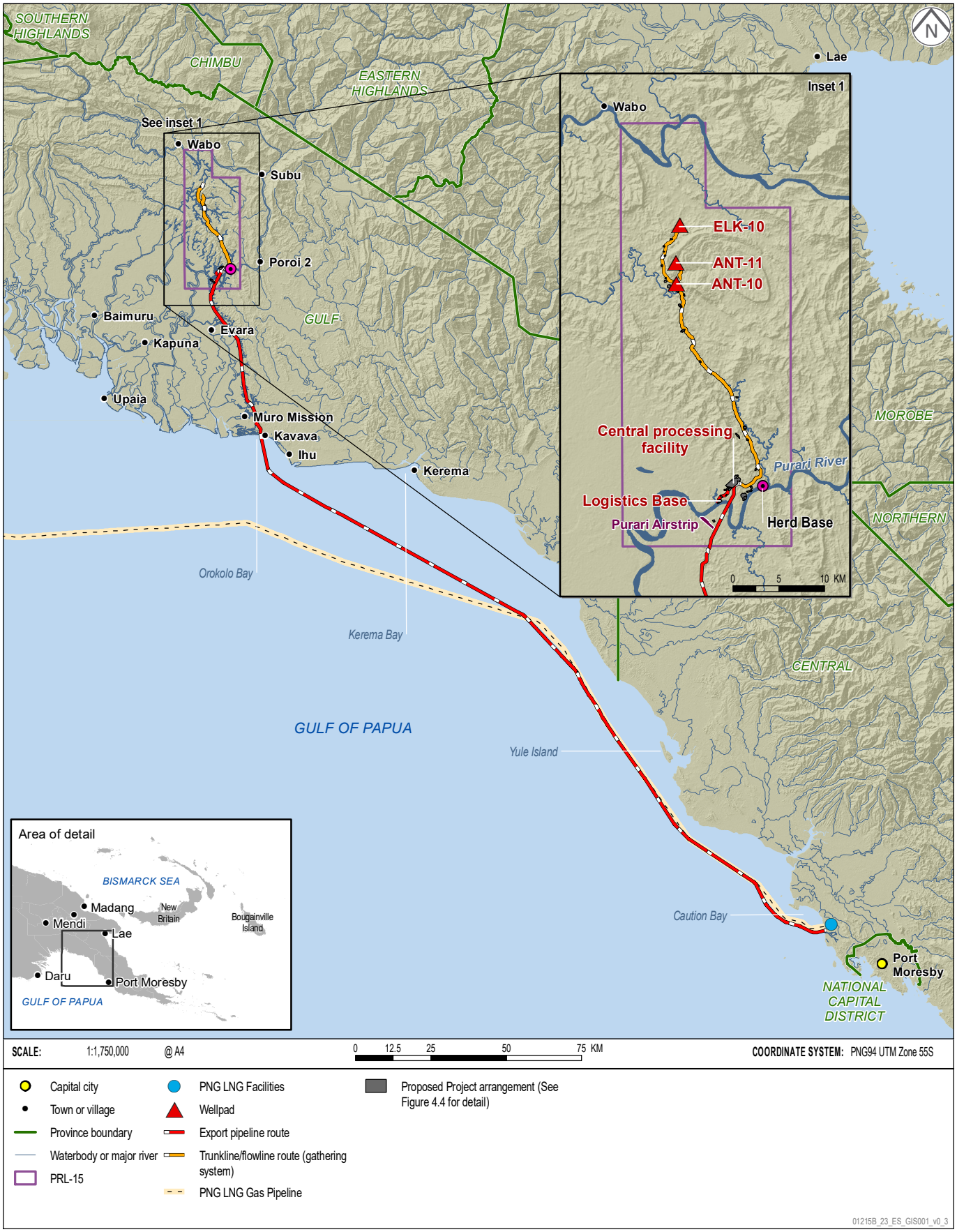

Table ES1.1 – Key Project Development Facts

US$4 billion Preliminary median capital cost estimate for the upstream portion of the Papua LNG Project development costs (2018 real terms) for the initial development, plus US$0.9 billion for the subsequent compression phases	**840 MMscfd** Average production of raw gas on an annual basis About 820 MMscfd (peak value) of treated gas and 15,000 barrels per day of condensate exported.
6.2 to 7.5 trillion cubic feet (Tcf) of initial gas in place and a condensate to gas ratio estimated between 15 to 20 bbl/MMscf.	**3 wellpads** One Elk production pad, one Antelope production pad, and an additional pad at Antelope for produced water. Nine wells in total.
25 years 5 years of construction and 20 years of operations. The Project operations will take place 24 hours per day, 7 days per week.	**60-km onshore export pipeline and a 260-km offshore export pipeline** The onshore export pipeline route will extend from the Purari River at the south end of PRL-15 to the coast at Orokolo Bay. From there, the export pipelines will traverse the Gulf of Papua and will generally follow the same route as the marine PNG LNG gas pipeline, before connecting with downstream LNG facilities in Caution Bay. Design life is 40 years.
936 ha Estimated total area of direct disturbance is 936 ha. Of this, approximately 20% uses existing disturbed areas.	**Approximately 6,000 workforce, at peak** The number of workers ranges from 50 to approximately 6,000 during construction.

The EIS assesses the potential impacts on the environment, amenity, and social, cultural and ecosystem services due to the Project[2]. The EIS has been prepared to satisfy relevant PNG laws, regulations and permits; company internal requirements, and International applicable standards and guidelines. As the Project is likely to seek financing by international finance institutions, applicable International Finance Corporation (IFC) Performance Standards on Environmental and Social Sustainability (IFC, 2012) and World Bank Group Environmental, Health and Safety Guidelines (IFC, 2007) have also been considered in this EIS.

2. Project Setting

2.1 Physical Environment

The Project area of influence is situated on the foothills, alluvial plains and beach areas south of Central Range, and encompasses various topographic features and landforms.

The terrestrial setting is with the lower Purari River catchment. Topography comprises ridge and ravine landforms of low-altitude hills to the north in PRL-15, descending to the broad, flat floodplains of the Purari River delta (Plate ES2.1) and sand dunes along the Orokolo Bay coast.

The marine setting comprises Orokolo Bay and the continental shelf along the eastern side of the Gulf of Papua to Caution Bay.

2 This EIS excludes Papua LNG project facilities inside the PNG LNG lease boundary in Caution Bay, which are subject to a separate assessment and permitting process.

Plate ES2.1 – Meandering River of the Purari River Delta

Phot: BMT WBM

2.2 Biological Environment

The physical environment supports the growth of dense and varied natural vegetation that sustains high regional biodiversity. Five broad terrestrial vegetation groups are identified (i.e., hill forest (Plate ES2.2), alluvial forest, freshwater swamp vegetation, mangroves and littoral forest). Freshwater, estuarine and wetland habitats are characterized by riparian areas of lowland or alluvial forests, swamp vegetation and mangroves. Various marine benthic habitats occur along the export pipeline corridor with seagrass meadows and subtidal reefs confined to Caution Bay.

Commercial logging operations since the early 2000s have degraded large areas of primary forest, and signs of human settlement, subsistence farming, and oil and gas exploration activities are also visible across the landscape.

Plate ES2.2 – Remnant Hill Forest

Photo: Iain Woxvold

2.3 Socio-economics and Cultural Heritage

There are 38 villages (Plate ES2.3), 1 settlement and one government station in the Project area of influence. Of these, Mapaio Fish Camp and Poroi 1 village are located in PRL-15. Seven distinct groups, defined by the language they speak, are recorded, with each having similar history, cultural beliefs and traditional practices. These communities occur in PRL-15, and along the Purari River corridor and export pipeline route. Reliance on natural resources further defines these communities, and fishing (Plate ES2.4), hunting and collecting are the primary resource uses. Communities have experienced previous exposure to industrial projects and activities beyond oil and gas (e.g., logging).

Local people access healthcare at nine operating and three partially operating health facilities, and there are 32 functioning schools in the Project area of influence.

The environmental and social baseline formally recorded tangible and intangible cultural heritage sites in the Project area of influence.

Plate ES2.3 – Typical Village House

Photo: ERIAS Group

Plate ES2.4 – Fishing in the Purari River Delta Estuary

Photo: ERIAS Group

3. Stakeholder Engagement

TEP PNG recognizes the importance of developing and maintaining relationships with Project stakeholders. Since early 2015, TEP PNG has implemented a program of consistent, planned and targeted engagement with Project stakeholders, using a range of approaches designed to address the specific needs of each stakeholder group.

Information disclosure and consultations have been undertaken as part of the EIS process and specific consultation and disclosure of the EIS will take place with the Conservation and Environment Protection Authority to satisfy requirements under s. 55 of the *Environment Act 2000* (aiming for Q1 2020).

4. Assessment of the Project's Impacts and Benefits

Impacts and benefits are predicted to arise from Project activities such as:

- Land acquisition.
- Vegetation clearing.
- Earthworks.
- Logistics and transport (e.g., water, air and roads).
- Construction and operation of temporary and permanent accommodation camps.
- Drilling.
- Pipeline construction, operations and maintenance.
- Waste management.
- Jetty construction and dredging at the Logistics Base.
- CPF operations (e.g., gas processing), produced water and acid gas management.
- Water extraction and discharge of surface runoff.
- Quarrying.
- Fuel and energy consumption.
- Project employment and procurement.
- Decommissioning.

Summary of the potential key impacts assessed in the EIS are listed in Table ES4.1. Additional detail is provided in Chapters 11 to 17 of the EIS.

Table ES4.1 – Potential Key Impacts Assessed in the EIS

Terrestrial
Landform destabilization and deterioration in soil properties.
Deterioration of groundwater quality and reduction in groundwater resource.
Altered hydraulic and sediment transport processes and reduced stream flow.
Deterioration in surface water quality.
Loss of freshwater and estuarine aquatic habitat or biodiversity.
Loss and degradation of habitats and key resources/sites.
Loss of flora and fauna individuals and populations.

Table ES4.1 – Potential Impacts Assessed in the EIS (cont'd)

Marine
Deterioration in marine water quality.
Loss of marine aquatic habitat or biodiversity.
Social and Cultural Heritage
Decline in customary social systems.
Increase in antisocial behaviors and crime.
Reductions in livelihoods and land access.
Changes (positive and negative) to employment, business opportunities and income.
Increased pressure on education, health facilities and services.
Increased risk, frequency, and severity of disease.
Challenges to traditional leadership and governance.
Loss or disturbance to tangible cultural heritage sites and intangible cultural heritage.
Decrease in provisioning ecosystem services (e.g., wild plant foods, timber)
Amenity
Disturbance, human health, and nuisance effects.
Decline, loss of or change to existing visual amenity or landscape character.
Disturbance to commercial traffic and transport.

Mitigation measures have been applied to potential impacts by implementing the mitigation hierarchy, e.g., avoid impacts, where possible, minimize impacts when avoidance is impossible and when they remain, consider rehabilitation or restoration, and ultimately compensate/offset. Most residual impacts were assessed as negligible to minor (considering embedded design controls, and mitigation and management measures). Where significant impacts remain (i.e., impacts were assessed as moderate or higher), additional opportunities for mitigation will be explored during the FEED Project phase. Additional requirements related to offsetting or compensation will be designed where appropriate, and in consultation with relevant communities, stakeholders and government agencies, as required.

The Gulf and Central provinces will experience direct and indirect financial benefits, e.g., royalties and development levies. Legally recognized landowners will receive statutory benefits from the State. The wider Project-affected communities in the Project area are likely to benefit through Project training, employment or other business opportunities.

5. Environmental and Social Management System

The Project's Health, Safety, Environment and Social Management System forms the framework for environmental and social management, monitoring and reporting under which the Project will operate.

The Project Environmental and Social Management Plan (ESMP) will be developed and implemented within this framework, from which detailed management plans will be developed. The management plans will support implementation of Project commitments and will define the monitoring requirements to assess mitigation performance and efficiency.

Specialist contractors will undertake activities on behalf of TEP PNG and will be contractually obligated to implement and comply with the Project's ESMP. The ESMP and monitoring procedures will be subject to periodic review and evaluation to identify any deficiencies. The ESMP will address the outcomes of commitments made in this EIS, the environment permit conditions when they become available, design refinements as Project development progresses and any changes in regulatory requirements.

Compliance with applicable standards, and the effectiveness of the Project's design controls and commitments, will be monitored and assessed against measurable performance indicators. Performance will be reported according to applicable requirements.

Further Information and Submissions
The EIS will be made available to the public according to the *Environment Act 2000*.