SundaGas Banda
Unipessoal Lda

Halona Serena Lda

ENVIRONMENTAL MANAGEMENT PLAN (EMP)
DRILLING ACTIVITIES
PSC TL-SO-19-16

Under

Decree Law No.39/2022 1st Amendment of DL No.5/2011- Environmental Licensing

Ministerial Diploma No. 46/2017

Authorization

	Name/Function	Signature/date
Prepared by	Halona Serena Lda.	
Reviewed by	Dino Gandara/General Manager Belazario Gusmao/Geo Scientist Sean Curnow/Well Operations Manager Brian Foley/HSE Manager	cn=Dino Gandara, o=SundaGas Ltd, ou=Technical Manager, email=dino.gandara@sundagas.com, c=TP 2025.04.11 13:52:04 +09'00' cn=Sean Curnow, o=Well Operations Manager, ou=SundaGas Ltd, email=sean.curnow@sundagas.com, c=VN 2025.04.11 11:56:35 +07'00'
Approved by	Dr. Andy Butler /Managing Director	

Revisions

Revision	Date	Author	Change Description
Revision 1			
Revision 2			

SundaGas Banda
Unipessoal Lda

Halona Serena Lda

Table of Contents

SundaGas Banda
Unipessoal Lda

Halona Serena Lda

List of Tables

List of Figures

ABBREVIATIONS

ADB	:	Asian Development Bank
AHT	:	Anchor Handling Tug
AMOSC	:	Australian Maritime Oil Spill Centre
ANP	:	*Autoridade Nacional do Petróleo*
ANPM	:	*Autoridade Nacional do Petróleo e Minerais*
ANZG	:	Australian and New Zealand Guidelines
AOF	:	Absolute Open Flow
APORTIL	:	*Autoridade Portuário Timor-Leste*
ATSEA	:	Arafura & Timor Seas Ecosystem Action
ATS	:	Arafura and Timor Seas
BMSL	:	Below Mean Sea Level
BOD	:	Biological Oxygen Demand
BoM	:	Bureau of Meteorology
BOP	:	Blow Out Preventer
BTEXN	:	Benzene, Toluene, Ethylbenzene, Xylenes, and Naphthalene
CPR	:	Competent Personal Report
CRT	:	Crisis Response Team
CSO	:	Civil Society Organizations
CTD	:	Conductivity, Temperature, and Depth
DEWHA	:	Department of the Environment, Water, Heritage and the Arts
DGV	:	Default Guideline Value
DNCPIA	:	*Direcção Nacional do Controlo Polução e Impacto Ambeintal*
DST	:	Drill Stem Test
EBS	:	Environmental Baseline Survey
EDTL	:	*Eletrisidade de Timor-Leste*/Timor-Leste Electrical Company
EEZ	:	Exclusive Economic Zone
EHS	:	Environmental, Health and Safety
EIA	:	Environmental Impact Assessment
EIS	:	Environmental Impact Statement
ESIA	:	Environmental and Social Impact Assessment
ENSO	:	El Niño-Southern Oscillation
EMP	:	Environmental Management Plan
ERP	:	Emergency Response Plan
ESD	:	Emergency Shut Down
FPSO	:	Floating Production, Storage and Offloading
G&G	:	Geology and Geophysics
GHG	:	Green House Gases
GoTL	:	Government of Timor-Leste

GTL	:	Gas-to-Liquid
HAZID	:	Hazard Identification
HAZOP	:	Hazard and Operability Study
HSE	:	Health, Safety & Environment
HSEQ	:	Health, Safety, and Environment Quality
IBAs	:	Important Bird Areas
IFC	:	International Finance Corporation
ILO	:	International Labour Organization
IMS	:	Integrated Management System
IMT	:	Incident Management Team
IOGP	:	International Association of Oil and Gas Producers
IUCN	:	International Union for Conservation of Nature
ITCZ	:	Inter-Tropical Convergence Zone
ITF	:	Indonesian Throughflow
INSTANT	:	International Nusantara Stratification and Transport Program
JPDA	:	Joint Petroleum Development Area
LFPR	:	Labour Force Participation Rate
LNG	:	Liquified Natural Gas
LOR	:	Limit of Reporting
LOWC	:	Loss of Well Control
LTMO	:	Low Toxicity Mineral Oil
MAF	:	Ministry of Agriculture and Fisheries
MD	:	Measured Depth
MDKB	:	Measured Depth Below Rotary Kelly Bushing.
MFV	:	Monitoring Fishing Vessel
MODU	:	Mobile Offshore Drilling Unit
MSDS	:	Material Safety Data Sheet
MSL	:	Mean Sea Level
MPAs	:	Marine Protected Areas
MuTek	:	MuTeknologi Software
NADF	:	Non-Aqueous Drilling Fluid
NE	:	Northeast
NT	:	Northern Territory
NW	:	Northwest
OBM	:	Oil Based Mud
OCNS	:	Offshore Chemical Notification Scheme
OIW	:	Oil-in-Water
OPEP	:	Oil Pollution Emergency Plan
OSCP	:	Oil Spill Contingency Plan
OSRL	:	Oil Spill Response Limited
OTL	:	*Oras Timor-Leste*

PAH	:	Polycyclic Aromatic Hydrocarbon
PD	:	Project Documents
PNTL	:	*Polícia Nacional Timor-Leste*
PNG	:	Papua New Guinea
PSC	:	Production Sharing Contract
PSD	:	Particle Size Distribution
PSDM	:	Pre-Stack Depth Migration
PSTM	:	Pre-Stack Time Migration
Q1, Q2, Q3, Q4	:	Fiscal Quarters
ROV	:	Remotely Operated Vehicle
RT	:	Rotar Table
SAQP	:	Sampling and Analysis Quality Plan
SBM	:	Synthetic Based Mud
SCERP	:	Source Control Emergency Response Plan
SDP	:	Strategic Development Plan
SE	:	Southeast
Sg	:	Specific Gravity
SW	:	Southwest
SundaGas/SGBU	:	SundaGas Banda Unipessoal Lda
SSS	:	Sea Surface Salinity
SST	:	Sea Surface Temperature
TD	:	Total depth
TG	:	TIMOR GAP Chuditch Unipessoal Lda
THR	:	Total Hydrocarbon Recoverable
TL	:	Timor-Leste
TLEA	:	Timor-Leste Exclusive Area
TOR	:	Term of Reference
TSS	:	Total Suspended Solid
TVD	:	True/Total Vertical Depth
TWT	:	Two Way Time
UN	:	United Nations
UNDP	:	United Nations Development Programme
UNFPA	:	United Nations Population Fund
UPF	:	*Unidade Polícia Fronteira*
WBM	:	Water Based Mud
WHO	:	World Health Organization
ZOCA	:	Zone of Corporation Area

MEASUREMENT UNITS

Bcf	Billion cubic feet
Bbl	Barrel
BOPD	Barrel of Oil per Day
dB	Decibel
Degree	Celsius
HP	Horse Power
Hz	Hertz
km	kilometre
km^2	kilometre square
km/h	kilometre per hour
kn/kt/kts	knot/knots
m	metre
mm	millimetre
mmscfd	Millions cubic feet per day
m/s	metres per second
μPa	micro Pascal (10^{-6})
Nm	nautical mile
ppm	part per million
TC/TCs	Tropical cyclones
Tcf	Trillion Cubic Feet
%	percentage

1. EXECUTIVE SUMMARY

1.1. Project Background

SundaGas Banda Unipessoal, Lda. (SGBU) and TIMOR GAP Chuditch Unipessoal, Lda. (TIMOR GAP) were awarded a Production Sharing Contract by the ANP in 2019 to conduct petroleum operations offshore Timor-Leste. PSC TL-SO-19-16 includes the Chuditch-1 gas discovery drilled by Shell in 1998. SGBU is currently evaluating the Chuditch-1 discovery and is anticipating undertaking a drilling programme in this PSC Area. Appraisal drilling is anticipated during late Q2 and Q3 of 2025.

SGBU is planning on drilling an appraisal well, Chuditch-2, using a suitably designed and capable self-elevating Jack-Up Rig. Following completion of a site survey for Chuditch-2, the appraisal well is expected to be drilled in approximately 68m water depth and to a target depth of approximately 3,000m in the Plover Formation.

The Chuditch-2 Appraisal Well is located within the Chuditch field in the area of PSC-TL-SO-19-16 block in the Timor Sea. The Chuditch PSC block is situated about 185km South of Timor-Leste's south Coast and is approximately 80km south-west of Greater Sunrise and 140km east-northeast of Bayu-Undan. The drilling program plans to conduct a DST to determine the presence of sufficient economic quantities of hydrocarbons in the gas-charged Plover reservoir interval in the Chuditch-2 appraisal well. Thereafter, the Chuditch-2 well will be plugged and abandoned.

1.2. Scopes and Objective of the EMP

This EMP is prepared for the appraisal drilling program of the Project and will encompass all activities associated with the drilling activities on the planned Jack-Up drilling unit.

The primary objectives of the EMP are as follows:

i. To provide the necessary framework to effectively mitigate against environmental impacts during the appraisal well construction activities;
ii. To provide the means to ascertain the effectiveness of environmental protection / conservation measures identified in the EIS study, which will form the basis for additional / modified provisions to meet the stipulated limits where these are expected; and

iii. To provide guidance for environmental management so that the drilling operations are carried out in accordance to legislative requirements and in meeting the overall environmental objectives of the Project.

1.3. Summary of Impact

Offshore drilling presents both positive socio-economic benefits and negative environmental impacts. This summary outlines key aspects of the Chuditch-2 drilling project's potential effects and their significance.

Positive Impacts

- Employment Opportunities: The future development and production phases will create job opportunities for national and international workers, engineers, and local communities, contributing to long-term economic growth.
- Revenue Generation: Royalties and income taxes from petroleum activities will provide substantial financial benefits to the Government of Timor-Leste, supporting national infrastructure and social programs.

Negative Environmental Impacts

Marine Habitat Disturbance

- Seabed Disruption: MODU positioning can disturb benthic communities, affecting marine biodiversity.
- Sediment Smothering: The discharge of drilling mud, cuttings, and cement can lead to burial and contamination of marine sediments, impacting benthic organisms.

Water Quality Degradation

- Chemical and Hydrocarbon Discharges: Routine discharge of drilling cuttings / fluids, and well cleanup brine can alter offshore water quality, leading to increased turbidity and potential toxicity to marine life.
- Wastewater and Sewage Disposal: Routine discharges of sewage, grey water, macerated food, and cooling water may result in temporary nutrient enrichment, attracting marine fauna to the drilling site.

Air Pollution and Climate Impact

- Greenhouse Gas Emissions: MODU operations, well cleanup flaring, and fuel combustion contribute to CO_2 and other emissions, increasing the cumulative impact on air quality and climate change.

Unplanned Events and High-Risk Scenarios

- Well Blowouts and Oil Spills: Loss of well control could result in oil spills, contaminating marine habitats, affecting fisheries, and harming marine mammals, reptiles, and seabirds.
- Vessel Collisions and Fuel Spills: Offshore supply vessel incidents pose a risk of diesel and synthetic-based mud (SBM) spills, leading to oiling of marine life and coral reefs.
- Introduction of Invasive Species: MODU ballast water and biofouling on vessel hulls can introduce non-native marine species, potentially displacing indigenous marine biodiversity.

The detailed summary of impacts is given in Section 8 of this EMP.

1.4. Mitigation Measures

The mitigation measures aim to minimize potential environmental risks associated with the Chuditch-2 appraisal drilling project. These measures align with international best practices and regulatory standards to ensure responsible offshore operations while maximizing socio-economic benefits for Timor-Leste.

Key Mitigation Strategies

Marine Ecosystem Protection

- Seabed Disturbance: Two tow vessels will be used to position the drilling unit, rather than anchoring which will reduce benthic impact, and pre-drilling habitat assessments will guide well placement.
- Sediment and Water Contamination: Water-based mud (WBM) will be used in riserless drilling of the open hole 17 ¼" section and as such there will be no return to the rig of cuttings or WBM. Modelling for cuttings dispersion and turbidity/TSS in the water column suggests affects will be localised and the benthic fauna will recover rapidly.

- Marine Fauna Protection: Noise-reduction technologies and lighting control strategies will be implemented to mitigate impacts on sensitive marine species.

Water and Air Quality Management

- Effluent and Discharge Control: Drilling fluids, cooling water, and other operational discharges will be treated before controlled release to prevent contamination.
- Air Emission Reduction: Low-emission combustion technologies and optimized flaring / DST will be utilized to curb greenhouse gas (GHG) emissions.

Spill Prevention and Emergency Response

- Hydrocarbon Spill Containment: A comprehensive oil spill response plan, including containment booms, dispersants, and regular emergency drills, will ensure prompt and effective containment.
- Well Blowout Prevention: The use of tested blowout preventers (BOPs) and emergency shut-down systems will minimize the risk of uncontrolled hydrocarbon releases.

Risk Management for Unplanned Events

- Vessel Collision Prevention: Strict navigation safety protocols, including vessel tracking and exclusion zones, will reduce the likelihood of accidents.
- Invasive Species Control: Adherence to the International Maritime Organization (IMO) Ballast Water Management Convention will mitigate risks of introducing non-native species.

The mitigation measures set forth in this EMP emphasize environmental stewardship while ensuring safe and efficient drilling operations. Through proactive risk management, regulatory compliance, and best environmental practices, SGBU and TIMOR GAP reaffirm their commitment to sustainable offshore exploration in Timor-Leste.

The mitigation measures are given in Section 9 of this EMP.

1.5. Conclusion

This EMP is prepared to provide environmental guidance so that the appraisal drilling program is conducted in line with the environmental requirements and minimizes potential impacts to the environment. It also identifies the roles and responsibilities of personnel and parties involved in the management of environmental aspects related to the appraisal drilling activities. In addition, this EMP has specified the implementation of environmental

management practices, environmental quality monitoring and surveillance audit program to ascertain the current effectiveness of mitigation measures and control measures implemented.

With proper implementation of the EMP, the associated environmental impacts caused by the appraisal drilling program should be minimized, controlled, and mitigated throughout the drilling activities. The EMP is a living document and shall be continuously reviewed and updated accordingly to reflect the current situation and site conditions.

2. DETAILS OF THE PROJECT PROPONENT

2.1. Details of the Project Proponent

Operator: SundaGas Unipessoal, Lda

TIN: 2003222
Rua Presidente Nicolau Lobato
Timor Plaza, Level 3, Suite 337
Comoro, Dom Aleixo, Dili
Timor-Leste
Tel: +670 331 0847

Joint Venture Partner: TIMOR GAP Chuditch Unipessoal, Lda.

TIN: 2003016
Rua Presidente Nicolau Lobato
Timor Plaza, Level 3, Suite 301-314
Comoro, Dom Aleixo, Dili
Timor-Leste
Tel: +670 331 1422

2.2. Company Organizational Structure

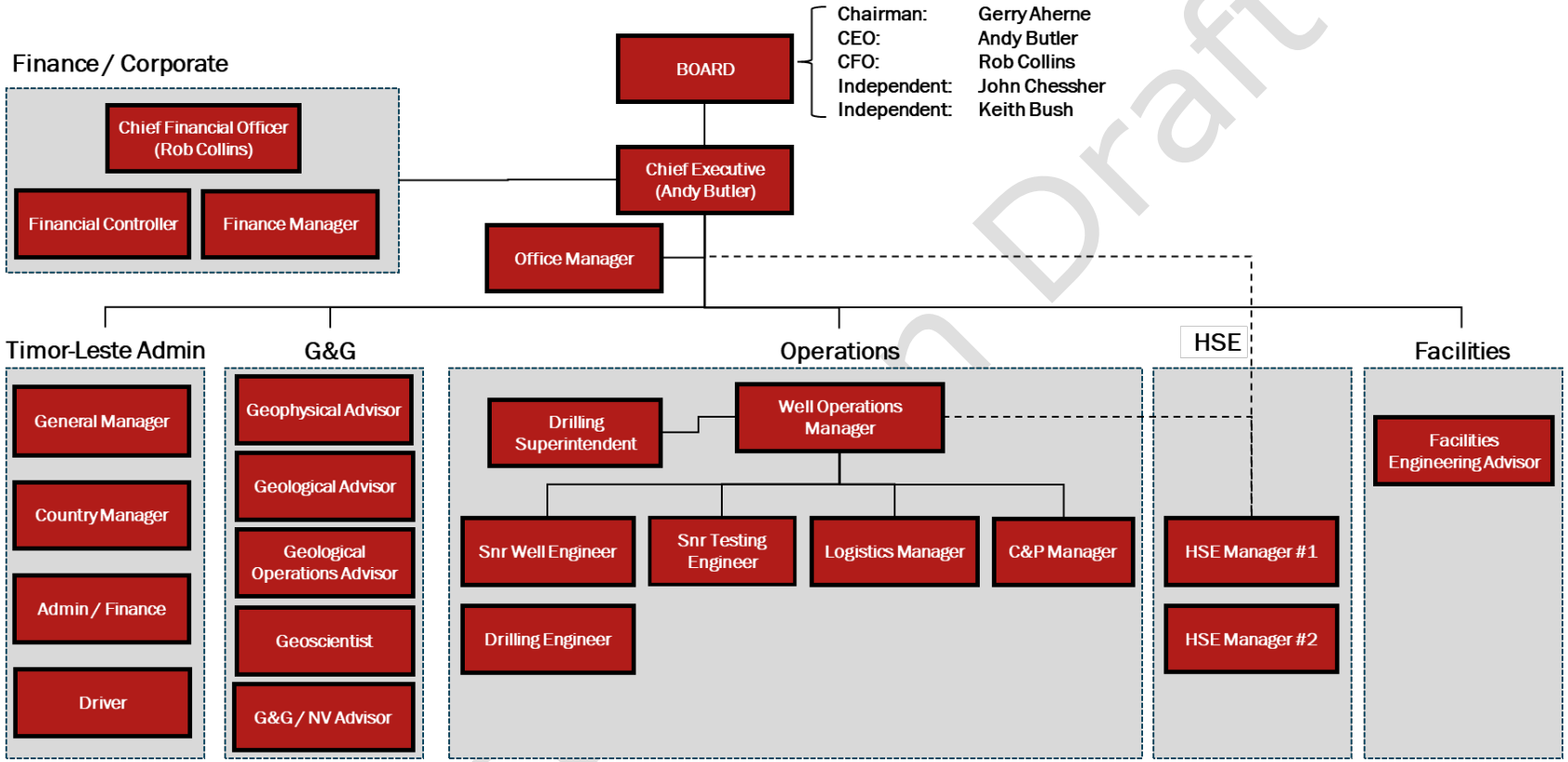


Figure 1-SGBU's Organizational Diagram

2.3. Contact Person

Dr. Andy Butler

Title : Managing Director

Email : andy.butler@sundagas.com

Mobile : +65 93845820

Sean Curnow

Title : Well Operations Manager

Email : sean.curnow@sundagas.com

Mobile : WhatsApp +44 7384 513212

Brian Foley

Title : HSE Manager

Email : brian.foley@sundagas.com

Mobile : WhatsApp +84 093 272 0105

Dino Gandara

Title : General Manager

Email : dino.gandara@sundagas.com

Mobile : +670 77626286

3. DETAILS OF THE CONSULTANT FOR EIS AND EMP

Sunda Energy Plc has engaged Halona Serena Lda, a Timor-Leste registered national consulting company, to carry out the EIA study to produce the EIS and EMP for the proposed project. Halona Serena has been providing services to domestic projects in Timor-Leste for approximately 3 years prior to commencing the subject EIA study. Halona Serena Lda has a number of key and highly qualified personnel. The following is the list of the proposed key personnel to be involved in this project:

Awinash Dulip

EHS and ESG Adviser - with more than 35 years' experience in ESG, Environment management, EIA, EIA, EMP, environment monitoring in Oil & Gas and mining Sector. Worked with various governments, private companies, organizations, funding institutions and as Petroleum Regulator. Adviser-ed on Equator Principles (EPFIs) for managing social and environmental risks for project financing and major infrastructure projects funded through PPP, SVP, Development Financial Institutions (DFI), World Bank / ADB / IBRD / International Development Associations (IDA). He has evaluated and monitored projects to IFC Performance Standards, pollution control abatement (PPAH) guidelines, and EHS guidelines for Onshore / Offshore Oil and Gas Development, ADB environmental safeguards & rapid environment assessment checklist. GHG, GRI on sustainability reporting, and CSR initiatives on social – economic reporting.

Pascoela Sequeira

Process Engineer experience for 8 years in evaluating the LNG process plant design for future Timor Leste LNG plant and its supporting activities. Recently, alongside with Halona Serena and its team, successfully obtained Environmental Licensing for TGPB for the Pualaca Block Seismic Activity. She possesses a M.Sc. in Natural Gas Engineering and Management and B.Sc. in Chemical Engineering from University of Oklahoma.

Bertanizo Guro da Costa

Bertanizo has about 10 years of experience in conducting Research in various sectors, including environmental science, conservation, security and defence, legal pluralism, impartiality of formal justice system, education, domestic violence etc. He also has 5 years of experience in leadership role (e.g., Research coordinator, General coordinator of

association etc.). He also has some expertise in Monitoring and Evaluation, research methods, statistics, data analysis, media and communications.

Maria Do Ceu Rosales

Maria is a graduate from the University of Western Australia, majoring in Environmental Science and Business Law. She is an Environmental Scientist with more than 7 years' experience predominantly in environmental assessment, management, and public procurement. She has led environmental studies on variety of environmental assessments and feasibility studies specifically for water resources management and has worked on a variety of projects from small-scale to large projects such as from established more than five water and sanitation projects to the rural communities and successfully completed marine environmental monitoring project for Tibar Port mega project.

Mario Marques Cabral

Has more than 20 years' experience as a marine biologist specialist. He has been working under Indonesian and Timor - Leste governments for marine departments. Also, Mario a candidate for Blue Planet Prize in 2022 (af:011785). The 31st Blue Planet Prize nomination process was organized by The Asahi Glass Foundation since the early of August 2021 under the supervision of Director, Commendation "Blue Planet Prize" (Toshihiro TANUMA, Ph.D.) in Tokyo-Japan. The Blue Planet Prize is an award presented to individuals or organizations from around the world in recognition of outstanding achievements in scientific research and its application that have helped provide solutions to global environmental problems.

Eurico Ediana da Costa

An experienced sociologist consultant with a demonstrated history of working around private sector development, research, decentralization, public policy, social-economic, community development, local government development, monitoring and evaluation, and gender mainstreaming. He possesses skills in M&E design, data analysis, research report, project management, policy analysis, business analysis, project management, negotiation, problem-solving, capacity building, community consultation, and basic NVivo operation.

Joctan Dos Reis Lopes

Mr Lopes is a marine and coastal fisheries ecologist. He completed his MSc in Marine Biology at Bangor University (School of Ocean Sciences) and has been actively engaged in Small-Scale Fisheries for over 6 years. His work mainly focuses on developing data innovation and

digital transformation to improve fisheries stock assessments, ecosystem interactions and aquatic food systems and enhance coastal resilience and livelihoods in Indo-Pacific Island countries. He is a published researcher with profound knowledge of ecosystem modelling and local and indigenous knowledge systems. Working alongside scientists, experts, governments, and fisheries practitioners, they have co-developed adaptive tools and context-specific practices that guide inclusive, well-informed, and sustainable marine resource management. He was one of the pioneers who developed an augmented real-time dashboard that collects catch data and provides fishing trends around Timor-Leste.

Tiago Gamboa

Geographer and HSE - Consultant with more than 25 years of experience in Environmental Management and Awareness, Environmental Impact Assessment, Environmental and Social Management Plan, Climate Change and Infrastructure Resilience, Water Resources, Urban Cleaning and Public Health, in the Public and Private Sectors, including international development cooperation in Timor-Leste.

4. PROJECT DESCRIPTION

4.1. Project Identification

The Appraisal Well is known as Chuditch-2 and is located within the Chuditch field also known as contract area PSC-TL-SO-19-16. This contract area is located in Timor Sea, in the northern Bonaparte Basin, Sahul Platform area. The Chuditch field is situated about 185km South of Timor-Leste's South Coast and well will be located approximately 80km south-west of Greater Sunrise and 140km east-northeast of Bayu-Undan. The location of Chuditch-2 and the nearby fields are shown in Figure 2.

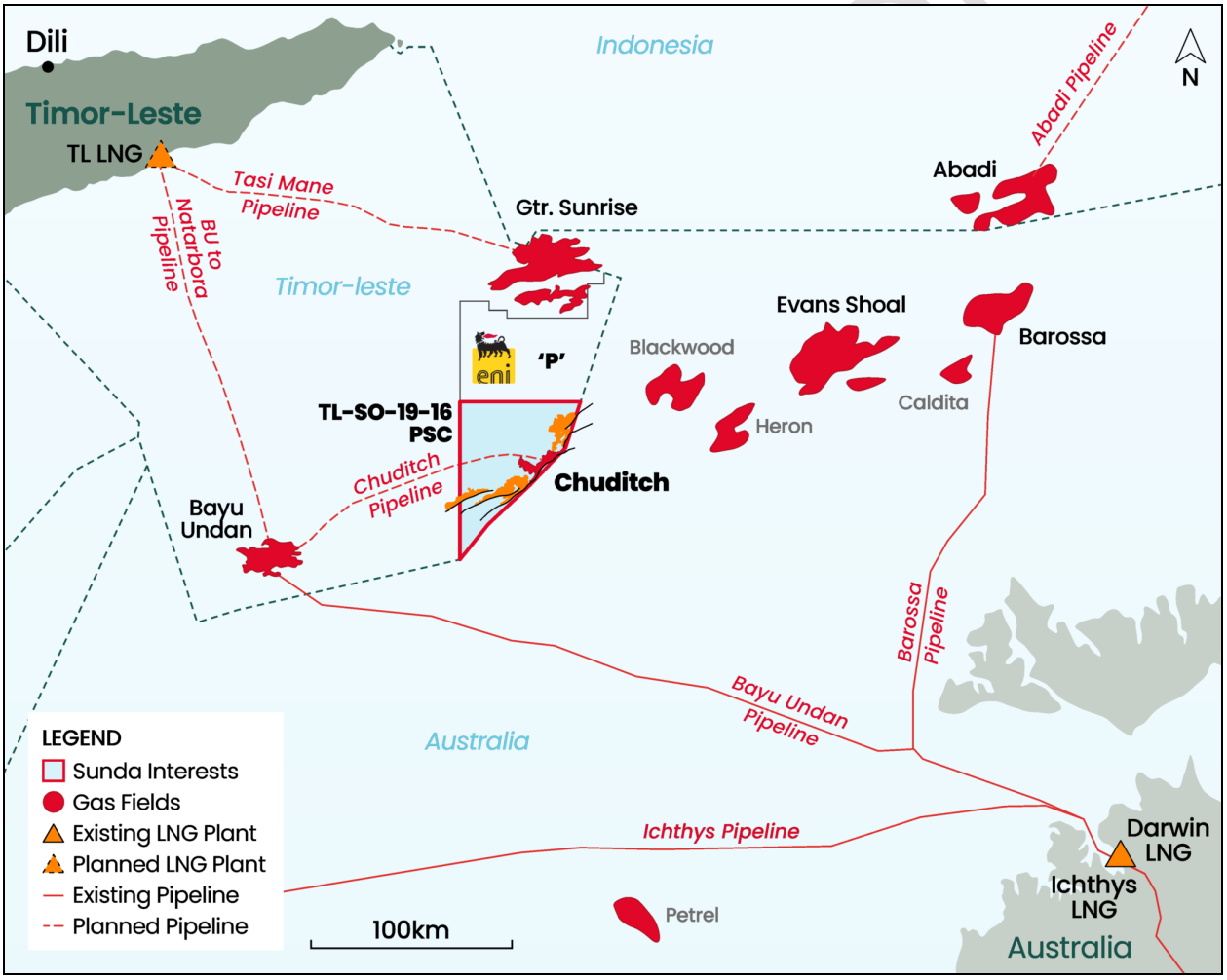


Figure 2-Location of Contract Area PSC-TL-SO-19-16/Chuditch and Nearby Fields.

4.2. Project Category

The project falls within the context of oil and gas appraisal drilling well operations. It is specifically an appraisal well drilled to evaluate the potential hydrocarbon quantities of the Chuditch-2 field in the Timor Sea for future hydrocarbon production. Such a project requires offshore drilling, environmental analysis, and geological data to make decisions.

As of November 2023, ANP approved the Project Document (PD) for the PSC-TL-SO-19-16 and classified the project as a Category A activity based on Decree Law No. 39/2022 1st Amendment of Decree Law No. 5/2011 on Environmental Licensing. SGBU was required to submit the Term of Reference (TOR) which was approved in November 2024 by ANP and is the basis for preparing the Environmental Impact Statement (EIS) and Environmental Management Plan (EMP). The proposed Chuditch 2 Appraisal Well Project is a Category 'A' project as it has the potential to generate significant environmental impacts.

4.3. Nature, Size, and Location of the Project

4.3.1. Project Nature

Appraisal well drilling and well testing operations are conducted to assess the presence and viability of hydrocarbon reserves in quantities that may support commercial extraction. These operations typically occur following the drilling of an exploration well, (Chuditch-1), comprehensive seismic survey and in this instance reinterpretation of existing seismic data. The process aims to evaluate the gas resources of the Chuditch field while minimizing environmental impact and ensuring sustainable resource management.

The objectives of the Chuditch-2 appraisal well will be to confirm the gas anticipated from the seismic mapping, better define gas resources associated with the Chuditch-1 discovery in Plover sandstones reservoir and to perform a Drill Stem Test (DST) to evaluate the expected future production rates that may be achieved from the Chuditch field.

The SGBU procedures are designed to drill the proposed Chuditch-2 well in a safe and environmentally responsible manner, assessing and where possible minimising impacts to the receiving environment.

The well will be drilled vertically using a Jack-Up drilling unit and expected to penetrate the Plover sandstone formations in the interval from 2,880m to 3,010mTVDBRT. The well total depth is prognosed at 3,010mTVDBRT.

The 12 ¼" hole will be drilled to a total depth of 3,010m TVDBRT through Plover sandstone formations, utilizing SBM. Run wireline logging in open hole to evaluate formation character and formation pressure.

In the success case, a 9 5/8" casing will be run and cemented in place and a DST will be conducted in 9 5/8" cased hole to evaluate well productivity if sufficient gas shows are present in the sandstone formations.

Full surface and downhole well testing equipment and services are required for testing in both 9 5/8" casing and contingency 7" liner. The following procedures are designed to cover both scenarios, with the differences only being the WBCO, packer size and the depths.

Prior to any testing operations, the well will be displaced with sea water then circulated to $CaCl_2$ brine for the DST. The well will be perforated underbalanced with 4.50" HSD TCP guns, with 5" DST tools and a 4 ½" test string with a multi-rate test planned to evaluate the reservoir productivity. On completion of any well testing operations, the well will be plugged and abandoned.

Table 1-Summary of Chudicth-2 Project Details

Well Name	**Chuditch-2**			
Operator	SundaGas Banda Unipessoal, Lda			
Partnership	SundaGas Banda Unipessoal, Lda 60%, TIMOR GAP Chuditch Unipessoal, Lda 40%			
Project	Chuditch-2			
Well Type	Appraisal			
Well Trajectory	Vertical Profile			
State/Country	Timor-Leste			
Anticipated Hydrocarbon	Gas/Condensate			
Block	TL-SO-19-16 PSC			
Basin	North Bonaparte Basin			
Surface Location (Chuditch-2)	Lat :	10° 32' 56.832" S	X:	406,436
	Long :	128° 8' 41.402" E	Y:	8,833,746
Bottom hole Target (Chuditch-2)	Lat :	10° 32' 56.832" S	X:	406,436
	Long :	128° 8' 41.402" E	Y:	8,833,746
Geodetic Information	WGS84, UTM Zone 52S, CM 129°E			
Target Objective	Plover Formation			
Drilling Rig	Jack-up Rig (Base case)			
Depth Reference	Mean Sea Level (MSL)			
Water Depth (MSL)	+/- 70m			

Well TD	+/- 3065 m TVD-MSL
Formation Temperature (Max)	~139°C (~282.2 °F) at TD
Formation Pressure	+/- 4400psi - Formations are predicted to be normally pressured from seabed down to Plover Formation
Target tolerance	50m at the Plover Formation target area
Hole Section	- 17 ½" hole for 13 3/8" casing, planned setting at 1650 m MDBRT. Drilling fluid will be Seawater and Hi-vis sweeps with returns to seabed. - 12 ¼" hole for 9 5/8" casing, planned setting depth at 3010 m MDBRT. This is firm. Drilling fluid will be SBM. Return to shale shaker before cuttings discharge to seabed.

4.3.2 Drilling Rig

The anticipated Jack-up rig is equipped with comprehensive facilities, including accommodation, kitchen services, heating and power supply, sewage management, storage areas, medical and emergency response units, as well as secondary operations such as welding, painting, and machining.

To support logistics, a minimum of two Anchor Handling Tugs (AHT) will assist rig positioning after which two vessels will facilitate the transportation of equipment and supplies between the shore and the rig. Additionally, a helicopter will be deployed for crew transfers. Crew members will operate on a 28-day rotation schedule, with approximately five crew change flights conducted per week to ensure operational efficiency and workforce sustainability.

A typical jack-up drilling rig and the main deck are shown in **Error! Reference source not found.** and **Error! Reference source not found.**, respectively. The rig will also provide dedicated storage for a variety of process chemicals and secondary materials. These include:

- Fuel Oil;
- Fresh (potable) water;
- Ballast (Seawater);
- Drilling water;
- Bulk mud and cement;
- Liquid mud;
- Dry process materials; and
- Pipe rack storage.

Error! Reference source not found. shows Illustration of Jack-up Rig and **Error! Reference source not found.** shows Typical view of Main Deck of a Jack-up Drilling Rig.

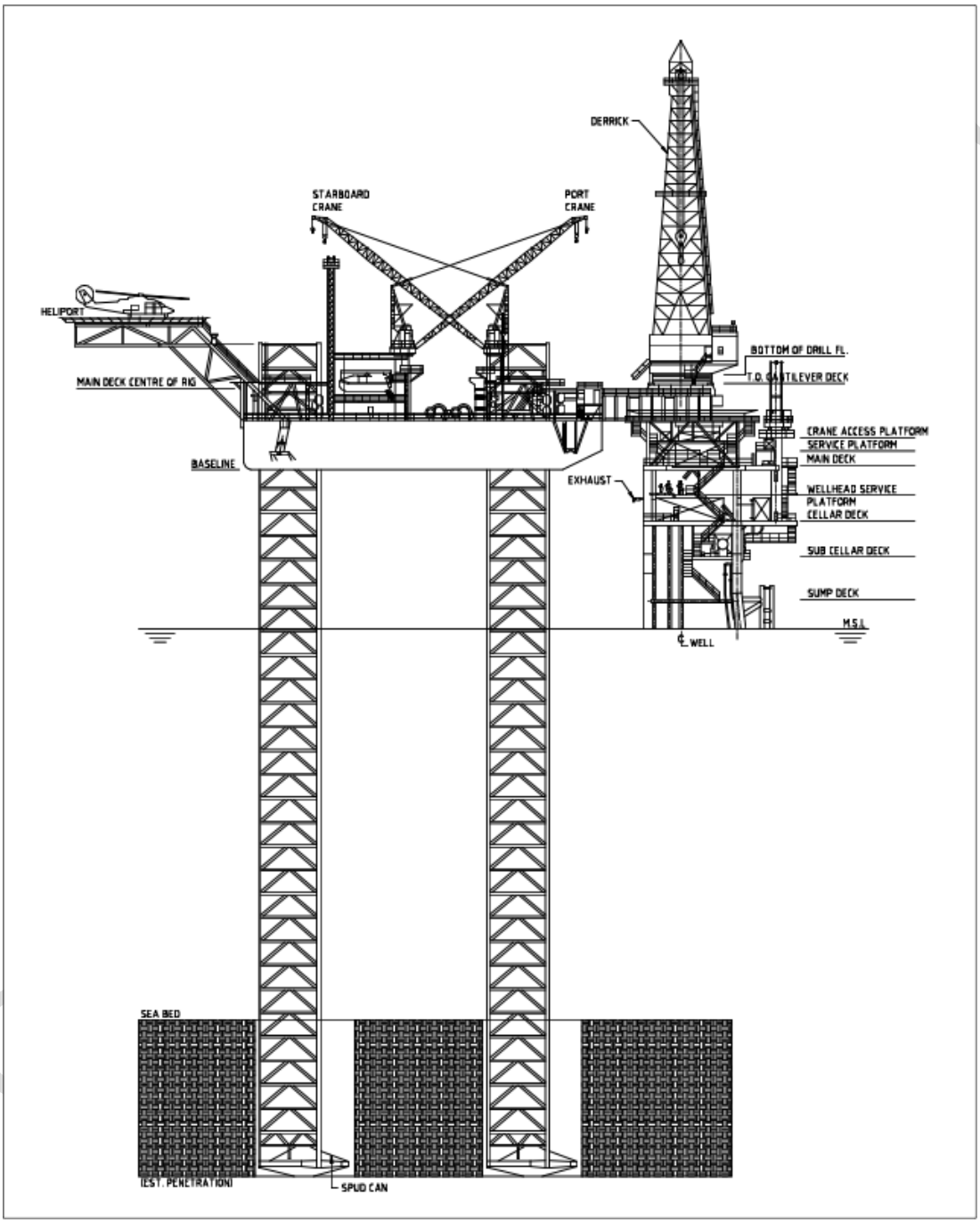


Figure 3-Illustration of Jack-Up Drilling Rig

Error! Reference source not found. showing Typical view of Main Deck of a Jack-up Drilling Rig.

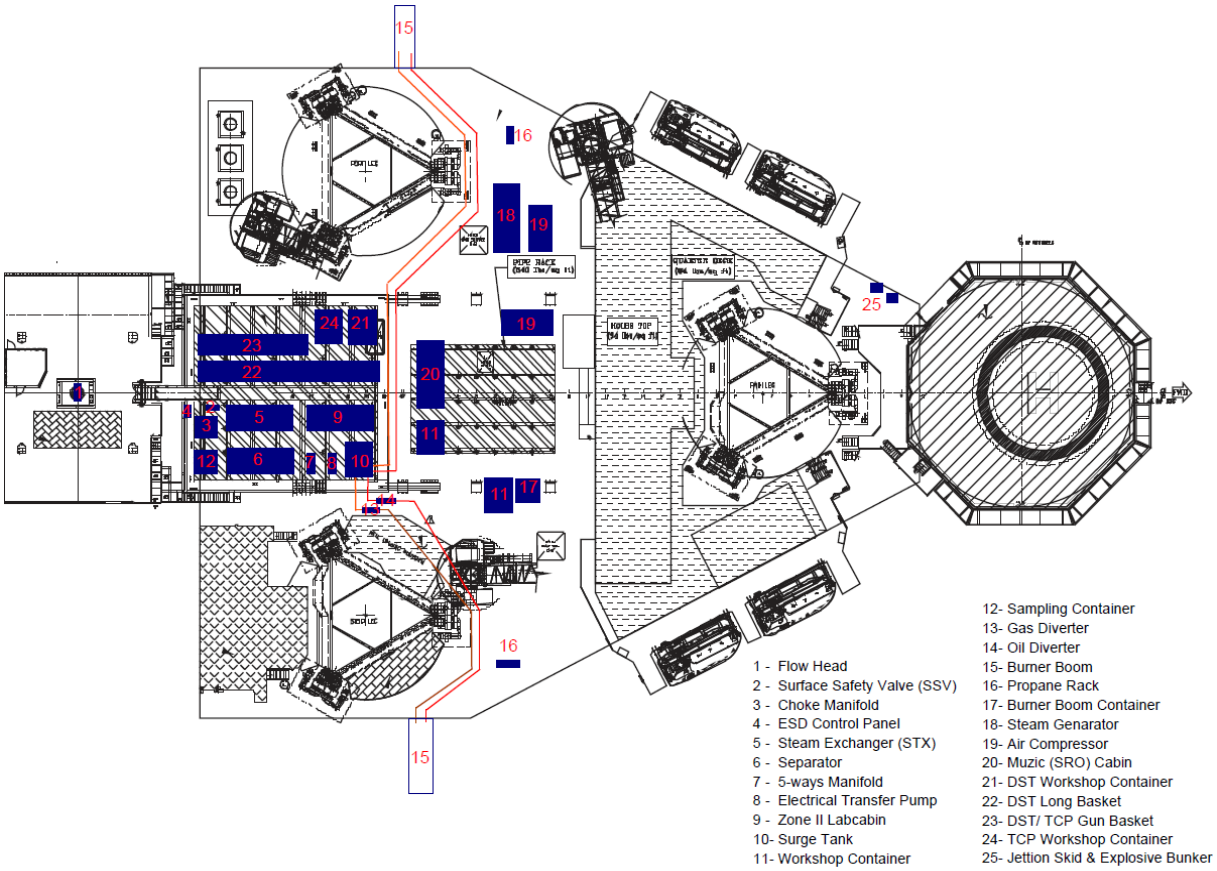


Figure 4-Typical view of Main Deck of a Jack-Up Drilling Rig

4.3.3 Project Activities and Drilling Program

The rig will be towed by two AHT's to the drill site. Upon arriving at the required location, the legs will then be jacked downward into the seabed floor to soft pin the rig, providing necessary stability and support for the rig. Once soft pinned the Rig will follow the rig contractor's pre-load procedure, ballasting the barge hull and lifting the barge hull above the water to the required air gap.

Site Survey and Geotechnical and Geophysical (G&G) site surveys were completed in Q1 2024. The G&G site survey confirmed a suitable primary well location, and two additional locations should construction of a relief well be required. A temporary safety exclusion zone

of 500m radius will be established around the rig location during the drilling operations always monitored by a 'standby' vessel.

Mobilization and the project logistics plan has not been finalized at this time. SGBU is considering options for mobilizing equipment and personnel via Suai, Timor Leste or Darwin, Australia versus any efficiency gained by conducting logistics operations from a Timor-Leste location. Once the project logistical arrangements have been determined, suitable advice will be provided. Offshore supply vessels will be sourced through competitive tender. Helicopters required for personnel transfer and medivac will be sourced from aviation contractors licensed to operate in Timor-Leste airspace.

SGBU are planning to commence project activities and rig move in late Q2 2025, based on the current rig schedule, the rig will be towed to location and positioned over the programmed well centre. Following soft pinning and pre load operations, the rig will jack up to the approved air gap of approximately 15 -18 m above mean sea level and begin to rig up, take on extra personnel, equipment, fluids, and chemicals in preparation for spudding the well.

Drilling activity of the Chuditch-2 well will target the Plover Formation to appraise the gas discovery encountered by Shell on the Chuditch-1 well. Its primary goals include confirming thicker gas pay in an upward direction from the original well toward its bounding fault and conducting a Drill Stem Test (DST) to assess the field's production potential.

The drilling process uses drilling bits of different sizes to drill a series of concentric holes from the seabed to the planned well total depth. During drilling operations, a fluid known as drilling fluid or mud is circulated through the inside of the drill string to the bit and returns to the surface. Drilling fluid performs several important functions including:

- Removal of drilled cuttings from the bottom of the well and transports cutting back to the surface, where they are then separated from the mud and discarded;
- Control of natural formation pressures, preventing the uncontrolled flow of oil or water into the borehole;
- Sealing permeable formations;
- Maintaining well stability;
- Cooling, lubricating, and supporting the drill bit and assembly; and

- Transmitting hydraulic energy to tools and bit.

The drilling fluid is prepared by mixing mud additives and chemicals on site to the desired concentrations in seawater. Only water-based mud (WBM) or synthetic-based mud (SBM), system will be used for the drilling campaign. The WBM does not pose a risk of contamination to subsurface formations or the environment. An engineering study of offset wells in the area indicate that synthetic based mud is required to mitigate risk of well bore stability in the 12 ¼" section due to reactive clays. The selected NADF is Saraline 185 V which is an OCNS E rated NADF.

4.3.3.1 Well Design

The objectives of the Chuditch 2 Appraisal Well at the Chuditch block location will be to confirm the gas anticipated from the seismic mapping, better define gas resources associated with the Chuditch-1 discovery and to perform a Drill Stem Test (DST) to evaluate the expected future production rates that may be achieved and potential commercial viability. The programme will include detailed engineering plans for the construction of the well, including casing and cementing strategies, drilling fluid selection, and well control measures. Figure 5 shows well design for Chuditch-2.

Before drilling commences a large conductor, pipe is lowered into the hole and cemented. This provides a conduit for the return fluid during the drilling of the next section. Wells are drilled in sections with predetermined decreasing sized drill bits used to drill a series of concentric holes from the seabed to the anticipated total well depth. After each section of the well is completed, the drill string is lifted and protective steel pipe or casing lowered into the well and cemented into place. The casing assists in maintaining well stability and helps to reduce fluid loss from the well bore into the surrounding rock formations.

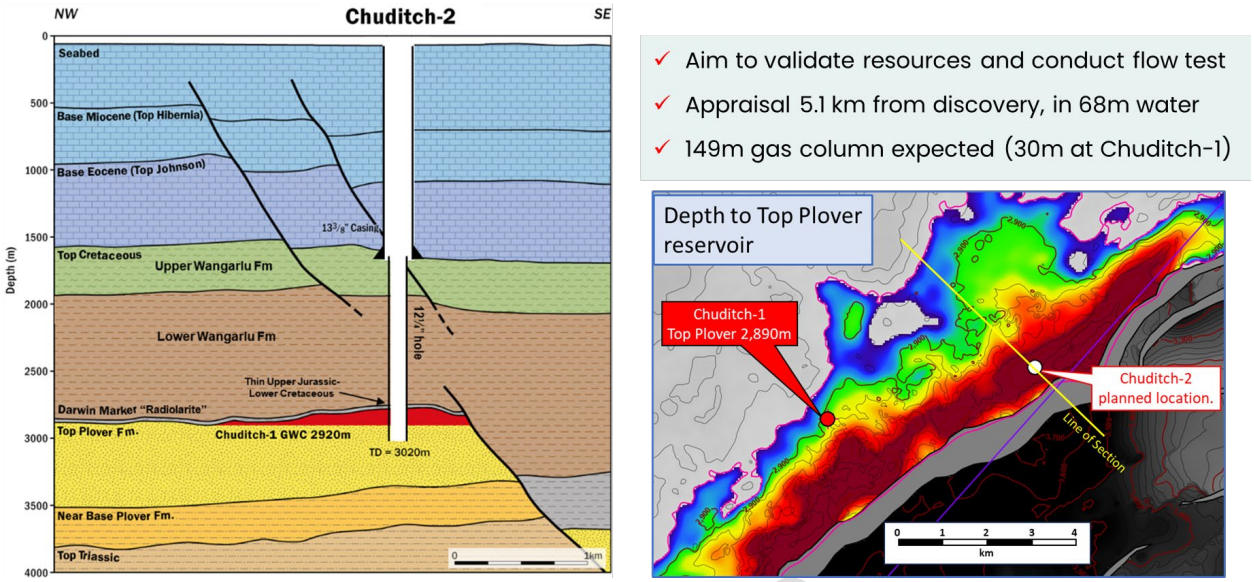


Figure 5-Well Design of Chuditch-2 Appraisal Well

4.3.3.2 Safety and Risk Management Procedures

Comprehensive safety protocols including design standards and equipment specification, peer review of designs and plans, formal risk assessment and HAZOP/HAZID have been or will be conducted prior to operations to identify and mitigate risks associated with offshore drilling activities, including emergency response plans. Well control procedures, tropical rotating storm planning, personnel training, and equipment maintenance schedules. Strategies to mitigate risk and ensure the safety and success of the operation in an environmentally responsible manner.

4.3.3.3 Logistic and Supply Chain Management

Plans for the procurement and transportation of equipment, materials, and personnel to and from the offshore drilling site are in planning and are not finalized. SGBU will plan to ensure efficient operations. The Chuditch-2 well is located 340km NW from Darwin, with travel times of 1.5hrs and 24hrs respectively, for helicopter and supply vessel.

In addition to the mobilisation, drilling and testing operations, normal operations will include loading and offloading of cargo vessels as well as mud and chemical transfers. It is anticipated that equipment and chemicals required during the drilling programme will be supplied to the rig by vessel from Darwin and will be transferred to the rig by crane.

The servicing of drilling operations will be conducted from Darwin / Dili where it will act as the receiving, storage and loading point for bulk materials and other equipment supplies required at the rig. Two support operation options are available and will be discussed with ANP. **Error! Reference source not found.** shows support supply base locations.

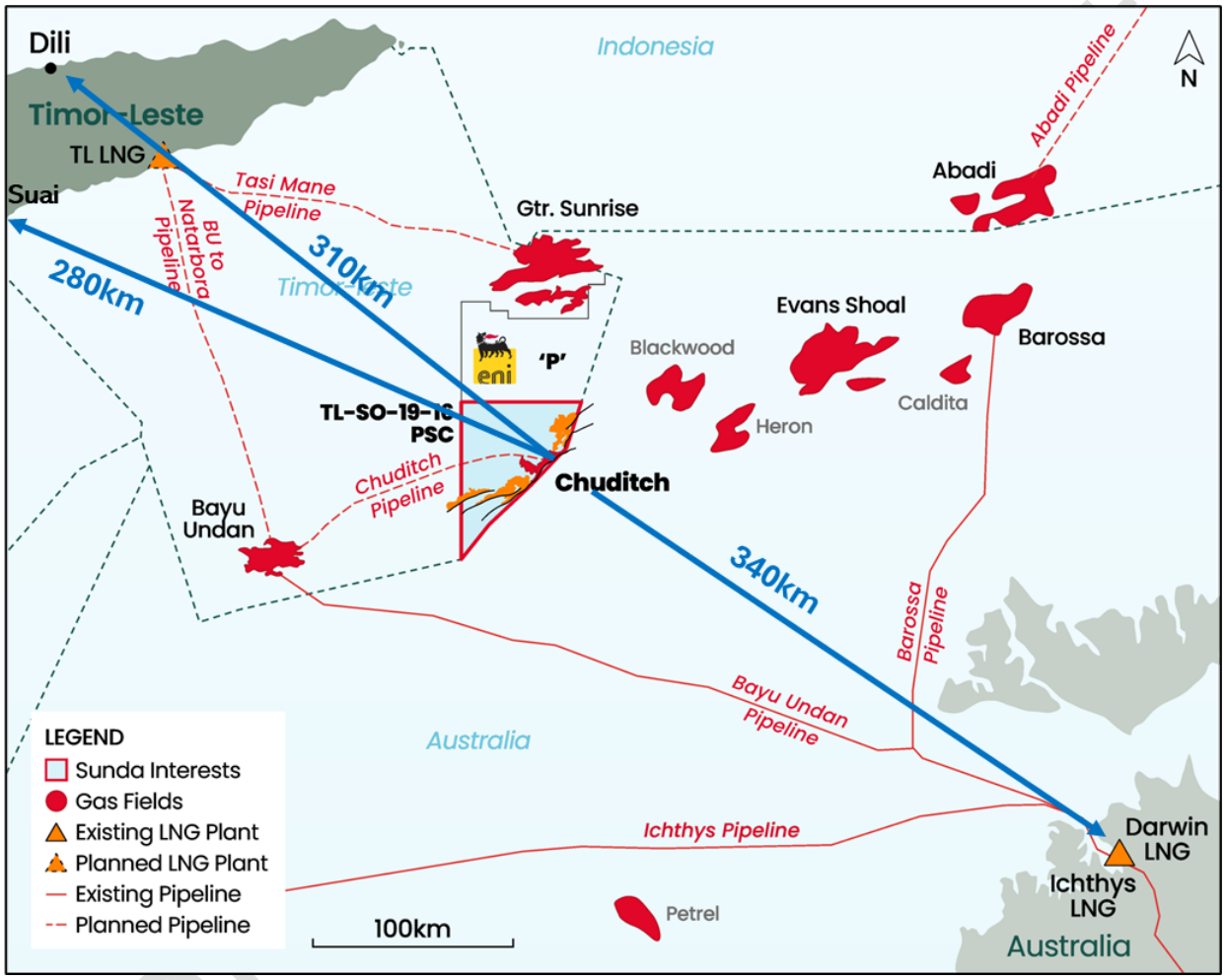


Figure 6-Support Supply Base Location

4.3.3.4 Drilling Resource Requirements

The majority of the resources required to drill the offshore appraisal well will be sourced from Australia owing to an absence of suitable service providers currently in Timor-Leste. This may limit opportunities for local participation to onshore support services such as water, and fuel supply.

The drilling rig will come self-contained with a highly trained and specialized workforce. Accommodation is supplied on the drilling rig, which will cater for two drilling shifts working on a 12-hour basis as well as daily operational and maintenance staff requirements. All other supporting drilling technical services will also be accommodated on-board.

4.3.3.5 Weather Monitoring and Contingency Plans

Monitoring systems to track weather conditions and develop contingency plans for adverse weather events, such as cyclones or tropical lows to ensure the safety of personnel and equipment. SGBU will contract with an appropriate weather forecasting company to provide metocean data for the project. Contingency planning for weather events will be in accordance with drilling rig procedures.

4.3.3.6 Community Engagement

Initiatives to engage with local communities and stakeholders, addressing concerns, and providing information about the location, intended drilling activities, duration, and their potential impacts.

4.3.3.7 Regulatory Compliance

Adherence to regulatory frameworks and obtaining necessary permits and approvals for offshore drilling activities, ensuring compliance with legal and environmental standards from the GoTL.

4.3.3.8 Drilling Schedule and Milestones

A timeline outlining the sequence of drilling operations, including key milestones and targets for completion of each stage of the drilling programme. Table 2 gives an Estimated Project Execution Timeline Detailed Operation Breakdown for Appraisal Well drilling.

4.3.3.9 Quality Assurance and Quality Control

Procedures to maintain the quality and integrity of drilling operations, including regular inspections, testing, and monitoring of equipment and processes.

4.3.3.10 Environmental Baseline Survey

An EBS study was conducted in January 2025 which includes water quality, sediment quality, and marine fauna. The EBS data obtained will inform the EIS, EMP and Monitoring

program. The Scope of Environmental Quality Baseline Study was approved by ANP in September 2024.

The primary objective of the EBS was to gather comprehensive baseline environmental data to enable effective post-drilling monitoring and impact assessment. The EBS will identify and document baseline conditions for water quality, benthic habitats, and sediment characteristics near the well site to assess potential impacts from drilling activities.

Environmental quality monitoring is planned to be carried out during drilling to understand if any changes are seen in environmental parameters of water quality, benthic habitats, and sediment characteristics near the well site to assess if any post drilling environmental quality monitoring will be required. The anticipated monitoring program during the drilling phase will include representative sampling of the EBS locations and associated testing.

4.3.4 Drill Plan Summary

The planned sequence of operations are as follows and the Estimated Project Execution Timeline Detailed Operation Breakdown for Appraisal Well drilling is given in Table 2.

The planned sequence of operations is:

- Mobilize a jack up rig to the Chuditch 2 well location. Position, preload and jacking up to the planned air gap height above MSL. Rig and deploy a tensioning deck to cantilever structure. Skid out cantilever with tensioning deck and prepare for well spud.
- Drill 17½" hole c/w MWD/LWD to planned section TD using Sea Water, pumping 50bbls Hi-vis sweeps every half stand. At section TD, the hole will be circulated clean and displace hole with 9.5ppg KCL/Polymer mud prior to running casing (wiper trip will be done if needed). ROV will be launched to for gas bubble watch and returns to seabed.
- Run 13⅜" casing with the compact housing (removal of all gate valves and blind off). Install casing clamp, activate the tensioning unit, and land the casing string on the tensioning unit. Cement 13⅜" casing with full bore cement head. Disconnect compact housing running tool. Retrieve and layout the casing landing string. Install the gate valves on wellhead. Install BOP adaptor/BOP and pressure

test connection between BOP and compact housing (The full BOP test is conducted offline). Run wear bushing.

- Make up and RIH 12 ¼" BHA to tag cement. Drill out the 13⅜" shoe track and 3m into new formation and conduct FIT.
- Drill 12¼" hole c/w MWD/LWD to a well TD using SBM with mud weight in the range of 9.5 – 9.8ppg (TBC). At the TD of well, circulate hole clean and POOH for logging (wiper trip to previous shoe will be done if needed).
- Wireline logging will be performed over the 12¼" open hole section as per program.
- RIH 12¼" wiper trip BHA, set a limitation of drag value, work through at any tight spot. At bottom, circulate hole clean. Flow check and POOH. (Subject to hole condition during logging, this step may be skipped).
- A 9⅝" casing string will be run and cemented in place, top of cement at 100m above 13⅜" shoe. Disconnect 9⅝" casing hanger running tool and layout landing string. Run and install 9⅝" pack-off assembly inside the compact housing and pressure test.
- Run wellbore clean out tools. Clean and circulate well until clean including BOP ram cavities. Displace well to packer fluid. POOH.
- Rig up wireline. Run CBL tools and POOH. Rig down wireline.
- Run guns and DST string. Set DST packer and pressure test. Fire the guns and perform well testing as per program.
- Kill the well and pull DST string.
- Set cement plugs, cut casings and recover wellhead/BOP for the well abandonment as per the program.
- Prepare for the rig move off location.
- Demobilize the rig.

Table 2-Estimated Project Execution Timeline Detailed Operation Breakdown for Appraisal Well drilling.

ESTIMATED TIMELINE FOR APPRAISAL WELL DRILLING		
Task	**No. of days**	**Execution Timeline**
	Activity	
Pre-Drilling		
Mobilisation	2	Day 2 – before spud
Preloading / rigging up	3	
Drilling		
17½" Hole section	5	Day 5 – before drilling with WBM
13 3/8" Casing	1	
18 ¾" BOP	1	Day 12 – After drilling with WBM/before SBM Discharge
12 ¼" Hole section	7	TBA
12 ¼" OH Logging	5	TBA
9 5/8" Casing	2	Day 26 – After SBM Discharge
9 5/8" CH Logging	1	TBA
Well Cleanup & Well Testing		
Well Cleanup	1	TBA
Well Testing	7	TBA
Abandonment		
Abandon well (Plug)	2	TBA
Rigging Down / Jack Down and Demobilisation	1	Day 38 - Demobilisation
Duration in total (approximately)	38	

4.3.4.1 Well Testing

Drill stem tests are typically performed on appraisal wells and are the key to determining whether a well has found a commercial hydrocarbon reservoir. It is usual that in the event of the presence of sufficient quantities of hydrocarbons a temporary drill stem test string may be run and the well fluids flowed to the surface and processed using a surface well testing package that involves the oil being stored and moved offsite and the associated gas being flared to the atmosphere.

SGBU plans to perform a Drill Stem Test (DST) on the expected gas-charged Plover reservoir interval in the Chuditch-2 appraisal well. The DST is currently being designed and

will be integrated into the overall well design by the SGBU well test engineer. The DST spread consists of two horizontal burner booms, one each to port and starboard of the Jack-up Rig, with dedicated gas lines complete with an ignition system to avoid 'dropout' during ignition for flaring gas and separate burner heads complete with ignition system for burning oil/condensate on each boom.

A standard triple phase separator rated at 1440 psi, complete with oil, gas and water outlets capable of 75 Mmscf/d of gas and 6000 bopd will be used. A full suite of SLB sourced, 2.25" ID, 10K DST of downhole test tools including the following test tools; HPPK packer, PTV, TFTV, PFSV, SCAR, IRDV, 2 x SHRV and 2 x DGA, which together provide isolation, tubing testing, downhole safety closure, downhole shut-ins, circulation, sampling and memory gauge conveyance.

The two DST gauge carriers will be run in the DST string with 4 x electronic pressure / temperature memory gauges in each carrier. All gauges will be linked to surface through the acoustic SRO system which gives real time bottom hole data read out throughout the DST. A full-bore DST sample carrier will also be deployed complete with bottom hole samplers. These samplers will be activated by applying a pre-determined annulus pressure.

Sufficient methanol will be brought onto the Jack-up Rig to mitigate the potential for hydrates formation. In general, drill string testing entails taking measurements while flowing hydrocarbons to the surface and flaring and is a primary source of critical data for the reservoir model and the principal means by how reservoir engineers adjust reservoir model parameters, understand the reservoir and employ the knowledge gained to optimise completion and development strategies.

During testing, operators measure formation pressure, characterize the formation fluids and reservoir and determine permeability and skin (damage to the formation incurred during drilling or other well operations). Data that indicate how the formation reacts to pressure increases and decreases during a test can also reveal critical information about the reservoir.

Once TD has been reached and casing set, drilling will be halted and well testers will rig up the well test spread. Packers are run to a pre-determined TVDBRT to isolate the zone to be tested. Guns are then run to the design depth and the formation perforated. The well is

flowed at different rates through a choke valve and surface equipment which can be adjusted to control the flow rate precisely and also provide positive well control.

Reservoir fluids produced to the surface are sent directly to a separator/surge tank, designed to function as storage/separation for produced liquids and gases until Well test engineers determine that contaminants such as drilling fluids are eliminated, or at least minimized, from the flow stream.

On the Chuditch-2 well, 3 clean-ups flow are programmed and produced gases and fluids including produced water will be redirected to the test separator where bulk fluids are separated into oil (if present), condensate, gas and water. The separator also facilitates the separation of any debris, such as sand and other material from the flow.

During the DST, reservoir fluids are produced to the separator at varying rates according to a predetermined schedule. Apart from clean-up flows, well testing will include build up, drawdown and absolute open flow (AOF)—the theoretical rate at the limit at which the well would flow if backpressure on the sand-face, or the borehole wall, were zero.

Note the maximum capacity of the well test choke and system is 50 million standard cubic feet of gas per day (50 MMSCFD) which will limit the AOF to the maximum flow rate of the test spread. The minimised flaring plan anticipates a total flare time of approximately 31 hours. The Table 3 below provides estimated flow periods and produced volumes.

Table 3-Provides estimated flow periods and produced volumes

Period	**Duration**	**Gas Rate**	**CGR**	**Gas Volume**	**Condensate Volume**	**Notes**
	Hours	**mmscf/d**	**Bbl/mmscf**	**mmscf**	**bbls**	
Initial Flow	1	0	0	0	0	Shut it when gas to surface
Clean-Up Flow	8	40	4	13.33	53.33	
Multi Rate Flow #1	6	10	4	2.5	10	
Multi Rate Flow #2	6	25	4	6.25	25	
Multi Rate Flow #3	6	40	4	10	40	
Sampling Flow	2	10	4	0.83	3.33	
Maximum Flow	2	45	4	3.75	15	
Total Cumulative Volumes				36.67	146.67	

4.3.4.2 Cement Program

Cementing is an important aspect of drilling hydrocarbon wells as the cement is used for a variety of purposes including to secure and support casing strings, isolate zones for production purposes and solve various hole problems. In the cementing process, cement is used with a variety of additives that act as corrosion inhibitors/accelerators/ retarders/ density adjusters and fluid loss additives, etc. An outline of the proposed cementing program is detailed below in Table 4.

The cementing program is for technical guidance only. The final slurry designs for each casing sizes will be based on tests utilizing rig cement and water samples, recorded temperatures or other means of determining accurate bore hole pressures, temperatures, final shoe depths, callipered hole volumes etc. The final cementing program will be issued to the rig prior to each individual cement job. The planned cementing programs are:

- 13⅜" casing will be cemented by full bore cement head c/w 12.5ppg Lead and 15.8ppg Tail slurry with TOC at seabed.
- Spacer for WBM shall be pumped prior to releasing bottom plug to improve cement quality.
- 9⅝" casing will be cemented by full bore cement head c/w 12.5ppg Lead and 15.8ppg Tail slurry with TOC at 100m above 13⅜" shoe.
- As the static bottom hole temperature is more than 110°C, blended class G cement will be used. Also, as the isolation of reservoir interval is required, the tail slurry will be included gas block additives and CO_2 anti corrosion additives.
- Spacer for SBM shall be pumped prior to releasing bottom plug to improve cement quality.

Table 4-Proposed cementing program

Hole Size (in)	Casing size (in)	Shoe depth (MD RT)	Slurry	Density (PPG)	TOC	Cement Type	Excess (%)	Comment
17½	13-3/8	1,60	Lead and Tail	12.5/15.8	250m Tail. Lead: Sea bed	Class G	50	
12¼	9-5/8	3,061	Lead	12.5/15.	350m	Class G	15	Including

			and Tail	8	Tail. Lead: 100m above previous shoe	blended		additives for gas tight and CO2 anti corrosion for Tail slurry
8½ Contingent	7	3,061	Single	15.8	Top of Liner hanger	Class G Blended	15	Same as tail slurry of 9⅝" casing.

4.3.4.3 Cement Plugs Program

Cement plugs to be set for isolation of perforation zones in 9 5/8" cased hole. A slurry at 15.8ppg shall be utilized for all plugs. In general, the blended cement will be used for the deep plugs. However, this type of cement can be used for the shallow plugs to avoid loading new cement.

The maximum length of cement plugs to be set is 200m which minimize the risk of cementing-in the stinger due to the extra time taken to pull slowly out of the plug.

After plug is in place POOH slowly (30-50ft/min) and break connections carefully to avoid stripping plug. Any delays shall be avoided as usually the slurry is designed with a short pump time to improve strength development.

Prior to testing a plug (tagging or pressure testing), time should be allowed for it to develop sufficient compressive strength of at least 500psi.

4.3.4.4 Chemical Usage

Various drilling chemicals are added to the mud as it is mixed on the rig in order to provide specific properties for drilling at different depths, through various rock types and reactive clays. The density of the mud will be monitored and adjusted to match the downhole conditions and maintain a 150psi overbalance. The drilling mud is stored in dedicated tanks within the drilling unit.

A summary of the types and quantities of current estimate based upon use of water-based mud in 17-1/2" hole section and SBM in 12-1/4" hole section the mud chemicals for consumption is provided in Table 5. The basic formulation for mud is lime, montmorillonite/ bentonite, caustic soda, barite, sodium bicarbonate and cellulose polymer, none of which are considered toxic. Additives including a bactericide and hydrocarbon based

defoamer are used in small amounts to prevent environmental impacts. Chemical use will be dependent on downhole conditions. Table 5 shows Mud Chemicals Consumption Summary.

Table 5-Mud Chemical Consumption Summary

Item	25kg sack	MT
Mil-Bar		183
Mil-Gel		49
Calcium Chloride		45
Carbo-Gel	107	
Carbo-Trol 375	107	
Carbo-Vis	54	
Caustic Soda	20	
Ecco-Mul R	646	
Mil-Lime	374	
NX Clean Up+A		3 m^3
Saraline 185V		1784 bbls
Soda Ash	20	
Sodium Chloride	52	
Xan-Plex D	100	
RX-03X		3 m^3
Contingency		
LC Lube		
Chek-Loss		
Calcium Carbonate		
Sodium Bicarbonate		
Citric Acid		
Mil-Bio SEA 98		

4.3.4.5 Plug and Abandonment

Once the DST is obtained, well test equipment is down rigged and back loaded. Upon completion of drilling activities, the well will be plugged and abandoned where a bridge plug or high viscosity plugs will be installed in conjunction with cement slurries to ensure that higher density cement does not fall in the wellbore.

The cement plugs will be set and tested as required by regulation and the P&A program. Finally, the casing is cut below the mudline and pulled to surface.

Once the well is secured for abandonment and all equipment retrieved, the rig will be prepared for moving to the next drill site location. This is a reverse of the installation process with the rig being jacked down and legs freed. The rig is then pulled off the location and moved to the next site by one or two anchor handling vessels.

4.3.4.6 Post Well Survey

The ROV will be deployed and conduct a post well seabed clearance survey in the vicinity of the well to ensure no dropped equipment or other object is left on the seabed. Video transects are downloaded to a separate storage device and made available for use in post project environmental monitoring if required and/or used in environmental monitoring reporting.

4.3.4.7 Rig Down and Rig Move

The Jack-up Rig then down rigs equipment, jacks down to the water and retracts the legs in a pre-planned sequence. The tow vessel takes tension on the bridle and moves the Jack-up Rig off location.

4.3.4.8 Well Control Event

The Plover is a normally pressured formation. In the event of encountering shallow gas whilst drilling Top hole, drilling into an unknown over pressured zone or equipment failure the Jack-up Rig may encounter a well kick or loss of control resulting in either partial loss of down hole fluids or in a worst-case scenario total evacuation of the hydrostatic mud column and well bore fluids migrating to the surface. Risks are considered in Jack-up Rig and equipment selection and all scenarios are considered in well design and drill pipe, casing selection, BOP specification and fully risk assessed. In the event of a well control situation, modelling of the loss of SBM and well bore fluids indicates the SBM, heavier than sea water, quickly settles to the bottom in a localised area near the well centre. The well is prognosed to be an almost dry gas well with a small fraction of condensates (<4%) and approximately 18% CO_2. Modelling indicates a condensate release will remain offshore and disappear rapidly through a combination of evaporation, bioremediation and entrainment in the water column. The weathered residues of the condensate will comprise mostly straight chain normal alkane (n-alkane) commonly called "paraffin wax". The paraffin wax residues in the condensate will always remain afloat as the product spreads out and thins while it weathers at sea. As the residual condensate increases in viscosity until the pour point is higher than the surrounding seawater it will begin to form thin clear sheets and white crystalline pancakes. These waxy sheets will then break up into small white waxy flakes due to the action of the waves and wind over time.

Condensate Hydrocarbons which cause most of the aquatic toxicity are usually the smaller aromatic and soluble components (one and two ring aromatics) or the poly aromatic hydrocarbons. The condensate is prognosed to be 82% by mass of volatile and semi volatile compounds, which are the compounds considered toxic. However, these compounds will evaporate rapidly on the sea-surface. Hence, the weathered

residues of the condensate are considered to not have these components present at levels that would pose a significant aquatic toxicity risk.

The Dry gas component including CO_2 will rapidly rise to the surface and combine with atmospheric gases in the event of a subsea release and will not remain entrained in the water column.

4.3.4.9 Side Track

Should the drill string become stuck in hole and efforts to free it are unsuccessful, it may be necessary to use either a shaped explosive charge or a specialised mechanical cutter to separate drill pipe above the stuck pipe. After recovering remaining drill pipe above the stuck pipe, a contingency, which will be considered in the event of loss of the drill string, will be to run back in hole to a planned depth and kick off a side track and use directional drilling techniques to continue drilling to target. There is no additional risk to the environment in a contingency side track.

4.3.4.10 Unplanned Anchoring

Should a supply vessel experience a loss of power or propulsion and be close to the rig on the upwind side, it may be necessary to drop an anchor to halt drift. Vessels of the size to be employed for the project will have enough anchor chain and rode to allow a 3 to 1 scope. In water depths of ~68m the majority of the chain will remain off the seabed ensuring a minimised drag zone and impact to the seabed. The anchor will, under tension, bury to an unknown depth in the seabed, if no or minimised dragging occurs, impact to the seabed will be of minimal disturbance and the immediate locality will recover rapidly with no meaningful effect on the infauna or benthic population.

4.3.4.11 Diesel/NADF/SBM Spill

Spill modelling for credible unplanned discharges to the environment show that in all modelled scenarios, diesel and NADF spills remain well offshore with a diesel spill remaining at surface level and weathering/evaporating within 5 days. NADF similarly lost approximately 45% of total volume within a 5-day period. NADF at ~6.8 specific gravity (sg) is significantly lighter than sea water and thus remains at surface level where wind/wave/ current and sun combined with high levels of biodegradation of the Saraline 185V to rapidly disperse the spill within a 5-day period (MuTek, 2024).

4.3.5 Rig Specification

SGBU is currently in negotiation to use a jack-up drilling for the Chuditch 2 Appraisal well. The rig under negotiation design specifications and rig equipment suitable for the drilling of the Chuditch well, which is of normal temperature and not over pressured. A safety case for the rig is being prepared and will be submitted shortly to GoTL.

Drilling rig equipment is as follows:

4.3.5.1 Mud Pump

The rig under negotiation is fitted with four National Oilwell model 14-P-220 Triplex mud pumps, each with a continuous 2,200 HP rating capable of operating at a maximum working pressure of 7,500 Psi or of similar specification depending upon the rig contracted. An extract from the Rig IADC report provided the Table 6 below.

Table 6-High Pressure Mud System

HIGH PRESSURE MUD SYSTEM		
System working pressure	Psi	7500
System test pressure	Psi	7500
Mud Pumps		
Quantity		4
Make		National Oilwell
Model		14-P-220
Type (Triplex/Duplex)		Triplex
Mud Pump drive motors/pump		2
Motor type		General Electric 752 Hi Torque Shunt Wound Motors
Continuous Power Rating	Hp	2200
Fluid End Type		Plungers
Maximum Working Pressure	Psi	7500
Test Pressure	Psi	7500
Pump stroke centre type		Rigserv
Supercharging pump type		Halco Centrifugal Pump
Driven by Motor of Power	Hp	100
Discharge/suction line ID	In	5-1/8in. / 5-1/8in.
Mud Pump Pulsation dampener type		Hydril K20-7500 KPD
Reset Relief Valve		Taylor Valve – Rupture Pin
Max. Pump Speed	SPM	90
Working flowrate per pump		1155gpm @ 2660 psi – 514gpm @ 6000 psi
Available liner sizes		5-9''
Liner size # 1	In	5 ½''
Pressure rating	Psi	7500
Working flowrate (volume per stroke)	Bbls/stk	0.098
Relief Valve Setting (90% max. liner rating)	psi	6750

4.3.5.2 Mud Tanks

The drilling rig is fitted with 10 storage mud tanks with a total capacity of 5,095 Bbl. Table 7 below, extract from the Rig IADC Equipment report, detailing storage capacity.

Table 7-Summary of Mud Tanks

Mud Processing Tank		
Gumbo Trap	Yes/no	Yes
Sand trap tank, usable volume	Bbl	230
Degasser tank, usable volume	Bbl	See total capacity below
Agitated	Yes/No	No
Desander Tank, usable volume	Bbl	See total capacity below
Agitated	Yes/No	No
Mud Cleaner tank, usable volume	Bbl	See total capacity below

Agitated	Yes/No	No
Centrifugal tank, usable volume	Bbl	See total capacity below
Agitated	Yes/No	No
Other tank, usable volume	Bbl	See total capacity below
Agitated	Yes/No	No
Total Usable Capacity	Bbl	418
Mud Tanks		
Quantity		10
Total capacity (usable volume)	Bbl	5096
Usable capacity # 1	Bbl	745
Type (Active/Reverse)		Active
Height	Ft	15
Mixer	Yes/no	Yes
Mud guns	Yes/no	No
Discharge from flowline	Yes/no	Yes
Usable capacity # 2	Bbl	447
Type (Active/Reverse)		Active
Height	Ft	15
Mixer	Yes/no	Yes
Mud guns	Yes/no	No
Discharge from flowline	Yes/no	Yes
Usable capacity # 3	Bbl	198
Type (Active/Reverse)		Active
Height	Ft	15
Mixer	Yes/no	Yes
Mud guns	Yes/no	No
Discharge from flowline	Yes/no	Yes
Usable capacity # 4	Bbl	198
Type (Active/Reverse)		Active
Height	Ft	15
Mixer	Yes/no	Yes
Mud guns	Yes/no	No
Discharge from flowline	Yes/no	Yes
Usable capacity # 5	Bbl	447
Type (Active/Reverse)		Active
Height	Ft	15
Mixer	Yes/no	Yes
Mud guns	Yes/no	No
Discharge from flowline	Yes/no	Yes
Usable capacity # 6	Bbl	745
Type (Active/Reverse)		Active
Height	Ft	15
Mixer	Yes/no	Yes
Mud guns	Yes/no	No
Discharge from flowline	Yes/no	Yes

4.3.5.3 Shale Shakers

Four AX-1 Triple Deck Shakers are fitted to the rig. These shale shakers can be operated in parallel or series mode. The screen size will be selected at the minimum screen mesh size practical to minimize OOC. OOC will be monitored closely whilst drilling / circulating operations are ongoing. Samples from all the solids control discharges will be taken, analysed, and reported daily when drilling the 12 ¼" section where SBM is required to monitor and ensure that oiled cuttings discharged overboard remain, on average, within the 9.2% by wet weight as specified in the ANP approval of the use of Saraline 185 V and discharge overboard. Table 8 extract from the Rig IADC report – Shale Shakers.

Table 8-Shale Shakers

Shale Shakers		
Primary		
Quantity		4
Make		Axlom (NOV)
Model		AX-1 Shale Shaker
Type		Triple Deck
Nominal Flow Rate (Total)	Gpm	

4.3.5.4 Blow Out Preventer (BOP)

There will be two units (i.e., one double and one single) of high-pressure Blowout Preventers (BOP), and all appropriate components are H_2S rated. Both are 18 ¾ inch Type "U", and each BOP has a working pressure of 10,000 psi. Table 9 extract from Rig IADC report.

Table 9-Ram Type Preventer

Ram Type Preventers	
Quantity	1
Model	Type "U"
Type (Single/Double/Triple)	Double
Size	18 ¾''
Working Pressure	10,000 psi
Annual Preventer	
Quantity	1
Type	0
Size	18 ¾''
Working Pressure	5,000 psi

4.3.5.5 Engine and Generators Unit

The rig power generation system consists of 5 Caterpillar Model 3608 Diesel fuelled internal combustion engines coupled to hi output alternators. The generation plant is situated within the internal levels of the rig structure where noise is negated by several compartments of varying size between the noise source and the exterior. The exhaust stacks emerge from the upper level of the rig structure and hot exhaust gases are exhausted via tubular exhaust stacks high above workspaces in open air.

Each of the five engines driving generator packs have a maximum continuous power of 3,395 hp at 900 rpm. Each AC alternator generates a continuous rating of 2,400 kW at 600 volts and 900 rpm.

4.3.5.6 Solids Treatment Equipment

Currently under consideration by SGBU engineers and Rig dependant as the efficiency of rig fitted shakers will influence the design of the solids control equipment spread. As a function of the approval to employ the NADF Saraline 185 V, SGBU has committed to the discharge of 9.2 % NADF by wet weight of cuttings or less for SBM contaminated drill cuttings averaged over the usage of SBM during drilling.

4.3.5.7 Drilling Fluid

This project will use both Water Based Mud (WBM) in the 17 1/2" section and Synthetic Based Mud (SBM) when drilling the 12 ¼" section through technically challenging formations.

Water Based Mud

.. The firm plan is to utilise riserless drilling from seabed in 17 ½" open hold to the 13-3/8" casing setting depth (109 – 1,600 m MDBRT) using Seawater and Hi-Viscosity sweeps. The 13 3/8" casing will be set at 1650m MDBRT and cemented in place. As a contingency, Water based mud will potentially be used in 26" hole for 20" casing, planned setting depth at 197 m.

Riserless drilling will use WBM will be seawater and high viscosity sweeps, which contain Bentonite, Caustic Soda, Soda Ash, Drill Water and Xan-plex D. The mix has a specific

gravity of 8.5 to 9.5 ppg and will be discharged to seabed at the depth of approximately 109 m MDBRT.

Synthetic Based Mud (SBM)

Saraline 185 V will be used in the construction of the 12 ¼" section of the Chuditch-2 well which is an OCNS "E" rated substance. Saraline 185V was the subject of an application for use by SGBU granted by ANP on 19th July 2024. ANP reference ANP/HSE/S/24/106 - Approved for Offshore Discharge.

Saraline 185 V is an 'E' rated (Lowest Environmental Hazard) product under the OCNS (Offshore Chemical Notification Scheme) and approved for offshore discharge in more than 40 countries due to its extremely favourable environmental profile. Table 10- Saraline 185V Properties.

Table 10-Saraline 185V Properties

Property	**Test Protocol**	**Results**
Biodegradation		
Aerobic (Freshwater)	OECD 301F	75% after 28d (Readily biodegradable
Aerobic (Marine Water)	OECD 306	64% after 28d (Readily biodegradable)
Aerobic (Soil)	OECD 307	Half-life (DT50) = 21d (Based on 1000mg/kg initial dose)
Water Column Toxicity		
Acartia Tonsa	PARCOM, ISO 14569	48h EL50:>1,000mg/L (non-toxic)
Skeletonema costatum	OSPAR/PARCOM	72h EL50:>1,000mg/L (non-toxic)
Mysidopsia Bahia	US-EPA 2001 40 CFR 435	96h lC50:>1,000,000ppm of 10% SPP (non-toxic)
Pagrus Auratus	US-EPA 2003	7d lC50:>100,000mg/L (non-toxic)
Daphina Magna	OECD 202	48h EL50:>1,000mg/L (non-toxic)
Brachydania Reria	OECD 203	96h LL50:>1,000mg/L (non-toxic)
Sediment Organism Toxicity		
Caraphium Valutator	PARCOM Protocol 1995 (A)	10d lC50>20,000mg/kg (wet basis)
Bioaccumulation Potential		
Octanol-water partition coefficient	OECD 117	Log Kaw>6.5 (not bioaccumulative due to poor bioavailability)

Low Toxicity

Its linear structures result in low toxicity to fish, invertebrates and algae in the water column and sedimentary toxicity testing. Notably, Saraline 1985 V does not bioaccumulate in marine organisms.

High Biodegradability

Saraline 185V is readily biodegradable in both marine water (OECD 306 test) and fresh water (OECD 301F test). Saraline demonstrated excellent bioremediation properties even considering onshore land farming methods as proven in studies in Bangladesh, China and New Zealand (Sanzone, et. al., 2016).

SBM consisting of Saraline 185V NADF, Carbomul HT, Deltaver, Carbogel, Deltalift, Carbotrol 375, Lime, Calcium Chloride and Barite will be used from the depth of 1650m, in the 12 ½" hole until TD is reached at approximately 3,010m TVDBRT. Whilst in use the SBM will be circulated in a closed system and returned over the shale shakers. The cuttings will be treated to a maximum of 9.2% wet weight, oil on cuttings before discharge overboard to the seabed from a discharge depth of 5m below MSL. Note: Only cuttings will be discharged. SBM will be separated from cuttings as the cuttings and mud move across the shaker screens and SBM will be returned to the active system for re-use.

At the conclusion of the drilling project the total remaining volume of SBM will be returned to the service provider's onshore storage facility prior to rig release. The SBM will then be recycled, reused, or resold. Table 11 provides physical properties of Saraline 185V and Table 12 provides a comparison of Saraline 185V to Diesel and LTMO.

Table 11-Saraline 185V Physical Property

Typical Properties	Saraline 185V	Remarks
Product Type	Synthetic Paraffin	Higher purity, consistent quality
Density @ 15°C, kg/m3	778	Under/ near balanced drilling
Flash Point, °C	85 - 93	Improved worker and assets safety
Viscosity @ 40°C, cSt	2.6 – 2.8	Higher drilling efficiency
Pour Point, °C	-30	Better cold flow properties
Aniline Point, °C	95	Enhanced elastomer compatibility, less non-productive time.

Table 12-Comparison of Saraline 185V to Diesel and LTMO

Property	Diesel	LTMO*	Saraline 185V	GTL Advantages
Flash point, °C	56 - 75	70 - 115	85	Improved safety
Aromatics, ppm wt Total PAHs ppm (Grimmer series)	$3x10^5$ - $6x10^5$ 680 - 3000 (NA)	50 - 1,000NA(NA)	200 ~0.002 (<0.2 ppb)	Lower toxicity, Improved worker safety
BTEX, ppm	400 - 2,500	Non-detect	Non-detect	Lower toxicity, Improved worker safety
Density at 15°C, kg/m³	800 - 865	804 - 814	790	Lower mud density
Viscosity, cSt, 40 °C	1.9 - 4.1	1.68 - 3.6	<2.8	Fast, consistent drilling
Pour point, °C	−12	−27 - -20	−24	Good performance in harsh environments
Aniline point, °C	61	72 - 91	94	Improved elastomer compatibility

4.3.6 Drilling Waste Management

The various wastes stream that are likely to be generated from the Jack-up Drilling Rig and the main types of wastes produced will include:

- Drill cuttings mainly comprised of shale, limestone, sand and clay;
- Waste mud generated as a result of return drilling fluid from the well;
- Drilling wastewater as a result of washing the drilling cuttings. Silt and sand will contain chemical ingredients from the drilling fluid and needs treatment before discharge;
- Chemical sludge generated from the wastewater treatment;
- Hydrocarbons such as waste oil from oil changes and leakages from equipment. Used oil is designated as hazardous;
- Non-hazardous solid waste such as paper wood and plastics;
- Hazardous waste including hazardous ingredients such as fluid or testing chemicals and containers previously holding hazardous material; and
- Biodegradable waste such as food scraps;
- Wastewater will be treated by the rig waste disposal system and discharged into the sea after treatment to MARPOL standard. Excess WBM will be pumped straight into the sea as the chemicals used are biodegradable, non-toxic and environmentally benign. In the case of hazardous drilling wastes, these will be collected, stored and transported ashore for disposal by a Government Approved waste disposal company.

- Used fuels and chemicals will be stored in containers in areas lined with impervious floors and surrounded by containment dykes on the rig. Recyclable material will intermittently be transported to the supply vessel and materials include used filters, paper, cardboard, and plastic.
- Oily water will be treated by oily water separators and the overboard discharge from the oily water separators will be monitored by an oil-in-water monitor. It is intended that the overboard pump will automatically shut down if the concentration of oil in discharged water exceeds 15 parts per million (ppm) oil in water.
- Sewage Treatment Unit with vacuum collection system is installed on the rig.

SGBU is still in process of contracting for Waste management services for return of waste streams from the drilling operation.

All rig operators conform to MARPOL and other international standards for Waste segregation and management. Figure 7 below provides a flow diagram for waste management plan which will be representative of rig waste management operations. The project EMP and Environmental monitoring program will provide details of the waste management process to be implemented.

Waste Management Plan

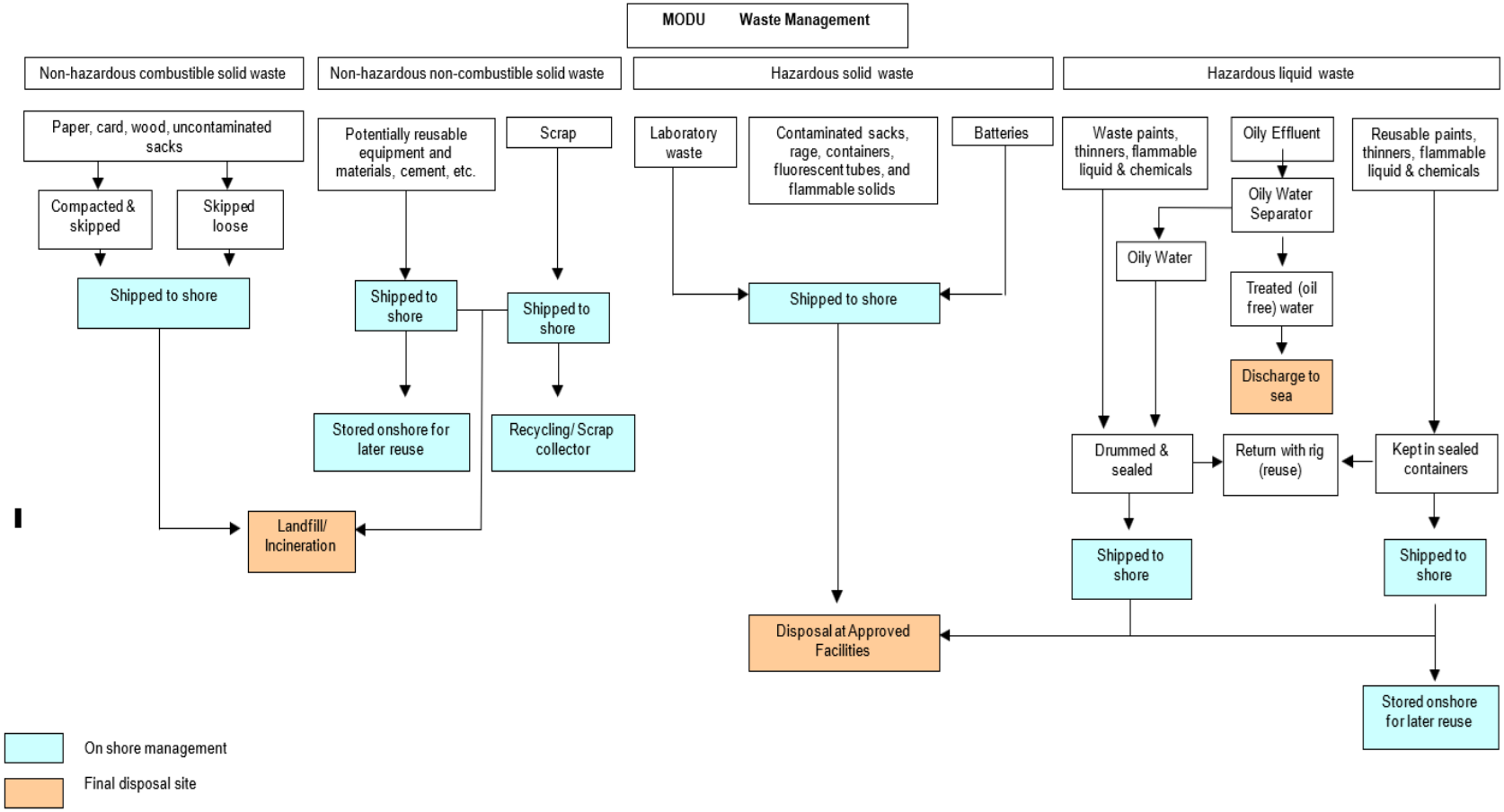


Figure 7-Representative Jack-Up Rig Waste Management Plan

4.3.6.1 Drainage System

The drainage system on the rig provides controlled contaminated water collection and treatment system with dedicated discharge points as a means of reducing the likelihood of uncontrolled discharge of contaminants into the environment to a level that is as low as reasonably practical.

At the helideck, an effective drainage system is important to prevent water and aviation fuel ponding on the landing surface. Therefore, the helideck on the Jack up rig is designed to always remain free from standing water and fuel accumulations. It is facilitated with gutter and drip trays to prevent spilled or leaked materials from entering the water. The drains will be penetrated by a valve and will be discharged overboard directly. The contaminated water will be collected in a catch tank and transferred to the portable container.

At the main deck, deck drain will capture various fluids and other materials that are spilled or washed onto the deck. In order to prevent the uncontrolled discharge of the deck drain, a perimeter drain system and separate drainage systems for each process area are facilitated to direct the deck drain.

These deck drains will be collected and filtered prior to discharge and the contaminated water will be stored in a drain holding tank.

The heavy machinery and equipment area is equipped with the pollution drip pans i.e. rotary table drip pan, draw-works drip pan, etc. The drain at this area is collected via these drip pans under the rig floor before being treated by a separator tank. In term of the mud process area, the drain is directed to a drain slump for treatment. All the contaminated water and pollutants from these two areas will be finally transferred into a mud contaminated drain tank while treated drain will be discharged overboard.

4.3.6.2 Jack-Up Rig Effluent Management

In the absence of internationally accepted regulation of discharge from MODU's in open ocean, discharge limits/guidelines as stipulated in MARPOL have been adopted for screening criteria for the Chuditch-2 Appraisal well project.

During operation, measures aimed at minimizing harmful effects to the receiving environment will be put in place in regard to controlled discharge of liquids such as drilling fluids and cooling water from the vessel and rig.

All liquid discharges will be in accordance with the applicable MARPOL requirement or other applicable standard such as World Bank EHS Guideline for Offshore Oil and Gas Development.

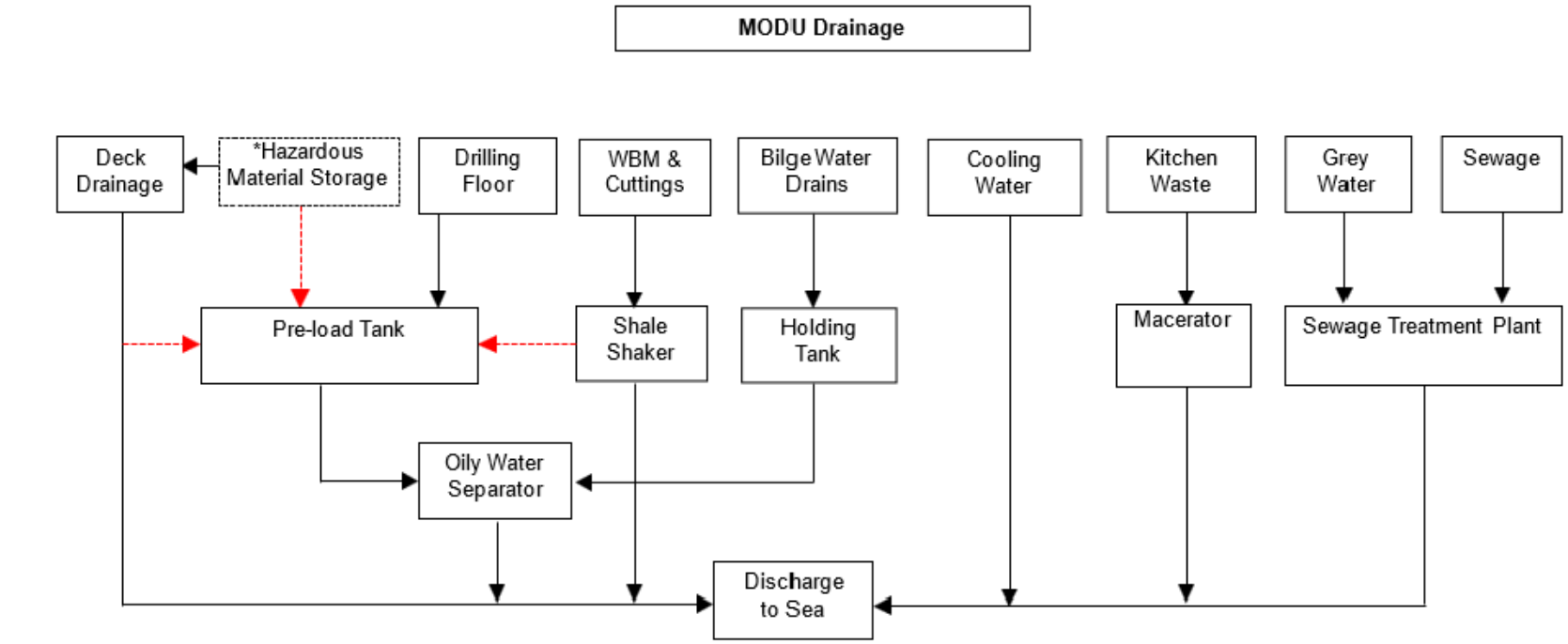
Hazardous materials such as chemicals and used oil will be segregated and transferred back to shore for treatment, recycling and disposal as relevant.

Oily/contaminated water will be routed to the oil/water separator and treated to separate the oil which will be transferred to the waste oil tank for transfer to shore for recycling/disposal. Contaminated water will then move to the greywater treatment unit for further treatment before discharge. Grey and Blackwater will be treated and discharged in accordance with MARPOL. MODU Effluent management Plan is given in Figure 8.

Cleaners and detergents may have an effect on the environment. SGBU will ensure that all chemicals, cleaners and surfactants to be used offshore are approved by the ANP.

Rig wash, a widely used, non-hazardous liquid cleaner, is routinely employed on Jack-up Rig's and offshore vessels in the maintenance of apparatus and machinery as well as deck areas subject to contamination from crew boots, oil and other products. Wastewater from cleanup on the Jack-up Rig will be captured by deck drainage and channelled to the oil/water separator where oily substances can be captured, treated, and managed to avoid marine environment contamination. Any chemicals or cleaning agents to be used in this regard will not violate environmental standards on safety or environmental harm and hence will not cause ecological effects.

MODU Effluent Management Plan



Notes:

* Hazardous material storage within deck area

Should water be contaminated, it will be routed for treatment using oily water separator before discharge to sea

Figure 8-Jack-Up Rig Waste Management Plan

4.3.7 Project Size

The appraisal drilling of Chuditch-2 is located within the contract area which has an area of approximately 3571 km^2. The appraisal well is expected to be drilled in 68m water depth and to a target depth of approximately 3,010m in the Plover Formation.

4.3.8 Project Location

The proposed surface location for Chudith-2 well is 5.1 km east of the Chuditch-1 well in approximately 68m of water depth. The well is in Timor-Leste waters approximately 700 m from the delineator between Timor-Leste and Australian Exclusive Economic Zones (EEZ). The Chuditch prospect is located largely below 185 km of south coast Timor-Leste and part of the PSC-TL-SO-19-16 Production Sharing Contract area in the northern Bonaparte Basin. The Chuditch-2 field is located on the Sahul Platform in the Timor Sea, 80 km southwest of Greater Sunrise and 140 km east-north-east of Bayu-Undan. Figure 9 shows the location of the Chuditch-2 appraisal well in relation to the EEZ boundary and the Oceanic Shoals marine park.

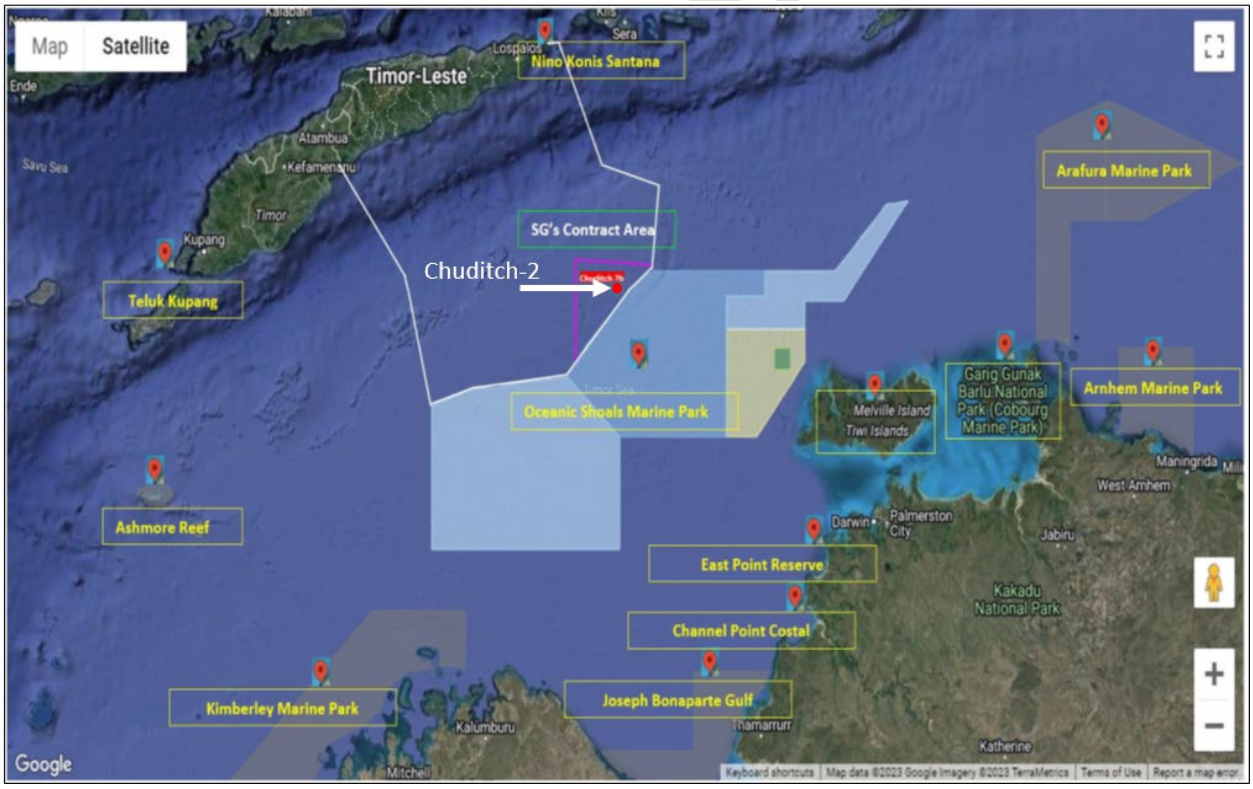


Figure 9-Proposed Chuditch-2 Well Location in reference to EEZ and Oceanic Shoals Marine Park

4.4 Justification and Need of the Project

Petroleum industry has been identified as a key component in Timor-Leste Strategic Development Plan (SDP) 2011-2030 for economic development to move the country from low-income to a middle-income nation. The revenue from the petroleum sector can contribute greatly to health care, education, and security of Timor-Leste's people. Additionally, the petroleum sector will be able to create opportunities for the people in Timor-Leste to improve their living standards through high-level employment as well highly skilled professionals. Human resources improvement through training in geology, petroleum and chemical engineering, petroleum finance, and business and project management, as well as for operational staff. Timorese with these trainings and skilled will be valuable in petroleum industry, not only in Timor-Leste but around the world.

This project will directly assist Timor-Leste in reaching the stated target in the SDP: The private sector will be the primary source of growth in incomes and employment for Timorese. Moreover, SGBU had signed with Government of Timor-Leste through MPRM the MoU of production to supply raw material/gas to the future LNG plant in Natarbora, Manatuto.

4.5 The Proponent's Endorsement of EMP

SundaGas Banda Unipessoal, Lda (SGBU), is committed to being a safe and responsible operator in Exploration & Production in Timor-Leste.

Hence, SGBU endorses the contents of this report and will abide by all recommendations contained herein.

Name	**Andy Butler**	**Signature**
Title	Managing Director SundaGas Banda Unipessoal, Lda	
E-mail	andy.butler@sundagas.com	

4.6 The Structure of the EMP

Per Decree Law No. 32/2016 on Offshore Petroleum Operations in Timor-Leste and Ministerial Diploma No. 46/2017 Article 8 and Annex 6, the minimum content of an EMP is as follow:

No.	Sections
1.	Executive Summary
2.	Details of the Project Proponent
3.	Details of the Consultant for EIS and EMP
4.	Project Description
5.	Legal Requirements
6.	Existing Environmental Description
7.	Institutional Roles and Responsibilities
8.	Summary of Impacts
9.	Proposed Mitigation Measures
10.	Governing Parameters
11.	Monitoring Program
12.	Reporting Requirements
13.	Responsibilities for Mitigation and Monitoring
14.	Emergency Plan
15.	Decommissioning Plan
16.	Capacity Development and Training
17.	Public Consultation & Information Disclosure
18.	Complaints and Grievances Mechanism
19.	Work Plan and Implementation Schedule
20.	Cost Estimates
21.	Review of EMP
22.	Non-Technical Summary

5. LEGAL REQUIREMENTS

Table 13 provides a summary of the applicable laws and regulations in Timor-Leste on the drilling of the Chuditch-2 Appraisal well. This table also includes the international standards and guidelines that are relevant to the proposed project.

Table 13-Applicable Timor-Leste Laws, Regulations, and International Standards and Guidelines.

Treaty/Act/ Legislation	Relevance to the project
Timor-Leste Legislation and Regulations	
Decree Law No. 39/2022 - the first alteration of the Decree Law no. 5/2011 about Environmental Licensing.	Categorization of the project according to severity of the environmental impacts. Procedures and information requirement for Category A project Provides the Environmental Licensing procedure
Decree Law No. 5/2016 – National System of Protected Areas (Appendix 1 – List of Timor-Leste Protected Areas)	Defines for the protection of the terrestrial and marine protected areas
Decree Law No. 26/2012 on Basic Environmental Law	Defines sustainable use of natural resources, conservation and preservation of natural resources
Decree Law No. 6/2020 Legal Regime for protection and the conservation of biodiversity	To protect and conserve the biodiversity, including marine species and their habitat around the drilling project.
Decree-Law No.32/2016 Offshore Petroleum Operations	Sets the requirements, including the Environmental impact statement, Environmental Management Plan, Environmental monitoring, and Oil Spill Contingency Plan.
Diploma Ministerial No.45/2017 – Rules and Procedures of the Evaluation Committee for Project with Category A	Defines Category A project for drilling activity.
Diploma Ministerial No. 46/2017 - Regulation on the Detailed Requirements for Screening, Scoping and TOR, EIS and EMP.	Mandates requirements and obtaining approval for TOR, EIS and EMP
Diploma Ministerial No.47/2017 – Public Consultation Procedure and Requirement during Environmental Baseline Process	Specifies the procedures and requirement of involvement of public and communities into different stages of the environmental assessment process through public consultation.
International Industry and Guidelines Documents	
Protection of the Sea (Prevention of Pollution from Ships) Act 1983 i.e. MARPOL	MARPOL is an international convention covering prevention of pollution of the marine environment by ships from operation or accidental causes. The

	convention governs the prevention of marine environment pollution from oil, liquid substances, harmful substances in packed form, sewage, garbage and air pollution.
Climate Change Kyoto Protocols. Government Resolution of National Action Plan for Climate Change	Implement measures in order to reduce the GHG emissions.
WHO Air Quality Guidelines (AQG)	The air quality benchmark used as reference by the project proponent is the WHO air quality guidelines.
United Nations Convention on Biological Diversity (UNCBD)	As the project could have impacts on the flora and fauna or risk to the loss of biodiversity, it is fundamental principle for the project proponent to prevent or minimize the risk of biodiversity loss during the project implementation
United Nations Framework for Climate Change Convention (UNFCCC)	The project activities release GHG emissions which could be one of the contributing factors to the country's climate change issue. Minimization climate change risks by reducing the GHG emissions are an essential part of the project environmental objective and target.
International Union for Convention of Nature (IUCN)	Timor-Leste is responsible to protect its ecological components that any drilling activity can impact, hence the necessity to have EMP and Environmental Monitoring Plan.
ANZECC and ARMCANZ (2000) – Australian and New Zealand Guidelines for Fresh and Marine Water Quality	The water and sediment quality parameters are adopted for the purpose of this project. The 'trigger values' are used as a benchmark for all the parameters used for environmental baseline survey as well as monitoring program.
Offshore Chemical Notification Scheme (OCNS) and Chemical Hazard and Risk Management (CHARM)	The OSPAR Pose Little or No Risk to the Environment (PLONOR) list which will be used by SGBU to evaluate chemical discharge to the marine environment around the proposed project location.

In addition to legal requirements, the SGBU Standard Operation Procedures (SOPs) and HSE Plan, Emergency Plan will be followed.

6. EXISTING ENVIRONMENTAL DESCRIPTION

This chapter is prepared using secondary, published information and according to the approved Terms of Reference (TOR) - Drilling Activities PSC TL-SO-19-16 dated November 2024, along with data and information from the Chuditch - 2 Environmental Baseline Survey (EBS) Technical Report dated March/April 2025.

The Timor Sea and its tropical marine environment support significant and growing economic activity including oil and gas exploration. To reduce uncertainty in decision making regarding the sustainable use and ongoing protection of these marine resources, environmental baseline studies and data are important to describe the existing environment.

Timor Sea region is tropical with two distinct seasons having a dry season and monsoon season. These govern the climate, ecological and biological components. This section has used both secondary and primary environmental baseline data.

The approved Environmental Baseline Studies (EBS) was conducted in January 2025 and this description and information is considered while writing this section. The baseline conditions of the existing environment have thus formed the basis of valuable insight into the natural, ecological, economic, social, and cultural features of the project area. The description of environment is used while writing the possible impacts that may arise from the Chuditch-2 project which are considered crucial writing the environmental management statement.

6.1. Physical Component

These elements focus on those aspects of the physical environment and in knowing how natural processes can relate to or be affected by the appraisal drilling project.

6.1.1. Climate

The Bonaparte Basin and Timor Sea region experience a tropical climate and distinct summer monsoonal 'wet' season from October to March and followed by a typical cooled winter 'dry' season from April to September. The two seasons go through a rapid transition, usually in April and September-October due to two major atmospheric pressure system

affecting the region. These atmospheric pressures are the subtropical ridge of high-pressure cells and a broad tropical low pressure or Monsoon Trough.

The subtropical highs move from west to east across the Southern Indian Ocean in winter, and further South in summer, usually separated by low pressure troughs or cold fronts. The highs provide the driving force behind the Southeast trade winds which dominate the Timor Sea in winter months.

The Monsoon trough or Inter-Tropical Convergence Zone (ITCZ) is a broad area of low atmospheric pressure running East-West through the tropics in the summer months.

During the wet season the South-Westerly winds can generate thunderstorm activity, high rainfall, and cyclones. While in the dry season the Easterly winds result in dry and warm conditions with very little rainfall (RPS, 2024).

6.1.2. Rainfall

During 'dry' season (April to September), rainfall in the north is low to non-existent in most areas, although light showers are common closer to the coast in the southern waters of the Timor Sea.

During the wet season, the weather on the South coast of Timor-Leste is largely determined by the position of the monsoon trough, which can be in either an active or inactive phase. The active phase is usually associated with broad areas of cloud and rain, with sustained moderate to fresh north-westerly winds on the north side of the trough. Widespread heavy rainfall can result if the trough is close to or over, land. An active phase occurs when the monsoon trough is temporarily weakened or retreats northwards. It is characterised by light winds, isolated showers, and thunderstorm activity, sometimes with gusty squall lines.

High rainfall is associated with the Northwest Monsoon and low rainfall with the Southeast Monsoon. Heavy rainfalls are also associated with tropical cyclones and thunderstorm activity. Mean annual rainfall for the Timor Sea region is 1770mm (Heyward et al., 1997). Mean air temperatures recorded at the Jabirus Floating Production, Storage and Offloading (FPSO) vessel, approximately 180nm south of Timor-Leste in the Timor Sea, are 24.9°C in July and 29.6°C in December (URS, 2002). Figure 10 below shows a graph of Timor Leste Climate and weather data.

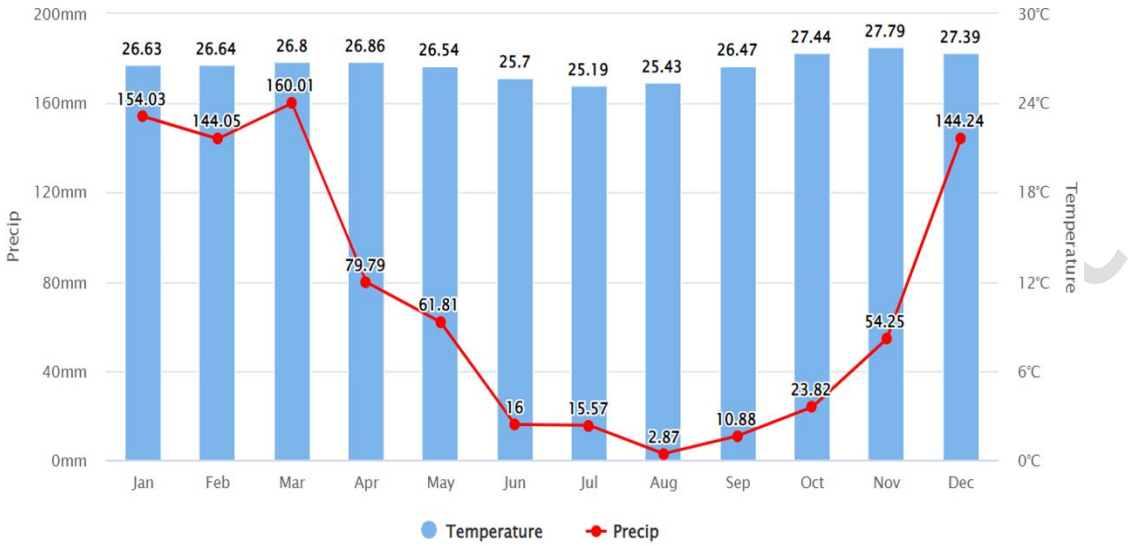


Figure 10-Timor-Leste Climate and Weather data graph – The Global Historical Weather and Climate

6.1.3. Oceanography

The main forces contributing to surface water movement in the vicinity of Chuditch Area are:

- General oceanic circulation;
- Astronomical tides; and
- Wind stress.

The Pacific–Indian through-flow flows south through the Indonesian Archipelago and into the Eastern Indian Ocean bathing it in warm, relatively low salinity seawater. Figure 11 shows the regional synoptic-scale currents of northern Australia and the Timor Sea.

Within the permit area, this may add a westerly component to the current regime. Current speeds vary depending on the season. Lowest speeds would occur in April at the end of the northwest monsoon when winds blow towards the Pacific whilst highest speeds would occur in September associated with the southeast monsoon (Wijffels et al., 1996).

The majority of water movement off northern Australia and the Timor Sea is poleward, with the water being relatively warm and low in nutrients (DEWHA, 2008). A strong seasonal wind regime is closely associated with seasonality in surface currents in the region, including the seasonal strength of trade winds in the equatorial Pacific Ocean which drive the Indonesian through-flow (ITF).

The Chuditch location is situated near the EEZ delineation between Timor Leste and Australian territorial waters and experiences semi diurnal times. Tidal ranges are large – 0.8m neap and up to 7m spring tides (RPS, 2018) and thus strongly influence currents in the region, notably, tidal amplitudes appear to be retained at long distances offshore and travel initially in a north easterly direction in the deeper waters of the region (RPS, 2018).

The tidal current component is imposed over the synoptic scale flow. In addition to the synoptic-scale and tidal currents, locally generated wind-driven currents also influence water movement within the area. These appear to be more variable and are superimposed over large-scale flows.

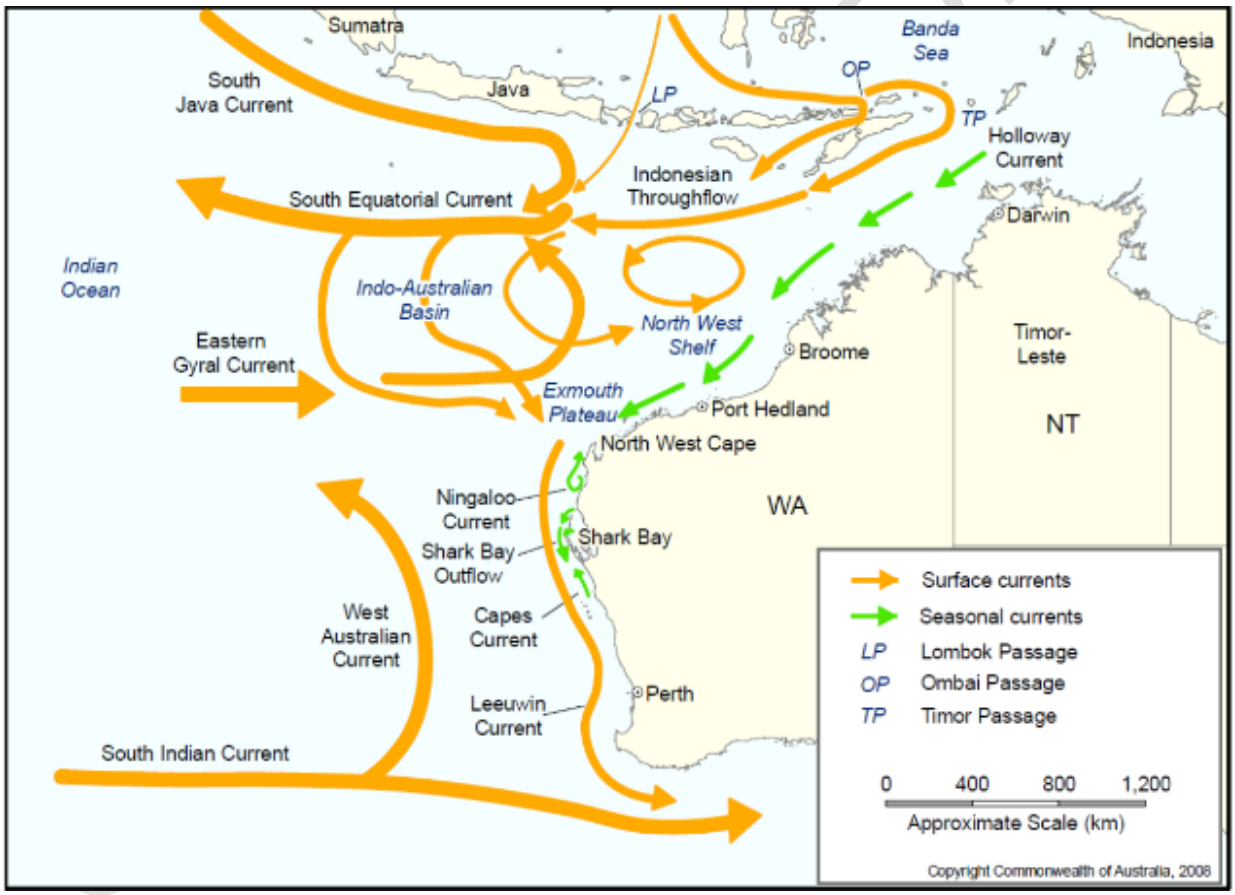


Figure 11-Regional synoptic-scale currents of northern Australia and the Timor Sea (Source: DEWHA, 2008)

6.1.1 Winds

The dry season (April to September) is characterized by steady northeast to southeast winds of 5 to 12m/s driven by the southeast Trade Winds over the Timor Sea.

The 'wet' season (October to March) is characterized by northwest to southwest winds of 5m/s for periods of 5 to 10 days with surges in mean wind speeds of 8 to 12m/s for periods of 1 to 3 days.

During the transition season (September to October), with seasonal low-pressure systems sweeping across the Australian mainland West to East, the surface wind in the Timor Sea possesses a westerly component with a light wind of less than 5m/s. While during the transition season in April, the wind is charactered by southeasterlies for a period and then returns to northwest airflow (RPS, 2024).

6.1.2 Cyclonic Weather Systems

The Bonaparte Basin is prone to tropical cyclones, during the wet season. Under extreme cyclonic conditions, 10-minute sustained wind speeds can exceed 205 km/h with gusts reaching as high as 408 km/h (Cyclone Olivia- Aus BOM, 1996).

Tropical cyclones develop in the Timor Sea in the northern wet season, usually forming within an active monsoon trough. Tropical Lows and Cyclones may also develop in the Coral Sea and move through the Torres Strait, usually as a tropical low or low range cyclone and may strengthen through the Gulf of Carpentaria region or in the Timor Sea (ABOM, 2024).

Heavy rain and strong winds, sometimes of destructive strength can be experienced along coastlines within several hundred kilometres of the centre of large cyclonic systems.

Most tropical lows and cyclonic systems pass through the area in a west or southwest direction before turning southwards.

Fully mature tropical cyclones range in size from 100km in diameter to 1,500 km (Cyclone Justin 3/03/1997, Aus BOM). Tropical cyclones typically have a distinct life cycle of about 4 to 7 days although some category 1 systems briefly reach gale force while other systems can be sustained for weeks at various levels of intensity or degrade to tropical low status before reforming.

The most active months for tropical cyclones in the Timor Sea/Bonaparte Basin region are December to March. The most severe cyclones most often occur in the months of December to April, when the surface temperatures are at their highest and the water column is at or above 26.7°C.

The majority of cyclones occur in the region early in the year, with the most severe cyclones most often occurring in the months December to April (SKM, 2001).

Most (75%) of these cyclones are not fully mature, with estimated wind speeds of less than ~ 80km/h. Severe cyclones, with wind speeds exceeding 100km/h occur, on average, once every 2.6 years (Heyward et al., 1997).

6.1.3 Seismicity and Tsunamis

The Timor Sea has experienced tectonic activity for at least six million years due to the convergence of the Australian and Eurasian continental plates. Since the mid-1970s, the region has recorded hundreds of earthquakes, many of which occur in the Australian sector of the Timor Sea along the edges of the Cartier and Timor Troughs (Irsyam et al., 2011). The dominant earthquakes in this area are subduction earthquakes, caused by one crustal plate being forced below another, with the Timor Trough being a focal point. Earthquake activity within the central Timor Trough and on the island of Timor tends to be more intense, frequent, and of greater magnitude, often exceeding seven on the Richter scale (Harris & Major, 2017). The contract area lies in the southern part of the Timor Trough on the Australian continental plate, which subducts northward under Timor. The subduction zone is steeply dipping, with higher activity rates observed to the east toward the Banda Sea compared to the west toward Sumbawa. While seismic activity is currently absent in the northwest, this may not be a long-term feature. Subduction-zone earthquakes in the Timor Trough are shallow at the offshore trench and deepest to the north, with most occurring at depths up to approximately 200 km (Cummis et al., 2020). Events deeper than 300 km are considered unlikely to cause surface damage to major engineered structures. Figure 12 shows Seismicity and Tsunamis.

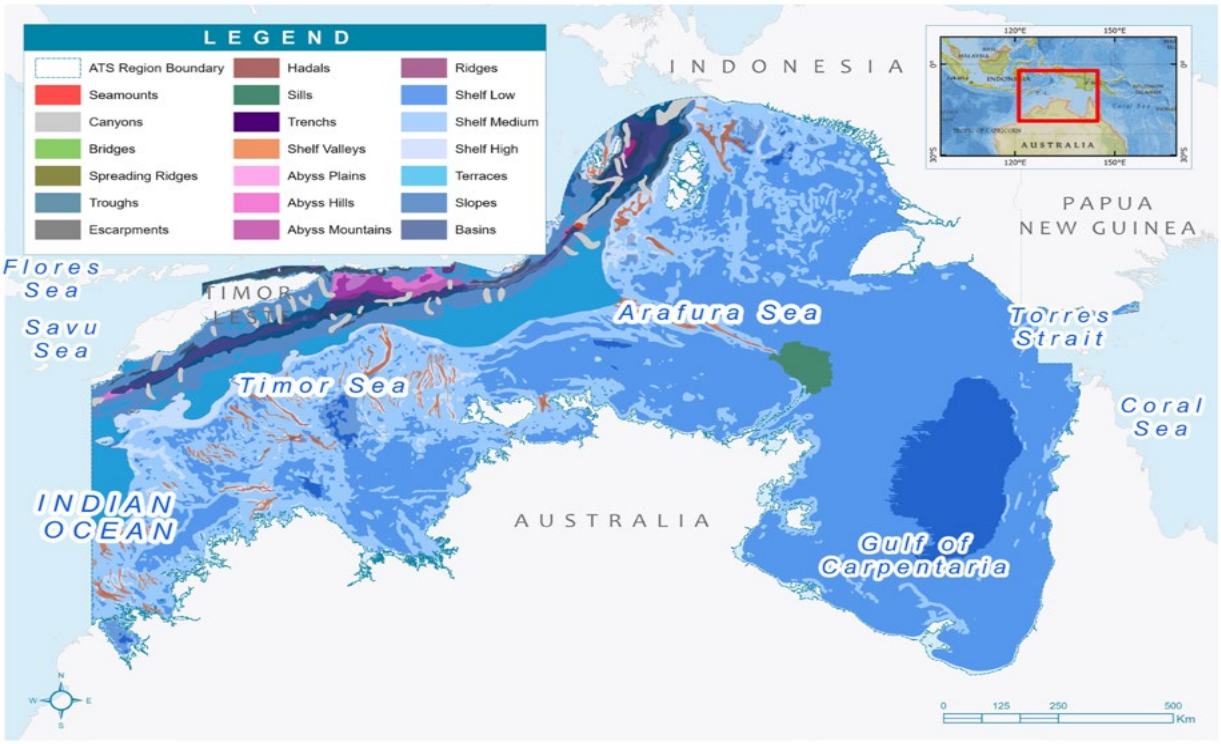


Figure 12-Seismicity and Tsunamis. (Source: ATSEA, 2023)

6.1.4 Geology

The primary hydrocarbon reservoir in the Bonaparte Basin is the sandstone of the Plover Formation, ranging from Early Jurassic to Callovian age. The Chuditch-2 well, based on offset data is prognosed to encounter 'near-dry' gas in the Plover Formation.

The regional stratigraphy in the area includes various formations spanning different geological periods:

1. Plover Formation (Pliensbachian to Callovian): Primary reservoir target, comprising fluvio-deltaic sandstone, mudstone, coals, and marginal marine sandstone. At Chuditch-1, it underlies shales of the Jurassic Flamingo Formation.
2. Flamingo Formation: Deep marine shales and turbiditic sandstone sourced from the south, displaying different depositional facies on the Sahul Platform, including marginal marine sandstone equivalent to the Sandpiper Sandstone south of the Malita Graben.
3. Bathurst Island Group: Comprising several sequences:

- Echuca Shoals Formation: Glauconitic claystone and siltstone overlying the Intra-Valanginian Disconformity.
- Darwin Formation (Aptian to Early Albian): Condensed radiolarian claystone/calcilutite unit deposited during the Cretaceous transgression.
- Wangarlu and Vee Formation: Claystone, marls, and calcilutites deposited in a marine shelf to slope environment.

4. Johnson Formation (Palaeocene) and Hibernia Formation (Eocene): Mainly calcilutites with dolomites, cherts, and claystone streaks.
5. Cartier Formation (Oligocene): Calcareous claystone and marls.
6. Oliver Formation (Miocene): Continuous carbonate deposition with an unconformity at the top due to the collision of the Australian and southeast Asian plates.
7. Barracouta Formation (Pliocene to Recent): Active margin carbonates overlying the Miocene unconformably.

The estimated target formation tops are 2,813 m TVD-MSL (Chuditch-2) and the geology of the Chuditch-2 well is shown in Table 14 below.

Table 14-Geology Structure of Chuditch-2 Appraisal Well

	Chuditch-2 Depth TVD-MSL (m)	Uncertainty (m) (TBC)
Sea Bed Carbonates	67	+/- 5
Hibernia Fm (Green horizon) Calcarenites & calcilutites grading to calcareous clay stones	688	+/- 20
Johnson Fm (Pink horizon) Argillaceous calcilutites to calcareous clay stones	1088	+/- 20
Wangarlu Fm (Purple horizon) Claystone with minor calcareous claystone	2000	+/- 20
Darwin Fm (Pink horizon) "radiolarite" Claystone & marl	2799	+/- 30
Plover Fm – reservoir target Sandstones & clay stones	2813	+/- 30
Gas-water-contact	2920	+/- 3
Total Depth	3020	+/- 30

6.1.5 Air

The air quality is normally good in offshore location, although emissions from shipping, drilling and other offshore activities will contribute to localized air pollution. The appraisal drilling programme is of a short duration of about 40 days. The diesel driven generators generate some pollutants, namely SO_2, NO_x, and CO will be discharged into atmosphere through stacks of suitable height. Therefore, impacts of gaseous pollutants on the ambient air quality due to drilling operations are insignificant. Moreover, the drilling site is located at a distance beyond territorial waters from the shores of Timor Leste and Australia. The impact of pollutants discharged in exhaust gases from the diesel driven generators of drilling in the offshore area would be minimal. The generators are maintained as per manufacturers criteria.

Air sampling was not included in the agreed scope of work and sampling plan for EBS prior to drilling activities as the operational area is approximately 240 km from the Timor-Leste coastline, which itself is a remote and non-industrialized area and the air is considered relatively pristine.

Secondary data shows that the Air temperature variations are small. The mean maximum summer and winter air temperature recorded at Point Fawcett on Melville Island as the closest metrological station to the project area range between 33-34°C in November/December. The annual minimum temperature is 27°C in June (RPS, 2024). The average tropical cyclone frequency for the Timor and Arafura seas region is one cyclone per year with cyclones most commonly occurring between November and April (RPS, 2024).

6.1.6 Marine Waters

Information in this section is taken from the Chuditch - 2 Environmental Baseline Survey (EBS) Technical Report dated March/April 2025 conducted by WA Marine Pty Ltd / as O2 marine, Western Australia. The data, figures and tables and information are reproduced from that report as primary information around the planned Chuditch - 2 Appraisal Well Program.

Generally, the marine waters in the Timor Sea are pristine, with high values of dissolved oxygen and low levels of pollutants. Baseline water quality parameters such as salinity,

temperature, and nutrient levels are critical to any assessment of potential impacts due to drilling activities.

Environmental Baseline water quality data allows for an assessment of potential impacts caused by drilling operations, such as the discharge of drilling mud, drilling fluids, and other pollutants. The EBS measured relevant water quality for physical, chemical and biological parameters, including heavy metals, hydrocarbons and other pollutants related to the discharges.

EBS Sampling Summary

The EBS study was conducted in January 2025 with laboratory analysis occurring immediately afterwards encompassing the extent of potential impacts to water quality, sediment quality and benthic habitats based on the mud and cuttings dispersion modelling for the drilling program (MuTek 2024) to design the sampling plan for impacts on potential receptors.

The sampling design is grouped as follows:

- At the well location and in the immediate vicinity (direct impact, benthic impact zone)
- 300 m from the well location (potential for benthic impact)
- 600 m from the well location (furthest potential extent for benthic impact)
- Relief well location
- 1000 m from the well location (potential low water quality impact)

Sampling Location

Sampling locations for the Chuditch-2 Environmental Baseline Survey were selected to ensure relevance to cuttings dispersion modelling. The number of sites required for sampling is outlined in Table 15.The EBS sampling locations around Chuditch-2 Appraisal Well are presented in Figure 13.

Table 15-Sampling location and Numbers of sites completed

Task	Sample	Required number of sites	Number of sites completed
Water quality sampling	Water samples	12	12
	Water column profiles	12	12
Sediment sampling	Sediment samples	13	13
	Infauna	1 3	13
Benthic Habitat Assessment	Towed camera	8	8
Marine fauna sightings	Opportunistic sightings	N/A	N/A

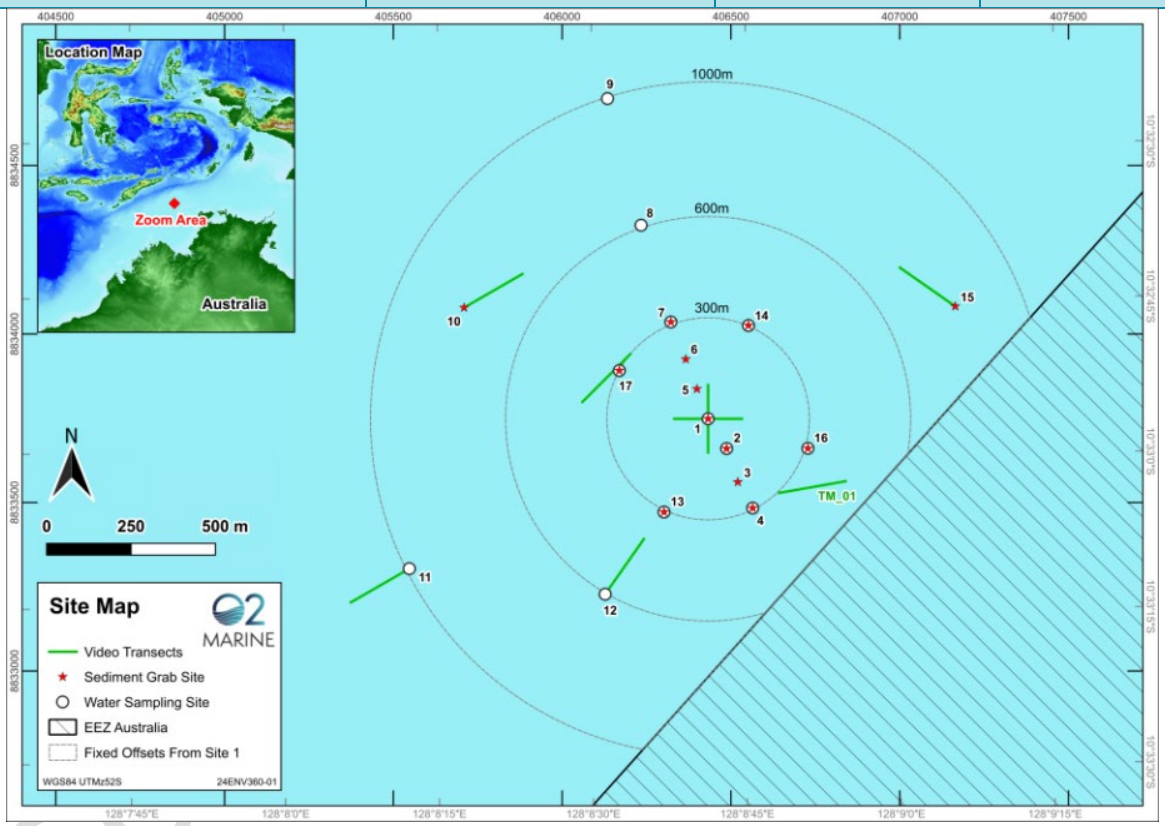


Figure 13-EBS Sampling locations around Chuditch-2 Appraisal Well

Water quality samples were collected using Niskin bottles (Figure 14) which was then analysed in a NATA certified laboratory for suspended solids, heavy metals, and hydrocarbons.

Figure 14-Niskin bottle water sampler used for water quality sample collection

Water samples were collected at the sea surface (1-5 m depth), mid-column (~30 m depth) and near bottom (seabed+ 1-5 m) using 10 litre Niskin bottles.

Water samples were then stored and transported to laboratories for the following analyses which comply with industry standards (e.g., SW-PACK-012 for Environmental Monitoring at Environmental Analysis Laboratory).

Water Column Quality Profiling

A CTD profiler (Figure 15) was used to measure water temperature and salinity in the water column which was used to inform the water sample analyses and provided useful environmental baselines for the area.

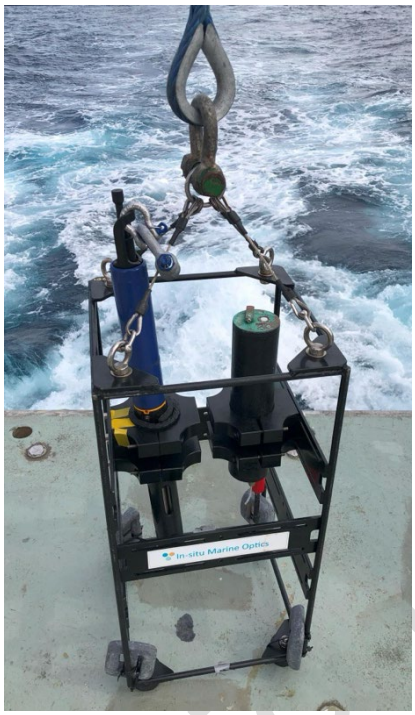


Figure 15-YSI Exo1 Sonde and IMO Ms9 light

Water column profiles were collected in accordance with the SAQP. The CTD profiler recorded the following parameters:

- Time;
- Depth;
- Temperature;
- Specific conductivity (SpC);
- Salinity (ppt);
- pH;
- PAR (9 wavelength multispectral sensor);
- Turbidity (NTU) and;
- Dissolved oxygen (DO) (%).

The summary of Physio-chemical water column quality analysis from the EBS results are:

Physiochemical Profiles

The physiochemical water column profiles in summary are:

- pH results ranged from between 8.21 and 8.26
- Salinity results ranged between 34.05 and 34.19
- Temperature values ranged between 28.77 and 30.29
- Conductivity results ranged between 51990.00 and 52147.10
- Turbidity values ranged between 0.06 and 0.26.
- Minimal spatial variability in water quality across the project area.
- Temperature, salinity, turbidity, and pH remained stable from surface to seafloor.
- Slight thermocline detected at 22–25m depth.
- Dissolved oxygen (DO) levels were high (~95%) but decreased slightly below 25m, indicating a stratified water column.
- Low turbidity levels indicate minimal sediment resuspension and particulate matter.

PAR Profiles

The light penetration results from the light (PAR) from water column profiles are summarized in **Error! Reference source not found.** across all locations measured under the EBS survey in February 2025.

Table 16-PAR values from EBS Survey across all locations

Location	Mean	Minimum	Maximum
Surface	467.2	92.79	1115.8
Bottom	1.42	0.57	2.98

Water Samples EBS Analysis Results

The water samples were analysed for the following parameters.

- Total recoverable hydrocarbons (TRH);
- Total aromatic hydrocarbons;
- BTEX (benzene, toluene, ethylbenzene and xylene);
- Polycyclic aromatic hydrocarbons;
- Oil and grease;
- Sulphur;
- Heavy metals (As, Ba, Cd, Cr, Co, Cu, Hg, Ni, Pb, Zn, Mg, Fe, Se);
- Chlorophyl-a; and

- Total organic carbon.

The samples were analysed at NATA-accredited laboratories in Australia.
The analytical results are summarized below:

Dissolved Metals

The Dissolved metals results across all EBS locations sampled are in summary:

Gold, mercury and manganese results were reported below the LOR in all samples.

Generally for the metals (As, Ba, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Ni, Sb, Se) analysis data all reported at low concentrations below ANZG (2018) 95% and 99% Special Protective levels (SPLs).

Hydrocarbons

Hydrocarbons results from water samples for BTEXN, TPH, TRH, and VOCs were all reported below the Limit of Reporting (LOR).

Chlorophyll-α

Chlorophyll-α was reported below the LOR in all water quality samples.

Oil and Grease

Oil and Grease values ranged between <5mg/L and 9mg/L and the Median oil and grease results across all sampling sites was <5mg/L.

Sulphur

Sulphur results ranged between 980mg/L and 1300 mg/L. The Sulphur results were generally consistent between sites and across depths.

6.1.7 Sediment

The sediments in the Timor Sea are dominated by fine sand, silt, and clay. Sediment quality is of prime importance as an aid to understanding the possible impact of drilling activities, such as sediment resuspension or contamination from drilling waste.

Sediment quality monitoring helps identify any potential impacts caused by drilling operations, particularly the release or creation of contaminated sediments which can affect marine ecosystems (Trefry et al., 2013, Reuscher et al. 2020).

Sediment was collected and processed onboard using methods adapted from the Australian national standard for grab and box corer sampling (Przeslawski et al., 2024). At each designated grab site two sediment samples were collected using a large Van Veen grab / day grab sediment sampler, (Figure 16) with a volume of at least 7 litres (Álvarez et al. 2020) for physical, chemical and biological analysis.

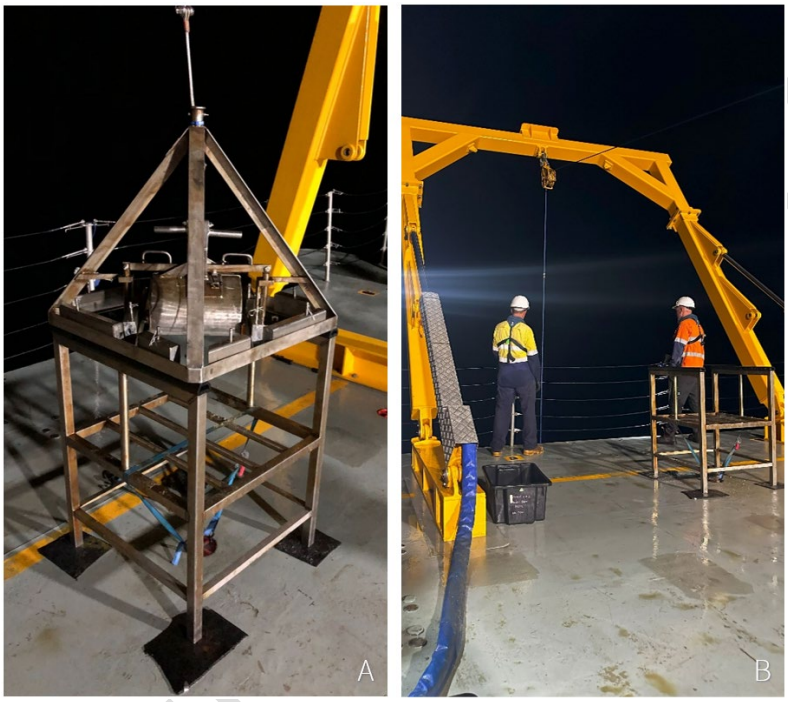


Figure 16-A) Day Grab sediment sampler positioned on retrieval point, B) Day Grab deployed overboard from vessel stern via A-Frame

From each grab, sediment was sampled for sediment quality analysis. Sediment samples was stored and transported to laboratories for the following analyses which included as industry standards (e.g. SS-PACK-080 for Drilling Mud Exemption at Environmental Analysis Laboratory):

Sediment samples were analysed for the following parameters:

- Total Recoverable Hydrocarbons (TRH);
- Benzene, Toluene, Ethylbenzene, Xylenes and Naphthalene (BTEXN);
- Total Petroleum Hydrocarbons (TPH);
- Polycyclic Aromatic Hydrocarbons (PAH);
- Metals (Al, As, Ba, Cd, Cr, Co, Cu, Fe, Hg, Ni, Pb, & Zn);

- Oil and grease;
- Sulphur;
- Total Organic Carbon (TOC); and
- Particle Size Distribution (PSD).

The samples will be analysed at NATA-accredited laboratories in Australia.

The summary of the EBS results are:

Particle Size Distribution

PSD were clay (<4 µm), Silt (4-62µm), Sand (62-250µm), Medium Sand (250-500µm), and Coarse sand (500-2000µm).

Sediment PSD was generally uniform across sampling locations, where coarse grained sand (500µm – 2000µm) was typically the most dominant fraction, followed by silt (4µm – 62µm). Medium grained sand generally comprised the lowest fraction of grains across all sample sites, and while no sites appeared to be significantly different in their PSD composition.

Dissolved Metals

Dissolved metals results are presented summarised below.

- Gold, mercury and manganese results were reported below the LOR in all samples.
- Remaining metals (As, Ag, Ba, Cd, Co, Cu, Cr, Fe, Pb, Mn, Hg, Ni, Sb, Se, and Zn) were all generally reported at low concentrations below ANZG (2018).

Moisture

Moisture content of sediment samples ranged between 33% and 44%. The median moisture content across all sample sites was 39%, while there was a low standard deviation in % moisture content between samples (2%).

Oil and Grease

Oil and grease results was generally reported below the LOR (<500 mg/kg) however was detected in low concentrations except two sites 690 mg/kg and 630 mg/kg.

Sulphur

Sulphur concentrations ranged between 2100 mg/kg and 6100 mg/kg. Median concentrations of sulphur across all samples were 3500 mg/kg, while the standard deviation was 1217 mg/kg.

Hydrocarbons

Results for hydrocarbons in sediments of BTEXN, Aliphatic and Aromatic Hydrocarbon, and Polyaromatic Hydrocarbon (PAH) concentrations were reported below the LOR at all sample sites.

Total recoverable hydrocarbons (TRH) were detected in low concentrations at several sample sites, normalised TRH concentrations were reported below the ANZG (2018) DGV.

6.1 Ecological Components

These components include living organisms and ecosystems which may be affected by the project. From secondary data the following description on ecological components are inferred.

Benthic communities consist of hundreds of species, yet many are sparsely distributed. As such, indicator groups are often used where the abundance or richness of one taxonomic group is used as a proxy for others (Mellin et al., 2011). Previous studies have yielded species inventories of sponges, octocorals, and polychaetes in the region and identified these groups as appropriate biological surrogates for benthic biodiversity (Wilson, 2010, Przeslawski et al., 2015, Przeslawski et al., 2019). As such, environmental baselines and monitoring around the Chuditch-2 site should focus on sponges, octocorals and polychaetes to assess conditions and detect changes in benthic communities in the Chuditch-2 region.

The grab samples from the G&G site survey were consistently similar across the area, and no live bivalves or bryozoans were recovered. Only one live sponge and one brittle star were retrieved from the samples. The high degree of easily suspended sediment and the lack of light suggest that sponge growth is low. Additionally, the drop camera work over the area showed a high similarity with single sponges present in 3 of 10 images and covering less than 5% of the field of view which will reconfirm the findings in the EBS survey March 2025 and towed video footage collected by ROV.

At the regional scale, the Timor Sea is characterised by raised geomorphic features with shoals and banks which foster biodiversity levels observed due to light penetration at shallower depths and increased nutrients from ocean currents. This highlights the fact that the carbonate banks and terrace formations serve as key ecological features that promote regional biodiversity hotspots. Benthic communities can vary within these environmental attributes based on bathymetry, exposure, geochemistry and substrate coupled with currents shaping the structure, distribution and abundance over time (Przeslawski et al. 2011, Nichol et al., 2013, Radke et al., 2015).

The ideal resemblance to the Chuditch-2 site is through environmental data collected by Geoscience Australia and the Australian Institute of Marine Science in Oceanic Shoals Marine Park, sampled within 45-90 meters of depth (Nichol et al., 2013). The sediments found in these terraces were typically medium to coarse-grained sand. In contrast, finer sediments were more common in deeper subdued geomorphic features (plains, valleys), and coarser sediments were more common on banks (Anderson et al., 2011). These terraces offer a significant correlation to the high biodiversity of benthic faunal groups where dense patches of sponges and octocorals (e.g. lithistids, halichondrids, and Xestospongia testudinaria) and both hard and soft substrates are profoundly intricated (Heap et al., 2010, Przeslawski et al., 2014).

During the EBS study the following ecological components include:

6.2.1 Benthic Infauna

After sediment was removed for sediment quality analysis, the remainder of the sediment sample was then processed for infauna. Sediment was washed through a 1 mm sieve, and the retained fraction was preserved in ethanol. The sieved fraction was then sorted and analysed by a taxonomist to operational taxonomic unit. Taxonomic analysis occurred onshore.

Infauna can also provide an important environmental baseline for soft sediment communities, as they are important to ecosystem function and often an integral component of environmental monitoring in soft sediment habitats (Nygård et al., 2020, Schenone et al., 2023).

The three most abundant species across all sites were the bristle worm Anthuridae, the Litocorsa sp1, and the Apseudidae.

6.1.1.1 Diversity Indices

Diversity indices are mathematical measures of species diversity and richness that provide more information about community composition than simply using raw abundance. Four indices were selected to provide information relevant to diversity, richness, and evenness. These are:

- Margalef's index (d) was selected to assess the species richness; Across the EBS survey area, the species richness index (Margalef) had the lowest value of (0.0) and the highest value of (6.636).
- Shannon's index (H) was selected to assess the species diversity; The species diversity index (Shannon-H) had the lowest value of (0.0) and the highest value of (3.086)

In general, the area the benthic infauna around Chuditch -2 appraisal well is low and not having much infauna inhabitants. The area around the Chuditch -2 well is generally poor in diversity.

6.1.1.2 ROV Assessment

The benthic habitat assessment was conducted by using a Commercial ROV used for collection of benthic habitat footage (Figure 17) to collect benthic footage. Benthic imagery provides a non-destructive way to assess the habitat, organisms, and substrate at and near the seabed. Towed imagery provide transects that can reveal habitat boundaries and zones of impact better than drop cameras.

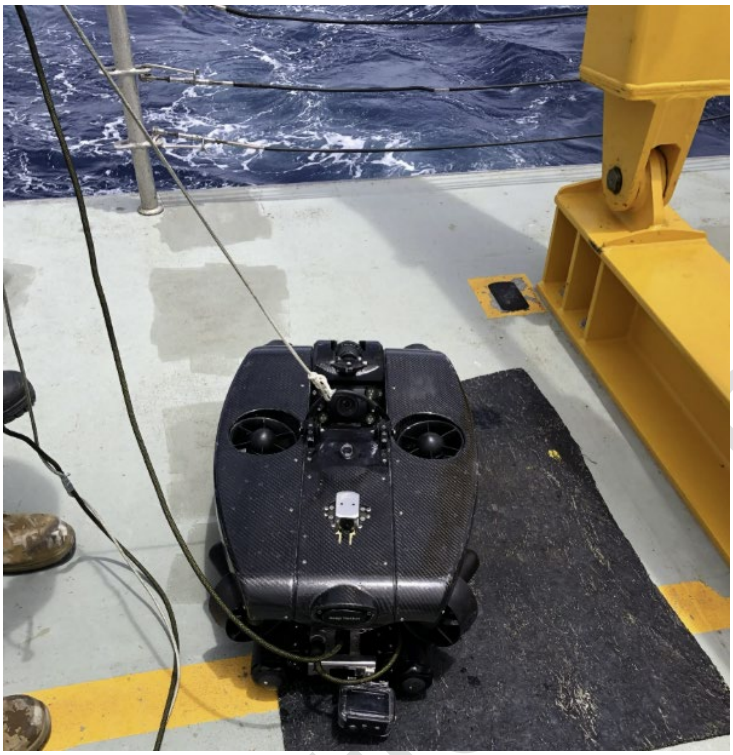


Figure 17-Commercial ROV used for collection of benthic habitat footage

Of the 4,542 classified points, 3,772 were assigned substrate information, which largely comprised of Sand / Mud (59.4%), while similar proportions were assigned as Rock (20.9%) and Pebble / Gravel – Rubble (49.1%), with Cobbles (0.6%) the only other substrate classification recorded.

Mixed Filter Feeders comprised 96.4% of all points assigned with dominant biota information, with Black & Octocorals (2.3%), Sponges (cup) (0.7%), Black & Octocorals - Fan (2D) (0.4%), and Sponges (mixed) (0.1%) collectively comprising the remaining 3.4%.

Information of percent cover of biota was assigned to 3,692 points, with 53.5% classified as Sparse/Low in cover. Relatively similar proportions of benthic biota cover were classified as Moderate (15.5%), Bare (14.1%), and High (12.2%), while 4.2% was classified as Dense, and 0.4% of classified points had None Recorded assigned to percent cover.

6.2.2 Marine Fauna

The Timor Sea is a biodiversity hotspot in terms of fish, marine mammals--such as dolphins and whales-in addition to sea turtles. Baseline studies recorded key species and habitats

with an emphasis on the possibility of disruptions due to underwater noise, pollution, or habitat disturbance.

During the EBS study no opportunistic marine megafauna were observed by O2 Marine field staff or Offshore Unlimited vessel crew during survey operations.

Biodiversity Hotspot: The Timor Sea is home to a wide variety of marine organisms such as fish, marine mammals like dolphins and whales, and sea turtles. These species are of ecological importance and therefore create a need for protection.

6.2.3 Corals

The EBS study did not find any significant Corals in the vicinity of the Chuditch-2 well.

However, several coral reefs exist in the Timor Sea, all of which perform critical functions as habitats for marine species. The Chuditch-2 field has been identified away from the largest reef systems; however, potential impacts related to increased turbidity, sedimentation, and pollution were considered to preserve these sensitive ecosystems.

The percentage of coral reefs in good or excellent condition (live coral cover of more than 50%) in the eastern side were 45% compared to only 23% in the western side. Burke et al. (2002) also identified a number of coral reefs along the Timor-Leste coast, including five distinct communities along the south coast of Timor-Leste, that were considered to be at medium to high risk of impact from the combined effects of coastal development, marine based pollution, sedimentation, overfishing and destructive fishing.

Fringing reefs are one of the most visible types of corals in Timor-Leste. These reefs are exposed to strong coastal currents and are even found in river mouths. They contribute to high fragment levels deposited at the upper reef slope. The shallow coral reefs on the northern coast occupy an estimated area of 3,000 hectares, with potential coral habitat of over 60,000 hectares in deeper waters (Kim et al., 2022). Whilst coral species occur in shallow coastal waters to open ocean depths of 6,000 m, reef-building corals occur in less than 46 m deep waters.

Corals on the northern coast include Acropora, Porites, Heliopora, Millepora, Xenia, and Briarium species. In contrast, the southern coast reefs have higher sponge, hydroid, algal,

ascidian, and Montipora coral cover. Montipora colonies with black line disease and some damaged by Drupella grazing are recorded on the southern coast.

The southern coast's climatic variation, including high rainfall and lower water salinity, may affect coral distribution. However, there is limited knowledge about coral reefs in this area. Shallow waters support coral filter-feeders, while deep-water continental shelf communities lack habitat diversity but may host filter-feeding heterotrophs where hard substrate is available.

The eastern side of Timor Island exhibits a higher percentage of coral reefs in good or excellent condition, with 45 %, compared to only 23 % on the western side, as indicated by the Timor-Leste coral reefs risk assessment (Burke et al., 2002). This study also identified several coral reefs along the Timor-Leste coast, including five distinct communities along the south coast, considered to be at medium to high risk of impact from coastal development, marine-based pollution, sedimentation, overfishing, and destructive fishing practices. These reefs include coral filter-feeders in shallow waters and continental shelf communities in deep waters. In areas with minimal seafloor topography and hard substrate, habitat diversity is limited, predominantly hosting detritus-feeding crustaceans, holothurians, and echinoderms. However, filter-feeding heterotrophs such as sponges, soft corals, and gorgonians may occur when hard substrate is available (Kim, 2021).

The G&G site survey in early 2024 indicated that at the well location's depth of approximately 68 meters, live coral reefs, which typically thrive in shallower, sunlit waters, are absent. Thus, drilling operations have minimal risk of directly impacting these sensitive marine ecosystems.

6.2.4 Fisheries

The Chuditch Field is located far offshore and the Chuditch -2 Appraisal well activities is restricted to 500m restricted zone and will not be of significant for both commercial and artisan fisheries for local communities.

Coastal communities along the 600km of Timor-Leste’s coastline rely on a wide range of fish, including the large tunas, flying fish, coral reef fish and deep-water snappers for their livelihoods.

More detailed information on fisheries is provided in the Socio- economic section of this chapter.

6.2.5 Protected Areas and National Parks

The area comprises Marine protected areas (MPA) and national parks that provide protection to biodiversity and importance for geo-tourism. Since the project is near Marine protected areas, proper project planning will be carried out in order not to harm species and their natural habitats.

The MPAs, National Parks: The project area is proximal to MPAs and national parks crucial in biodiversity conservation for eco-tourism, especially geo-tourism.

Biodiversity Importance: These protected areas safeguard various ecosystems, hence protecting different species and their habitats, most of which are very sensitive to environmental changes.

The Coral Triangle, in general, is a highly biodiverse region globally, renowned as the central hub of tropical marine biodiversity. The origins of this remarkable biodiversity are attributed to the complex tectonics, evolution, and geological history of the region, including climate fluctuations and changing sea levels. The Oceanic Shoals Marine Park, which is located 15 Km from the Chuditch field. Within this Marine Park, there is the Oceanic Marine reserve (National Park) which does not permit any fishing activities ('no take' zone). the Ocean Shoals National Park is located approximately 184 Km from the Chuditch-2 well location (Figure 18).

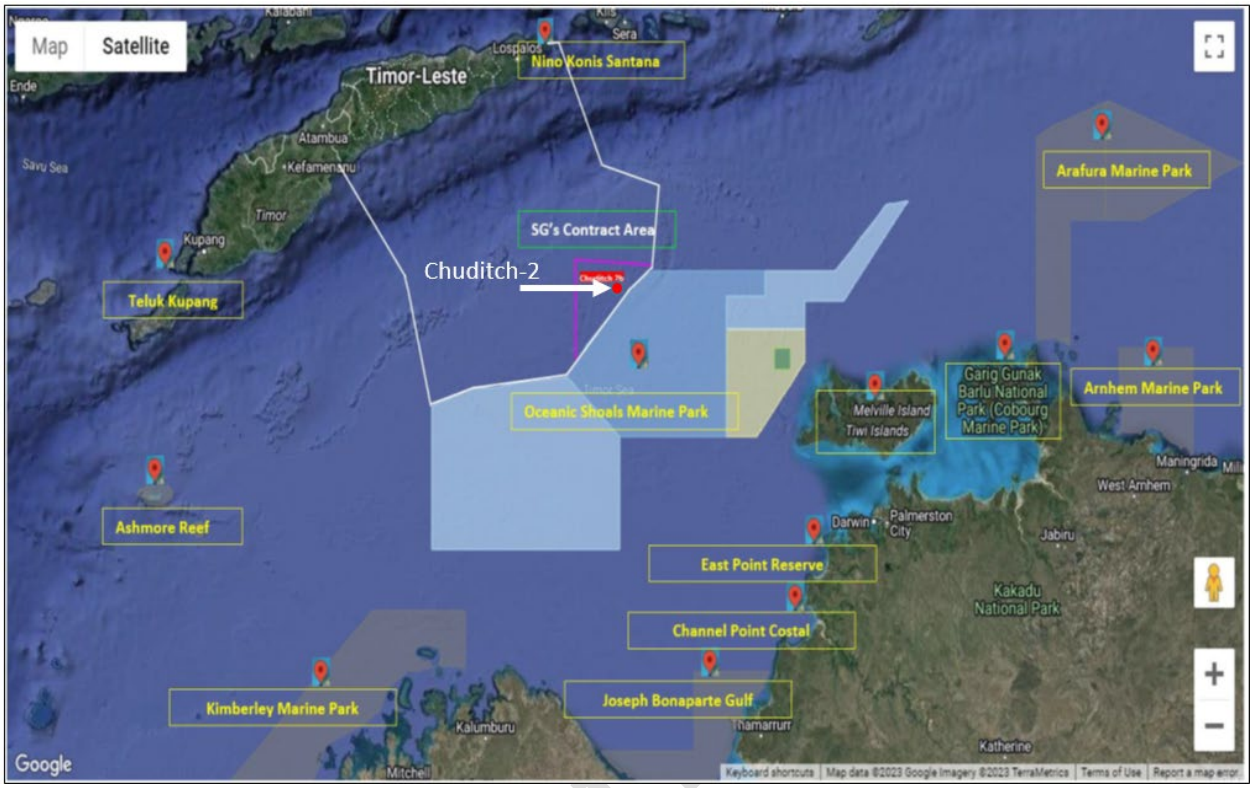


Figure 18-Proposed Chuditch-2 Well locations in reference to the EEZ & Oceanic Shoals Marine Park

6.2 Economic Components

These components address the human economic activities and industries that could be impacted by the project.

Traditionally, the majority of Timorese still practices subsistence agriculture growing corn, rice, cassava, millet and sweet potatoes. Other products such as palm and betel nut are playing important role for traditional rituals. Coffee plantation is also the main source of Timor Leste economy. Forest product such as sandalwood has had significant value also, but due to the extinction now it is protected and controlled its trade by the government. In farming activities, buffalo, cattle, pig and chicken are important for the economy of rural communities. Due to the agricultural traditions in Timor-Leste, industry is limited. Timor-Leste government is also promoting tourism and with recent development of international involvements in the country, it opens potential to grow tourism industry. In terms of fisheries, Timor-Leste has enormous resources, but relatively little has been explored of the country's economic contribution.

For mineral and energy industry, offshore oil and natural gas deposits found in Timor Sea, there is potential for this to support the future of Timor-Leste's economy. The development of oil and gas resources in offshore waters and recently onshore has begun to supplement government revenue.

Timor-Leste's economy has experienced fluctuations in recent years. In 2022 according to World Meters, the country's nominal Gross Domestic Product (GDP) was approximately $3.16 billion, with a real GDP of about $2.25 billion after adjusting for inflation. This represented a significant decline from the previous year, with a real GDP growth rate of -17.49% in 2022.

Looking ahead, the Asian Development Bank (ADB) forecasts a GDP growth of 3.1% in 2024 and 3.9% in 2025, indicating a potential economic recovery. Whilst, based on World Bank data, Timor-Leste's GDP per capita was estimated at $1,502.50 as of 2023.

The economy is heavily reliant on oil and gas revenues, which poses challenges due to the finite nature of these resources. Efforts to diversify the economy are ongoing, with a focus on sectors such as agriculture, tourism, and manufacturing.

In terms of trade, Timor-Leste's imports were valued at $850 million in 2020, with refined petroleum, cars, cement, delivery trucks, and motorcycles being the main import goods. The primary import partners were Indonesia (27.1%), China (23.2%), and Singapore (8.97%).

The country faces socio-economic challenges, including poverty and unemployment. Efforts to address these issues are critical for sustainable development.

For a comprehensive analysis of Timor-Leste's socio-economic components, it is essential to consider these economic indicators alongside factors such as education, healthcare, infrastructure, and governance.

Oil and gas sector is a critical component of its socio-economic landscape. The operation of the Chuditch 2 project is significantly impacts the country and supports national development. The royalties, taxes and production sharing agreements go into the government's budget to fund education, health and infrastructure. It also creates jobs in maritime logistics, engineering and maintenance and in supporting industries such as transportation, catering and accommodation. Offshore drilling also boosts the economy

through increased demand for local businesses and services and a multiplier effect that increases household incomes and consumer spending. These are key to diversifying and strengthening Timor-Leste's economy and broader economic resilience.

6.3.1 Employment Sectors

The employment sector in Timor-Leste reflects a developing economy characterized by high informality, sectoral imbalances, and ongoing challenges in job creation. According to Trading Economics (2023), the overall unemployment rate in Timor-Leste was 1.8% in 2022 and 2023, a relatively low figure compared to global averages. However, this does not account for the high levels of underemployment and informal labour, particularly in rural areas. Youth unemployment remains a major issue, with a rate of 12.31% among individuals aged 15–24 as of 2019. Many young people struggle to transition into formal employment due to limited opportunities and inadequate skills training.

Additionally, the International Labour Organization (ILO, 2021) reported that Timor-Leste's labour force participation rate (LFPR) is 30.5%, which is low for a developing nation. This figure reflects significant gender disparities, with men participating at a rate of 36.9% compared to 24.2% for women. Many women are engaged in unpaid domestic work or informal agricultural activities, which limits their participation in the formal economy.

Employment in Timor-Leste is primarily concentrated in sectors such as services, agriculture, and industry. According to the ILO (2021), the services sector is the largest employer, accounting for 59.1% of the workforce and including areas such as education, healthcare, public administration, and retail. The agriculture sector employs 26.9%, focusing on subsistence farming of crops like coffee, maize, and cassava. The industrial sector accounts for 13.5% of employment and is driven by construction, manufacturing, and extractive industries. Despite its relatively small workforce share, the industrial sector is vital for infrastructure development and economic diversification.

The industry of oil and gas in the country is among the biggest employment in Timor-Leste. Employment opportunities will be both directly created and through support industries such as transport and logistics for skilled and unskilled labour.

In terms of economic contributions, the AMAN Alliance (2023) reported that private-sector employment in non-oil-producing companies contributed $590.2 million to the GDP in 2023.

The retail/wholesale trade and construction sectors were key contributors to this growth. Private sector employment grew by 3%, with approximately 62,500 people employed in 2023, reflecting a modest improvement in job creation.

To address the challenges in the employment sector, the government has prioritized strategic economic diversification as outlined in the Strategic Development Plan (2011–2030). This includes reducing reliance on oil revenues by promoting agriculture, tourism, and manufacturing, which are expected to generate sustainable employment opportunities. Investments in infrastructure projects, such as road networks and construction, are also being prioritized to stimulate economic activity. Human capital development is another key focus, with vocational training and education initiatives being implemented in collaboration with organizations like the ILO to improve workforce skills and align them with market demands.

Despite these efforts, challenges such as high levels of informal employment, limited opportunities for youth, and gender inequality persist. Addressing these systemic issues remains critical to achieving sustainable economic growth and improving livelihoods in Timor-Leste. The government's focus on education, infrastructure, and economic diversification offers a pathway toward fostering a more inclusive and resilient labour market.

A World Bank report of Unemployment Rate (*Figure 19*).

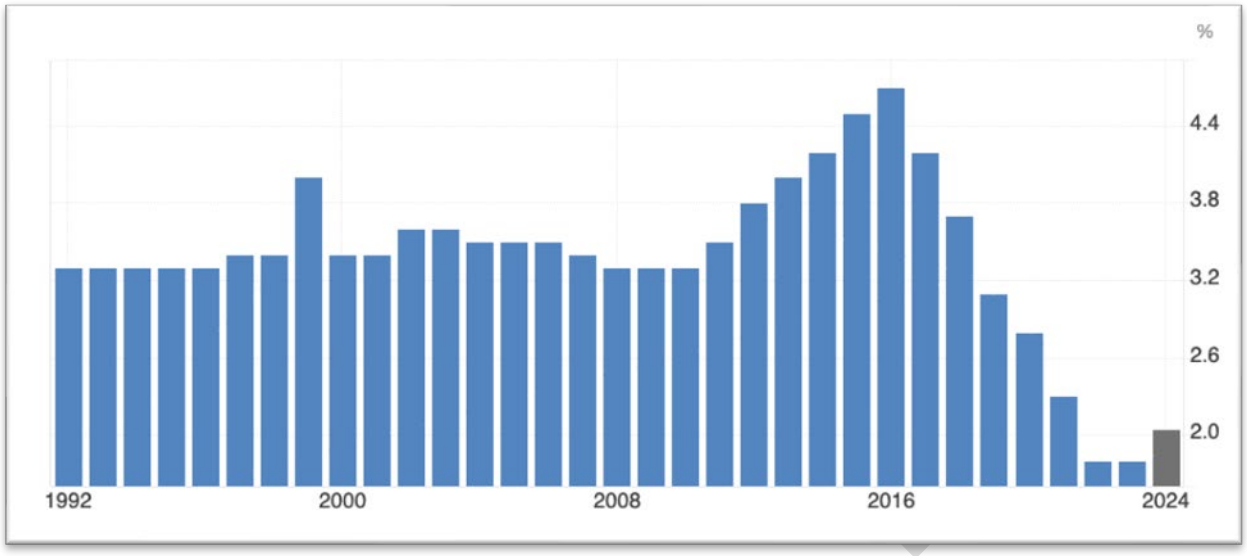


Figure 19-Unemployment Rate (Source: World Bank)

6.3.2 Fishing

Fishing is a cornerstone of Timor-Leste's economy and sustenance, with approximately 40,000 individuals directly engaged in the sector. The nation's waters, part of the Coral Triangle, are rich in marine biodiversity, supporting both artisanal and small-scale fisheries. Number of Households engaged in aquaculture / fisheries activities (Figure 20).

Fisheries are a major part of the local economy in the coastal areas. It is of great economic importance since fishing provides a source of livelihood and ensures food security, besides aiding in artisanal fisheries and commercial fisheries, which assist the coastal economy. Artisanal fishing, in a traditional manner, characterizes catches in the region, together with a little commercial fishing targeting tuna and mackerel among other species. Their economic importance, be it at local incomes or market contributions, is immense, and as such, they are vital in securing the livelihood of the communities. However, it may destroy fishing grounds, cause habitat contamination, and add another player that competes for resources. This also includes mitigation through compensation programmes, continued monitoring, and liaison with local fishermen for resolution of issues that will help minimize conflict.

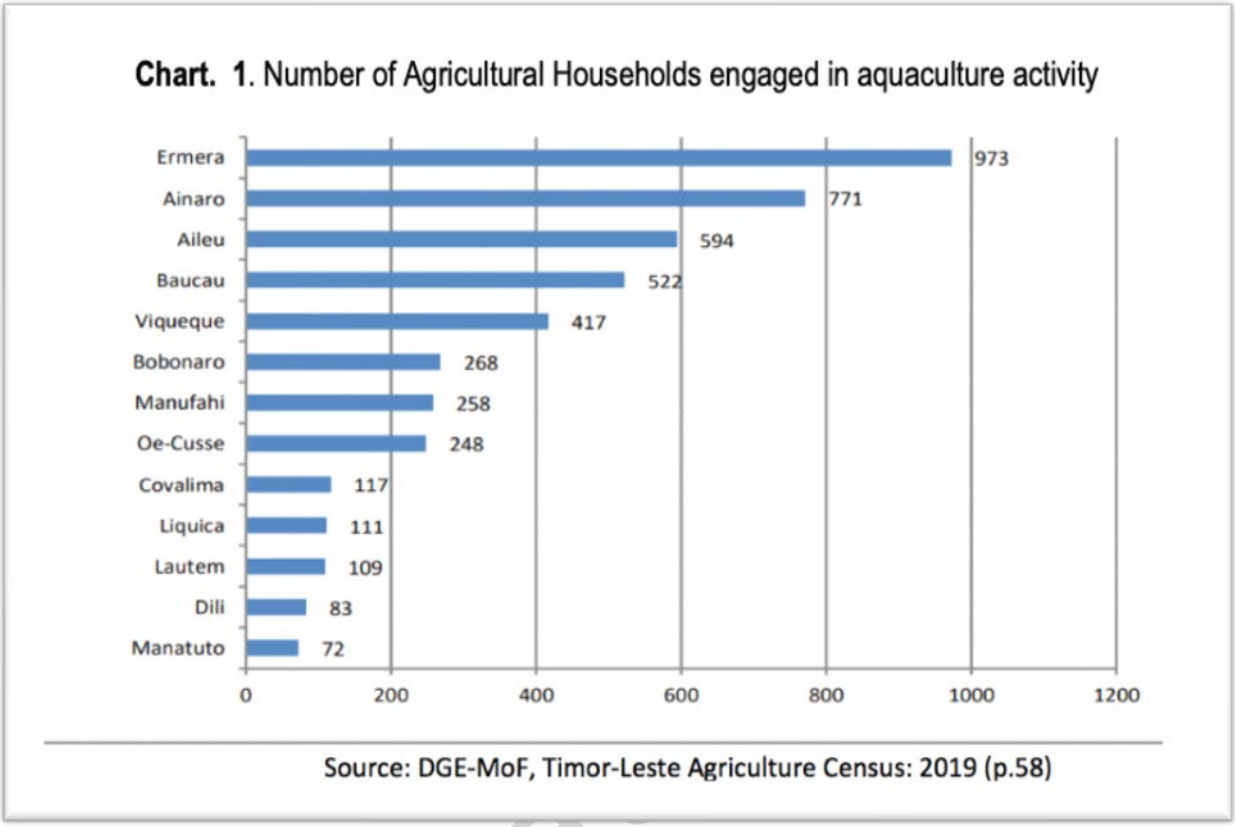


Figure 20-Number of Agriculture Households engages in aquaculture activity. (Source DGE-MOF, 2019)

Artisanal fishers primarily use handlines, gillnets, and traditional traps to target species such as reef fish, tuna, and mackerel. These activities are vital for food security, as fish constitute a primary protein source for the population.

Coastal communities along the 600km of Timor-Leste's coastline rely on a wide range of fish, including the large tunas, flying fish, coral reef fish and deep-water snappers for their livelihoods. The DNFA estimates that for over half the 20,000 fishermen of Timor-Leste, fishing is the main source of food and income many individual, small-scale operators with small boats catch a range of fish mostly sardines. According to fish production data from the National Directorate of Fisheries and Aquaculture in ATSEA Program Socio Economic Impact Assessment report (2011), there were an estimated 2,889 tonnes of fish (with equivalent value of around US$ 5.8 million) landed in Timor-Leste in 2005. Dili was the most active fishing district, dominating the country's fish production and seaweed export, with limited fishing from the south coast towards the Contract Area.

There are 739 species (234 genera, 61 families) of reef fish and 921 species of coral fish recorded in Timor-Leste. The site diversity ranged from 64 to 293 species/sire with an average of 210 species/site.

The coral Fish Diversity Index are expected to predict 921 species. Sites with the highest fish diversity included Atauro Island with barrier reefs (293), Loikere (271), Ete Asa Lepek (259), west Jaco Island (249), and Tenu in Lautem (243). Several new fish species were also collected including Chrysiptera caesifrons and Eviota santani.

Many of the species listed for Timor-Leste are found throughout the tropics and are important commercial species, such as the tunas (The Big Tuna, Thunnus obesus) listed as threatened species, mackerels and snappers. Fish densities in the region of the contract area are likely to be low, with some pelagic species traversing the area. However, waters with greater fish abundance are likely to occur in the shallow, coastal fringe and around reefs and shoals on the edge of the continental shelf (CSIRO 1999a). The broader area of the Timor Sea region supports pelagic fish species that are utilized in traditional and commercial fisheries occur in the deeper offshore areas.

Some figures that give the efforts of Fishery in Timor Leste:

- Volume of Fish catch (Figure 21 as Chart 2).
- Small scale fishing area in Timor Leste (Figure 22).
- Fish catch Composition per Area (Figure 23).

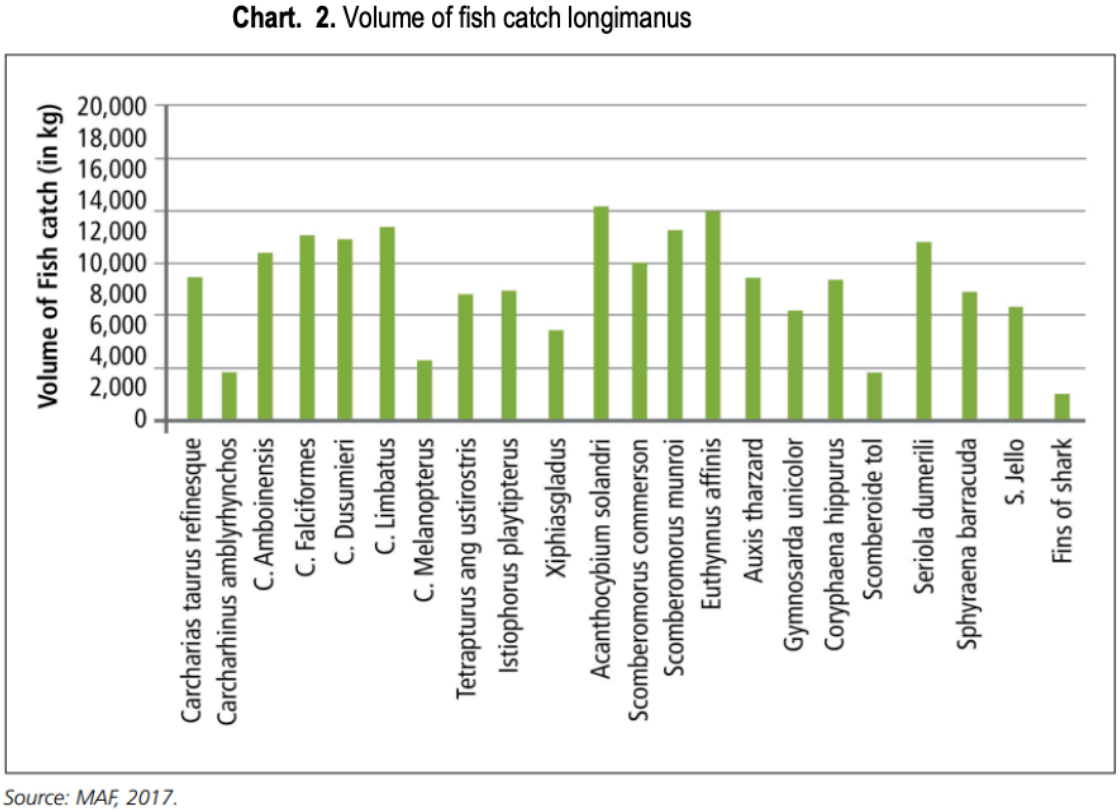


Figure 21-Volume of fish catch. (Source: MAF, 2017)

In the Timor-Leste Sea, at that time more than 239,460 tons of fish or equivalent to $1.2 Billion of total catch were taken from Timor Sea.

To ensure sustainable fishing practices, the government has implemented several regulatory measures. Joint Ministerial Order No. 11/GM/2015 establishes minimum sizes and weights for fishing aquatic species, aiming to prevent overfishing of juvenile stocks. Additionally, Joint Ministerial Order No. 18/MAP/MCIA/II/2017 lists protected aquatic species, prohibiting their capture to preserve biodiversity. The implementation of a Satellite System for Monitoring Fishing Vessels (VMS) under Decree-Law No. 21/2008 further enhances the management of fish stocks by enabling effective monitoring, control, and surveillance of fishing activities. Despite these efforts, challenges persist, including illegal, unreported, and unregulated (IUU) fishing, which threatens marine ecosystems and local livelihoods. In response, Timor-Leste has taken steps to strengthen its commitment to combating IUU

fishing by approving accession to the Agreement on Port State Measures, as outlined in Government Resolution No. 8/2023.

Figure 22-Small-scale fishing area in Timor-Leste. (Source: Ship Traffic)

The Peskas platform, an open-source web portal, provides data and insights on fisheries in Timor-Leste. Initiated in 2016 in partnership with the Ministry of Agriculture and Fisheries, Peskas uses catch data collected by local enumerators and vessel tracking data to show fishing trends over time and space. This near-real-time monitoring system focuses on small-scale fisheries and supports sustainable management practices.

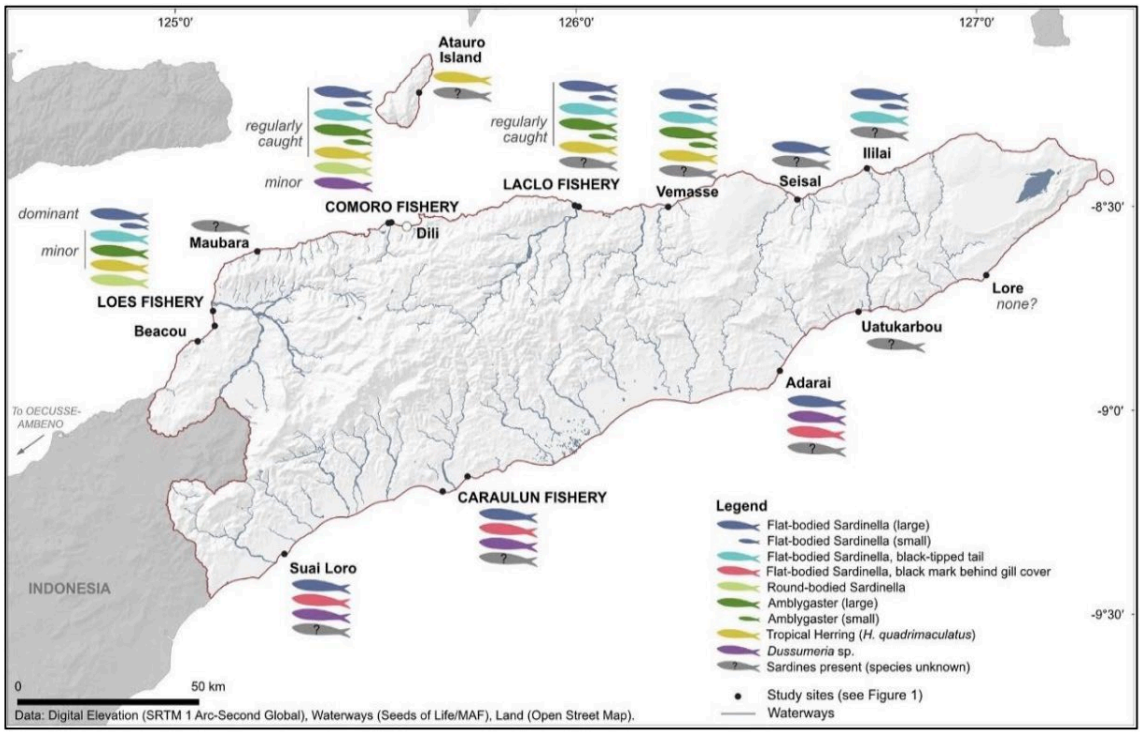


Figure 23-Fish catch composition per area. (Source: Hunnam et. al., 2021)

6.3.3 Tourism

Though this itself is an offshore project, its impacts on the tourism industry, mainly on marine-based tourism activities of diving, snorkelling, and eco-tourism area considered.

Although the project would be classified as offshore, it may have effects on whatever marine-based tourism activities that exist in the area, such as diving and snorkelling, eco-tourism. An approximation of the potential visual disturbance, noise, or even environmental pollution-for example, water contamination-that would be adverse to the tourism aspects. It includes interference with the natural view and underwater experience, which is equally important to tourists. The key principle in evaluation for this would be that the marine ecosystems should be protected, and tourism should be a more attractive and sustainable economic activity in the area. The proposed drilling location is far offshore and has limit or no significant impact on eco-tourism.

Tourism is one of the Government of Timor-Leste's tools for ensuring economic and socially sustainable development. The Government of Timor-Leste has officially published a website

providing information related to tourism in Timor-Leste. This has been a stepping-stone for the country to introduce Timor-Leste worldwide through the website.

Marine tourism has been identified as a potential economic growth area for Timor-Leste, particularly along the north and east coasts, and could deliver social and economic benefits through employment. Some ecotourism, including cultural tourism in coastal areas, in interaction with marine wildlife (dolphins, whales) fishing competitions and diving outfits already exist however further development of these industries is reliant on improved infrastructure and services (Bateman & Bergin, 2011). In northern Australia, commercial marine tourism is an important industry although a small component of the overall tourism sector. Activities include charter fishing, diving, snorkelling, whale mammal watching and visitations on luxury cruise boats around the Kimberley archipelago and NT coast to view sparsely inhabited pristine marine and coastal region. This industry is expected to grow over coming years (DEWHA, 2008b). In the northern region, the marine tourism industries are largely associated with recreational fishing ventures which are projected to increase to increase both in terms of effort, numbers and potentially movement from coastal to offshore areas (Fernander and Grainer, 2010 - ATSEA Program Socio Economic Impact Assessment report 2011). The cruise shipping sector has seen significant growth in northern Australia, particularly through Darwin. There are no known significant heritage or archaeological sites, shipwrecks or marine heritage sites in the vicinity of the survey/drilling area. There is no regular passenger vessel passing by the Chuditch Field.

6.3.4 Seaport and Shipping

Shipping into and out of Timor-Leste is through the port of Dili, with a relatively limited but growing number of vessels. However, administration of shipping is underdeveloped. A new port has recently been completed in Tibar, Liquiça municipality, 2 km to the west of Dili and has been operating since November 2022. It is estimated that this new facility will lead to an increase in shipping traffic to Timor-Leste. In northern Australia, the major ports (Darwin, Dampier, Broome, Weipa, Karumba, Nhulunbuy) are experiencing increased activity due to expansion in the resources sector and exports of major commodities (Iron-ore, natural gas and other petroleum products, lead, zinc, manganese and copper) (DEWHA, 2008A & 2008B). The number of non-government port authority ports in Australia are associated with private resources sector (e.g., in areas adjacent to Gove, Groote Eylandt

and McArthur River in the Northern Territories) with major expansion in ports having been undertaken for gas developments). There is almost a certain amount of traffic associated with offshore support vessels associated with oil and gas industry production and exploration. An increase in shipping and port expansion associated with the growth of the resources sector in the region has potential implications for the marine environment (DEWHA 2008b). Details record of fishing and shipping activity in Timor Sea shown in Figure 24.

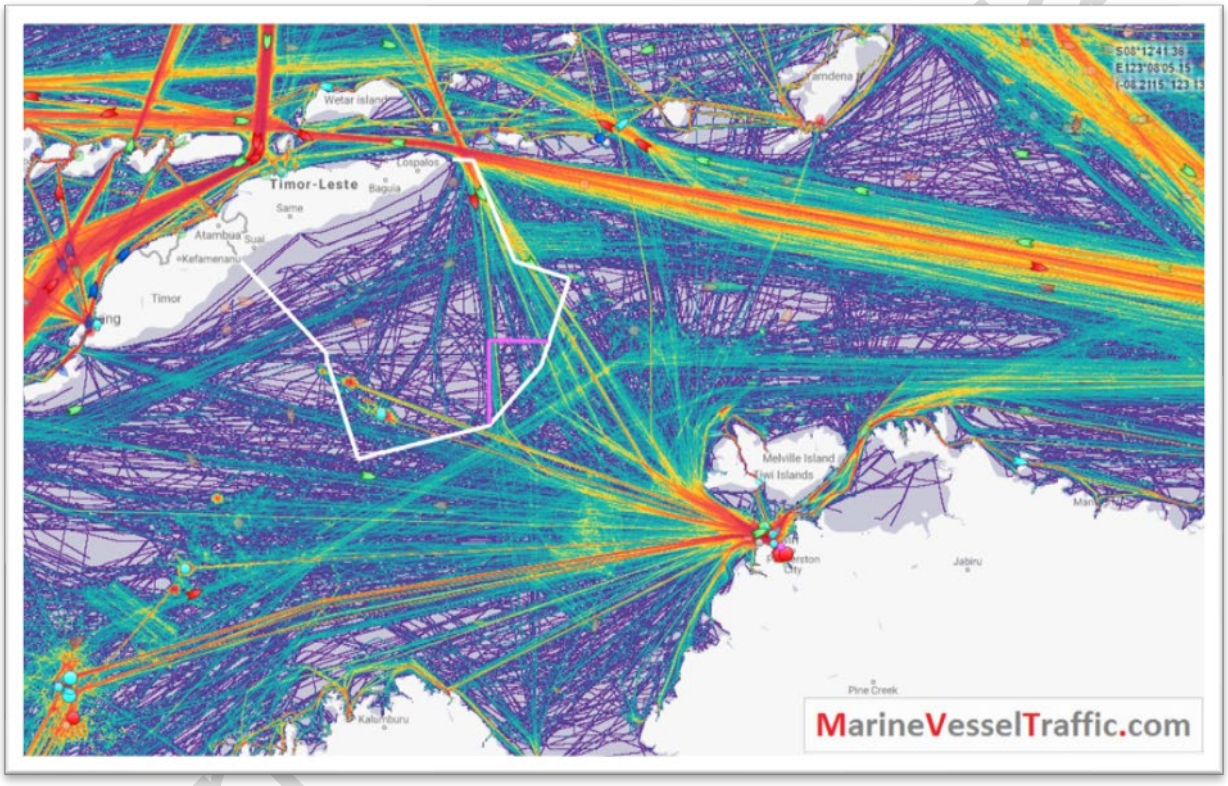


Figure 24-Details record of fishing and shipping activity in Timor-Leste. (Source: Marine Vessel Traffic)

6.3.5 Agriculture and Forestry

Timor-Leste is famous with its coffee variety named Timor Hybrid and also known as the country origin of sandalwood. The following crops are considered economically productive for Timor-Leste: cashew nuts, mangos, spices, vanilla, pineapples, passion fruit, guavas, as well as flowers. The proposed drilling location is far offshore and would not have any significant impact on the agriculture and forestry aspects. The development of Oil and Gas

subsequently would have significant positive impact in supply chain of fresh fruits and vegetable to Oil and Gas Industry.

6.3.6 Other Industries

Mineral and Energy Exploration

Timor-Leste is considered as a highly promising country for mineral and natural gas and oil both onshore and offshore. Based on the study carried out by UNESCAP, Timor-Leste has reserves of metallic minerals: copper-gold, chromite, gold, manganese; and also non-metallic minerals: bentonite clay, phosphorite, gypsum and salt, wollastonite, graphite and talc, silica sands, sulphur, and ochre. In the northern edge of Timor-Leste, there are indications of the existence of copper, chromite, gold, silver, and manganese. The north edge of Oecusse is claimed as the richest copper zones in Timor-Leste as well as Baucau and north central Viqueque Municipality. Atauro and Ossu area of the Viqueque Municipality have number of gold and silver occurrences. In the eastern and western coastal areas of Timor-Leste possesses limestone and marl. Phosphate and bentonite are found in central Baucau Municipality. Good quality marble is also found in Manatuto. The belt from east Dili to the east coast possibly contains clay and kaolin. Mineral that have not been explored yet but are predicted to exist in Timor-Leste are laterite nickel, platinum, and diamonds. This is onshore and development of mining resources would boost the economic development of Timor-Leste.

6.3.6.1 Potential Impacts of Oil and Gas Exploration

The oil and gas sector is central to Timor-Leste's economy, historically contributing over 90% of government revenues. While its employment generation capacity is limited compared to its revenue contributions, it offers several specific benefits to the employment sector:

1. Creation of Direct and Indirect Jobs:
   - Direct Employment: The sector requires specialized roles during exploration, drilling, and production phases, such as petroleum engineers, geologists, drill operators, and safety officers. These positions, though limited in number, are high-paying and skill-intensive.

- Indirect Employment: Support industries such as transportation, catering, equipment supply, and facility maintenance see increased demand. For instance, during the Greater Sunrise gas project, local suppliers were contracted for logistics and site preparation services.
- Construction Opportunities: Infrastructure development for pipelines, refineries, and export facilities generates substantial short-term employment, often engaging unskilled and semi-skilled workers from local communities.

2. Skills Development and Knowledge Transfer:
   - Technical Training Programs: Partnerships between oil and gas companies and local vocational institutions can upskill the workforce. For example, training programs in welding, machinery operation, and environmental safety equip workers with industry-relevant expertise.
   - Apprenticeships and Internships: Opportunities for on-the-job training allow workers to gain practical experience under expert supervision, facilitating knowledge transfer from international professionals to local employees.
   - Long-Term Career Development: Skills acquired in oil and gas operations, such as project management, engineering, and environmental monitoring, can be applied across multiple industries, ensuring sustainable career progression.
3. Economic Multiplier Effect:
   - Boost to Local Enterprises: Oil and gas projects often rely on local suppliers for goods and services, stimulating the growth of small and medium-sized enterprises (SMEs). For instance, catering companies, transport operators, and equipment rental businesses benefit from increased demand.
   - Infrastructure Development: Revenues from the sector are channelled into public infrastructure projects such as roads, ports, and power plants, creating additional employment opportunities and enhancing economic connectivity.
   - Increased Household Income: Wages earned in oil and gas jobs flow back into the local economy, driving consumption and supporting retail and service sectors.
4. Support for Local Content Policies:
   - Mandatory Local Hiring: Policies requiring oil and gas companies to hire a minimum percentage of local workers ensure that the economic benefits of projects are distributed within the community.

- Capacity Building for Local Suppliers: Companies often invest in training local businesses to meet industry standards, enabling them to compete for contracts in the oil and gas supply chain.

5. Gender Inclusion Opportunities:
   - Encouraging Women's Participation: The sector can create targeted programs to train and hire women in technical and leadership roles, addressing historical gender disparities.
   - Flexible Roles: Support positions, such as administrative, environmental monitoring, and community liaison roles, offer opportunities for women to engage in the workforce.
6. Community Development through Revenue Allocation:
   - Education and Health Investments: Revenues from oil and gas projects are often used to fund public services, indirectly creating employment in education, healthcare, and social infrastructure.
   - Social Programs: Community development initiatives funded by oil and gas revenues, such as scholarships, housing, and entrepreneurship grants, foster long-term socio-economic benefits.

6.4 Social Components

The baseline information regarding socio-economic is derived from secondary, publicly available and published sources. The sources are Government websites, public, Institutional publications, Government of Timor-Leste National Strategic Development Plan, World Bank 2023, basic sanitation facilities, WHO, UNDP, UNFPA, ILO, MAF.

Timor-Leste has made significant strides in rebuilding its social and economic components since achieving independence in 2002. This section provides an overview of the social components in Timor-Leste, including the status of the population, living standards, health indicators, and societal structures. Furthermore, it evaluates the potential impacts of oil and gas exploration activities, such as the Chuditch 2 project, on employment, income levels, and infrastructure development.

In general, the EIS team assess the present status of populations, including: Demographics, Population size and composition, Living Standards such as Housing, clean water, and electricity access, Health Status: Public health indicators and access to healthcare, and

Social Aspects like Community structures, local governance systems. The possible impacts whether the project affects jobs in a positive or negative manner, including job creation or displacement. Changes in income whereby an offshore activity may result in increased economic activities, development of Infrastructure. These are in the nature of roads, schools, healthcare, and other such facilities that are propelled by the increased demand or investment.

6.4.1 Demographics and Population Composition

As of 2023, Timor-Leste's population is estimated at approximately 1.34 million people (World Bank, 2023), with a youthful demographic profile. Over 60% of the population is under the age of 25, reflecting high fertility rates averaging 4.2 births per woman (UNFPA, 2022). Figure 25 shows Timor Leste Population Census 2022. This demographic trend has implications for the country's labour force, education system, and social services. Rural areas account for about 70% of the population, while Dili, the capital city, is the primary urban hub. Ethnically, the population is diverse, with Austronesian and Melanesian influences, and there are over 30 local languages spoken, in addition to the official languages of Tetum and Portuguese.

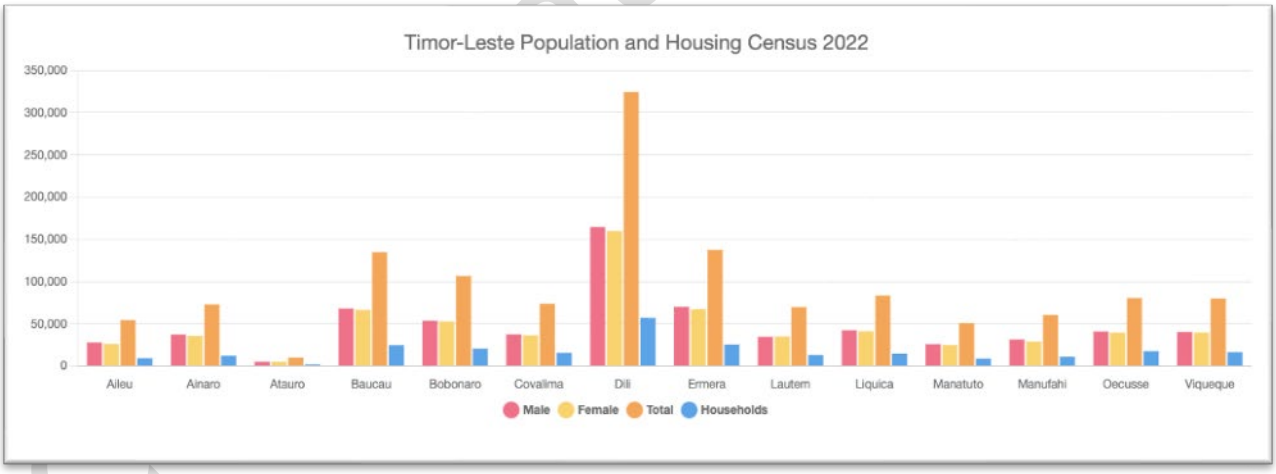


Figure 25-Timor-Leste Population Census 2022. (Source: INE, IP., 2022)

6.4.2 Living Standard

While Timor-Leste has made progress in improving living standards, significant challenges still remain.

6.4.2.1 Housing

The Timor Leste Housing 2022 Census (*Figure 26*) reported that 55.9% of households lived in units which have concrete or brick walls. Palm trunk (bebak) is the second-most common wall material used. In rural areas, 19.5 percent of all housing units have palm trunks as wall material. In urban areas, this is much less (6.9 percent). About one in seven Timor-Leste housing units have bamboo walls (14.4 percent). While this is 19.6 percent in rural areas, just a few houses in urban areas use bamboo as construction material for walls (1.2 percent).

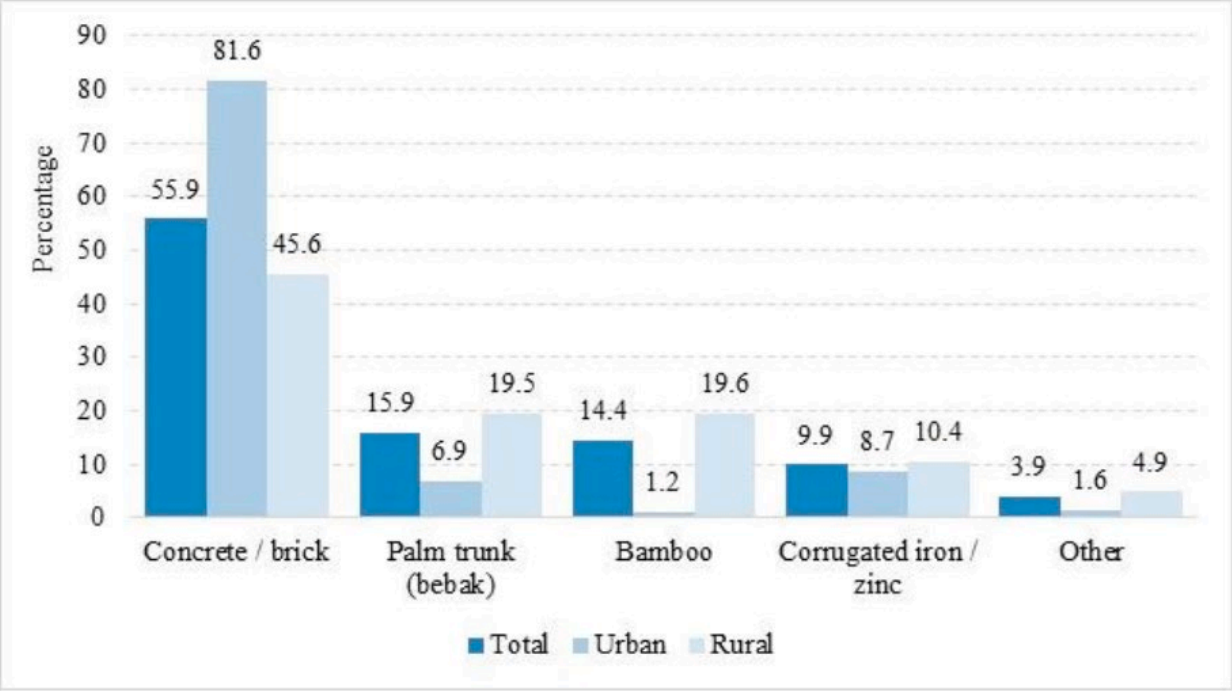


Figure 26-Timor-Leste Housing Census 2022 (Source: INE.IP, 2022)

6.4.2.2 Clean Water and Sanitation

The criteria to classify drinking water services are 'improved' or 'unimproved' type of drinking water sources, accessibility of drinking water on the premises, the time required to collect drinking water, including queuing, the availability of water if needed and absence of contamination.

An improved drinking water source can deliver safe water through its design or construction. The following types of water supplies are considered a source of improved

drinking water: piped supplies and non-piped supplies (such as boreholes, protected wells and springs, rainwater, and packaged or delivered water, e.g. by tanker trucks). Unimproved water sources do not protect against bacterial and chemical contamination. These sources include rivers, streams, irrigation channels and lakes.

The Clean Water and Sanitation Census 2022 (Figure 27) reported for drinking water source that the most occupied housing units rely on public taps or public piped water (39.5 percent). Only a minority of 10.2 percent of all housing units have piped or pumped water in the house, and 11.0 percent have a private water source in the yard. Bottled water and water delivered by a water vendor account for 8.8 and 2.3 percent of all housing units, respectively. The graph shows (Figure 28) that people in 8.7 percent of all housing units depend on rivers, streams, lakes, ponds and irrigation channels to get drinking water, and 4.3 percent obtain their drinking water from unprotected wells and unprotected springs. This means that unimproved drinking water sources are used in 13.0 percent of all housing units.

Figure 27-Clean water and sanitation census 2022. (Source: WHO/UNICEF, 2022)

Approximately 75% of households have access to improved drinking water sources, but only 46% have access to basic sanitation facilities (WHO/UNICEF Joint Monitoring Programme, 2022).

Lack of proper sanitation is a major contributor to waterborne diseases, particularly in rural communities.

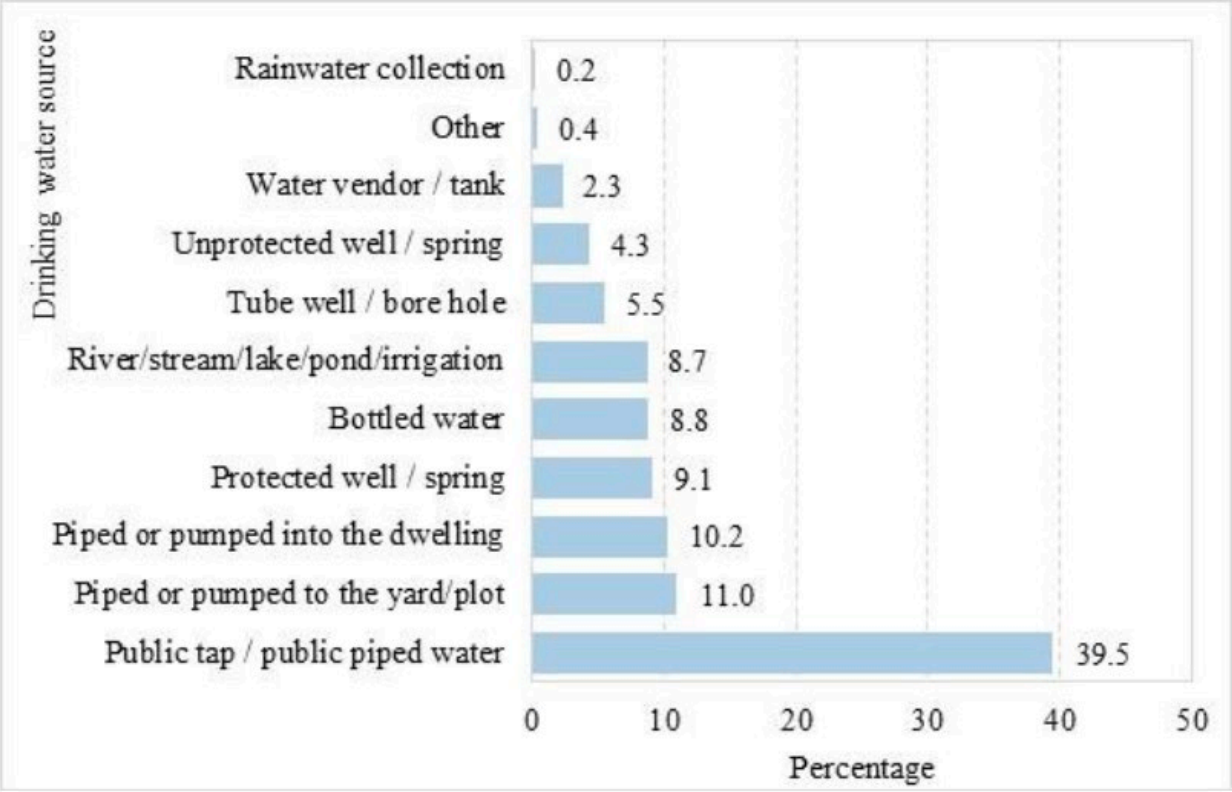


Figure 28-Drinking water source (Source: INE.IP, 2022)

6.4.2.3 Electricity Access

As of 2024, Timor-Leste has achieved a national electrification rate of 99%, according to *Eletricidade de Timor-Leste* (EDTL). This milestone reflects substantial government efforts to expand electricity access across the country. Currently, only one suku, Betulau, in the post-administrative area of Lequidoe, Aileu Municipality, remains under construction. Furthermore, 96% of aldeias nationwide are now connected to the electrical grid, marking significant progress in enhancing electricity access for both urban and rural communities.

This achievement aligns with the National Strategic Development Plan (2011–2030), which prioritizes universal access to reliable, 24-hour electricity by 2030. The plan emphasizes rural electrification as a cornerstone of sustainable development, aiming to reduce inequalities and foster economic growth across Timor-Leste (Timor-Leste National Strategic Development Plan).

Despite these advancements, challenges persist, particularly in rural areas, where intermittent power supply hampers productivity and quality of life. To address these challenges, the government and international organizations have launched targeted initiatives. For instance, the UNDP's Accelerating Clean Energy Access to Reduce Inequality (ACCESS) project, funded by the Korea International Cooperation Agency, has been pivotal in improving energy access for vulnerable communities. Between 2020 and 2023, the project focused on enhancing sustainable electricity access in 25 villages across Dili (Atauro), Bobonaro, and Manatuto municipalities, aiming to improve livelihoods and reduce energy inequality (UNDP ACCESS Project).

Additionally, the UNSDG's Solar-Powered UN House project highlights Timor-Leste's commitment to greener and more sustainable energy solutions. This initiative showcases the potential of renewable energy sources, such as solar power, to address chronic energy challenges and reduce dependency on expensive and environmentally harmful diesel generators (UNSDG Solar-Powered UN House).

The government is further promoting renewable energy technologies, including micro-hydro, solar panels, and biofuel generators, particularly in remote areas. Communities are encouraged to adopt these solutions, with opportunities to produce surplus energy for sale to the national grid.

While Timor-Leste has made commendable progress toward electrification, continued efforts are necessary to ensure the reliability, affordability, and sustainability of electricity, particularly in rural areas. Strengthening infrastructure and advancing renewable energy initiatives will be critical to achieving the country's long-term development goals.

6.4.3 Health Status

Public health indicators in Timor-Leste highlight areas of progress and ongoing challenges.

6.4.3.1 Life Expectancy

Life expectancy in Timor-Leste has seen significant improvement, increasing to approximately 70 years as of 2023. This progress reflects advancements in healthcare, education, and living conditions within the country. Despite these gains, life expectancy in Timor-Leste remains lower than the global average, which was 73.4 years in 2019 according to the World Health Organization (WHO).

The improvement is attributed to investments in public health infrastructure, vaccination programs, and reductions in infant and maternal mortality rates. However, challenges persist, including access to healthcare in remote areas, nutritional deficiencies, and the burden of communicable and non-communicable diseases. Continued efforts in addressing these issues are essential to closing the gap with the global average.

6.4.3.2 Healthcare Access

Timor-Leste faces significant challenges in ensuring equitable access to healthcare, particularly for rural communities. While healthcare infrastructure is concentrated in urban centers like Dili, rural and remote areas remain underserved. This geographic disparity greatly affects access to skilled healthcare, with only 40% of births in rural areas attended by skilled health personnel, compared to 85% in urban settings.

6.4.3.3 Resource and Workforce Challenges

Health facilities in Timor-Leste often operate with limited resources, including insufficient medical equipment, essential medicines, and infrastructure such as clean water, electricity, and transportation services. Rural health posts, which are typically the first point of care for many communities, are especially affected by these shortages.

Moreover, the country faces a critical shortage of skilled healthcare professionals, including doctors, nurses, and midwives. This shortage is compounded by challenges in recruiting and retaining qualified staff in rural areas. Many healthcare workers prefer urban settings due to better living conditions, professional opportunities, and access to education for their families.

6.4.3.4 Maternal and Child Health

Maternal and child health indicators highlight the need for targeted interventions. Although progress has been made since independence in 2002, maternal mortality remains high, with 142 maternal deaths per 100,000 live births in 2020 (World Bank). Neonatal and under-five mortality rates are also higher in rural regions (41 per 1,000 live births) due to limited access to antenatal care, skilled delivery services, and postnatal care (World Bank, 2023).

While Timor-Leste has made notable progress in rebuilding its healthcare system post-independence, significant disparities remain. Achieving universal healthcare access requires sustained investments in health infrastructure, human resources, and community outreach

programs. Addressing these challenges is critical to improving health outcomes, particularly for women and children in rural areas.

6.4.4 Education

Timor-Leste's education system comprises six years of primary education, followed by three years each of lower and upper secondary education, totalling 12 years of formal schooling. As of 2015, the country had 106 secondary schools, with 61 public and 45 private institutions. The net attendance ratio for secondary education stood at 32.8%, with a higher participation among females (35.9%) compared to males (29.9%).

In tertiary education, the net attendance ratio was 16.3%, indicating that a modest proportion of the population pursued higher education. A significant concentration of tertiary students resided in Dili municipality, accounting for 66.7% of the total higher education student body.

Additionally, the Timor-Leste government has committed to supporting students through initiatives through the Human Capital Development Fund, which allocated at least $150,000 in 2023 to assist up to three Timorese students in pursuing studies in the United States. Furthermore, the collaboration with development partner’s support students to study in Europe, Australia, New Zealand, China, Japan, etc.

These collaborative efforts between the government and international partners aim to develop a skilled workforce capable of contributing to Timor-Leste's ongoing development, aligning with the educational objectives outlined in the SDP 2011–2030.

Despite these advancements, several challenges persist. A significant issue is the shortage of qualified teachers; many educators have only completed secondary education, with only half meeting the minimum qualifications for teaching.

This lack of qualified teachers contributes to high repetition rates, particularly in early grades. For instance, a 2009 assessment found that over 70% of Grade 1 students were unable to read a single word in Portuguese or Tetum, though this improved to 40% by the end of Grade 2.

Infrastructure deficits further hinder educational access, especially in rural areas. Ageing facilities, insufficient classrooms, and limited educational resources contribute to high dropout rates and absenteeism.

Additionally, language diversity poses challenges, as instruction is primarily in Portuguese and Tetum, which may not be the first languages of many students.

Efforts to address these challenges include government initiatives and international partnerships aimed at improving teacher training, updating curricula, and enhancing educational infrastructure. However, sustained investment and comprehensive strategies are essential to overcome these obstacles and ensure quality education for all Timorese children.

6.4.5 Transportation Infrastructure

Infrastructure plays an important role to support economic and social development. The Government of Timor-Leste along with Funding agencies have improved the transportation infrastructure in general. However, there are many challenges due to climate changes, low maintenance, not enough human resources to support the system.

The Timor-Leste Strategic Development Plan 2011–2030 outlines a comprehensive vision for enhancing the nation's transport infrastructure across land, air, and maritime sectors. The plan emphasizes the critical role of a robust transportation network in facilitating economic growth, social development, and national integration.

Timor-Leste's transportation infrastructure encompasses land, air, and maritime sectors, each presenting unique challenges and ongoing development efforts.

6.4.5.1 Land Transportation

The nation's road network spans approximately 6,041 km, with about 2,600 km paved and the remainder unpaved. The general condition of these roads is inadequate, often hindering efficient transportation. Public transport primarily consists of privately operated minibuses, known locally as microlets, which serve various routes without formal schedules. Recent initiatives, such as the Timor-Leste Branch Roads Project, aim to improve road connectivity by linking key towns and enhancing access to popular destinations like Mount Ramelau.

6.4.5.2 Air Transportation

The country operates several airports, with Presidente Nicolau Lobato International Airport in Dili being the primary hub for international flights. This airport accommodates flights to destinations including Darwin, Denpasar, and Singapore. However, limitations such as a short runway and lack of night-time landing capabilities restrict operations to daylight hours. Other airports, such as those in Oecusse, Baucau and Suai, primarily handle domestic flights and are less equipped for international traffic.

6.4.5.3 Maritime Transportation

Maritime transport is vital for both domestic and international trade. The Port of Dili has historically been the main international cargo reception port, but its capacity has been insufficient to meet import needs. To alleviate this, the Tibar Bay Port was developed and began operations on September 30, 2022, aiming to handle all cargo shipping and improve trade efficiency. Additionally, ferry services operate between Dili and regions like Oecusse and Atauro, providing essential connectivity for passengers and vehicles.

6.4.6 Religion

Timor-Leste has no official state religion and the government values different religious views. The Catholic has dominated the religion of Timor-Leste especially due to the Portuguese's occupation for a very long time. Protestant, Animist and Islamic have also been practiced by Timorese. Most of Timorese also practices animistic beliefs, where traditions and old animistic cultures are still attached in some rural areas. However, animistic is more cultural rather than religion belief.

6.4.7 Social Structures and Local Governance

Timor-Leste's community structures are deeply rooted in traditional systems, with customary practices ("adat") playing a pivotal role in social cohesion and dispute resolution. Local governance operates through village-level councils ("sucos"), which are essential for implementing development programs and resolving conflicts. These councils work alongside formal administrative systems established by the national government, ensuring localized decision-making and community engagement.

6.4.8 Social Structure and Language

Timor-Leste consists of diversity of ethnic groups that speaks more than 30 languages as well as Bahasa Indonesia and Portuguese has been used across the territory with some of the larger language groups being. Timorese largely speak Tetum, Mambae, Portuguese, Bahasa Indonesia, Tokodede, Makasae, Kemak, and Bunak. Among those languages, Tetum and Portuguese are claimed as the official languages in Timor-Leste that lives around Dili and neighbouring northern coast.

6.5 Cultural Components

6.5.1 Traditions

Timor-Leste traditions are strongly related to mythology and verbally spread from generation to generation. The tradition is dominated by animist spiritualism that believes the spirits of the dead people should be worshiped. The spirits, named as Lulik, are on shapes and objects such wells, streams, stones, and animals.

A significant tradition of Timor-Leste is Tais weaving. It is the textile of the country that expresses the beauty and ancient traditions of Timor-Leste, which is mostly crafted by women. Tais has been widely worn for dances, religious gatherings and special rituals in Timor-Leste.

Music and dance in Timor-Leste have been strongly influenced by Portuguese and Indonesian cultures, with the most popular dance namely Likurai. Performed by women, this is a welcoming dance for men back to their homes after the war.

6.5.2 Cultural Heritage

The form of cultural heritage may thus relate to valuable sites, whether these are related to maritime heritage, traditional fishing practices, or indigenous systems of knowledge. The analysis of the cultural impact by identifying all places featuring cultural significance and analyse the potential influence of a project on such an area. The Cultural Heritage: Sites might include any of the following:

Maritime Heritage: Sites related to the sailing tradition, Traditional fishing practices form part of the culture and employment of local communities, and Indigenous knowledge systems manifest themselves in the unique practices tied to land and sea.

Cultural Impact Assessment: In terms of marine heritage in the vicinity of the drilling activity, there are no known significant heritage or archaeological sites, ship-wrecks or marine heritage sites. In additional, the people of Timor-Leste still carry out traditional rituals prior to conducting activities in the ocean.

7. INTITUTIONAL ROLES AND RESPOSIBILITIES

Table 17 provides details of the roles and responsibilities for all Health, Safety, and Environment (HSE) related aspects of SGBU and its drilling contractor management within the drilling of Chudicth-2 Appraisal Well.

Table 17-Details of the roles and responsibilities related to HSE for Chudicth-2 Appraisal Well.

Party	Responsibilities
SGBU General Manager	• To establish environmental protection policy for the project; • To obtain the Authority's permission and approval with regards to the relevant environmental requirements; • To notify the relevant agency on works to be carried out on site; • To verify contractor's environmental policies, standards and procedures are acceptable and conform to applicable laws and regulations; • To engage an Environmental Consultant in conducting environmental monitoring and verification of environmental performance on site; • To review environmental monitoring and surveillance audit reports prepared by the Environmental Consultant.
SGBU Well Operations Manager	• To communicate SGBU environmental performance targets to all project team members; • To impose environmental management requirements on the Drilling Crews. This including requiring the subcontractor's personnel to observe HSE programme and coordinating activities between the rig contractor and subcontractor personnel to avoid conflicts; • To ensure that suitable management processes are in place to carry out the operations safely and in an environmentally sound manner and to reduce risks wherever practicable; • To provide environmental emergency support, including emergency response plans, equipment and professional support for tier 2 and tier 3 emergencies; • To monitor SGBU HSE and Drilling Contractor performance and assisting in the implementation of environmental improvement initiatives; to ensure all relevant environmental plans, procedures and records are in place and maintained; • To review actions undertaken in response to any non-conformance or complaints received from the public and consider whether additional mitigation measures are required with respect to the operation of the work; and • To report environmental related incidents to the ANP and other relevant agencies.

Party	Responsibilities
SGBU HSE Manager	The SGBU HSE Manager will advise and assist the Well Operations Manager on health, safety and environmental issues, includes the following: • Advise on governmental environmental regulatory requirements and applicable legislation; develop project overall environmental policy and plan and advise on environmental clauses and their implementation in the contractual document with the drilling contractor and other service contractors; • Provide advice and guidance for all aspects of the operations on matters relating health, safety and environment; advises on environmental hazards associated with chemicals and other material produced, or likely to be used in the operations and advise on emission limits; • Review Drilling Contractor and other service contractors' environmental management plan; monitor and analyse environmental performance during the operation and make suitable recommendation for improvement; • Maintain close liaison with Drilling Contractor's OIM and Safety Department Representative (SDR) to discuss the environmental implementation and performance, audit findings and develop practical improvement action plans, if necessary; • Assist in investigation and analysis of environmental incidents including report writing; to conduct review meetings with the Environmental Consultant to assess environmental performance of the works and to identify any improvements in working practices to avoid non-compliance of the proposed work practices; report on all environmental related matter to SGBU; • and liaise with governmental agencies to ensure timely advice of regulatory requirements and compatibility of operations with the requirements.
Drilling Superintendent / (DS)	The Drilling Superintendent will work closely with the Rig Manager on the following: • Develop environmental objective and plans in line with the SGBU environmental objective and regulatory obligations; • Coordination and consultation with line supervisors, employees and subcontractors on environmental matters; • Responsible for safe execution of all operations on the rig including rig moving, well construction, well testing and maintenance of facilities on rig. • Responsible for overall environmental requirements and management on rig including waste management and

Party	Responsibilities
	disposal, fuel/ oil spill responses, emergency response, etc.; • Ensure the Offshore Drilling Supervisor and SGBU/Rig HSE personnel, carry out environmental hazards identification, assessment and develop plan for mitigation measures; • Ensure that necessary pollution control equipment is provided on board and that a schedule for periodical inspection and maintenance activities is in place and used; and • Ensure all personnel on board are provided with appropriate environmental awareness induction and adhere to the SGBU and rig operator's environmental directives.
Drilling Rig Drilling Crew	
Drilling Supervisor/ Rig Manager, (RM) Company Man (CM)	The Offshore Drilling Supervisor/ Company Man (CM) is SGBU's senior representative on site. The CM, in close liaison with SGBU Drilling Superintendent in Dili, is responsible: • For safe operation of the well construction activities by appropriate planning and monitoring of drilling program carried out by the Drilling Contractor. • To ensure that the appraisal drilling works is carried out in accordance with SGBU HSE and this EMP's requirements, which include: ○ To incorporate environmental management considerations and practices in project planning including the selection of drilling site, drilling method.; ○ To ensure that appropriate control and mitigation measures are implemented to minimize overall potential environmental impacts associated with the exploration drilling activities; ○ To re-assess environmental impacts of the drilling activities and together with the Rig Contractor, develop corrective actions; ○ To alert the SGBU DS and SGBU HSE Manager to any operational changes which have significant impact to the environment; and ○ To notify the SGBU HSE Manager of any incidents and activities arising from the exploration activities that could have negative environmental impacts.
OIM/Tool Pusher (TP)	• Ensure that the drillers are aware of all environmental requirements and abide with the best environmental practices in carrying out drilling and associated activities; • Where necessary, incorporate and consider environmentally

Party	Responsibilities
	friendly option in identification of work method; • Carry out drilling work as per procedures established and verifies that environmental provisions are followed; • Verifies the performance of environmental management for the drilling associated activities; and • Provides environmental emergency response support, both personally and together with drillers.
HSE Advisor	• Identify the resources and equipment available and required for environmental control and mitigation purposes; • Monitor/ inspect environmental practices on site on a regular basis; take necessary actions to ensure compliance with all the relevant approval conditions and environmental related regulations; • Ensure that environmental protection requirements are communicated to all personnel and subcontractors; • Provide environmental, health and safety induction for all staff on board; • Ensure that the work procedures are carried out within the preferable environmental mean; Maintain all spill clean-up kits or spill control equipment are in good working conditions in compliance with the manufacturers' recommendations; • Verify the necessity to rectify work procedures so as to comply with the relevant environmental requirements; and • Liaise with HSE Manager during periodical site surveillance audit and monitoring program.
Drillers	• Conduct drilling activities in accordance to work statement as instructed by the CM; • Implement on site best management practices as detailed in this EMP; • Take necessary steps to correct environmental hazardous conditions and incorrect practices and inspection of the pollution control equipment for drilling activities are in good condition; and • Report any activities that breach the practices recommended in the EMP to the Rig OIM who will advise the SGBU CM.
Barge Master (BM)	• To incorporate environmental consideration in the Jack-up Rig move plan; • To implement appropriate environmental control measures during rig movement; • To be responsible for the sewage and waste management on the Jack-up Rig; • To report marine mammal sighting during rig movement and during operations; To be responsible on the inspection and maintenance of pollution control requirements on the Jack-up Rig.

Party	Responsibilities
Others	
Environmental Consultant	The Environmental Consultant will assist SGBU in the identification of the environmental requirements during the project implementation stage, monitor the environmental quality on site and verify the implementation of EMP by the respective parties involved. • Incorporate SGBU environmental policy in the EMP; • Support and advise SGBU on any environmental issues, which may arise during the implementation of the appraisal well construction program; • Advise SGBU HSE on the environmental management and mitigation measures that need to be implemented at the site so as to minimize adverse environmental impacts; • Monitor and verify the implementation of environmental practices on the rig and to check on the effectiveness of the mitigation measures implemented; • Notify SGBU on the environmental performance onsite and advise for the review of the EMP and the monitoring program, if deemed necessary; check the environmental management on the closure and rehabilitation of the drill site.

8. SUMMARY OF IMPACTS

The potential impacts of the appraisal drilling activities are summarized in Table 18 and Table 19 summaries the Potential Impacts Matrix.

Table 18-The potential impacts of the appraisal drilling activities.

Aspects	Source of Impact	Source Activities	Potential Impacts	Nature of Impacts	Impact Indicator
Positive Impacts					
Future Development and Production	Development and Production	Employment Opportunities	Potential job opportunities in the future once the Chuditch field reaches the development and production stage.	Positive, direct and indirect, cumulative, long term (duration of The production, national, high).	National, International labors, engineers, and community
	Development and Production	Revenue	Royalties and Income Tax on Petroleum Activities	Positive, direct, cumulative, long term, national, high	Government of Timor-Leste and Timorese
Negative Impacts					
MODU Mobilization	Rig/MODU positioning/ Preload procedures	deployment of rig legs/burying of spud cans in seabed sediments	Seabed disturbance resulting in disturbance to benthic communities	Negative, direct, site specific, short term (±40days), medium	Marine Biota, Marine Habitat, Water and Sediment Quality
	MODU positioning and Operation	Business interruption due to damage to commercial vessel or fishing gear.	Interference with Timorese and Australian fishing vessels, commercial shipping, and other marine users.	Negative, direct, site-specific (500m petroleum safety zone), short term, medium.	Marine Users
Drilling	MODU Operation	Noise and vibration Emissions into the	Behavioral disturbance to marine fauna	Negative, direct, local, short term,	Marine Fauna

Aspects	Source of Impact	Source Activities	Potential Impacts	Nature of Impacts	Impact Indicator
Operations		marine environment		low	
	MODU and Support Vessels	Illumination of waters within close proximity to the MODU and support vessels	Marine Fauna attraction to light emission from MODU and support vessels	Negative, direct, local (vicinity to the site), short, low	Marine Fauna
Drilling Operations	MODU Support	Routine discharges of cement to sea from cementing conductor	Turbidity near wellhead. Contamination of marine sediment with cement and cement additives Smothering of benthic environment	Negative, direct, local, short, medium	Marine Biota, Marine Water and Sediment Quality
	MODU Support	Routine discharge of blowout preventer fluids during operations testing.	Change in water quality in offshore deep open water	Negative, Direct, local, short, medium	Marine Biota, Water Quality
	Routine discharges to the marine environment	Routine discharge of WBM drill cuttings and fluids to the seabed during riserless drilling	Burial and smothering of benthic habitats.	Negative, direct, cumulative, short, medium	Marine Biota, Water Quality, Sediment Quality
	Wellbores clean up	Once well circulated excess and contaminated brine containing SBM will be separated, discharged to a supply vessel where a licencesed waste management company will dispose.	No change to seabed or water quality	No direct impacts	Marine Biota, Water Quality

Aspects	Source of Impact	Source Activities	Potential Impacts	Nature of Impacts	Impact Indicator
	Drilling Operation	Routine sea surface discharge of drill cuttings and residual SBM into the marine environment	Temporary toxic effects to marine biota, burial and smothering of benthic habitats, temporary reduction in water quality in offshore deep open water (turbidity increase)	Negative, direct, cumulative, short, medium	Marine Biota, Water Quality, Sediment Quality
Drilling Operations	Fluid Waste Discharge	Routine discharge of sewage, greywater, macerated food, brine and cooling water to marine environment from the MODU	Temporary nutrient enrichment in surface waters. Attraction of marine fauna in the vicinity of the MODU.	Negative, direct, local, short, medium	Marine Biota, Water Quality, Sediment Quality
Atmospheric Emission	MODU Support	Use of MODU and machinery engines resulting in release of emissions under normal operation.	Contribution to the incremental build-up of greenhouse gas in the atmosphere.	Negative, Direct, local, short, low	Air Quality
	Well Clean up	Combustion gas emissions to atmosphere through well clean up flaring	Contribution to the incremental build-up of greenhouse gas in the atmosphere.	Negative, direct, local, short, medium	Air Quality, GHG
Unplanned Events	Drilling Operation	Loss of well control during drilling	Toxic effects to marine biota Oiling of marine mammals, reptiles and seabirds Oiling of islands and emergent coral reefs/submerged shoals Interruption to commercial and coastal subsistence fishing	Negative, direct, global, short, high	Marine users, marine biota, marine habitat, water quality

Aspects	Source of Impact	Source Activities	Potential Impacts	Nature of Impacts	Impact Indicator
			activities.		
	MODU Support	MODU bunkering and supply from Offshore Supply Vessel with and estimated release of diesel, SBM	Toxic effects to marine biota Oiling of marine mammals, reptiles and seabirds	Negative, direct, local, short, medium	Marine Biota
Unplanned Events	MODU Support	Offshore Supply Vessel collision with a release of hydrocarbons	Toxic effects to marine biota Oiling of marine mammals, reptiles and seabirds Oiling of islands and emergent coral reefs/submerged shoals Interruption to commercial fishing activities.	Negative, direct, global, short, high	Marine Users, Marine Biota, Marine Habitat
	Drilling operations	Release of shallow gas from shallow gas pockets.	Contribution to the incremental build-up of greenhouse gas in the atmosphere	Negative, direct, global, short, medium	Air Quality, GHG
	MODU Support	Release of ozone depleting substances	Contribution to the cumulative build-up of ozone depleting substances in the atmosphere.	Negative, direct, global, short, medium	Air Quality, Climate
	MODU Support	Unplanned discharge overboard of hazardous and non-hazardous wastes to marine environment.	Decline in water quality Toxic effects to marine biota	Negative, direct, local, short, medium	Marine Biota and Water Quality
	MODU	Chemical and hydrocarbon spill during handling and storage	Toxic effects to Marine Biota and decline in	Negative, direct, local, short, low	Marine Biota and Water Quality

Aspects	Source of Impact	Source Activities	Potential Impacts	Nature of Impacts	Impact Indicator
	Support	on the MODU that is released overboard (anticipated to be none to small amount due to dry break nozzle)	water quality (turbidity increase)		
Unplanned Events	Well clean up	Hydrocarbon fallout during well clean up	Protected Marine reptiles, cetaceans, and sharks may transit the area.	Negative, direct, local, short, low	Marine Biota and Marine Habitat
	MODU Mobilization	Transport/ introduction of invasive marine species (IMS) in MODU ballast water	Introduction and establishment of IMS and displacement of native marine species.	Negative, direct, regional, short, low	Marine Biota and Marine Habitat
	MODU Mobilization	Transport/introduction of invasive marine species on hull, internal niches and in water equipment (Biofouling)	Introduction and establishment of IMS and displacement of native marine species.	Negative, direct, regional, short, low	Marine Biota and Marine Habitat

The summary of environmental impacts and environmental parameters during mobilization of rig to site, during drilling operations and during the demobilization of rig and the Potential Impacts Matrix is given Table 19.

Table 19-Potential Impacts Matrix.

Environmental Components/Parameters			Mobilization/Rig Move	Operation			Demobilization/Rig Down
				Rig Up	Drilling	Well Testing	
Physical and Chemical Components	Air Quality, Noise, Vibration, and Light	CO/CO_2	✓		✓	✓	✓
		Methane (CH_4)	✓		✓	✓	✓
		$NO/NO_2/N_2O$	✓		✓	✓	✓
		Ammonia Gas (NH_3)	✓		✓	✓	✓
		SO	✓		✓	✓	✓

Environmental Components/Parameters			Mobilization/Rig Move	Operation			Demobilization/Rig Down
				Rig Up	Drilling	Well Testing	
		Particulate Matter (PM_{10})	✓		✓	✓	✓
		$PM_{2.5}$	✓		✓	✓	✓
		Noise	✓		✓	✓	✓
		Vibration	✓		✓	✓	✓
		Light	✓		✓	✓	✓
Physical and Chemical Components	Water Quality	pH	✓		✓	✓	✓
		Salinity	✓		✓	✓	✓
		Turbidity	✓		✓	✓	✓
		Total Suspended Solids	✓		✓	✓	✓
		Total recoverable hydrocarbons (TRH)	✓		✓	✓	✓
		Polycyclic aromatic hydrocarbons (only where TRH is detected)	✓		✓	✓	✓
		Total Aromatics Hydrocarbons	✓		✓	✓	✓
		BTEX (benzene, toluene, ethylbenzene and xylene)	✓		✓	✓	✓
		Sulphur	✓		✓	✓	✓
		Heavy metals (As, Ba, Cd, Cr, Co, Cu, Hg, Ni, Pb, Zn, Mg, Fe, Se)	✓		✓	✓	✓
		Oil and Grease	✓		✓	✓	✓
		Chlorophyl-a	✓		✓	✓	✓
	Sediment Quality	Sediment Speciation	✓		✓	✓	✓
		Acid Volatile Sulphides (AVS)	✓		✓	✓	✓
		Pore water	✓		✓	✓	✓
		Metals and Metalloids	✓		✓	✓	✓
		Hydrocarbons	✓		✓	✓	✓
		PAH	✓		✓	✓	✓
		Oil and Grease	✓		✓	✓	✓
	Marines Flora and Fauna	Habitat/Seabed Destructions	✓		✓	✓	✓
		Migration	✓		✓	✓	✓
		Abundance	✓		✓	✓	✓
Social, Economic and Cultural	Socio-Economic	Employment	✓		✓	✓	✓
	Socio-Cultural	Public Complaints	✓		✓	✓	✓

9. PROPOSED MITIGATION MEASURES

The following are the detailed mitigation measures and management strategies proposed to mitigate the potential environmental impacts and risks identified in Section 9 – Impact Assessment of the EIS report.

This environmental management plan serves as a management plan for the environmental components identified in the EIS report. Details of the environmental mitigation measures and responsibility of various parties on the Jack-up Rig are given in Table 20

Table 20-Environmental Mitigation Measures and Responsibility of various parties.

Environmental Mitigation Measures		Responsibility
Marine Ecology Protection		
Jack-up Rig movement and positioning	• Determine the rig leg positioning point based on the findings from seabed survey conducted for rig positioning.	RM, BM
	• Conduct seabed sediment and geotechnical sampling and pre-loading test to determine seabed stability during Jack-up Rig positioning to limit seabed destruction.	SGBU WOM
	• Jack-up Rig positioning/ deployment to be carried out according to standard procedures to minimise disturbance to the seabed sediments.	BM
Marine pest control	• Clearing of biofouling on rig legs, if necessary, prior rig mobilisation to and demobilisation from PSC TL-SO-19-16.	RM, BM
Vibration/ light heat disturbance during drilling	• Minimise unnecessary lights directed towards water and minimise the duration of exploration drilling.	OIM, BM, DS
Discharge of drilling fluid and cuttings/ oil spill	• Onboard separation of drilling muds for reuse as much as practicable to minimise drilling fluids discharge to the marine water.	BM, OIM, DS
	• Execute oil spill response plan to minimise spillage into marine water	BM, OIM
	• Installation of safety features such as automatic shutdown valves on the oily water separator to minimise risk of oily discharge to marine water.	BM, OIM
	• Summary of Jack-up Rig Effluent Management Plan (Figure 8)	BM, OIM
Hazardous Material Usage & Storage Management		

Environmental Mitigation Measures		Responsibility
Hazardous materials handling and storage	• A copy of Safety Data Sheet (SDS) should be made available and readily accessible on the Jack-up Rig as guidance for material handling and disposal.	OIM/Rig HSE/SGBU HSE
Hazardous materials handling and storage	• A designated and proper storage area for chemical and hazardous materials must be provided on derrick. The storage area should be sheltered and bunded to prevent rainwater collection and to contain spills.	OIM, SO/HSE
	• Use less hazardous alternative chemicals, whenever possible.	SO/HSE, BM, DS
	• Handling of chemicals and hydrocarbons should comply with strict procedures, including transfer and disposal procedures. • Retain records of chemical inventories.	DS, BM, SO/HSE
	• Any spills and leaks of chemicals or hydrocarbon to deck should be cleaned immediately using absorbent materials.	HSE, OIM BM
	• All chemicals and hazardous wastes such as cleaning detergent, acids, solvents, toxic and medical wastes, contaminated mud, should be segregated and stored in clearly marked containers prior to disposal onshore.	SO/HSE, OIM, BM
Drilling Mud & Chemicals	• Use of water-based drilling mud and Synthetic mud with low ecotoxicity and high biodegradability in the 17 ½" Section and a Class E, low toxicity and highly biodegradeable synthetic base drilling fluid system in the 12 ¾" section to TD	SGBU DS, TP
	• Drilling chemicals shall be selected based on ISO 13500:2008 for mud additives or similar internationally recognized system, properly monitor the usage of drilling mud and chemicals	OIM, DS, TP
	• A log sheet of chemicals usage should be properly maintained	OIM, DS, TP
	• Minimise chemical usage as far as possible.	TP
	• Onboard separation of drilling muds. • Drilling muds should be reused whenever	OIM, DS, TP

Environmental Mitigation Measures		Responsibility
	possible.	
Drilling Waste Management		
Drill Fluids & Cuttings	• Filter fine cuttings from the drilling muds by shale shaker aboard the rig.	DS, OIM
	• Use of high efficiency triple deck shale shakers to reduce the need for fluid change out and minimizing the amount of residual fluid on drilled cuttings	DS, OIM
Drill Fluids & Cuttings	• Cuttings to be treated in shale shaker to 9.2% SBM by wet weight prior to discharge.	DS,OIM
	• Discharge of cutting via a cutting caisson	DS, OIM
	• Testing of drilling fluids physical properties prior final discharge to sea	DS,OIM
Cooling Water Discharge	• Appropriate screens should be fitted to the seawater intake to prevent ingestion of marine life, if safe and practical.	OIM, BM
Well Test Fluids	• Consider safety issues on handling of volatile hydrocarbons during the recovery of test fluids which will be flared onsite.	DS, OIM, SO/HSE
Jack-up Rig Discharge Management		
Deck Drainage Water	• Drainage water collected from precipitation, sea spray or routine operations such as deck and equipment cleaning and fire drills, should be routed to a deck drainage system on the Jack-up Rig for direct discharge. (Figure 8)	OIM, BM
	• Contaminated water should be collected in preload tank for treatment using oily water separator as per MARPOL requirements	OIM, BM
	• Water collected from the drill floor should be channelled into pre-load tank for treatment using the oily water separator before discharge into sea. IMO standard is 15 ppm. Reg 16(5) refers. MARPOL requires water discharged overboard after treatment by an oil/water separator to be <15 ppm	OIM, BM
	• Contaminated water from the hazardous material storage area should be channelled to pre-load tank for treatment using oily water	OIM, BM

Environmental Mitigation Measures		Responsibility
	separator before discharge into sea.	
	• Spill kits, absorbents and containers to be made available for clean-up of oil and grease contamination on deck	OIM, BM, SO/HSE
	• The oil concentration in water discharge from the deck drainage should not exceed 15 mg/L at any one time or on an average of 15 mg/L over 24-hour period.	OIM, BM, SO/HSE
Bilge Water	• Bilge waters from machinery spaces on the Jack-up Rig should be routed to a separate drainage system on the deck, leading to the holding tank, contained and treated by oily water separator before discharge into the sea. The discharge should comply with the guidelines provided in Table 22 i.e. oil concentration should not exceed 15mg/L.	OIM, BM, SO/HSE
Other Wastes		
Sewage and Food Wastes	• Black water onboard should be channelled to the sewage treatment plant before discharge to sea	BM, SO/HSE
	• Food waste onboard should be treated using macerator with the final disposal having grain size of less than 25mm diameter prior to disposal into the sea.	BM, SO/HSE
	• Disposal of food and sewage into the sea should be handled in accordance to the MARPOL requirements. (refer Table 22).	BM, SO/HSE
Solid Wastes	• No plastic or plastic products of any kind should be disposed overboard.	All
	• No domestic wastes i.e. cans, glass, paper or other wastes are to be discharged overboard.	All
	• No maintenance wastes i.e. paint sweepings, rags, deck sweeping, oil soaks, machinery deposits, etc, to be disposed of overboard.	All
	• Wastes should be segregated according to comparable characteristics, stored in clearly marked skips for treatment and disposal onshore at approved disposal sites in Darwin	All, OIM, SO, SGBU HSE

Environmental Mitigation Measures		Responsibility
	Australia.	
	• Efforts should be made to eliminate, reduce or recycle wastes at all times.	All
	• Good housekeeping practices should be maintained on the deck.	All
	• Waste containers should be properly covered to prevent loss overboard.	SO/HSE
	• A record should be maintained for solid wastes to be disposed of onshore.	OIM, SO/HSE
Laboratory wastes, if any	• Oil soluble chemicals should be disposed of to the Jack-up Rig holding tank to be treated in oily water separator prior discharge into sea.	SO, OIM BM HSE
Used oil and chemicals	• All used oil and chemicals should be collected, treated and disposed of at the approved facilities in Australia.	SO, SGBU HSE
	• A proper storage area should be made available on the Jack-up Rig.	OIM, SO/HSE
	• The usage of oil and chemicals should be documented and tracked. Minimise the quantity of storage onboard.	OIM, SO/HSE
Hazardous Wastes	• Any discharge of hazardous wastes from Jack-up Rig is prohibited.	All
	• A designated storage area with adequate containment facility should be provided on the Jack-up Rig for storage of hazardous wastes.	RM OIM, SO/HSE
	• All hazardous wastes should be properly labelled and disposed of in accordance to the instructions in the MSDS.	SO/HSE
	• Records of hazardous wastes inventory should be maintained and frequently updated.	SO/HSE
Air Emission Management		
Fossil fuel combustion for power generation	• Turning off engines when the machineries are not in used.	All
	• Periodical maintenance of machineries and equipment to ensure its efficiency.	OIM, DM, TP
Fossil fuel	• Emission from fuel combustion machineries	OIM, BM

Environmental Mitigation Measures		Responsibility
combustion for power generation	should be routed and emitted via adequate centralized exhaust system.	
Fugitive Emission	• Selection of valves, flanges, fittings, seals, and filters should consider safety and suitability requirements as well as their capacity to reduce gas leaks and fugitive emissions.	RM, OIM
	• Implement leak detection and repair programs	RM, OIM, SO
	• Provision of adequate ventilation system in machinery and material storage room.	RM, BM
	• Good operational control and maintain high level of housekeeping.	SO, RM, OIM
Social Disturbance		
Interference with shipping activities	• Inform and consult the relevant authorities on the shipping routes and schedules of the Jack-up Rig and the location of drilling sites.	RM/BM
	• Maintain on going communication with other mariners on the presence and progress of the drilling activity. Employ radio system for real-time communication.	OIM BM
	• The rig should be lit during nighttime and during poor visibility.	OIM, BM
Shipment disturbance in Timor Sea EEZ	• Notify appropriate maritime authorities of the drilling works prior to work commencement onsite.	BM
Physical presence	• Consult and notify the Fisheries Department via ANP and other vessel operators on the proposed appraisal drilling program.	BM
	• Use findings from the seabed survey and sonar survey to assist in the positioning of the rig.	DS, RM/BM
	• Ongoing communications with ANP throughout operations to prevent conflicts.	BM
Employment opportunities	• Use skilled local workers in Timor-Leste whenever possible.	BM
Plug and Abandonment	• Follow established plug and abandonment procedures for suspending/ abandoning well.	DS/ BM
	• Conduct briefing (toolbox meeting) to all personnel involved for the plug and	DS, BM

Environmental Mitigation Measures		Responsibility
	abandonment operation prior to work commencement.	

A summary of Jack-up Rig Effluent Management Plan and Waste Management Plan are illustrated in Figure 7 and Figure 8, respectfully

The Effluent Discharge Quality from Offshore Oil and Gas Development as per World Bank EHS Guidelines for Offshore Oil and Gas Development, Protection of Sea (Prevention of Pollution from Ships) Act 1983 (MARPOL) and Australian Ballast Water Management Guidelines is discussed in Section 10 on Governing Parameters. The Jack-up Rig has adopted the International Guidelines and Protection of Sea (Prevention of Pollution from Ships) guidelines in the design in the management, treatment and discharge of effluent per MARPOL 73/78 Annex V.

The Table 22 describes the possible events, environmental contingency measures and safeguards in case of a spill event. The table has considered loss of well control and blow out, leak from fittings and connections or leak from engines or machinery and spillage during refuelling, further description of the safeguards and who is responsible on the Jack-up Rig.

A summary of Jack-up Rig Effluent Management Plan (Figure 7) and Waste Management Plan (Figure 8) are illustrated respectively.

In an event of loss of well control and blow out, leak from fittings and connections or leak from engines or machineries, Spillage during refueling, Overall spills and Ship collision the safeguards and responsibilities of various parties is given in Table 21.

Table 21-Environmental Contingency Measures for Spill Events

Event	Safeguards	Responsibility
Loss of well control and blow out	Installation of Blow Out Preventer (BOP) system that can be closed rapidly in the event of an uncontrolled influx of formation fluids and which allows the well to be circulated safely by venting the gas at surface.	OIM, TP, CM
	Periodical test and maintenance on the BOP during the operations.	OIM, CM

Event	Safeguards	Responsibility
	Continuous monitoring of pressure reading during drilling to detect any abnormal pressures.	TP, CM
	Maintaining well bore's pressure by effectively estimating formation fluid pressures and strength of subsurface formations.	TP, CM
	Provision of emergency control plan and oil spill contingency plan and provision of emergency response training for the Drilling Crews.	RM, DS, SO/HSE
Leak from fittings and connections or leak from engines or machineries	Install pressure low switch on flow lines.	OIM
	Placing of drip trays and sump under engines to contain leaks	OIM, SO
	Oil collected in the drip trays and sump to be periodically transferred to the containment tank.	OIM, SO
	Provide adequate ventilation at machinery room. Installation of gas detection device in the event of detection of dangerous gas levels.	RM/OIM, SO
Spillage during refueling	Schedule refuelling activities during daylight hours and during calm weather and suitable sea-state conditions.	OIM, BM
	Refuelling only to occur at the discretion of the Vessel Master and OIM.	OIM, BM
	Conduct hose and couplings checked for integrity prior to refuelling.	OIM, SO
	Continuous visual monitoring of hoses, couplings and sea surface during refuelling to monitor potential spill and leakage and continuous monitoring of fuel flow gauges on the Jack-up Rig.	OIM, TP, SO
Overall Spills	Prepare Oil Spill Contingency Plan (OSCP).	RM, SDR
	Provision of spill clean-up kits on Jack-Up Rig.	SGBU HSE RM
	Design of drilling systems (i.e. well equipment, etc.) to reduce the risk of major un-contained spills.	SOR, RM Rig design BM
	Install valves to allow early shutdown or isolation in the event of emergency.	RM, DS
	Provide adequate personnel training in oil spill	Rm, BM, DS

Event	Safeguards	Responsibility
	prevention, containment and response.	
	Ensure spill response and containment equipment are deployed or available as necessary for response.	SO, OIM
	Conduct periodical inspection on chemical materials, hazardous wastes and oil storage area.	SO
	Stocks of absorbent materials on board the Jack-up Rig and standby vessel to be periodically checked for their adequacy and replenished as necessary prior to the commencement of exploration drilling activities.	OIM, BM, SO
	ANP should be informed of any significant oil spill incidents	CM
Ship Collision	Monitor and communicate with vessels approaching drilling site to reduce the risk of vessel collision.	BM, OIM
	Navigation lighting and watch aboard the rig.	BM
	Provision of radio contact between Jack-up Rig and supply vessel at all time.	BM
	Distance support vessel's crane arm from Jack-up Rig during offloading and unloading.	BM
	Maintain update weather forecast information at Jack-up Rig.	BM

10. GOVERNING PARAMETERS

The general governing parameters accepted as International Guidelines and Practice for sewage discharge, solid waste discharge, ballast water, Bilge water and Deck Drainage in the offshore oil and gas development projects are given in Table 22.

Table 22-International Guidelines for liquid, solid waste discharge for Oil and Gas Offshore Development.

Parameter	Guidelines
Cooling water	**World Bank EHS Guidelines for Offshore Oil and Gas Development** • The effluent should result in temperature increase of no more than 30C at edge of the zone where initial mixing and dilution take place/ where the zone is not defined, use 100m from point of discharge.
Sewage discharge within Timor Sea EEZ or in international water	**Protection of Sea (Prevention of Pollution from Ships) Act 1983 (MARPOL)** (Part IIIB, Division 2, Section 26D – Prohibition of discharge of sewage into the sea) • Sewage from the Jack-up Rig and supporting vessel should be treated either by sewage disinfection system or a sewage holding tank; • Discharge of the sewage are prohibited except the sewage has been treated using an approved system at a distance of more than 3 nm from the nearest land; • Discharge of untreated or disinfected sewage only permitted at a distance of more than 12 nm from the nearest land; • Where the sewage has been stored in holding tanks, the sewage is not discharged instantaneously but is discharged at a prescribed rate when the ship is proceeding en route at a speed of not less than 4 knots; • The effluent does not produce visible floating solids in the waters of the sea and does not cause discolouration of the waters of the sea; and • No sewage (untreated or treated) to be discharged within 3nm from the nearest land.
Solid domestic and food wastes discharge within Timor Sea EEZ or in international water	**Protection of Sea (Prevention of Pollution from Ships) Act 1983 (MARPOL)** (Part IIIC – Section 26F- Prohibition of disposal of garbage into the sea) • No onboard disposal of plastic waste is allowed (In this section plastics includes synthetic ropes, synthetic fishing nets, plastic garbage bags and incinerator

Parameter	Guidelines
	ashes from plastic products that may contain toxic or heavy metal residues);and • For onboard disposal of the garbage, the garbage has to be passed through a macerator so that it is capable of passing through a screen with no opening wider than 25 mm; and the disposal occurs when the ship is as far as practicable from, and is at a distance of not less than 12 nm from, the nearest land or ice shelf.
Ballast water	**Australian Ballast Water Management Guidelines** • In accordance with Timor Leste regulations • In accordance with Australian Ballast Water Management Guidelines and Australian department of Agriculture, Fisheries and Forestry Regulations; and • The discharge of high-risk ballast water in Australian ports or waters is prohibited.
Bilge water	**Protection of Sea (Prevention of Pollution from Ships) Act 1983 (MARPOL)** (Part II, Section 9 – Prohibition of discharge of oil or oily mixtures into sea) • Oil and grease concentration of the oily effluent discharge from ships should be below 15 ppm.
Deck Drainage (non- hazardous and hazardous drains)	**Protection of Sea (Prevention of Pollution from Ships) Act 1983 (MARPOL)** (Part II, Section 10 – Prohibition of discharge of oil residues into sea) • Oil and grease concentration of the oily effluent discharge from ships should be below 15 ppm.
Note: In the absence of international accepted regulations for discharge from the Jack-up Rig, discharge limits/ guidelines as stipulated in MARPOL have been adopted for screening criteria for this Project.	

11. ENVIRONMENTAL MONITORING PROGRAM

11.1. Environmental Management Induction Program

Prior to the commencement of work on site, a project specific induction program will be developed and implemented for this appraisal drilling program. The program will incorporate all the practical environmental issues that could influence either the behaviour of individual or the standards of environmental performance of the appraisal drilling activity.

The training program should include a site induction briefing prior to starting work on site to properly spell out the environmental commitments and individual duties and responsibilities while doing works as well as to highlight any potential health, safety and environmental issues. Topics to be covered in the induction programs include the importance of implementation of best environmental management practices and housekeeping requirements to minimize potential impacts to the marine environment as well as disturbance to the social environment particularly at the onshore logistic points, guidance on how to avoid disturbing the aforementioned and pertinent mitigation measures.

The drilling and service contractors shall provide site workers with all necessary personal protective equipment (PPE) and shall take necessary precautions in the movement and operation of machinery within the site for the safety of both workers and other existing mariners.

SGBU HSE Manager and HSE Advisor on the Rig shall ensure that records of all site inductions are documented and maintained. Proper documentation of training records are required in order to monitor the level of relevant competency and appropriateness of the skilled employees, suitable training programs, and adequate supervision for the site works.

11.2. Environmental Monitoring Program

The environmental monitoring requirements for the proposed appraisal drilling program are provided in this Section. Generally, two types of monitoring program are proposed namely, environmental management practices monitoring and environmental quality monitoring.

11.2.1 Environmental Management Practices Monitoring

Environmental Management Practices Monitoring will be integrated into the practices and procedures of HSE management system for implementation throughout the appraisal drilling program. This system applies to the drilling procedures and the operation of the Jack-up Rig. The proposed environmental management practices monitoring covers the following aspects and are described in Table 23 below.

Table 23-Proposed environmental management practices

Particulars	**Inspection[1]**	**Records[2]**
Drilling mud	Daily operational log inspection based on daily drilling report.	• Total volume intake to Jack-up Rig for each month. • Total volume unused/ in storage on board at the end of each month. • Total volume used and/or discharged into sea each month.
Fuel consumption	Daily operational log inspection based on daily report by Barge supervisor	• Total volume intake to Jack-up Rig for each month. • Total volume unused/ in storage on board at the end of each month. • Total volume consumed for each month.
Chemicals and hazardous materials	• Daily operational inspection of the storage area, management and transfer procedures and recorded in the daily mud report. • Inspection to be carried out by the mud engineer as part of the daily operation procedures.	• Total volume intake to Jack-up Rig for each month. • Total volume unused/ in storage at the end of each month. • Total volume consumed each month.
Sewage (black and greywater)	Weekly inspection for the sewage treatment facility	Total volume of pot water intake to Jack-up Rig for each month.
Food waste	Daily best management practices. Daily refuse log maintenance.	Volume of food waste generated and discharged into the sea for each month.

Particulars	Inspection[1]	Records[2]
Garbage (plastic, glass, paper, etc)	Daily best management practise. Daily refuse log maintenance	• Total volume of garbage generated and collected each month. • Total volume of garbage transferred out for onshore disposal for each month. • Total volume of garbage storage on Jack-up Rig at the end of each month.
Hazardous waste (used paint, contaminated wastes, used chemical, etc.)	• Maintenance of hazardous waste log by the storekeeper • Weekly inspection of storage area by storekeeper	• Total volume of hazardous wastes generated for each month. • Total volume of hazardous wastes transferred for onshore disposal for each month. • Total volume of hazardous wastes storage on Jack-up Rig at the end of each month.
Notes: 1 – The inspection scheduled is proposed for internal implementation by SGBU HSE on the Jack-up Rig. 2 – The total volume to be summarized at the end of each month. This summary will be provided to ANP upon completion of each drilling cycle.		

11.2.2 Environmental Quality Monitoring

Environmental Quality Monitoring is undertaken prior to the drilling program and after drilling activities are completed. The environmental parameters monitored include marine water quality, seabed sediment and marine biological component (zooplankton, phytoplankton and benthic).

To secure an environmental licence for this appraisal drilling project, SundaGas has an ANP approved environmental baseline study scope (EBS) which was conducted in January and February 2025 prior to drilling. The EBS report covers an area extending 1 km from the Chuditch-2 well site, excluding waters within the Australian Exclusive Economic Zone (EEZ) and the Oceanic Shoals Marine Park. The sampling locations include the well site, relief well sites, and additional sites at prescribed distances based on drilling cuttings and mud

dispersion modelling. This sampling design covers the potential environmental impact areas and confirm baseline status of water, sediments and benthic habitats.

The Environmental Quality Monitoring covered water quality sampling involving collecting surface, mid-column, and near-bottom samples for analysis of suspended solids, heavy metals, hydrocarbons and other pollutants, benthic imagery was collected to assess habitats and identify notable ecological features. Sediment sampling was also conducted involving the collection and analysis of metals, organics, hydrocarbons and other pollutants, as well as the assessment of infaunal communities.

The primary objective of the EBS was to gather comprehensive baseline environmental data to support the environmental impact assessment studies and to enable effective post-drilling monitoring and impact assessment. The EBS identified and documented baseline conditions for water quality, benthic habitats, and sediment characteristics near the well site to assess potential impacts from drilling activities. The outcomes from the EBS will set the data against which post-drilling monitoring data are compared.

The details of the EBS conducted are provided in the approved scope of Chuditch-2 Environmental Baseline Study Report number AU213017880.001 dated 26 September 2024. The survey for Chuditch-2 Environmental Baseline Study (EBS) survey was conducted from 26 to 31 January 2025 and report dated March / April 2025.

The post drilling Environmental Quality Monitoring program is proposed in this section of the EMP. The post monitoring sampling and analysis program is reflective of the approved sampling locations in the above report and will be representative of the environmental parameters measured. The number of sampling and locations may differ from those of the approved EBS survey design depending on the vessel used, sampling facilities onboard the support vessel, trajectory of any observed turbid waters and actual deposition of cuttings observed in the field. It is envisaged that the stand-by / support vessel will be used for collecting the water, sediment, benthic samples. The samples collected will be analyzed by NATA accredited labs.

11.2.2.1 EBS Sampling Summary

As part of the commitment on environmental quality monitoring the EBS study was conducted in March / April 2025 encompassing the extent of potential impacts to water

quality, sediment quality and benthic habitats based on the mud and cuttings dispersion modelling for the drilling program (MuTek 2024).

The sampling design is grouped as follows:

- At the well location and in the immediate vicinity (direct impact, benthic impact zone)
- 300 m from the well location (potential for benthic impact)
- 600 m from the well location (furthest potential extent for benthic impact) Relief well location
- 1000 m from the well location (potential low water quality impact)

11.2.2.2 Sampling Location

Sampling locations for the Chuditch-2 Environmental Baseline Survey were selected to ensure relevance to cuttings dispersion modelling and to include special features such as seafloor mounds and ridge features. In accordance with the Sampling and Analysis Plan SAQP), the number of sites required for sampling is outlined in Table 24. Proposed sampling locations are presented in Figure 29.

Table 24-Sampling program and number of sites completed.

Task	Sample	Required number of sites	Number of sites completed
Water quality sampling	Water samples	12	12
	Water column profiles	12	12
Sediment sampling	Sediment samples	13	13
	Infauna	1 3	13
Benthic Habitat Assessment	Towed camera	8	8
Marine fauna sightings	Opportunistic sightings	N/A	N/A

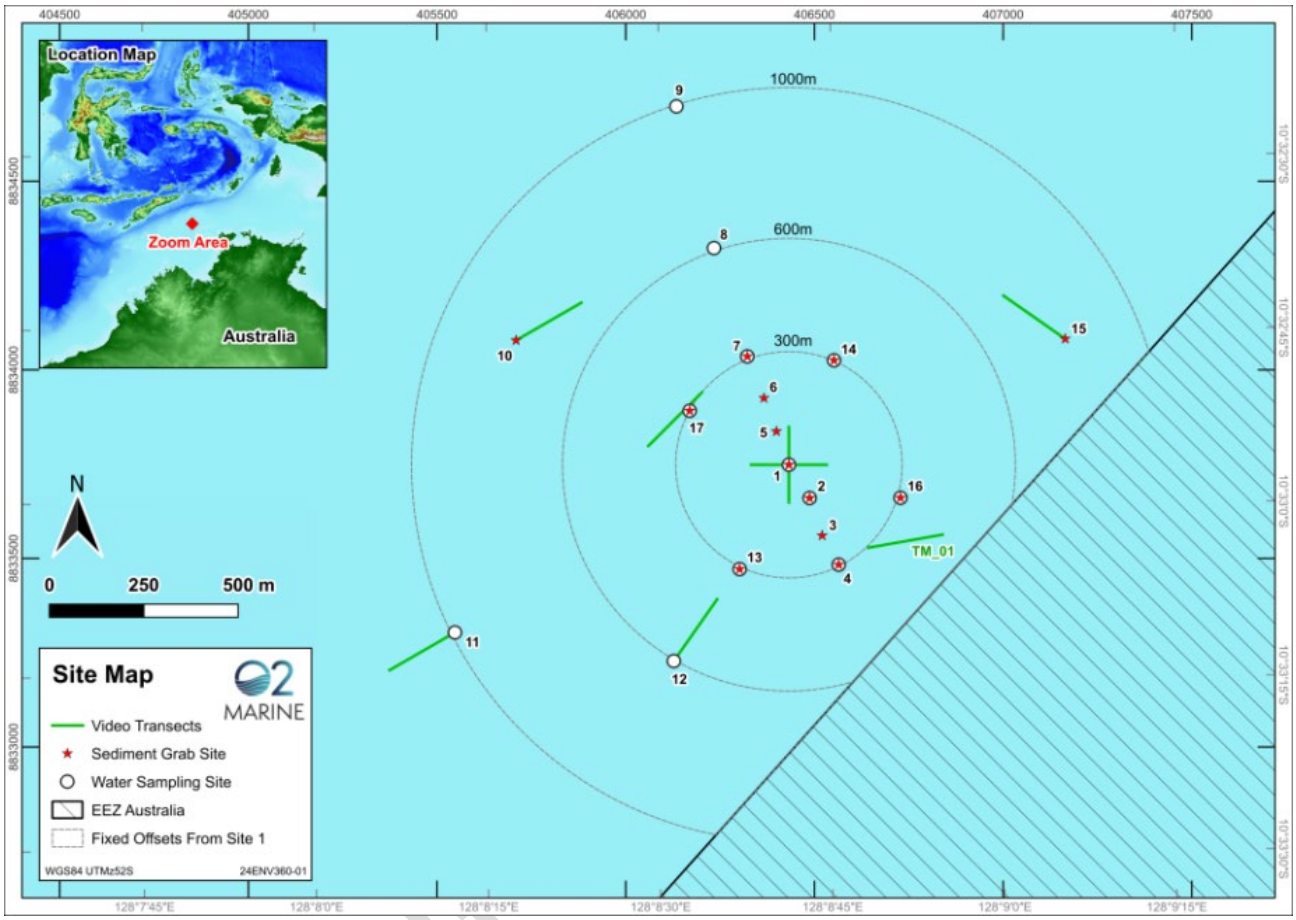


Figure 29-Project survey area and proposed sample locations, Adapted from O2 Marine, 2025

Details of sampling area, sites at well location, 300m radius, 600m radius, relief well and at 1000m radius along with longitude, latitude, depth, water quality, sediment quality, benthic habitat and infauna details are given in Table 25.

Table 25-Sampling location and samples collected.

Project Area	Site	Longitude	Latitude	Estimated Depth	Water Quality	Sediment Quality	Benthic Habitat	Infauna
Well Location	1	128.14480000	-10.54909998	~65m	✓	✓	✓	✓
	2	128.14530000	-10.54990003	~65m	✓	✓	-	✓
	3	128.14560000	-10.55080000	~65m	-	✓	-	✓
	5	128.14450000	-10.54830000	~65m	-	✓	✓	✓
	6	128.14420000	-10.54750000	~65m	-	✓	✓	✓
300 m radius	4	128.14600000	-10.55149997	~65m	✓	✓	-	✓
	7	128.14380000	-10.54649999	~65m	✓	✓	-	✓
	13	128.14360000	-10.55159996	~65m	✓	✓	-	✓
	14	128.14590000	-10.54659999	~65m	✓	✓	-	✓
	16	128.14750000	-10.54990003	~65m	✓	✓	-	✓
	17	128.14240000	-10.54780003	~55m	✓	✓	✓	✓
	TM_01	128.14670000	-10.55100000	~65m	-	-	✓	-
600 m radius	8	128.14300000	-10.54390001	~65m	✓	-	-	-
	12	128.14200000	-10.55379996	~65m	✓	-	✓	-
Relief Wells	10	128.13820000	-10.54610000	~65m	-	✓	✓	✓
	15	128.15150000	-10.54610000	~65m	-	✓	✓	✓
1000 m radius	9	128.14210000	-10.54049998	~65m	✓	-	-	-
	11	128.13670000	-10.55309999	~65m	✓	-	✓	-

The water quality sampling locations is given in Figure 30 and sediment sampling locations is given in Figure 31.

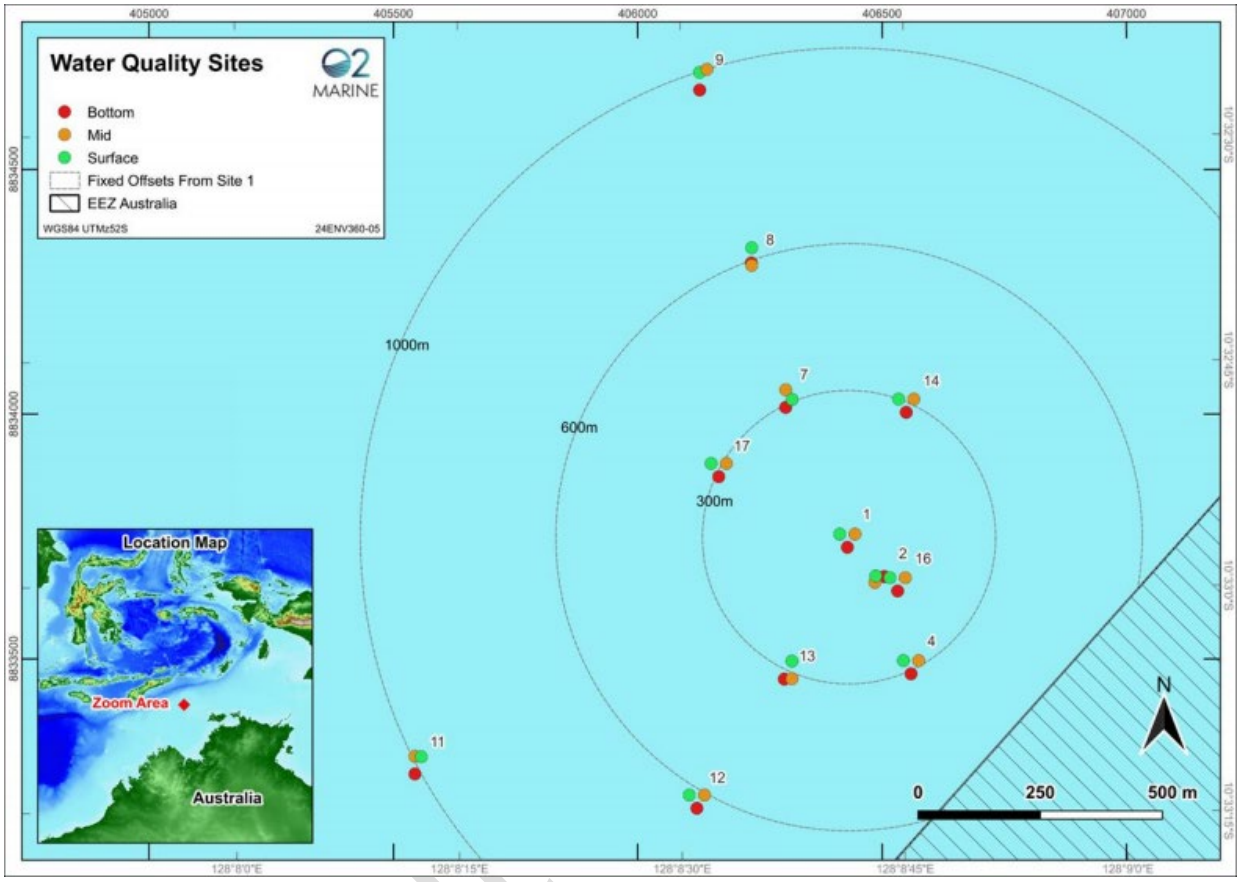


Figure 30-Water sampling locations. Adapted from O2 Marine, 2025

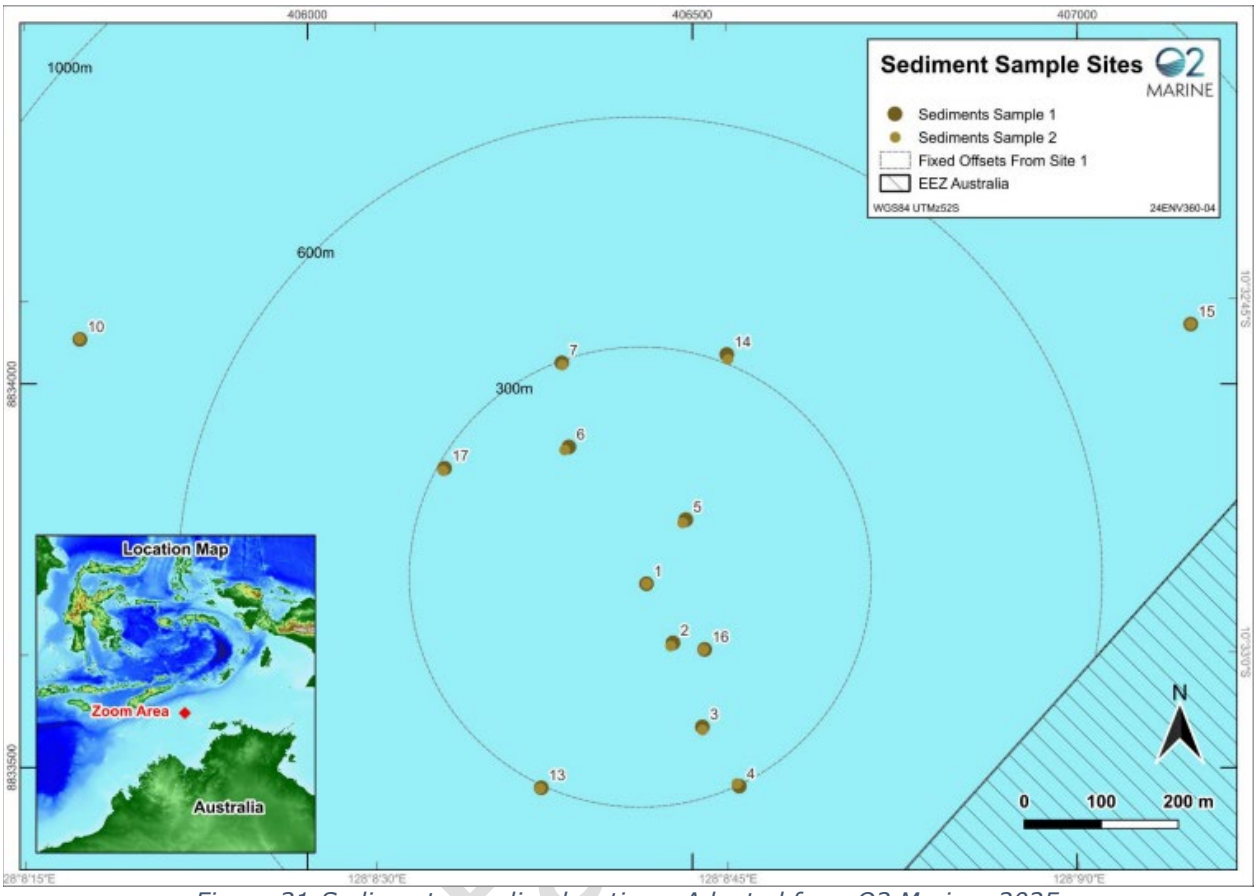


Figure 31-Sediment sampling locations. Adapted from O2 Marine, 2025

The benthic habitat assessment was conducted by using an ROV and the ROV transect locations is given in Figure. 16

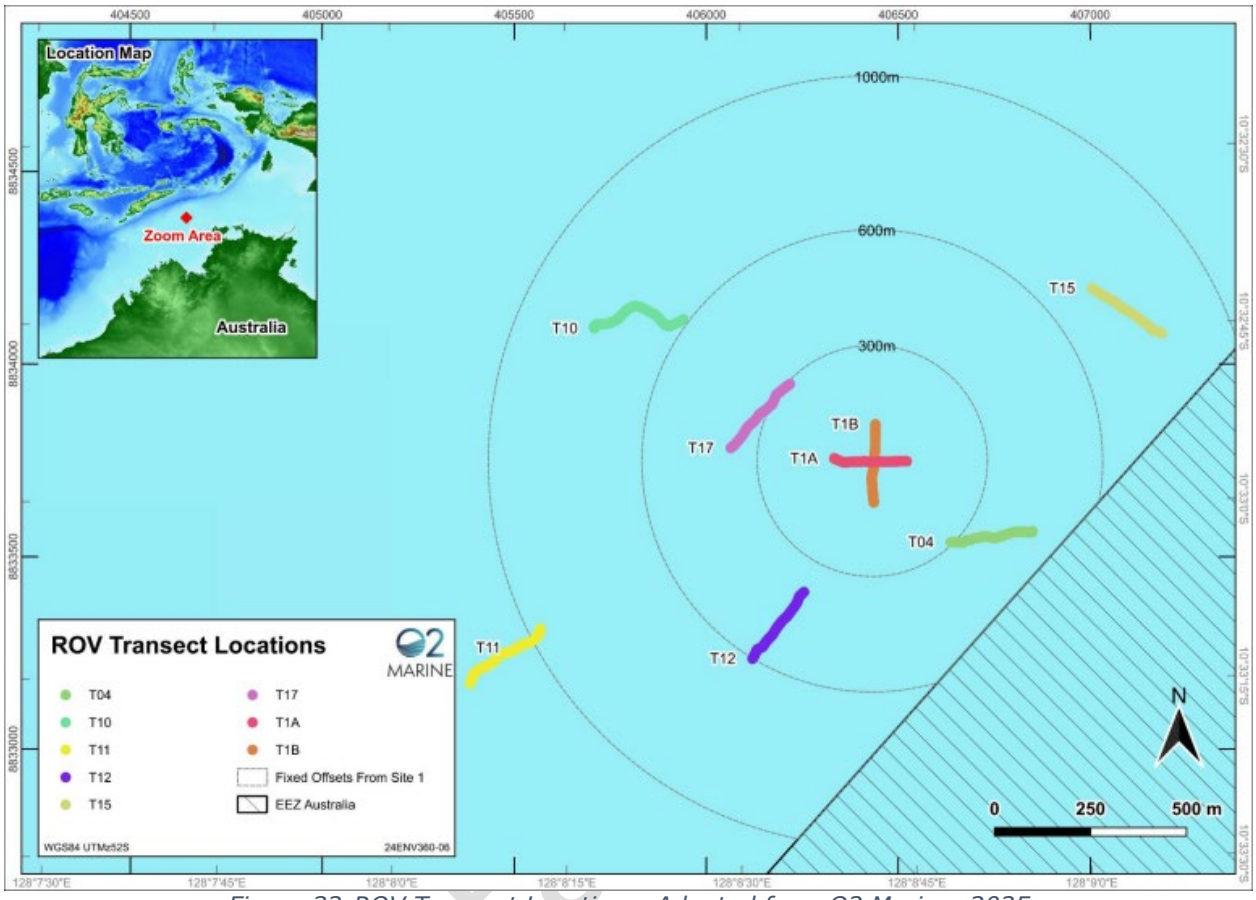


Figure 32-ROV Transect Locations. Adapted from O2 Marine, 2025

11.2.3 EBS Summary, Key Finding and Conclusion.

The EBS was conducted as per the approved scope of Chuditch-2 Environmental Baseline Study Report number AU213017880.001 dated 26 September 2024. The EBS survey was conducted from 26 January 2025 to 31 January 2025 and the Report dated March / April 2025.

Marine Environmental Quality

Water Quality Profiling

- Minimal spatial variability in water quality across the project area.
- Temperature, salinity, turbidity, and pH remained stable from surface to seafloor.
- Slight thermocline detected at 22–25m depth.

- Dissolved oxygen (DO) levels were high (~95%) but decreased slightly below 25m, indicating a stratified water column.
- Low turbidity levels indicate minimal sediment resuspension and particulate matter.

Water Quality Samples

- Low dissolved metal concentrations, with only minor exceedances for copper and zinc.
- Hydrocarbons and chlorophyll-α were below detection limits.
- Sulphur concentrations were stable, with one outlier likely due to a laboratory error.

Sediment Quality Samples

- Sediments were mostly sand-sized with minimal organic content.
- Metal concentrations were generally below guideline values.
- Low hydrocarbon concentrations, assumed to be of natural origin.

Benthic Infauna

- 192 individuals from 62 taxa were identified.
- Species diversity was evenly distributed with no dominant species.
- Limited statistical analysis due to low sample size.

Benthic Habitat Assessment

- Substrate types included sand/mud, rock, and rubble, with sparse to moderate filter feeder coverage.
- Hard substrate was more abundant along some transects and correlated with higher biota diversity.
- Majority of benthic habitat was relatively featureless, but certain areas exhibited complex structures valuable for biodiversity.

Marine Fauna Observations

- No marine megafauna were observed due to the small survey area.
- Limited sightings of small fish and sea snakes.

Conclusion

- The project area exhibits stable water and sediment quality with minimal contamination.
- Benthic habitats are largely featureless, though some areas provide significant ecological value.
- Limited biodiversity data exists for the region, and findings align with other nearby surveys.
- No significant marine megafauna were observed..

11.2.4 The results of the EBS are given below.

Marine Environmental Quality

Water Quality

Physiochemical Profiles

The summary results of physiochemical water column profiles are shown

Table 26 and:

- pH results ranged from between 8.21 and 8.26
- Salinity results ranged between 34.05 and 34.19
- Temperature values ranged between 28.77 and 30.29
- Conductivity results ranged between 51990.00 and 52147.10
- Turbidity values ranged between 0.06 and 0.26.

Table 26-Physiochemical profile results.

Site	pH -	Salinity PPT	Temperature °C	Conductivity µs/cm	DOsat %	Turbidity FNU
IMCRA (2018)	-	34.7	28.8 - 31.3	-		-
1	8.23	34.07	30.29	52025.30	94.80	0.07
2	8.21	34.16	29.27	52110.50	87.20	0.06
4	8.22	34.19	29.30	52147.10	89.70	0.06
7	8.22	34.19	29.18	52132.70	89.80	0.08
8	8.22	34.17	29.33	52115.30	91.10	0.08
9	8.21	34.19	28.97	52079.85	87.40	0.06
11	8.26	34.17	29.05	52111.40	87.90	0.22
12	8.24	34.18	28.90	52118.15	86.35	0.07
13	8.24	34.13	29.18	52067.70	88.90	0.07
14	8.22	34.18	28.84	52121.45	84.70	0.16
16	8.25	34.05	29.98	51990.00	94.30	0.26
17	8.21	34.19	28.77	52128.05	83.10	0.11

Dissolved Metals

Dissolved metals results are presented in Table 27. In summary:

- Gold, mercury and manganese results were reported below the Limit of Recording (LOR) in all samples.
- Remaining metals were all generally reported at low concentrations below ANZG (2018).

Table 27-Dissolved metals results from water samples.

Site Units	As	Ag	Ba	Cd	Co	Cu	Cr	Fe mg/L	Pb	Mn	Hg	Ni	Sb	Se	Zn
95% SPL	-	-	-	0.002	0.001	0.0013	-	-	0.0044	-	0.0004	0.07	-	-	0.008
99% SPL	-	-	-	0.0007	0.001	0.0003	-	-	0.0022	-	0.0001	0.007	-	-	0.0033
1_S	0.0016	<0.1	< 0.01	< 0.0001	<0.00005	0.0003	0.0004	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	0.002
1_M	0.0017	<0.1	0.02	0.0006	<0.00005	0.0003	0.0003	0.02	0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	0.004
1_B	0.0018	<0.1	< 0.01	< 0.0001	<0.00005	0.0003	0.0002	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	0.001
2_S	0.0016	<0.1	< 0.01	< 0.0001	<0.00005	0.0004	0.0003	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	0.002

SundaGas Banda
Unipessoal Lda

Site	As	Ag	Ba	Cd	Co	Cu	Cr	Fe	Pb	Mn	Hg	Ni	Sb	Se	Zn
Units								mg/L							
95% SPL	-	-	-	0.002	0.001	0.0013	-	-	0.0044	-	0.0004	0.07	-	-	0.008
99% SPL	-	-	-	0.0007	0.001	0.0003	-	-	0.0022	-	0.0001	0.007	-	-	0.0033
2_M	0.0016	<0.1	< 0.01	< 0.0001	<0.00005	0.0003	0.0002	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	0.002
2_B	0.0016	<0.1	0.01	< 0.0001	<0.00005	<0.0002	0.0002	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	<0.001
4_S	0.0017	<0.1	0.01	< 0.0001	<0.00005	<0.0002	0.0002	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	0.002
4_M	0.0017	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	0.0002	0.02	< 0.001	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.004
4_B	0.0017	<0.1	0.01	< 0.0001	<0.00005	<0.0002	0.0004	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	<0.001
7_S	0.0016	<0.1	< 0.01	< 0.0001	<0.00005	0.0002	0.0002	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	0.001
7_M	0.0016	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	0.0003	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	0.001
7_B	0.0016	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	0.0002	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	0.001
8_S	0.0016	<0.1	< 0.01	< 0.0001	<0.00005	0.0002	0.0003	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	0.003
8_M	0.0016	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	0.0003	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	0.001
8_B	0.0018	<0.1	< 0.01	< 0.0001	<0.00005	0.0002	0.0003	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	<0.001
9_S	0.0015	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	0.0003	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	0.002
9_M	0.0016	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	<0.0002	0.02	0.002	< 0.005	< 0.0001	0.001	0.001	0.001	0.002
9_B	0.0016	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	0.0004	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	0.001
11_S	0.0016	<0.1	< 0.01	< 0.0001	<0.00005	0.0003	<0.0002	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	0.001
11_M	0.0017	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	0.0002	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	0.001
11_B	0.0016	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	0.0002	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	<0.001
12_S	0.0016	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	<0.0002	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	0.002
12_M	0.0017	<0.1	0.01	< 0.0001	<0.00005	<0.0002	0.0003	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	0.001
12_B	0.0017	<0.1	0.01	< 0.0001	<0.00005	0.0002	0.0007	0.02	< 0.001	< 0.005	< 0.0001	0.001	< 0.001	< 0.001	0.001
13_S	0.0017	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	0.0003	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	0.002
13_M	0.0016	<0.1	< 0.01	< 0.0001	<0.00005	0.0002	0.0002	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	0.002
13_B	0.0017	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	0.0003	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	<0.001

Site	As	Ag	Ba	Cd	Co	Cu	Cr	Fe	Pb	Mn	Hg	Ni	Sb	Se	Zn
Units	mg/L														
95% SPL	-	-	-	0.002	0.001	0.0013	-	-	0.0044	-	0.0004	0.07	-	-	0.008
99% SPL	-	-	-	0.0007	0.001	0.0003	-	-	0.0022	-	0.0001	0.007	-	-	0.0033
14_S	0.0017	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	0.0002	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	0.001
14_M	0.0017	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	0.0004	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	<0.001
14_B	0.0017	<0.1	0.02	< 0.0001	0.00006	<0.0002	0.0004	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	<0.001
16_S	0.0016	<0.1	0.01	< 0.0001	<0.00005	0.0002	0.0004	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	0.002
16_M	0.0017	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	0.0003	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	0.001
16_B	0.0017	<0.1	< 0.01	< 0.0001	<0.00005	<0.0002	0.0004	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	<0.001
17_S	0.0017	<0.1	< 0.01	< 0.0001	<0.00005	0.0002	0.0002	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	0.001	0.001	0.002
17_M	0.0017	<0.1	0.01	< 0.0001	<0.00005	<0.0002	0.0002	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	0.002
17_B	0.0016	<0.1	0.01	< 0.0001	<0.00005	<0.0002	<0.0002	0.02	< 0.001	< 0.005	< 0.0001	< 0.001	< 0.001	< 0.001	<0.001
Median	0.00165	-	0.005	0.00005	0.000025	0.0001	0.0003	0.008	0.0005	-	-	0.0005	0.00075	0.00075	0.002
Max	0.0018	-	0.02	0.0006	0.00006	0.0004	0.0007	0.04	0.002	-	-	0.001	0.001	0.001	0.004
Min	0.0015	-	0.005	0.00005	0.000025	0.0001	0.0001	0.005	0.0005	-	-	0.0005	0.0005	0.0005	0.001
St-Dev	0.00007	-	0.004	0.00009	-	0.00008	0.00012	0.011	0.0003	-	-	0.0001	0.0003	0.0002	0.001

Hydrocarbons

Hydrocarbon results from water samples are presented in Table 15 for BTEXN, TPH, TRH, and VOCs were all reported below the LOR.

Chlorophyll-a

Chlorophyll-a was reported below the LOR in all water quality samples.

Oil and Grease

- Oil and Grease values ranged between <5mg/L and 9mg/L.
- Median oil and grease results across all sampling sites was <5mg/L.

Sulphur

- Sulphur results ranged between 980mg/L and 1300 mg/L.
- Sulphur results were generally consistent between sites and across depths.

11.2.5 Sediment Quality

Particle Size Distribution

Particle size distribution (PSD) results are presented in Table 28.

Sediment PSD was generally uniform across sampling locations, where coarse grained sand (500µm – 2000µm) was typically the most dominant fraction, followed by silt (4µm – 62µm). Medium grained sand generally comprised the lowest fraction of grains across all sample sites, and while no sites appeared to be significantly different in their PSD composition sites 13 to 17 appeared to have a higher content of medium grained sand (250µm - 500µm) and a lower proportion of clay sized particles (<4 µm) when compared with sites 1 to 10.

Table 28-Sediment Particle Size Distribution (PSD).

Site ID	Clay (<4 µm)	Silt (4-62 µm)	Sand (62 - 250 µm)	Medium Sand (250 - 500µm)	Coarse Sand (500 - 2000µm)	Cobbles (>2000µm)
Units				%		
1_ 1	12.27	23.15	14.04	3.37	36.28	10.89
1_ 2	9.57	19.33	16.9	3.69	30.79	19.72
2_ 1	12.83	24.12	13.79	3.97	32.41	12.88
2_ 2	10.84	23.61	14.27	1.76	38.35	11.17
3_ 1	14.07	28.63	10.19	0.83	29.63	16.65
3_ 2	12.13	27.55	18.88	2.58	24.42	14.44
4_ 1	12.86	26.88	17.11	3.99	23.27	15.89
4_ 2	8.71	28.3	19.69	2.77	20.83	19.7
5_ 1	7.53	16.14	14.01	2.74	39.66	19.92

Site ID	Clay (<4 µm)	Silt (4-62 µm)	Sand (62 - 250 µm)	Medium Sand (250 - 500µm)	Coarse Sand (500 - 2000µm)	Cobbles (>2000µm)
Units				%		
5_ 2	6.95	15.15	14.21	2.67	40.98	20.04
6_ 1	10.17	21.55	10.54	1.87	37.05	18.82
6_ 2	8.16	17.42	13.63	3.94	29.45	27.4
7_ 1	9.57	20.14	14.7	2.26	32.84	20.49
7_ 2	7.5	15.58	15.34	3.34	39.37	18.87
10_ 1	12.26	28.06	15.59	1.52	22.61	19.96
10_ 2	8.07	18.13	22.67	7.53	27.67	15.93
13_ 1	7.11	11.63	10.59	2.89	48.25	19.53
13_ 2	6.26	13.57	16.1	11.57	34.37	18.13
14_ 1	6.22	15.9	20.2	15.59	33.24	8.85
14_ 2	5.12	11.96	19.87	14.9	34.23	13.92
15_ 1	8.57	19.97	24.74	14.18	23.5	9.04
15_ 2	6.67	15.86	25.16	14.06	27.03	11.22
16_ 1	5.93	13.58	19.06	14.67	36.19	10.57
16_ 2	7.56	16.18	16.26	10.54	26.71	22.75
17_ 1	6.24	13.47	18.83	15.17	34.25	12.04
17_ 2	8.02	15.95	17.95	13.26	33.04	11.78

Total Metals

Total metals concentrations are presented in Table 29. In summary:

- Mercury, cobalt, selenium, silver, and cadmium were reported below the LOR in all samples.
- Remaining metals were reported below ANZG (2018) Default Guideline Values (DGVs) where available.

Table 29-Sediment sample total metals results.

Site	Al	Sb	As	Cd	Cr	Co	Cu	Fe	Pb	Mn	Hg	Ni	Se	Ag	V	Zn
Unit	mg/kg															
DGV (ANZG 2018)	-	2	20	1.5	80	-	65	-	50	-	0.15	21	-	1	-	200
1_1	5700	< 2	3.4	< 1	16.0	< 5	< 5	7900	5.3	160	< 0.1	8.7	< 5	< 1	< 10	8.3
1_2	4500	< 2	2.5	< 1	13.0	< 5	< 5	6900	< 5	160	< 0.1	7.1	< 5	< 1	< 10	7.9
2_1	3500	5.4	2.5	< 1	9.0	< 5	< 5	5100	< 5	120	< 0.1	< 5	< 5	< 1	< 10	< 5
2_2	5500	< 2	4.0	< 1	15.0	< 5	< 5	8200	< 5	140	< 0.1	8.4	< 5	< 1	< 10	7.0
3_1	5000	< 2	< 2	< 1	13.0	< 5	< 5	6700	< 5	100	< 0.1	6.8	< 5	< 1	< 10	5.8
3_2	4400	2.1	2.9	< 1	12.0	< 5	< 5	7500	< 5	110	< 0.1	6.8	< 5	< 1	< 10	6.0
4_1	3600	< 2	< 2	< 1	10.0	< 5	< 5	5600	< 5	87	< 0.1	5.7	< 5	< 1	< 10	7.0
4_2	7700	< 2	2.7	< 1	21.0	< 5	6.2	11000	< 5	170	< 0.1	12.0	< 5	< 1	12.0	13.0
5_1	6400	< 2	3.7	< 1	19.0	< 5	5.6	11000	< 5	180	< 0.1	11.0	< 5	< 1	11.0	12.0
5_2	4500	< 2	2.8	< 1	13.0	< 5	< 5	6800	< 5	120	< 0.1	7.3	< 5	< 1	< 10	6.4
6_1	4000	< 2	< 2	< 1	11.0	< 5	< 5	5900	< 5	95	< 0.1	6.0	< 5	< 1	< 10	8.2
6_2	5100	< 2	2.3	< 1	14.0	< 5	< 5	6700	< 5	120	< 0.1	7.8	< 5	< 1	< 10	6.7
7_1	4600	< 2	3.3	< 1	13.0	< 5	< 5	6600	< 5	120	< 0.1	7.0	< 5	< 1	< 10	6.1
7_2	8500	5.6	6.3	< 1	26.0	< 5	7.8	16000	5.1	200	< 0.1	15.0	< 5	< 1	18.0	15.0
10_1	4100	< 2	< 2	< 1	9.8	< 5	< 5	5400	< 5	80	< 0.1	5.7	< 5	< 1	< 10	5.5
10_2	5900	< 2	< 2	< 1	16.0	< 5	5.0	8200	< 5	130	< 0.1	9.6	< 5	< 1	< 10	10.0
13_1	4000	< 2	2.3	< 1	11.0	< 5	< 5	5000	< 5	120	< 0.1	5.6	< 5	< 1	< 10	< 5
13_2	5800	< 2	4.1	< 1	17.0	< 5	< 5	8000	< 5	160	< 0.1	8.7	< 5	< 1	< 10	8.5
14_1	3900	< 2	2.7	< 1	9.6	< 5	< 5	6400	< 5	98	< 0.1	5.8	< 5	< 1	< 10	< 5
14_2	4800	< 2	2.2	< 1	13.0	< 5	< 5	6400	< 5	130	< 0.1	7.6	< 5	< 1	< 10	6.2
15_1	4500	< 2	< 2	< 1	12.0	< 5	< 5	6300	< 5	100	< 0.1	6.7	< 5	< 1	< 10	5.6
15_2	3200	< 2	< 2	< 1	7.8	< 5	< 5	4300	< 5	75	< 0.1	< 5	< 5	< 1	< 10	< 5
16_1	4600	< 2	< 2	< 1	12.0	< 5	< 5	6300	< 5	100	< 0.1	6.6	< 5	< 1	< 10	6.0
16_2	8100	< 2	3.3	< 1	22.0	< 5	6.7	12000	< 5	190	< 0.1	13.0	< 5	< 1	13.0	14.0
17_1	6900	< 2	3.1	< 1	20.0	< 5	5.7	10000	< 5	170	< 0.1	11.0	< 5	< 1	11.0	11.0
17_2	1900	< 2	2.0	< 1	5.7	< 5	< 5	3500	< 5	61	< 0.1	< 5	< 5	< 1	< 10	< 5
Median	4600	5.4	2.9	-	13.0	-	6.0	6700	5.2	120.0	-	7.3	-	-	12.0	7.0
Max	8500	5.6	6.3	-	26.0	-	7.8	16000	5.3	200.0	-	15.0	-	-	18.0	15.0
Min	1900	2.1	2.0	-	5.7	-	5.0	3500	5.1	61.0	-	5.6	-	-	11.0	5.5
St Dev	1542.1	2.0	1.0	-	4.7	-	1.0	2695.5	0.1	37.3	-	2.6	-	-	2.9	3.0

Moisture

Moisture content of sediment samples is presented in Table 30. In summary:

- Moisture content ranged between 33% (Site 3) and 44% (Site 13). The median moisture content across all sample sites was 39%, while there was a low standard deviation in % moisture content between samples (2%).

Oil and Grease

Oil and grease results are presented in Table 30. In summary:

- Oil and grease was generally reported below the LOR (<500 mg/kg) however was detected in low concentrations at Site 5 (690 mg/kg) and at Site 16 (630 mg/kg).

Sulphur

Sulphur results are presented in Table 30. In summary:

- Sulphur concentrations ranged between 2100 mg/kg (Site 17) and 6100 mg/kg (Site7).
- Median concentrations of sulphur across all samples was 3500 mg/kg, while the standard deviation was 1217 mg/kg.

Hydrocarbons

Results for hydrocarbons in sediments are presented in Table 30. In summary:

- BTEXN, Aliphatic and Aromatic Hydrocarbon, and Polyaromatic Hydrocarbon (PAH) concentrations were reported below the LOR at all sample sites

Total recoverable hydrocarbons (TRH) were detected in low concentrations at several sample sites, normalised TRH concentrations were reported below the ANZG (2018) DGV.

Table 30-Sediment sample Analysis Results

Site	Moisture Content	Oil and Grease	Sulphur	TRH C10-C36 (Total)	TOC	TRH (C10-C36) Normalised to 1% OC
Units	%	mg/kg	mg/kg	mg/kg	%	mg/kg
DGV (ANZG 2018)	-	-	-	-	-	280
1_ 1	39	< 500	5600	57	6.9	8.3
1_ 2	38	< 500	3400	< 50	5.7	-
2_ 1	41	< 500	2900	< 50	6.6	-
2_ 2	38	< 500	4900	< 50	7.8	-
3_ 1	33	< 500	3300	55	7.6	7.2
3_ 2	36	< 500	2800	< 50	7.2	-
4_ 1	38	< 500	2200	< 50	6.4	-
4_ 2	40	< 500	4100	< 50	7.2	-
5_ 1	40	< 500	5400	< 50	8.5	-
5_ 2	40	690	4900	< 50	7.2	-

Site	Moisture Content	Oil and Grease	Sulphur	TRH C10-C36 (Total)	TOC	TRH (C10-C36) Normalised to 1% OC
Units	%	mg/kg	mg/kg	mg/kg	%	mg/kg
DGV (ANZG 2018)	-	-	-	-	-	280
6_ 1	38	< 500	2700	< 50	11.0	-
6_ 2	39	< 500	4300	137	10.0	13.7
7_ 1	38	< 500	3600	< 50	9.6	-
7_ 2	38	< 500	6100	70	9.2	7.6
10_ 1	40	< 500	2500	470	7.6	61.8
10_ 2	39	< 500	3400	< 50	9.2	-
13_ 1	41	< 500	4400	480	8.3	57.8
13_ 2	44	< 500	6100	71	8.6	8.3
14_ 1	39	< 500	3100	< 50	7.6	-
14_ 2	39	< 500	4100	< 50	11.0	-
15_ 1	39	< 500	3300	< 50	7.1	-
15_ 2	39	< 500	2300	< 50	6.8	-
16_ 1	38	630	3300	< 50	5.1	-
16_ 2	37	< 500	5200	< 50	10.0	-
17_ 1	39	< 500	5100	160	10.0	16.0
17_ 2	39	< 500	2100	72	7.1	10.1
Median	39	-	3500	25	7.6	10.1
Max	44	-	6100	480	11	61.8
Min	33	-	2100	25	5.1	7.2
St Dev	2	-	1217	122	1.5	22.1

Benthic Infauna

The marine benthic survey collected 192 individuals from 62 taxonomic morphological species. The three most abundant species across all sites were the bristle worm Anthuridae, the *Litocorsa sp1* and, the Apseudidae. In general the survey area indicated poor biota compared to other regional areas.

11.2.6 Benthic Habitat Assessment

Analysis of the towed video footage collected by ROV classified a total of 4,542 points from the eight (8) transects.

Description and example images of each of the five (5) benthic habitat classes is given in Figure 16. From the description it is noted that

i. Bare Sediment are largely featureless (flat), unconsolidated substrate with minimal (<1%) or no biota cover.

ii. Bare Sediment (bioturbated) are unconsolidated substrate with minimal (<1%) or no biota cover.

iii. Sediment with Sparse Filter Feeders are largely unconsolidated substrate with sparse (<10%) biota cover, where various filter feeder types are present.

iv. (iv) Filter Feeders (mixed habitat) shows a combination of habitat types (e.g. sediment, rubble, reef, etc.) with no dominant substrate. Filter feeders (e.g. sponges, sea whips, gorgonians, ascidians, soft corals, hydroids, etc.) dominant across substrate, typically in moderate cover, and

v. (v) Reef with mixed assemblage show varying relief (from flat to >3 m) of consolidated rock which typically forms part of a large, structurally complex reef feature. Reef substrate dominated by various forms of filter feeders and fishes. Typically, high (25-75%) to dense (>75%) in biota cover.

Class	Description	Example Image
Bare Sediment	Largely featureless (flat), unconsolidated substrate with minimal (<1%) or no biota cover	
Bare Sediment (bioturbated)	Unconsolidated substrate with minimal (<1%) or no biota cover, although with consistent bioturbation	

Class	Description	Example Image
Sediment with Sparse Filter Feeders	Largely unconsolidated substrate with sparse(<10%) biota cover, where various filter feeder types are present	
Filter Feeders (mixed habitat)	Combination of habitat types (e.g. sediment, rubble, reef, etc.) with no dominant substrate. Filter feeders (e.g. sponges,sea whips, gorgonians, ascidians, soft corals, hydroids, etc.) dominant across substrate, typically in moderate to high cover	

Class	Description	Example Image
Reef with Mixed Assemblage	Varying relief (from flat to >3 m) of consolidated rock which typically forms part of a large, structurally complex reef feature. Reef substrate dominated by various forms of filter feeders and fish. Typically, high (25-75%) to dense (>75%) in biota cover	

Figure 33-Description and example images of each of the five (5) benthic habitat classes.

Post Well Survey: The ROV will be deployed and conduct post well survey in the vicinity of the well to ensure no dropped equipment or other is left on the seabed, Video transects are downloaded to a separate storage device and made available for use in post project environmental monitoring if required and/or used in environmental monitoring reporting.

11.2.7 Marine Fauna Observations

No opportunistic marine megafauna were observed during survey operations.

12. REPORTING REQUIREMENTS

12.1. Surveillance Audit Program

The objective of the environmental auditing and review program are to:

1. Verify impacts and risks are effectively managed;
2. Ensure relevant standards and procedures are being forward;
3. Demonstrate compliance with regulatory requirements, approval commitments and conditions within the EMP; and
4. Checking EMP implementation by various parties involve in the appraisal drilling activities.

This is to verify that environmental controls are incorporated in the project planning stage, implemented on site and in the closure and any required rehabilitation activities. The findings of the surveillance audit program are useful to improve EMP implementation and will be used to verify the need for revision of the EMP and monitoring program, if deemed necessary.

Three phases of surveillance audit programmes are proposed (Table 31) for the appraisal drilling programme that include:

Table 31-Proposed three phases of surveillance audit programmes.

Drilling Stage	Audit Focus	Schedule
Planning stage (Pre-drilling Audit)	• The objective of the audit is to verify whether appropriate planning is in place before the commencement of the exploratory activities. • The audit primarily includes inspection on compliance to various environmental related approval requirements, agency/ stakeholders' notification/consultation, if required, provision of the necessary control measures/ equipment/ tools on board, etc.	Before start of drilling program

Drilling Stage	Audit Focus	Schedule
Drilling stage (Drilling Audit)	• The objective of the audit is to verify the implementation of EMP during the drilling operation. • The audit primarily focuses on the compliance of environmental practice implementation to evaluate the level of compliance against the EMP requirements, to identify area for improvement, to review the appropriateness/ efficiency of mitigation measures employed and to recommend or suggest additional mitigation measures, if deemed necessary.	During drilling of Chuditch - 2 appraisal well.
Demobilization stage (Demobili-zation Audit)	The objective of the audit is to monitor and verify waste disposal management in compliance to the EMP requirements, removal of materials and equipment from drilling sites and to verify environmental damage, if any, is rehabilitated to an acceptable level.	Upon completion of Chuditch -2 appraisal well.

The surveillance audit to be carried out should encompasses the following main elements:

- Review of environmental requirements for the appraisal drilling activities;
- Review of relevant documentation and records;
- Physical inspection of sites and operations;
- Discussion on ambiguous information, facts and data with the person in charge.
- The checklist for the surveillance audit of the difference stages of appraisal well activities are presented in Appendix 2.

12.2. Management of non- conformance and corrective action

All HSE hazards and incidents are reported in accordance with the SGBU Incident Reporting and Investigation Procedure. Root cause analysis of incidents is performed to determine the cause and aid identification of appropriate corrective actions.

Monitoring and measurement is planned accordance with auditing procedures. Non-performances identified in audits and reviews will be addressed. Responsible personnel for EMP and OSCP performance auditing, monitoring and management of non-conformances are part of SGBU Safety and Environment Policy and management systems.

12.3. Records and Communication

The findings from the environmental monitoring and surveillance audit program will be properly recorded and reported (Table 32). The report will be made available to all parties involved in the project and a copy will be submitted to ANP. Any non-conformance recorded from the environmental monitoring and surveillance audit program will be investigated to adequately identify and understand the non-conformance and actions considered and implemented to ensure controls are in place.

Apart from the environmental monitoring and surveillance audit report, SGBU will also keep records on the relevant environmental management practices monitoring as described in above section as part of the internal work procedures. In addition, other relevant reports on oil spill incidents, environmental incidents, cetacean sighting, etc will be prepared and submitted to ANP should any of incidents or observations occur.

Table 32-Records, Reporting and Communication

Item	Records & Reporting	Frequency	Submission Requirements
1	Environmental Quality Monitoring Report	EBS Technical report	ANP
2	Environmental Surveillance Audit Report	Pre-Mobilisation Surveillance Audit Report During Drilling Surveillance Audit Report Demobilisation Surveillance Audit Report	ANP
3	Environmental management practices monitoring records	As part of daily operation procedures (for SGBU's internal records only)	NA
4	Summary of the monthly records at the end of each month / upon completion of each well drilling cycle	Summary monthly reports upon completion of each well drilling cycle	ANP
5	Other relevant environmental report such as oil spills or other environmental incident reports, etc.	Ad-hoc; 2 weeks after the incident.	ANP

Based on Decree Law No. 32/2016 Article 143 all records keeping including the above mentioned reports are to be kept for a minimum of 5 years.

13. RESPONSIBILITIES FOR MITIGATION AND MONITORING

The Institutional roles and responsibilities are provided in Table 17 for mitigation and monitoring for Health, Safety, and Environment (HSE) related aspects of SGBU and its drilling contractor management within the drilling of Chudicth-2 Appraisal Well.

The Table 20 gives the Environmental Mitigation Measures and Responsibility of various parties. It describes the possible events, environmental contingency measures and safeguards in case of a spill event. The table has considered loss of well control and blow out, leak from fittings and connections or leak from engines or machinery and spillage during refuelling, further description of the safeguards and who is responsible on the Jack-up Rig.

14. EMERGENCY PLAN

SGBU Integrated management Systems includes the Chuditch-2 Emergency Response Plan (ERP) which has been developed in line with the Incident Management System for the Oil and Gas Industry, good practice guidelines for incident management and emergency response personnel (IOGP and IPIECA, 2023).

This ERP outlines the emergency response procedures for SGBU operations and activities conducted in the Chuditch field. This includes providing for a functioning Incident Management Team (IMT) and Crisis Response Team (CRT) and the Facility, Support Craft and Supply Base organisations having a like for like response structure.

The Campaign bridging document will bridge to the MODU, Support vessel and Helicopter Providers. The Supply Base will be managed under SGBU SMS. Each organisation including the principal contractor shall maintain a response structure (Emergency Response Team) at the potential source of an event and:

- A fully functioning Incident Management Team (ERT)
- A fully functioning Crisis Response Team (CRT)

The Objectives of the Chuditch 2 ERP are to ensure that the systems and processes used by SGBU, Vessel, Supply Base, Helicopters and Support Craft Operators in an emergency are focused on:

People

- Protecting our People.
- Treating the injured and warning personnel / public to avoid further casualties.
- Evacuate or shelter people from the effects of an emergency.

Environment

- Saving the environment and property from destruction.
- Preventing further contamination to the environment or property.
- Providing security for property, especially in evacuated areas.

Assets

- Protect our Assets.

- Help protect the basis of our operations and the community it seeks to serve if there is a release from a SGBU operated facility.

Reputation

- Protect our Reputation.

Primary and support responsibilities for the Chuditch 2 campaign are detailed in Table 33.

Table 33-Primary and support functions

Emergency Event Description	Primary Responsibility	Support Responsibility
General emergency on the MODU (Fire, major injury, etc.)	Rig Contractor	SGBU
General emergency within the 500m exclusion zone (man overboard, helicopter ditching, etc.)	Rig Contractor	SGBU
Emergency event with drilling and intervention equipment, including BOP and risers	Rig Contractor	SGBU
Emergency event - Well integrity (below the Wellhead)	SGBU	Rig Contractor
Emergency event - Well blow out/loss of well control event	Rig Contractor	SGBU
Oil or chemical spill contained on-board MODU	Rig Contractor	SGBU
Oil or chemical spill overboard into ocean	SGBU	Rig Contractor
Helicopter incident, ditching or missing offshore	Helicopter Contractor	SGBU
Helicopter incident on or near the MODU	Rig Contractor	SGBU and Helicopter Contractor
Contracted Vessel emergency inside MODU 500m zone	Vessel Contractor	Rig Contractor
Contracted Vessel emergency outside MODU 500m zone	Vessel Contractor	SGBU
Emergency event – Darwin Supply Base	Supply Base Operator	SGBU

SGBU Incident Command structure and the Incident Command System (ICS) is a standardized approach to the command, control, and coordination of emergency response providing a common hierarchy within which responders from multiple

agencies can be effective. Incident Command structure is organized in such a way as to expand and contract as needed by the incident scope, resources and hazards.

14.1. Integrated Management System (IMS)

SGBU Integrated management Systems has a Tiered Response. In the event of an emergency, the OIM is responsible for the initial situation assessment and emergency response. Both the rig contractor and SGBU classify emergencies into Levels 1, 2 and 3, according to the consequence of each emergency and its potential to escalate. Where there is doubt regarding the exact level of an emergency, the higher classification will be used until a definitive classification can be made by the OIM. Table 34 provides guidance and assistance in determining the incident response level and classification.

Table 34-Provides guidance and assistance in determining the incident response level and classification

Response Level	**Incident Management/Emergency Response**		**Emergency Management**
Criteria	**Incident (Level 1)**	**Major Incident (Level 2)**	**Emergency (Level 3)**
Definition	Can be rectified using existing business as usual (BAU) processes and resources	Requires escalated and coordinated response with enhanced stakeholder communications	Requires special mobilization and organization of resources well beyond BAU
Coordinated By	Rig contractor ERT	Rig contractor ERT Activated and SGBU IMT IC Advised	SGBU IMT activated – CEO Advised CMT Leader Advised / Activated
Delegation	Rig contractor ERT is responsible with additional company support as required	SGBU IMT IC responsible with functional roles activated	CMT Leader responsible with functional roles activated
Resources	Site response & local resources (potentially with or without SGBU	Additional management expertise and resources (potentially	Company-wide resources available including support Aust EMT

Response Level	Incident Management/Emergency Response		Emergency Management
Criteria	**Incident (Level 1)**	**Major Incident (Level 2)**	**Emergency (Level 3)**
	IMT support	with SGBU IMT support)	
Primary Internal Document Reference	Rig contractor Offshore Emergency response document	SGBU ER BD	SGBU Crisis Management Plan

14.2. Emergency Response Scenario

Emergency Response Scenario in the ERP are:

- For any Medical Events SGBU are in the process of finalising aviation and medivac services negotiations to provide a complete aviation solution, including crew change, Limited Search and Rescue (LIMSAR) and 24/7 medevac coverage including Medevac Crew.
- For Well Control Events the Rig contractor's Offshore Emergency Response document, guides the initial emergency response for the safety of personnel onboard the MODU as directed by the OIM. In the event of a loss of well control event, the Rig contractor's EMT will be activated, and response taken in alignment with the OSCP.
- The OSCP describes the arrangements for responding to and monitoring pollution in the event of a hydrocarbon spill during drilling on the Chuditc-2 well. This plan provides a first strike response plan and escalation according to incident tiers, incident management team structure (IMT), Crisis Management Structure and emergency structure framework.
- The Source Control Emergency response Plan (SCERP) or otherwise known as a Well Control Blowout Plan describes the response strategies and procedures that will be employed to plan for and control the source during a Loss Of Well Control (LOWC) event including the response framework, source control strategies and resources, logistics, response timeline, potential SIMOPs and preparedness, exercising, training and competency based on worst-case discharge analysis and modelling.

- For Response Resources and equipment beyond SGBU and the MODU, the ERP has list of contact details of Organizations to call for assistance as per International practice. SGBU has contracted Wild Well Control as their provider of well control support.
- Oil Spill Response Limited (OSRL). SGBU is a shareholder and a Participant Member of OSRL and has full access to its capability. This includes guaranteed and immediate response, 24 hours, 365 days per year. OSRL possesses a large stockpile of regularly maintained oil pollution response equipment. Further details of the arrangements with OSRL are given in the OSCP.
- Australian Maritime Oil Spill Centre (AMOSC). The Australian Marine Oil Spill Centre operates Australia's major oil spill response equipment stockpiles on 24-hour standby for rapid response within the Australian Exclusive Economic Zone. AMOSC is also on call 24 hours a day, 365 days a year. This ensures immediate access to AMOSC personnel and equipment. SGBU will have access to the AMOSC stockpile of respone equipment and expertise in the event of a spill of national or international significance requiring an intergovernmental request for assistance via AMSA and the Australian Nat Plan. Further details on the activation pathway to obtain AMSA/AMOSC assistance are given in the OSCP.

15. DECOMMISIONING PLAN

The Decommission Plan for the jack-up Rig will be prepared as the SOP and abandon well as per approved program. The overview of Chuditch-2 Well Construction Sequence: Mobilisation, Preloading / rigging up, 17½" Hole Section, 13⅜" Casing, Run 18¾" BOP Stack, Drill 12¼" Hole Section, conduct 12¼" OH Logging, Run and cement 9 5/8" Casing, conduct 9 5/8" CH Logging, Well Clean up, Well Testing, Abandonment Well, Rigging Down / Jack Down and Demobilisation.

15.1. Rig Move

In Q2 2025, based on the current rig schedule, the rig will be towed to location and positioned over the programmed well centre. Following soft pinning and pre load operations, the rig will jack up to the approved air gap of approximately 15 -18 m above mean sea level and begin to rig up, take on extra personnel, equipment, fluids and chemicals in preparation for spudding the well.

15.2. Drilling

The Chuditch-2 well will target the Plover Formation to appraise the gas discovery encountered by Shell on the Chuditch-1 well. Its primary goals include confirming thicker gas pay in an upward direction from the original well toward its bounding fault and conducting a Drill Stem Test (DST) to assess the field's production potential.

15.3. Well Testing

SGBU plans to perform a Drill Stem Test (DST) on the expected gas-charged Plover reservoir interval in the Chuditch-2 appraisal well. The DST is currently being designed and will be integrated into the overall well design by the SGBU well test engineer.

15.4. Plug and Abandonment

Upon completion of drilling activities, the well will be plugged and abandoned where a bridge plug or high viscosity pills will be installed in conjunction with cement slurries to ensure that higher density cement does not fall in the wellbore. Once the well is secured for abandonment and all equipment retrieved, the rig will be prepared for moving to the next drill site location. This is a reverse of the installation process with the rig being jacked down

and legs freed. The rig is then pulled off the location and moved to the next site by the two anchor handling vessels.

15.5. Post well survey

The ROV will be deployed and conduct a post well survey in the vicinity of the well to ensure no dropped equipment or other object is left on the seabed. Video transects are downloaded to a separate storage device and made available for use in post project environmental monitoring if required and/or used in environmental monitoring reporting.

15.6. Rig Down and Rig Move

The MODU then down rigs equipment, jacks down to the water and retracts the legs in a pre-planned sequence. The tow vessel takes tension on the bridle and moves the MODU off location.

16. CAPACITY DEVELOPMENT AND TRAINING

The framework for petroleum exploitation in Timor-Leste was set in 2005 (Law No. 13/2005). The general framework in the Act is then elaborated further in various decree laws, for example in public tendering, policy and guidelines for administration and monitoring of Timor-Leste Content, and the award of petroleum contracts. Specific provisions are set in the Timor-Leste Content to include proposals for training of and giving preference in employment in the Petroleum Operations to, nationals of Timor-Leste, and the procurement of goods and services from persons based in Timor-Leste to stimulate development of local suppliers of goods and services and the Timor-Leste economy.

Job creation is critical for the stability and long-term development of Timor-Leste. This effort will provide a strong economic growth, consistent and supportive of macroeconomic policies, competitive wages, support private sectors, local involvement, and competitive and skilled workforce. From the stakeholder's consultation, training to upgrade and enhance skills, equal opportunities and access to skills for men and women, also the matchmaking between the training and actual employment prospects are important for Timorese so they will be able to compete with foreigners.

SGBU will train local workers in Timor-Leste, keep records of where workers are employed and training conducted with these workers.

Induction and Offshore certification requirements

In general, there would be Safety Training and Induction for all working offshore to raise awareness of the increased safety risk and provide them with skill and knowledge to deal with offshore emergencies. An environmental and safety induction will be undertaken with crew members prior to commencement of any drilling-related operations. Items that will be covered include:

a) OPITO T-HUET/BOSIET or FOET.

b) General offshore safety training;

c) Training for command and control in emergency response;

d) Training for specialist emergency response roles;

e) Regulatory requirements for drilling operations;

f) Environmental considerations and special procedures to be used for environmental protection in the permit area; and

g) Safety procedures with particular regard for appropriate conduct on Jack-up Rig and safe use of equipment.

In addition, SGBU is committed to local content as follows during the procurement of local goods and services that build capacity development and training.

1. Local Employment: Companies are encouraged to hire local residents for various roles within the project. This includes providing training and skill development programs to ensure that the local workforce is equipped to take on these roles.
2. Procurement of Local Goods and Services. Sourcing materials, equipment, and services from local suppliers to support the local economy.
3. Community Engagement: Involving local communities in decision-making processes and ensuring that their needs and concerns are addresses. This can include community development projects and social investment programs.
4. Capacity Building: Investing in the development of local businesses and industries to enhance their ability to participate in the supply chain.
5. Technology Transfer: Sharing knowledge and technology with local companies to help them improve their capabilities and competitiveness.

17. PUBLIC CONSULATION and INFORMATION DISCLOSURE

The public consultation for a Category A project, such as Chuditch-2 Appraisal Drilling is a requirement per Decree Law No. 39/2022 first amendment of Decree Law No. 5/2011 of Environmental License, for environmental assessment involving the preparation of the Environmental Impact Statement (EIS) and Environmental Management Plan (EMP). This requirement is aimed at addressing the public's concern, understanding, and acceptance of the project, especially on how the project may affect them positively and/or negatively.

17.1. Purpose of the Consultation

Public Consultation process for the Environmental Impact Assessment (EIA) is carried out in accordance with the Ministerial Diploma No. 47/2017 for the Regulation on the Public Consultation Procedures and Requirements during the environmental assessment process. Based on the aforementioned Ministerial Diploma, the objective of the Public consultation is to disseminate information on the result of Environmental Baseline Survey (EBS) as part of EIA and Environmental Management Plan.

17.2. Methodology & Approach

The methodology and approach for this public consultation:

17.2.1. Methodology

- Preparation:
- Identification of Stakeholders:
  1) *Autoridade Nacional do Petróleo (ANP);*
  2) Ministry of Petroleum and Mineral Resources (MPRM);
  3) Ministry of Tourism and Environment;
  4) *Unidade de Policia Maritima (UPF-PNTL);*
  5) *Unidade Policia Esplosivo;*
  6) *Autoridade Maritima Nacional;*
  7) *Direcção Nacional de Transporte e Maritima;*
  8) *Gabinete das Fronteiras Tereste e Maritima;*
  9) *Asosiasaun Peskan no Marina Timor-Lorosa'e (APM-TL);*
  10) Port Custom (Ministry of Finance);

11) Port Authority (APORTIL);
12) Ministry of Agriculture and Fisheries (MAF);
13) *Forca Componente Marinha/Naval de Falintil Forca da Defesa de Timor-Leste (F-FDTL)*
14) Ministry of Health;
15) Australian Embassy;
16) Civil Society Organizations – CSOs (e.g. Lao Hamutuk);
17) Ministry of Foreign Affairs; and
18) Quarantine.

17.2.2. Approach

- Public Notice will be published through ANP's website, proponent's website, any social networks such as Facebook, LinkedIn, Newspaper, Radio, and Televisions on the day of the EIS and EMP drafts submission.
- Through Public Notice: anyone has the right to review and provide their comments through writing via e-mail or in-person at the office of the Environmental Authority - ANP, Project Proponent – SGBU.
- SGBU will organize a formal meeting where result from the Environmental Baseline Survey (EBS) results, EIA, and potential impacts as well as mitigation measures will be presented to stakeholders identified in sub-section 17.2.1.
- As a courtesy, SGBU will notify the Australian National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), the Northern Territory government, and the Australian Maritime Safety Authority (AMSA) of the offshore drilling.

17.3. Summary of Consultation

- Date:
- Venue:
- Participants Registry:
- Summary of Minutes of Meeting:

17.4. Summary of Main Comments

Summary of comments will be added in this section after the public consultation and public notice.

17.5. Recommendations for Future Consultations

SGBU will continue to collaborate with ANP and stakeholders to share any changes on any amendments on potential environmental impacts and any mitigation measures within EIS and EMP.

18. COMPLAINTS AND GRIEVANCES MECHANISM

The drilling project is offshore, far from land and interaction with local community is unlikely. However, the SGBU team will liaise with the ANP and other authorities to manage complaints and grievances, should such occur.

The complaints and grievances mechanism is intended to assist anyone or any stakeholders, who might be affected by the Chuditch-2 Appraisal Well Drilling activities, with their complaints and/or grievances. The project proponent, SGBU, has the obligation to record and address any complaints submitted.

18.1. Objective

The objectives of the complaints and grievances are:

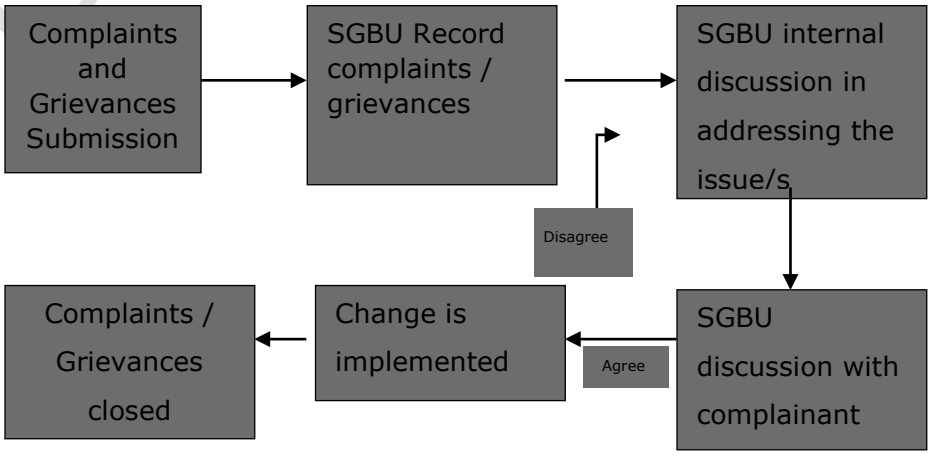
- To give anyone from the community and/or stakeholder the opportunity to submit their opinion, complaints, and/or grievances on the environmental impacts from the drilling campaign;
- To ensure that any complaints and/or grievances are heard and addressed properly;
- To assist SGBU in addressing complaints and/or grievances regarding the drilling campaign; and
- To assist transparency and fair process.

18.2. Mechanism

SGBU is committed to treat all complaints and grievances:

- Seriously and confidentially without discrimination;
- Within a specified timeframe;
- Through negotiation, mediation, and conciliation; and
- Clear communication between SGBU and complainants.

Below is the procedure diagram for complaints and grievances mechanism:



19. WORK PLAN AND IMPLEMENTATION SCHEDULE

Table 35-Estimated Timeline for Appraisal Well Drilling

ESTIMATED TIMELINE FOR APPRAISAL WELL DRILLING		
Task	**No. of days**	**Execution Timeline**
Pre-Drilling		
Mobilisation	2	Day 2 – before spud
Preloading / rigging up	3	
Drilling		
17½" Hole section	5	Day 7 – before drilling with WBM
13 3/8" Casing	1	
18 ¾" BOP	1	Day 14 – After drilling with WBM/before SBM Discharge
12 ¼" Hole section	7	
12 ¼" OH Logging	5	
9 5/8" Casing	2	Day 28–After SBM Discharge
9 5/8" CH Logging	1	
Well Cleanup & Well Testing		
Well Cleanup	1	
Well Testing	7	
Abandonment		
Abandon well (Plug)	2	
Rigging Down / Jack Down and Demobilisation	1	Day 40 - Demobilisation
Duration in total (approximately)	**40**	

Figure 34-Complaints and Grievances Mechanism Diagram.

20. COST ESTIMATES

Activity	*timing*	*Estimated cost*	*Total*
EIA including spill and cuttings modelling	*April 2024 - Current*	*USD $ 130,000*	
EBS including SOW.	*January 2025*	*USD $ 634,000*	
Tier 1/Tier 2/Tier 3	*July 2025*	*TBA*	
Drilling Environmental Monitoring Plan	*Q/2 2025*	*USD $ 150,000*	*USD $ 914,000.*

SGBU has budgeted for all anticipated and credible mitigation measures and monitoring requirements to be correctly implemented.

21. REVIEW OF THE EMP

The Environmental Management Plan (EMP) is considered as a living document which is subject to review or update as necessary based on any new events which may occur during the appraisal drilling. As stipulated in Decree Law No. 32/3016, Article 140, the EMP is required to be reviewed annually. In this instance, the EMP is designed for the Chuditch 2 Appraisal Well Drilling Program and is limited to that scope. Furthermore, when necessary, revisions and submissions are required to reflect any changes amended through ongoing monitoring, reports, and inspections/audits conducted on environmental impacts and risks.

Whilst preparing the draft EMP, SGBU shall discuss with ANP and formulate a Public consultation plan as per requirements. Any relevant suggestions, comments shall be considered and the revision of EMP will be prepared. The review of EMP shall be done before the start of the appraisal drilling program.

Additionally, since this is a 40-day drilling campaign, there is no annual review; instead, the EMP review is subject to:

a) Changes in project plan, activity, process, and/or procedure that may have an impact on the project, its human resources, and/or the environment. This includes positive changes that can enhance the project's value.
b) Changes in the physical area of the project and its size.
c) Changes of responsibility towards any social and/or environmental aspects identified within the project EIS and EMP.
d) Changes in any legislation related to the project implementation and monitoring that may require an update to the EMP
e) Changes of monitoring results deviate from any guiding values and/or environmental standards that may require an update to the EMP.

22. NON-TECHNICAL SUMMARY

Non-Technical Summary

Introduction

This document provides a clear and simple explanation of the Environmental Management Plan (EMP) for the Chuditch-2 offshore drilling project in Timor-Leste. The goal of this summary is to help people understand how the project will be carried out while ensuring environmental protection and worker safety. It explains the purpose of the project, the benefits, possible environmental impacts, and the steps taken to reduce harm.

The EMP is a detailed plan that outlines how the company will comply with environmental laws and ensure that the drilling activities do not cause long-term damage to the marine environment. It provides guidelines on safety measures, waste disposal, emergency preparedness, and community engagement.

Why This Plan is Important

The EMP is essential because it:

- Ensures that drilling activities follow environmental laws.
- Reduces harm to marine life and natural habitats.
- Keeps workers and local communities safe.
- Establishes a plan for responding to emergencies such as oil spills.
- Helps monitor and report environmental impacts.

Without an EMP, drilling activities could become uncoordinated and less effective in safeguarding the environment including less effective planning to safeguard water pollution, destruction of marine habitats, and health risks to people living nearby.

Overview of the Chuditch-2 Drilling Project

The Chuditch-2 drilling project is taking place in the Timor Sea, about 185 NM East of Timor-Leste. The goal is to determine if

Sumáriu Naun-Tékniku

Introdusaun

Dokumentu ida-ne'e fó esplikasaun klaru no simples kona-ba Planu Jestaun Ambientál (PJA) ba projetu perfurasaun tasi-laran/klean Chuditch-2 iha Timor-Leste. Objetivu husi sumáriu ida-ne'e maka atu ajuda ita sira komprende oinsá projetu ne'e sei hala'o enkuantu garante protesaun ambientál no seguransa traballadór nian. Ida-ne'e deskreve objetivu projetu nian, benefísiu sira, impaktu ambientál sira ne'ebé posivel, no pasu sira ne'ebé foti atu hamenus prejuízo ka risku sira.

EMP hanesan planu detallu ne'ebé trasa oinsá kompañia sei kumpre lei ambientál sira no asegura katak atividade perfurasaun sira la hamosu estragu ba tempu naruk ba ambiente tasi. Ida-ne'e fornese matadalan sira kona-ba medida seguransa nian, soe lixu, preparasaun ba emerjénsia, no envolvimentu komunidade nian.

Tanbasá Planu Ida-ne'e Importante

EMP ne'e esensiál tanba:

- Asegura katak atividade perfurasaun tuir lei ambiental.
- Hamenus prejuízu ka riksu ba moris tasi nian no habitat naturál sira.
- Mantein traballadór sira no komunidade sira ne'ebé besik seguru.
- Estabelese planu atu responde ba emerjénsia sira hanesan asidente mina-rai fikar.
- Ajuda monitoriza no relata impaktu ambientál sira.

La ho EMP, atividade perfurasaun sira bele kauza prejuízu ka reisku sériu ba ambiente, inklui poluisaun bee, destruisaun ba habitat tasi nian, no risku saúde ba ema sira ne'ebé hela besik.

Vizaun Jerál kona-ba Projetu Perfurasaun Chuditch-2

Projetu perfurasaun Chuditch-2 hala'o dadaun hela iha Tasi Timor, besik km 185 ba

there is enough natural gas in the area to support future production. An offshore drilling rig will be used for this project.
The project consists of three main stages:
Mobilization: Preparing equipment, transporting the drilling rig, and setting up at the site.
Drilling and Testing: Drilling the well, collecting samples, and analyzing them to confirm the presence of natural gas.
Decommissioning and and any mitigation or restoration recommended by the planned environmental monitoring program: Plugging and abandoning the well safely, removing equipment, and ensuring the site is left in a safe condition.
The drilling will be done in 68 meters of water depth and will reach a total depth of approximately 3,010 meters below the seabed.

Expected Environmental Impacts
The project has both positive and negative effects on the environment and society.

Positive Effects
Job Opportunities: The project in the long term, will create jobs for local workers in Timor-Leste. In the short term there is limited opportunity for employment due to the level of training, formal qualifications, experience and skill sets required to safely work in the oil and gas sector.
Economic Growth: The drilling will generate revenue for the government through taxes and royalties.
Skill Development: Future workers will receive training in offshore drilling operations.
Technology Transfer: Advanced drilling technology will be introduced to Timor-Leste. Offshore drilling requires engineering and support services on shore. Future opportunities will exist for Timor-Leste citizens to become trained in these support activities.

súl Timor-Leste nian. Objetivu maka atu determina se iha gás naturál ne'ebé sufisiente iha área ne'e atu suporta produsaun iha futuru. Unidade perfurasaun espesiál ida sei uza ba operasaun ida-ne'e.
Projetu ne'e kompostu husi etapa prinsipál tolu tuir mai:
Mobilizasaun: Prepara ekipamentu, transporta plataforma perfurasaun, no monta iha fatin perfurasaun.
Perfurasaun no Teste: Perfurasaun posu, halibur amostra sira, no analiza sira hodi konfirma prezensa gás naturál.
Dekomisaun no Restaurasaun Fatin: Taka posu ho seguru, hasai ekipamentu, no asegura fatin ne'e husik hela iha kondisaun seguru.
Perfurasaun ne'e sei halo iha tasi kle'an metru 68 no sei to'o metru 3,000 iha tasi okos.

Projetu ne'e iha efeitu pozitivu no negativu ba ambiente no sosiedade.

Efeitu Pozitivu sira
Oportunidade Servisu: Projetu ne'e sei kria kampu traballu ba traballadór lokál sira iha Timor-Leste.
Kresimentu Ekonómiku: Perfurasaun sei hamosu reseita ba governu liuhosi impostu no regalias.
Dezenvolvimentu Abilidade: Traballadór sira sei simu formasaun kona-ba operasaun perfurasaun iha tasi-laran/klean.
Transferénsia Teknolojia: Teknolojia perfurasaun avansadu sei introduz mai Timor-Leste.

Efeitu negativu no solusaun sira ne'ebé posivel
Perturbasaun iha tasi okos: Perfurasaun bele estraga habitat tasi nian. Atu prevene ida-ne'e, empreza sei uza sistema kolokasaun sistemátiku hodi evita interupsaun tasi-okos ne'ebé la nesesáriu.
Poluisaun Bee: Perfurasaun kímika no lixu bele polui tasi. Atu prevene ida-ne'e, lixu sei hetan tratamentu molok soe, no sei uza de'it kímiku sira ne'ebé seguru ba ambiente.

Possible Negative Effects and Solutions

Seabed Disturbance: The drilling may damage marine habitats, although this will be transient and very localised. To prevent this, the company will use precise positioning systems to avoid unnecessary seabed disruption.

Water Pollution: Drilling chemicals and waste could pollute the ocean, although the volumes of chemicals and treated wastes discharge to the sea will be neglible in comparison to the overall volume of the water column in the area. To prevent and measurable harm, waste will be treated before disposal, and only environmentally safe chemicals will be used.

Air Pollution: The operation may release emissions that affect air quality. This will be highly localized and far less than seasonal crop burn-offs ashore. To minimize this, the project will use fuel-efficient equipment and monitor emissions.

Oil Spills: A major risk is oil spills, which can damage marine life. The Chuditch well is not expected to produce liquid oil. It is prognosed as a dry gas well with a very small percentage of condensate which upon release will evaporate on the sea surface rapidly.

In the event of a diesel spill, studies show this will also evapaorate and weather rapidly. To assist and mitigate, the company has an emergency response plan with trained teams and spill containment equipment to handle any accidents.

Impact on Marine Life: Noise and light pollution from the drilling could disturb fish and marine mammals. It is considered this effect will be transitory with wildlife exhibiting avoidance behaviours and returning to normal behavioural patterns after the drilling campaign is completed. To reduce this impact, the project will use noise-reduction technology and limit unnecessary lighting.

Poluisaun Ar: Operasaun bele hasai emisaun sira ne'ebé afeta kualidade ar. Atu minimiza ida-ne'e, projetu sei uza ekipamentu sira ne'ebé efisiente iha kombustível no monitoriza emisaun sira.

Derretamentu/fakar mina-rai: Risku boot ida maka mina-rai fakar, ne'ebé bele estraga vida tasi nian. Kompañia iha planu resposta emerjénsia nian ho ekipa sira ne'ebé hetan ona treinamentu no ekipamentu sira adekuadu ba kontensaun ba derretamentu sira hodi maneja asidente ruma.

Impaktu ba Vida Tasi nian: Poluisaun barullu no naroman husi perfurasaun bele perturba ikan no mamíferu sira tasi nian. Atu hamenus impaktu ida-ne'e, projetu sei uza teknolojia hodi hamenus barullu no limita iluminasaun ne'ebé la nesesáriu.

Kumprimentu Legál no Ambientál

Projetu ne'e tenke tuir lei ambientál nasionál no internasionál, inklui:

- Lei Lisensiamentu Ambientál Timor-Leste nian – Asegura esplorasaun mina no gás ne'ebé responsável.
- Konvensaun MARPOL – Proteje ambiente tasi nian husi poluisaun.
- Matadalan Protesaun Biodiversidade – Asegura katak moris tasi la hetan prejuízo/risku husi atividade perfurasaun.
- Regulamentu sira kona-ba Mudansa Klimátika – Ho objetivu atu hamenus emisaun gás ho efeitu estufa.
- Padraun Saúde no Seguransa – Garante seguransa iha servisu fatin ba funsionáriu sira.

Hodi tuir lei sira-ne'e, projetu sei funsiona ho responsabilidade no minimiza risku ambientál sira.

Monitorizasaun no Relatóriu Ambientál

Atu garante seguransa ambientál, projetu sei regularmente halo verifikasaun no relatóriu kona-ba:

- Kualidade Bee no Ar – Teste amostra bee tasi nian hodi estabelese dadus baze no asegura kualidade ar nian tuir padraun sira fabrikante nian.

Legal and Environmental Compliance

The project must follow national and international environmental laws, including:

- Timor-Leste's Environmental Licensing Laws – Ensure responsible oil and gas exploration.
- MARPOL Convention – Protects the marine environment from pollution.
- Biodiversity Protection Guidelines – Ensures that marine life is not harmed by drilling activities.
- Climate Change Regulations – Aims to reduce greenhouse gas emissions.
- Health and Safety Standards – Ensures workplace safety for employees.

By following these laws, the project will operate responsibly and minimize environmental risks.

Environmental Monitoring and Reporting

To ensure environmental safety, the project will regularly check and report on:

- Water and Air Quality – Testing marine water samples to establish baseline data and ensure air quality adheres to manufacturers standards.
- Waste Disposal – Ensuring waste is properly handled and not harmful to the environment.
- Marine Life – Studying the impact of drilling on fish, coral reefs, and other marine species.
- Compliance with Laws – Regular audits to make sure the project follows all environmental regulations.

If any problems are detected, corrective actions will be taken immediately.

Emergency Preparedness

The project has a detailed **emergency response plan** to handle unexpected events, such as oil spills or gas leaks. The plan includes:

Trained Emergency Teams – Workers who are prepared to respond to accidents.

Spill Containment Equipment – Booms and

- Soe Lixu – Asegura katak lixu hetan maneja ho di'ak no la prejudika ambiente.
- Vida Tasi nian – Estuda impaktu husi perfurasaun ba ikan, ahu-ruin, no espésie tasi nian sira seluk.
- Kumprimentu ba Lei sira – Auditoria regular sira atu asegura katak projetu tuir regulamentu ambientál hotu-hotu.

Karik iha problema ruma ne'ebé detekta, asaun koretiva sira sei foti kedas.

Preparasaun ba Emerjénsia

Projetu ne'e iha planu resposta emerjénsia ne'ebé detallu atu maneja eventu sira ne'ebé la espera, hanesan fakar mina-rai ka vazamentu gás. Planu ne'e inklui:

Ekipa Emerjénsia Treinadu sira – Traballadór sira ne'ebé preparadu atu responde ba asidente sira.

Ekipamentu Kontensaun Derramamentu – Booms no skimmers atu hapara mina-rai atu labele sulin namkari.

Koordenasaun ho Autoridade sira – Komunikasaun lalais ho ajénsia governu nian ba asisténsia.

Ezersísiu Seguransa Regular – Funsionáriu sira sei hetan treinamentu liuhosi ezersísiu sira hodi asegura katak sira prontu ba emerjénsia sira.

Medida sira-ne'e sei ajuda atu kontrola lalais no hamenus estragu sira ne'ebé kauza hosi asidente ruma.

Envolvimentu Komunidade no Envolvimentu Públiku

Maski perfurasaun ne'e hala'o iha tasi-laran/klean, ekipa projetu nian envolve ona ho komunidade lokál sira no parte interesada sira hodi asegura transparénsia no rezolve preokupasaun sira. Kompañia estabelese ona mekanizmu keixa ida iha ne'ebé ema sira bele hato'o preokupasaun ambientál sira ka kestaun sira ne'ebé relasiona ho projetu.

Adisionalmente, ekipa projetu nian sei kontinua atu atualiza públiku no autoridade governu nian sira kona-ba progresu perfurasaun nian no risku ambientál ruma.

skimmers to stop oil from spreading.
Coordination with Authorities – Quick communication with government agencies for assistance.
Regular Safety Drills – Employees will be trained through drills to ensure they are ready for emergencies.
These measures will help to quickly control and reduce the damage caused by any accidents.

Community Engagement and Public Involvement

Even though the drilling takes place 184 nm offshore, the project team has engaged with local communities and stakeholders to ensure transparency and address concerns. The company has set up a grievance mechanism where people can report environmental concerns or issues related to the project.
Additionally, the project team will continue to update the public and government authorities on the progress of the drilling and any environmental risks.

Decommissioning and Site Restoration

After drilling is complete, the company will:

- Plug and abandon the Well safely – To prevent any gas leaks.
- Remove All Equipment – Ensuring no waste is left behind.
- Monitor the environment during drilling to ensure the area will recover naturally.

Environmental monitoring will occur throughout the drilling program to assess if the area needs any or any restoration efforts post drilling.

Capacity Building and Training

Current personnel and future workers will receive extensive training on:

- Environmental Protection – Learning how to reduce pollution and protect marine life.
- Safety Procedures – Training on emergency response and safe handling

Dekomisaun no Restaurasaun ba Fatin

Hafoin perfurasaun hotu, empreza sei:
Taka Posu ho Seguru – Atu prevene fuga gás ruma.
Hasai Ekipamentu Hotu-hotu – Asegura katak laiha lixu ne'ebé maka husik hela.
Restaura Fatin – Halo monitorizasaun ba ambiente hodi asegura katak área ne'e rekupera naturalmente.
Programa akompañamentu ida sei hala'o atu avalia se área ne'e rekere esforsu restaurasaun adisionál sira.

Hasa'e Kapasidade no Treinamentu

Traballadór sira sei hetan formasaun klean kona-ba:

- Protesaun Ambientál – Aprende oinsá atu hamenus poluisaun no proteje vida tasi nian.
- Prosedimentu Seguransa nian – Treinamentu kona-ba resposta emerjénsia no manejamentu seguru ba ekipamentu sira.
- Abilidade Tékniku – Hetan koñesimentu iha perfurasaun, jestaun lixu, no prátika di'ak sira ba operasaun sira iha tasi-ibun.

Ida-ne'e sei hadi'a forsa traballu lokál no kria oportunidade serbisu ne'ebé di'ak liu iha setór enerjia.

Kustu no Rekursu sira

Kompañia aloka ona fundu sira atu kobre:

- Programa sira monitorizasaun ambientál nian.
- Resposta ba emerjénsia no medida seguransa nian.
- Programa formasaun ba traballadór sira.
- Ekipamentu no teknolojia hodi hamenus impaktu ambientál.

Ida-ne'e garante katak projetu funsiona ho responsabilidade enkuantu mantein sustentabilidade finanseira.

Konkluzaun

Projetu perfurasaun Chuditch-2 hein katak sei kontribui maka'as ba kreximentu

of equipment. • Technical Skills – Gaining knowledge in drilling, waste management, and best practices for offshore operations. This will improve the local workforce and create better job opportunities in the energy sector. **Cost and Resources** The company has allocated funds to cover: • Environmental monitoring programs. • Emergency response and safety measures. • Training programs for workers. • Equipment and technology to reduce environmental impact. This ensures the project operates responsibly while maintaining financial sustainability. **Conclusion** The Chuditch-2 drilling project is expected to contribute significantly to Timor-Leste's economic growth while ensuring environmental safety. By following strict environmental laws, using advanced technology, and having a clear emergency response plan, the project aims to minimize negative effects on the environment. The Environmental Management Plan ensures that drilling activities are carried out responsibly, with continuous monitoring and improvement to reduce risks. Through cooperation with local authorities and community engagement, the project can support sustainable energy exploration while protecting Timor-Leste's marine ecosystems for future generations.	ekonómiku Timor-Leste nian enkuantu garante seguransa ambientál. Hodi tuir lei ambientál sira ne'ebé rigorozu, uza teknolojia avansadu, no iha planu resposta emerjénsia ne'ebé klaru, projetu ne'e hakarak minimiza efeitu negativu sira ba ambiente. Planu Jestaun Ambientál garante katak atividade perfurasaun sira hala'o ho responsabilidade, ho monitorizasaun no melloramentu kontínuu hodi hamenus risku sira. Liuhosi kooperasaun ho autoridade lokál sira no envolvimentu komunidade nian, projetu ne'e bele apoia esplorasaun enerjia sustentável enkuantu proteje Timor-Leste nia ekosistema tasi nian ba jerasaun sira iha futuru.**bb**

REFERENCES

ADB (2021). Climate Risk Country Profile: Timor-Leste. Asian Development Bank.

Apache Energy (2001). Simpson Development: Public Environmental Report, Report Number: EA60-RI-I 10. Apache Energy Limited, Perth, Australia.

APPEA (1996). Code of Environmental Practice. Australian Petroleum Production & Exploration Association Limited, Canberra, Australia.

ATSEA (2023). Climate Change and Its Impact on the Arafura and Timor Seas Region. ATSEA Regional Strategic Action Program (RSAP).

Australian Hydrographic Services (2003). Australian national tide tables. Australian Hydrographic Publication.

Beasley, I, Kelly, M and Roberston, PA (2005). Description of a new dolphin, the Australian snubfin dolphin, Orcaella heinsohni, sp. n. (Cetacea, Delphinidae). Marine mammal Science 21 (3), 365-400.

Bird,ECF and Ongkosongo, OSR (I 980). Environmental changes on the coasts of InTSDAia. The United Nations University.

BirdLife International (2005). BirdLife's online World Bird Database: the site for bird conservation. Version 2. 0. Cambridge, UK: BirdLife International. Available: http://www.birdlife.org.

BOM (2006). Australian Climate Extremes — Cyclone. Bureau of Meteorology, Commonwealth of Australia. ~

Burke, L, Selig, L and Spalding, M (2002). Reefs at Risk in Southeast Asia. World Resources Institute.

Bureau of Meteorology. Australian Climate Averages and Meteorological Data. Available at: www.bom.gov.au.

Chatto, R (2001). The distribution and status of colonial breeding seabirds in the Northern Territory. NT Parks and Wildlife Commission, Palmerston, Technical Report No. 70.

Cl (2007). Biodiversity Hotspots. Centre for Applied Biodiversity Science, Conservation International.

Country Profiles: Timor-Leste (2025). Unicef : For Every Child. https://data.unicef.org/country/tls/

CSIRO (1999). Survey and Stock Size Estimates of the Shallow Reef (0-15 m deep) and Shoal Area (15-50 m deep) Marine Resources and Habitat Mapping within the Timor Sea M0U74 Box Volume 3: Seabirds and Shorebirds ofAshmore Reef. Canberra, Australia.

DEH (2001). Management Guidelines for Seismic Vessels Operating in Australian Waters so as to Avoid or Minimise Interference with Whales and Certain Other Larger Cetaceans. Department of the Environment and Heritage, Australia.

DEW (2007). Ashmore Reef National Nature Reserve, Timor Sea, EXT. Australian Hertage Database, Department of the Environment and Water Resources, Australia (tittp.://www.environment.Qovau/heritaqe/ahdb/)

DEW (2007a). EPBC Act Protected Matters Report, 31/01/2007, Area of Interest, TL-7.9°S, 124.48°E, BR-13.02°S, 132.62°E,Department of the Environment and Water Resources,Australia (httD://www.environmentgovau/erin/eWeDbc/imaD/maD html).

Minza Oil & Gas Limited (2007) Environment Management Plan, Minza Oil & Gas Limited Australia, Perth, Australia.

East Timor Unemployment Rate (2022). Trading Economics. https://tradingeconomics.com/east-timor/unemployment-rate

Economic Forecasts for Timor-Leste (2024). ADB. https://www.adb.org/where-we-work/timor-leste/economy

Economy of Timor-Leste (2023). Wikipedia: The Free Encyclopedia. https://en.wikipedia.org/wiki/Economy_of_Timor-Leste

Environment Australia (2002). White Shark (Carcharodon carcharias) Recovery Plan. Environment Australia (now DEW).

FishBase (2006). FishBase. World Wide Web electronic publication. Froese, R. and D. Pauly. Eds., www.fishbase.org, version (10/2006).

Heyward, A Pinceratto, E and Smith, L (eds). (1997). Big Bank Shoals of the Timor Sea. An environmental resource atlas. eBook, Australian Institute of Marine Science, Townsvjlle.

Household data – World – Service Levels (2025). WHO, UNICEF:JMP. https://washdata.org/data/household#!/dashboard/new

Jasarevic, T (2002). Reviving fisheries in East Timor — Casting nets for development. UN Volunteers, UNV News, #93, August 2002.

Johnson, P. et al. (2023). Climate Projections for the Arafura and Timor Seas: Impacts on Marine Ecosystems. Journal of Marine Science, 45(2), 120-135.

Jones, HE (I 986). Marine Resources Map of Western Australia. Part I, The Resources; and Part 2, The Influence of Oil on the Marine Resources and Associated Activities with an Emphasis on Those Found in Western Australia. Western Australian Department of Fisheries Report No. 74, Fisheries Department, Perth, Australia.

Kagi, RI, Fisher, SJ & Alexander, R (1988). Behaviour of Petroleum in Northern Australian Waters. In:Purcell, RG & Purcell, RR (eds), The North West SheffAustralia Proceeding, North West Shelf Symposium. Petroleum Exploration Society of Australia Limited, Perth, Australia.

Kyranis, N (2005). Technical Overview — JPDA. Timor Sea Designated Authority, Offshore Acreage Release Presentation, Oil, Gas & Energy Directorate, Government of the Democratic Republic of Timor-Leste.

Last, PR & Stevens, JD (I 994). Sharks and rays of Australia. CSIRO, Canberra, Australia.

LDM (1997). Bayu-Undan Field Development Preliminary Environmental Report (PER), prepared by LeProvost Dames and Moore for Phillips Petroleum Company and BHP Petroleum.

Lloyd, J (2003). Timor Reef trap and line fishery. Deep Sea 2003: Conference on the Governance and Management of Deep-sea Fisheries. Part 2: Conference poster papers and workshop papers.

Lusa - Business News - Timor-Leste: Non-oil companies' contribution to economy up 4.7% in 2023 to $590M (2024). AMAN. https://www.aman-alliance.org/Home/ContentDetail/81334

Queenstown, New Zealand, 1—5 December 2003, Dunedin, New Zealand, 27—29 November 2003. Ed. R Shotton, Food and Agriculture Organization of the United Nations, Rome.

Marsh, H (2006). Dugong dugon. In: IUCN 2006. 2006 IUCN Red List of Threatened Species.

McCauley RD (1994). The environmental implications of offshore oil and gas development in Australia — seismic surveys. In Swan, JM, Neff, JM and Young, PC (eds.), "Environmental Implications of Offshore Oil and Gas Development in Australia - The Findings of an Independent Scientific Review", pp. 19-122. Australian Petroleum Exploration Association, Sydney, Australia.

McCauley RD, Jenner MN, Jenner, C, McCabe KA and Murdoch, J (1998). The response of humpback whales (Megaptera novaeangllae) to offshore seismic survey noise: preliminary results of observations about a working vessel and experimental exposures. APPEA Journal, 38 (1): 692-707.

Milliman, JD, Farnsworth, KL, & Albertin, CS (1999). Flux and fate of fluvial sediments leaving large islands in the East Indies. JournalofSea Research, 41, 97-107.

Molcard, R, M Fieux, and AG Ilahude (1996) The Indo-Pacific throughflow in the Timor Passage. J. Geophys. Res., 101, 12,411-12,420

Mumby, PJ, Edwards, AJ, Arias-Gonzalez JE, Lindeman, KC, Blackwell, PG, Gall, A, Gorczynska, MI, Harborne, AR, Pescod, CL, Renken, H, Wabnitz, CCC, & Llewellyn, G (2004.) Mangroves enhance the biomass of coral reef fish communities in the Caribbean. Nature, 427, 533-536.

Nunes, MN (2001) The Natural Resources of East Timor. A physical, geographical and ecological review. Sustainable Development and the Environment in East Timor: Proceedings of the Conference on Sustainable Development in East Timor, 2001, Anderson, R & Deutsch, C Eds. Timor Aid, Dili, Timor-Leste.

NOAA (National Oceanic and Atmospheric Administration). Global Wind Database (1985-2022). Available at: www.noaa.gov.

OMV (2003) Timor Sea Regional Environment Plan for Drilling Operations. OMV Australia Pty Ltd, Perth, Australia.

Program of the IX Constitutional Government (2025). Government of Timor-Leste. https://timor-leste.gov.tl/?cat=39&lang=en

Reef Base (2007). Reef Base: A Global Information System on Coral Reefs. The World Fish Centre. (http: llwww.reefbase.org)

Ross, JP (ed.). (1998). Crocodiles. Status Survey and Conservation Action Plan [Online 2nd Edition. IUCN/SSC Crocodile Specialist Group. IUCN, Gland, Switzerland and

Cambridge, UK. http://www.flmnh. ufl.edu/natsci/herDetoloqy/actDlan/Dlan I 998a. htrn.

Sandlund, OT, Bryceson, I, de Carvalho, D, Rio, N, da Silva, J, Silva, MI (2001). Assessing Environmental Needs and Priorities in East Timor. Final Report. UNDP Dili and Norwegian Institute for Nature Research, Trondheim, Norway.

5KM (2001) Sunrise Gas Project Draft Environmental Impact Statement for Woodsicie Energy Ltd, Sinclair Knight Merz, Perth, Australia.

Storr, GM, Smith, LA & Johnstone, RE (1 986). Snakes of Western Australia. WA Museum, Perth, Australia.

Timor-Leste (2006). Web portal of the Government of the Democratic Republic of Timor-Leste, IT Division, Ministry of Transport, Communication & Public Works (tift~: llwww.timor-IesteQovtI)

Timor-Leste (2023). World Bank Group. https://data.worldbank.org/country/timor-leste

Timor-Leste GDP (2025). Worldometer. https://www.worldometers.info/gdp/timor-leste-gdp/

Timor-Leste Labour Force Survey 2021 – Final Report (2023). International Labour Organization. https://www.ilo.org/publications/timor-leste-labour-force-survey-2021-final-report

Timor NET (2007). East Timor, an Information Service on East Timor. University of Coimbra, Portugal. UNEP-WCMC (2003), World Atlas of Seagrasses, — Interactive Map Service, Marine Programme, UNEP World Conservation Monitoring Centre, Cambridge, UK.

UNEP-WCMC (2006), Marine Turtle Interactive Mapping system (IMAPS), — Interactive Map Service, ~ Marine Programme, UNEP World Conservation Monitoring Centre, Cambridge, UK.

United States – Youth Unemployment Rate for Democratic Republic of Timor-Leste (2025). Trading Economics. https://tradingeconomics.com/united-states/youth-unemployment-rate-for-the-democratic-republic-of-timor-leste-fed-data.html

UNFCCC (2020). Timor-Leste's National Climate Change Policy and Action Plan. United Nations Framework Convention on Climate Change.

US (2000). ASIA-PACIFIC ECONOMIC UPDATE, JANUARY 2000. U.S. Pacific Command's Strategic Planning and Policy Directorate. Regional Strategy and Policy Division, USCINCPAC J537, HI 96861-4015.

USAID (2021). Climate Risk Profile: Timor-Leste. United States Agency for International Development.

URS (2002) Environment Plan for Jabiru Field. Prepared for Newfield Australia (Ashmore Cartier) Pty Ltd, Perth, Australia.

Veron, JEN And Stafford-Smith, M (2000). Corals ofthe World. AIMS, Cape Ferguson.

WesternGeco (2007). "Vessel"Shipboard Oil Pollution Emergency Plan (SOPEP).

Wilson, BR & Allen, GR (1987). Major components and distribution ofmarine fauna. In: Fauna of Australia, Vol 1A - General articles. Australian Government Publishing Service, Canberra Australia.

World Bank (2005). World Bank Country assistance Strategy for Timor-Leste FYO6-O8. Report No.32700-TP, 18-Aug-05. Timor-Leste Country Management Unit, World Bank. Wyatt, ASJ (2004). Preliminary survey of the nearshore coastal marine environment of the south coast of East Timor: a baseline for assessing the impacts of a developing nation. Bachelor of Engineering thesis, University of Western Australia (Nov 2004).

World Population Dashboard – Timor-Leste (2022). United Nations Population Fund. https://www.unfpa.org/data/world-population/TL

APPENDIX 1 – SGBU HSE Policy

Health Safety & Environment Policy

SUNDA ENERGY

Sunda Energy are committed to:

- Eliminating, mitigating and managing hazards and risks that could cause accidents, injuries, illnesses, property damage or an environmental impact.
- Supporting personnel to meet their health, safety and environmental responsibilities.
- Ensuring all decisions consider short and long term economic, environmental, safety and community impacts.

Sunda Energy demonstrate this commitment by

- Integrating Health, Safety and Environment (HSE) management into all business plans and operations. We will clearly define accountabilities and communicate our operating principles effectively.
- Ensuring that systems and processes are developed and implemented to identify, assess, control, and review HSE risks in all operations. Additionally, processes will be defined to investigate, learn from, and manage incidents effectively.
- Ensuring that appropriately trained, qualified and competent personnel are provided to manage, maintain, and implement systems and controls to manage hazards and risk in all operations of the business.
- Ensuring that effective communication channels are established to provide staff with relevant information on HSE issues and, conduct all structured meetings so that pertinent HSE learnings or information can be shared as appropriate with the meeting group, fostering involvement and stimulating discussion on HSE matters.
- Regularly measuring, monitoring, and reviewing HSE performance as part of our management review process, ensuring records are maintained and results are reported to senior management, relevant authorities, and other stakeholders as required.
- Ensuring that established procedures for the procurement or provision of Goods and operation of Services, incorporate HSE requirements in alignment with the Company management principles and standards.
- Ensuring that timely treatment and active rehabilitation for personnel who suffer work-related injuries or illnesses. In case of an environmental incident, we will take necessary steps to minimize its impact. We will also learn from these events to enhance our health, safety, and environmental practices.
- Ensuring that we take all viable opportunities to reduce waste and green house gas emissions, conserve energy and repurpose or recycle materials.

Andy Butler
Chief Executive Officer, Sunda Energy Plc
22 December 2024

Revision: 0
Document Number: SGBU.GEN.HSSE.0004

APPENDIX 2 – SURVEILLANCE AUDIT CHECKLIST

ENVIRONMENTAL AUDIT CHECKLIST FOR APPRAISAL DRILLING PROJECT
(PRE- DRILLING: Prior Mobilisation of Jack-up Rig to the drilling site)

Date : _____ Audit Area :

PROJECT ACTIVITIES		COMPLIANCES		AUDIT FINDINGS	REMARKS
		YES	NO		
1.0 RELEVANT PERMIT AND MANAGEMENT PLAN					
1.1	Notification of shipping routes and schedules of exploration drilling activities to ANP, relevant maritime authorities and fisheries department.				
1.2	Application and letter of approval for 500m exclusion zone to prevent unauthorized encroachment to the area.				
1.3	Environmental Management Plan for appraisal drilling in place?				
1.4	Oil Spill Contingency / Response Plan for appraisal drilling (for Jack-up Rig) in place?				
1.5	Established procedures for handling and disposal of wastes (conform to the requirements of MARPOL).				
1.6	Established procedures for Jack-up Rig positioning / deployment activities.				
1.7	Provision of pre-mobilisation HSE induction to every member of the project team SGBU and Party service Companies.				

1.8	Organisation chart for Environmental related matter): Roles and Responsibility identified				
PROJECT ACTIVITIES		**COMPLIANCES**		**AUDIT FINDINGS**	**REMARKS**
		YES	NO		
2.0 Jack-up Rig INSPECTION					
2.1	Inspection of biofouling of rig hulls/ legs.				
3.0 POLLUTION CONTROL EQUIPMENT OR STRUCTURE ON Jack-up Rig					
3.1	Provision of sewage treatment facility on the Jack-up Rig				
3.2	Provision of designated and proper area (bunded and sheltered) for storage of chemicals and hazardous materials.				
3.3	Provision of Shale shaker equipment on the Jack-up Rig.				
3.4	Provision of appropriate screen to the seawater intake, if any				
3.5	Separate drainage system for area with potential contamination sources.				
3.6	Provision of holding tank and oil water separator for treatment of water collected from the surface of Jack-up Rig.				
3.7	Provision of spill clean up kits including absorbents and containers for clean up of potential spills.				
3.8	Provision of grinder for treatment of food wastes.				
3.9	Provision of clearly marked skips for wastes				

	storage.				
3.10	Provision of sump for containment of potential oil leaks from machineries.				
3.11	Provision of geophysical site survey prior to rig movement and positioning at drill site				
3.12	Inspection conducted for all pollution control equipment?				

Recommendation of action follows inspection

No	Follow up action	Responsibility	Target date of completion

Inspected by : …….. Date: ……

Acknowledged by : …….. Date: ……

(DRILLING: During Drilling Activities at the drilling site)

Date :_____ Audit Area :

PROJECT ACTIVITIES		COMPLIANCES		AUDIT FINDINGS	REMARKS
		YES	NO		
1.0 Administration					
1.1	Records of worker employed on Jack-up Rig				
1.2	A copy of EIA including EMP provided on Jack-up Rig				
1.3	Periodic environmental awareness on Jack-up Rig (weekly / fortnightly briefing?)				
1.4	Relevant Environmental Policies on Jack-up Rig (eg. Wastes, Environmental discharges, etc)				
1.5	Conduct of the environmental monitoring program and reporting				
1.6	Waste Management Plan/System established on Jack-up Rig				
1.7	Oil Spill Contingency Plan for Jack-up Rig				
1.8	Records of Hazardous Material (Listing, MSDS, inventory)				
1.9	Records on work notification / communication with other mariners				
PROJECT ACTIVITIES		**COMPLIANCES**		**AUDIT FINDINGS**	**REMARKS**
		YES	NO		

1.10	Standard procedure for Jack-up Rig deployment and positioning at appraisal well location				
2.0 Marine Ecology Protection					
2.1	Marine protection measures for Jack-up Rig deployment.				
2.2	Designation of personnel for monitoring and records for marine mammal sighting, if any				
2.3	Lighting orientation and potential disturbance to the marine life				
2.4	Provision of water intake screen, should marine water intake for exploration drilling activities or Jack-up Rig antifouling purposes, if any				
3.0 Hazardous Material Handling & Storage Management					
3.1	Designate storage area and bunding facility on Jack-up Rig				
3.2	Labeling of the container, appropriate signages				
3.3	Standard handling procedure				
3.4	Sign of spillage and leakage at storage and work area				
3.5	Plan and procedures for spillage inspection				
3.6	Holding tank and oil water separator for treatment of surface water from Jack-up Rig				

3.7	Fuel consumption records and refueling activities (during daylight? Std procedure)				
4.0 Spill & Other Contingency Plan					
4.1	Refueling procedures in place				
PROJECT ACTIVITIES		**COMPLIANCES**		**AUDIT FINDINGS**	**REMARKS**
		YES	NO		
4.2	Availability of spill clean up kits on site				
4.3	Establishment of spill response team. Provision of training.				
4.4	Spill response drill				
4.5	Installation of Blow Out Preventer (BOP) on well? Periodic test and maintenance				
4.6	Periodical inspection of leakage from equipment's, pipes, valves, etc at work area				
5.0 Drilling Mud & Chemicals					
5.1	Drilling chemical (type, listing, quantity, MSDS, etc)				
5.2	Type of drilling mud employed on board (WBM/SBM)				
5.3	Log sheet of drilling mud and other chemical usage				
5.4	Onboard (Jack-up Rig) separation of drilling mud; shale shaker equipment / solid control equipment				
5.5	Reuse of drilling mud				

5.6	Cutting discharge via cutting caisson at depth of more than 15m				
5.7	Disposal of drilling fluids				
6.0 Jack-up Rig Discharge					
6.1	Provision of adequate drainage system on the Jack-up Rig oil water separator for discharge from area such as drilling area, hazardous material storage areas, etc				
6.2	O&G concentration in Rig deck discharge water < 9.2ppm by wet weight				
PROJECT ACTIVITIES		**COMPLIANCES**		**AUDIT FINDINGS**	**REMARKS**
		YES	NO		
6.3	Separate drainage for bilge waters from machinery spaces; O&G concentration in discharge water < 15ppm per IMO std.				
6.4	Depth of cooling water discharge, if any; verify with sea water temperature monitoring results				
6.5	Treatment of grey and black water and discharge (macerated to less than 25 mm diameter)				
6.6	Provision of sewage treatment on Jack-up Rig				
6.6	Inspection and maintenance program for drainage system, oil water separator and sewage treatment facility on Jack-up Rig				

7.0 Other Wastes					
7.1	Treatment of food waste by maceration prior to discharge to sea (grain size of food waste should be less than 25 mm diameter) or less per MARPOL requirement				
7.2	Waste management system, facilities and implementation on Jack-up Rig - domestic wastes - hazardous wastes - laboratory / clinical wastes, if any				
7.3	Records of waste generation and disposal - Sewage discharge - Food waste discharge - Garbage generation -Hazardous wastes generation				
PROJECT ACTIVITIES		**COMPLIANCES**		**AUDIT FINDINGS**	**REMARKS**
		YES	NO		
8.0 Air Emission Management					
8.1	General best environmental practices for air emission reduction				
8.2	Dark smoke from diesel fired machinery				
8.3	Installation of gas detection devices at machinery room				
8.4	Installation of combustion efficiency technology, etc, if any				
9.0 Environmental Emergency and mariner disturbance					

9.1	Lighting of Jack-up Rig for safety warning				
9.2	Signages / communication to mariners on the drilling activities				
10.0 Others					
10.1	Maintenance schedule and records for pollution control equipment: - Oil water separator - Shale shaker - Oil spill clean-up kit - Blow out preventer				
10.2	General housekeeping within the work area				
10.3	Any records on equipment lost overboard				
10.4	Is drilling and relevant equipment being inspected frequently to monitor if pollution occurring?				

Recommendation of action follows inspection

No	**Follow up action**	**Responsibility**	**Target date of completion**
1			
2			
3			

4			

Inspected by : … … … … … … … … … … … … .. Date: ……

( )

Acknowledged by : …… Date: ……

ENVIRONMENTAL AUDIT CHECKLIST FOR APPRAISAL DRILLING PROJECT

(POST DRILLING: Before Jack-up Rig Demob from the drilling site)

Date : …… Audit Area :

PROJECT ACTIVITIES		STATUS		RECOMMENDATION / RECTIFICATION	REMARKS
		YES	NO		
1.0 Administration					
1.1	Notification to relevant party on the proposed demobilization from the project site (Fishery Dept, other operator				
1.2	Records on marine mammal sighting, if any				
1.3	Drilling completion report				
1.4	Environmental incidents report, e.g. oil spill, etc, if any				
1.5	Completion of all environmental related monitoring program and records maintained and updated				
2.0 Site Demobilisation					
2.1	Plug and abandonment as per procedures				
2.4	Confirmation of plugging and and filling dump holes				
2.2	Well clean up programme completed				
2.3	Rig movement procedures and report				
3.0 Marine Ecological Measures					
3.1	Inspection and removal of biofouling on the rig's legs, (if required)				

4.0 Hazardous Material Handling					
PROJECT ACTIVITIES		**STATUS**		**RECOMMENDATION/ RECTIFICATION**	**REMARKS**
		YES	NO		
4.1	Records of total volume of hazardous material unused and in storage on Jack-up Rig - drilling chemicals - fuels				
4.2	Handling plan for the unused material				
5.0 Wastes					
5.1	Records of final waste volumes storage on Jack-up Rig to be disposed off on-shore : - Garbage - Hazardous solid wastes - Hazardous liquid wastes				
5.2	Wastes final disposal plan (type of waste & where is the final disposal site?)				
6.0 Safety and mariner disturbance					
6.1	Communication to mariners on the completion of drilling activities and rig movement activities				

Recommendation of action follows inspection			
No	Follow up action	Responsibility	Target date of compl etion

Inspected by : ..... Date: .....

Acknowledge by : ..... Date: .....