Limited Environmental and Social Impact Assessment (ESIA) for the 2D Seismic Exploration Program and the Exploration Drilling Program in the Coronie Area

Final Report


Report prepared for

Staatsolie Maatschappij Suriname N.V.

Paramaribo, 13 March 2024

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Abbreviations

AOI	Area of Interest (Staatsolie)
BO	Government Inspector (Bestuursopzichter)
CCU	Corporate Communication Upstream
CLA	Corporate Legal Affairs
CEP	Caribbean Environment Program
CR	Community Relations
CSR	Corporate Social Responsibility
DC	District Commissariat
DS	Districts Secretary (Districts Secretaris)
EA	Environmental Assessment
EBA	Endemic Bird Area
EFA	Environmental Framework Act
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMMP	Environmental Management and Monitoring Plan
ESIA	Environmental and Social Impact Assessment
EMP	Environmental Management Plan
EW	East West
GPS	Global Positioning System
HSE	Health, Safety and Environment.
HSEQ	Health Safety Environmental and Quality
HSSE	Health, Safety, Security and Environment
IBA	Important Bird Areas
IFC	International Finance Corporation
ILACO	ILACO Suriname N.V.
ITCZ	Inter-Tropical Convergence Zone
IUCN	International Union for Conservation of Nature
LBB	National Forestry Service (Dienst's Lands Bosbeheer)
LVV	Ministry of Agriculture, Animal Husbandry and Fisheries (Ministerie van Landbouw, Veeteelt en Visserij)
MAC	Maximum Allowable Concentration
MMSTB	Million Stock Tank Barrels
MOP	Meerjaren Ontwikkelings Plan- Multi Year Development Plan of Suriname
MUMA	Multiple Use Management Areas
NB	Nature Conservation Division (afdeling Natuurbeheer)
NBAP	National Biodiversity Action Plan

NBS	National Biodiversity Strategy
NCCR	National Coordination Centre for Disaster Management
NCD	Nature Conservation Division
N.E.	Northeast
NIMOS	National Institute for Environment & Development in Suriname
NMA	National Environment Authority
OW	Ministry of Public works (Ministerie van Openbare werken)
POC	Paradise Oil Company
PPE	Personal protective equipment
PPV	Peak Particle Velocity
PVC	Polyvinylchloride
QA/ QC	Quality Assurance/ Quality Control
ROM	Ministry of Spatial Planning and Environment (Ministerie van Ruimtelijke Ordening en Milieu)
S.B.	Staats Besluit
SEP	Stakeholder Engagement Plan
SHI	Staatsolie Hydrocarbon Institute N.V.
SSB	Surinaams Standaarden Bureau
Staatsolie	Staatsolie Maatschappij Suriname N.V.
S.W.	Southwest
SWM	Suriname Water Supply Company (Surinaamsche Waterleiding Maatschappij)
UNCBD	United Nations Convention on Biological Diversity
UNFCCC	United Nations Framework Convention on Climate Change
WB	World Bank
WBM	Water-Based drilling Mud
WHSRN	Western hemisphere shorebird Reserve Network

Executive Summary

This document presents the results of the limited Environmental and Social Impact Assessment for the 2D Seismic Exploration Program and the Exploration Drilling Program in the Coronie area.

This limited ESIA study has been conducted in accordance with national regulatory requirements (Milieu Raamwet S.B. 2020 no. 97/ Environmental Framework Act S.B. 2020 no. 97) and the guidelines of the National Institute for Environment and Development in Suriname (NIMOS, 2005 and NIMOS 2009), as well as international best practices.

The Staatsolie 2D Seismic Exploration Program and Exploration Drilling Program in the Coronie area have both been classified as Category B-path 2 projects by NIMOS. In consultation with NIMOS, it has been agreed that both projects can be consolidated into a single ESIA report. The ESIA study has been conducted according to the Scoping Report (ILACO, 24 July 2023) approved by NIMOS, which outlined the terms of reference for specialist studies, as well as the approach and methodologies. The ESIA study primarily involved a desk study, complemented by field surveys, measurements (water quality and noise), and stakeholder consultations. Furthermore, an ESIA public meeting was held on the 31st of October 2023 at the CCC building in Coronie, after submission of the draft ESIA report to NIMOS. All (relevant) comments received from NIMOS and stakeholders have been addressed in this final version of the report.

Conclusions drawn from this study include:
Environmental and social baseline
From the environmental baseline assessment, the following can be stated:

- The plantation area of Coronie falls with a narrow strip along the coast, which has drier conditions. The average rainfall in Coronie is lower compared to Paramaribo.
- The air quality in the study area is good as there are hardly any stationary sources and only few other larger sources of air emissions. Air pollution sources within the area are emissions from local traffic, farm activities and some small facilities with engines (such as generators).
- The highest noise levels were measured in the rural areas along the Oost-Westverbinding due to traffic with relative high speed. Noise levels measured along the Oost-Westverbinding near residents, exceeded the WHO/IFC daytime guideline value of 55 dBA for residential areas. The measurement conducted within the residential area in Totness (not along the Oost-Westverbinding) had a noise level of 49.1 dBA, which is below this guideline. This measurement is considered representative for the Coronie residential areas.
- Within the project area both brackish and freshwater wetlands are found. Water from the Coronie (freshwater) swamp is mainly discharged to the east towards the Coppename River, south to the Wayambo River, west to the Nickerie River and north towards the Atlantic Ocean. The northern swampwater of the Coronie swamp is discharged through drainage structures along the Oost-Westverbinding (culverts, sluices, canals). The area north of the Oost-Westverbinding, between Burnside and Moy, drains through ditches and canals into the canal along the Coronie Dijk. The canal along this dike has a sluice (at Totness) to discharge excess water towards the Atlantic Ocean. In the other areas, excess water drains towards the ocean predominantly through mass flow, some small creeks near the ocean and canals which have been dug towards the ocean.
- Based on water quality, four different ecosystems can be identified within the project area, namely brackish to saline coastal swamps, the plantation area with freshwater conditions (brackish water may be present), freshwater swamp and ombrogenous swamp. During the measurements in the freshwater swamp and coastal swamp, no visible contamination and no unnatural odors were observed.
- In the area at proposed drilling location CEP01 and CEP02 parwa forest (black mangrove) is encountered and at location CEP03, freshwater swamp forest. The proposed seismic lines run through open coastal swamps and mangroves, open to closed freshwater ecosystems and the plantation area with agricultural lands and low to high secondary vegetation.

From the socio-economic baseline assessment, the following can be stated:

- The District Coronie is predominantly characterized by extensive brackish and freshwater swamps. Habitation is only present along the Oost-Westverbinding with human activities mainly found in the plantation area (Ingikondre-Burnside) and at Coppenamepunt.
- The various economic activities in the district include agriculture (rice cultivation, horticulture, and livestock farming), beekeeping, fishery, and mining (shell and sand).
- The main concerns that were raised during the stakeholder consultations include: environmental and property damage, risk of coastal area flooding due to project activities, disruptions to the livelihoods of individuals engaged in agriculture and beekeeping within the project areas and, insufficient communication of Staatsolie.

Potential impacts and mitigation measures

The 2D Seismic Exploration Program

From the assessment of potential impacts from the 2D Seismic Exploration Program, there is one (1) impact with major significance which can be reduced to moderate after implementation of the proposed mitigation measures. Furthermore, there are four (4) impacts with a moderate significance, which can be effectively reduced to minor after implementation of the proposed mitigation measures. The other impacts are minor or negligible and one (1) is a positive impact is identified.

The table below presents a summary of the main identified impacts and the residual impact for the 2D seismic exploration activities.

2D Seismic Exploration Program

Component	Impact Description	Receptors	Significance	Residual impact
Reputation of Staatsolie and the Seismic contractor	Loss of social license to operate due to project activities.	Staatsolie/ Seismic contractor	Major	Moderate
	Income generation for local businesses and employment of local workers due to local purchasing of goods and services	Local community	Negligible	Minor
	Social conflicts and community health, safety, and security	Local community	Moderate	Minor
Nature conservation	Seismic survey activities in the MUMA's could damage the integrity and conditions of these areas	Nature conservation	Moderate	Minor
Mobilization and seismic survey	Occupational health and safety (attacks from wildlife such as bees, snakes, general swamp safety e.g. hydration, vector borne diseases (mosquitos), sunburn and other environmental hazards such as unstable ground, waterborne diseases, extreme weather conditions)	Staatsolie personnel and contractors	Moderate	Minor
Decommissioning and restoration	Upon completion of project activities, there is remaining damage to the property, or waste present	Landowners and local community	Moderate	Minor

For the Exploration Drilling Program, there is one (1) impact with major significance which can be reduced to moderate after implementation of the proposed mitigation measures. Further, there are seven (7) impacts with a moderate significance, which can be effectively reduced to minor after implementation of the proposed mitigation measures. The other impacts are minor or negligible and one

(1) is a positive impact is observed. The table below presents a summary of the main identified impacts and the residual impact for the exploration drilling activities.

Exploration Drilling Program

Component	Impact Description	Receptors	Significance	Residual impact
Reputation of Staatsolie	Loss of social license to operate due to project activities	Staatsolie	Major	Moderate
	Social conflicts incl. community health and safety and nuisance to receptors close to the drilling sites	Local community	Moderate	Minor
Employment and local economy	Income generation	Local community	Negligible	Minor
Surface water resources	Water pollution with spilled or leaked oil, grease, or fuel, or drilling liquid and completion fluid during drilling operation	Aquatic life, water users and landowners	Moderate	Minor
	Blockage of waterways and changes in hydrology and drainage due to construction of access roads and preparation of drilling site	Local community	Moderate	Minor
Ecosystem	Damage to ecosystem, loss of high swamp forest and vegetation in the MUMA's	Vegetation and wildlife	Moderate	Minor
	Nature conservation: activities in the MUMA's could damage the integrity and conditions of these areas	Nature conservation	Moderate	Minor
Land use	Potential property damage incl. impact on livelihood	Local community and landowners	Moderate	Minor
Occupational health and safety	Attacks from wildlife such as bees, snakes, general swamp safety e.g. hydration, vector borne diseases (mosquitos), sunburn and other environmental hazards such as unstable ground, waterborne diseases, extreme weather conditions	Staatsolie personnel and contractors	Moderate	Minor

Environmental Management and Monitoring Plan

The several mitigation measures, management and monitoring requirements, including responsibilities are included in an Environmental Management and Monitoring Plan (EMMP). The EMMP must be implemented as part of normal operations by effectively incorporating the key components into daily activities, such as including environmental issues in the decision-making process, carrying out operations in accordance with the standard procedures, and maintaining complete records.

1 Introduction

This document presents the findings of the Limited Environmental and Social Impact Assessment (ESIA) for the 2D Seismic Exploration Program and the Exploration Drilling Program in the Coronie Block.

1.1 General

One of Staatsolie Upstream Operation's strategic goals is to find new additional crude reserves to sustain the 6 million Stock Tank Barrels of oil (MMSTB) and feed the refinery after 2030. The goal of this project is to find at least 10 MMSTB of proved reserves by executing this program outside the proved boundaries of Staatsolie fields, the so-called heartland areas. In this regard in-depth geological, geophysical and some petro-physical studies have been carried out in the Coronie Block (visualized in **Figure 1**) to evaluate the hydrocarbon potential of the study area, but more data is required to acquire pertinent information trapping potential as well as the lateral extension of the identified leads.

As such, Staatsolie intends to carry out a 2D Seismic Exploration Program and a dryland Exploration Drilling Program in the Coronie Block. Five (5) seismic lines with a sum of ± 200 km will be surveyed for the seismic program and three (3) wells will be drilled for the exploration program.

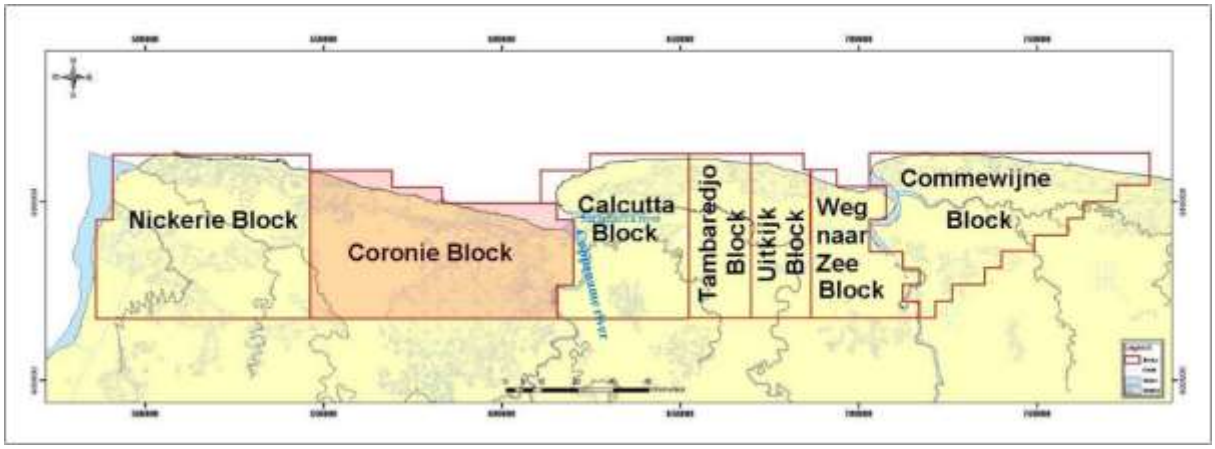

Figure 1: Overview map of the onshore concession blocks showing the Coronie Block highlighted in red.

This Limited ESIA study has been conducted in accordance with national regulatory requirements (the Milieu Raamwet S.B. 2020 no. 97/ Environmental Framework Act S.B. 2020 no. 97), the Generic Environmental Impact Assessment Guidelines of the National Institute for Environment and Development in Suriname (Nationaal Instituut voor Milieu en Ontwikkeling in Suriname - NIMOS) (NIMOS, 2009) and the Social Impact Assessment Guidelines of NIMOS, 2005. Additionally, it considers the Staatsolie Corporate Standards, including the Health Safety Environmental and Quality (HSEQ) Policy and Community Relations (CR) Policy, along with all relevant international standards, guidelines, and best practices from organizations such as the World Bank (WB) Group and the International Finance Corporation (IFC).

1.2 Project background and scope

The Staatsolie 2D Seismic Exploration Program and Exploration Drilling Program in the Coronie area have both been classified as Category B-path 2 projects by NIMOS, thus requiring limited ESIA's. In consultation with NIMOS, it has been agreed that both projects can be consolidated into a single ESIA report.

Previous ESIA studies conducted within the Coronie Block in 2008 and 2014, have been used for the current study, namely:

- Noordam & Teunissen, 2008. Preliminary Environmental Impact Assessment of the 2D seismic survey 2008 in the Coastal Plain in Suriname.
- Noordam & Teunissen, 2008. Preliminary Environmental Impact Assessment of Oil Exploration Activities in the Coronie Prospective Area in Suriname, update (December 2008).
- Noordam Environmental Consultancy, 2014. Limited Environmental and Social Impact Assessment for the Coronie Dryland Exploration Drilling Project.

The purpose and scope of this study are as follows:

- Describe the existing environmental and socio-economic conditions which may affect or be affected by the seismic or exploration drilling program.
- Identify and engage with relevant stakeholders regarding the current project activities.
- Identify, evaluate, update and/or amend the potential environmental and socio-economic impacts, both positive and negative, of the proposed project, and as presented in earlier ESIA reports and if required, make additional assessments.
- Propose, review and/or update mitigation measures for avoiding or minimizing adverse effects and measures that promote or enhance potential benefits.
- Compile a Limited ESIA report containing the outcomes of the above listed objectives and provide input for incorporation into the Environmental Management and Monitoring Plan (EMMP) of the project.
- Provide appropriate recommendations to ensure that appropriate measures for preventing or minimizing any adverse impacts during all the phases of project implementation are incorporated and establish an EMMP specifically tailored for the proposed project.

1.3 Project and study area

The project area of interest (AOI) for the 2D Seismic Exploration Program and Exploration Drilling Project is located in the Coronie Block, which is located east of the Nickerie Block, West of the Calcutta Block and is bordered by the Coppename River (**Figure 1**). The Coronie Block is divided into two parts (North and South) by the 'Oost-Westverbinding' which is a main public road connecting east and west Suriname (Noordam, 2014). The 2D seismic activities will be carried out in both parts of the concession area, mostly on dry land in the north and predominantly in swamp area in the south. The exploration drilling activities will be carried out in the north only, on dryland along the Oost-Westverbinding (see **Figure 2**).

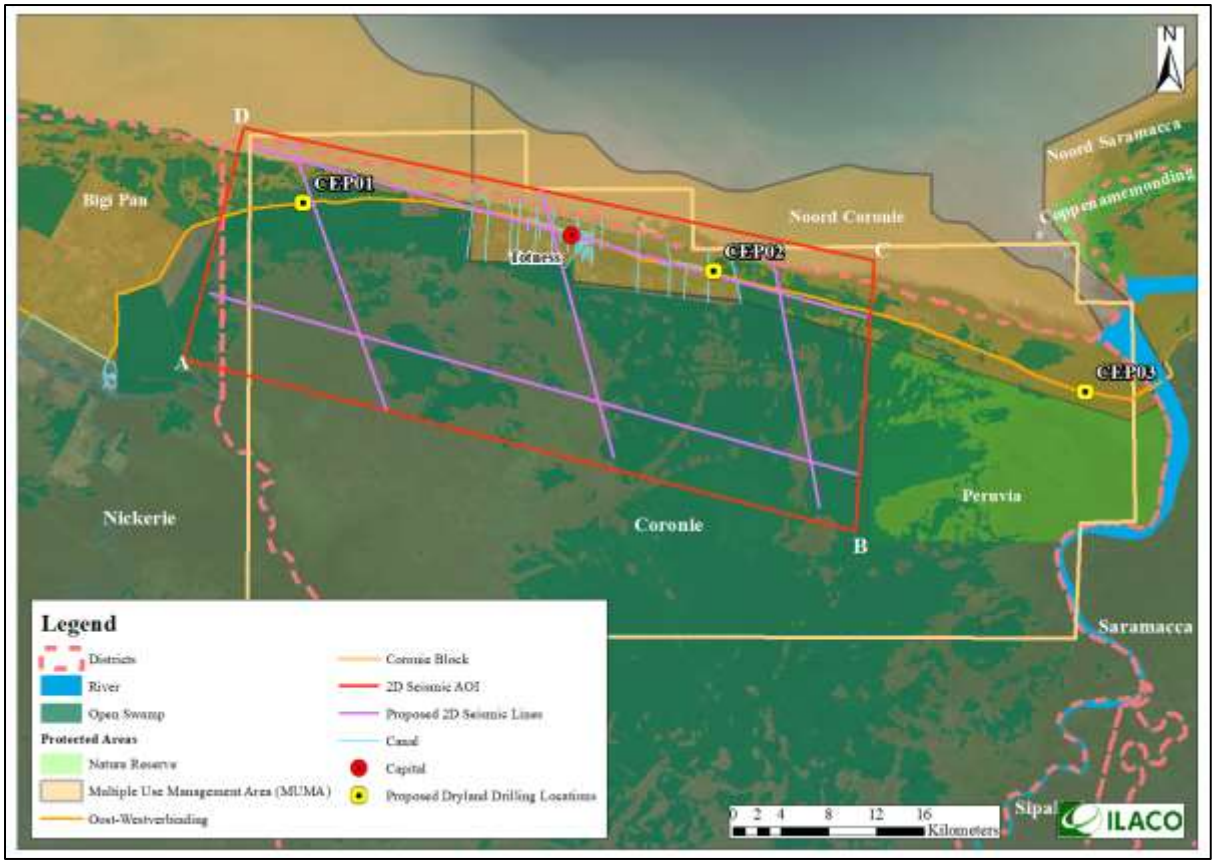

Figure 2: Overview proposed 2D seismic lines and dry land drilling locations

The ESIA study area for the current study includes the project area of interest (AOI/ the project footprint where the actual activities will take place), access routes, and their immediate surroundings where potential impacts may occur. For the environmental component's geology, soil, and ecology (including vegetation and wildlife, ecosystems, and habitat), the ESIA study area is identical to the project area, thus local. However, the effects on the components noise and water quality could extend beyond the boundaries of the project footprint. Also, the socio-economic environment is situated beyond the boundary of the project area. In summary, the ESIA study area can be considered nearly identical to the Coronie Block as shown in **Figure 2.**

1.4 Methodology

The ESIA process conform to the NIMOS guidelines has been followed. There are five phases in the ESIA process, namely Screening, Scoping, Environmental Assessment, NIMOS review and decision making and monitoring.

The Screening Phase of the Project was completed by Staatsolie and based on the screening report, the current project is classified as a Category B-path 2 project by NIMOS. As the previous ESIA's were conducted in 2008 and 2014 (older than 5 years), it was required by NIMOS to gather recent data for better representation of the baseline conditions.

After the screening, the Scoping phase was initiated, outlining the scope of the forthcoming ESIA process, the terms of reference for specialist studies, and the approach and methodologies to be employed in the ESIA process. A public scoping meeting took place on May 10, 2023, in the Coronie District. The scoping phase resulted in the final Scoping Report, submitted to NIMOS on July 27, 2023. By accepting the Scoping Report on July 31, 2023, NIMOS approved the impact assessment methodology and the methods used for gathering baseline data. The ESIA study was conducted primarily as a desk study, supplemented by field surveys, measurements (water quality and noise), and stakeholder consultations. Additionally, an ESIA public meeting was held on the 31st of October 2023, after submission of the draft ESIA report to NIMOS.

Baseline study
The environmental (biophysical) and socio-economic baseline studies have been conducted primarily as desk studies. This involved a review of existing ESIA studies from 2008 and 2014, as well as recent data from other studies (not older than five years). Additional data and information were collected during the execution of these baseline studies. For the biophysical environment, noise and water quality data were obtained through field measurements conducted during the long rainy season. In the social-economic study, consultation with key stakeholders and a resident survey were conducted.

Impact assessment
An assessment of the potential impacts has been conducted considering the project description of the seismic and drilling activities, the biophysical and social conditions. The methodology for the impact assessment is included in **Appendix 1**.

1.5 Team of Experts

ILACO Suriname N.V. (ILACO) has been awarded the contract to undertake the Limited ESIA for the Staatsolie 2D Seismic Exploration Program and the Exploration Drilling Program in the Coronie Block. The ESIA has been undertaken by a team of highly motivated experts with ample national and international experience and under conditions similar to the assignment. The team of experts is presented in the table below.

Table 1: Overview team of experts

ESIA Team	
Shareen Koenjbiharie B.Sc.	Team Leader/ ESIA Specialist
Marie Fortune B.Sc.	Dept. Team Leader/ Project Engineer
Dirk Noordam M.Sc.	Sr. ESIA Specialist/ QA&QC
Arshna Naigi B.Sc.	Stakeholder & Communication Specialist

2 Policy, Legal and Regulatory Framework

This section provides an overview of Suriname's environmental legislative and regulatory framework, with a specific focus on the proposed 2D Seismic Exploration Program and the Exploration Drilling Program. It encompasses Suriname's commitments as a signatory to international conventions and agreements, and emphasizes Staatsolie's Health, Safety, Environmental and Quality Policy and Communication Policy. Additionally, relevant international standards and procedures governing this type of activity are also addressed.

2.1 Policy

Multi Year Development Plan of Suriname 2021 – 2026 (MOP): The general objective of the development plan is to build and maintain a national economy that is free from foreign domination with the participation of the citizens, and from which citizens benefit. With regard to the onshore oil sector the MOP indicates ongoing on- and nearshore oil explorations as a strategic action point.

Environmental Policy Note - Ministry of Spatial Planning and Environment (ROM), September 2020: The Ministry of Spatial Planning and Environment was established in August 2020, after the elections. Its mission is to have a leading role in the development and implementation of policies to guarantee an environment that is spatially ordered and where health, well-being and sustainable development are central.

Policy priorities

- The main pillar of the Ministry of ROM's policy will be to bring both environmental policy and spatial planning policy closer to the general population. This is based on the realization that both spatial planning and environmental policy can only be successfully implemented if there is broad participation from society, driven by the conviction of each individual that this is not just about the well-being of one generation, but of the well-being and survival of humanity. Policy in these areas is still too much seen as an activity of academics and project professionals. In addition, the decentralization model as set out in the Environmental Framework Act will also be applied to spatial planning.
- A second important pillar of the policy will be to unlock mechanisms for the mobilization of development funds so that the benefits that Suriname's nature offers to the environment, combined with a dynamic policy to prevent any degradation of the environment, can be compensated with resources from more developed countries that have a huge carbon footprint due to industrialization.
- A third strategy in this respect is an intensive and higher-quality emphasis on Public Private Partnership, whether or not supported by international organizations that support this form of cooperation.

Within the policy note of ROM, emphasis is also placed on the environmental reform policy, wherein specific priority areas have been identified. These areas include:

- Waste management
- Regulation of industrial environmental pollution
- Operationalization of the Environmental Framework Act
- Provision of environmental information

Biodiversity Strategy (2006-2020) and National Biodiversity Action Plan (2012-2016): In 2006, the Government of Suriname adopted the Biodiversity Strategy (NBS), which outlines the country's vision and strategic directions for preserving and sustaining its diverse range of biological resources. The NBS aims to achieve the sustainable management of natural resources and promote the fair distribution of benefits derived from biodiversity-related services. Subsequently, in 2012, a National Biodiversity Action Plan (NBAP) was developed in accordance with the NBS. The NBAP seeks to translate the set objectives into tangible actions and assigns responsibility to specific entities for their implementation.

In 2022[1], the Ministry of ROM initiated an evaluation and possible update of Suriname's strategy for the sustainable management and conservation of biodiversity and the associated action plan. The finalization of the updated Strategy 2023-2030[2] is planned for October 2023.

2.2 National laws and regulations

The national laws and regulations that are relevant for this project are described in the section below, namely:

- Grondwet van de Republiek Suriname S.B. 1987 no.116 z.l.g bij S.B. 1992 no.38 (Constitution of the Republic of Suriname S.B. 1987 no. 116 as amended by S.B. 1992 no. 38).
- Milieu Raamwet S.B. 2020 no. 97 (Environmental Framework Act (EFA) S.B. 2020 no. 97).
- Petroleum-Related Legislation.
- Environmental-Related Legislation, and
- Occupational Health and Safety Legislation.

Constitution of the Republic of Suriname

The 'Grondwet van de Republiek Suriname S.B. 1987 no.116 z.l.g bij S.B. 1992 no.38 (Constitution of the Republic of Suriname S.B. 1987 no. 116 as amended by S.B. 1992 no. 38) serves as the primary law that governs all existing and forthcoming legislation in Suriname. Alongside various national acts, it contains provisions that are pertinent to environmental preservation and the management of natural resources, particularly concerning the petroleum sector.

The Constitution proclaims that natural riches and resources belong to the State, and the State has the right to take possession of these natural resources to use them for the benefit of Suriname's economic, social, and cultural development (Article 41). The State must also create and improve the necessary conditions to protect nature, and preserve the ecological balance. Moreover, Article 6g emphasizes the State's social objective to foster conditions necessary for nature protection and ecological balance. Ensuring the well-being of workers, Article 28 affirms the entitlement of all workers to have safe and healthy working conditions, and everyone has a right to health (Article 36). Lastly, Article 42 stipulates that the law must safeguard that trade and industry practices align with national objectives and the public interest, particularly concerning public order, health, morality, and state security.

Environmental Framework Act

In March 2020, the 'Milieu Raamwet S.B. 2020 no. 97 (Environmental Framework Act (EFA) S.B. 2020 no. 97)' was approved by the Parliament and published in the Gazette in May 2020. The EFA aims to protect and elevate sustainable management of the environment in Suriname. The Act establishes the National Environment Authority (NMA) as a statutory body responsible for the implementation and enforcement of this law. In July 2020, the institutional structure for environmental management changed with the change of Government. The structural change included the establishment of a Ministry for Spatial Planning and Environment (ROM). The Ministry of ROM aims to coordinate all environmental activities in the country. Legal positioning of the Ministry of ROM became a priority of the Government, and a formal working group was established for amending the Environmental Framework Act[3]. The amendment proposes the Ministry to become primarily responsible for coordinating Environmental Policy while the NIMOS is being transformed into the National Environmental Authority.

[1] https://gov.sr/rom-en-scf-gaan-samen-voor-behoud-biodiversiteit/

[2] Personal Communication with Ratna Kewal, Policy Officer Ministry ROM, 27 July 2023.

[3] The Draft law to amend the Environmental Framework Act is being addressed in the DNA

For the EFA to be operational, a set of subsidiary legislation needs to be promulgated, most of which is already in draft form (see below).

1. The *Duty of Care*, whereby every citizen has a general duty of care regarding the environment, including refraining from acts or omissions that have adverse consequences for the environment.
2. *Environmental and Social Impact Assessment*. Although the EIA process has been administered by NIMOS since 2005, with the promulgation of the EFA it becomes mandatory. EIA regulations have been drafted and will immediately take effect after its promulgation.
3. *Pollution and Standards*. Environmental norms and standards will be developed under the EFA. This will be executed through implementation regulations. This includes the application of environmental permits and the rehabilitation of affected areas. The pollution regulations standardize the determination of contaminants, Maximum Allowable Concentration (MAC) values for the release of contaminants, and procedures for the rehabilitation of contaminated areas. Pollution regulations have already been drafted. Staatsolie will have to apply for an environmental permit when these regulations are promulgated.
4. *Waste and Hazardous Substances and Emergency Plans*. The NMA will determine norms and procedures for handling of waste (collection, transportation, storage, and transfer) and may, among other things, prohibit the import or export of any waste. Furthermore, the NMA can prohibit hazardous substances or impose procedures for import, export, safe storage, handling, transport, use and disposal. These procedures are part of a permit for hazardous substances. Staatsolie will have to register its storage, handling, and transport of hazardous substances and apply for a hazardous substance permit when regulations are promulgated. Furthermore, the NMA is authorized to require an emergency response plan for the storage, use, and transportation of contaminants, waste, or hazardous substances. Staatsolie will be required to have a plan in place for management of waste and hazardous substances (This plan can be integrated into an emergency plan or kept separately).
5. *Environmental Audits.* The EFA provides for the establishment of guidelines and procedures for conducting an audit. These Guidelines had not been prepared as of this writing.

In anticipation of the approval of the above regulations, Staatsolie is committed to comply in line with these regulations. An overview of the regulations that will apply to the 2D seismic exploration and the exploration drilling activities in the Coronie area, are detailed in **Table 2**.

Table 2: Overview applicable regulations

Regulations	Compliance
Draft Implementation Regulations[4] under the Environmental Framework Act (S.B. 2020 no. 97)	
EIA Regulation The regulation gives an overview about the activities for which an EIA is or is not required. The list includes activities related to different kinds of projects and indicates to which category (A, B) they belong. According to the determined category, NIMOS (soon the NMA) shall decide whether the further execution of an EIA shall take place. The regulation further indicates that project activities that fall under Category C do not	Completion of the EIA process phases, viz. Screening, Scoping, Assessment, Review, Decision and monitoring and its requirements (see **Appendix 2**).

[4] Once the NMA is formalized (NIMOS transformed into NMA), and the relevant regulations are promulgated, the EIA and other environmental licensing processes will become paid processes. Project proponents will have to pay when applying for the EIA process and other permits under the Environmental Law, etc.

require an EIA but are still obliged to apply for an environmental license. The regulation provides a list with activities for which an EIA is required. The regulation sets further provisions regarding the determination of the scope of the required EIA, specifications for the qualification of persons to conduct an EIA, minimum requirements for the Environmental Impact Statement (EIS) including the submission and assessment of the EIS.	
Environmental Pollution This regulation lays down provisions concerning the prevention of environmental pollution by means of inter alia introducing a licensing system. For an effective monitoring of compliance with the provisions under or pursuant to the Environmental Act, the regulation also determines the pollutants, their values, quantities, and other technical details in connection with the measurability of environmental pollution. Regarding existing sources of pollution, it is obliged to register these sources at NIMOS. The regulations further provide provisions regarding spills and accidental releases.	1. Registration of existing sources of pollution. 2. Apply for an environmental permit for the release of contaminants. 3. Comply with the specifications in the environmental permit provided by NIMOS. 4. In case of leakage or accidental release: • Take immediate action to stop this leakage or release. • Take measures to repair damage to the environment. • Notify NIMOS of this event immediately and strictly follow instructions given by NIMOS.
Hazardous Substances The implementation regulation lays down provisions concerning hazardous substances to prevent environmental pollution by means of inter alia introducing a licensing system. For an effective monitoring of compliance with the provisions under or pursuant to the Environmental Framework Act, the regulation also determines the hazardous substances as well as the provisions concerning inter alia the license for the registration of such substances and their transport, storage, use, treatment, and disposal.	• Proof of Registration • Apply for permit. • Comply with the specifications in the permit provided by NIMOS. With regard to transportation: Bulk transport over land, water and in the air, are in accordance with good international industry practice and NIMOS can give instructions. Transportation is only allowed by authorized persons and vehicles. Notification obligation for transport to: Fire brigade; law enforcement; NIMOS; National Coordination Centre for Disaster Management (NCCR) or its district representative; Districts Commissioner Disposal: Apply environmentally friendly practices. Recycling and reuse in accordance with NIMOS permit. Emergency Response Plan: NIMOS can give the obligation to draw up an emergency response plan related to contaminants, waste, or hazardous substances. NIMOS approves the emergency response plan. Notification of NIMOS in case of contamination or accidental release of hazardous substance.

Act	Relevance
Petroleum-Related Legislation	
Petroleumwet 1990 S.B. 1991 no. 7 z.l.g. bij S.B. 2001 no. 58 (Petroleum Act 1990 S.B. 1981 no. 7 as amended by S.B. 2001 no. 58)	• Staatsolie is required to comply with the requirements of this Act.
Decreet Mijnbouw S.B. 1986 no. 28 z.l.g bij S.B. 2017 no. 41 (Mining Decree S.B. 1986 no. 28 as amended by S.B. 2017 no. 41	• The general provisions of the Mining Decree apply unless otherwise stipulated in special legislation such as the Petroleum Act
Decreet E8B S.B. 1981 no. 59 houdende machtiging tot verlening aan de Staatsolie Maatschappij N.V. van een vergunning voor het doen van onderzoek naar en van een concessie voor de ontginning van koolwaterstofvoorkomens (Decree E8B S.B. 1981 no. 59 authorising the granting to Staatsolie Maatschappij N.V. of a license to conduct research into and concessions for the exploitation of hydrocarbon deposits)	• A Permit to Staatsolie to conduct research into hydrocarbon deposits and a concession for the exploitation of the hydrocarbon deposits. • Staatsolie is required to comply with the rules for research and exploitation of hydrocarbons as stated in the Decree.
Besluit Mijnbouwinstallaties S.B. 1989 no.38 (State Order on Mining Installations S.B. 1989 No.38	• Specific elements of this State Order • (e.g., protection of the environment; traffic and transportation) will be applicable.
Presidentiele Resolutie van 11 juli 1993, No. 3051/93 ter verlening van de exploratie en exploitatierechten aan de Staatsolie Maatschappij betrekking hebbende op het deel van het zeegebied zoals aangegeven op de bijbehorende figuratieve kaart. Presidential Resolution of 11 July 1993, no. 3051/93 granting exploration and exploitation rights to the State Oil Company with regard to the part of the sea area as indicated on the safe figurative map.	• Staatsolie must ensure that all reasonable measures are in accordance with the petroleum industry's good oilfield practices, including a responsible system of water drainage and disposal of waste oil.
Environmental-Related Legislation	
Natuurbeschermingswet 1954, G.B. 1954 no. 26 z.l.g. bij S.B 1992 no. 80 (Nature Conservation Act 1954, G.B. 1954 no. 26 as amended by S.B. 1992 no. 80)	• There is a potential for impacts on coastal ecosystems from accidental spills associated with the proposed seismic survey program. In this context, the Act is germane to the conservation and protection of important or designated areas.
Ministeriele Beschikking betreffende de instelling van het Bigi Pan bijzonder beheersgebied S.B. 2002 no.34 (Ministerial Order to designate Bigi Pan as special management area S.B. 2002 no.34); Ministeriele Beschikking betreffende de instelling van het Noord Coronie beheersgebied S.B. 2002 no.87 (Ministerial Order to designate North Coronie as special management area S.B. 2002 no.87); and	• There is a potential for impacts on coastal ecosystems from accidental spills associated with the project. In this context, the Act is germane to the conservation and protection of important or designated areas. • The proposed project will need to minimize impacts to marine resources.
Jachtwet 1954 G.B. 1954 no. 25 z.l.g. bij S.B. 1997 no. 33 (Game Act 1954, G.B. 1954 no. 26 as lastly amended by S.B. 1997 no. 33). Jachtbesluit 2002 S.B.2002 no. 116 (Game State Order 2002 S.B. 2002 no. 116)	• Protection of species that can be affected by the project.

Wetboek van Strafrecht G.B. 1911 no.1 z.l.g bij S.B.2020 no. 42 (Penal Code G.B. 1911 no.1 as amended by S.B. 2020 no.42)	• All activities under the proposed project should avoid littering and water pollution but also air and soil.
Politie strafwet G.B. 1915 no. 77 z.l.g bij S.B. 1990 no. 24 (Police Criminal Act G.B. 1915 no. 77 as amended by S.B. 1990 no. 24)	
Occupational Health & Safety Legislation	
Arbeidswet G.B. 1963 no. 163 z.l.g. bij S.B. 2011 no. 71 (Labour Code G.B. 1963 no. 163 as amended by S.B. 2011 no.71)	• The labor regulations need to be complied with for the workers involved in the project.
Veiligheidswet 1947 G.B. 1947 no. 142, z.l.g. bij SB. 1980 no.116 (Occupational Safety and Health Act 1947 G.B. 1947 no. 142, as amended by SB. 1980 no.116)	• The project will be carried out in compliance with this Act concerning management and reporting of accidents.
Veiligheidsvoorschrift nr. 1, G.B. 1972 no. 95 (Safety regulation nr. 1, G.B. 1972 no. 95)	• To prevent or minimize injuries the proposed project should be carried out in compliance with the safety regulation.
Veiligheidsvoorschrift nr. 2, G.B. 1948 no. 104 (Safety regulation nr. 2, G.B. 1948 no. 104)	• Project activities must be carried out taking into consideration the regulations regarding hygiene.
Veiligheidsvoorschrift nr. 3, G.B. 1948 no. 183 (Safety regulation nr. 3, G.B. 1948 no. 183)	• To prevent or minimize injuries the project should be carried out in compliance with the safety regulation.
Veiligheidsvoorschrift nr. 4, G.B. 1948 no. 128; 1969, no 30 (Safety regulation nr. 4, G.B. 1948, no. 128; 1969, no. 30)	• To prevent or minimize injuries the project should be carried out in compliance with the safety regulation.
Veiligheidsvoorschrift nr. 7, S.B. 1981 no 72 (Safety regulation nr. 7, S.B. 1981 no. 72).	• In order to promote safe and comfortable working conditions, the project activities need to be implemented in compliance with this regulation.
Veiligheidsvoorschrift nr. 9, S.B. 1981 no. 74 (Safety regulation nr. 9, S.B. 1981 no. 74) (State Order harmful gases and vapors).	• This regulation is applicable if areas belonging to associated canteens, dressing rooms, or sleeping quarters are being set up where noxious and irritating gasses are released.
Ongevallenwet G.B. 1947 z.l.g. bij S.B. 2007 no.26 (Industrial Accidents Act G.B. 1947 as amended by S.B. 2007 no.26)	• The provisions of this Act and requirements thereto are applicable to the projects in case accidents or occupational diseases related to the project activities occur.

Waste management

Standard on Waste (developed by Surinaams Standaarden Bureau, SSB)

In the absence of legislation on waste management and awaiting the approval of the Draft Laws, the Ministry of Public Works, has requested the Surinaams Standaarden Bureau (Surinamese Standards Bureau; SSB) to develop a Standard on Waste. In response, the SSB initiated the process to set up the standard which contains (i) garbage collection and (ii) processing. Part 1 of the Standard has been finalized and was published on 23 January 2019.3 It covers household, medical, industrial, and bulky waste and provides a procedure for packaging, offer and pickup, including frequency of pickup. It is recommended that this standard is followed for waste management activities related to the project.

2.3 International conventions, agreements, and guidelines

Suriname has become a signatory to various international agreements and conventions that focus on environmental management and occupational health and safety. These conventions typically necessitate governmental involvement in implementing legal and administrative measures. Below is a

comprehensive compilation of the relevant Conventions pertinent to the proposed 2D seismic exploration and the exploration drilling program.

- ***United Nations Convention on Biological Diversity (CBD)*** - In June 1992, Suriname officially signed the Convention on Biological Diversity (CBD) and later ratified it on 12 January 1996. The CBD's main objectives revolve around the preservation of biological diversity, sustainable utilization of its components, and the equitable sharing of benefits derived from these valuable resources.

- ***Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Western Hemisphere Convention)*** - In 1985, Suriname ratified the Western Hemisphere Convention. The primary objectives of this convention are twofold: to safeguard all species and genera of native fauna and flora from the threat of extinction and to preserve areas of exceptional beauty, remarkable geological formations, or those possessing aesthetic, historical, or scientific significance. The Coppename-monding Nature Reserve is a Western hemisphere shorebird Reserve Network (WHSRN) site, which is situated at least 18 km from the nearest drilling well. No impacts are expected for the nature reserve. The Bigi Pan MUMA, in which proposed drilling well CEPO1 and part of two (2) seismic lines is situated, is also a WHSRN site.

- ***Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat***- on 22 November 1985, Suriname became a party to the Convention on Wetlands, widely known as the Ramsar Convention. Functioning as an intergovernmental treaty, the Ramsar Convention establishes a comprehensive framework for national and international efforts towards the conservation and sustainable use of wetlands and their resources. Suriname has one site designated as a Wetland of International Importance – the Coppenamemonding wetland. This expansive wetland complex, covering an area of 12,000 hectares, lies along the Saramacca coastline and stands as an exemplary representation of natural or near-natural wetland habitats. The Coppename-monding Nature Reserve is a Ramsar site. However, this area is minimal 18 km from the nearest drilling well and no impacts are expected. The Bigi Pan MUMA, in which the proposed drilling well CEPO1 and part of two (2) seismic lines is situated in a proposed Ramsar site.

- ***United Nations Framework Convention on Climate Change (UNFCCC)*** - On 14 October 1997, Suriname ratified the United Nations Framework Convention on Climate Change (UNFCCC). The primary objective of the UNFCCC is to stabilize greenhouse gas emissions in the atmosphere at a level that ensures dangerous human-induced interference with the climate system is avoided. This target must be achieved within a specific timeframe to allow ecosystems to naturally adapt to climate changes, safeguard food production, and promote sustainable economic development. The UNFCCC establishes international guidelines to limit greenhouse gas emissions and combat climate change. Combustion of fuel will contribute to greenhouse gases, which will need to be recorded and reported.

- ***Paris Agreement*** - In 2016, Suriname acceded to the Paris Agreement, an international accord linked to the UNFCCC (United Nations Framework Convention on Climate Change). The agreement commits its participating countries to promote the mitigation of greenhouse gas emissions while fostering sustainable development. Under the Paris Agreement, Suriname is obligated to regulate and control greenhouse gas emissions within its territory. To comply with the requirements of the Paris Agreement, the proposed project must implement measures aimed at reducing and reporting emissions from e.g., vehicles and equipment.

- ***The Stockholm Convention on Persistent Organic Pollutants; POP's Stockholm*** – This Convention deals with water and air pollution as well as waste management. Suriname ratified the Stockholm Convention in 2011. The proposed project activities will generate waste that

may be incinerated and can cause emissions of persistent organic pollutants. Inspection of waste management facilities to ensure compliance with incinerator standards will be necessary to eliminate persistent organic pollutants in accordance with this Convention.

- ***The Vienna Convention for the Protection of the Ozone Layer*** – Suriname acceded to the Vienna Convention for the Protection of the Ozone Layer in 1997, which relates to the protection of air quality and climate. The Convention sets international standards for protection of the ozone layer by phasing out the use of stratospheric ozone depleting chemicals, chiefly chlorofluorocarbons (CFCs), halons, and carbon tetrachloride, of relevance to some mining endeavors. The project will need to comply with requirements to reduce or eliminate ozone-depleting substances (e.g., certain types of refrigerants).

Suriname is also preparing to accede to the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena Convention) and its Protocols (oil spills, specially protected areas and wildlife and land-based sources of pollution). Suriname is also an official team member of the Caribbean Environment Program (CEP).

2.4 Institutional Framework

Several institutional stakeholders play a role in the context of environmental management in Suriname. In this section, only the primary institutions and their relevance to the project are presented. The functions of these stakeholders are summarized in **Table 3**.

Table 3: Relevant actors and their relevance to the project

Relevant Stakeholder	Role/ Relevance to project
Ministerie van Ruimtelijke Ordening en Milieu, ROM Ministry of Spatial Planning and Environment	The Ministry of Spatial Planning and Environment is responsible for proper spatial planning and must do this in consultation with relevant ministries and institutes and coordinate national policy for spatial planning. In addition, the ministry is also charged with ensuring compliance with statutory regulations with regard to spatial planning and the environment, if necessary, in an interdepartmental context. In accordance with its mission statement, the Ministry of Spatial planning and Environment is also responsible for coordinating and monitoring the implementation of national environmental policy, in collaboration with relevant ministries and agencies. The Ministry is further responsible for developing and maintaining cooperation mechanisms and partnerships in order to meet national and international environmental obligations in an efficient and effective manner.
Nationaal Instituut voor Milieu en Ontwikkeling in Suriname National Institute for Environment and Development in Suriname (NIMOS) in transition to become NMA	With the promulgation of the Milieu Raamwet S.B. 2020 no. 97 (Environmental Framework Act S.B. 2020 no. 97) the National Institute for Environment and Development (NIMOS) will be transformed into the National Environmental Authority (NMA). The NMA will be responsible for administering the Environmental Impact Assessment process and Pollution Control.
Ministerie van Natuurlijke Hulpbronnen Ministry of Natural Resources	Responsible for policy direction, legislation, issuance of permits, budget allocation and inter-ministerial coordination, and for all matters relating to natural resources (not fisheries). Supporting agency to NIMOS in the approval process for a project associated with exploitation of natural resources.

Directoraat Visserij van het Ministerie van Landbouw, Veeteelt en Visserij Fisheries Department of the Ministry of Agriculture Animal Husbandry and Fisheries	The Ministry of LVV is responsible for the maintenance of the waterways, roads and water structures on agricultural lands that are located between the East-West connection road and the swamp-retaining dam.
Ministerie van Grondbeleid en Bosbeheer Ministry of Land Policy and Forest Management	The Ministry of Land Policy and Forest Management is responsible for nature management with regards to the protected areas. Not directly involved in project approval and management. Can become a key stakeholder in situations where project activities can affect biodiversity.
Dienst 's Lands Bosbeheer en Afdeling Natuurbeheer Suriname Forest Service (Landsbosbeheer, LBB) and Nature Conservation Division of the National Forest Service (NB)	The Suriname Forest Service is part of the Ministry of Land Policy and Forest Management and is responsible for management of nature reserves established under the Nature Conservation Act 1954. This task is being delegated to the Nature Conservation Division (NCD). Not directly involved in project approval and management. The NCD supports the Ministry of Land Policy and Forest Management in law enforcement and management with regards to conservation, nature reserves and wildlife. The NCD is responsible for the day-to-day management of protected areas in Suriname. The NCD is also responsible for wildlife protection. Can become a key stakeholder in situations where project activities can affect protected species and areas in the coastal area.
Ministerie van Arbeid Werkgelegenheid & Jeugdzaken Ministry of Labor, Employment and Youth Affairs	Development and safeguarding of the labor market. Regulatory responsibility for specifying safety conditions for projects of this nature and for receiving and investigating safety-related incidents as necessary. Regulation of permits required for labor or work by foreigners. The Project will be accomplished in accordance with all applicable Surinamese health and safety regulations.
Ministerie van Volksgezondheid Ministry of Public Health	Responsible for environmental health management, such as control of infectious disease, food and drinking water quality, sanitation, and disposal of industrial waste in collaboration with other relevant institutions.
Ministerie van Openbare Werken Ministry of Public Works	Policy, planning and development of general architectural structure, and other civil engineering infrastructure in the public interest; Flood control and drainage; Technical provisions for traffic and public transport. The Ministry of Public Works‟ responsibilities are the management of all main waterways, roads, bridges, sluices etc. north of the East West connection, from the sluices to the Atlantic Ocean.
Ministerie van Regionale Ontwikkeling en Sport Ministry of Regional Development and Sport	One of the tasks on regional level is to develop administrative procedures to promote participation in decision-making at the level of districts. Furthermore, the DC gives authorization for transport if the road will be occupied more than usually.
Nationaal Coördinatie Centrum voor Rampenbeheersing National Coordination Centre for Disaster Management (NCCR)	A division of the Ministry of Defense that develops national policies on disaster management through coordination and prevention of potential threats and disasters. Supporting agency to NIMOS in the approval process for a project of this nature. Can become a key stakeholder in situations involving accidental spills or other project-related emergencies.

Staatsolie Maatschappij Suriname N.V State Oil Company Suriname (Staatsolie Maatschappij Suriname N.V)	Develop Suriname's hydrocarbon potential over the full value chain, to generate electricity, and to develop renewable sustainable energy resources. Assessment of hydrocarbon potential, promotion, contracting, and monitoring activities of other oil companies on behalf of the State.
Staatsolie Hydrocarbon Institute N.V. (SHI)	Since its establishment in December 1980, Staatsolie has acted as the state vehicle through which the government oil policy was executed and whereby foreign companies could only explore for and produce oil through service contracts with Staatsolie. The regulator's role was further developed through the establishment of the Petroleum Contracts division in 2000, followed by the establishment of SHI in 2020. SHI is an agent of the Government of the Republic of Suriname and performs a regulatory role for the exploration and drilling activity (exploration and production);

2.5 International Standards and Guidelines

Currently, Suriname lacks national effluent or emission standards. However, Staatsolie will ensure adherence to relevant international standards and guidelines, as well as explicit environmental protection principles and criteria outlined in Suriname's legislation. Where national legislation, standards or guidelines are lacking, international standards like the IFC and World Bank standards are applied.

For the current project, the IFC Environmental, Health and Safety (EHS) Guidelines[5] developed for Onshore Oil and Gas Development are used in the absence of national legislation.

The EHS Guidelines for Onshore Oil and Gas Development include information relevant to the management of EHS issues. The environmental issues associated with onshore oil and gas projects include noise and vibration, air quality, solid waste, hazardous materials, and wastewater discharges. The associated occupational Health and Safety issues include fire and explosion, air quality, hazardous materials, well-blowout, etc., The EHS Guidelines recommend several prevention and control measures which, if applicable, are included in the Environmental Management and Monitoring Plan (EMMP) as part of this study.

Noise guidelines

In the absence of specific national guidelines for noise levels, the international standards WHO/IFC for community- based noise limits, also used by NIMOS, are applied. The noise levels should not exceed the levels presented in **Table 4**, or result in a maximum increase in background levels of 3 dB (A) at the nearest receptor location.

Table 4: Noise Level Guidelines (World Bank/IFC guidelines)

Receptor	Maximum Allowable Ambient Noise Levels 1-hour LAeq (dB(A))	
	Daytime 07:00-22:00	Nighttime 22:00-07:00
Residential; institutional; educational	55	45
Industrial; commercial	70	70
Note: No LAeq values are conditioned for rural areas		

2.6 Staatsolie's Health, Safety, Environmental and Quality Policy

The Health, Safety, Environmental and Quality (HSEQ) Policy is a paramount framework that lies at the core of any responsible and forward-thinking organization. By instilling a collective sense of responsibility, this policy aligns the organization's objectives with the principles of health, safety, environmental sustainability, and quality assurance, thereby ensuring a harmonious and sustainable

[5] https://www.ifc.org/content/dam/ifc/doc/2000/2007-onshore-oil-gas-development-ehs-guidelines-en.pdf

future for all stakeholders involved. This ESIA is intended to ensure Staatsolie's compliance with its Corporate Social Responsibility (CSR) and HSEQ policies and commitments and Suriname's environmental laws.

Corporate Requirements

Staatsolie has adopted procedures for protecting the environment which comply with international standards. An integrated Health, Safety, Environment and Quality (HSEQ) Policy and Management System is implemented across Staatsolie's operations to monitor effects on the health and safety of employees, contractors and affected communities, as well as impacts on the environment.

The Staatsolie's Health, Safety, Environmental and Quality Policy and its commitment to health and safety for its employees, contractors, community, and environment is included in **Appendix 3**.

3 Project Description

3.1 Introduction

As described in Chapter 1, Staatsolie intends to carry out a 2D Seismic Exploration Program and Exploration Drilling Program in the Coronie Block.
In the past seismic activities have already been executed in the project area. In **Figure 3,** the regional 2D seismic lines of the previous seismic activities are expressed in blue. Further, between 1969 and 1970, drilling activities have been conducted in the project area by Shell Suriname E.P.M. Two (2) dryland exploration wells were drilled in the north of Coronie, respectively TN-1 and BNS-1. In addition, eight (8) wells (COR01 – COR08) were drilled in the swampy southern area of Coronie (see **Figure 3)** by Paradise Oil Company (POC), which was 100% subsidiary of Staatsolie.

3.2 Project Justification

In its effort to sustain its oil production, Staatsolie is continuously searching for additional oil reserves. Currently Staatsolie has a daily onshore production of 17,000 Barrels. In this capacity, the Coronie East Area has been identified as one of the remaining onshore areas of interest with potential for oil exploration by means of 2D seismic acquisition and exploration drilling.

To evaluate the hydrocarbon potential of the study area more data is required to acquire pertinent information trapping potential as well as the lateral extension of the identified leads.

3.3 The 2D Seismic Exploration Program

3.3.1 Purpose

The purpose of the 2D Seismic Exploration Program is to develop an integrated subsurface structural and sedimentological model with the available well and the acquired seismic data to better understand the erratically deposited fluvial to deltaic sands in the Coronie Block and its hydrocarbon potential.

The proposed 2D seismic survey has the following objectives:

- Confirm the presence of several Fault systems, trending SW-NE in the Coronie Block, and other structures such as subtle highs and lows.
- Review the structural configuration of the T Unit in the Coronie Block
- Investigate the presence of potential Paleocene and other reservoir bodies in the Coronie Block

3.3.2 Project site

The outline for the proposed 2D seismic survey in dryland and swamp area, is represented by an area of interest (AOI) with points A to D. The coordinates are presented in the **Table 5**. The 2D seismic data will be gathered along five (5) seismic lines, indicated with the lines 1-2, 3-4 (W-E lines), 5-6, 7-8 and 9-10 (N-S lines). The AOI as well as the 2D seismic design is outlined in **Figure 3**.

Table 5: Coordination AOI seismic survey

Point	X-Coordinate	Y-Coordinate
A	542106.90	637585.85
B	598832.49	625087.52
C	598979.49	649186.74
D	544332.08	659164.31

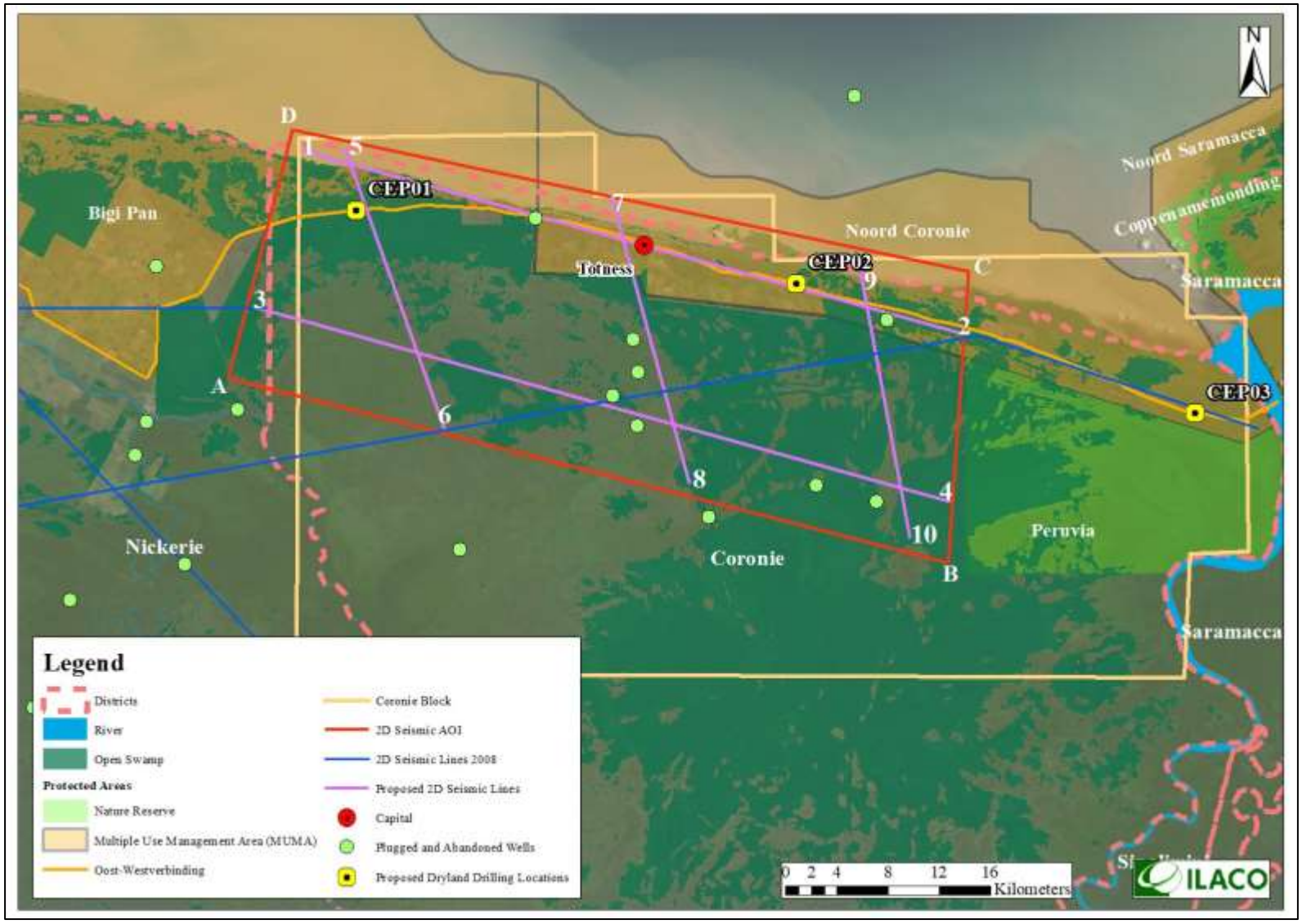

Figure 3: Overview of the previous seismic and drilling location, current AOI and planned seismic lines

It can be stated that the intended AOI is on mostly dry land in the north and predominantly in swamp area in the south. The area in the north (dryland) can be reached by vehicle, while the area in the south is overall marshy (swamp) and can only be reached by watercrafts such as boats or airboats through existing trail (**Figure 4**). Some lines will likely pass through forested environments.

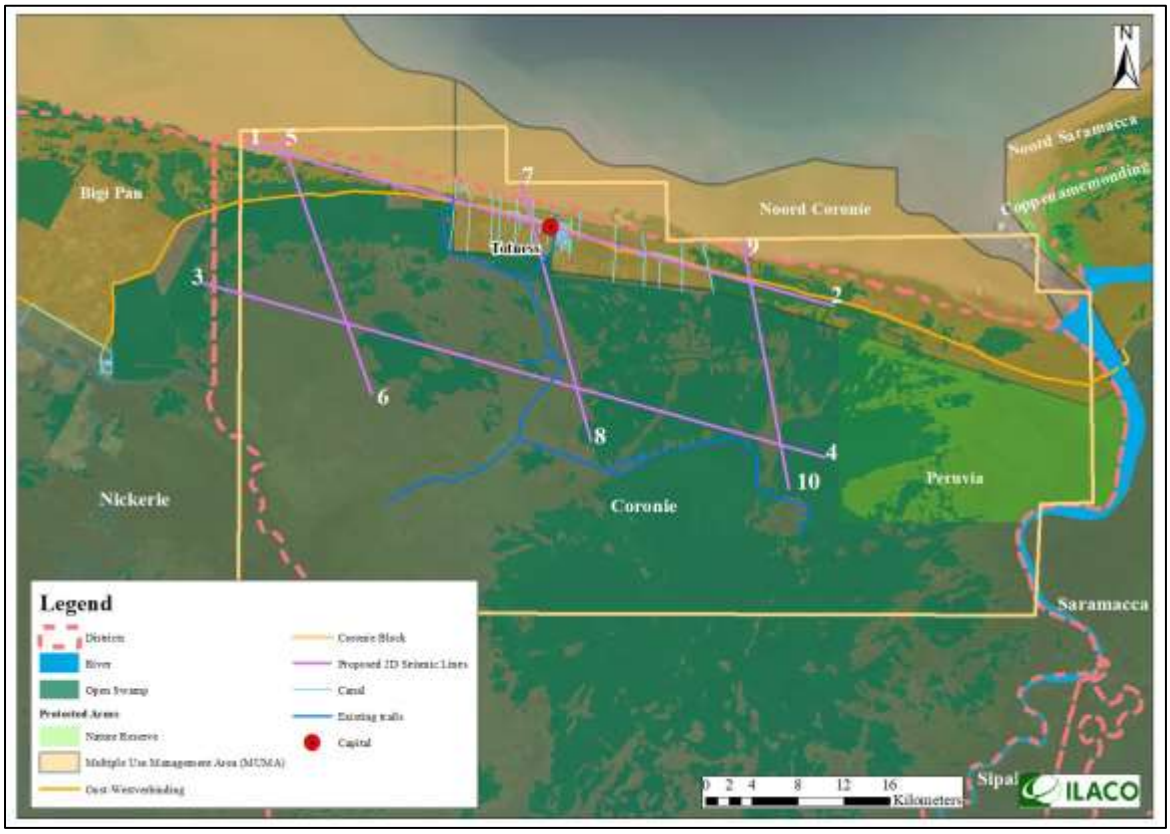

Figure 4: Overview of the existing waterways within the project area

3.3.3 Project planning

Gathering of seismic data requires mobilization to the project area, clearance of grid lines (North-South and West-East), drilling of shot holes, signal generation with explosives, recording and abandonment of lines.

For the execution of the seismic survey, the following will be conducted:

- The locations of the seismic survey will be accessed using existing infrastructure, such as the main road, as much as possible, and also existing waterways (indicated with the blue lines in **Figure 5**) to lay out the source and receivers to acquire the intended seismic data. In case new access pathways are constructed, the vegetation clearance for the gridlines will be done as minimal as possible. Access routes and trails will be one to two meters (1-2 m) wide. In this project line cutting in the swamp by surveyors is inevitable to access areas where acquisition will take place.
- Small seismic explosives will be used to generate the seismic signal. Geophones and marsh phones can be used for receivers. However, other options are not excluded.
- The project will start in the swamp where Pick-up point 2 (PP2) is located (see **Figure 5**). From there the contractor will go through the existing waterways in zodiacs or wooden boats to the starting point on line 1. From there they will do the line cutting and acquisition in 2 groups. 1 group will go to the North and the other to the south. After line 1 is finished they will carry on to line 2 (E-W line) also with 2 groups. The next route will be line 3 to the West and then line 4 (east). When they have finished the lines in the swamp, seismic line 5, which is mostly on land, will follow. The only different equipment they will use or geophones instead of hydrophones (swamp equipment).

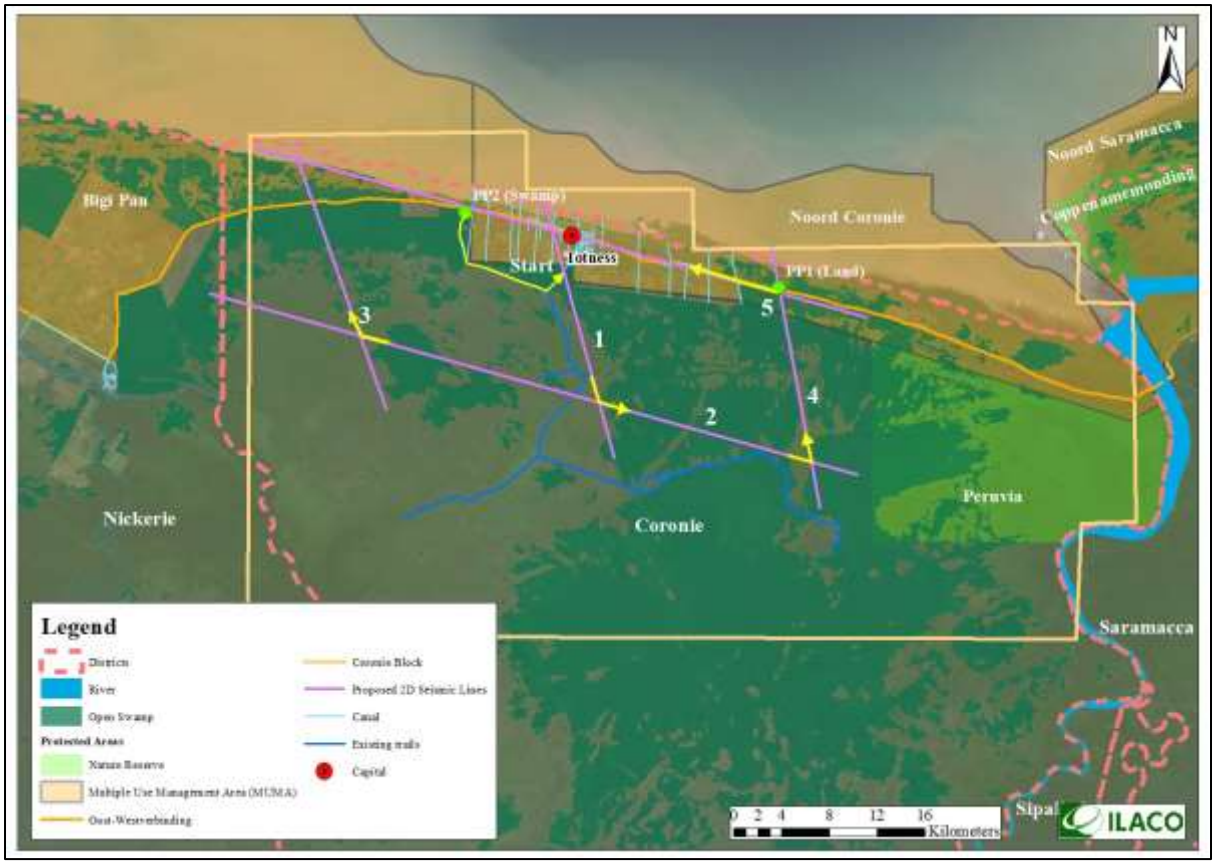

Figure 5: Overview map of the workplan through the swamp (lines 1-4) and land (line 5).

3.3.4 Project activities

The seismic survey comprises the following project activities that will incorporate any necessary measures and controls as deemed fit to manage any potential health, safety, environmental or community related impacts:

- Planning and preparation.
- Mobilization to the project area.
- Reconnaissance/ survey.
- Line clearing and marking.
- Drilling of shot holes and loading of the seismic explosive.
- Shooting and recording.
- Abandonment of lines.
- Inspection and closure; and
- Restoration.

A contractor will be hired for the execution of this project.

Planning and preparation

Considering the potential overlap of the project area with private land, it will be necessary to determine or confirm landownership in part of the seismic block during the planning and preparation phase. Following proper consultation with identified landowners, before the start of the project, a land use agreement (contract) will be signed with the landowners.

Mobilization to the project area

Before the start of the fieldwork, the Contractor will determine the best (safest, and fit for purpose) methodology and routes for importing and transporting equipment from Saramacca (storage facility of the contractor) to the project site.

Transport and Trails
The contractor will use their own equipment which will be placed in the swamp and retrieved after the data acquisition.

To execute the seismic program, existing overgrown trails will be cleared and approximately 200km of small new trails with a width of 2 m will be opened (if necessary) by machetes in the swamp.

Small wooden boats will be used in the swamp while placing the acquisition equipment. This is to guarantee the safety of the equipment but also for the personnel. The processing and recording unit will be placed nearby on a dryland spot. A logistic plan will be worked on after the contractor is hired.

Reconnaissance/survey
In preparation for the field program, a reconnaissance/survey will be carried out to identify access routes. Within the wetland area, the existing waterways will be used and within the polder area existing roads and dams will be used.

Actual line and shooting locations will take the following into account:
- Power, water, and telephone lines.
- Radio, television, and radar transmitters.
- Holes or pits.
- Fences.
- Animals or insects (such as bees).
- Hunting zones.
- Houses and other building constructions.
- Wells; and
- Other potential natural or manmade obstacles or hazards.

Line clearing and marking
Within the seismic area, a grid of lines will be cleared with North-South running shot (source) lines and East-West running receiver lines. Line clearance entails hand clearing of the natural vegetation along the lines. No large trees will be felled, only low growth and shrubbery cleared to allow walking along a narrow path. Machetes and small chainsaws will be used. To ensure that the clearance crew remains within the pre-plot versus post-plot tolerances, regular positional control will be provided via GPS methods. The shot points and receiver locations along the lines will be marked. Line clearance and shot/receiver point marking will be done at the same time.

Drilling of shot holes and loading of the seismic explosive
After the clearance crew has built up sufficient lead, the drilling crew moves along the cleared path and will drill the shot holes to a maximum depth of 20 meters (actual depth yet to be determined) and load them with explosives. The source point interval is 10, 20, 30 or 40 meters apart (yet to be determined). The drilling equipment (which is not heavy and can easily be dismantled) that will be utilized for this activity, will be portable motorized drilling units that can be transported by truck, airboat and/or man portable operations.

Specially trained crewmembers will handle and load the explosives. Loading will be done via PVC pipes and as soon as possible after drilling, to prevent the shot holes from collapsing. After that, the shot holes are closed again and clearly marked. The shooting source is 100 grams of seismic explosives that will be loaded into each shot hole. These explosives will be primed with seismic detonators.

Shooting and recording
The drilling crew will be followed by the recording crew to deploy the phones. The recording line equipment will be laid out by manpower, with marsh geophones placed at 4-meter intervals (actual interval yet to be determined). After sufficient spread has been deployed, the “shooting” crew will detonate the explosives. For safety reasons, in inhabited areas the shooting will be done as soon as

possible following drilling and placement of explosives. In easily accessible areas, the recording unit is mounted on a truck, while a portable recording cabin will be available for less accessible areas. Recording progress is estimated to be approximately 0.6 km per day.

The shooting will produce a noise of which the level is such that it is hardly audible at the surface and vibrations are only felt near the shooting location, producing a brief and faint trembling, comparable to one produced by the passage of a truck.

Shooting is not expected to result in any surface cratering, because the charge size is very small and the shot hole relatively deep. Should, for now unknown reasons (e.g., soil characteristics), cratering be expected, the holes can be drilled deeper.

Decommissioning of lines and natural Restoration
In the decommissioning phase of the project, the cables, receivers, and waste material from the sources will be removed and the surface will be left as clean as possible. The processing unit will also be removed. The project area will be abandoned and left without any obstacles. Afterwards a close out inspection will be carried out by representatives of HSSE, CCU department, the project manager, and the respective landowners to validate proper clean-up and closure.

Natural Restoration
All the utilized waterways that have been opened will grow closed again in a natural way.

3.3.5 Time Planning

The plan is to acquire approximately 200 km 2D seismic data with the use of land and swamp acquisition method. The data acquisition will be performed in alignment with the available permits and the start of the 2D seismic acquisition is aimed at Q4 2024 and will last approximately 6 months. An overview of the planning is indicated in **Table 6**.

Table 6: Planning of the 2D seismic Exploration Coronie Project is as follow:

Phase 1		
Activities	**Timeline**	
Project planning and preparation (including consultations with landowners)	6 weeks	Mid-November 2024
Scouting and mobilization to the project area	4 weeks	January 2025
Reconnaissance/ survey	4 weeks	February 2025 March 2025
Line clearing and marking (North-South and West-East)	4 weeks	March 2025 – April 2025
Drilling of shot holes and loading of the seismic explosive	1.5 Month	April 2025 – Mid- May 2025
Shooting and recording	4 weeks	Mid-May – Mid- June 2025
Abandonment of lines, inspection, and closure	1 weeks	End -June 2025
Restoration and finalization project	2 weeks	Mid -July 2025

3.3.6 Equipment and manpower input

The table below provides an overview of the equipment that will be used for the various project activities. In addition, an overview of required personnel is presented.

Table 7: Information on planned resources for this project

Equipment	#	Deployment	Activity	Personnel
CONSTRUCTION & ACQUISITION				
Line cutting and surveying material	2	Daily-workdays	Personnel transport and monitoring/ machetes and transportation vehicles will be used	15
Lay out / deploy equipment	1	Daily-workdays	Personnel transport and monitoring, transportation of survey equipment and personnel	15
Recording	1	Daily-workdays	Deployment of recording equipment, recording and quality control	2
DECOMISSIONING PHASE				
Inspection for abandonment	2	Final workday	Inspection of abandoned worksites and closure	3

3.4 Exploration Drilling Program

3.4.1 Purpose

The purpose of the Exploration Drilling Program is to test the geological concepts identified during the geological technical evaluation. Furthermore, to develop an integrated subsurface structural and sedimentological model with the drilling results in order to better understand the erratically deposited fluvial to deltaic sands in the Coronie Block and its hydrocarbon potential.
Drilling the proposed well locations have the following objectives:

- To test the geological features identified by the conceptual model as well the structures such as subtle highs and lows.
- Review the hydrocarbon potential in the North.
- Investigating the presence of potential Paleocene and other reservoir bodies in the Coronie Block.

3.4.2 Project site

Staatsolie plans to carry out exploration activities (dryland drilling) in the Coronie area. The exploration drilling activities will be carried out only on land along the Oost-Westverbinding. The area can be reached by vehicle and is easily accessible. Three (3) wells are projected along the main road. The proposed well locations are expressed in **Table 8** and **Figure 6**.

Table 8: Proposed well locations.

Coordinates proposed well locations Coronie			
Location	**Name**	**X-Coordinate**	**Y-Coordinate**
1	CEP01	550650	652800
2	CEP02	584900	647200
3	CEP03	615970	637303

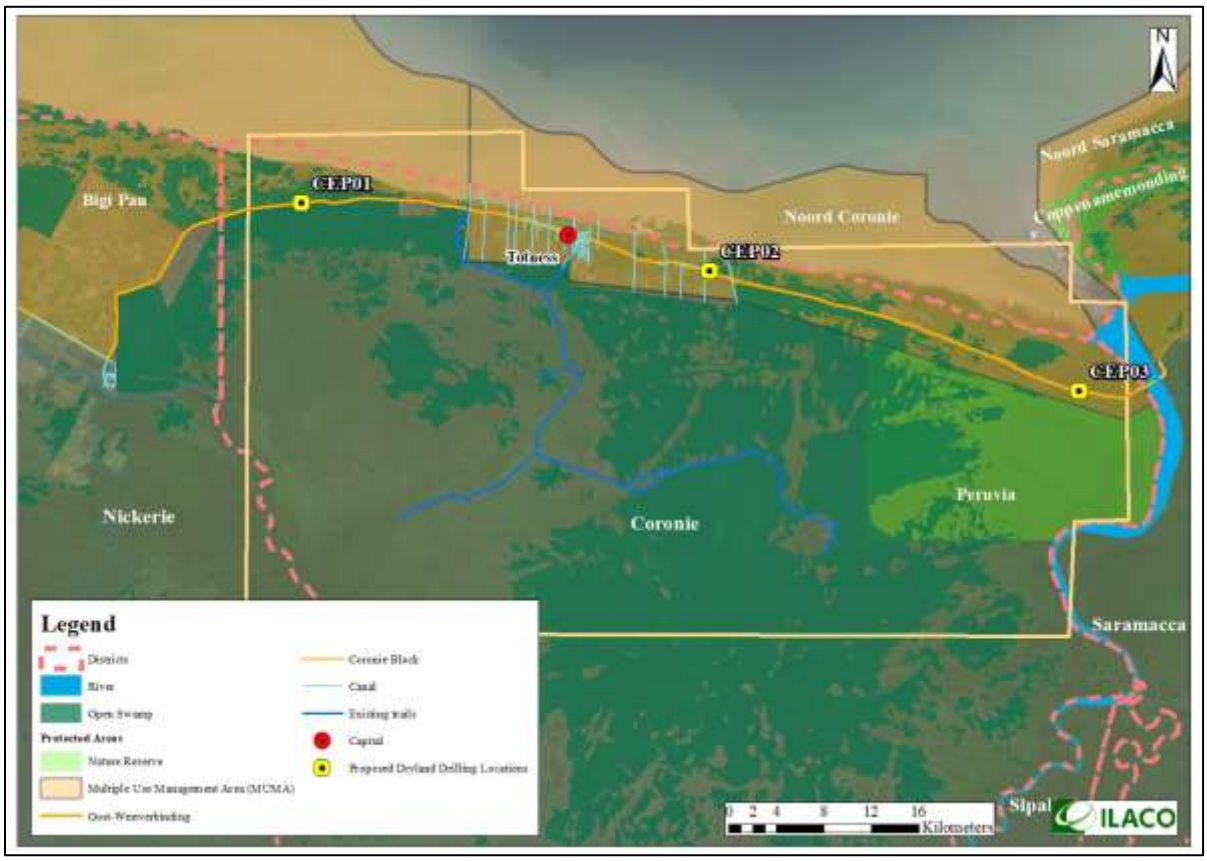

Figure 6: Overview map of the Coronie Block, indicating the 3 dryland exploration drilling locations.

The intended AOI for drilling comprises only accessible land in the North. Drilling site locations are close to the Oost-Westverbinding and can be reached through the construction of a short access road to the site. The exact locations have yet to be determined by a detailed reconnaissance of the proposed area.
A land mobile drilling rig will be utilized for this project. The Rig and auxiliary equipment will be moved to the first location. Prior to drilling at each location, a ~ 60x50 meter area will be prepared to accommodate the drilling and auxiliary equipment including temporary parking mobile vehicles and equipment. These ~60x50 meter drilling sites and the required access routes from the public road form the project area(s).

3.4.3 Planning

The plan is to drill 3 exploration wells along the main Oost-Westverbinding. The mobilization of the drilling rig and auxiliary equipment might be from Saramacca or Nickerie to Coronie to the drill sites. The drill sites will be constructed in consultation with local authorities, in particular the Districts Commissioner, LBB and the police. For the transport of equipment materials and personnel, public roads will be used. Exceptional transport will be escorted by the police. This transport will be planned in consultation with the authorities and will be timely communicated to relevant stakeholders to keep inconvenience for other road users to a minimum.

The Land-rig will first drill CEP01 in the west, then move to CEP02 and finally CEP03 in the east. In **Figure 7** the sequence of the drilling is depicted.

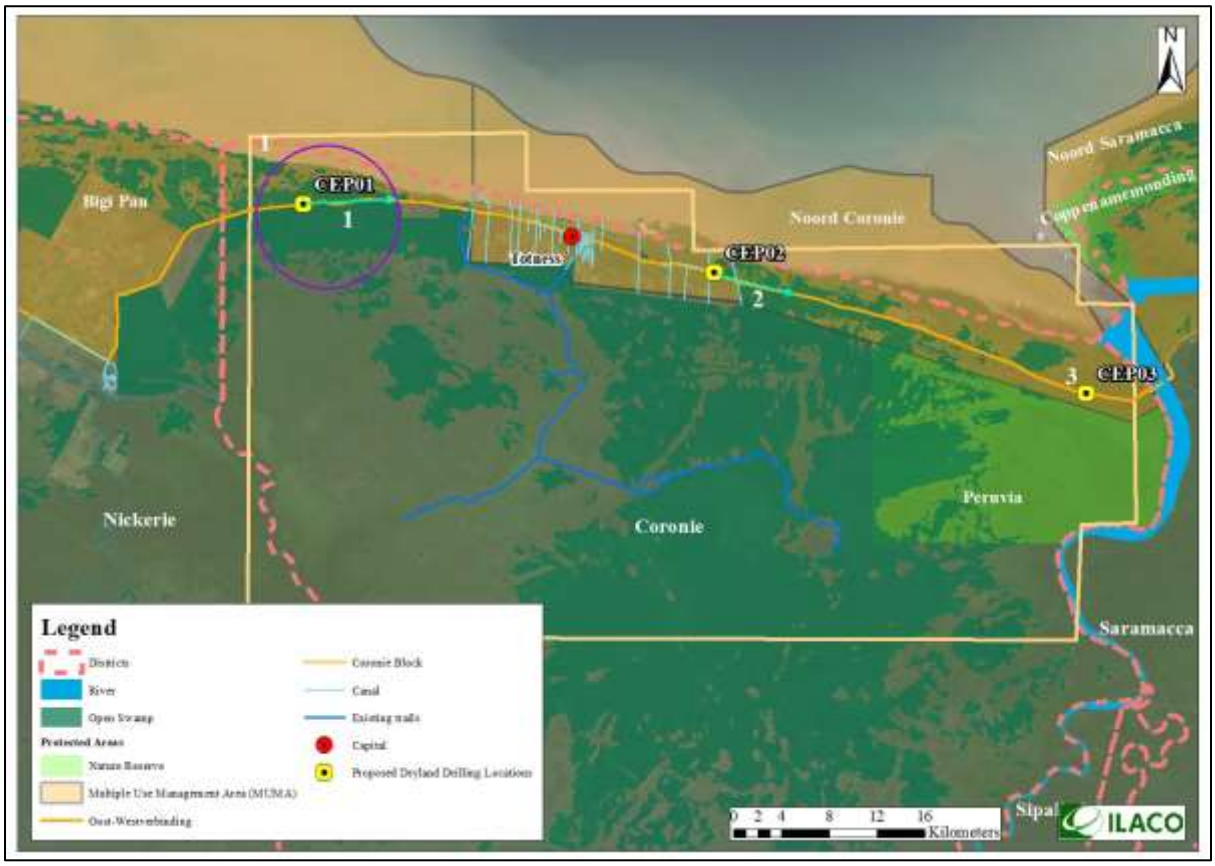

Figure 7: Overview map of the workplan, indicated by the green arrows.

The preparations and drilling activities will commence in Q2 of 2024 and will last approximately 6 months. An overview of the planning is indicated in **Table 9**.

Table 9: Planning of the drilling activities in the Coronie North area is as follows:

Activities	Timeline	
A. Construction phase:		
Preparations (well design, purchase material, Rig selection)	10 months	November 2023 – July 2024
Scouting of the area/identification of landowners, if any, eventually followed by landowner agreement	7 days	July 2024
Construction of access to the drilling sites	6 weeks	July – Mid -August 2024
Construction of the drilling sites	6 weeks	Mid-August - September 2024
B. Operation phase:		
Mobilization (Rig move) to the project area	4 weeks	September 2024
Drilling, logging of locations, including move to next location	6 weeks	October – Mid-November 2024
C. Decommissioning/ Closure phase:		
Decommissioning	2 weeks	End- November 2024

3.4.4 Construction phase

During this phase, the 3 well locations will be prepared for drilling. Model drilling sites are shown in **Figure 8** and **Figure 9**. Both basically measure 51 x 33 meters. Other dimensions could be more appropriate in certain cases, like 60 x 50 meters in case parking place for vehicles is required, but the latter will be the maximum dimensions. The drilling site in Figure 5 is connected to the public road by a shorter or longer access road of 4 meter wide. The whole project site is surrounded by a ditch that is connected to a nearby waterway. For the current project, all drilling sites will be located as close as possible to the Oost-Westverbinding, meaning that access roads will be absent, or at most short.

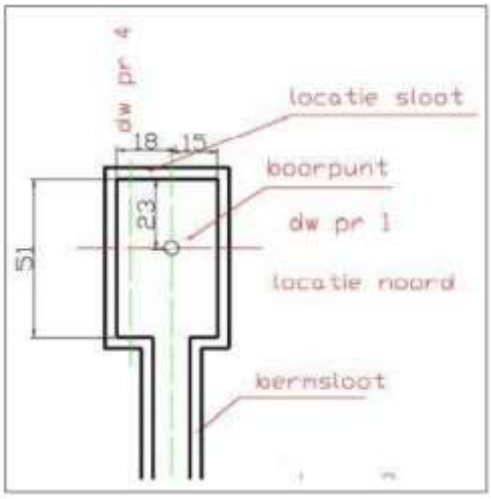

Figure 8: Model dryland drilling site with access road

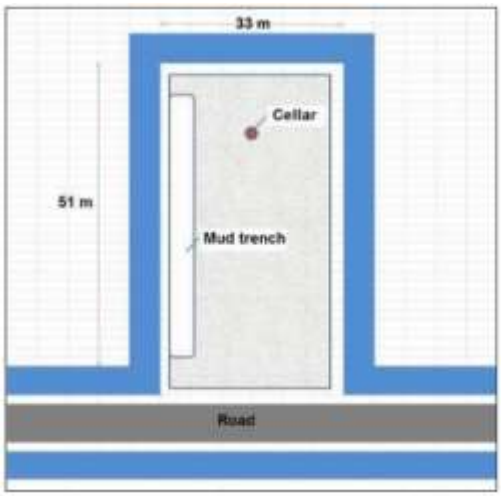

Figure 9: Model dryland drilling site directly bordering the main road

For construction, the following activities will be undertaken.

3.4.4.1 Construction of access to the drilling site.

Starting from the Oost-Westverbinding, access will be provided to the drilling sites. Access of 4m wide is required for the drilling rig to enter the site. The type of access differs per location, but in general, a waterway must be crossed, which may be either a ditch or a canal. The crossing will be made by means of culverts or by placing a container within the waterway, in order not to interrupt the waterflow. The type of crossing is determined by the characteristics of the waterway, with the use of culverts in the narrow waterways (ditches) and possible use of a container (or large culverts) in the wider waterways (canals). The culverts and containers will be covered by sand to provide a road surface. All access

provisions are in principle temporary and will be removed upon abandonment of the location unless other agreements have been made with landowners. Access may require some clearing of low secondary vegetation for the road trajectory in case the drilling site is not located directly south of the waterway and an access road is to be constructed. However, for most locations the drilling site will be right across the waterway. In case of an access road, this will be 4 meter wide and sufficient sand fill will be applied where necessary. For locations on ridges, this will be a shallow layer, but on clay soils, first a roadbed and berm need to be constructed from locally excavated clay. The roadside ditches will be constructed from excavated clay. A cross section of an access road is provided in **Figure 10**.

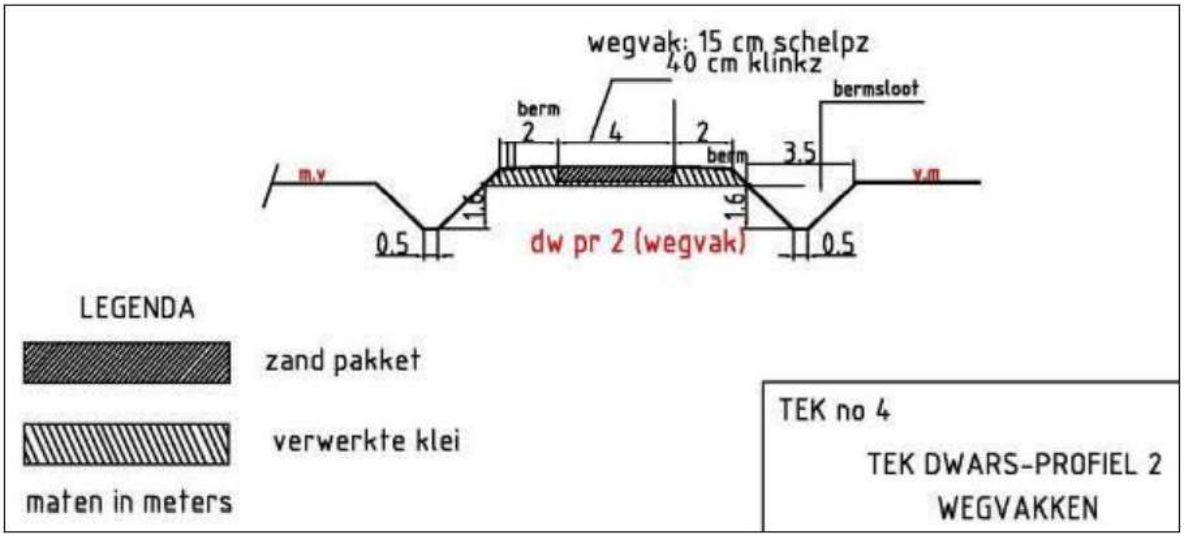

Figure 10: Cross section through an access road.

3.4.4.2 Construction of drilling site

The drill location exists of a square of ~51x33 meter. However, in case no safe nearby parking place for vehicles is available, e.g. on the access road, or on a neighboring lot. The drilling site is extended to accommodate vehicles. The dimensions then will become 60x50 meter. The type of construction of a site depends upon the local soil conditions. On sand, less earth movement is required, while on clay the whole site must be heightened up to 50 cm above the highest swamp water level. In all cases, however, a ditch will be excavated surrounding the drill location and the soil material from the ditch will be used to build an outer dam. The ditch will be inside this outer dam. The perimeter ditch will be connected to the nearest drainage way to drain stormwater. In swamps on clay soils part of the excavated clay will also be used to raise the drilling site. Here another but smaller inner dam will be built, also surrounding the ditch. The purpose of the smaller dam is to hold the sand (~50 cm thickness) that will be used to finalize the location. A certified and experienced contractor will carry out the construction of all locations. On ridge soils far less filled sand is needed, the volume depending upon the existing conditions at the ridge. Depending on the arrangement of the rig with all auxiliary equipment, especially the directions of the flow of cuttings and mud, a pit will be excavated to collect all cuttings and water-based drilling mud from the well (**Figure 9**).

3.4.5 Operation phase

3.4.5.1 Mobilization to the project area

Following proper consultation with identified landowners, before the start of the project, a land use agreement (contract) will be signed with the landowners.

Before the start of the fieldwork, the Contractor will determine the best (safest, and fit for purpose) methodology and routes for importing and transporting equipment to the project site.

3.4.5.2 Drilling

The exploration wells will be drilled with a land drilling rig. The mobile rig auxiliary equipment is moved to the locations. Other trucks will move supplies such as the drill pipes, the mud treatment system, mobile offices, the generators and pumps, the logging unit, and the cementing unit. The drilling activities will start by pressing a conductor pipe and after hooking up safety devices an intermediate hole will be drilled case off. Subsequently an 8-1/2 inches hole will be drilled to planned depth which is around 4,000 feet.

Drilling fluid and cuttings processing

Drilling fluid (also known as "mud") is pumped down the inside of the drill pipe and exits at the drill bit. For the Coronie Dryland exploration drilling, water-based drilling mud (WBM) will be used, mainly composed of water, bentonite (clay) and polymer. Particular functions of the drilling mud include cooling the bit, lifting cuttings to the surface, preventing destabilization of the walls of the well bore and overcoming the pressure of fluids inside the sediment so that these fluids do not enter the well hole. During drilling “cuttings” are generated consisting of clay, sand, and shell fragments. These "cuttings" will be brought to surface through the mud circulation system. The cuttings are separated from the mud in the mud treatment system and at regular depth intervals sampled. The drilling mud will be re-used as much as possible. Spent drilling mud, which is not harmful to the environment, will be buried, either on-site or at Sarah Maria.

During the drilling phase, water will be required for drilling of wells. Initially approximately 40- 50 m^3/day is required, but when drilling progresses less water is needed because it will be recycled. Depending on availability, it may be trucked in from off-site or obtained from nearby surface water bodies.

Logging

After finalization of the drilling operations, the hole is logged with a variety of logging tools that are lowered into the open well hole. Measurements include electrical properties (resistivity and conductivity at various frequencies), sonic properties, and active and passive nuclear measurements. The logging equipment is placed on a truck, where also the logging is recorded. No emissions occur during the logging process. No special tools will be run during this phase of drilling.

3.4.6 Decommissioning phase

After finalization of logging, the well is plugged with cement and abandoned. No communication between stratigraphic zones will be possible and contamination of aquifers will thus not occur.

From the intermediate casing will be cut 15 feet below the surface and cement will be used to plug and abandon the hole. Cement will be transported in bulk to the rig site.

All facilities, equipment and materials will be removed from the site. This includes any sand that has been placed in the field and on dams, and all culverts or containers (used as culvert). However, most landowners have indicated that they like to see that the sand is left behind. When consent of the landowner is obtained, the cuttings and spent drilling mud will be buried on-site, which is a normal procedure for both wetland and dryland operations of Staatsolie. When no consent is obtained, the cuttings and spent drilling mud will be excavated and transported to Sarah Maria where it will be buried at a dedicated site after the drilling activity at the location has ended.

Dams constructed in the field will be leveled and dug ditches will be filled back. The field surface will be leveled so that the site is brought back, as much as feasible, to its pre-project state. Any spent completion fluid will be transported to the Sarah Maria facilities where it will be treated and disposed of. Any other waste will also be removed.

A soil quality assessment will be conducted for drilling sites from where the fill sand will be removed in case the landowner would not want to keep it. The latter has never been the case and no sand has ever

been removed from former drilling sites at privately owned lands. Anyway, if it would happen, such assessment is needed in order to determine if any soil pollution or deterioration has occurred. In that case, baseline soil sampling will be required, which should be conducted as soon as the exact drilling location is known, and prior to any activities at the site. Any contaminated soil will either be treated on-site or be removed from site for treatment elsewhere. In case of oil pollution, the polluted soil will be transported to Sarah Maria to be treated at the landfarm. In case of increased salt levels in the soil, the soil will be desalinized with fresh water by flooding and/or flushing of the drilling site.

As the last step of decommissioning of a site, a close out inspection will be held with (a representative of) the project owner, HSE, CR and the landowner. This closeout inspection will be held at least 2 weeks before the contract between Staatsolie and the landowner expires. If there are no issues arising from this inspection the landowner will sign for proper hand-over. If there are outstanding issues these should be attended, and a second close-out inspection should be held upon finalization.

3.4.7 Equipment and manpower input

During the various project stages, different equipment and personnel will be involved. In addition to on-site personnel, the project will be visited by supervisors, technicians, HSE crew and other staff members from the Sarah Maria office in Saramacca. Security personnel will be present throughout the day and night during all phases of the project.

The table below provides an overview of the equipment that will be used for the various project activities. In addition, an overview of personnel is presented.

Table 10: Information on planned resources for this project

Equipment	#	Deployment	Activity	Personnel
CONSTRUCTION PHASE				
Heavy equipment	1	Daily-workdays	Construction of drilling site	3
Material transportation	1	Daily-workdays	Construction of drilling site	5
OPERATION PHASE				
Rig move	2	Daily workday	Drilling activities	10
Logging unit	2	Several hours	Logging job	2
DECOMISSIONING PHASE				
Inspection for abandonment	3	Final workday	Inspection of abandoned worksites and closure	3

3.5 Project Alternatives

The "no-go" alternative pertains to the scenario where the project is not implemented. On a positive note, this would entail no disruption to the local environment. However, past experiences with similar projects have shown that any impacts tend to be localized and temporary. Therefore, there are no significant anticipated medium or long-term environmental or social effects resulting from the absence of this project. When considered in the context of the current level of oil and gas development activities in the region, the environmental advantage of this scenario is deemed to be relatively small.
Conversely, opting not to pursue this project would mean that Suriname forfeits potential economic development opportunities. Without the seismic and exploration drilling program, future development, and production of hydrocarbons in the area would not be feasible. While technical alternatives, such as alternative data collection methods (Airborne Gravity Gradiometry (AGG/FTG) and Surface resistivity) have been assessed, no viable options have been identified.

4 Description of the Existing Environment

4.1 Regional Setting

Coronie is a district of Suriname located in western Suriname and situated on the Atlantic Ocean coast. The capital is Totness. To the west, Coronie borders the district of Nickerie and to the east the district of Saramacca, separated from it by the Coppename River. The southern boundary is formed by the Wayambo River, which separates Coronie from the district of Sipaliwini. Much of the district is uninhabited, being a swamp area. Habitation is only present along the Oost-Westverbinding, which connects Paramaribo with Nickerie. Human activities are mainly found in the plantation area (Ingikondre-Burnside) and at Coppenamepunt.

4.2 Physical environment

The below baseline descriptions are based on literature reviews, existing maps, photographs and images, field observations and interviews. Field measurements have been conducted for noise and water quality. The environmental setting described in this section provides baseline conditions from which an assessment of the potential effects of project development was determined. In addition, the baseline environmental information could be used as a benchmark by which future monitoring results will be compared.

4.2.1 Climate

The weather of Suriname is dictated mainly by the northeast and southeast trade wind system called the Inter-Tropical Convergence Zone (ITCZ).
The ITCZ follows the sun in its movement to the north to about 15˚ latitude north and to the south to about 10˚ latitude south of the Equator. The ITC zone passes over Suriname two times per year bringing heavy rainfall when it is overhead.
This result in four seasons based upon rainfall distribution:

Long Rainy Season	End April - Mid August
Long Dry Season	Mid-August - Early December
Short Rainy Season	Early December - Early February
Short Dry Season	Early February - End April

Most of Northern Suriname has a Tropical Rainforest Climate (Af-climate in Köppen's classification). The average rainfall exceeds 60 mm in the driest month(s). A narrow strip along the coast, which has drier conditions, forms an exception. Here a Monsoon (Am) or a Wet and Dry Climate (Aw) is found, characterized by at least one month with less than 60 mm. In addition, the average annual precipitation is (much) lower in this zone. The plantation area of the Coronie District is known for such dry conditions, with a mean rainfall of around 1,500 mm/year and average monthly rainfall below 60 mm in one or more of the dryer months. Going towards the east and to the south the average annual rainfall increases to over 2,250 mm (**Figure 12**). The dry character of Coronie is illustrated in **Figure 11**.

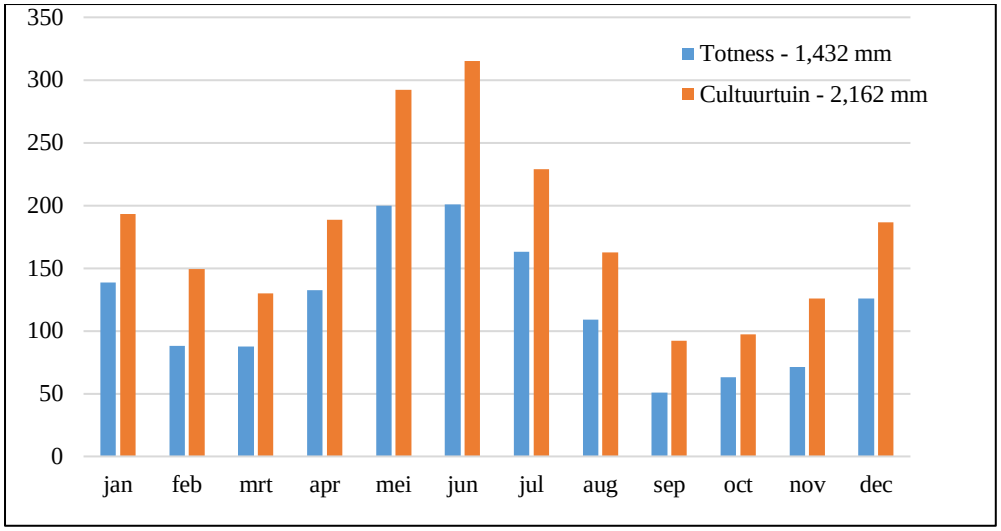

Figure 11: Average monthly rainfall for Totness and Paramaribo (Cultuurtuin)

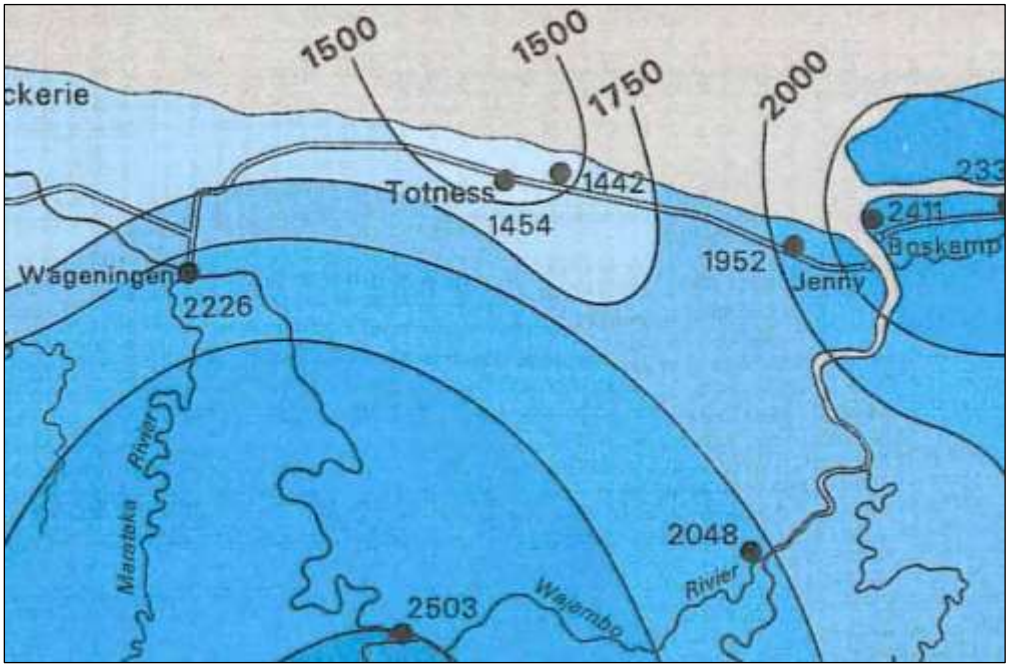

Figure 12: Average annual rainfall over the period 1971-1980 (SPS/OAS).

Like in most parts of Suriname, consistently high temperatures and a high humidity characterize the study area with the main variation being rainfall and the associated cloud cover. The mean annual air temperature at Paramaribo is 27.3 º C, with a daily range of 7-10 ºC and with an annual range of about 2ºC.

Northern Suriname has northeast to southeast wind directions, with the first dominating in the February-April and the latter during the July-September period. The other months show directions mostly ranging between northeast and southeast. Calm winds, i.e. winds with hourly average speeds less than 0.5 m/s, are very frequent. During the night and early morning, it is usually calm. During the day, the wind speed may increase to about 5 m/s, and in some seasons to 5-8 m/s, in particular in the February-April and the September-October periods. In the coastal zone, including the Coronie plantation area, wind speeds are usually higher than further inland. Wind speeds of 20-30 m/s have been occasionally recorded during thunderstorms, but only for a very short period (locally known as ‘sibibusi’), and sometimes causing some isolated low-severity incidents (material damage) from wind gusts. Suriname is free of hurricanes.

4.2.2 Air quality

Related to air quality, the study area is still good as there are hardly any stationary sources and only few other larger sources of air emissions.
Air pollution sources within the area are emissions from local traffic, farm activities and some small facilities with engines, like generators for power supply and pumps (e.g. water supply, drainage stations). Incidentally, confined grass or vegetation debris fires in dry periods may locally affect the air quality. However, any air pollution is minor, because traffic intensity is generally low and concentrated along the main road, while other activities are few and at a rather low level, with usually small-scale emissions. Moreover, the dominating north to southeast winds quickly disperses the emissions.
Thus overall, the air quality of the study area is good, while the air quality at the drilling locations can be characterized as good in the absence of significant emission sources (**Table 11**).

Table 11: Air quality characteristics of the proposed drilling locations

Location	Description	Type of area	Emission source(s)	Impact intensity at drilling location
CEP01	Along O-W verbinding, km 163	Uninhabited swamp area	Road traffic	Low, limited traffic
CEP02	Along O-W verbinding, km 128	Rural; few houses	Road traffic; mechanized farm activities; weed burning	Low, limited traffic; incidental activities
CEP03	Along O-W verbinding, km 95	Uninhabited area (no residents within 1 km)	Road traffic	Low; limited traffic

The planned seismic lines are mainly through uninhabited swamp areas. Only the northern line (line 1-2) and line 7-8 partly run through inhabited zones (**Figure 3**). The northern line passes through residential areas for approximately 1.5 km. Here, air quality will be affected by the higher traffic activity and human activities associated with households and businesses. Overall, however, in the absence of significant emission sources, air quality here is still expected to be good.

4.2.3 Noise

No specific noise legislation or guidelines currently exist for Suriname, so international guidelines were considered (WHO, World Bank/IFC) in this study. Noise is recognized as a potential pollutant or nuisance. Noise measurements were conducted at all drilling locations and at two selected locations near the northern seismic line (line 1-2) in residential areas. Only daytime measurements were conducted, because no nighttime project activities are foreseen. The noise data are presented in **Table 12** and the conclusions are summarized below. See **Appendix 4** for the detailed noise baseline report.
In the table below, LAeq has been ranked from high to low. Highest LAeq is observed at N1 (rural with one house nearby) and N5 (natural), both locations along the Oost-Westverbinding outside the plantation area, with traffic at relatively high speed. Although the speed limit is 80 km/h, cars frequently drive at over 100 km/h.
Within the plantation area (rural with scattered houses), cars tend to drive somewhat slower, also because of the many speed bumps in this section of the Oost-Westverbinding (N2 and N4). LAeq is lower here, even though the number of vehicles at N2 is higher than at the two previously discussed locations. At all the locations with residents (N1, N2 and N4) the WHO/IFC daytime guideline value of 55 dBA for residential areas is exceeded, for N1 and N2 also when corrected for the distance of the houses to the road axis (see footnote).
N3 is not along the Oost-Westverbinding, but within a residential area in Totness. The WHO/IFC daytime guideline is not exceeded here, despite the relatively high number of vehicles. This can be

explained form the low speed (40 km/h) and the absence of heavy traffic. This measurement is considered representative for the Coronie residential areas.

Table 12: Results of daytime noise measurements

ID #	Location	LAeq	L10	L90
N1	Along the Oost-Westverbinding, near a resident approx. 1440 m away from drilling location **CEP03**. The measurement was conducted 7.4 m away from the axis of the road. Traffic counts: 34 vehicles	66.1[6]	62.3	34.0
N5	Along the Oost-Westverbinding approx. 4300 m away from drilling location **CEP01**. The area is surrounded with low to high vegetation. The measurement was conducted 7.4 m away from the axis of the road. Traffic vehicles: 26 vehicles	65.0	59.6	26.1
N2	Along the Oost-Westverbinding, in the driveway of a resident in Ingikondre approx. 170 m away from drilling location **CEP02**. The measurement was conducted 7.4 m away from the axis of the road. Traffic counts: 45 vehicles	63.1	62.3	41.9
N4	Along the Oost-Westverbinding, at the driveway of a resident in Burnside (KM 128). The measurement was conducted 7.4 m away from the axis of the road. Traffic counts: 17 vehicles	57.3	53.9	36.4
N3	In the driveway of a resident in Totness, along the Gouverneurstraat. The measurement was conducted 7.4 m away from the axis of the road. Traffic counts: 27 vehicles	49.1	50.4	37.6
xx	Exceeds the WHO/IFC noise standard of 55 dBA for daytime in residential areas			

4.2.4 Geology and geohydrology

The three proposed drilling locations and seismic lines are all located within the Young Coastal Plain, which is developed on Holocene deposits of the Coronie Formation. The Coastal Plain of Suriname is formed on sediments that have been deposited since the Late Cretaceous. These sediments are known as the Corantijn Group (**Figure 13**).

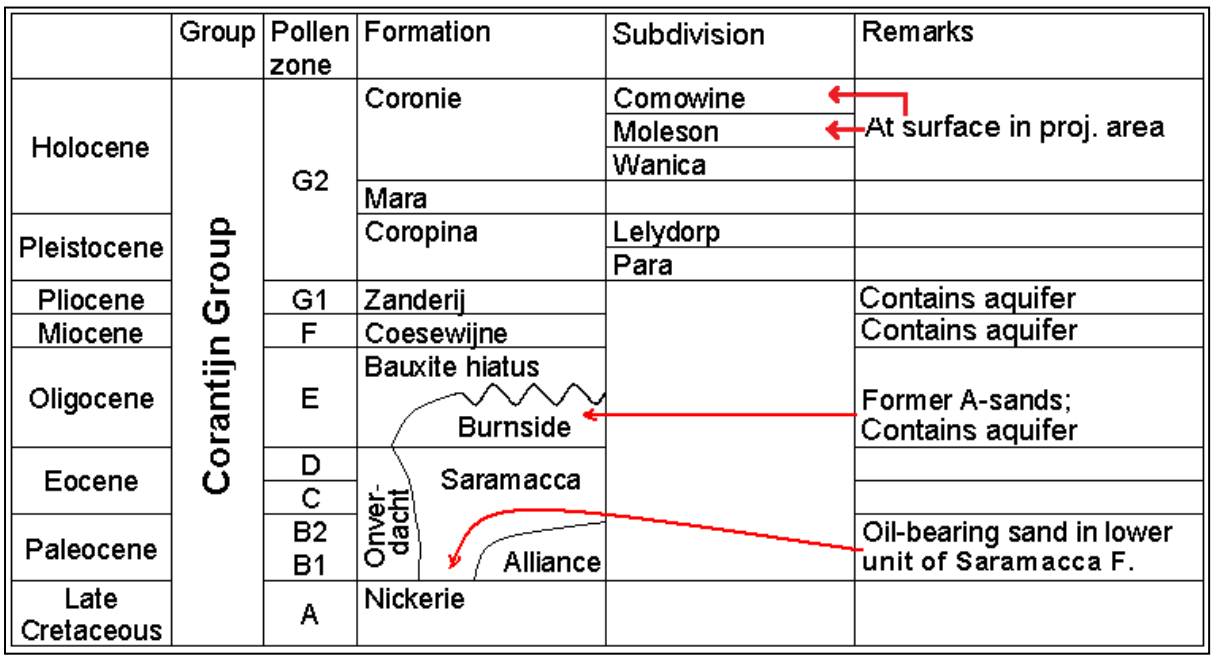

Figure 13: Stratigraphy of the Corantijn Group

[6] Note: measurements were made on a distance of 7.4 m from the road axis. When corrected for houses at a distance of 15 meters from the road axes, the LAeq levels are resp. 60.0, 57.0 and 51.2 dBA for N1, N2 and N4.

The drilling locations are found on clay sediments, most likely of the Comowine phase, which was deposited since the last 1,000 years. The seismic lines are found on clayey deposits of the Comowine phase, and on clayey, sandy, and shell deposits of the Moleson phase (2,500-1,300 years ago). Lines 3-4 and 9-10 end in the deep part of the Coronie Swamp, which is developed on deposits of the Mara Formation. This part of the swamp is characterized by deep water conditions (up to > 3 m) and thick layers of ombrogenous (rainwater fed) peat (see section on soils).

Drinking water in the coastal plain is withdrawn from three major aquifers within the Corantijn Group: A-Sand aquifer, Coesewijne aquifer and Zanderij aquifer, found in the formations of the same respective names (note: the A-Sand Formation has been renamed Burnside Formation; Wong, 1989). The Zanderij aquifer, at 50-210 m, is not being used for drinking water supply in Coronie, because the water of the zone of this aquifer in Coronie is brackish.
The drinking water station at Totness uses the A-Sand aquifer, which is at a depth of 152-166 m. The station produces good quality drinking water. This aquifer is likely to be present below the project area. In 2013, another drinking water station was opened in the Coppename area (km 100-101). This station also uses the A-Sand aquifer.

4.2.5 Land and Soil

The project area is located in the flat and very low-lying Young Coastal Plain in an area dominated by clayflats that form swamps, and with ridges in the northeastern. In the far south of the project area an extensive and deep swamp with thick peat layers is present. The physiography and soil conditions of the project area are presented in **Figure 14**. The information presented in this map has been adapted from the Reconnaissance soil map of Northern Suriname (Soil Survey Department, 1977).
An overview of the characteristics of physiographical units and a brief description of the soils in the project area, is presented in **Table 13.**

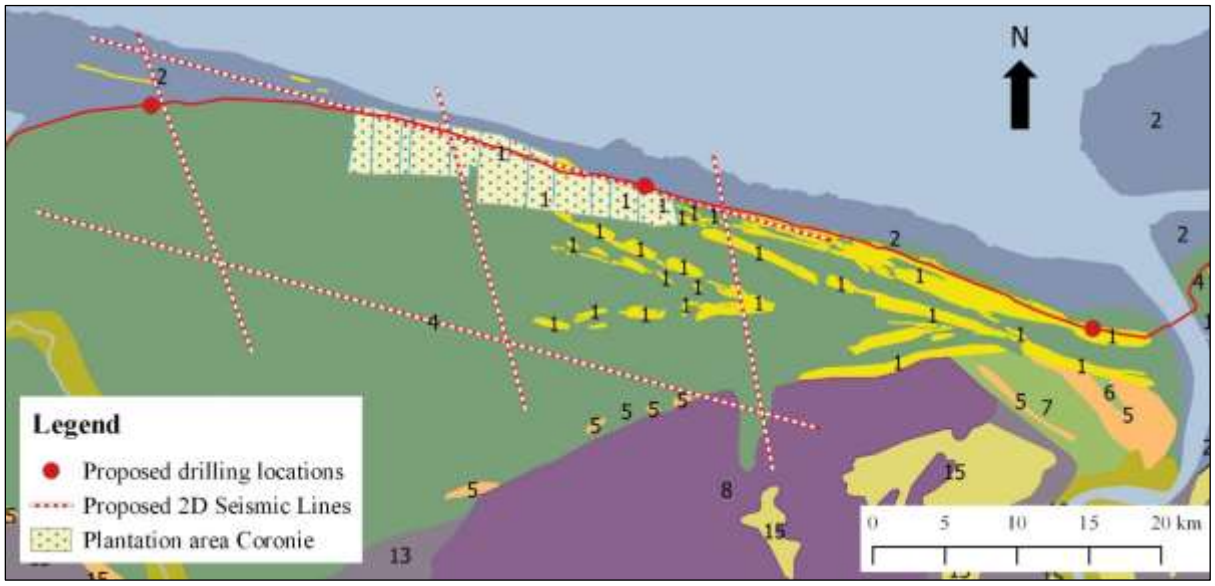

Figure 14: Soil map of the wider study area (adapted from Reconnaissance Soil Map of North Suriname; scale 1:500 000).

Table 13: Characterization of geology, physiography, and soil of the project area

Geology	Physiography	Elevation (m + NSP)	Peat / Pegasse (cm)	Unit soil map	Soils	Swamp water depth (cm)
Coronie Formation: Comowine phase	Coastal swamps	1-1.5 m	<20 cm	2	Unripe and practically unripe saline to brackish swamp clay soils.	0-70
Coronie Formation: Moleson phase	Ridges along O-W verbinding and in polder area	1-3 m	None	1	Well (to poorly) drained shells, shell-grit, shell sand, medium and fine sand	Groundwater
	Polder area, with dryland and rice land	Around 1 m	none (removed)		Imperfectly to poorly drained nearly ripe and ripe clay with brown and yellow mottles; usually puddled topsoil	Groundwater; in rainy season 0-20
	Drowned ridges in Coronie Swamp	1-2 m	< 20 cm	1	Poorly to very poorly drained shells, shell-grit, shell sand, medium and fine sand	0-40
	Swamp	About 1 m	20-80+ cm	4	Very poorly drained half-ripe and ripe clay with brown and yellow mottles, locally over peat	20- >150
Mara Formation	Swamp	< 0 m	100 - > 400 cm	8	Very poorly drained ombrogenous peat	2- > 4 m

NOTE: The above is fully based on available maps and reports, most of which are desk studies, using aerial photo interpretation. Actual field data is very limited and outdated. Data presented by Noordam & Teunissen (2008) has been included.

CEP02 and part of seismic line 1-2 are situated north of the Oost-Westverbinding, and thus within unit 2 (**Figure 14**). This unit comprises saline to brackish nearly unripe (soft) to half ripe clay soils. Also, CEP03 is located north of the Oost-Westverbinding, but in an area where ridges grade into a freshwater swamp with half ripe-to-ripe clays (unit 4; **Figure 14**). Most likely the drilling pad will be on clay soil. CEP01 is projected in a brackish water lagoon to the north of the Oost-Westverbinding. Saline to brackish nearly unripe (soft) to half ripe clay soils are found here (unit 2; **Figure 14**).
The majority of seismic lines is also found in the Coronie Swamp, south of the Oost-Westverbinding (unit 4; **Figure 14**). The peat layer become thicker when going further south. Small sections at the end of seismic lines 3-4 and 9-10 are projected within the deep swamp with ombrogenous peat (unit 8; **Figure 14**). Peat thickness of over 1-2 meter may be encountered here. The soft mineral clay soil is several meters below the water surface.
Within the plantation area (Burnside-Ingikondre) both sandy ridges and ripe to nearly ripe clays will be encountered in the area south of the Oost-Westverbinding. Clay soils dominate north of the road; these may be fresh to saline, depending on whether inundation with seawater has taken place and if so whether renewed sedimentation has occurred. The older soils are ripe (firm) and fresh to brackish, and recent deposits, often on top of older ones, are soft and saline.

4.2.6 Hydrology

The Surinamese coastal region has about 2,000 sq. km of brackish wetlands with mangrove forest, saltwater lagoons and herbaceous brackish swamps, and 12,000 sq. km of freshwater wetlands (Teunissen, 1993). In the project area both brackish and freshwater wetlands are found.
Most of the freshwater wetlands consist of swamplands with poorly to very poorly drained soils, which are inundated either permanently, or at least during the greater part of the year (Teunissen, 1993). The coastal wetlands have a tidal regime along the coast, but inland inundation is also found, but this is less deep and over a shorter period. During the rainy season a swamp is permanently draining towards its edges to rivers and the ocean, with preference for sections with creeks or culverts. With diminishing rainfall at the end of the rainy season the discharge also decreases, as the swamp water level gradually drops. At a certain water level, the drainage from the swamp will virtually stop and water will mostly be depleted by evapo-transpiration only.

The Coronie Swamp forms one of the largest swamp areas in Suriname, and the central part of it is characterized by a domed shape, thick ombrogenous (rainwater-fed) peat layers and deepwater conditions, especially in the central part. This dome is the result of the fact that the peat (‘pegasse’ retains water like a sponge, allowing the peat to continue to "grow" above the base level (‘peat-moor’). The domed shape results in a radial drainage pattern by which water is discharged from the center towards all edges.

Water from the swamp area is discharged to the east towards the Coppename River, south to the Wayambo River, west to the Nickerie River and north towards the Atlantic Ocean. Some local creeks, like the Peruvia, Pereko (or Pierre Creek), Akwansa and Kofimaka creeks, support this discharge, but the number of such creeks is limited, and most creeks are short. Natural blockage occurs where flow is forced to flow through a narrower drainage way, resulting in increased (perched, dammed up) upstream swamp levels. Such conditions occur naturally in the northeast of the swamp, where E-W ridges block the S-N flow, allowing throughflow at a limited number of locations only. Another major (manmade) obstruction of S-N flow to the Atlantic Ocean is formed by the Oost-Westverbinding The construction of this road has led to a considerable damming-up of swamp levels in the northern Coronie Swamp, which on its turn resulted in dramatic changes in the vegetation of the Coronie Swamp as well as in the estuarine zone to the north of it (Teunissen, 1993).
The water levels rise to such an extent that the ridges within the swamp have “drowned” and now most or all of its land is being inundated in the rainy seasons. An indication of the swamp water depths is presented in the legend of **Table 13.**
To the northeast swamp water is discharged through culverts below the Ingikondre-Jenny road section, while to the northwest, swamp water is discharged through the sluice at Burnside and through culverts below the Burnside-Wageningen road section. At the height of the plantation area (Ingikondre-Burnside), the swamp water can only be discharged through the freshwater canal (Zoetwaterkanaal) at Totness. **Figure 15** schematically presents the hydrology of the wider area with schematic flow patterns in the Coronie Swamp and the drainage structures along the Oost-Westverbinding (culverts, sluices, canals).

The Coronie plantation area forms a polder with a drainage system with ditches and canals. To the north, the plantation area is protected from the ocean by the Coronie Dijk, which runs from Burnside to Moy. South-north canals drain excess water from the dryland through sluices towards the parallel canal of the dike, which has a sluice at Totness to discharge excess water towards the Atlantic Ocean. Each plantation has its own sluice placed at the Oost-Westverbinding (**Figure 15**). So, these sluices regulate the water management of the polders south of the main road. The area north of the main road discharges through ditches and canals that drain directly in the dike canal.
The natural zone north of the Oost-Westverbinding receives freshwater from the southern swamps through the culverts under the road. Excess water drains towards the ocean predominantly through mass flow and some small creeks near the ocean. Some canals have been dug towards the ocean to promote discharge of excess water from the southern swamps, but these need frequent maintenance to keep them open when mudflats are present. Overall, the drainage from the northern swamps is slow and in the rainy season water levels at both sides of the road show a minor difference, thus slowing down the

discharge of water from the southern swamp. Notwithstanding the presence of culverts under the Oost-Westverbinding and some canals towards the ocean, still the swamp water levels may become so high that in some prolonged periods with heavy rainfall, water can be seen flowing over the Oost-Westverbinding between Jenny and Ingikondre.

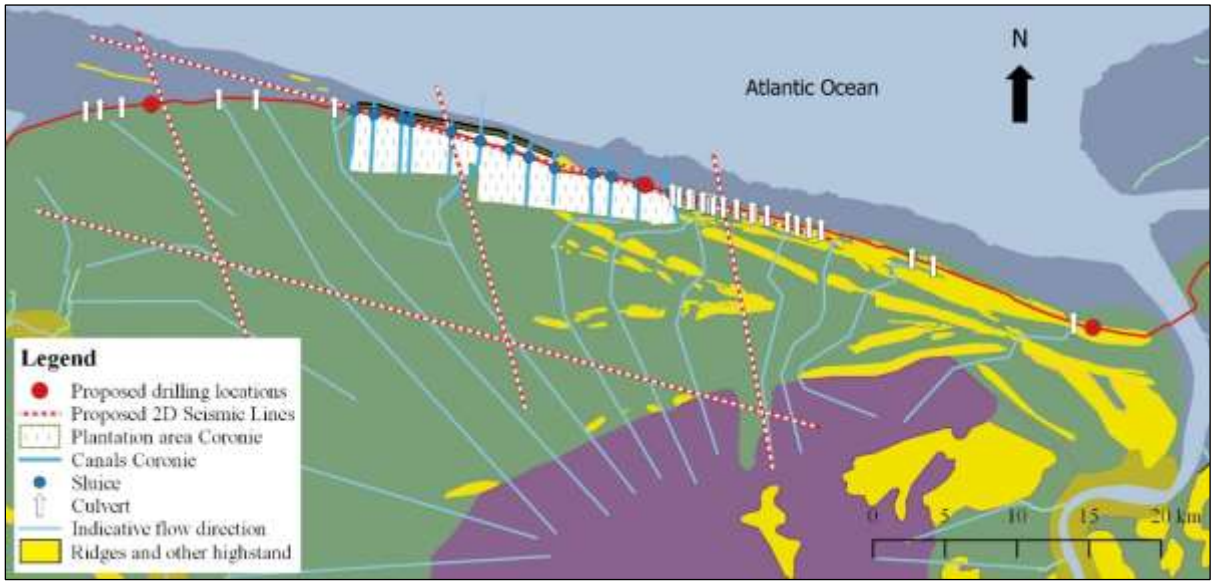

Figure 15: Hydrology of the wider study area

4.2.7 Water quality

With respect to water quality four different ecosystems can be identified in the study area:

1. Brackish to saline coastal swamps (unit 2 of **Figure 14)**: Along the ocean sea water is brought in by the high tide and at spring tide this water may penetrate deeper inland, creating brackish to slightly brackish conditions locally up till the Oost-Westverbinding. The latter occurs more frequently during the dry season, when the freshwater flow from the southern swamp is reduced or absent. During the rainy season, the fresh water from the south dilutes the brackish water, in particular near the culverts. The pH in this zone is usually between 6 and 8.
2. The plantation area has freshwater conditions, but brackish water may be present in some sections to the north of the Oost-Westverbinding. The latter is the result of past intrusion of the sea and the presence of brackish to saline clay soils. The pH varies with salinity from near neutral to acid.
3. Freshwater swamp (unit 4 of **Figure 14**): Salinity in these swamps is virtually absent; the water – in particular during the rainy season – resembles rainwater with EC below or slightly above 100 µS. The water is clear and brownish due to organic compound from the peat. This also influences pH, which is acid (5.2-5.8; Noordam & Teunissen, 2008). Close to shell ridges, pH, and Electrical Conductivity (EC) will be higher due to the presence of, among others, calcium salts.
4. Ombrogenous swamp (unit 4 of **Figure 14**): This swamp is rain fed and the water quality is only affected by the release of organic compounds from the peat. The water is clear and brownish. An EC of 22-33 µS and a pH of 4.8-5.0 was measured here (Noordam & Teunissen, 2008).

All swamps generally have low oxygen content, with values changing over the day. Measurements north (coastal swamps) and south (freshwater swamps) of the Oost-Westverbinding (Burnside-Wageningen) in the period 1992-2000 indicate that most of the years the average DO is below 2 mg/L to the north and below 1 mg/L to the south (Bansie, 2001). Maxima are respectively <4 mg/L and <2 mg/L. Lower values are indicative for standing water, while higher values are recorded in areas with some flow and/or waves.

Nutrients are medium in the coastal swamps and the plantation area, low in the freshwater swamps and very low in the ombrogenous swamp (Noordam & Teunissen 2008 and Parahoe 2008).

In the absence of human activities, the water quality in the swamps is considered to reflect natural conditions.

On July 25, 2023, measurements have been conducted at five locations (**Figure 16**). Three locations are close to the proposed drilling locations and two are selected for the characterization of the freshwater swamp.

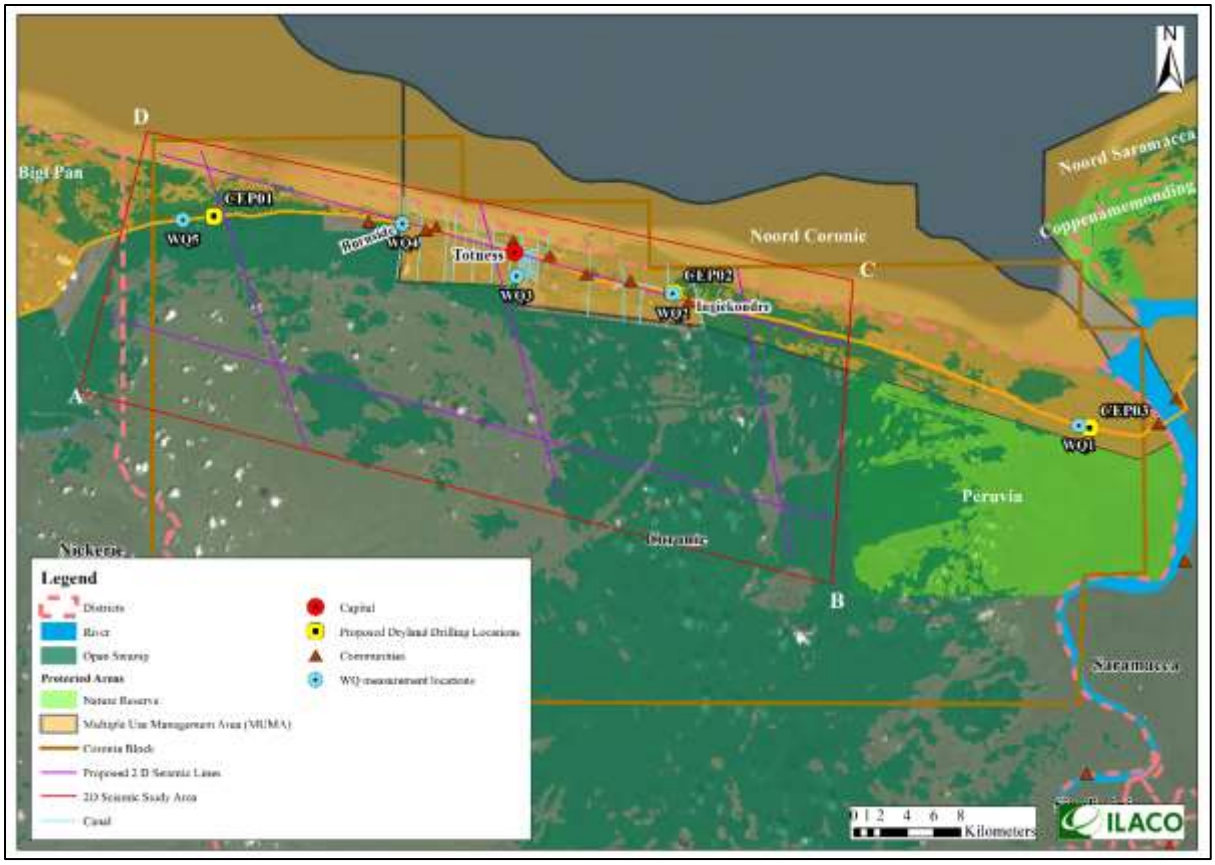

Figure 16: Water quality measurement locations

The measurement procedures and field observation are included in **Appendix 5**. A summary of the results is presented in **Table 14**. Measurement locations WQ3 and WQ4 represent the freshwater swamp. Findings for pH, EC, DO, clarity, and color are mostly in line with above description (#3), but WQ 4 is less clear and has relatively high Dissolved Oxygen (DO) due to the moving water (sluice is open).
All other measurement locations are north of the Oost-Westverbinding:

- WQ1 (CEP03) is found in the freshwater section (soil unit 4; **Figure 14)**. A ridge is present nearby, causing some turbidity and a somewhat higher pH.
- WQ2 (CEP02) is in a coastal swamp as can be concluded from the presence of mangrove forest and the high Electrical Conductivity (EC) and pH.
- WQ5 (CEP01) was measured in a lagoon, apparently beyond the reach of the tide, because the EC is low (fresh water), be it somewhat higher than in the freshwater swamp. The wave action causes some turbidity.

None of the measurement locations showed visible contamination (litter, oil) and there were no unnatural odors.

Table 14: Summary of water quality measurements 25 July 2023.

Location ID / Description	Temp (C°)	pH	DO (mg/l)	EC (µS/cm)	Turbidity (NTU)	Secchi (cm)	Color	Clarity	Other remarks (Odor, etc)
WQ1- Swamp north of the Oost-Westverbinding, 825 m west of **CEP03**.	27.2	6.3	2.9	92	8.5	42	Light brown	Slightly turbid	Precipitated and floating particles. No odor and no contamination observed. Fishes present.
WQ2- Swamp north of the Oost-Westverbinding, 75 m south of **CEP02**.	29.1	7.9	0.5	28,270	18.1	-	Dark brown	Turbid	Precipitated and floating particles. No odor and no contamination observed. Fishes observed. Mangrove Forest with some dead trees near location.
WQ3- Sluicegate within the Coronie Swamp which drains water in the Zoetwater Kanaal.	29.5	5.6	0.1	89	0.0	56	Very light brown	Almost clear	Floating particles. No odor and no contamination observed.
WQ4- Lozing 68 (Burnside) Canal along the Oost-Westverbinding. S of sluice (open)	27.9	5.3	4.2	94	36.7	22	Light brown	Slightly turbid	Floating particles. No odor and no contamination observed.
WQ5- Swamp north of the Oost-Westverbinding, approx. 2 km west of **CEP01**.	28.4	5.7	2.9	388	28.0	-	Brown	Turbid	Precipitated and floating particles. Muddy odor. No contamination observed.

4.3 Biological Environment

4.3.1 Vegetation

An overview of the ecosystems of the wider study area is presented in **Figure 17**. The information on these maps has been adapted from the Reconnaissance Map Surinam Lowland Ecosystems (Teunissen 1978; scale 1:200 000).

Compared with this map, which is based on 1971-1974 aerial photo's, the more recent Google satellite imagery shows:

- Changes along the coast due to coastal processes of accretion and erosion,
- Some vegetation changes:
    - Mainly in the Coronie Swamp, where in recent times ridge forest drowned due to the raising swamp level caused by the construction of the Oost-Westverbinding between Burnside and Wageningen and of the Swamp Retaining Dykes south of the Coronie rice polders.
    - North of the Oost-Westverbinding some (parts of) lagoons have been overgrown with parwa, while new ones emerged.
    - South of the Oost-Westverbinding between Burnside and Wageningen some swamp wood disappeared due to vegetation and peat fires.
    - Farther to the south swamp forest developed from swamp wood and morisi palm forests due to vegetation succession that became possible due to the prolonged absence of fires.

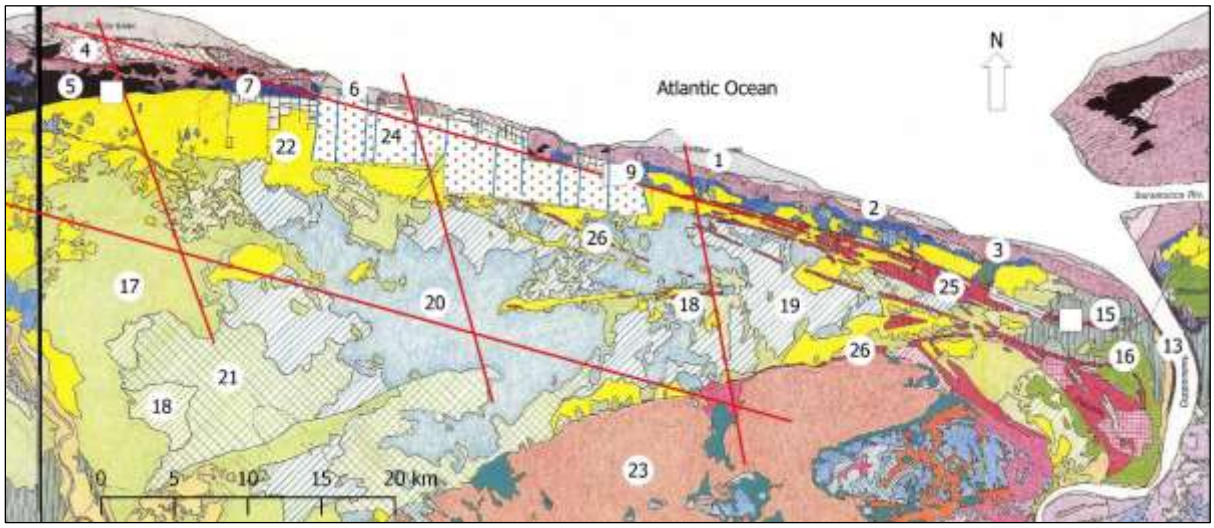

Figure 17: Ecosystems of North Coronie

Table 15: Legend of ecosystems of North Coronie

No.	**SWAMPS (WETLANDS)**
1	**coastal mudflats:** often with film of yellow diatoms
2	**young coastal (black) mangrove:** early stages of black-mangrove (= "parwa") (*Avicennia germinans*) forest; near the Coppename River mouth preceded by mudgrass (= "sarasara grasi") (*Spartina brasiliensis*) vegetation
3	**mature coastal (black) mangrove:** mature black-mangrove (="parwa") forest with white-mangrove (="akira") (*Laguncularia racemosa*) trees along tidal creeks
4	**dying coastal (black) mangrove:** dying black-mangrove *Avicennia germinans*) forest
5	**deeper lagoons**: salt to brackish lagoons, locally with submerged vegetation of widgeon grass (="sewar") (*Ruppia maritima*) and/or water lilies (="pankuku-wiwiri") (*Nymphaea ampla)*
6	**shallow lagoons:** silted up (shallow) lagoons, covered with halophytic herb vegetation, dominated by sea purslane or "zeepostelein" (*Sesuvium portulacastrum*), saltwort or "krapegrasi" (*Batis maritima*) or Virginia grass (*Sporobolus virginicus*)

No.	**SWAMPS (WETLANDS)**
7	**salt and brackish grass swamps:** salt and brackish "short grass" swamps, dominated by spike rush or "drikanti" (*Eleocharis mutata*), or "fini-adrun"-sedge (*Cyperus articulatus*), locally fern swamps dominated by the giant salt fern or "tabaka-tiki" (*Acrostichum aureum*)
8	**open coastal (black) mangrove:** scattered black-mangrove (="parwa") (*Avicennia germinans*) trees brackish grass swamp
9	**brackish grass swamps:** brackish short and tall grass swamps, dominated by the short "fini-adrun"-sedge (*Cyperus articulatus*) or the tall "reed mace" (="cat tail", "langa-grasi", "papayagrasi") (*Typha angustifolia*)
10	**"brantimaka" swamp scrub:** brackish to freshwater swamp scrub, dominated by "brantimaka" (*Machaerium lunatum)*
11	**"kofimama" swamp wood:** brackish to freshwater swamp wood, dominated by kofimama (*Erythrina glauca*)
12	**brackish-freshwater mangrove**: brackish to freshwater black and / or red-mangrove (*Avicennia germinans / Rhizophora* spec.) forest with "pina" (*Euterpe oleracea)* palms
13	**riverside (red) mangrove:** brackish to freshwater red-mangrove (="mangro")-forest, dominated by *Rhizophora*-species: *Rhizophora mangle, R. harrissonii and R. racemosa*. White-mangrove (="akira") (*Laguncularia racemosa*) trees may be found along brackish tidal creeks
14	**"pruimen-zuurzak" swamp wood:** closed freshwater to slightly brackish swamp wood characterized by "zwamppruim" (*Chrysobalanus icaco*) and "zwampzuurzak" (*Annona glabra*)
15	**"babun-mataki-pina" swamp forest** with "babun" (*Virola surinamensis*), "mataki" (*Symphonia globulifera*) and "pina" palms (*Euterpe oleracea*), locally mixed with "posentri" (*Hura crepitans*) or morisi palms (*Mauritia flexuosa*)
16	**"mira-udu"- swamp forest:** freshwater swamp forest, dominated by mira-udu (*Triplaris surinamensis*)
17-18	**"watrabebe" swamp wood:** closed **(17)** and open **(18)** freshwater (to slightly brackish) swamp wood dominated by "blood wood" (="watrabebe") (*Pterocarpus officinalis)*
19-21	**"morisi" swamp forest**: open **(19)** to closed **(20)** swamp forest dominated by "morisi" palms (*Mauritia flexuosa*), locally with swamp wood islands dominated by "watrabebe" *(Pterocarpus officinalis*) and/or "zwamppanta" (*Tabebuia insignis*) **(21)**
22	**freshwater grass swamp:** species-rich freshwater (to slightly brackish) tall grass (graminoid) swamps, locally dominated by the tall "reed mace" (="cattails" or "langa-grasi" or "papayagrasi") (*Typha angustifolia*), "Fefikanti-grasi" (*Fuirena umbellata*) "prasorograsi" (*Cyperus giganteus)* and "mokomoko" *(Montrichardia arborescens*); also short swamp ferns (*Blechnum indicum*) may dominate, locally with scattered "morisi" palms (*Mauritia flexuosa*)
23	**ombrogenous peat swamp:** on thick layer of peat, possibly also on floating peat
24	**dry crop polders and (fallow) rice fields**
No.	**RIDGES**
25	**coastal forest on Moleson ridges:** mixed xero-mesophytic dryland and marsh forest
26	**drowned Moleson ridges**: open grass swamps with or without scattered Morisi palms

All proposed drilling locations are situated along the Oost-Westverbinding. Therefore, all ecosystems are already affected to some extent by human influences. At proposed location CEP01 a lagoon is found (unit 5), bordered by parwa forest (unit 2). CEP02 is situated within a parwa forest (unit 2/3) and CEP03 in a freshwater swamp forest (unit 15). High swamp forest in Suriname known as babun – mataki – pina forest (mapping unit 15) has the highest level of biodiversity of all swamp forest vegetation. Because of past peat fires and more recent vegetation clearing, this type of forest is becoming rare in Suriname. The proposed seismic lines run through open coastal swamps and mangroves, open to closed freshwater ecosystems and the plantation area with agricultural lands and low to high secondary vegetation. See **Photo 1- Photo 4** for some observations.

Photo 1: Freshwater swamp forest near CEP03

Photo 2: Dead mangrove trees north side of the Oost Westverbinding (km 153-155)

Photo 3: Mauritia palms south side of the Oost-Westverbinding (approx. km 119- 121)

Photo 4: Parwa forest with dead trees among in Bigi Pan MUMA

4.3.2 Fauna

The fauna along the road will be typical for man-made and man-affected ecosystems, with animal species that are adapted to/tolerating, or able to cope with the presence of men in general, forest clearing, bush fires (habitat destruction), noise, road kills, hunting and fishing pressure and trapping.
Mangrove forest and associated ecosystems are the feeding and nesting places for coastal birds like Scarlet Ibises (**Photo 5**) and Heron species (breeding seasons from March/April up to July/August and from March-September respectively). These ecosystems are the most important feeding grounds for migrating birds from the North (Canada and Alaska).
Given the location of the proposed drilling locations along the Oost-Westverbinding, no unique, rare, endangered, vulnerable or biogeographically important plant or animal species are expected. Some, like the near threatened (IUCN Red list 2023) Jaguar (Panthera onca), however, occasionally venture into inhabited rural areas, but they tend to avoid people as much as possible.
The proposed seismic lines cross coastal and freshwater swamps. The coastal swamps comprise mangrove forest, lagoons, and open brackish water swamps. It is also indicated as the estuarine zone. Mangrove forests are nursery grounds for many species of marine fish and shrimp and contain a high degree of biodiversity. The entire estuarine zone of Suriname applies to the RAMSAR criteria for wetlands of international importance as all its sub-areas contain the internationally important feeding and nesting sites for Caribbean coastal birds and internationally important feeding grounds for migratory birds from North America.

For the Coronie Swamp the following is mentioned about the fauna by Noordam & Teunissen (2007).

- At least 8 species of mammals are expected to be common, of which 4 species of monkeys.
- The freshwater wetlands are considered to be important for many wetland birds including Rallidae (Rails) and some Ardied (Heron-like) species.

- The Coronie wetlands and the nearby Peruvia Nature Reserve are rich in Psittacidae, particularly the Blue-and-Yellow Macaw (*Ara araurana*), the Red-bellied Macaw (*Ara manulata*), the Red-shouldered Macaw (*Ara nobilis*) and the Amazon (*Amazona amazonica*).
- The Coronie Swamp may be one of the few localities in Suriname where the twatwa (*Oryzoborus crassirostris*) still occurs in significant numbers.
- The number of reptiles and amphibians in the Coronie Swamp may be limited and no unique, rare, endangered, vulnerable or biogeographically important species were found up to now.
- During their nesting season, caimans may become aggressive.
- Anacondas may become very large in the inaccessible parts of the Coronie Swamp.

Parahoe (2008) reports on the collection of 39 species of swamp fish. The most well-known are kwikwi (*Hoplosternum* and *Callichthys* spp), krobia (mainly *Aequidens* spp.), pataka (*Hoplius malabaricus*) and walapa (*Erythrinus erythrinus*).

Photo 5: Observed birds, including scarlet ibis at open area in Ingikondre (km 127- 128)

4.3.3 Protected areas and areas of biological importance

The protected areas within the wider study area are shown in **Figure 18**.

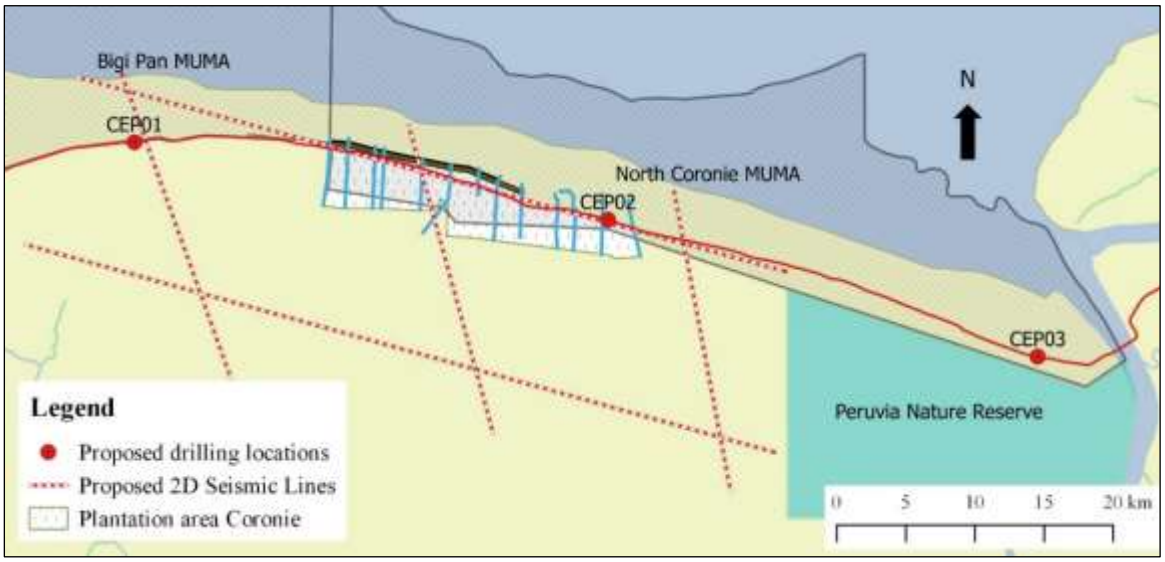

Figure 18: Protected areas in the wider study area.

The Peruvia Nature Reserve was established in 1986 (Staatsblad B 52, 1986), because of its unique ecosystems, species of flora and fauna, and archaeological findings (Teunissen, 1979). As it was recognized that protection of a small part of the (changing) coastline was not adequate to meet the overall goals, the concept of “Multiple Use Management Areas" (MUMA’s) has been adopted. MUMA's are defined as areas where special management by or on behalf of the Government is needed for a rational use of the natural resources, which includes the protection of vulnerable ecosystems and species.

The goals of MUMA’s are:

- To optimize the long-term productivity and sustainable use by man.
- To optimize the long-term natural productivity of the estuarine land zone and the bordering ocean. This will be achieved by maintaining or enhancing the quantity, quality, and diversity of the natural ecosystems and those of formerly cultured areas.
- To promote the development of the sustainable production in man-made ecosystems (as agriculture, animal husbandry and oil exploitation), taking into consideration the demand of unspoiled ecosystem areas. This will be achieved only by respecting the management rules and recommendations set for the area.

At this moment four MUMA’s have been established in most of the estuarine zone of Suriname. Project activities are partly planned within the Bigi Pan and North Coronie MUMA. The MUMA’s in Suriname fall under IUCN Category VI, Protected area with sustainable use of natural resources. The main goal of this category is to protect natural ecosystems and use natural resources in a sustainable way. The MUMA’s comprise a terrestrial and a marine part. The Head of Lands Bosbeheer (LBB; Suriname Forest Service) is the Management Authority of the North Coronie MUMA.

Important Bird Areas (IBA)

Both the Bigi Pan and the North Coronie MUMA are also Important Bird Areas (IBA) which are part of an Endemic Bird Area (EBA) because of the common occurrence of three range restricted species, i.e. with world distributions of less than 50,000 sq. km. Furthermore, the MUMA’s are known to hold, on a regular basis, 1% of the biogeographic population of a congregating waterbird species, and to hold, on a regular basis, 20,000 waterbirds or 10,000 pairs of seabirds of one or more species.

4.4 Socio-Economic Environment

This chapter describes the socio-economic environment of the study area based on existing data, field observations in April, July, and August 2023, several stakeholder consultations, and a resident survey conducted.

4.4.1 Administrative structure

The Area of Influence (AOI) for the project encompasses a significant portion of the Coronie district, situated in the northwestern part of Suriname. Coronie covers an area of 3,902 km², with its capital being Totness. The district is divided into three administrative regions or resorts, each named after its main settlement: Welgelegen, Totness, and Johanna Maria (ABS, 2020). These resorts, along with the capital of Coronie, are depicted in **Figure 19**.

In Suriname, each district is overseen by a District Commissioner (DC), appointed by the government, and affiliated with the Ministry of Regional Development (www.gov.sr). The DC is aided by an advisory council comprising elected civil servants at both the district (known as District Council members or district raadsleden) and resort (Resort Council members or ressort raadsleden) levels. At the local level, the DC is supported by a workforce consisting of BOs and OBOs. Since 2018, the DC has also received support from Adjunct District Secretaries (ADS).

The District Commissioner's Office is situated in Totness, Coronie's primary town, where most of the state's administrative services are concentrated. These include government offices for ministries such as the Ministry of Agriculture, Animal Husbandry & Fisheries (Min. LVV), Public Works (Min. OW), and Regional Development and Sport (ROS). Additionally, other facilities noted during the site visit to Totness include telecommunications provider Telesur, banks, the central market, the police station, and a fire station.

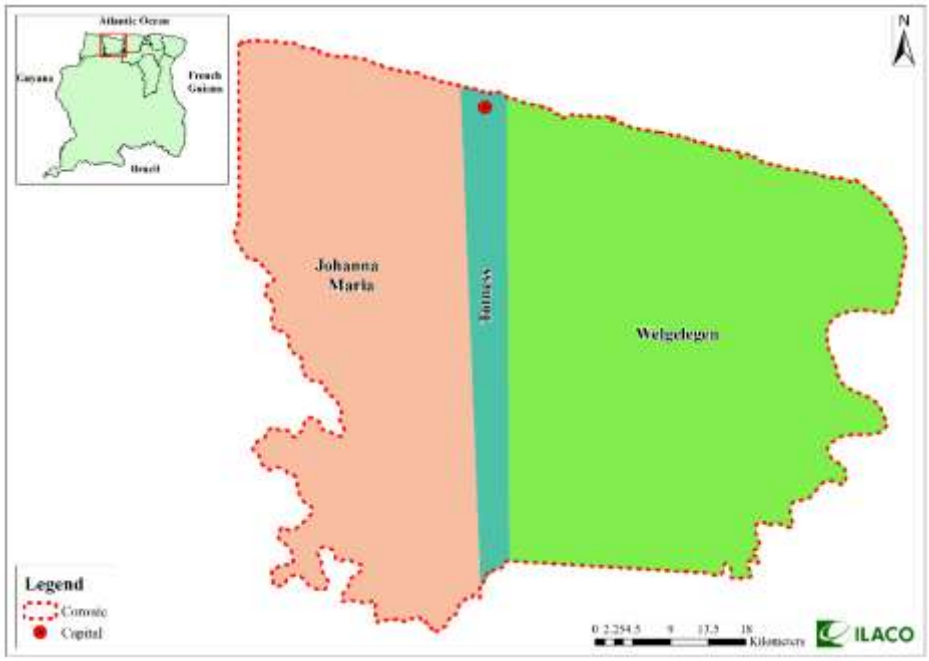

Figure 19: Overview resort of Coronie

4.4.2 Population and Demographics

According to statistics from the Central Bureau of Civil Affairs, the population of Coronie was 2,657 inhabitants as of December 31, 2013, which accounted for less than 1% of the total population of Suriname. After experiencing an average negative growth rate during the period 2006 – 2009, there was a slight increase observed in 2010, followed by negative growth again in 2011 and 2013. A selective form of migration takes place, leading to an aging population (Stichting Planbureau Suriname, 2014).

After 2014 an increase in the population of Coronie is noticeable. After 2014, there has been a noticeable population growth in Coronie. The Coronie district now has approximately 4,000 inhabitants[7] with the majority residing in the Totness ressort, primarily along the Oost-Westverbinding.

4.4.3 Infrastructure and Services

Land ownership and titling

Land in Coronie district can fall under various categories including domain land (domeingrond, or state property), private property (privé-eigendom), allodial property and inherited assets (allodiaal eigendom en erfelijk bezit - aeeb) or landlease (grondhuur). Allodial property (aeeb) is the most common land title in Coronie. Much of the land that is classified as allodial property comprises undivided estates (boedel). This means that a -sometimes substantial- number of family members must agree on decisions regarding the land, even if these family members live abroad. In the Coppename area, several families hold land lease titles (NEC, 2014). As part of the project, Staatsolie is gathering data from the Management Institute Land Registration and Land Information System (MI-GLIS). Notably, the digitalization of land titling information for Coronie, carried out by MI-GLIS, remains incomplete, a status that persists as of 2023. Consequently, providing specific details about land ownership and titling in various segments of the Coronie district proves to be challenging.

Healthcare

Primary healthcare in the study area falls under the Regional Health Service (Regionale Gezondheid Dienst- RGD). During the site visit, the main RGD-clinic was observed in Totness along with a smaller clinic in Hamilton. A Mylab clinic was also identified in Totness.

Education

The Coronie district has four primary schools, 1 Lower Basic Education (LBGO) school, and 1 Secondary Education (MULO) school. Additionally, there is a school dedicated to Lower Technical Education (LTS).

Sports, Recreation, and Culture

The youth in the district lack adequate and sufficient recreational opportunities. Additionally, there is a need for a well-equipped public library stocked with quality literature to promote reading habits. It is proposed (by stakeholders) that a portion of the Cultural Center Coronie building be allocated for this purpose. Furthermore, the districts boast ten religious' denominations in the district and five sports fields. Given the keen interest of young people in activities such as softball and volleyball, there is a significant demand for professional sports guidance.

Drinking water

Due to the small size and dispersion of the population, establishing or expanding utility services on a per-user basis incurs significant costs, thereby limiting households' access to these services. The management of the drinking water supply falls under the Suriname Water Supply Company (SWM). The provided drinking water is of good quality. Drinking water stations were observed on-site in Jenny and Totness.

Photo 6: SWM station at Jenny

Electricity

Electricity is supplied by N.V. Energie Bedrijven Suriname (EBS). However, not all areas along the Oost-Westverbinding are connected to the grid. The area from Burnside onwards (commonly known as the Kutai area) and some inland roads in Coronie do not have access to electricity[8]. In February 2020,

[7] Personal Communication with Suwena Mettendaf, Secretary Districts commissioner of Coronie, August 2023
[8] Personal communication with Micheal Udenhout, Ministry of Agriculture, Animal Husbandry and Fisheries, 28 august 2023

a solar power plant project was realized in Coronie in the Soemboredjo area by Caribbean Development Bank (CDB) and the Ministry of Finance. This solar power plant consists of 920 solar panels, which provides about 9 percent of Coronie's households with electricity through solar energy (N.V. EBS).

Telecommunication

The Totness region is fully equipped with fixed phone lines, while the Welgelegen and Johanna Maria administrative regions have partial coverage. In the Johanna Maria region, the fixed phone line extends as far in the Totness area, and in the Welgelegen region, there is no connection from Mary's Hope to Jenny. The completion of Telesur's fiber-optic project in 2021 has significantly improved the service quality. Further, the offshore sub-sea cables known as the "Suriname-Guyana Submarine Cable System (SGSCS)" makes landfall in Suriname at Totness as indicated in **Figure 20**.

In terms of radio reception, the Suriname Radio Broadcasting Foundation (SRS), broadcasting from Paramaribo, is the only radio station that can be received well throughout the district. Among the two local stations, one is privately operated, and the other is government operated. Additionally, residents in the district can receive television stations such as STVS, ATV, and Apintie.

Waste collection

Waste collection services in Coronie are overseen by the Directorate of Public Greenery, with garbage disposal taking place on Kokoslaan in the Totness administrative region. Supervision of garbage collection and disposal is conducted once a month by the Administrative Service. While Totness benefits from a waste collection service, the Welgelegen and Johanna Maria administrative regions do not. As a result, many residents resorts to burning garbage in their backyards. Additionally, the improper disposal of garbage along the roads by car passengers presents a significant problem, causing issues for both human health and the environment.

Coastal and Water Management

Coronie is susceptible to flooding, prompting various initiatives to tackle waterlogging issues through infrastructure enhancements. To begin with, a 12 km long seawall has been erected along the coastline to mitigate salinization of coastal areas and curb erosion along the Oost-Westverbinding. This construction effort has liberated hundreds of hectares of agricultural land, providing adequate protection against sea encroachment for the inhabited areas of Coronie. Efforts have also been directed at rejuvenating the deteriorated infrastructure for rice production. This includes the construction of canal systems and the cleaning of existing north-south canals. The water-retaining dam, which prevents rice fields from flooding during the rainy season, has been fully restored and is receiving regular maintenance. These improvements in land and water management, coupled with the seawall construction, are fundamental prerequisites for advancing infrastructure development and fostering economic progress (Stichting Planbureau Suriname, 2014). Recently, several dam breaks have occurred along the Coronie shoreline, causing salinization of the ecosystems especially in the northern part of the district.

Transport Infrastructure and Road Network

Transportation to and from Paramaribo is managed by private bus operators. Within Coronie, the National Transportation Company operates a service between Burnside, Friendship, Ingikondre, and Jenny. The National Transportation Company also operates a service with Paramaribo and Nickerie. The road network of Coronie is dominated by the Oost-Westverbinding. Only Totness has several secondary and tertiary roads, some of which are gravel, and a few have been. In 2019, the Jenny- Henar Project was initiated, also aiming to asphalt the Oost-Westverbinding stretch from km 90 to km 209 in Coronie. As of July 2023, sections from km 104 to km 115, km 143.5 to km 148, and km 188 to km 197.5 have already been asphalted in Coronie (ILACO, 2023).

The location of the main infrastructure and facilities are presented in the figure below.

Figure 20: Overview observed facilities within Coronie

4.4.4 Economic activities

The various economic activities in the district include agriculture (rice cultivation and livestock farming), beekeeping, fishery, and mining (shell and sand). Trade in products such as coconut oil, honey, and tamarind syrup also occur mainly along the Oost- Westverbinding. Sometimes, fresh fish and crabs caught from the immediate surroundings are also sold. Another economic activity is (Eco) tourism where tourists usually pay visits to the coastal areas (birdwatching), Cocos plantations and the freshwater swamps (sport fishing).

4.4.4.1 Agriculture

Coronie is located on fertile land, making agriculture its primary economic activity. According to the Ministry of Agriculture, Animal Husbandry and Fisheries, in Coronie, approximately. 4000 ha is used for rice cultivation. Rice is planted in the spring (February-March) and in the fall (November-December). The current planting area is approximately 500 ha. Rice cultivation takes place near the freshwater swamps[9] . Other agriculture land-uses include stock breeding (cattle, poultry, and pig farming), fruits and vegetables (banana, coconuts, cassava etc.) and horticulture. Currently, there are two rice farmers and approx. 50 greengrocers located in the district.[10] During the site visit an agriculture area was observed (at km 138) that is part of the Suriname Agriculture Market Access Project (SAMAP). Some photo's of agriculture activities are presented in **Photo 7- Photo 9.**

[9] Personal communication with Micheal Udenhout, Ministry of Agriculture, Animal Husbandry and Fisheries, 27 April 2023

[10] Personal communication with Suwena Mettendaf, Commisariaat Coronie, 22 August 2023

Photo 7: Rice area in Coronie (May 2023)

Photo 8: Agriculture facility Coronie

Photo 9: Plantain/ Banana field observed

4.4.4.2 Beekeeping

Over 50% of all beehives in Suriname are located in this district. There are about 25- 30 beekeepers in the district, spread across the entire area from Coppename to Novar[1], located in the Totness area. Important nectar plants include Mira-udu, Parwa, Watrabebe, Dyamun, Tapirira, and Brokobaka. Primary challenges in beekeeping include finding suitable locations, the relatively long time between initial investment and harvest, material supply, and transportation facilities (Stichting Planbureau, 2014). According to the Ministry of Agriculture, Animal Husbandry, and Fisheries, the beehives are located between km 120-145. Additionally, near km 163, beyond the Burnside area, beehives are also present[11] (see **Figure 21**). The Ministry of Agriculture, Animal Husbandry and Fisheries supports beekeepers of Coronie by providing training on Hazard Analysis Critical Control Point (HACCP), aiming to meet international standards in order to gain access to the market (www.lvv.gov.sr). It should be note that some of the seismic line as well as the drilling location CEP02 are in close proximity of indicated beehives (see **Figure 21**).

[1] Novar is a village and former plantation in the Coronie district in Suriname. It is on the Oost-Westverbinding, between Johanna Maria (Eastern) and plantation Clyde (Western) in the Totness area.

[11] Personal Communication with Michael Udenhout, Ministry of Ministry of Agriculture, Animal Husbandry, and Fisheries, 29 august 2023

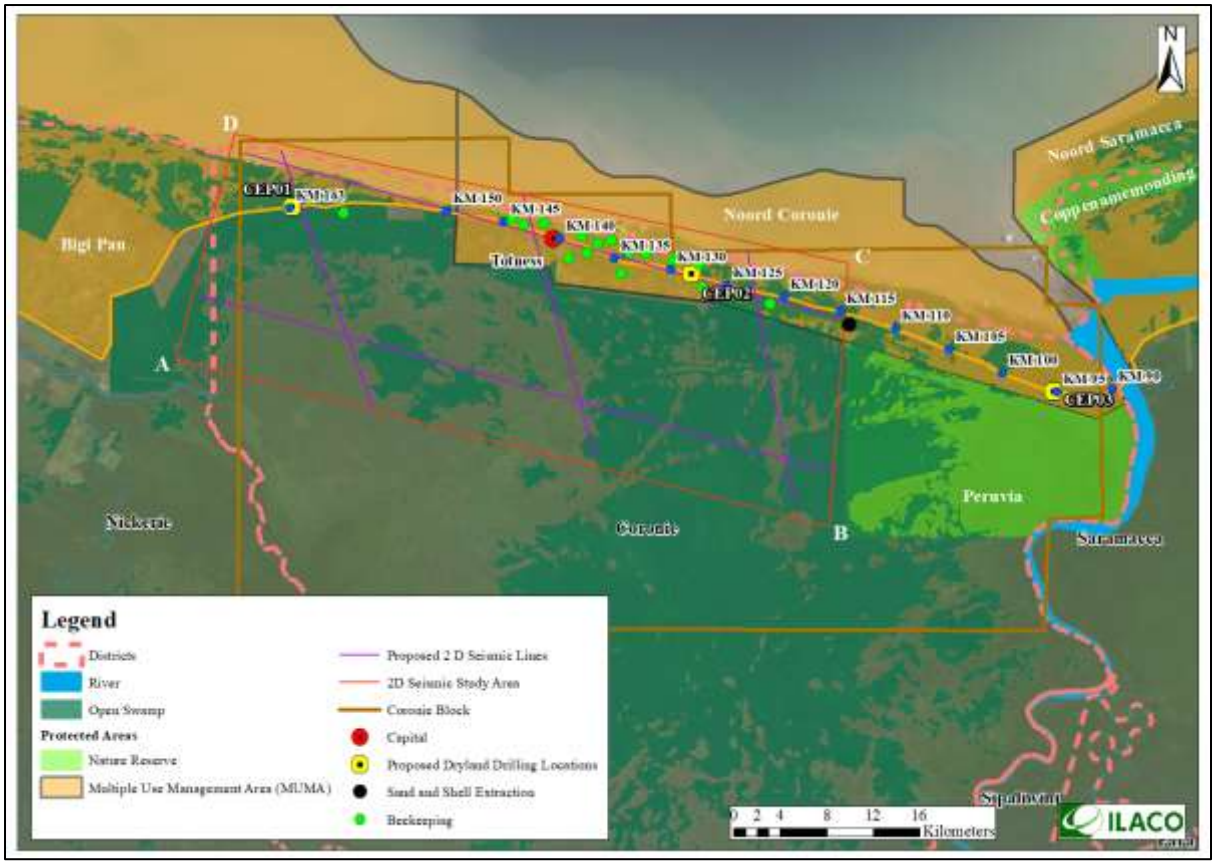

Figure 21: Indicative location of beekeeping

4.4.4.3 Fishery

In Coronie, fishing is carried out on a small-scale in the swamps, mostly near the rice fields, and along the Oost-Westverbinding. Swamp fishing involves catching species such as kwiekwie, krobia, and pataka. Additionally, marine fish, such as sea-shrimps, bang-bang and kandratiki are caught at the coast by individuals with licenses.

4.4.4.4 Shell and Sand Excavations

Large-scale sand and shell excavations are widespread in the district, resulting in significant deforestation and habitat loss for various species. Excavations create large ponds and swamps. Without proper solutions, this human-created issue, combined with natural factors, could lead to even more flooding. Further, sand and shell extraction (mining) are observed within the project area on the south side of the Oost-Westverbinding (see **Figure 22,** black dot).

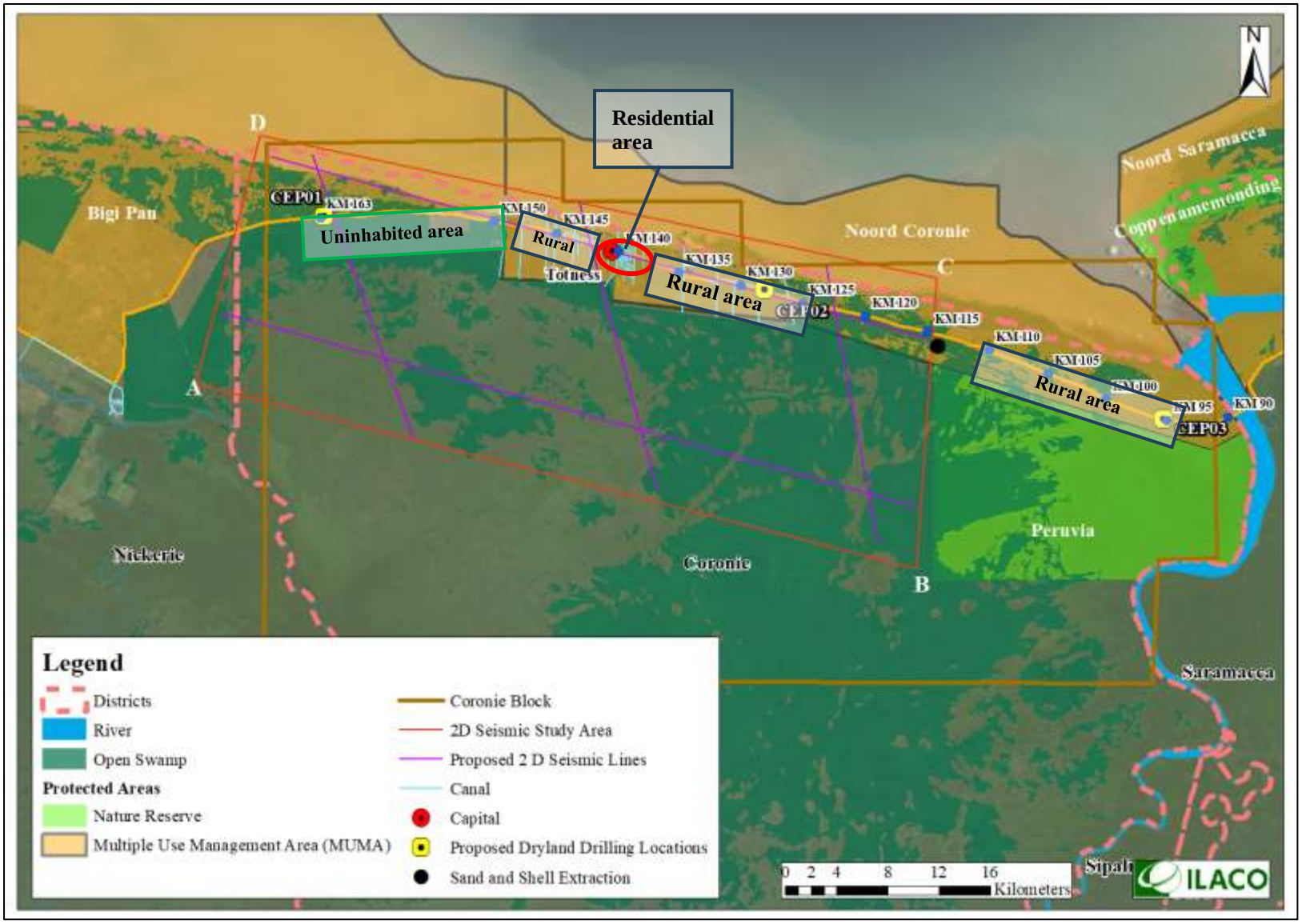

Figure 22: Overview of land use within the project area

4.4.5 Receptors

Coronie is predominantly characterized by extensive brackish and freshwater swamps, collectively referred to as the Coronie Swamp, which remain uninhabited. The inhabited areas can be classified into two main categories: residential areas, including Totness and Friendship, and rural areas, spread intermittently along parts of the Oost-Westverbinding. The majority of the population and housing development is concentrated in the region between Ingikondre and Burnside, spanning kilometers 127 to 150, with Totness having the highest building density. Isolated residences can be found in the area between Ingikondre and Jenny, known as Coppenamepunt. While most of the Oost-Westverbinding features human habitation, there are also uninhabited sections, such as the west side of Burnside. For a visual overview of the open swamps, residential areas (indicated with red circles), rural zones, and primary uninhabited areas along the Oost-Westverbinding, see **Figure 22**.

The nearest receptors to the project drilling activities are description in **Table 16** and some photo's are presented below.

Table 16: Overview nearest receptors of the drilling locations

Well location	Location	Distance to nearest resident
CEP01	Oost-Westverbinding km 163	Uninhabited area
CEP02	Oost-Westverbinding, near km 95	At approx.170 m south of the proposed well location. At approx. 120 m south of proposed well location CEP02, a house under construction was also observed.
CEP03	Oost-Westverbinding, near km 128	At approx. 1440 m west side of the proposed well location.

Photo 10: Uninhabited area near proposed drilling location CEP01

Photo 11: House under construction approx. 120 m south of proposed well location CEP02

Photo 12: Mangrove trees, some dead among, near proposed well location CEP02

Photo 13: Uninhabited area with 1 km from proposed well location CEP03

The proposed east- west 2D seismic line on land goes through the inhabited areas between Ingikondre and Burnside. During the side visit it was observed that this line currently cross some agriculture site and buildings. Indicative location of these areas are descriped in **Table 17** and some photo's are presented below.

Table 17: Overview receptors near seismic lines

Location	Approx. distance	Description
Hamilton	Km 132	The seismic line pass near a guesthouse (Howards Appartementen)
Mary's Hope	Km 138	The seismic line crosses an agriculture area. The site is fenced and some greenhouses were observed (**Photo 8**).
Totness	Between km 138 and 141	The seismic line crosses or pass nearby several buildings within this section, such as a shop, houses, child care centrum and government offices in the Geraniumstraat. Nearby, two graveyards and the drinking water supply stations (SWM stations) in Totness were also observed.
Burnside	Between km 148 and 149	The seismic line cross/ goes near some buildings (houses)

Photo 14: A childcare centrum in the Geraniumstraat (Totness)

Photo 15: Houses and cemetery in the Geraniumstraat (Totness)

Photo 16: RGD clinic at Hamilton (km 132-132)

Photo 17: A school, church and graveyard at Hamilton (km 131- 132)

Photo 18: RGD clinic in Totness (km 141)

Photo 19: Health clinic (My Lab) in Totness (km 141)

Photo 20: A church observed at km 145

Photo 21: A school observed at km 145

4.4.6 Planned Developments

Planned developments for the Coronie District include the hydrological study of the Coronie Swamp, which involves an investigation of a hydrological system and drainage of the Coronie swamp, including coastal management. Furthermore, there is the continuation of the Jenny- Henar Rehabiltation Project, which covers the Oost-Westverbinding (ILACO, 2023). Another planned project is the start of coconut planting by the company Pomeroon. The planting area will be approximately 1000 ha and will be located at the area near the Oost-Westverbinding km 170 (De West, 27 September 2023). Further, there is a potential UNDP project concerning the protection of the parwa and the mangrove zones (ILACO, 2023). Finally, there are ideas for developing water-based tourism in the Coronie swamp based on research conducted by N. Kalloe in 2013 (comm. Mr. Sinester, 7 November 2023).

4.4.7 Archeological and historical sites

Mounds associated with the Hertenrits Culture (700 – 1250 years A.D.) have been discovered both to the east (Peruvia) and to the west (Hertenrits) of the project area. Notably, a mound attributed to the Hertenrits Culture has also been identified in Burnside, Coronie.

Within the ridge area of Coronie, six (6) archaeological sites are recognized, although none have been definitively linked to a particular culture. Importantly, there are no known historical sites within the Coronie Swamp (Noordam & Teunissen, 2008). It's worth noting that all these known archaeological areas within the ridge area of Coronie fall within the Area of Influence (AOI) of the project.

Figure 23: Overview known and possible archaeological sites in Coronie (Noordam & Teunissen, 2008)

5 Public Consultation

5.1 General

Stakeholder engagement and consultation are integral components that run throughout the EIA process. The purpose of stakeholder engagement is to ensure that stakeholders are consulted beforehand about the project and its potential environmental and social impacts. The process offers stakeholders the opportunity to make comments, suggestions, and voice any concerns, which are then considered during the preparation of the ESIA report and the development of mitigation measures and management plans for the project.

The study began with the official Contract Signing. The project approval and the official kick-off meeting were held on the 18th of November 2022. On the 15th of December 2022, NIMOS was consulted about the approach, methodology, and additional concerns to be included in the study.
Stakeholders have been consulted during the scoping and during the ESIA assessment phase. Prior to these consultation meetings, individual stakeholders were contacted by email, along with a Background Information Document containing a non-technical summary of the project and the ESIA process, to provide stakeholders with advance project information.

During the scoping phase, individual meetings were held with the:

- Nature Conservation Division of the Forestry Service Suriname (NB-LBB) on the 26th of April 2023,
- The District Commissioner of Coronie on the 27th of April 2023, and
- The Division of the Ministry of Agriculture, Animal Husbandry and Fisheries (Min. LVV) in Coronie on the 27th of April 2023.

Additionally, on May 10, 2023, a public meeting was held in the Multifunctional Hall (Multifunctionele zaal) near the DC's office. The process and the outcomes of this meeting are presented in the Final Scoping Report (ILACO, July 2023).

During the ESIA assessment phase, individual meetings were also conducted, and a resident survey was undertaken (see **Table 18**). Prior to these meetings, Staatsolie published a notification through the Districts Commissariat (DC) via their social media from June 16th to June 23rd, 2023, for registration of landowners in the project area. With information gathered through this notification, Staatsolie provided a stakeholder list with potential landowners to be consulted. This complete list is included in **Appendix 6**.

Table 18: List of consulted stakeholders

Date	Time (approx.)	Stakeholder	Type of meeting	Platform
Government organizations				
22-Aug-23	09:30	Natuurbeheer Regio West	Individual	By phone call
Possible Landowners				
2-Aug-23	11:00	Landowner #1 (km 97)	Individual	Physical in Paramaribo
2-Aug-23	13:00	Landowner #2 (km 99-100)	Individual	Physical in Paramaribo
4-Aug-23	10:00	Landowner #3 (km 119-120)	Individual	Physical in Paramaribo
4-Aug-23	13:00	Landowner #4 (km 108)	Individual	Physical in Paramaribo
10-Aug-23	13:00	Landowner #5 (km 98)	Individual	By phone call
11-Aug-23	15:00	Landowner #6 (km 98)	Individual	Physical in Coronie
11-Aug-23	14:00	Landowner #7 (Burnside)	Individual	Physical in Coronie
11-Aug-23	12:00	Landowner #8 (km 98) and (km 173)	Individual	Physical in Coronie

16-Aug-23	16:00	Landowner #9 (km 98)	Individual	Physical in Coronie
16-Aug-23	15:00	Landowner #10 (108)	Individual	Physical in Coronie
16-Aug-23	15:30	Landowner #11(km 98)	Individual	Physical in Coronie
23-Aug-23	14:00	Landowner #12 (km 99,5) and (km 123)	Individual	By phone call
23-Aug-23	13:00	Landowner #13 (km 121)	Individual	By phone call
Residents – 57 respondents				
11th and 16th of August 2023.	9.00-16.00	Residents (km 57- km 150)	Individual	Questionnaire (included in **Appendix 6**)

The ESIA public meeting was held on the 31st of October 2023 from 10:00- 12:00 a.m., at the CCC-building in Coronie. A total of approx. 32 individuals attended this meeting. The comments and suggestions from this meeting were shared with Staatsolie, and to the extent feasible, incorporated into this report and/or included in the mitigation measures. The ESIA report was made available on the NIMOS repository site on the 16th of October and on the Staatsolie website for a period of 30 days. The details of the public meeting, including the presentation and attendees, are included in **Appendix 4.** During the public review period, additional stakeholder meetings were held on the 7th and the 14th of November 2023 with the representative of a group of intellectuals from Coronie. The minutes are also included in **Appendix 4**.

5.2 Stakeholder Consultation Results

A summary of concerns voiced during the stakeholder consultation is presented in the table below. See further information in **Appendix 6**.

Table 19: Results stakeholder meetings and resident survey

Stakeholder Category	Stakeholder	Concerns
Government	Department of State Forest Management (LBB)- Natuurbeheer Regio west Coronie	• LBB carries out observations in the area to identify any illegal or unauthorized activities. While such activities are infrequent, instances of individuals from different regions engaging in activities like bird hunting off the coast have been observed. • One of the key challenges faced by Nature Conservation Regio West is the lack of a seaworthy boat. This limitation restricts their ability to effectively monitor and control activities in coastal areas. • Based on lessons learned from previous projects, it is crucial to establish effective communication and coordination with contractors of Staatsolie.
Landowners	Several	• Clarity about the locations where Staatsolie is planning activities. • Various landowners engage in agricultural activities and beekeeping on their land, which can be impacted by the project activities. • In previous projects there was a lack of clear agreements: which led to misunderstandings and conflicts with landowners. • Timely, clear and transparent communication from Staatsolie including adequate information sharing. • Community awareness: in previous projects there was also a lack of awareness among local communities about ongoing activities and upcoming developments. • There is a concern for environmental damage (e.g. poor soil preventing agricultural activities) and damage to property (e.g. cracks in houses) • Landowners are also concerned about the property inheritance issues that and how these will be addressed by Staatsolie.
Residents	Several	• Several landowners have concern about flooding and saltwater intrusion (due to dam breaches and drainage canals that are not maintained). This is an existing issue in the district. • There are concerns about damage to houses, cracks and sinking of houses, poor soil quality that will prevent agriculture. • Environmental impact and impact on animals in the area. • Improvement of communication with the local community during all project phases. Residents would like to be informed for example through the use of a sound truck and/or distribution of flyers. To address the local dispersion of residents, it has been proposed to arrange transportation for public meetings so that they can actively participate and stay informed. Some residents mentioned that they heard about the project but were unable to attend the public meeting because of lack of transportation.

Based on the consultations, it can be concluded that stakeholders generally welcome the project and development in their district. They are open to engaging in dialogue with Staatsolie, provided that their concerns are addressed. In summary, these concerns include:

1. Establish effective communication, involvement, and coordination with Staatsolie. Information sharing and community awareness are crucial throughout all project phases.
2. Addressing concerns related to environmental and property damage.
3. Addressing potential impacts on livelihood of those engaged in agricultural activities and beekeeping in areas where the project activities will be conducted.
4. Managing the potential of coastal area flooding due to project activities, recognizing that this is an existing problem.

5.3 Stakeholder Engagement Plan

Additionally, a Stakeholder Engagement Plan (SEP) has been developed for the project to ensure a consistent procedure is followed during all stakeholder engagement. The ESIA-consultant is responsible for the stakeholder engagement during the ESIA process and Staatsolie is responsible for the stakeholder engagement during the project execution.

Communication with several relevant stakeholders will be an ongoing process.
Table 20 presents the preliminary SEP (Stakeholder Engagement Plan), with relevant stakeholders and required actions per project phase. The SEP may be updated during the execution of the project.

Table 20: Stakeholder Engagement Plan

Stakeholder (Who)	**Information sharing (What)**	**Frequency (When)**	**Communication method (How)**
Phase 1: ESIA study (responsibility of consultant with input from the Applicant)			
Government institutes (DC, LBB, LVV, KPS etc.)	Proposed project and planning of the project Expected impacts. Project risks, safety, and security measures	Scoping and ESIA phase	BID document. Online/ physical meetings Public consultations
Directly affected stakeholders (landowners/ land and road users/ residents)	Proposed project and planning of the project Expected impacts and mitigation measures	Scoping and ESIA phase	BID document. One-on one meetings Public consultations Release of ESIA report
Phase 2: Prior to the start and during the project (responsibility of the Applicant)			
Government institutes (DC, KPS, LBB, LVV etc.)	Announcement regarding general information and/ or update planning about the project.	Prior to the start and during the project	During regular communication Phone calls
Directly affected stakeholders (landowners/ land users/ residents)			Posters/ Flyers Phone calls Field visits Focus group meetings
Users of the Oost-West verbinding	Planning of the project (transportation of equipment along main roads)	During the life of the project, where applicable	Posters/ Flyers Announcements in newspapers Staatsolie website/ Facebook page Through BIC Coronie
Phase 3: After the seismic or drilling activities (responsibility of the Applicant)			
Local community and relevant institutes	Project results and outcomes	Upon project completion	Poster/Flyers Focus group meetings. Staatsolie website/Facebook page Through BIC Coronie

6 Environmental Impact assessment

6.1 Introduction

In this Chapter, the actual and potential impacts of the proposed project and their mitigation measures are evaluated and discussed. The applied methodology is explained in **Appendix 1**.

Due to the resemblance with previous similar projects a range of standard best practice procedures and impact reduction measures (or inherent mitigation measures) are adopted from the previous studies. The lessons learned regarding the efficiency of proposed mitigation measures based on existing monitoring results elsewhere have also been taken into consideration. In addition, the experiences of stakeholders from previous projects have also been taken into consideration. Finally, any identified cumulative impacts are discussed separately.

6.2 Impact assessment

A summary overview of the potential impacts, impact significance, mitigation measures and residual impact for the environmental and socio-economic environment is presented in the tables below.

6.2.1 The 2D Seismic Exploration Program

Table 21: Bio-physical Impacts with Proposed Mitigation Measures for the 2D seismic operation

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
Air	Reduction of air quality due to project emissions	Local receptors	Mag: negligible; medium-term; small-scale Probability: medium Significance: Negligible	• Select the quietest and most effective equipment available. • Ensure that the contractor has a maintenance schedule for combustion equipment and that maintenance on the equipment is done accordingly. • Reduce the number of transportation trips to the minimum (adequate planning)	Negligible
Noise	The noise of project traffic will affect local population when operated near inhabited areas	Local receptors	Mag: low; medium-term; small-scale Probability: high Significance: Minor	• Locate the landing stages at such distance from houses or working locations that noise levels for people are acceptable. • Reduce the number of transportation trips to the minimum (adequate planning) • Have a complaint mechanism in place (Grievance Redress Mechanism)	Negligible
	Noise and vibration due to the use of seismic explosives	Local receptors	Mag: low; medium-term; small-scale Probability: low Significance: Negligible	• This impact cannot be further reduced. Small charges of explosives will be used at 20 m below surface level.	Negligible
Water resources	The construction of seismic drilling holes can result in result in changes in water quality (suspended solids) in swamps and canals	Aquatic life and water users	Mag: low; medium-term; small-scale Probability: medium Significance: Minor	• Plan drilling holes on third party land in consultation with the landowners and have a proper landowner agreement in place. • Plan drilling holes in consultation with land and water users (in stakeholder meetings) • Locate transport routes as much as possible in herbaceous vegetation	Negligible
	Fuel or oil spills from equipment (e.g. boats) can lead to water pollution	Aquatic life and water users	Mag: low; medium-term; small-scale Probability: low Significance: Negligible	• Use leak proof containers and storage tanks at landing stages. • Provide adequate containment in case of container or tank leakage. • Have the oil spill contingency plan in place for the area under consideration	Negligible

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
	Project transportation leads to change of water quality: increased pollution with suspended solids in swamps and canals	Aquatic life and water users	Mag: low; medium-term; small-scale Probability: medium Significance: Minor	• Keep a low speed when a swamp area or canal has to be crossed	Minor
	The construction of new trails and drilling holes can result in changes in the swamp hydrology and hydrology of areas susceptible to flooding	Local receptors	Mag: negligible; medium-term; small-scale Probability: low Significance: Negligible	• Limit to a minimum the construction of trails in swamps and waterways • Scouting must be conducted before commencing the work. The objective is to map any dams and/or ridges. For seismic operations the breaching of dams/ridges is not foreseen. • Plan trails on third party land in consultation with the landowners and have a proper landowner agreement in place. • Plan trails in consultation with land and water users (in stakeholder meetings, see Stakeholder Engagement Plan)	Negligible
Ecosystems: vegetation clearing for camp sites and trails	Loss of trees in forests within the Bigi Pan and North Coronie MUMA at the proposed project area	Vegetation and wildlife	Mag: low; long-term; small-scale Probability: high Significance: Minor	• Do not construct landing stages and camps or trails in protected areas. • When relocation of seismic lines is not possible: apply only hand clearing in forests near the proposed nature reserve. • Limit clearance to 1-2m for seismic trails	Negligible
Ecosystems: grass and peat fires	Increased fire hazards due to third parties that accidentally or on purpose set fire in swamp areas of the project area especially in the dry seasons: grass and peat fires damage vegetation, flora and fauna and threaten people, camps, boats, equipment and vehicles	Vegetation, wildlife, and humans (workers in the area)	Mag: low; medium-term; small-scale Probability: low Significance: Negligible	• Develop and implement strict fire control procedures and measures. • Plan operations outside the height of the dry season • Include fire risk awareness in the training program for the contractors working in the seismic survey area	Negligible

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
Ecosystems: noise and fauna	Noise of project traffic can disturb wildlife, especially near breeding colonies of coastal birds, and areas with foraging birds as is the case with the Blue-and-Yellow Macaws in the posentri forests in the Peruvia NR	Fauna	Mag: low; medium-term; small-scale Probability: medium Significance: Minor	• Staatsolie will not conduct any project activities (including traffic routes) within the nature reserve. • Use other means of transport near nature reserve. • If activities must be conducted near the nature reserve plan these activities outside the breeding seasons (March/April up to July/August and from March-September) • Keep the noise levels as low as possible and the project period as short as possible; use manual augers instead of motorized drilling equipment near the nature reserve	Minor
Ecosystems: water transport and fauna	Water travel can result in collisions with wildlife resulting in death of animals	Fauna	Mag: low; medium-term; small-scale Probability: low Significance: Negligible	• Apply the Waterway Traffic Regulations developed for Calcutta (adapted when necessary) • When constructing new trails, avoid as much as possible creeks with floating vegetation. • All transport outside the project area and off the trails should be forbidden, or should be bound to permission from the Project Manager • Keep a low speed when a swamp area or creek must be crossed or when wildlife is observed.	Negligible
Ecosystems: water pollution and fauna	Increased pollution with suspended solids, fuel or oil can affect the aquatic fauna and fisheries	Fauna	Mag: low; medium-term; small-scale Probability: high Significance: Minor	• See measures for water resources	Negligible
Ecosystems: hunting, poaching and collecting	Improved access and the influx of people can cause increased poaching and bird trapping in the project area and cause general disturbance to the fauna	Flora and fauna	Mag: low; medium-term; small-scale Probability: medium Significance: Minor	• Enforce strict admission rules for third parties for the project areas (if legally possible) • Trapping of songbirds should be prohibited also for contractors • If required, request special assistance from government's game and fish wardens (e.g. LBB) responsible for control of fish and wildlife as early as possible in the project and follow their necessary permitting procedures. • Upon closure: make access (only those created by Staatsolie for the project) into the project area inaccessible for third parties (unless agreed otherwise with landowners); maintain already existing trails only for example for monitoring purposes. • Implement above mitigation measures in consultation with the nature conservation authorities and local stakeholders	Minor

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
Nature conservation	Seismic survey activities in the MUMA's could damage the integrity and conditions of these areas	Nature conservation	Mag: medium; medium-term; small-scale Probability: medium Significance: Moderate	• Organize an awareness program for contractors to emphasize the importance of working within, near, and around MUMAs. Furthermore, ensure that mitigation measures for noise, water resources, and ecosystems, among others, are highlighted in such programs and that strict planning and inspection of fieldwork within the MUMAs must also be conducted and why. Close cooperation with LBB- Natuurbeheer in order to avoid sensitive areas and/or periods.	Minor
Archaeology	Destruction of or damage to archaeological sites occurs during soil moving/drilling activities related to trail construction or landing stages or camp sites	Archaeological sites	Mag: low; medium-term; medium-scale Probability: medium Significance: Minor	• Plan access routes and camp sites in such way that they remain at some distance from known or possible archaeological sites. • Create awareness amongst construction staff regarding the significance of such finds and on indicators of the presence of such sites (especially exposed pottery sherds, bed structures, spots with deviating terrain and vegetation). • Have a chance find procedure in place (Appendix 3E): – Cease all construction activities in the area if a potential site is noticed, and cordon off area. – Notify the Project Manager immediately, who will give a preliminary assessment of the site and will notify the National Museum ("Surinaams Museum") – Ask the National Museum to undertake a detailed assessment of the site if deemed necessary in the preliminary assessment. – Follow recommendations made in preliminary and/or detailed assessment as appropriate	Minor
Solid waste and sewage	Release of solid waste and sewage from landing stages, camp sites or from workers during seismic survey can result in water pollution	Aquatic life and water users	Mag: negligible; medium-term; small-scale Probability: low Significance: Negligible	• Manage all solid waste, produced during project activities, according to the Staatsolie Waste Management Plan	Negligible
	Solid waste and sewage from project activities can affect the visual aesthetics of the study area	Local receptors (community)	Mag: low; medium-term; small-scale Probability: medium	• Provide basic sanitary facilities. • Provide waste bins and have other provisions for appropriate waste collection and disposal. • Promote waste reduction, re-use, recycling amongst personnel. • Do not litter and/or leave any waste behind in the project area	Negligible

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
			Significance: Minor		

Table 22: Socio-economic Impacts with Proposed Mitigation Measures for the 2D seismic operation

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
Reputation of Staatsolie and the Seismic contractor	Loss of social license to operate due to project activities	Staatsolie/ Seismic contractor	Mag: medium; long-term; medium-scale Probability: medium Significance: Major	• Ensure that the contracted seismic company is informed and held responsible for applying the EMMP recommendations. • Verify whether the seismic equipment is in conformity with the standards and ensure that there is an Emergency Response Plan, an Oil Spill Contingency Plan, and a Waste Management Plan in place; these plans should be approved by NIMOS. • Ensure that land-use agreements have been signed with all landowners (where applicable), prior to the start of seismic activities. • Certify that the Seismic Contractor is equipped to comply with the EMMP.	Moderate[12]
	Income generation for local businesses and employment of local workers due to local purchasing of goods and services	Local community	Mag: low; medium-term; small-scale Probability: low Significance: Negligible	• Require that seismic contractor sources goods/materials and services locally, as much as possible. • Build/strengthen capacity of local workforce to obtain skills necessary for the project.	Minor
	Social conflicts and community health, safety and security	Local community	Mag: medium; medium-term; small-scale Probability: medium Significance: Moderate	• Ensure that seismic contractor personnel are aware of the HSEQ requirements of Staatsolie (e.g., Code of Conduct, Alcohol and Drugs policy, COVID-19 Preventive measures in accordance with Public Health regulations, etc.). • Ensure that the contents of the CR Policy of Staatsolie is communicated with and disseminated amongst personnel. • Ensure that a Code of Conduct that applies to premises outside Staatsolie (e.g., at their settlement) is in place and all personnel	Minor

[12] This impact requires attention from Staatsolie and has been classified as moderate, even with mitigation measures. This because not all relevant stakeholders (landowners) are known at this point. It should be noted that the impact can be further reduced to minor during project execution, once Staatsolie has identified the landowners and establishes agreements with them.

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
				(both foreign and local workers) are aware of the content of this Code. • Ensure that an Alcohol and Drugs Policy is in place, that applies to premises outside Staatsolie (e.g., at their settlement) and all personnel (both foreign and local workers) are aware of the content of this Policy. • Have a communication plan in place and adhere to the proposed stakeholder engagement plan (SEP).	
	Social unrest develops because people have the feeling that Staatsolie is not properly addressing nuisances that they experience or problems, which they believe to have been caused by the project	Landowners and local community	Mag: medium; medium-term; medium-scale Probability: low Significance: Minor	• Organize in time stakeholder meetings with the land and water users. • Involve the local people and keep an open dialogue during all stages of the project as relevant to them. • See further measures proposed for noise, hydrology, water quality and land and water use.	Negligible
Mobilization and seismic survey	Various potential interactions due to increased traffic in general including boat traffic, wires, lines, explosives transport and personnel transportation etc.	Local community and Staatsolie	Mag: negligible; medium-term; small-scale Probability: low Significance: Negligible	• See measures social conflicts and community health, safety, and security. • During the seismic project phases, have an appropriate planning in place and incorporate safety zones based on risks assessed.	Negligible
	Damage to pipelines, cables, buildings, agricultural area etc.	Local community	Mag: low; medium-term; small-scale Probability: medium Significance: Minor	• Keep sufficient distance between shot hole and objects: telephone line 7-meter, electric power line 23-meter, pipeline 15-30 meter, wells 70 meter, and brick and/or concrete buildings 85 meter.[13] • Properly map existing and planned wells in case of simultaneous operation with the Exploration drilling Project. • Contractor will determine safe distances by executing peak particle velocity (PPV) measurements prior to acquisition, in	Minor

[13] These safety distances were determined during the past seismic projects executed by Seismic Company Service (SCS), considering the charge size, shot-hole depth and local conditions. SCS is highly experienced in seismic activities in similar environments and with previous Staatsolie projects in Suriname.

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
				which case he should demonstrate that at any closer distance the effects are still insignificant. • Uphold established communication structures with the local community to ensure that landowners (where applicable), and other key stakeholders are notified (verbally and/ or in writing) in a timely and suitable manner of the seismic schedule so that they are aware of where and when seismic activities will be taking place. • One staff member of Corporate Communication Upstream must be appointed as primary contact person or focal point specifically for the project in order to avoid misunderstandings or confusion in the communication with relevant stakeholders and the name and contact information of this staff member must be communicated with relevant stakeholders. • Confirm that local communities are aware of the existence of the Staatsolie grievance mechanism and/or complaints procedure and are informed how to make use of it. • Continue implementing a complaints registry and investigation procedure to warrant the appropriate and satisfactory response to presented grievances. • Lessons learned from previously executed similar projects should be taken into account. • In case seismic surveys will take place on private lands, ensure that written agreements have been signed between Staatsolie and relevant landowners. It is crucial that the agreement is reached with relevant landowners in the planning and preparation phase before commencement of the seismic surveys. • Upon completion of project activities, ensure that the premises of relevant landowners are inspected by all parties relevant, to inspect the land and check any problems, damage to buildings or other structures, improperly filled or leaking shot holes, garbage, or debris, any contaminates, improperly disposed of excavated soil, tags that could damage livestock, any form of damage, and document in writing all occurrences. • Any identified outstanding issues will be addressed appropriately (to the satisfaction of the landowner).	

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
				• When no problems or shortcomings are observed, or when any issues have been addressed, the owner will sign for release.	
	Water transport leads to dangerous situations with other boat transport (e.g. fishermen, tourists, game warden), with potentially fatal casualties	Water users	Mag: low; medium-term; small-scale Probability: low Significance: Negligible	• Follow Calcutta Waterway Traffic Regulations • Involve the local people and keep an open dialogue during all stages of the project as relevant to them. • Place signs in critical areas to indicate boat routes. • See measures listed for damages to pipelines etc.	Negligible
	Noise, dust and other forms of nuisance	Local community	Mag: low; medium-term; small-scale Probability: medium Significance: Minor	• See measures above	Negligible
	Occupational health and safety (attacks from wildlife such as bees, snakes, general swamp safety e.g. hydration, vector borne diseases (mosquitos), sunburn and other environmental hazards such as unstable ground, waterborne diseases, extreme weather conditions)	Staatsolie personnel and contractors	Mag: medium; medium-term; small -scale[14] Probability: medium Significance: Moderate	• Workers should wear protective clothing. • Train workers to be aware of bee activity and nests in the area. Look out for signs of beehives and avoid disturbing them. • Encourage employees to be vigilant and avoid reaching into tall grass or undergrowth without first checking for snakes. Snakes may be camouflaged and difficult to spot. • Ensure that all survey team members are trained in basic first aid, including snakebite treatment. Have a well-equipped first aid kit on-site. • Ensure that all team members receive thorough safety training, including specific instructions on how to deal with bee and snake encounters. • The following safe distance measures (personal comm. with Mr. Kodabaks- Min. LVV) should be followed when working/ traveling near beehives:	Minor

[14] For each location and activity, there will be a minimum of 2 people present. However, activities may run simultaneously, and the number of people can increase to 3-5 individuals, and in peak situations, even up to 15 people. The scale of this impact remains small because potential dangers will be assessed during the scouting phase (2 persons), and therefore, mitigating measures will already be in place for those who come afterward.

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
				○ In case the presence of high/ dense forest, a min. of 150m should be maintained. ○ In case of less dense forest, a distance of 250m should be maintained and ○ 350m should be maintained for an open area. • Ensure that workers stay well-hydrated and have access to clean water. • Establish a clear communication plan for the survey team to call for help in case of emergencies. • Consult with local experts or authorities who are familiar with the specific risks in the swamp area	
	Water pollution from fuel and oil spills, and solid or liquid waste impacts the drinking and washing water quality of local communities	Local community	Mag: negligible; medium-term; small-scale Probability: low Significance: Negligible	• Plan landing stages, camp sites and storage areas in consultation with the local stakeholders • See measures proposed for waste management and fuel and oil spills	Negligible
	Water pollution from fuel and oil spills, suspended solids and solid or liquid waste results in lower fish catches	Local community	Mag: negligible; medium-term; small-scale Probability: low Significance: Negligible	• See measures proposed for water resources	Negligible
	Transport through swamps could damage fishing nets	Fishermen	Mag: low; medium-term; small-scale Probability: low Significance: Negligible	• Plan activities together with the local land and water users • Limit activities in fishery zones • Compensate for any damage done by Staatsolie/contractor to fishing equipment	Negligible
	Seismic survey activities lead to loss of crops or cattle, or damage to farm infrastructure (impact of livelihood)	Farmers	Mag: low; medium-term; small-scale Probability: medium	• Conduct a detailed assessment of the surroundings during clearance activities and plan the seismic operation on outcome of this assessment. • Involve the local people (those affected and the local government) and keep an open dialogue during all stages of the	Negligible

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
			Significance: Minor	seismic survey activities in their area (communication plan and SEP) • Perform activities in rice polders preferably on dry land, not when cropped. • Where and when possible: relocate seismic lines to an area outside pastures and active cropping land	
	Solid waste pollution / Visual and health related problems	Community	Mag: negligible; medium-term; small-scale Probability: low Significance: Negligible	• Manage all solid waste, produced during project activities, according to the Staatsolie Waste Management Plan • See further measures proposed for solid waste and sewage (**Table 21**)	Negligible
	Sewage / Water pollution and health related problems	Local community	Mag: negligible; medium-term; small-scale Probability: low Significance: Negligible	• Provide basic sanitary facilities. • See further measures proposed for solid waste and sewage (**Table 21**)	Negligible
Decommissioning and restoration	Upon completion of project activities, there is remaining damage to the property, or waste present	Landowners and local community	Mag: medium; long-term[15]; small-scale Probability: medium Significance: Moderate	• Staatsolie and (where applicable) the respective landowner shall inspect the land and check any outstanding actions resulting from the work activities, damage to buildings or other structures, improperly filled or leaking shot holes, garbage, or debris, any contaminates, improperly disposed of excavated soil, tags that could damage livestock, any form of damage, and document in writing all occurrences. When no problems or shortcomings are observed, the owner will sign for release.	Minor

[15] This impact is scaled with a long-term duration because there may be ongoing agreements with the landowners after the project concludes

6.2.2 Exploration Drilling Program

Table 23: Bio-physical Impacts with Proposed Mitigation Measures for the exploration drilling

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
Air quality	Reduction of air quality due to project emissions	Local receptors	Mag: low; medium-term; small-scale Probability: medium Significance: Minor	• Select the quietest and most effective equipment available. • Regularly maintain engines of vehicles and equipment. • Operate and maintain exhaust systems and engines in accordance with the manufacturer's specifications. • Use preventative maintenance and repair programs. • Reduce number of transportation trips to the minimum (adequate planning) • Require above also from Contractors	Negligible
Noise	Noise during land preparation, construction of required installations and equipment, drilling, transportation- on-site and via access roads, and during decommissioning activities	Local receptors	Mag: low; medium-term; small-scale Probability: medium Significance: Minor	• See measures for air quality. • Conduct site inspections and keep a minimum distance of 100 meters between the drilling site and the nearest dwelling. • Consider safe distances to avoid effects on bees (aggressive or immobile bees due to increase noise levels), see measures at occupational health and safety. • Truck and other heavy transport should only be operational during daytime. • Install noise screens around the drilling site or at least at the side where houses are found within the 100 m. • Have a complaint procedure in place (Grievance Redress Mechanism)	Negligible
Soil resources	Soil degradation and loss of soil productivity due to compaction and/or soil contamination during construction of access roads and preparation of drilling site	Landowners and land users	Mag: low; medium-term; small-scale Probability: medium Significance: Minor	• Make an assessment of the local soil conditions of any access route and the well location before the start of activities, comprising soil profile description, soil density and soil analytical parameters that could be affected by the activity (salinity, visual oil contamination in soil and/or groundwater) • Avoid clearing and construction works under wet conditions as much as possible. • Limit clearance of shrubs and low trees as needed and preferably by light machine. • Spread sand without disturbance of the original topsoil. • During drilling: use mats or other protective materials as required.	Minor

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
				• After decommissioning: Conduct a soil assessment to check any changes and if necessary, ameliorate the soil-by-soil tillage (to remove soil compaction) and soil cleaning (in case of contamination, or • Compensate the owner for any loss of land if so identified	
Surface water resources	Water pollution during construction of access roads and preparation of drilling site	Aquatic life, water users and landowners	Mag: low; medium-term; small-scale Probability: medium Significance: Minor	• See measures soil resources. • Plan access roads and drilling sites in consultation with the relevant stakeholders (see Stakeholder Engagement Plan) • Access roads and drilling sites on third party land should be done with a proper landowner agreement in place.	Negligible
	Water pollution with spilled or leaked oil, grease or fuel, or drilling liquid and completion fluid during drilling operation	Aquatic life, water users and landowners	Mag: medium; medium-term; small-scale Probability: medium Significance: Moderate	• Staatsolie will not locate drilling locations in an open water area. • Provide adequate containment for tanks. • Use drip-pans, leak-proof containers, and storage tanks. • Follow the Staatsolie guidelines for inspection, maintenance, and clean-up. • Conduct daily visual inspection of pipes and valves for signs of corrosion and replace pipes and valves when corrosion is found. • Have the oil spill contingency plan in place for the area under consideration and have the required clean-up materials and equipment on-site.	Minor
	Water pollution as a result of truck accident	Aquatic life, water users and landowners	Mag: medium; medium-term; small-scale Probability: low Significance: Minor	• Have procedures, materials, and equipment in place to ensure immediate containment and cleanup by competent personnel, in the event an accident.	Negligible
	Blockage of waterways and changes in hydrology and drainage due to construction of access roads and preparation of drilling site	Local community	Mag: medium; medium-term; small-scale Probability: medium Significance: Moderate	• Conduct an assessment of existing hydrology and do not obstruct natural waterways, canals and creeks without necessary provisions (placement of culverts) • Do not open existing dams without the necessary provisions. • Plan access roads and drilling sites in consultation with the relevant stakeholders • Access roads and drilling sites on third party land should be done with a proper landowner agreement in place	Minor

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
Ecosystem	Damage to ecosystem, loss of high swamp forest and vegetation in the MUMA's	Vegetation and wildlife	Mag: medium; long-term; small-scale Probability: high Significance: Moderate	• Limit the footprint of disturbance to the minimum through optimized planning. • Organize an awareness program for contractors to emphasize the importance of working within, near, and around MUMAs. Furthermore, ensure that mitigation measures are highlighted in such programs and ensure that strict planning and inspection of fieldwork within the MUMAs must also be conducted and why. • Close cooperation with LBB-Natuurbeheer in order to avoid sensitive areas and/or periods.	Minor
	Improved access and influx of people can cause increased poaching and bird trapping and cause general disturbance	Wildlife	Mag: low; medium-term; small-scale Probability: medium Significance: Minor	• Enforce strict admission rules for third parties for the project areas (if legally possible) • Trapping of songbirds should be prohibited also for contractors. • Request special assistance from government's game and fish wardens responsible for control of fish and wildlife. • Upon closure: make access into the project area inaccessible for third parties (unless agreed otherwise with landowners) • Put up clearly marked signs indicating "No Entry or No Trespassing." • Implement above mitigation measures in consultation with the nature conservation authorities and local stakeholders	Negligible
	Nature conservation: activities in MUMA's could damage the integrity and conditions of these areas	Nature conservation	Mag: medium; long-term; small-scale Probability: high Significance: Moderate	• Organize an awareness program for contractors to emphasize the importance of working within, near, and around MUMAs. Furthermore, ensure that mitigation measures are highlighted in such programs and ensure that strict planning and inspection of fieldwork within the MUMAs must also be conducted and why. Close cooperation with LBB-Natuurbeheer in order to avoid sensitive areas and/or periods.	Minor
Archaeological and historical sites	Disturbance or destruction of archaeological sites	Archaeological sites	Mag: low; medium-term; small-scale Probability: low Significance: Negligible	• Create awareness amongst construction staff regarding the significance of such finds and indicators of the presence of such sites (especially exposed bottles, pieces of earthenware, metal, pottery sherds, bed structures, spots with deviating terrain and vegetation). • Have a chance find procedure in place (see Appendix 3E): – Cease all construction activities in the area, if a potential site is noticed, and cordon off the area.	Negligible

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
				– Notify the Archaeological Service and request them to give a preliminary assessment of the site. – Allow that a detailed assessment of the site is undertaken by, or on behalf of, the Archaeological Service deemed necessary in the preliminary assessment. – Follow recommendations made in preliminary and/or detailed assessment as appropriate	
Solid waste and sewage	Release of solid waste and sewage during project activities	Local receptors	Mag: low; medium-term; small-scale Probability: high Significance: Minor	• Provide basic sanitary facilities. • Provide waste bins and have other provisions for appropriate waste collection and disposal. • Promote waste reduction, re-use, recycling amongst personnel. • Do not litter and/or leave any waste behind in the project area. • Dispose waste in line with local laws and regulations and international best practices	Negligible

Table 24: Socio-economic Impacts with Proposed Mitigation Measures for the exploration drilling

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
Reputation of Staatsolie	Loss of social license to operate due to project activities	Staatsolie	Mag: medium; long-term; medium-scale Probability: medium Significance: Major	• Present this ESIA during stakeholder meetings to all involved landowners, including neighbors, and involved authorities like DC, DS and BO, LVV, OW, SWM, and upon request make the document available to interested parties. • Have a communication plan and adhere to the Stakeholder Engagement Plan (SEP) • Ensure that the local government representatives and the population are well informed of the project activities and their timing and location. • Implement a communication and information point for questions and answers in the local area, with a community-based project communication officer to contact. • Communicate the occurrence of large/exceptional transports of equipment, materials and supplies along inhabited roads with the local population (through BO) and road users (through national media). • Restrict heavy transport to daytime only. • Conduct transportation as much as possible during the weekend morning hours, when the intensity of other traffic tends to be low. • Require that double or more axle trucks are being used for the transportation of fill sand in order to avoid (more) damage to the local roads. • Ensure that there is an Emergency Response Plan, an Oil Spill Contingency Plan, and a Waste Management Plan in place; these plans should be approved by NIMOS. • Consult landowners for their cooperation prior starting the activities. • Ensure that land-use agreements have been signed with respective landowners (where applicable). Staatsolie will adhere to the TTT (Team Toegang Terreinen) procedure which includes all steps to be taken to identify, inform, and negotiate	Moderate[16]

[16] This impact requires attention from Staatsolie and has been classified as moderate, even with mitigation measures. This because not all relevant stakeholders (landowners) are known at this point. It should be noted that the impact can be further reduced to minor during project execution, once Staatsolie has identified the landowners and establishes agreements with them.

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
				with the legitimate landowners regarding the planned activities, and monitoring of the compliance of agreements.	
	Social conflicts incl. community health and safety and nuisance to receptors close to the drilling sites	Local community	Mag: medium; medium-term; small-scale Probability: medium Significance: Moderate	• Organize in time stakeholder meetings with the land and water users. • Involve the local people and keep an open dialogue during all stages of the project as relevant to them. • Enter into a land use agreement with landowners. • Register and address complaints according to the Grievance Redress Mechanism • Have a close-out inspection with all relevant parties. • Ensure that personnel are aware of the HSEQ requirements of Staatsolie (e.g. Code of Conduct, Alcohol and Drugs policy, COVID-19 Preventive measures in accordance with Public Health regulations, etc.). • Ensure that the contents of the CR Policy of Staatsolie is communicated with and disseminated amongst personnel. • Ensure that a Code of Conduct that applies to premises outside Staatsolie (e.g. at their settlement) is in place, and all personnel (both foreign and local workers) are aware of the content of this Code. • Ensure that an Alcohol and Drugs Policy is in place, that applies to premises outside Staatsolie (e.g. at their settlement) and all personnel (both foreign and local workers) are aware of the content of this Policy. • Have a communication plan in place and adhere to the proposed Stakeholder Engagement Plan (SEP)	Minor
Land use	Potential property damage incl. impact on livelihood	Local community and landowners	Mag: medium; medium-term; small-scale Probability: medium Significance: Moderate	• Have a land use agreement in place with respective landowners covering. • No operations will be planned without prior consultation with the landowner, and upon any operations being undertaken, communication and notification will continue on a regular basis between Staatsolie and the owners. • Written communication between the landowner and Staatsolie should ensure that adequate notice is given, so that drilling operation does not interfere with the grazing or other	Minor

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
				agricultural operations, and that communication is direct, clear, and concise. • Staatsolie shall permit the landowner, or its duly authorized representative, access subject to safety and health restrictions to observe operations being conducted on his land. • Trespassing on any area outside of the agreed upon program area is strictly forbidden and any resulting damage is the sole responsibility of the project. • Staatsolie shall conduct its operations to protect all surface water sources and so as to not interfere with grazing animals. • No fences or trees are to be cut or removed unless permission is obtained from the landowner. • No garbage, trash, waste, wire, or equipment shall be present upon completion of project activities. • Any leak or spill of fuel, oil or other compounds shall be completely cleaned up and contaminated soil and vegetation parts shall be removed from the land at the cost of the Contractor. • Any damage caused by the project or by any equipment or personnel related to the project is the responsibility of the project. • Upon completion of the project, Staatsolie and the respective landowner shall inspect the land and check any outstanding actions resulting from the work activities, damage to buildings or other structures, improperly closed well holes or improperly filled pits, garbage or debris, any contaminates and any form of damage, and document in writing all occurrences (see close-out inspection checklist) When no problems or shortcomings are observed, the owner will sign for release.	
Road use	Accidents	Road users	Mag: low; medium-term; small-scale Probability: medium Significance: Minor	• Ensure that all project vehicles are officially tested and have additional tests conducted on brakes and steering mechanism. • Enforce speed limits for all vehicles to minimize the potential of accidents. Specify road types. • Keep frequent speed controls for project traffic (involve the local police if necessary). • All truck drivers, including contractors, should follow a Defensive Drivers training.	Negligible

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
				• Place warning signs, warning lights and mobile speed bumps at intersections of the exit of construction traffic (involve local police). • Have (a) trained flag man (men) at intersections.	
Solid waste and sewage	Visual and health related problems	Local community	Mag: low; medium-term; small-scale Probability: high Significance: Minor	• Manage all solid waste, produced during project activities, according to the Staatsolie Waste Management Plan • Provide basic sanitary facilities. • See further measures proposed for solid waste and sewage (**Table 23**)	Negligible

Occupational health and safety	Attacks from wildlife such as bees, snakes, general swamp safety e.g. hydration, vector borne diseases (mosquitos), sunburn and other environmental hazards such as unstable ground, waterborne diseases, extreme weather conditions	Staatsolie personnel and contractors	Mag: medium; medium-term; small-scale[17]
			
			Probability: medium
			
			Significance: Moderate
				• Workers should wear protective clothing.
				• Train workers to be aware of bee activity and nests in the area. Look out for signs of bee hives and avoid disturbing them.
				• Encourage employees to be vigilant and avoid reaching into tall grass or undergrowth without first checking for snakes. Snakes may be camouflaged and difficult to spot.
				• Ensure that all survey team members are trained in basic first aid, including snakebite treatment. Have a well-equipped first aid kit on-site.
				• Ensure that all team members receive thorough safety training, including specific instructions on how to deal with bee and snake encounters.
				• The following safe distance measures should be followed when working/ traveling near beehives (personal comm. with Mr. Kodabaks- Min. LVV):
				  ○ In case the presence of high/ dense forest, a min. of 150m should be maintained.
				  ○ In case of less dense forest, a distance of 250m should be maintained and
				  ○ 350m should be maintained for an open area.
					Minor

[17] For each drilling location there will be 3-5 people present for the construction phase, approx. 10 people for the operation phase and 2-3 people for the decommissioning phase. The scale of this impact remains small because potential dangers will be assessed during the mobilization and construction phase (3-5 persons), and therefore, mitigating measures will already be in place for those who come afterward.

Component	Impact Description	Receptors	Impact significance	Mitigation measures	Residual Impact
				• Ensure that workers stay well-hydrated and have access to clean water. • Establish a clear communication plan for the survey team to call for help in case of emergencies. • Consult with local experts or authorities who are familiar with the specific risks in the swamp area	
Employment and local economy	Income generation	Local community	Mag: low; medium-term; small-scale Probability: low Significance: Negligible	• Recruit local labor, as far as available and feasible. • Purchase food, lodging and other necessary resources as much as possible from local entrepreneurs. • Keep a record and give feedback on jobs provided to locals and others with clear reporting on each job profile.	Minor

6.2.3 Cumulative impacts

The seismic survey and exploration drilling program are not expected to be conducted simultaneously; therefore, cumulative impacts are not anticipated. However, it is important to consider the following if the planning changes, considering the potential planned developments (see chapter 4.4) as well.

Environmental Impacts:

a. Habitat Disturbance: The simultaneous operation of seismic surveys and drilling rigs can disturb local ecosystems (e.g. physical disturbances), particularly if they are conducted in important areas like the MUMA's.
b. Noise Pollution: Both activities generate noise, which can disturb wildlife, including nesting birds. The cumulative noise impact can be more significant when conducted together.

Community Impacts:

a. Social Nuisances: The presence of multiple operations simultaneously can lead to increased traffic, noise, and other nuisances and conflicts in local communities.

Operational Challenges:

a. Logistical Challenges: Coordinating and managing the activities of seismic surveys and drilling programs simultaneously can be complex, requiring careful planning and logistics.
b. Safety: Increased activity in the same area raises safety concerns, both for workers on-site and for the surrounding community.

Effective communication and consultation with local stakeholders will be crucial for addressing above listed and finding mutually beneficial solutions.

7 Environmental Management and Monitoring Plan

This chapter presents the Environmental Management and Monitoring Plan (EMMP) for the 2D Seismic Exploration Program and the Exploration Drilling Program in the Coronie Block.

7.1 Description of the EMMP

Scope of the EMMP

The EMMP applies to all Staatsolie' s activities associated with the 2D Seismic Exploration Program and the Exploration Drilling Program including operations conducted on Staatsolie' s behalf by contractors and sub-contractors. This includes, but is not limited to, seismic or drilling and support operations as well as administrative support.

The EMMP is linked to and works together with the following documents which are to be submitted by the selected Seismic or Drilling Contractor: Emergency Response Plan (ERP), the Oil Spill Response Plan (OSRP), Community Relations Plan (CRP) and Waste Management Plan (WMP) for the project. All plans should also be in line with the Staatsolie procedures as considered relevant.

Purpose of the EMMP

The purpose of the EMMP is to set out the management and monitoring measures required to minimize the environmental impacts of construction, operations and decommissioning the projects, and to ensure that responsibilities and appropriate resources are efficiently allocated to the project. The EMMP addresses all the phases of the projects. This plan may be reviewed and where necessary, updated as required.

Structure of the EMMP

The roles and responsibilities, management and monitoring and reporting requirements for seismic and drilling are described separately, respectively in subchapter 7.2 and 7.3. The Staatsolie grievance mechanism, applicable for both projects, is described in subchapter 7.4.

7.2 EMMP 2D Seismic Exploration Program

7.2.1 Roles and Responsibilities

The Staatsolie organizational structure, focusing on those personnel with environmental responsibilities/accountabilities, is described below.

Table 25: Organizational structure and responsibilities seismic project

Position	HSE responsibility
Upstream Director	Overall accountability for HSE matters for all exploration & production activities
Exploration Manager (Project Sponsor)	Overall accountability for HSE matters for all exploration operations and activities.
Project Owner	Overall accountability for management of the seismic project, including environmental management aspects: • Provide direction on strategic matters to the Project Manager; and • Review monthly reports on the performance of the environmental management and monitoring of the seismic project that are submitted by the Project Manager
Project Manager	Overall responsibility for the seismic project activities, including environmental management aspects: • Ensure that the key on-site staff (Staatsolie and Seismic Contractor) are duly informed of the EMMP and associated responsibilities and implications of this EMMP prior to commencement of the project. • Inform key on-site staff through initial environmental awareness training of their roles and responsibilities in terms of the EMMP. • Ensure that a copy of the EMMP shall be available on site; and • Keep all relevant team members within Staatsolie informed.

Seismic Acquisition Contractor	Responsibility for HSE matters related to activities under its control: • Submit ERP, OSRP, WMP for the project. • Ensure that all personnel on site (including Sub-Contractors and their staff, and suppliers) are familiar with and understand the requirements of the EMMP by discussing these during safety meetings. • Hold daily safety meetings to keep all personnel aware of HSE issues. • Ensure that all employees and sub-contractors comply with this EMMP. • Ensure that any problems and non-conformances are remediated in a timely manner, to the satisfaction of the Project Manager. • Ensure that all personnel are aware of the ERP; are adequately trained therein and hold regular ERP drill. • Report all incidents and non-conformance to the Project Manager, such as: oil spills; and stakeholder's complaints; and • Compile compliance reports to include summary of incidents; safety meetings; ERP drills and waste register.
Seismic Quality Control (QC) Staatsolie representative	Overall responsibility to ensure that Seismic Contractor complies to the contract for the day-to-day on-site project activities, including environmental management aspects: • Ensure that Seismic Contractor complies to all contractual obligations under the contract including those related to the EMMP. • Be the eyes and ears of the Project Manager for all contractor's and on-site Staatsolie activities during operations. • Regularly inform the Project Manager of progress of the activities and will immediately report any discrepancies or default, including those related to the EMMP; and • Undertake weekly site inspections to determine compliance with the EMMP and monitor their activities on site with regard to the requirements outlined in this EMMP. Inspection reports are reported to the Project Manager, Project owner and HSE Department
HSSE Upstream Manager, Staatsolie	Responsibility to support the operations and monitor the performance with regards to HSE and Community matters: • Identify areas of non-compliance and propose action items to rectify them in consultation with the Project Manager/Project Leader. Undertakes spot inspections to determine compliance with the EMMP and monitor the activities of the contractor on site with regards to the requirements outlined in this EMMP. • Alert when action items intended to remedy non-compliance are not closed out in a timely and satisfactory manner. • Compile compliance reports. • Submit reports on the implementation of the EMMP and non-compliance to the NIMOS. • Undertake a post-decommissioning inspection upon completion of the project area, which may result in recommendations for additional clean-up and rehabilitation measures.
Environmental Engineer	Overall responsibility for Environmental Support for the project
Corporate Communications Upstream Head	Overall accountability of Community and Public Relations support for the project: • Put the Stakeholder Engagement Plan into effect. • Establish a communication structure to liaise with the main stakeholders (see separate SEP). • Ensure that all affected parties as identified in the EMMP and SEP are duly informed of the seismic activities (what, where and when); and • Organize and undertake local information meetings with key affected stakeholders (e.g. communities), as required.
Staatsolie Employees and contractors	Shall be aware of the EMMP requirements and adhere to the relevant mitigation measures.

7.2.2 Environmental Training

Environmental awareness training courses shall be run for all personnel on site. It is incumbent upon the Project Owner to convey the objectives of the EMMP and the specific provisions of the EMMP to all personnel involved in the operation of the 2D Seismic Exploration Program. Environmental training must cover the specific environmental management requirements as set out in the EMMP but must also ensure that all on-site staff are aware of and familiar with the relevant requirements and principles/objectives of the HSEQ Policy, Community Relations Policy, applicable procedures (GFIs) and the EMMP.

The Project Owner will initialize the training sessions for all new or additional staff and the HSE department shall support with Environmental Awareness Courses (Integrated Health, Safety and Environmental Inductions). The Process Owner shall ensure that all his/her staff attends the awareness courses to be held not less than one week before the Commencement Date. Where applicable, the Field Supervisors shall provide job-specific training on an ad hoc basis when workers are engaged in activities that require method statements. A copy of the EMMP shall be available on site, and the Field Supervisors shall ensure that all the personnel on site (including Sub-Contractors and their staff) as well as suppliers are familiar with and understand the specifications contained in the EMMP.

Operation training will include information on:

- Working on privately owned land
- Current land and water use
- Clearing, access and transportation
- Waste minimization, handling, and disposal methods
- Fire and spill prevention and control
- Emergency response procedure (Health, Safety and Environmental issues)
- Handling and storage of hazardous materials, fuels, and oils
- Reclamation measures.

7.2.3 Environmental and Social Specification

Table 26: Environmental and Social specification table for the 2D seismic program

Component	Impact Description	Mitigation measures	Responsibility	Monitoring and Performance Evaluation		Compliance Reporting
				Performance indicator	Monitoring Method	
Environmental impacts						
Water resources	The construction of seismic drilling holes can result in result in changes in water quality (suspended solids) in swamps and canals/ Fuel or oil spills from equipment (e.g. boats) can lead to water pollution.	• Plan drilling holes on third party land in consultation with the landowners and have a proper landowner agreement in place. • Plan drilling holes in consultation with land and water users (in stakeholder meetings) • Locate transport routes as much as possible in herbaceous vegetation. • Use leakproof containers and storage tanks at landing stages. • Provide adequate containment in case of container or tank leakage.	Project Manager/ Seismic contractor	Number of complaints Number of incidents/ accidents and spills Presence of turbid water/ oil sheen, etc.	Field inspection	Weekly progress on construction of water trails Weekly checklist (**Appendix 3D**) Method statement (**Appendix 3B**)
Nature conservation	Seismic survey activities in the MUMA's could damage the integrity and conditions of these areas	• Organize an awareness program for contractors to emphasize the importance of working within, near, and around MUMAs. Furthermore, ensure that mitigation measures for noise, water resources, and ecosystems, among others, are highlighted in such programs and that strict planning and inspection of fieldwork within the MUMAs must also be conducted and why. • Close cooperation with LBB- Natuurbeheer in order to avoid sensitive areas and/or periods.	Project Manager/ Environmental Engineer	Plan in place and awareness among field staff Number of complaints	Field inspection	Compliance report

Component	Impact Description	Mitigation measures	Responsibility	Monitoring and Performance Evaluation		Compliance Reporting
				Performance indicator	Monitoring Method	
Social impacts						
General	Loss of social license to operate due to project activities	• Ensure that the contracted seismic company is informed and held responsible for applying the EMMP recommendations. • Verify whether the seismic equipment is in conformity with the standards and ensure that there is an Emergency Response Plan, an Oil Spill Contingency Plan, and a Waste Management Plan in place; these plans should be approved by NIMOS. • Ensure that land-use agreements (**Appendix 3C**) have been signed with all landowners (where applicable), prior to the start of seismic activities. • Certify that the Seismic Contractor is equipped to comply with the EMMP.	Project Manager/ HSSE Upstream Manager/ CCU head	Number of complaints Number of focus group meetings Percentage of attendance Number media announcements of project information	Field inspection	Signed agreement. Community Relation (CR) report
	Social conflicts and community health, safety and security	• Ensure that seismic contractor personnel are aware of the HSEQ requirements of Staatsolie (e.g., Code of Conduct, Alcohol and Drugs policy, COVID-19 Preventive measures in accordance with Public Health regulations, etc.). • Ensure that the contents of the CR Policy of Staatsolie is communicated with and disseminated amongst personnel. • Ensure that a Code of Conduct is in place that applies to premises outside Staatsolie (e.g., at their settlement) and all personnel (both foreign and local workers) are aware of the content of this Code. • Ensure that an Alcohol and Drugs Policy is in place, that applies to premises outside Staatsolie (e.g., at their settlement) and all	CCU Head	Number of complaints	Focus group meetings	Community Relation (CR) report

Component	Impact Description	Mitigation measures	Responsibility	Monitoring and Performance Evaluation		Compliance Reporting
				Performance indicator	Monitoring Method	
		personnel (both foreign and local workers) are aware of the content of this Policy. • Have a communication plan in place and adhere to the proposed stakeholder engagement plan (SEP)				
Mobilization and seismic survey	Occupational health and safety (attacks from wildlife such as bees, snakes, general swamp safety e.g. hydration, vector borne diseases (mosquitos), sunburn and other environmental hazards such as unstable ground, waterborne diseases, extreme weather conditions)	• Workers should wear protective clothing. • Train workers to be aware of bee activity and nests in the area. Look out for signs of bee hives and avoid disturbing them. • Encourage employees to be vigilant and avoid reaching into tall grass or undergrowth without first checking for snakes. Snakes may be camouflaged and difficult to spot. • Ensure that all survey team members are trained in basic first aid, including snakebite treatment. Have a well-equipped first aid kit on-site. • Ensure that all team members receive thorough safety training, including specific instructions on how to deal with bee and snake encounters. • The following safe distance measures should be followed when working/ traveling near beehives: o In case the presence of high/ dense forest, a min. of 150m should be maintained. o In case of less dense forest, a distance of 250m should be maintained and o 350m should be maintained for an open area. • Ensure that workers stay well-hydrated and have access to clean water.	Project Manager/ Environmental Engineer	Awareness among field staff (number of trainings conducted, 100% attendance in training) Number of incidents/ accidents Number of sick leave Number of PPE provided	Training records/ Number of safety talks	Incident report Complaint register Personnel and staff record

Component	Impact Description	Mitigation measures	Responsibility	Monitoring and Performance Evaluation		Compliance Reporting
				Performance indicator	Monitoring Method	
		• Establish a clear communication plan for the survey team to call for help in case of emergencies. • Consult with local experts or authorities who are familiar with the specific risks in the swamp area				
Decommissioning and restoration	Upon completion of project activities, there is remaining damage to the property, or waste present	• Staatsolie and (where applicable) the respective landowner shall inspect the land and check any outstanding actions resulting from the work activities, damage to buildings or other structures, improperly filled or leaking shot holes, garbage, or debris, any contaminates, improperly disposed of excavated soil, tags that could damage livestock, any form of damage, and document in writing all occurrences. When no problems or shortcomings are observed, the owner will sign for release.	Project Manager/ Environmental Engineer/ CCU Head	Closure completion criteria	Visual inspection on compliance	Closure report and sign off

7.2.4 Monitoring and Reporting

7.2.4.1 Monitoring

Respective Process Owners together with the HSSE Upstream Division are responsible for monitoring the performance of on-site personnel against the commitments of the EMMP. Overall control of this function will lie with the HSSE Manager, and responsibility for day-to-day monitoring will lie with the Process Owner representatives. The Process Owner is obliged to and will have the power to suspend activities if they do not comply with the performance standards specified in the EMMP. The following principal items will be monitored:

- Correct implementation of EMMP;
- Compliance with Method Statements; and
- Physical parameters and indicators, e.g., water quality and hydrology (table below).

Table 27: Physical Monitoring framework for seismic program

Aspect	Parameters	Frequency	Monitoring locations
Water quality	• Electrical Conductivity, Turbidity (using a field meter) • TSS and oil and grease or • Total Petroleum Hydrocarbons (TPH) (lab analysis) • Color, water levels and clarity (visual observations)	Before (pre-monitoring baseline)	Two- three locations in the swamp
	• Color, water levels and clarity (visual observations)	During and after the project.	To be determined before the start of the project.
	Check for oil spills and oil films (visual)	Daily during project	At all activity areas
Vegetation	Width and location of trails in forested parts – according to design (visually)	Directly upon completion of trails	All new trails
Presence of wildlife and honeybees	Visual observation of presence within working area	Daily	All working locations
Waste	Check if landing sites and working areas are clean. Check proper storage of waste. Check proper disposal of waste. Log on waste	Daily Weekly Weekly Daily at collection of waste	All working locations

Environmental and Social Inspections

To determine the compliance with the Environmental and Social Specifications as indicated in Chapter 7.2.3, environmental inspections will be undertaken throughout the duration of the project by the contractors that are executing project activities on behalf of Staatsolie, as well as by the Process Owners.

Data and information management

Environmental data is stored in a respective database, which allows systematic storage and manipulation of data, and will permit rapid retrieval for the purposes of internal and external reporting. The Staatsolie HSSE Representative will ensure that relevant environmental data of the project is provided for this database. In order to ensure a consistent and coherent system for documenting the implementation of the EMMP, all written records and other information will be stored in a filing system that is compatible with the requirements of the existing HSE Management System. This comprises standardized forms, documents and reporting procedures.

7.2.4.2 Reporting

The frequency and nature of reporting of environmental management performance will depend upon the nature of the activity and aspect that is being managed.
The table below summarizes the formal reporting schedule that will be used for this 2D seismic project data acquisition.

Table 28: Regular reports and report lines

Name report	Description	Frequency	Responsibility of	Receiver
Land use Agreement (**Appendix 3C**)	"Overeenkomst toegang terreinen voor het verrichten van mijnbouwwerkzaamheden"	Prior to start of project activities at locations, if applicable	Officer Sr. Legal	Project Manager
Method Statement	Methods statements	Two weeks before commencement	All process owners	Project Manager and HSSE Manager
Waste Transfer Registration Form	Filled in forms on generated solid waste (refer to WMP)	At every transferal of waste	Seismic Contractor	Seismic QC/ HSSE Upstream Manager
Weekly HSE inspection	Weekly summary of the safety meetings held by the Seismic Contractor	Weekly	Seismic QC	HSSE Upstream Manager
Reports of ERP drills held.	Drills as emergency response etc.	Monthly	Seismic QC	HSSE Upstream Manager
Incidents	Report type and consequences for loss of days/oil spills	When accidents happen	Seismic QC	HSSE Upstream Manager
Weekly Environmental and Social Inspection	Compliance with ESIA and ESMP, using checklists	Weekly	Seismic QC	HSSE Upstream Manager
Water quality monitoring reports	Reports of water quality monitoring done for the project	1 week after monitoring has taken place.	Drilling Operation	HSSE Upstream Manager
Community Relation (CR) report	Report on implementation of Communication Plan, and compliance with ESIA and ESMP	Quarterly	CCU officer	HSSE Upstream Manager
Complaints	Report each complaint in the database	Directly after complaint is received	CCU officer	HSSE Upstream Manager

Based on data from the above reports, HSSE Representative will compile a Project Compliance and Monitoring Report that will be sent to NIMOS on a quarterly basis.

Feedback

Feedback on performance will be communicated to the appropriate parties (including NIMOS) concerned. Any substandard performance will trigger a process that notifies the responsible party of the nature of the issue and indicates the actions that are required to rectify the situation. This will be followed up by further monitoring to ensure that the sub-standard performance has been corrected.

7.3 EMMP Exploration Drilling Program

7.3.1 Roles and Responsibilities

The process owners and Staatsolie organizational structure, focusing on those personnel with environmental responsibilities/accountabilities, is described below.

Table 29: Process Owners

Process	Process Owner
Construction of infrastructure and drilling locations	Acting Head Drilling Services
Drilling wells	
Well plug and abandonment	
Decommissioning	
Planning of locations of wells	Functional Subsurface Support Manager
Wireline logging	Acting Head Drilling Services
Repeat Formation Testing of exploration wells	Acting Head Drilling Services

Table 30: Organizational structure and responsibilities exploration drilling project

Position	HSE responsibility
Upstream Director	Overall accountability for HSE matters for all upstream operations.
Production Asset Manager	Overall responsibility for HSE matters with regards to activities during the operational and decommissioning phase.
Acting Head Drilling Services	Responsibility for HSE matters related to Construction of infrastructure and drilling locations, drilling, plug and abandonment and decommissioning of the wells.
FSS Manager (Project Sponsor)	Accountable for the execution of the exploration drilling project in the Uitkijk area and HSE matters related to this project
Project owner	Overall accountability for management of the exploration drilling program, including environmental management aspects.
Project manager	Responsibility for the execution of the exploration drilling project in the Uitkijk area and HSE matters related to this project.
HSSE Upstream Manager	Responsibility to support the operations and monitor the performance with regards to HSE and Community matters.
Environmental Engineer	Overall responsibility for Environmental Support for the project
Corporate Communication Upstream Head	Overall accountability of Community and Public Relations support for all Staatsolie operations and activities.
Corporate Communication Officer	Overall responsibility of Community Relations support for the project
Staatsolie Employees and contractors	Should be aware of the EMMP requirements and adhere to the relevant mitigation measures.

7.3.2 Environmental Training

Environmental awareness training courses shall be run for all personnel on site. It is incumbent upon the Process Owner to convey the objectives of the EMMP and the specific provisions of the EMMP to all personnel involved in the operation of the Exploration Drilling Project. Environmental training must cover the specific environmental management requirements as set out in the EMMP but must also ensure that all on-site staff are aware of and familiar with the relevant requirements and principles/objectives of the HSE Policy, ER Policy, applicable procedures (GFIs) and the EMMP.

The Project Owner will initialize the training sessions for all new or additional staff and the HSE department shall support with Environmental Awareness Courses (Integrated Health, Safety and Environmental Inductions). The Process Owner shall ensure that all his/her staff attends the awareness courses to be held not less than one week before the Commencement Date. Where applicable, the Field Supervisors shall provide job-specific training on an ad hoc basis when workers are engaged in activities that require method statements. A copy of the EMMP shall be available on site, and the Field Supervisors shall ensure that all the personnel on site (including Sub-Contractors and their staff) as well as suppliers are familiar with and understand the specifications contained in the EMMP.

Operation training will include information on:

- Working on privately owned land
- Current land and water use
- Clearing, access and transportation
- Waste minimization, handling, and disposal methods
- Fire and spill prevention and control
- Emergency response procedure (Health, Safety and Environmental issues)
- Handling and storage of hazardous materials, fuels, and oils
- Reclamation measures.

7.3.3 Environmental and Social Specification

Table 31: Environmental and Social specification table for the exploration drilling program

Component	Impact Description	Mitigation measures	Responsibility	Monitoring and Performance Evaluation		Compliance Reporting
				Performance indicator	Monitoring Method	
Environmental impacts						
Soil resources	Soil degradation and loss of soil productivity due to compaction and/or soil contamination during construction of access roads and preparation of drilling site	• Make an assessment of the local soil conditions of any access route and the well location before the start of activities, comprising soil profile description, soil density and soil analytical parameters that could be affected by the activity (salinity, visual oil contamination in soil and/or groundwater) • Avoid clearing and construction works under wet conditions as much as possible. • Limit clearance of shrubs and low trees as needed and preferably by light machine. • Spread sand without disturbance of the original topsoil. • During drilling: use mats or other protective materials as required. • After decommissioning: Conduct a soil assessment to check any changes and if necessary, ameliorate the soil-by-soil tillage (to remove soil compaction) and soil cleaning (in case of contamination, or • Compensate the owner for any loss of land if so identified	Project Manager/HSE Manager	Number of spills Number of complaints Presence of oil waste, etc. Agreements with landowners	Field inspection Closure inspection	Method statement (**Appendix 3B**) Closure report and signed off Weekly checklist (**Appendix 3D**) Complaints reporting Landowners Agreements
Surface water resources	Water pollution with spilled or leaked oil, grease, or fuel, or drilling liquid and completion fluid during drilling operation	• Staatsolie will not locate drilling location in an open water area. • Provide adequate containment for tanks. • Use drip-pans, leak-proof containers, and storage tanks. • Follow the Staatsolie guidelines for inspection, maintenance, and clean-up. • Conduct daily visual inspection of pipes and valves for signs of corrosion and replace pipes and valves when corrosion is found.	Project Manager/ ID&M Superintendent / Head Drilling HSSE Manager	Awareness among field staff Number of incidents/ accidents and spills	Field inspection Water sampling and testing	Weekly checklist (**Appendix 3D**) Water quality monitoring report

Component	Impact Description	Mitigation measures	Responsibility	Monitoring and Performance Evaluation		Compliance Reporting
				Performance indicator	Monitoring Method	
		• Have the oil spill contingency plan in place for the area under consideration and have the required clean-up materials and equipment on-site.		Presence of turbid water/ oil sheen, etc.		
	Blockage of waterways and changes in hydrology and drainage due to construction of access roads and preparation of drilling site	• Conduct an assessment of existing hydrology and do not obstruct natural waterways, canals and creeks without necessary provisions (placement of culverts) • Do not open existing dams without the necessary provisions. • Plan access roads and drilling sites in consultation with the relevant stakeholders • Access roads and drilling sites on third party land should be done with a proper landowner agreement in place	Project Manager / HSSE Manager	Number of complaints Presence of stagnant water Flooding	Field inspection	Weekly progress on construction of water trails Method statement Complaints register
Ecosystem	Damage to ecosystem, loss of high swamp forest and vegetation in the MUMA's	• Limit the footprint of disturbance to the minimum through optimized planning. • Organize an awareness program for contractors to emphasize the importance of working within, near, and around MUMAs. Furthermore, ensure that mitigation measures are highlighted in such programs and ensure that strict planning and inspection of fieldwork within the MUMAs must also be conducted and why. • Close cooperation with LBB-Natuurbeheer in order to avoid sensitive areas and/or periods.	Project Manager/ ID&M Superintendent HSSE Manager	Plan in place and awareness among field staff (number of planning meetings and trainings) Number of complaints	Field inspection	Method Statement Weekly checklist Compliance report
	Nature conservation: activities in MUMA's could damage the integrity and conditions of these areas	• Organize an awareness program for contractors to emphasize the importance of working within, near, and around MUMAs. Furthermore, ensure that mitigation measures are highlighted in such programs and ensure that strict planning and inspection of fieldwork within the MUMAs must also be conducted and why. Close cooperation with LBB-Natuurbeheer in order to avoid sensitive areas and/or periods.	CCU Head/ Project Manager HSSE Manager	Plan in place and awareness among field staff Number of complaints		

Component	Impact Description	Mitigation measures	Responsibility	Monitoring and Performance Evaluation		Compliance Reporting
				Performance indicator	Monitoring Method	
Social impacts						
General	Loss of social license to operate due to project activities	• Present this ESIA during stakeholder meetings to all involved landowners, including neighbors, and involved authorities like DC, DS and BO, LVV, OW, SWM, and upon request make the document available to interested parties. • Have a communication plan and adhere to the SEP. • Ensure that the local government representatives and the population are well informed of the project activities and their timing and location. • Implement a communication and information point for questions and answers in the local area, with a community-based project communication officer to contact. • Communicate the occurrence of large/exceptional transports of equipment, materials and supplies along inhabited roads with the local population (through BO) and road users (through national media). • Restrict heavy transport to daytime only. • Conduct transportation as much as possible during the weekend morning hours, when the intensity of other traffic tends to be low. • Require that double or more axle trucks are being used for the transportation of fill sand in order to avoid (more) damage to the local roads. • Ensure that there is an Emergency Response Plan, an Oil Spill Contingency Plan, and a Waste Management Plan in place; these plans should be approved by NIMOS. • Consult landowners for their cooperation prior starting the activities. • Ensure that land-use agreements have been signed with respective landowners (where applicable). Staatsolie will adhere to the TTT (Team Toegang Terreinen) procedure which includes all steps to be taken to identify, inform,	Project Manager/ HSSE Manager/ CCU Head Head Drilling / ID&M Superintendent	Number of complaints Number of focus group meetings Number media announcements of project information Traffic plan in place	Field inspections	Communication plan/ SEP Signed agreement Community Relation (CR) report

Component	Impact Description	Mitigation measures	Responsibility	Monitoring and Performance Evaluation		Compliance Reporting
				Performance indicator	Monitoring Method	
		and negotiate with the legitimate landowners regarding the planned activities, and monitoring of the compliance of agreements.				
	Social conflicts incl. community health and safety and nuisance to receptors close to the drilling sites	• Organize in time stakeholder meetings with the land and water users. • Involve the local people and keep an open dialogue during all stages of the project as relevant to them. • Enter into land use agreement (**Appendix 3C**) with landowners. • Register and address complaints according to the Grievance Redress Mechanism • Have a close-out inspection with all relevant parties. • Ensure that personnel are aware of the HSEQ requirements of Staatsolie (e.g. Code of Conduct, Alcohol and Drugs policy, COVID-19 Preventive measures in accordance with Public Health regulations, etc.). • Ensure that the contents of the CR Policy of Staatsolie is communicated with and disseminated amongst personnel. • Ensure that a Code of Conduct is in place, that applies to premises outside Staatsolie (e.g. at their settlement), and all personnel (both foreign and local workers) are aware of the content of this Code. • Ensure that an Alcohol and Drugs Policy is in place, that applies to premises outside Staatsolie (e.g. at their settlement) and all personnel (both foreign and local workers) are aware of the content of this Policy. • Have a communication plan in place and adhere to the proposed stakeholder engagement plan (SEP)	Project Manager/ HSSE Upstream Manager/ CCU head/ Counsel Upstream	Number of complaints Number of focus group meetings	Field inspection	Signed agreement Community Relation (CR) report
Land use	Potential property damage incl. impact on livelihood	• Have a land use agreement in place with respective landowners.	ID&M Superintendent (Method statement)	Number of complaints	Closure report and sign off	Singed agreement

Component	Impact Description	Mitigation measures	Responsibility	Monitoring and Performance Evaluation		Compliance Reporting
				Performance indicator	Monitoring Method	
		• No operations will be planned without prior consultation with the landowner, and upon any operations being undertaken, communication and notification will continue on a regular basis between Staatsolie and the owners. • Written communication between the landowner and Staatsolie should ensure that adequate notice is given, so that drilling operation does not interfere with the grazing or other agricultural operations, and that communication is direct, clear and concise. • Staatsolie shall permit the landowner, or its duly authorized representative, access subject to safety and health restrictions to observe operations being conducted on his land. • Trespassing on any area outside of the agreed upon program area is strictly forbidden and any resulting damage is the sole responsibility of the project. • Staatsolie shall conduct its operations so as to protect all surface water sources and so as to not interfere with grazing animals. • No fences or trees are to be cut or removed unless permission is obtained from the landowner. • No garbage, trash, waste, wire, or equipment shall be present upon completion of project activities. • Any leak or spill of fuel, oil or other compounds shall be completely cleaned up and contaminated soil and vegetation parts shall be removed from the land at the cost of the Contractor. • Any damage caused by the project or by any equipment or personnel related to the project is the responsibility of the project. • Upon completion of the project, Staatsolie and the respective landowner shall inspect the land and check any outstanding actions resulting from the work	Project Manager/ HSSE manager (Closure completion criteria) CCU Head/ Counsel Upstream	Visual inspection on compliance		Closure completion criteria

Component	Impact Description	Mitigation measures	Responsibility	Monitoring and Performance Evaluation		Compliance Reporting
				Performance indicator	Monitoring Method	
		activities, damage to buildings or other structures, improperly closed well holes or improperly filled pits, garbage, or debris, any contaminates and any form of damage, and document in writing all occurrences (see close-out inspection checklist). When no problems or shortcomings are observed, the owner will sign for release.				
Occupational health and safety	Attacks from wildlife such as bees, snakes, general swamp safety e.g. hydration, vector borne diseases (mosquitos), sunburn and other environmental hazards such as unstable ground, waterborne diseases, extreme weather conditions	• Workers should wear protective clothing. • Train workers to be aware of bee activity and nests in the area. Look out for signs of bee hives and avoid disturbing them. • Encourage employees to be vigilant and avoid reaching into tall grass or undergrowth without first checking for snakes. Snakes may be camouflaged and difficult to spot. • Ensure that all survey team members are trained in basic first aid, including snakebite treatment. Have a well-equipped first aid kit on-site. • Ensure that all team members receive thorough safety training, including specific instructions on how to deal with bee and snake encounters. • The following safe distance measures should be followed when working/ traveling near beehives: o In case the presence of high/ dense forest, a min. of 150m should be maintained. o In case of less dense forest, a distance of 250m should be maintained and o 350m should be maintained for an open area. • Ensure that workers stay well-hydrated and have access to clean water. • Establish a clear communication plan for the survey team to call for help in case of emergencies. • Consult with local experts or authorities who are familiar with the specific risks in the swamp area	Project Manager/ HSSE Manager/CCU Head	Awareness among field staff (number of trainings conducted, 100% attendance in training) Number of incidents/ accidents Number of sick leave Number of PPE provided	Training records/ Number of safety talks	Incident report Complaint register Personnel and staff record

7.3.4 Monitoring and Reporting

7.3.4.1 Monitoring

Respective Process Owners together with the HSSE Upstream Division are responsible for monitoring the performance of on-site personnel against the commitments of the EMMP. Overall control of this function will lie with the HSSE Manager, and responsibility for day-to-day monitoring will lie with the Process Owner representatives. The Process Owner is obliged to and will have the power to suspend activities if they do not comply with the performance standards specified in the EMMP. The following principal items will be monitored:

- Correct implementation of EMMP.
- Compliance with Method Statements; and
- Physical parameters and indicators, e.g., soil, water quality and hydrology (table below).

Table 32: Physical Monitoring framework for drilling program

Aspect	Parameters	Frequency	Monitoring locations
Water quality	• Electrical Conductivity, Turbidity (using a field meter) • TSS, BOD, COD and oil and grease or TPH (lab analysis) • Color, water levels and clarity (visual observations)	Before (pre-monitoring baseline) and after the project.	Near drilling locations
	• Color, water levels and clarity (visual observations)	During the project	Ditch around drilling locations
	Check for oil spills and oil films (visual)	Daily during project	At all activity areas/ Ditch around drilling locations
Water levels (Hydrology)	Check the water levels in the swamp/ canal (visually)	Daily	At all activity areas
Soil[18]	TPH, EC and soil profile	Before start of activities and during decommissioning	At drilling site (representative sample)
	Soil profile	Before start of activities	At drilling site
Vegetation	Width and location of trails in forested parts – according to design	Directly upon completion of trails	All new trails
Presence of wildlife and honeybees	Visual observation of presence within working area	Daily	All working locations
Waste	Check if landing sites and working areas are clean. Check proper storage of waste. Check proper disposal of waste. Log on waste	Daily Weekly Weekly Daily at collection of waste	All working locations

[18] Incase filled soil will be removed during decommissioning.

Environmental and Social Inspections
To determine the compliance with the Environmental and Social Specifications as indicated in Chapter 7.3.3, environmental inspections will be undertaken throughout the duration of the project by the contractors that are executing project activities on behalf of Staatsolie, as well as by the Process Owners.

Data and information management
Environmental data is stored in a respective database, which allows systematic storage and manipulation of data, and will permit rapid retrieval for the purposes of internal and external reporting. The Staatsolie HSSE Representative will ensure that relevant environmental data of the project is provided for this database. In order to ensure a consistent and coherent system for documenting the implementation of the EMMP, all written records and other information will be stored in a filing system that is compatible with the requirements of the existing HSE Management System. This comprises standardized forms, documents, and reporting procedures.

7.3.4.2 Reporting

The frequency and nature of reporting of environmental management performance will depend upon the nature of the activity and aspect that is being managed.
The table below summarizes the formal reporting schedule that will be used for this 2D seismic project data acquisition.

Table 33: Regular reports and report lines

Name report	Description	Frequency	Responsibility of	Receiver
Land use Agreement	"Overeenkomst toegang terreinen voor het verrichten van mijnbouwwerkzaamheden"	Prior to start of project activities at locations, if applicable	Officer Sr. Legal	Project Manager
Method Statement	Methods statements	Two weeks before commencement	All process owners	Project Manager and HSSE Manager
Waste Transfer Registration Form	Filled in forms on generated solid waste (refer to WMP)	At every transferal of waste	All Process owners	HSSE Upstream Manager
Weekly HSE inspection	Weekly summary of the safety meetings held by the Seismic Contractor	Weekly	All process owners	HSSE Upstream Manager
Reports of ERP drills held.	Drills as emergency response etc.	Monthly	Acting Head Drilling Services	HSSE Upstream Manager
Incidents	Report type and consequences for loss of days/oil spills	When accidents happen	All Process owners	HSSE Upstream Manager
Weekly Environmental and Social Inspection	Compliance with ESIA and ESMP, using checklists	Weekly	All Process owners	HSSE Upstream Manager
Community Relation (CR) report	Report on implementation of Communication Plan, and compliance with ESIA and ESMP	Quarterly	CCU officer	HSSE Upstream Manager
Water quality monitoring reports	Reports of water quality monitoring done for the project	1 week after monitoring has taken place.	Drilling Operation	HSSE Upstream Manager
Complaints	Report each complaint in the database	Directly after complaint is received	CCU officer	HSSE Upstream Manager

Based on data from the above reports, HSSE Representative will compile a Project Compliance and Monitoring Report that will be sent to NIMOS on a quarterly basis.

Feedback
Feedback on performance will be communicated to the appropriate parties (including NIMOS) concerned. Any substandard performance will trigger a process that notifies the responsible party of the nature of the issue and indicates the actions that are required to rectify the situation. This will be followed up by further monitoring to ensure that the sub-standard performance has been corrected.

7.4 Community Engagement and Grievance Redress Mechanism of Staatsolie

Staatsolie has a Community Relation Policy that aims to perform business activities in such a way that communities' interest and expectations with regards to socio-environmental aspects are properly considered. The community engagement is the responsibility of the Corporate Communication Upstream (CCU) department of Staatsolie.
In addition, to Staatsolie Community Relation Policy, the SEP for these projects outlined in subchapter 5.3, will assist the stakeholder engagement process during the execution of the projects, by enabling the disclosure and dissemination of important information about the project (activities) to all relevant stakeholders that may be impacted. Key objectives of the communication plan and the SEP are:

- to maintain or strengthen productive relationships with stakeholders identified during the consultation process, conducted prior to the start of the project.
- to ensure that any additional stakeholder that may be impacted by the project is identified and included in the communication for the remainder of the project lifecycle.
- to ensure transparent, efficient, and regular dispersal of key project information.
- to provide stakeholders with an opportunity to raise issues or concerns about the project and to ensure that such feedback is addressed in a suitable manner; and
- to avoid conflicts or conflicting situations from emerging.

Further, Staatsolie has a Grievance Redress Mechanism/ complaint procedure that is followed in case of complaints (see **Figure 24**). Complaints can be reported to all personnel of Staatsolie, who should report this within one working day to the CCU department. All complaints are registered in a software allowing that complaints can be registered in the system at any time and from anywhere. There are also complaint forms available at the security posts for registration of complaints after working hours, which are later shared with CCU for registration in the system.

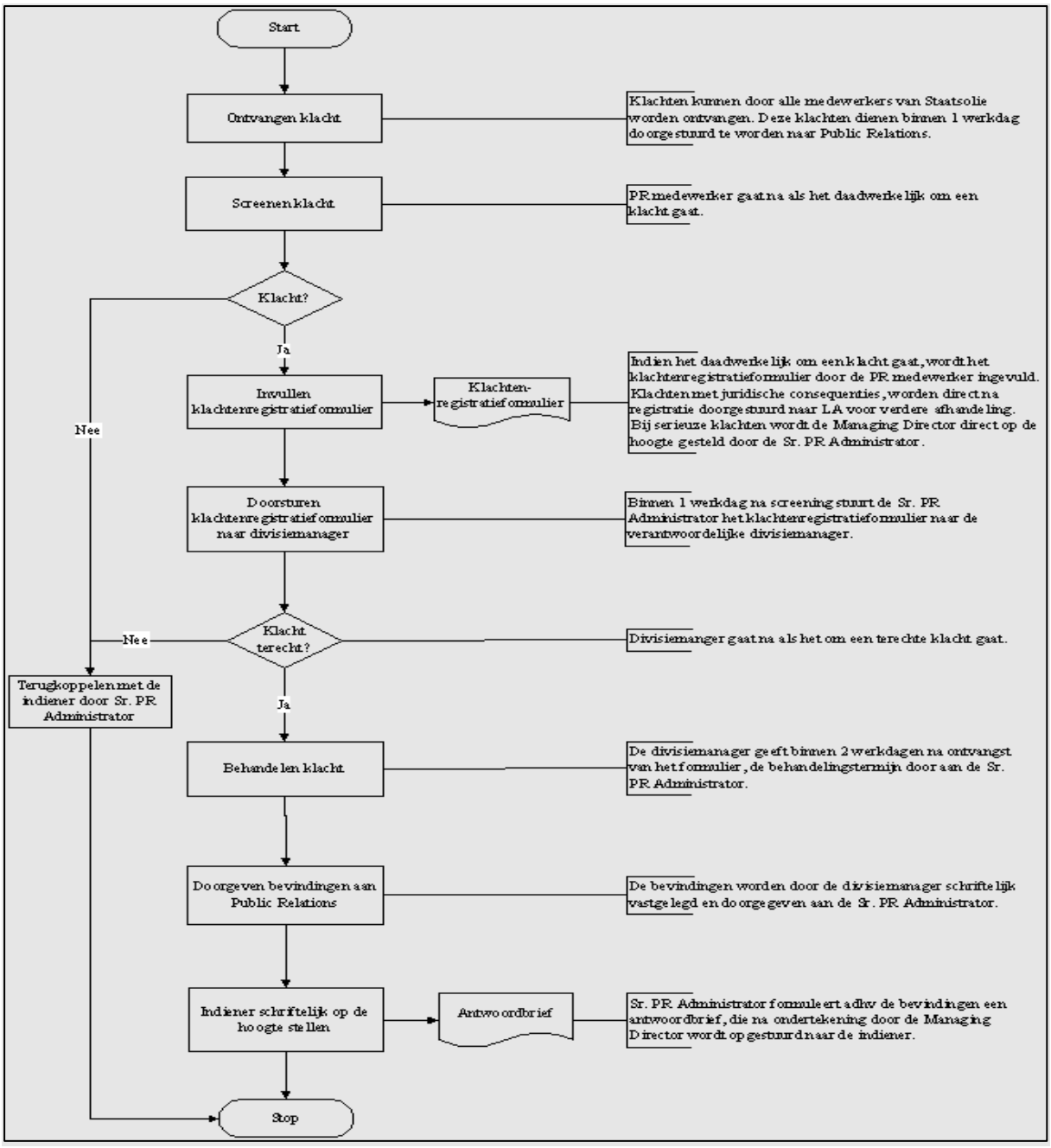

Figure 24: Overview Grievance Redress Mechanism of Staatsolie

8 Conclusions and Recommendations

This chapter presents the conclusion and recommendation for the limited ESIA study for the Staatsolie 2D Seismic Exploration Program and the Exploration Drilling Program in the Coronie area.

This limited ESIA study has been conducted in accordance with national regulatory requirements (Milieu Raamwet S.B. 2020 no. 97/ Environmental Framework Act S.B. 2020 no. 97) and the guidelines of the National Institute for Environment and Development in Suriname (NIMOS, 2005 and NIMOS 2009), as well as international best practices.

The Staatsolie 2D Seismic Exploration Program and Exploration Drilling Program in the Coronie area have both been classified as Category B-path 2 projects by NIMOS. In consultation with NIMOS, it has been agreed that both projects can be consolidated into a single ESIA report. The ESIA study has been conducted according to the Scoping Report (ILACO, 24 July 2023) approved by NIMOS, which outlined the terms of reference for specialist studies, as well as the approach and methodologies. The ESIA study primarily involved a desk study, complemented by field surveys, measurements (water quality and noise), and stakeholder consultations. Furthermore, an ESIA public meeting was held on the 31st of October 2023 at the CCC building in Coronie, after submission of the draft ESIA report to NIMOS. All (relevant) comments received from NIMOS and stakeholders have been addressed in this final version of the report.

Environmental and Social baseline

From the environmental baseline assessment, the following can be stated:

- The plantation area of Coronie falls with a narrow strip along the coast, which has drier conditions. The average rainfall in Coronie is lower compared to Paramaribo.
- The air quality in the study area is good as there are hardly any stationary sources and only a few other larger sources of air emissions. Air pollution sources within the area are emissions from local traffic, farm activities and some small facilities with engines (such as generators).
- The highest noise levels were measured in the rural areas along the Oost-Westverbinding due to traffic with relative high speed. Noise levels measured along the Oost-Westverbinding near residents, exceeded the WHO/IFC daytime guideline value of 55 dBA for residential areas. The measurement conducted within the residential area in Totness (not along the Oost-Westverbinding) had a noise level of 49.1 dBA, which is below this guideline. This measurement is considered representative for the Coronie residential areas.
- Within the project area both brackish and freshwater wetlands are found. Water from the Coronie (freshwater) swamp is mainly discharged to the east towards the Coppename River, south to the Wayambo River, west to the Nickerie River and north towards the Atlantic Ocean. The northern swamp water of the Coronie swamp is discharged through drainage structures along the Oost-Westverbinding (culverts, sluices, canals). The area north of the Oost-Westverbinding, between Burnside and Moy, drains through ditches and canals into the canal along the Coronie Dijk. The canal along this dike has a sluice (at Totness) to discharge excess water towards the Atlantic Ocean. In the other areas, excess water drains towards the ocean predominantly through mass flow, some small creeks near the ocean and canals which have been dug towards the ocean.
- Based on water quality, four different ecosystems can be identified within the project area, namely brackish to saline coastal swamps, the plantation area with freshwater conditions (brackish water may be present), freshwater swamp and ombrogenous swamp. During the measurements in the freshwater swamp and coastal swamp, no visible contamination and no unnatural odors were observed.
- In the area at proposed drilling location CEP01 and CEP02 parwa forest (black mangrove) is encountered and at location CEP03, freshwater swamp forest. The proposed seismic lines run through open coastal swamps and mangroves, open to closed freshwater ecosystems and the plantation area with agricultural lands and low to high secondary vegetation.

From the socio-economic baseline assessment, the following can be stated:

- The District Coronie is predominantly characterized by extensive brackish and freshwater swamps. Habitation is only present along the Oost-Westverbinding with human activities mainly found in the plantation area (Ingikondre-Burnside) and at Coppenamepunt.
- The various economic activities in the district include agriculture (rice cultivation, horticulture, and livestock farming), beekeeping, fishery and mining (shell and sand).
- The main concerns that were raised during the stakeholder consultations include: environmental and property damage, risk of coastal area flooding due to project activities, disruptions to the livelihoods of individuals engaged in agriculture and beekeeping within the project areas and insufficient communication of Staatsolie.

Potential impacts and mitigation measures
From the assessment of potential impacts from the 2D Seismic Exploration Program, there is one (1) impact with major significance which can be reduced to moderate after implementation of the proposed mitigation measures. Further, there are four (4) impacts with a moderate significance, which can be effectively reduced to minor after implementation of the proposed mitigation measures. The other impacts are minor or negligible and one (1) is a positive impact.

For the Exploration Drilling Program, there is one (1) impact with major significance which can be reduced to moderate after implementation of the proposed mitigation measures. Further, there are seven (7) impacts with a moderate significance, which can be effectively reduced to minor after implementation of the proposed mitigation measures. The other impacts are minor or negligible and one (1) is a positive impact.

EMMP
The several mitigation measures, management and monitoring requirements, including responsibilities are included in the EMMP for each project. The EMMP must be implemented as part of normal operations by effectively incorporating the key components into daily activities, such as including environmental issues in the decision-making process, carrying out operations in accordance with the standard procedures, and maintaining complete records.

Recommendations
Based on the findings of the ESIA study the following is recommended:

1. Implement the EMMP during all phases of the project as part of normal operations by effectively incorporating the key components into daily activities.
2. During the planning and preparation phase of each project (prior to the start of physical works such as line clearing for seismic and construction of access route to drilling location) the following must be conducted:
    a. All observations near the well locations and seismic line must be registered.
    b. All required assessments (such as the scouting, hydrology, and soil profile assessment) must be conducted.
    c. All landowners must have been identified. Further, all procedures and mitigation measures (where applicable) included in the respective EMMP, such as signing a land use agreement, must have been followed.
3. Maintain lines of communication, according to the Staatsolie Community Relation Policy and SEP (Stakeholder Engagement Plan), with the landowners and residents in the vicinity of the seismic and drilling locations.
4. Ensure that they are aware of the Staatsolie Grievance Redress Mechanism/ complaint procedure and how to utilize it. Further, register and adequately address complaints according to this procedure.
5. Conduct ongoing monitoring and assessment of environmental performance during the projects and take corrective actions in case of non-compliances.

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10 Appendices

Appendix 1: Impact Assessment Methodology

Impact Assessment Methodology

The significance of all potential impacts that would result from the proposed project is determined to assist managers.
Key issues identified during scoping require further studies to determine whether they are likely to occur and to assess how they will manifest themselves.
For key potential impacts identified by the scoping study, it will be necessary to determine the significance of each impact, based upon qualitative or quantitative assessment of the following attributes:

- magnitude
- geographical scale
- duration
- probability of occurrence

The resulting impact will be indicated by their significance class, which classes are defined as:

Table 1: Classes of impact significance

< Impact significance >
Major (significant) effect: effect expected to be permanent or continuous and non-reversible on a national scale and/or have international significance.
Moderate (significant) effect: long-term or continuous effect, but it is reversible and/or it has regional significance.
Minor (not significant) effect: effect confined to the local area and/or of short duration, and it is reversible.
Negligible (not significant) effect: effect not detectable.
Unknown effect: insufficient data available to assess the significance of the effect.

In addition, impacts have been classified as:

- Positive: indicating whether the impact will have a positive (beneficial) effect; or
- Negative: indicating whether the impact will have a negative (adverse) effect on the environment, including affected people.

The degree of detail will enable the determination of required mitigation and possible enhancement measures, respectively to prevent or reduce significant negative impacts and to promote any positive impacts already in the planning phase. The implementation of mitigation measures will reduce negative environmental impacts to an acceptable level as much as possible.
After implementation of mitigation/enhancement measures the significance of the impacts will again be determined. The impact assessment methodology is described below.

The **significance** of an impact is defined as a combination of the **severity** of the impact occurring and the **probability** that the impact will occur. The significance of each identified impact will be rated according to the methodology set out below:

First the **intensity/magnitude/size, scale** and **duration** of the impact are determined according to below tables (**Table 2** or **Table 3** and
Table 4).

Table 2: Defining the intensity / magnitude / size of the negative impacts

Rating	Description of Rating for		
	Natural environment	Socio-cultural	Health/safety
High	Irreversible damage to highly valued species, habitats or ecosystems	Irreparable damage to highly valued items of cultural significance, or social functions or processes are severely altered	Event resulting in loss of life, serious injuries or chronic illness; hospitalization required

Medium	Reversible damage to species, habitats or ecosystems	Repairable damage to items of cultural significance, or impairment of social functions and processes	Event resulting in moderate injuries or illness; may require hospitalization
Low	Limited damage to biological or physical environment	Low-level damage to cultural items, or social functions and processes are negligibly altered (nuisance)	Event resulting in annoyance, minor injuries or illness, not requiring hospitalization
Negligible	No relevant damage to biological or physical environment	No damage is done to cultural items and social functions and processes are not altered	Event is not experienced by receptors or only occasional minor annoyance

Table 3: Defining the intensity / magnitude / size of the positive impacts

Rating	**Description of Rating for**		
	Natural environment	**Socio-cultural**	**Health/safety**
High	Direct benefits to species, habitats and resources with significant opportunities for sustainability	Benefits to local community and beyond	Health and safety will be significantly improved
Medium	Moderate benefits to species, habitats and resources with some opportunities for sustainability	Benefits to many households or individuals	Health and safety will be improved
Low	Minor benefits to species, habitats and resources with possible opportunities for sustainability	Benefits to few households or individuals	Health and safety will be slightly improved

Table 4: Defining duration and scale of the impact

Rating	**Definition of Rating**
Duration– the time frame for which the impact will be experienced	
Short-term (ST)	Up to 2 months (construction time)
Medium-term (MT)	2 to 6 months (total seismic/ drilling time)
Long-term (LT)	More than 6 months
Scale– the area in which the impact will be experienced	
Small (SS)	Localized spot - project site
Medium (MS)	Coronie Block
Large (LS)	Outside Coronie Block

Then the **Severity Rating** of the impact is determined by combining the **magnitude** of the impact with **duration** and **scale** of the impact as set out below (**Table 5**).

Table 5: Defining the severity of the impact

Magnitude	High	Medium	Low	Negligible
Duration and/or Scale				
LT-LS, LT-MS or MT-LS	High	High	Medium	Negligible
LT-SS, MT-MS, MT-SS, ST-MS or ST-LS	High	Medium	Low	Negligible
ST-SS	Medium	Low	Negligible	Negligible

The next step is to define the **probability** of an impact to occur, as defined below (**Table 6**).

Table 6: Defining the probability of the impact

Probability– the likelihood of the impact occurring	
High	Sure to happen, or happens often
Medium	Could happen, and has happened in Suriname
Low	Possible, but only in extreme circumstances

Finally, the overall **significance** of the impact is determined as explained below (**Table 7**).

Table 7: Determination of the overall Significance of the impact

Severity	High	Medium	Low	Negligible
Probability				
High	Major	Moderate	Minor	Negligible
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible

Appendix 2: The ESIA Process

The legal and regulatory implementation of environmental impact assessments is governed by NIMOS. NIMOS' Office of Environmental and Social Assessments is responsible for the implementation of ESIA processes in Suriname. Prior to the approval of the Environmental Framework Act, EIAs have been carried out (since 2005) on the basis of Generic Environmental Assessment Guidelines as well as specific Guidelines developed by NIMOS.

The EIA process described by NIMOS is divided in 5 phases, namely:

1. Screening phase: This is the phase in the EIA process, in which NIMOS decides whether an Environmental Impact Assessment is needed or not. If yes, NIMOS will indicate the nature and extent of the analysis. NIMOS acknowledges three categories of EIA:
   a) Category A: an EIA is mandatory
   b) Category B, either:
      i. An EIA is required (Category B, path 3);
      ii. Another environmental document is needed (e.g. Environmental Management Plan) (Category B, path 2);
      iii. No EIA is needed, but some environmental information is required before a decision can be taken (Category B, path 1).
   c) Category C: No EIA is required, but the project proponent will have to keep with the minimal guidelines.
2. Scoping phase: In this phase the Terms of Reference (ToR), sometimes also called Scoping report, for the EIA-study has to be prepared.
3. Assessment phase: In the assessment phase the EIA-study is to be carried out by a qualified consultant or consultancy firm by order of the project proponent.
4. Review phase: During the review process the submitted Environmental Impact Statement (EIS) is reviewed by NIMOS.
5. Decision-making phase: After the EIS is reviewed, NIMOS should send the environmental advice regarding approval or denial of the project to the permitting agency.

Meanwhile NIMOS has the following sector specific EIA Guidelines in use, namely:

- Volume I: Generic (2009)
- Volume II: Mining (2005)
- Volume III: Forestry (2005)
- Volume IV: Social Impact Assessment (2005)
- Volume V: Power Generation and Transmission Projects (2005)
- Volume VI: Aquaculture Projects (2011)
- Volume VII: Agriculture Project (2013)
- Guidance Note (2017) (Supplement to the Generic Environmental Assessment Guidelines Volume 1)
- Volume IX: Part 1 - Offshore Oil and Gas Reconnaissance and Exploration Drilling 2020

Appendix 3: Staatsolie Corporate Environmental Policies and Standards

Appendix 3A: Staatsolie HSEQ Policy

HSEQ POLICY

We are strongly committed to health, safety and the environment towards our employees, contractors and the communities in which we operate. We strive for customer satisfaction through continuous improvement of our products and services.

We will achieve this by adhering to the following principles:

LAWS AND REGULATIONS

Comply with applicable laws, regulations and standards. In doing so, we consider the needs of our stakeholders and the environment in which we operate.

SAFE AND HEALTHY WORKPLACE

Provide a safe and healthy workplace and protect the environment by preventing or minimizing the chance of incidents or unsafe conditions. We are continuously identifying, analyzing and evaluating risks, hazards and environmental aspects, in order to manage them effectively through elimination or mitigation.

EXCELLENT

Achieve excellent performance in a safe and responsible manner by participation and consultation of employees in the development and implementation of the HSEQ processes. We hold our employees and contractors accountable for adhering to Staatsolie's core values, policies and procedures.

OPTIMIZING PROCESSES

Continuously improve our HSEQ performance and management systems by optimizing processes, services and product quality. We achieve set objectives and identify opportunities through process monitoring, periodic evaluations and planned actions.

TRAINING

Ensure that every employee and contractor is well trained and competent to perform his/her work, as required by the Staatsolie HSEQ management system.

June 2023
Annand Jagesar
Managing Director

Appendix 3B: Community Relations Policy Staatsolie

STAATSOLIE **MAATSCHAPPIJ SURINAME N.V.**
STATE OIL COMPANY SURINAME N.V.

COMMUNITY RELATIONS POLICY

Staatsolie performs its business activities in such a way that communities' interests and expectations with regard to socio-environmental aspects are properly considered.

Staatsolie is committed to this policy by taking into consideration the following key elements:

1. Establish and encourage relationships of trust with the communities and their representatives, based on continuous dialogue.
2. Conduct business activities in accordance with applicable local laws, regulations and international treaties, ratified by the Government of the Republic of Suriname, with special emphasis on Human Rights and cultural values of a multi-ethnic community.
3. Conduct socio-environmental baselines studies and develop and implement an effective socio-environmental management system to minimize socio–environmental impacts.
4. Maximize positive impacts through initiatives and social alliances aiming at mutual benefits, value creation, and sustainable local development.
5. Ensure community participation and engagement with impacted communities and other stakeholders, during the full lifecycle of projects.
6. Communicate and disseminate the contents of this Community Relations Policy to our various stakeholders, including contractors and suppliers.
7. Communicate and report periodically, publicly the results of community relations management.

To ensure the effectiveness, the Community Relations Policy will be reviewed bi-annually.

December 13, 2011

M.C.H. Waaldijk
Managing Director

Appendix 3C: Risk Management Policy Staatsolie

MAATSCHAPPIJ SURINAME N.V.

STATE OIL COMPANY SURINAME N.V.

Staatsolie Risk Management Policy

As an integrated oil company, Staatsolie is exposed to a wide range of risks with the potential to impact health, safety, environment, reputation, community, legal and the financial performance of Staatsolie and thereby the achievement of our objectives.

It is therefore the policy of Staatsolie to implement Enterprise Risk Management (ERM) to create a consolidated view of risk throughout our organization.

Risks faced by Staatsolie shall be managed on an enterprise-wide basis which means that we evaluate significant risk exposure related to our corporate goals and that we manage risk at corporate level.

Roles and responsibilities, and accountabilities will be clearly defined in our ERM process, which will contribute to a transparent and clearly understood ERM process. By understanding and managing risk we provide greater assurance and confidence for our shareholders, employees, customers and suppliers, and the community in which we operate. The ERM process consists of the following key steps:

- Risks will be identified, analyzed and scored in a consistent manner for all business processes, projects and functions. Common systems and methodologies will be used.
- Risk controls will be designed and implemented to reasonably assure the achievement of our objectives. The effectiveness of these controls will be systematically reviewed and, where necessary, improved.
- Risks will be monitored, reviewed and reported.

The ERM process will be evaluated on a regular basis to ensure its continuing contribution to the success of our organization achieving its business objectives.

1 April 2013,

M.C.H. Waaldijk
Managing Director

Appendix 3D: List of Applicable GFIs and Procedures

Listing of applicable GFIs and Procedures

GFI No/ Procedure/plan	Subject	Scope
Section 1 ADMINISTRATIVE		
GFI 104N	Security Rules for Saramacca Operations Dutch	This instruction outlines the security rules and regulations applicable to the Saramacca Operations for the different groups concerned.
Procedure HSSE-G-Routine Safety Talks	Routine Safety Talks. English/Dutch	This instruction formalizes the dissemination of information through regular meetings, approximately ten minutes long, commonly called "Toolbox Meetings" or "Safety Talks".
GFI 106	HSE and Security Induction for New Arrivals. English	This instruction describes the management of the system that controls HSE and Security Induction through which every new arrival is made familiar with the company's health, safety, environmental and security requirements as they relate to the activity that they are about to undertake.
GFI 110C	Incident Reporting and Investigation English	This instruction details the process for investigation according to the incident type in accordance with Staatsolie policy and legislation. This will help to control further losses of human and material resources by identifying and correcting unsafe acts and conditions that can lead to an incident.
GFI 119C	Personal Protective Equipment and Dress Code. English/Dutch	This GFI identifies the most common types of personal protective equipment for the various locations on the Saramacca Field.
GFI 120C	General traffic rules. English/Dutch	This GFI defines the general traffic rules to guide the performance of company employees, contractor's employees, and visitors while on company roads. It also defines rules for the behavior of drivers of company owned and rented vehicles on public roads.
GFI 126	Safe Use of Mobile Communication Devices. English	This instruction provides guidance to the safe use of mobile Communication Devices in order to minimize hazards that are introduced with it.

Procedure ISoW	Procedure Integrated System of Work English	This procedure enables all Staatsolie and contractor employees to systematically manage operating risks by adhering to the elements of the Integrated system of Work.
GFI 131	Guidelines for Departmental HSE Teams. English	This GFI outlines the terms of reference and composition of the Departmental HSE Teams which are intended to assist the departmental head in the execution of the departmental HSE program and to achieve workers participation.
GFI 132	Contractor Health, Safety and Environmental Management English	This GFI provides guidance to Staatsolie staff in promoting and managing HSE performance of Contractors.
Section 2 JOB SAFETY INSTRUCTIONS		
Procedure HAZCOM	Hazard Communication Procedure. English	The purpose of this procedure is to ensure that information regarding the hazards associated with all chemicals used on Staatsolie Upstream's premises is readily available to all personnel and that the health and physical hazards from chemical products used in the workplace are identified. It provides the information necessary for personnel to protect themselves from exposure to hazards associated with chemicals and to have the information necessary to minimize the consequences if exposure were to occur.
Procedure PTW	Permit to Work (PTW)	This procedure describes the management system managing work activities that have inherently higher risks or unique aspects that could lead to a higher level of risk than routine or daily work activities. It is supported by other procedures and processes to regulate all work activities and manage risk.
Procedure MOC	Management of Change Procedure English	This procedure manages all proposed changes that might have adverse economic, health and safety or environmental consequences within the Upstream Operations, by defining the steps used to identify and manage change-associated risks and their effects within the operations.

GFI 225(N)	Storage, Transportation and handling of Compressed, liquefied and pressurized gasses. English/Dutch	This GFI handles the general guidelines for safe storage, transportation and the handling of gas bottles. The most common industrial gasses, which are used by Staatsolie, are oxygen, acetylene, nitrogen, propane (LPG), butane and carbon dioxide.
Procedure Abrasive Blasting	Abrasive Blasting Procedure. English/Dutch	This procedure provides guidelines for the protection of personnel engaged in abrasive blasting and others who may be in the surrounding areas where abrasive blasting is conducted.
Procedure Spray Painting	Spray painting Procedure. English/Dutch	This procedure provides guidance for the safe use of spray painting whereby care must be taken to protect the workers involved, other personnel in the vicinity, nearby equipment and the environment.
Housekeeping	Housekeeping Guidelines English	This guideline provides guidance to employees to ensure that proper housekeeping is maintained.
GFI 232	Job Safety Analysis English	Job Safety Analysis is a proven method that evaluates a sequence of job steps or tasks to identify and document potential hazards and to take countermeasures to protect workers' health and safety against those hazards. This instruction provides guidance for conducting a Job Safety Analysis.
Procedure Safety Color Codes	Safety Color Codes Procedure	This procedure establishes the requirements for a uniform visual system for marking potential hazards and provides an effective means of communicating hazard information to the employees & contractors, in order to reduce the likelihood of injury from potential hazards in the work environment. It defines the color codes of signs, tags and barricades to be used in controlling exposure to potential hazards and specifies requirements for design uniformity to promote employee's recognition and avoidance of hazards.
Section 3 EMERGENCY RESPONSE		
Emergency Response plan	Emergency Response Plan Upstream Saramacca	This plan describes the procedure that needs to be followed when an emergency situation at the Staatsolie Saramacca Location turns up.
Section 4 EQUIPMENT STANDARDS AND SPECIFICATIONS		
GFI 400	Inspection of Fire Protection and Emergency Equipment. English	This GFI provides departments and divisions of the Saramacca Operations with procedures for the inspection of Fire protection and Emergency Equipment, which must be in good condition at all time.

Procedure Scaffolding Rules	Scaffolding Rules Procedure English	This procedure provides the guidelines of erecting tubular scaffolding.
Section 5 ENVIRONMENT PROTECTION		
Waste Management Plan	Waste Management Plan Onshore	This plan provides guidance for solid waste handling and disposal requirements for waste listed in the appendix of this field instruction.

Appendix 3E: Method Statement

DEPARTMENT:…….…….. **DATE:**……

PROPOSED ACTIVITY (give title of method statement and reference to Environmental specification):

WHAT WORK IS TO BE UNDERTAKEN (give a brief description of the works):

WHERE ARE THE WORKS TO BE UNDERTAKEN (where possible, provide an annotated plan and a full description of the extent of the works):

START AND END DATE OF WORKS FOR WHICH METHOD STATEMENT IS REQUIRED:

Start Date:	End Date:

HOW ARE THE WORKS TO BE UNDERTAKEN (provide as much detail as possible, including annotated maps and plans where possible):

In case on private land: include signature of owner/user to show that he/she is aware

Please attach extra pages if more space is required

Appendix 3F: Pro Forma Landuse Agreement

Contractnummer:

OVEREENKOMST

TOEGANG TERREINEN VOOR HET VERRICHTEN VAN MIJNBOUWWERKZAAMHEDEN

De ondergetekenden:

Staatsolie Maatschappij Suriname N.V., gevestigd aan de Dr. Ir. H.S. Adhinstraat 21 te Paramaribo, hierna te noemen **"Staatsolie"**

en

, houder van ID kaart nummer ……. en wonende aan de te , hierna te noemen **"Gerechtigde"**

In overweging nemende:

- dat bij Decreet E-8B (S.B. 1981 nr. 59) aan Staatsolie concessie is verleend tot het verrichten van werkzaamheden verband houdende met de opsporing en ontginning van koolwaterstoffen,

- dat in gevolge het Decreet Mijnbouw (S.B. 1986 no. 28), Gerechtigde en derde-belanghebbende werkzaamheden die hiermee verband houden moeten gedogen,

Verklaren het volgende overeen te komen:

Artikel 1

Gerechtigde is het perceelland aan de , gelegen in het district . Gerechtigde zal een deel van dit perceelland ter beschikking stellen aan Staatsolie voor het verrichten of doen verrichten van werkzaamheden voortvloeiende uit het recht verkregen door Staatsolie vanwege Decreet E-8B, gedurende de periode .

Artikel 2

Staatsolie zal Gerechtigde indien van toepassing vergoeden de schade onmiddellijk veroorzaakt door de bovengenoemde werkzaamheden. Deze vergoeding is, afhankelijk van het geval, gebaseerd op taxatie van LVV of andersoortige uit te voeren taxaties, en zal indien van toepassing in een nadere overeenkomst vastgelegd worden.

Artikel 3

Partijen zullen indien nodig tijdens de uitvoering van de werkzaamheden met elkaar in overleg treden voor nadere afspraken met betrekking tot de uitvoering van bovengenoemde werkzaamheden.

Artikel 4

Visuele oriëntatie van de staat van bovengenoemd perceelland vóór de aanvang van de werkzaamheden heeft het navolgende doen constateren:

Artikel 5

Staatsolie zal ten behoeve van de mijnbouwwerkzaamheden de volgende aanpassingen plegen op bovengenoemd perceelland:

- Er zullen geen aanpassingen .

Artikel 6

Staatsolie is gehouden om conform de door het Nationaal Instituut voor Milieu en Ontwikkeling in Suriname (NIMOS) goedgekeurde Environmental management Plan bij beëindiging van de werkzaamheden het perceelland te rehabiliteren, zulks in overleg met Gerechtigde.

Artikel 7

Na het verrichten van de werkzaamheden zal Staatsolie het terrein als volgt overdragen:

- Het terrein zal met de verbeteringen die door Staatsolie zijn aangebracht ten behoeve van de werkzaamheden worden overgedragen.

Aldus overeengekomen en in tweevoud opgemaakt en ondertekend te Paramaribo op

…… .....

Staatsolie Maatschappij Suriname N.V. Gerechtigde

_____ _____

Managing Director

Datum:

Appendix 3G: Weekly Checklist
To be submitted to the HSSE-U Division

Area:

Coordinates:

Mitigation measure	Compliance Yes/No	Responsible	Remarks
A copy of the following documents is available onsite: EMMP, WMP, OSRP and ERP			
A traffic management plan is developed and implemented			
All personnel on site are aware of the contents of the EMMP and were made aware of environmental issues			
All personnel on site are aware of the ERPs (spill response, medevac, fire contingency plan)			
Have any drills been held?			
MSDS's are available for all hazardous substances on site			
All equipment is regularly maintained and are kept in optimum condition			
All equipment has been certified			
Fuel is stored in tanks within a bunded area (with 110% of the stored fuel volume) and storage tanks are leak proof			

All containers and storage tanks are leak proof			
There are no spills or leakages			
Drip trays are being used where there is a risk of spillage (i.e. fueling of equipment).			
Spill response equipment and materials are present, functional and accessible			
Minimal clearance of vegetation, and clearing of high forest is limited to the minimum.			
Waste handling conform WMP: no waste lying around, waste bins available, etc.			
Firefighting equipment is functional and accessible			
No complaints have been received about project activities			
Have any encounters with wildlife (e.g. jaguars, snakes) been reported. Please describe and provide date/time.			
Any accidents registered, including snake bites, bee stings?			
Any other observations or comments			

Department Delegate

Completed by: ……

Date: ……..

Sign: ……..

Project Manager or his delegate

Received and checked by: ……

Date: ……..

Sign: ……..

Appendix 3H: Chance Find Procedure

Introduction

This Chance Finds Procedure (CFP) is developed in compliance with the Environmental Management and Monitoring Plan (EMMP) established for the 2D Seismic Exploration Program and the Exploration Drilling Program in the Coronie area and describes necessary measures to be taken in response to the chance discovery of (a) physical cultural resource(s) due to project associated (e.g. seismic and drilling) activities.

National legislation of relevance to the development of the CFP is the Monuments Act 2002, S.B. 2002 no. 72, that aims to preserve historical monuments and architecture in Suriname, since archaeological or historical items may be encountered during seismic and drilling activities in Coronie. International best practice standards, such as the guidelines of the World Bank Group also provided guidance for the writing of the CFP document.

Objective and scope

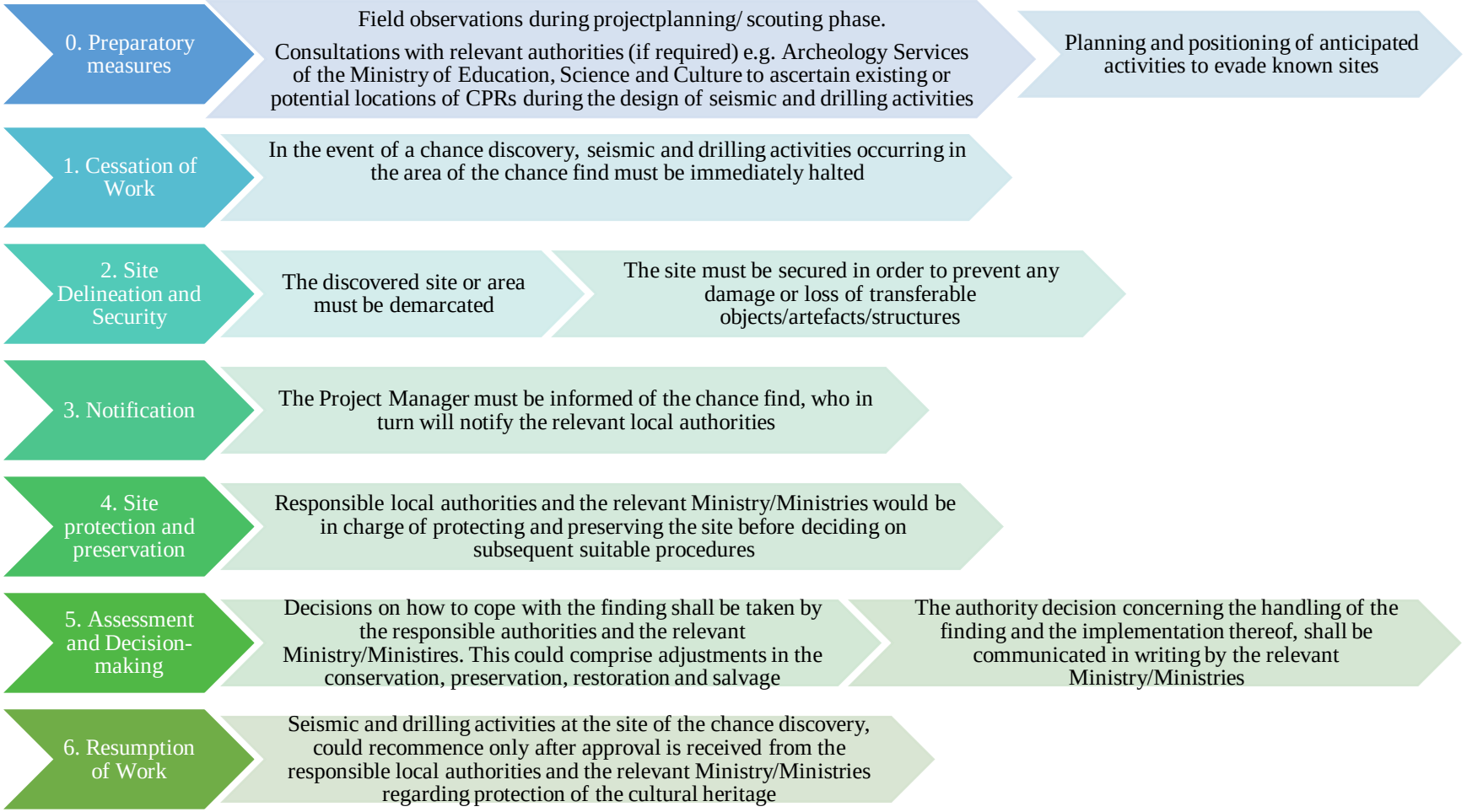
The chance finds procedure serves to monitor how chance finds of Physical Cultural Resources (PCRs). PCR are managed in order to ensure their protection from adverse impacts of project activities (e.g. damage) and to support their preservation.

The CFP contains actions for avoiding and/or mitigating unsolicited impacts on possible PCRs, including:

- Consultations with relevant authorities and local residents/communities to ascertain existing or potential locations of CPRs during the design of seismic and drilling activities;
- Planning and positioning of anticipated activities to evade known sites (including protected areas and zones);
- The interruption/stoppage of work until the importance of a ‘find’ has been assessed by appropriate authorities or relevant experts; and
- Measures for managing and alleviating undesirable impacts (for example establishment of buffer zones).

This CFP pertains to physical cultural resources located on land, that may include movable or immovable objects, (groups of) structures, and sites and natural features/landscapes having archaeological, historical, religious, or other cultural significance or value.

Schematic overview Chance Finds Procedure



Roles and responsibilities

Roles and responsibilities attributed to the following actors under the Chance Finds Procedure (CFP) are:

Actor	Role(s) and/or responsibility/(ties)
Project Manager/CCU	• Consultations with relevant authorities to ascertain existing or potential locations of CPRs, during the planning of seismic and drilling activities • Planning and positioning of anticipated activities to evade known sites • In case of a chance discovery, notify the responsible local authorities e.g. Archaeology Services of the Ministry of Education, Science and Culture; possibly the support or assistance of the Foundation Built Heritage (*Stichting Gebouwd Erfgoed Suriname*-SGES) and the *Stichting Surinaams Museum* will be necessary • Providing permission to the seismic and drilling contractor for resumption of work
Seismic Contractor/ Acting Head Drilling Services	• Conducting field observations during scouting activities • Empower staff to stop works on (chance) discovery of artefacts • In the event of a chance discovery, seismic and drilling activities occurring in the area of the chance find must be immediately halted • The discovered site or area must be demarcated and secured in order to prevent any damage or loss of transferable objects / artefacts / structures; no archaeological or historical object may be removed from the ground without prior authorization issued by the Government • The Project Manager/CCU must be informed of the chance find • Permission must be sought of the Project Manager, before seismic and drilling work can be resumed.
Staatsolie Management	Responsible for: • Protecting and preserving the site before deciding on subsequent suitable procedures in consultation with other relevant local authorities • Assessment and Decision-making on how to cope with the finding in relation to conservation, preservation, restoration and salvage of the find • Communicating the outcome of the assessment in writing to the Project Manager • Providing permission to the seismic and drilling contractor for resumption of work
Ministry of Education, Science and Culture; Archaeology Services	Supporting/advisory role to the other government entities in particular concerning the conservation, preservation, restoration and salvage of the find
Foundation Built Heritage (Stichting Gebouwd Erfgoed Suriname-SGES)	Supporting/advisory role to the other government entities in particular concerning the conservation, preservation, restoration and salvage of the find
Stichting Surinaams Museum	Supporting/advisory role to the other government entities in particular concerning the conservation, preservation, restoration and salvage of the find
National Institute for Environment and Development in Suriname (NIMOS)	Advisory role to the relevant Ministries regarding the execution of the EMMP for the project, in particular the protection of Heritage Resources

Appendix 4: Noise Baseline Report

Limited Environmental and Social Impact Assessment (ESIA) for the 2D Seismic Exploration Program and the Exploration Drilling Program in the Coronie Area

Noise Baseline Report

Final Report

Paramaribo, 13 December 2023

Prepared by

ILACO

ISO 9001:2015 certified

Project Title: Limited Environmental and Social Impact Assessment (ESIA) for the 2D Seismic Exploration Program and the Exploration Drilling Program in the Coronie area
Project Number: IS-426
Document: Noise Baseline Report

Version	Status	Compiled by	Validated by	Approved by	Document Date
1.0	Draft	Nakchedi A Fortune M	Noordam D/ Koenjbiharie S	Noordam D/ Koenjbiharie S	21 August 2023
2.0	Final	Fortune M	Noordam D/ Koenjbiharie S	Noordam D/ Koenjbiharie S	13 December 2023

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Abbreviations and Terminology

Abbreviation	Definition
A-weighted sound level	A measure of sound pressure level designed to reflect the acuity of the human ear, which does not respond equally to all frequencies.
dBA	Decibel using the A-weighting setting
dBL	Linear decibel level
Decibel (dB)	A measure of sound. Equal to 10 times the logarithm (base 10) of the ratio of a given sound pressure to a reference sound pressure. The reference sound pressure used is 20 micro-Pascal, which is the lowest audible sound for the human ear.
ESIA	Environmental and Social Impact Assessment
EHS	Environmental, Health and Safety
IFC	International Finance Corporation
L_{10}	L10 is the level exceeded for 10% of the time. For 10% of the time, the sound or noise has a sound pressure level above L10. For the rest of the time, the sound or noise has a sound pressure level at or below L10.
L_{90}	See L_{10} but read 90% instead of 10% and L_{90} instead of L_{10}.
LAeq	Equivalent Sound Pressure Level using the A-weighting setting
Lmax	Maximum RMS (root mean squared) level of a sound source or environment.
Lmin	Minimum RMS (root mean squared) level of a sound source or environment.
NIMOS	National Institute for Environment and Development in Suriname
WHO	World Health Organization

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Executive Summary

ILACO Suriname NV (ILACO) has been contracted by Staatsolie Maatschappij Suriname (Staatsolie) to conduct a Limited Environmental and Social Impact Assessment (ESIA) for the 2D Seismic Exploration Program and the Exploration Drilling Program in the Coronie Block. As part of the baseline study of the Limited ESIA, it is required to determine the existing noise levels within the project area.

This report presents the methodology and the results of the noise baseline study.

The noise measurements have been carried out according to the General Environmental, Health and Safety (EHS) Guidelines of the World Health Organization (WHO) / International Finance Corporation (IFC) for Noise monitoring (IFC, 2007). The measurements were conducted with a sound level meter and analyzer, the SVAN 957 (#15357) mounted on a tripod at approximately 1.5 m above the surface level, and at least 3 m away from obstacles or reflecting surfaces. All baseline measurements have been carried out for 30 minutes continuously during daytime (7:00 – 22:00 hrs.). No Nighttime measurements (22:00 – 07:00 hrs.) were conducted since project activities will only be executed during daytime.

Rural and residential area
The residents along the Oost-Westverbinding experience noise levels (LAeq) that are above the WHO/IFC standard of 55 dBA for residential areas during daytime, due to traffic intensity along the road.

Uninhabited area
High noise levels at this location are caused by traffic. The type of vehicles that mostly passes by are heavy trucks, light trucks and cars. Also, the speed at which the vehicles are driving with cause higher noise levels. In the absence of traffic, the noise conditions are quite natural.

1. Introduction

ILACO Suriname NV (ILACO) has been contracted by Staatsolie Maatschappij Suriname (Staatsolie) to conduct a Limited Environmental and Social Impact Assessment (ESIA) for the 2D Seismic Exploration Program and the Exploration Drilling Program in the Coronie Block. As part of the baseline study of the Limited ESIA, it is required to determine the existing noise levels within the project area.

This report presents the methodology and the results of the noise baseline study.

1.1 Project background

Staatsolie intends to carry out a 2D Seismic Exploration Program and a dryland Exploration Drilling Program in the Coronie Block. As part of the seismic program, 5 seismic lines with a sum of ± 200 km will be acquired and for the exploration program three (3) wells will be drilled.

The project area for the 2D Seismic Exploration Program and Exploration Drilling Project is located in the Coronie Block, which is located east of the Nickerie Block, West of the Calcutta Block and is bordered by the Coppename River (Error! Reference source not found.). The Coronie Block is divided into two parts (North and South) by the 'Oost-Westverbinding' which is a main public road connecting east and west Suriname (Noordam, 2014). The 2D seismic activities will be carried out in both parts of the concession area, mostly on dry land in the north and predominantly in swamp area in the south. The exploration drilling activities will be carried out in the north only, on dryland along the Oost-Westverbinding (**Figure 1**).

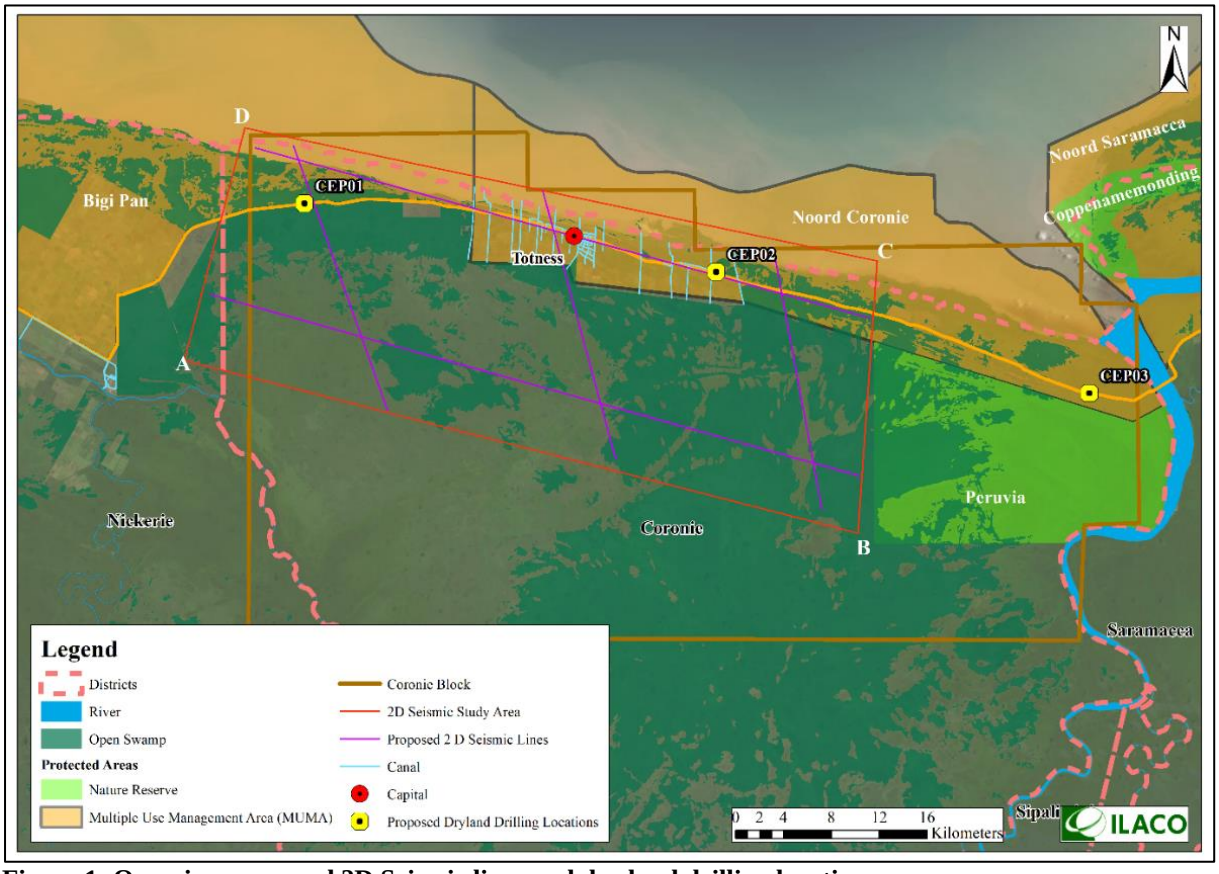

Figure 1: Overview proposed 2D Seismic lines and dry land drilling locations

1.2 Objective and scope of works

The purpose of the noise baseline study is to determine the baseline noise levels within the project area, which includes the Oost-Westverbinding access routes and the community along this road.

The objective of this study included the following:

- Selection and accessibility of representative noise measurement locations
- Conduct daytime noise measurements in the project area and in the community, mostly along the 'Oost-Westverbinding'.
- Interpretation of collected data and reporting

1.3 Land use and nearest receptors

The project area within the Coronie Block comprises a residential area (Totness and Friendship), a rural area along parts of the O-Wverbinding and a large uninhabited part (brackish and freshwater swamps)). There are sensitive receptors present such as individual residents, small farms, agriculture areas and fishery. The majority of these are located in the area between Burnside and Ingikondre along the Oost-Westverbinding, with a concentration at Totness and Friendship. Individual residents are located in the stretch between Ingikondre and Jenny (area known as Coppenamepunt). Agriculture land-use include stock breeding (cattle, poultry and pig farming), beekeeping, field crops (rice), fruits and vegetables (banana, coconuts, cassava etc.) and horticulture. Along the Oost-Westverbinding, mainly in Totness other commercial activities were observed, like fishing at sea and in the swamps. **Figure 2** gives an overview of the residential and agriculture areas (with a red circle) within the project area. Further, sand and shell extraction (mining) are observed (black dot) within the project area on the south side of the Oost-Westverbinding.

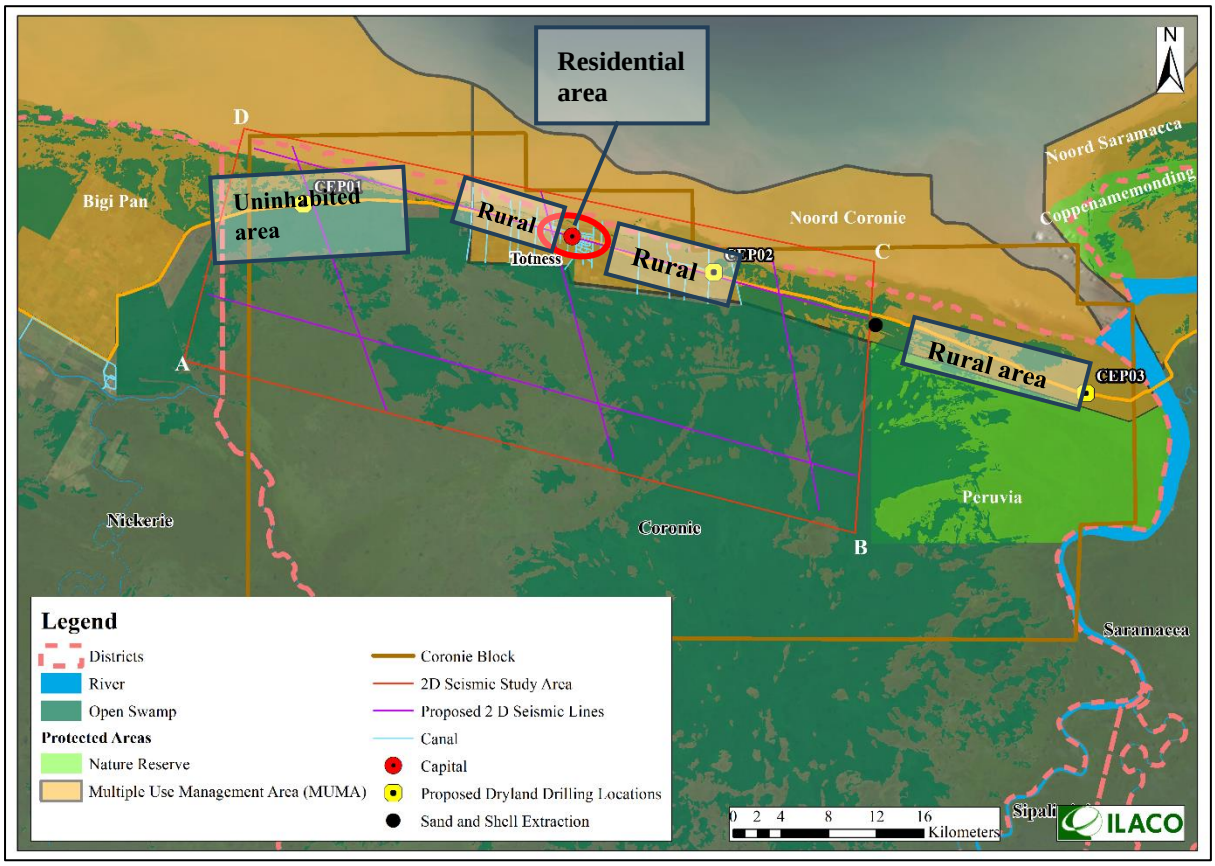

Figure 2: Overview of land use (red circle) within the project area

1.4 Applicable noise standards

In the absence of specific national guidelines for noise levels, the international standards World Health Organization (WHO) / International Finance Corporation (IFC) for community-based noise limits, also used by National Institute for Environment and Development in Suriname (NIMOS), are applied (see **Table 1**).

Table 1: Applicable Outdoor Noise Standards for Community-based noise (WHO/IFC).

Receptor	Maximum Allowable Ambient Noise Levels 1-hour LAeq (dBA)	
	Daytime 07:00-22:00	**Nighttime 22:00-07:00**
Residential; institutional; educational	55	45
Industrial; commercial	70	70

The IFC states that noise impacts should be limited to a maximum increase above background levels of 3dBA at the nearest receptor location off-site (IFC 2007). For a person with average hearing acuity an increase of less than 3 dBA in the general ambient noise level is not detectable.

2. Methodology

The noise measurements were carried out according to the General EHS Guidelines of the WHO/IFC for Noise monitoring (IFC 2007).

2.1 Measurement instruments

Noise measurements were performed with a sound level meter and analyzer SVAN 977c (#98852) mounted on a tripod. The MK 255 pre-polarized microphone is provided with a SA22 windscreen, through which the measurements will be done. The measurements are done with Class 1 IEC 61672:2013 accuracy in the frequency range of 20 Hz to 20 kHz with an MK 255 microphone. A FAST detector is used for the measurements with A, C and Z filters. Also, an 1/1 OCTAVE analysis with 10 filters with center frequencies 31.5 Hz ÷ 16 kHz, Class 1 IEC 61260-1:2014, will be logged. Before each measurement period, a calibration will be done with an SV 33B Acoustic Calibrator (serial # 125676) with IEC 60942:2003 standard, Type 1 accuracy. The sound level meter was calibrated on the 26th of July 2023. The logged data was analyzed with the software SVANPC++ version 3.3.16. See **Appendix 1** for the specifications of the SVAN 977c.

2.2 Measurement parameters

At every measurement, the following was recorded:

- Time and date;
- Location and GPS;
- Name of person carrying out the monitoring;
- Serial number of equipment used;
- Noted noise sources and noise levels, direction and frequency from source of interest;
- Duration of monitoring;
- Weather conditions such as wind direction, cloud cover etc.;
- SVAN 977c measured noise levels in L linear peak (dBL), and LAeq, L10, L50, L90, Lmax and Lmin, all provided in dBA, and
- Audio recordings.

The LAeq provides information on the nature and extent of the noise sources. The L10 represents the higher noise levels during 10% of the measurement period and together with L50 and L90 are generally utilized for traffic noise levels. The L90 gives an indication of the underlying noise level or the noise level that is present 90% of the measurement time. It is generally used to represent background noise levels i.e., the noise levels without the influence of infrequent transient sources.

2.3 Measurement procedures

All measurements have been carried out by a survey team of two (2) persons, with the SVAN 977c meter placed on a tripod at approximately 1.5 m above the surface level and at least 3 m away from obstacles or reflecting surfaces. Audio recordings have also been made of all measurements by attaching an audio recorder to the noise meter. Nio measurements were carried out during rainfall. All project activities will be carried out during daytime; therefore, no measurements will be conducted during nighttime (22:00 – 07:00 hrs.). All measurements took place for 30 min continuously.

2.4 Measurement locations

Table 2 gives a description of the noise measurement locations and **Figure 3** gives an overview.

Table 2: Description of noise measurement locations

ID#	Location	Time	Date	Season
N1	Nearest resident near CEP03	14:27 hrs.	27th of July 2023	Rainy season
N2	Nearest resident near CEP02	10:17 hrs.		
N3	Resident in Totness	11:24 hrs.		
N4	Resident in Burnside	13:25 hrs.		
N5	Near CEP01	09:10 hrs.		

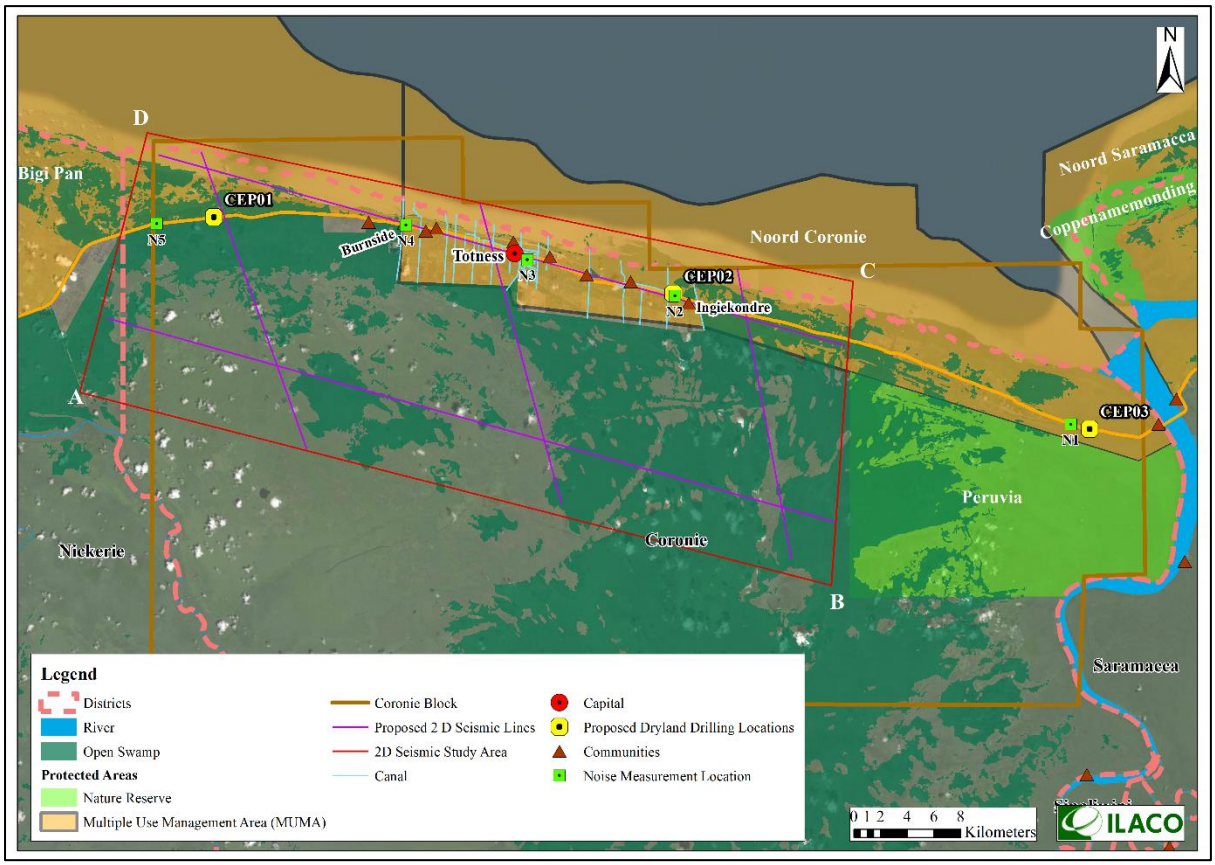

Figure 3: Overview of noise measurement locations

The pictures below give an illustration of the measurements.

27 July 2023
Daytime (07:00 – 22:00 hrs.)

N1: Along the Oost-Westverbinding, near a resident approx. 1440 m away from drilling location CEP03. The area was surrounded with low grass and coconut trees.

N2: Along the Oost-Westverbinding, in the driveway of a resident in Ingikondre approx. 170 m away from drilling location CEP02. The area was surrounded by low trees and the ground was unpaved (sandy).

N3: In the driveway of a resident in Totness, along the Gouverneurstraat. The area was surrounded with low grass.

N4: Along the Oost-Westverbinding, at the driveway of a resident in Burnside (KM 128). The area was surrounded with low grass and banana trees.

N5: Along the Oost-Westverbinding approx. 4300 m away from drilling location CEP01. The area surrounded with low to high vegetation and the road is bordered by a lagoon.

3. Results

3.1 Introduction

The field measurements were performed as planned. During the baseline measurements, all noise sources were recorded in field observation sheets presented in **Appendix 2**. The logger results of all measurements are presented in **Appendix 3**, together with general information.

3.2 Baseline conditions of the study area

3.2.1 Weather conditions

The noise measurements have been carried out during daytime. The weather condition during daytime measurements was sunny.
The wind speed during the measurements varied from light air (0.3 – 1.5 m/s) till light breeze (1.5 – 3.3 m/s) during. A predominant northeast wind direction was observed during daytime. No measurements were conducted during rainfall.

3.2.2 Traffic intensity

Four of the measurements (N1, N2, N4 and N5) were carried out along the Oost-Westverbinding, which is a very busy road especially during daytime. The daytime traffic is dominated by cars (55%), followed by heavy truck (19%), light truck (16%), bus (7%) and moped (2%).

3.3 Noise conditions

Rural area (N1, N2 and N4)

The noise measurement at these locations were all conducted near a resident along the Oost-Westverbinding. The measured noise levels (LAeq) exceeded the daytime WHO/IFC noise standard of 55 dBA (see **Table 3**). The higher noise levels are caused by traffic (such as heavy trucks, light trucks and cars). The higher LAeq correspond with higher traffic intensity and or with higher speed levels. In general speed is higher in the road sections outside the plantation area (Ingikondre-Burnside). Speeds above 80 – 120 km/hr. were observed here (N1). Within the rural section of the plantation area (N2 and N4), the number of cars seems to be the determining factor for the LAeq. Other observed noise sources were birds, chickens, barking dogs, person cutting coconuts, leaves rustling by the wind, and claxon. The background noise level (L90) indicates quite natural conditions (see **Table 3**), which gives an approximate indication of noise levels without traffic.

Note: measurements were made at a distance of 7.4 m from the road axis. When corrected for houses at a distance of 15 meters from the road axes, the LAeq levels for N1, N2 and N4 are respectively 60.0, 57.0 and 51.2 dBA.

Residential area (N3)

One noise measurement was conducted in a residential area, namely Totness which is rather densely populated. The noise measurement was conducted in the driveway of a resident along the Gouverneurstraat. The measured noise level (LAeq) is below the daytime WHO/IFC noise standard of 55 dBA (see **Table 3**). At this location the traffic intensity was the same compared to some other locations, but consisted mostly of cars and mopeds. The speed limit in this street is 40 km/hr., but speeds between 20 – 40 km/hr. were observed, resulting in lower noise levels. Other observed noise sources were talking and yelling persons, birds, dogs barking, insects and sounding one's horn. The background noise level (L90) indicates a quiet neighborhood, which gives an approximate indication of noise levels without traffic.

Uninhabited area (N5)

The noise measurement was conducted in an uninhabited area along the Oost-Westverbinding. The area is surrounded with low to high vegetation with the Coronie Swamp on the south side of the road and a lagoon in the Bigi Pan MUMA on the North side. The recorded noise level (LAeq) is 65.0 dBA (see **Table 3**). This noise level is a result of the type of traffic and the high speeds with which they pass by

over the road. The type of traffic that was observed were heavy trucks, light trucks and cars. Other observed noise sources were birds, insects and leaves rustling by the wind. The background noise level (L90) indicates very quiet conditions, which gives an approximate indication of noise levels without traffic.

Table 3: Results of daytime noise measurements

ID #	Location	LAeq	L10	L90
N1	Along the Oost-Westverbinding, near a resident approx. 1440 m away from drilling location CEP03. The measurement was conducted 7.4 m away from the axis of the road. Traffic counts: 34 vehicles	66.1	62.3	34.0
N2	Along the Oost-Westverbinding, in the driveway of a resident in Ingikondre approx. 170 m away from drilling location CEP02. The measurement was conducted 7.4 m away from the axis of the road. Traffic counts: 45 vehicles	63.1	62.3	41.9
N3	In the driveway of a resident in Totness, along the Gouverneurstraat. The measurement was conducted 7.4 m away from the axis of the road. Traffic counts: 27 vehicles	49.1	50.4	37.6
N4	Along the Oost-Westverbinding, at the driveway of a resident in Burnside (KM 128). The measurement was conducted 7.4 m away from the axis of the road. Traffic counts: 17 vehicles	57.3	53.9	36.4
N5	Along the Oost-Westverbinding approx. 4300 m away from drilling location CEP01. The area surrounded with low to high vegetation. The measurement was conducted 7.4 m away from the axis of the road. Traffic vehicles: 26 vehicles	65.0	59.6	26.1
xx	Exceeds the WHO/IFC noise standard of 55 dBA for daytime in residential areas			

4 Conclusion

Rural and residential area

The residents along the Oost-Westverbinding experience noise levels (LAeq) that are above the WHO/IFC standard of 55 dBA for residential areas during daytime, due to traffic intensity along the road. Number of vehicles and their speed are the main determinants of the noise level. When corrected (see note previous page) LAeq at N1 and N2 still exceed the standard.
Within the residential area the WHO/IFC daytime standard of 55 dBA is not exceeded, due to the low speed at the residential roads and the type of vehicles (mainly cars; no heavy trucks).

Uninhabited area

High noise levels are recorded at this location, mainly caused by traffic. The type of vehicles that mostly passes by are heavy trucks, light trucks and cars. The higher speed at this location contributes to the high noise levels. In the absence of traffic, the noise levels are very low.

References

IFC 2007. Environmental, Health, and Safety (EHS) Guidelines. General EHS Guidelines. International Finance Corporation / World Bank Group, April 30, 2007.

Appendices

Appendix 1 Specifications SVAN 977c

SVAN 977C

Sound & Vibration Level Meter and Analyser

SVANTEK

sound and vibration

What's inside the SVAN 977C kit?

The kit consists of SVAN 977C Class 1 sound & vibration level meter with a detachable preamplifier SV 12L and high quality MK 255 microphone. The list of accessories includes: SA 143 carrying case, SA 22 windscreen, 16 GB microSD card, four AA batteries, USB cable, and CD with user manual. Each SVAN 977C has its factory calibration certificate and 36 months warranty card.

SVAN 977C Technical Specifications

Sound Level Meter & Analyser

Standards	Class 1: IEC 61672-1:2013; Class 1: IEC 61260-1:2014
Weighting Filters	A, B, C, Z, LF, U, AU
Time Constants	Slow, Fast, Impulse
Microphone	Microtech Gefell MK 255, 50 mV/Pa, prepolarised 1/2" condenser microphone
Preamplifier	SV 12L detachable (TNC)
Linear Operating Range	23 dBA RMS ÷ 140 dBA Peak (in accordance to IEC 61672)
Total Dynamic Measurement Range	16 dBA RMS ÷ 140 dBA Peak (typical from noise floor to the maximum level)
Internal Noise Level	Less than 16 dBA RMS
Dynamic Range	>110 dB
Frequency Range	3 Hz ÷ 20 kHz with Microtech Gefell MK 255
Meter Mode Results	Elapsed time, Lxy, Leqx (LEQ), Lxpeak (PEAK), Lxymax (MAX), Lxymin (MIN), LR (ROLLING LEQ), Ovl (OVERLOAD), Lxye (SEL), LN (LEQ STATISTICS), Lden, LEPd, Ltm3, Ltm5
Measurement Profiles	Simultaneous measurement in three profiles with independent set of filters (x) and detectors (y)
Analyser[1] (optional)	1/1 octave or optional 1/3 octave real-time analysis, up to 40.0 kHz band meeting Class 1: IEC 61260-1 FFT analysis 1600 lines, up to 40.0 kHz band (optional) RPM rotation speed measurement parallel to the vibration measurement (optional) RT60 reverberation time measurement (optional)
Statistics	L_n (L_1-L_{99}), complete histogram in meter mode and 1/1 or 1/3 octave analysis
Data Logger[1]	Time-history logging of summary results, spectra with adjustable double logging steps down to 2 ms
Audio Recording[1] (optional)	Audio records to time-history data or WAV format with selectable band and recording period

Vibration Level Meter & Analyser

Standards	ISO 20816-1
Meter Mode	RMS, Max, Peak, Peak-Peak Simultaneous measurement in three profiles with independent filter sets and detectors
Filters	HP1, HP3, HP10, Vel1, Vel3, Vel10, VelMF, Dil1, Dil3, Dil10, Wh
Accelerometer	SV 80 (100 mV/g) or any IEPE accelerometer (optional)
Analyser[1] (optional)	1/1 octave or optional 1/3 octave real-time analysis, up to 40.0 kHz band meeting Class 1: IEC 61260-1 FFT analysis 1600 lines, up to 40.0 kHz band (optional) RPM rotation speed measurement parallel to the vibration measurement (optional)
Data Logger	Time-history logging of summary results, spectra with two adjustable logging steps
Time-domain Signal Recording[1]	Continuous or triggered time-domain signal recording to WAV format (optional)

General information

Input	IEPE with TNC connector	
Memory	MicroSD card 16 GB (removable & upgradeable)	
Display	Super contrast (10000:1) OLED 2.4" colour display (320 x 240 pixels)	
Interfaces	USB 2.0 Client, Bluetooth®, RS 232 (with optional SV 55)	
	External I/O - AC output (1 V Peak) or Digital Input/Output (Trigger – Pulse)	
Power Supply	Four AA batteries	operation time > 12 h (6 V / 2 Ah)[2]
	Four rechargeable AA batteries	operation time > 16 h (4.8 V / 2.6 Ah)[2] (not included)
	External power supply	6 V/500 mA DC ÷ 15 V/250 mA DC
	USB interface	500 mA HUB
Environmental Conditions	Temperature	from -10 °C to 50 °C
	Humidity	up to 90 % RH, non-condensed
Dimensions	343 x 79 x 39 mm (with microphone and preamplifier)	
Weight	Approx. 0.6 kg with batteries	

[1]works together with the meter mode
[2]dependent on instrument operation mode

The policy of our company is to continually innovate and develop our products. Therefore, we reserve the right to change the specifications without prior notice.

SVANTEK Sp. z o. o.
ul. Strzygłowska 81, 04-872 WARSAW, POLAND
phone/fax (+48) 22 51 88 320, (+48) 22 51 88 312
http://www.svantek.com e-mail: office@svantek.com.pl

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SVANTEK

EU Declaration of Conformity

No. SVAN977C-CE-EN/07/2020

Manufacturer:	**SVANTEK Sp. z o. o**
Address:	Strzygłowska 81 04-872 Warszawa Poland
Kind of product:	SOUND LEVEL METER – ANALYSER, VIBRATION LEVEL METER – ANALYSER
Type:	**SVAN 977C**
Directive:	**Low Voltage Directive** (LVD) 2014/35/EU
Standard:	EN 61010-1: 2010 *Safety requirements for electrical measurement equipment*
Directive:	**Electromagnetic Compatibility Directive** (EMC) 2014/30/EU
Standards:	EN 61326-1:2006 *Measurement equipment: EMC emission and immunity*
Directive:	**Radio and Telecommunication Directive** (RTTE) 1999/5/EC

Standards:

a.3.1a: SAFETY	EN 61010-1: 2010	*Information technology equipment*
art.3.1b: EMC	ETSI EN 301 489-1 V1.9.2:2011	*Radio transmission systems*
	ETSI EN 301 489-17 V2.2.1:2012	*Broadband transmission systems*
art.3.2: RADIO	ETSI EN 300 328 V1.9.1:2015	*Wideband transmission systems (2.4 GHz)*

Auxiliary industry standards:

EN 61672-1:2013	*Electroacoustics - Sound level meters: Class 1*
EN 61260-1:2014	*Octave-band filters*
EN ISO 8041:2005	*Human response to vibration - Measuring instrumentation*

I, the undersigned authorized manufacturer representative, declare that this declaration is issued under the sole responsibility of the manufacturer, and that the object of the declaration described above is in conformity with the relevant Union harmonization legislation.

Place of issue: **Warsaw, Poland**

Date of issue: **01. 07. 2020**

Bogdan Żmuda, CEO

.....
(signature)

SVANTEK Sp. z o. o.
Strzyglowska 81
04-872 Warsaw, Poland
tel.: 22 518 83 20
e-mail: office@svantek.com.pl

Registered in
the Warsaw District Court
XIII Economic Department
Initial Capital 100 000 zł

KRS 0000192065
REGON 002175672
VAT PL 5270105272

Appendix 2 Daytime Baseline Noise Measurements

Daytime Baseline Measurements																						
Measuring date:	27 July 2023																	**Legend**				
Number of measurements:	5																	1x	Counts of observation			
Measured by:	Nakchedi A./Rodjan R																	x	Observed noise (not countable)			
Noise measurement locations:	See below																					
No #	**Locations**	**Coordinates (UTM21N/ WGS84)**	**Time/ Weather**	**Provide numbers**							**Birds**	**Insects**	**Leaves/ Grass**	**Dogs**	**Music**	**Claxon**	**Alarm**	**Talking**	**Wind speed (m/s) See wind scale table**	**Wind direction**	**Remarks**	
				Cars	**Light truck**	**Bus**	**Heavy truck**	**Moped**	**Bike**	**Overfly**												
N1	Along the Oost-Westverbinding, near a resident approx. 1440 m away from drilling location CEP03. The area was surrounded with low grass and coconut trees. The meter was placed in an open area approx. 7.4 m away from the axis of the main road on the project site and 1.5 m above surface level.	21 N 614585.52 637674.73	14:27 – 14:57 hrs. (30 min) / Sunny	20x	8x	5x	4x	-	1x	3x	x	x	x	x	-	x	-	-	0.3–1.5 m/s	North-East	Continuous noise of blowing trees and grass. Occasional noise of car passing by; noise of heavy truck passing by; noise of light truck passing by; noise of overfly at distance; noise of insect nearby; noise of birds; noise of barking dog; noise of bike passing by; noise of bus passing by; noise of claxon at distance; noise of slamming bin truck; car passing by and noise of slamming truck bin at distance.
N2	Along the Oost-Westverbinding, in the driveway of a resident in Ingikondre approx. 170 m away from drilling location CEP02. The area was surrounded by low trees and the ground was unpaved (sandy). The meter was placed approx. 4.5 m away from the edge of the road and 1.5 m above surface level.	21 N 565000.80 652321.03	10:17 – 10:47 hrs. (30 min) Sunny	10x	2x	-	2x	3x	-	-	x	x	x	-	x	x	-	-	0.3–1.5 m/s	North-East	Occasional: Frequent noise of birds and chickens; noise of person cuts coconut; noise of light truck; noise of car passing by; noise of claxon; noise of banana leaves rustling by the wind; noise of leaves rustling by the wind; noise of sneezing; noise of insects; noise of heavy truck passing by and noise of moped.
N3	In the driveway of a resident in Totness, along the Gouverneurstraat. The area was surrounded with low grass. The meter was placed approx. 7.4 m away from the axis of the Gouverneurstraat and 1.5 m above surface level.	21 N 574049.25 649781.52	11:24 – 11:44 hrs. (30 min) / Sunny	11x	-	-	-	14x	2x	-	x	-	-	x	-	-	-	x	1.5–3.3 m/s	North-East	Continuous noise of birds and noise of radio of resident. Occasional noise of car passing by; noise of moped passing by at distance, noise of people talking, noise of insects nearby, noise of dog barking at distance, noise of claxon at distance, and noise of chicken at distance, noise of bike passing by, noise of person laughing, noise of chair move up and noise of birds, person yelling at distance.
N4	Along the Oost-Westverbinding, at the driveway of a resident in Burnside (KM 128). The area was surrounded with low grass and banana trees. The meter was placed approx. 7.4 m away from axis of the road in the driveway of a resident and 1.5 m above surface level.	21 N 585048.33 647112.89	13:25 – 13:54 hrs. (29 min) / Sunny	23x	5x	4x	13x	-	-	-	x	-	x	-	-	x	-	-	1.5–3.3 m/s	North-East	Frequent noise of birds. Occasional noise of leaves rustling by the wind and noise of car passing by, noise of light truck passing by, noise of bus passing by and noise of chicken, noise of heavy truck passing by, noise of claxon, noise of cargo truck passing by.
N5	Along the Oost-Westverbinding approx. 4300 m away from drilling location CEP01. The area surrounded with low to high vegetation. The meter was placed approx. 7.4 m away from the axis of the road, 1.5 m above surface level.	21 N 546429.80 652403.96	9:10 – 9:39 hrs. (29 min) / Sunny	16x	5x	-	5x	-	-	-	x	x	x	-	-	-	-	-	1.5–3.3 m/s	North-East	Continuous noise of birds and insect. Occasional noise of car passing by, noise of leaves rustling by the wind, noise of heavy truck passing by, noise of light truck passing by.

Baseline Daytime measurements									
ID #	**Location**	**Date**	**Time**	**LAeq**	**L10**	**L50**	**L90**	**Lmax**	**Lmin**
N1	Along the Oost-Westverbinding, near a resident approx. 1440 m away from drilling location CEP03. The area was surrounded with low grass and coconut trees. The meter was placed in an open area approx. 7.4 m away from the axis of the main road on the project site and 1.5 m above surface level.	27-Jul-23	14:27 hrs.	66.14	62.30	41.90	34.00	88.99	28.68
N2	Along the Oost-Westverbinding, in the driveway of a resident in Ingikondre approx. 170 m away from drilling location CEP02. The area was surrounded by low trees and the ground was unpaved (sandy). The meter was placed approx. 4.5 m away from the edge of the road and 1.5 m above surface level.	27-Jul-23	13:25 hrs.	63.13	62.30	46.50	41.90	83.74	36.42
N3	In the driveway of a resident in Totness, along the Gouverneurstraat. The area was surrounded with low grass. The meter was placed approx. 7.4 m away from the axis of the Gouverneurstraat and 1.5 m above surface level.	27-Jul-23	11:24 hrs.	49.14	50.40	42.70	37.60	74.87	33.27
N4	Along the Oost-Westverbinding, at the driveway of a resident in Burnside (KM 128). The area was surrounded with low grass and banana trees. The meter was placed approx. 7.4 m away from axis of the road in the driveway of a resident and 1.5 m above surface level.	27-Jul-23	10:17 hrs.	57.30	53.90	42.80	36.40	81.31	31.22
N5	Along the Oost-Westverbinding approx. 4300 m away from drilling location CEP01. The area surrounded with low to high vegetation. The meter was placed approx. 7.4 m away from the axis of the road, 1.5 m above surface level.	27-Jul-23	9:10 hrs.	65.02	59.60	32.60	26.10	88.05	22.53

Wind Beaufort scale

#	Description	Conditions	Wind speed
0	Calm	Calm. Smoke rises vertically.	<0.3 m/s
1	Light air	Smoke drift indicates wind direction. Leaves and wind vanes are stationary.	0.3–1.5 m/s
2	Light breeze	Wind felt on exposed skin. Leaves rustle. Wind vanes begin to move.	1.5–3.3 m/s
3	Gentle breeze	Leaves and small twigs constantly moving, light flags extended.	3.3–5.5 m/s
4	Moderate breeze	Dust and loose paper raised. Small branches begin to move.	5.5–8 m/s
5	Fresh breeze	Branches of a moderate size move. Small trees in leaf begin to sway.	8–10.8 m/s
6	Strong breeze	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic bins tip over.	10.8–13.9 m/s
7	High wind	Whole trees in motion. Effort needed to walk against the wind.	49.9–61.8 km/h

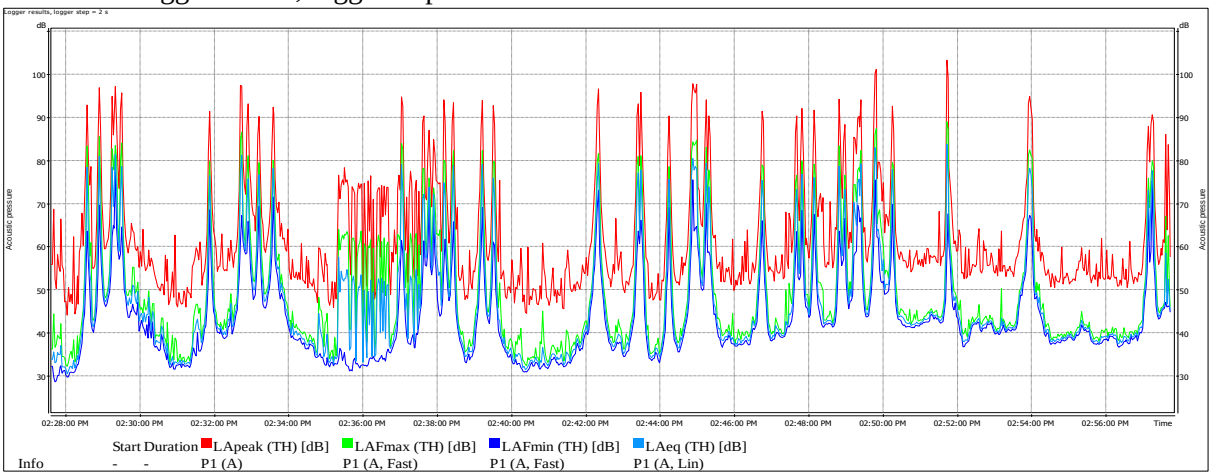
Appendix 3 Logger Results

Daytime Baseline Noise Measurements (N1-N5)
07.00 – 22:00 hrs.

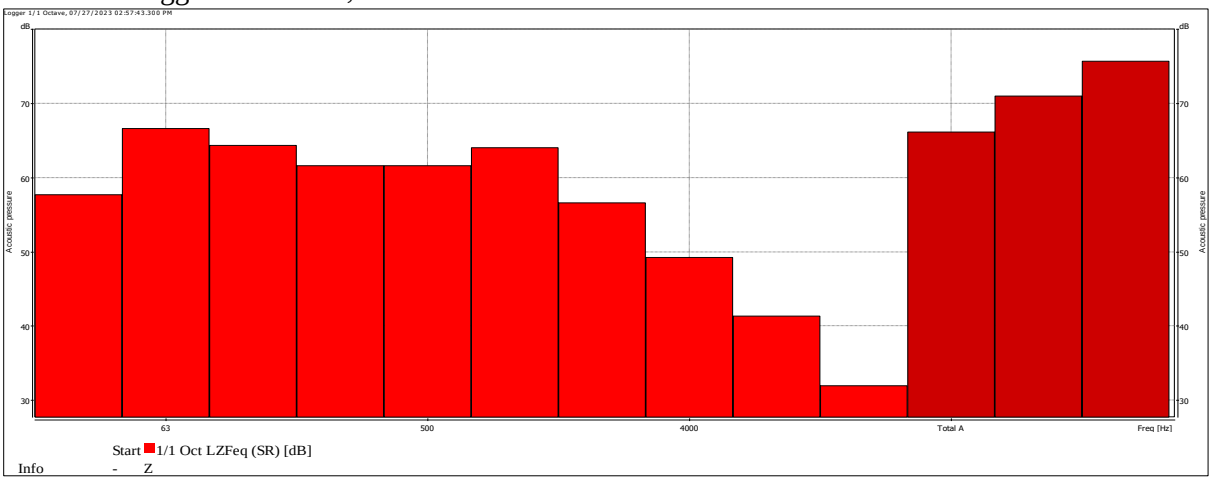
Location N1

Log number:	Log 176
Date:	27 July 2023
Time:	14:27 – 14:57 hrs. (30 min)
Description of the location:	Along the Oost-Westverbinding, near a resident approx. 1440 m away from drilling location CEP03. The area was surrounded with low grass and coconut trees.
Observation during measurement	Continuous noise of leaves rustling and grass by the wind. Noise of car passing by; noise of heavy truck passing by; noise of light truck passing by; noise of overfly at distance; noise of insect nearby; noise of birds; noise of barking dog; noise of bike passing by; noise of bus passing by; noise of claxon at distance; noise of slamming garbage truck; car passing by and noise of slamming garbage truck at distance. Wind speed: 0.3–1.5 m/s Wind direction: North -East
Position of the noise meter	The meter was placed in an open area approx. 7.4 m away from the axis of the main road on the project site and 1.5 m above surface level.

LOG176 : Logger results, logger step = 2 s



LOG176 : Logger 1/1 Octave, 07/27/2023 02:57:43.300 PM



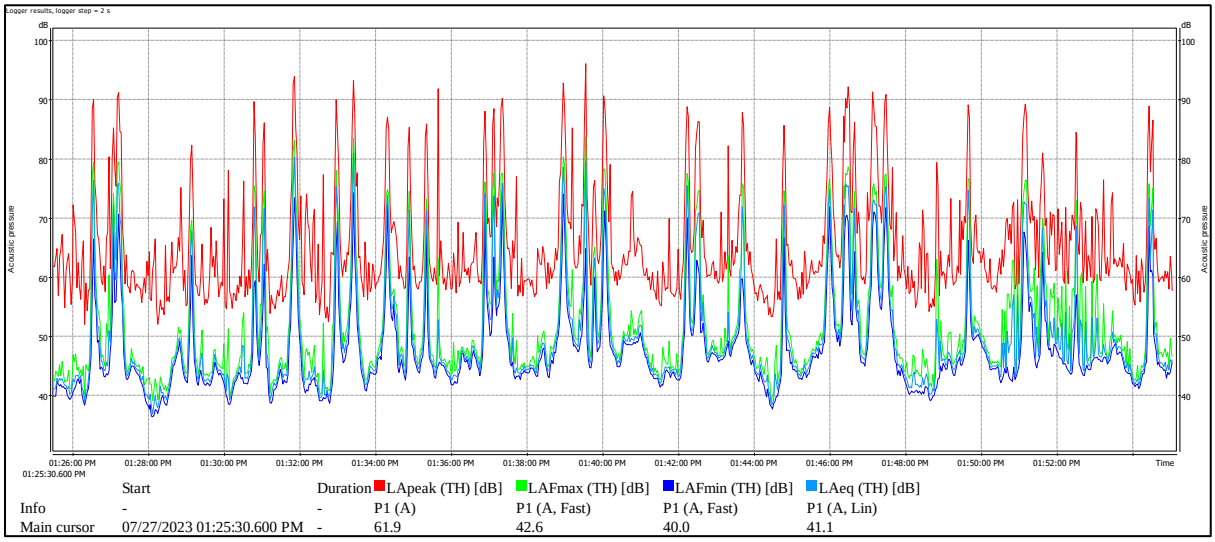
Causes of exceedance of the background level.

Nr.	Time	Cause
1	14:27 – 14:57 hrs.	Continuous noise of leaves rustling and grass by the wind.
2	14:28 – 14:29 hrs.	Noise of car passing by (2x).
3	14:29 – 14:30 hrs.	Noise of light truck passing by (2x); noise of heavy truck passing by(1x) and noise of overfly at distance (1x).
4	14:30 – 14:31 hrs.	Noise of overfly at distance (1x) and noise of insect nearby.
6	14:31 – 14:32 hrs.	Noise of birds and noise of car passing by (1x).
7	14:32 – 14:33 hrs.	Noise of light truck passing by (1x).
8	14:33 – 14:34 hrs.	Noise of light truck passing by (1x); noise of overfly (1x); noise of heavy truck passing by (1x) and noise of birds.
9	14:34 – 14:35 hrs.	Noise of birds and noise of overfly at distance.
10	14:35 – 14:36 hrs.	Noise of barking dog.
11	14:36 – 14:37 hrs.	Noise of barking dog and noise of birds.
12	14:37 – 14:38 hrs.	Noise of car passing by (4x) and noise of barking dog.
13	14:38 – 14:39 hrs.	Noise of car passing by (2x) and noise of birds.
14	14:39 – 14:40 hrs.	Noise of car passing by (1x); noise of bike passing by (1x) and noise of bus passing by (1x).
15	14:40 – 14:41 hrs.	Noise of insect nearby.
16	14:42 – 14:43 hrs.	Heavy truck passing by (1x) and noise of birds.
17	14:43 – 14:44 hrs.	Noise of birds; noise of insects and noise of car passing by at distance (2x).
18	14:44 – 14:45 hrs.	Noise of car passing by (1x) and noise of bus passing by (3x).
19	14:45 – 14:46 hrs.	Noise of claxon at distance; noise of bus passing by (1x); noise of car passing by (1x) and noise of insects nearby.
20	14:46 – 14:47 hrs.	Light truck passing by (1x) and noise of birds.
21	14:47 – 14:48 hrs.	Noise of car passing by (2x).
22	14:48 – 14:49 hrs.	Light truck passing by (2x) and noise of insects.
23	14:49 – 14:50 hrs.	Noise of car passing by (3x); noise of bus passing by (1x); noise of heavy truck passing by (1x) and noise of slamming bin truck.
24	14:50 – 14:51 hrs.	Noise of car passing by (2x); noise of slamming truck bin at distance.
25	14:53 – 14:54 hrs.	Noise of birds; noise of light truck passing by (1x) and noise of birds.
26	14:54 – 14:55 hrs.	Noise of birds
27	14:56 – 14:56 hrs.	Noise of insects nearby.
28	14:57 – 14:58 hrs.	Noise of car passing by (1x).

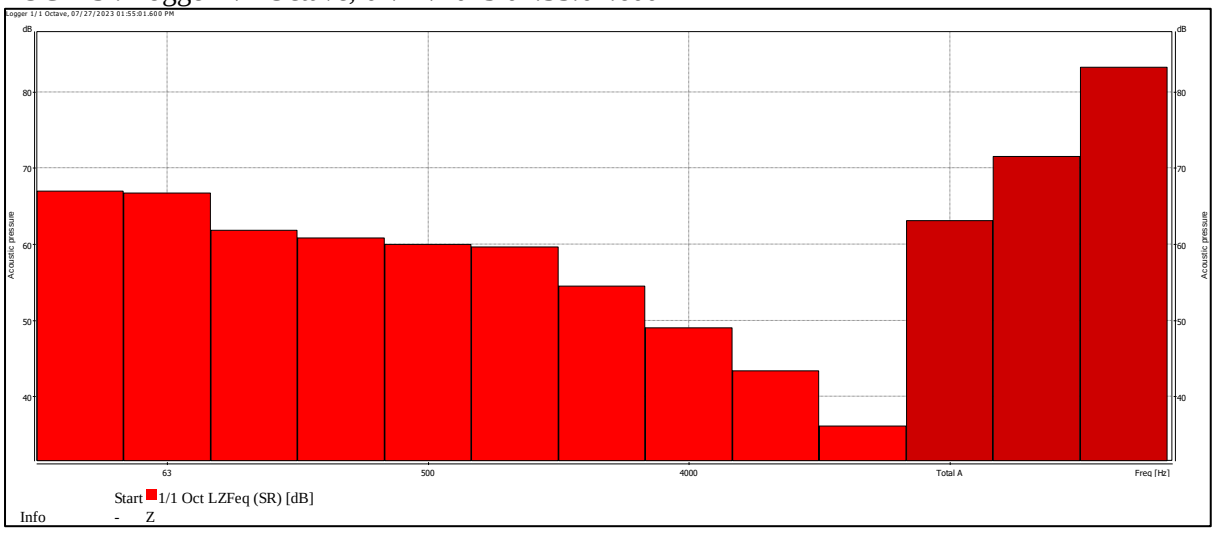
Location N2

Log number:	Log 175
Date:	27 July 2023
Time:	13:25 – 13:54 hrs. (29 min)
Description of the location:	Along the Oost-Westverbinding, in the driveway of a resident in Ingikondre approx. 170 m away from drilling location CEP02. The area was surrounded by low trees and the ground was unpaved (sandy).
Observation during measurement	Frequent noise of birds. Occasional noise of leaves rustling by the wind and noise of car passing by, noise of light truck passing by, noise of bus passing by and noise of chicken, noise of heavy truck passing by, noise of claxon, noise of cargo truck passing by. Wind speed: 1.5–3.3 m/s Wind direction: North-East
Position of the noise meter	The meter was placed approx. 7.4 m away from the edge of the road and 1.5 m above surface level.

LOG175 : Logger results, logger step = 2 s



LOG175 : Logger 1/1 Octave, 07/27/2023 01:55:01.600 PM



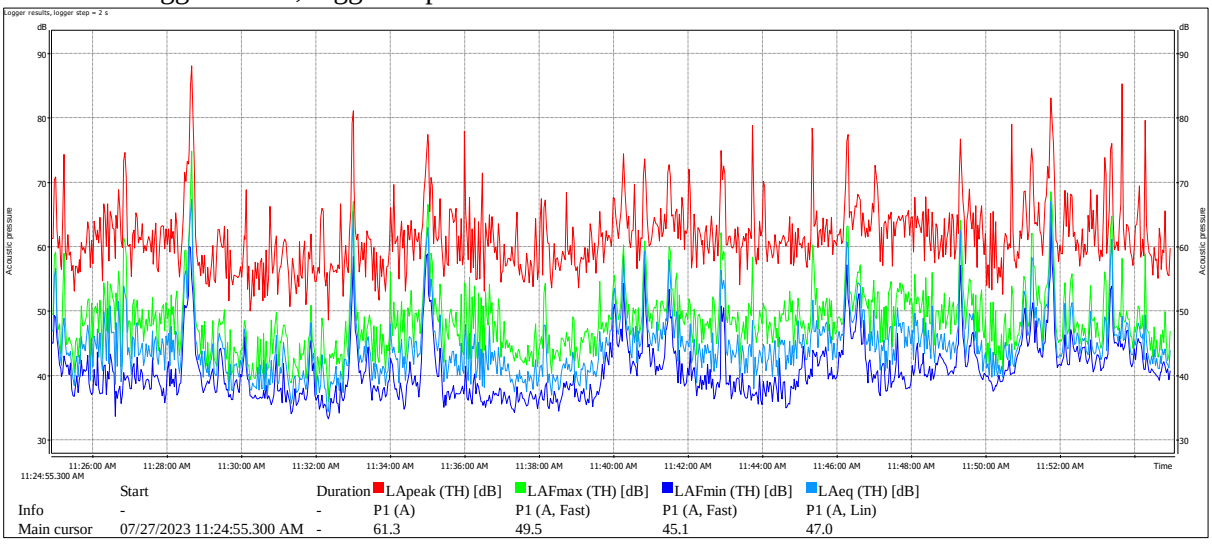
Causes of exceedance of the background level.

Nr.	Time	Cause
1	13:25 – 13:54 hrs.	Frequent noise of birds
2	13:25 – 13:26 hrs.	Noise of leaves rustling by the wind and noise of car passing by (1x).
3	13:26 – 13:27 hrs.	Noise of car passing by (1x).
4	13:27 – 13:28 hrs.	Noise of car passing by (2x); noise of light truck passing by(2x) and noise of leaves rustling by the wind.
5	13:28 – 13:29 hrs.	Noise of leaves rustling by the wind.
6	13:29 – 13:30 hrs.	Noise of leaves rustling by the wind; noise of bus passing by and noise of chicken.
7	13:30 – 13:31 hrs.	Noise of car passing by (1x) and noise of bus passing by (1x).
8	13:31 – 13:32 hrs.	Noise of heavy truck passing by (1x) and noise of car passing by.
9	13:32 – 13:33 hrs.	Noise of claxon (1x); noise of car passing by (1x) and noise of light truck passing by (1x).
10	13:33 – 13:34 hrs.	Noise of heavy truck passing by (1x).
11	13:34 – 13:35 hrs.	Noise of heavy truck passing by (1x).
12	13:35 – 13:36 hrs.	Noise of car passing by (1x) and noise of heavy truck passing by (1x).
13	13:36 – 13:37 hrs.	Noise of car passing by (1x).
14	13:37 – 13:38 hrs.	Noise of car passing by (1x) and noise of heavy truck passing by (1x).
15	13:38 – 13:39 hrs.	Noise of claxon (3x); noise of leaves rustling by the wind.
16	13:39 – 13:40 hrs.	Noise of bus passing by (1x).
17	13:40 – 13:41 hrs.	Noise of car passing by(3x) and heavy truck passing by(1x).
18	13:41 – 13:42 hrs.	Noise of leaves rustling by the wind.
19	13:42 – 13:43 hrs.	Noise of cargo truck passing by(2x); noise of car passing by(1x) and noise of claxon.
20	13:43 – 13:44 hrs.	Noise of light truck passing by (1x).
21	13:44 – 13:45 hrs.	Noise of chicken and noise of car passing by (1x).
22	13:45 – 13:46 hrs.	Noise of leaves rustling by the wind and noise of chicken.
23	13:46 – 13:47 hrs.	Noise of heavy truck passing by (2x) and noise of car passing by (3x).
24	13:47 – 13:48 hrs.	Noise of heavy truck passing by (3x).
25	13:48 – 13:49 hrs.	Noise of chicken.
26	13:49 – 13:50 hrs.	Noise of chicken and noise of bus passing by (1x).
27	13:50 – 13:51 hrs.	Noise of leaves rustling by the wind and noise of bird.
28	13:51 – 13:52 hrs.	Noise of car passing by (3x); noise of claxon(1x) and noise of birds.
29	13:52 – 13:53 hrs.	Noise of birds; noise of leaves rustling by the wind and noise of car passing by (1x).
30	13:53 – 13:54 hrs.	Noise of leaves rustling by the wind.
31	13:54 – 13:55 hrs.	Noise of car passing by (1x) and noise of light truck passing by (1x).

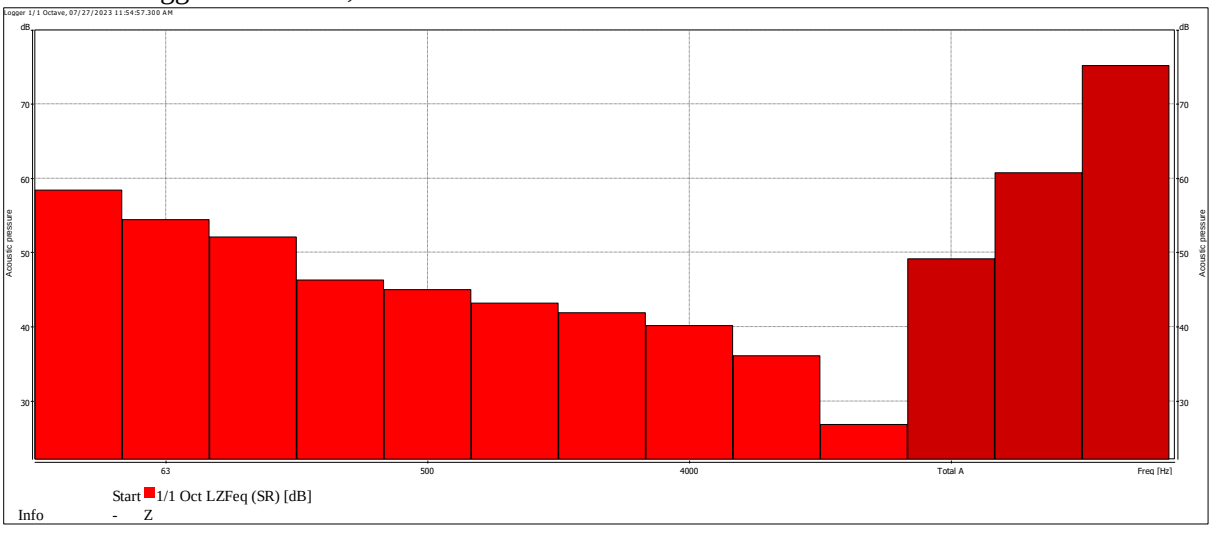
Location N3

Log number:	Log 171
Date:	27 July 2023
Time:	11:24 – 11:44 hrs. (30 min)
Description of the location:	In the driveway of a resident in Totness, along the Gouverneurstraat. The area was surrounded with low grass.
Observation during measurement	Continuous noise of birds and noise of radio of resident. Occasional noise of car passing by; noise of moped passing by at distance, noise of people talking, noise of insects nearby, noise of dog barking at distance, noise of claxon at distance, and noise of chicken at distance, noise of bike passing by, noise of person laughing, noise of a chair and noise of birds, person yelling at distance. Wind speed: 1.5–3.3 m/s Wind direction: North-East
Position of the noise meter	The meter was placed approx. 7.4 m away from the axis of the Gouverneurstraat and 1.5 m above surface level.

LOG171 : Logger results, logger step = 2 s



LOG171 : Logger 1/1 Octave, 07/27/2023 11:54:57.300 AM



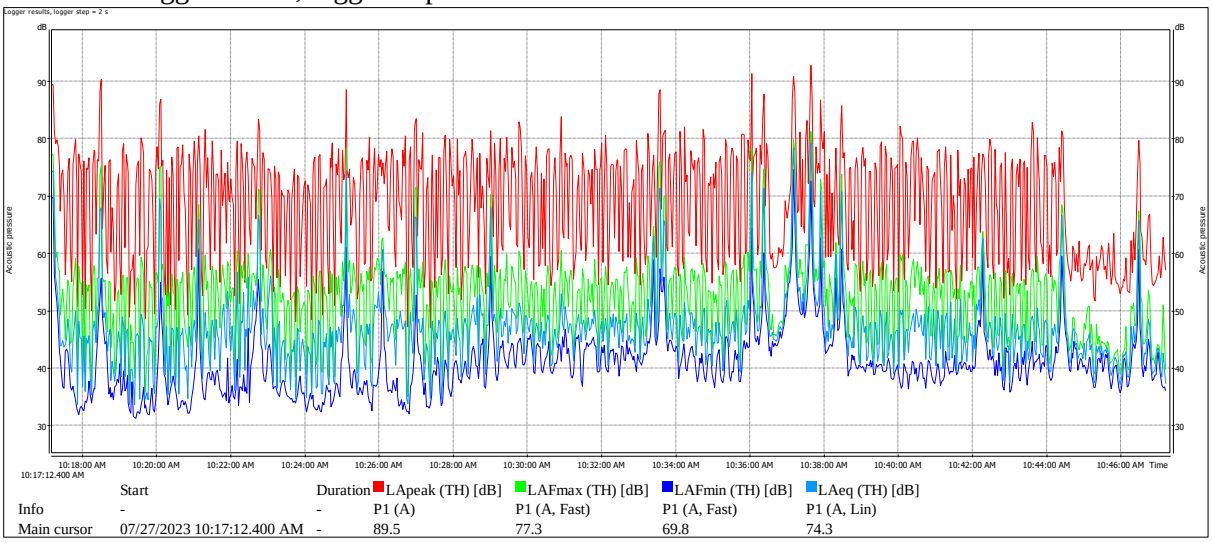
Causes of exceedance of the background level.

Nr.	Time	Cause
1	11:24 – 11:44 hrs.	Continuous noise of birds and noise of radio at the resident.
2	11:24 – 11:25 hrs.	Noise of car passing by (1x) and noise of moped passing by at distance (1x).
3	11:25 – 11:26 hrs.	Noise of moped passing by at distance and noise of car passing by at distance.
4	11:26 – 11:27 hrs.	Noise of people talking.
5	11:27 – 11:28 hrs.	Noise of moped passing by at distance and noise of car passing by at distance.
6	11:28 – 11:29 hrs.	Noise of car passing by (2x).
7	11:29 – 11:30 hrs.	Noise of moped passing by at distance.
8	11:30 – 11:31 hrs.	Noise of moped at distance; noise of insects nearby and noise of car at distance.
9	11:31 – 11:32 hrs.	Noise of moped passing by at distance and noise of car passing by at distance.
10	11:32 – 11:33 hrs.	Noise of dog barking at distance; noise of claxon at distance; noise of birds and noise of moped passing by (1x).
11	11:33 – 11:34 hrs.	Noise of moped passing by at distance and noise of car passing by at distance.
12	11:34 – 11:35 hrs.	Noise of car passing by (1x); noise of car passing by at distance.
13	11:35 – 11:36 hrs.	Noise of car passing by; noise of talking persons and noise of chicken at distance.
14	11:36 – 11:37 hrs.	Noise of bike passing by (1x); noise of moped passing by at distance and noise of barking dog at distance.
15	11:37 – 11:38 hrs.	Noise of barking dog at distance; noise of chicken at distance and noise of car passing by at distance.
16	11:38 – 11:39 hrs.	Noise of chicken at distance; noise of person laughing and noise of chair move up.
17	11:39 – 11:40 hrs.	Noise of bike passing by (1x) and noise of moped passing by at distance.
18	11:40 – 11:41 hrs.	Noise of moped passing by at distance and noise of car passing by(1x).
19	11:41 – 11:42 hrs.	Noise of bike passing by (1x) and noise of moped passing by(1x).
20	11:42 – 11:43 hrs.	Noise of car passing by at distance.
21	11:44 – 11:45 hrs.	Noise of barking dog at distance.
22	11:45 – 11:46 hrs.	Noise of barking dog at distance
23	11:46 – 11:47 hrs.	Noise of car passing by (1x); noise of barking dog at distance and noise of moped at distance.
24	11:47 – 11:48 hrs.	Noise of bike passing by (1x).
25	11:48 – 11:49 hrs.	Noise of car passing by at distance and noise of mower machine at distance.
26	11:49 – 11:50 hrs.	Noise of car passing by (1x) and noise of moped passing by at distance.
27	11:50 – 11:51 hrs.	Noise of mower machine at distance and noise of moped passing by at distance.
28	11:51 – 11:52 hrs.	Noise of car passing by (1x); noise of barking dog at distance and noise of car passing by (1x).
29	11:52 – 11:53 hrs.	Noise of moped at distance and noise of car at distance.
30	11:53 – 11:54 hrs.	Noise of bike passing by; noise of car passing by (1x) and noise of person yelling at distance.
31	11:54 – 11:55 hrs.	Noise of moped at distance and noise of passing by at distance.

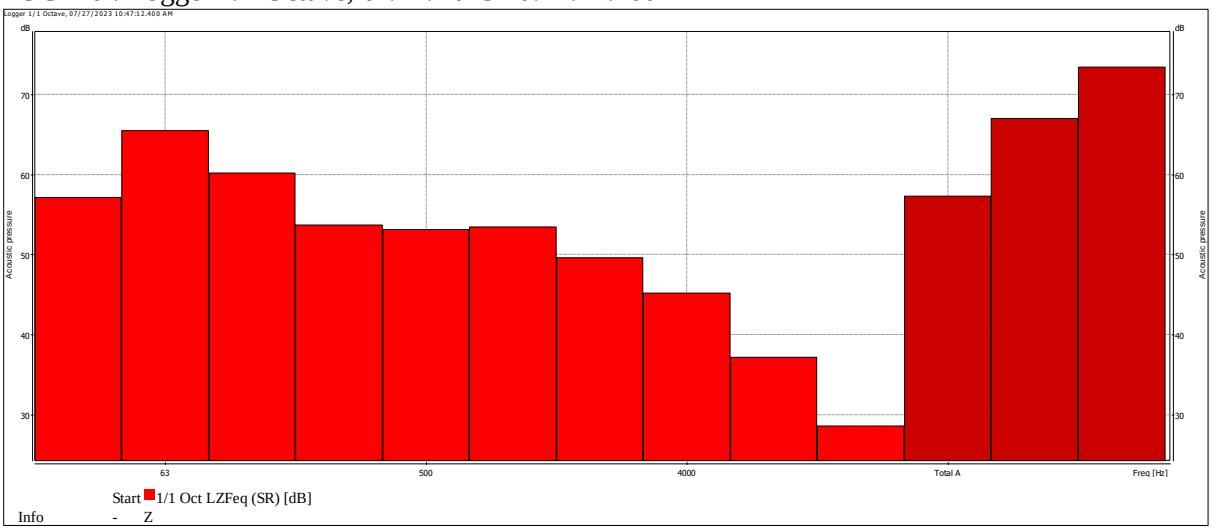
Location N4

Log number:	Log 170
Date:	27 July 2023
Time:	10:17 – 10:47 hrs. (30 min)
Description of the location:	Along the Oost-Westverbinding, at the driveway of a resident in Burnside (KM 128). The area was surrounded with low grass and banana trees.
Observation during measurement	Frequent noise of birds. Occasional noise of chickens; noise of person cutting coconuts; noise of light truck; noise of car passing by; noise of claxon; noise of banana leaves rustling by the wind; noise of leaves rustling by the wind; noise of sneezing; noise of insects; noise of heavy truck passing by and noise of moped. Wind speed: 0.3–1.5 m/s Wind direction: North -East
Position of the noise meter	The meter was placed approx. 7.4 m away from axis of the road in the driveway of a resident and 1.5 m above surface level.

LOG170 : Logger results, logger step = 2 s



LOG170 : Logger 1/1 Octave, 07/27/2023 10:47:12.400 AM



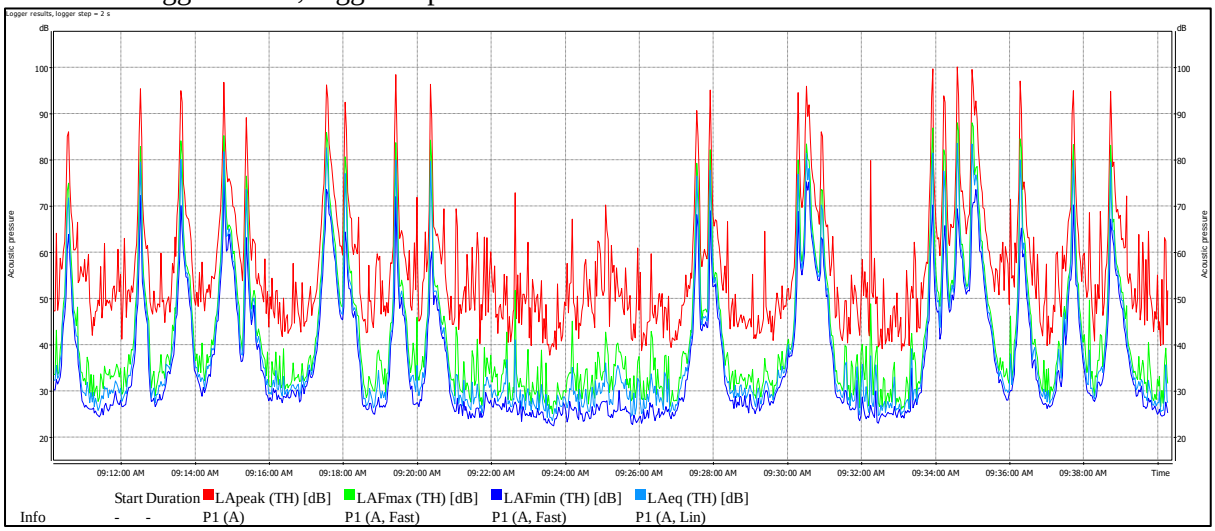
Causes of exceedance of the background level.

Nr.	Time	Cause
1	10:17 – 10:47 hrs.	Frequent noise of birds. Occasionally noise of chickens.
2	10:24 – 10:45 hrs.	Noise of person cutting coconuts.
3	10:26 – 10:47 hrs.	Noise of insects.
4	10:17 – 10:19 hrs.	Noise of person cutting coconuts.
5	10:19 hrs.	Noise of light truck passing by (1x) and noise of claxon (1x).
6	10:20 – 10:22 hrs.	Noise of car passing by (1x).
7	10:21 – 10:22 hrs.	Noise of car passing by (1x).
8	10:22 – 10:23 hrs.	Noise of banana leaves rustling by the wind; noise of car passing by.
9	10:23 – 10:24 hrs.	Noise of leaves rustling by the wind.
10	10:25 – 10:26 hrs.	Noise of car passing by with music (1x) and noise of sneezing.
11	10:26 – 10:47 hrs.	Noise of car passing by (1x).
12	10:28 – 10:29 hrs.	Noise of car passing by (1x).
13	10:30 – 10:31 hrs.	Noise of banana leaves rustling by the wind.
14	10:36 – 10:37 hrs.	Noise of car passing by (2x).
15	10:37 – 10:38 hrs.	Noise of heavy truck passing by (2x) and noise of light truck passing by (1x).
16	10:38 – 10:39 hrs.	Noise of moped (1x); noise of car passing by (1x).
17	10:39 – 10:44 hrs.	Noise of leaves rustling by the wind.
18	10:44 – 10:45 hrs.	Noise of moped passing by (1x).
19	10:45 – 10:46 hrs.	Noise of leaves rustling by the wind.
20	10:46 – 10:47 hrs.	Noise of car passing by (1x); noise of claxon and noise of leaves rustling by the wind.
21	10:47- 10: 48 hrs.	Noise of leaves rustling by the wind.

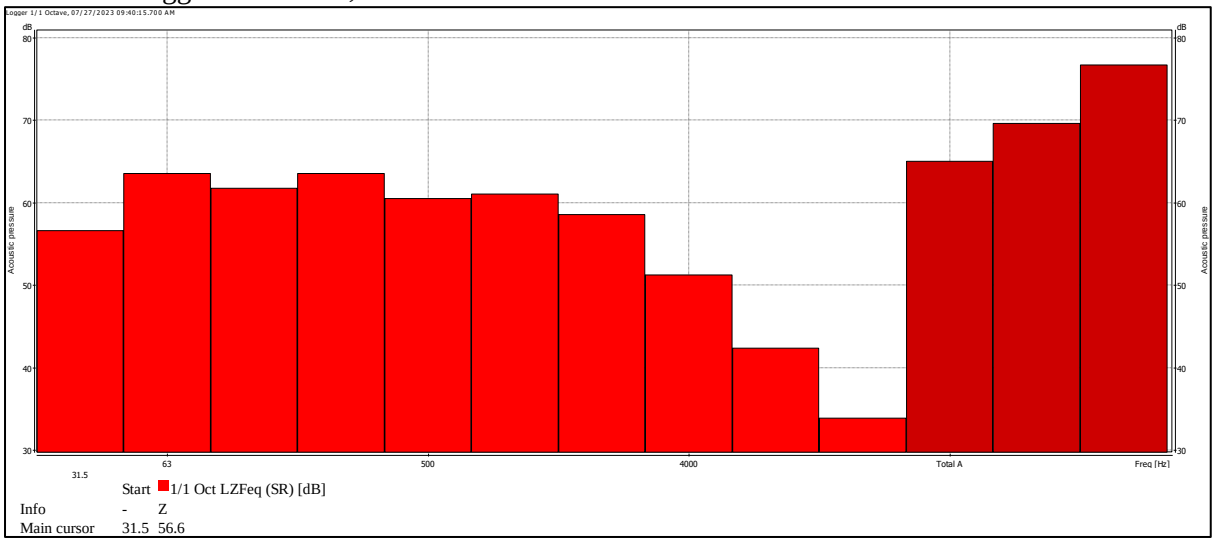
Location N5

Log number:	Log 169
Date:	27 July 2023
Time:	9:10 – 9:39 hrs. (29 min)
Description of the location:	Along the Oost-Westverbinding approx. 4300 m away from drilling location CEP01. The area surrounded with low to high vegetation.
Observation during measurement	Continuous noise of birds and insect. Occasional noise of car passing by, noise of leaves rustling by the wind, noise of heavy truck passing by, noise of light truck passing by. Wind speed: 1.5–3.3 m/s Wind direction: North-East
Position of the noise meter	The meter was placed approx. 7.4 m away from the axis of the road, 1.5 m above surface level.

LOG169 : Logger results, logger step = 2 s



LOG169 : Logger 1/1 Octave, 07/27/2023 09:40:15.700 AM



Causes of exceedance of the background level.

Nr.	Time	Cause
1	9:10 - 9:38 hrs.	Continuous noise of birds and insect.
2	9:10 – 9:11 hrs.	Noise of car passing by (1x).
3	9:12 – 9:13 hrs.	Noise of car passing by (1x) and noise of leaves rustling by the wind.
4	9:13 – 9:14 hrs.	Noise of light truck passing by (1x) and noise of birds.
5	9:14 – 9:15 hrs.	Noise of heavy truck passing by (1x).
6	9:15 – 9:16 hrs.	Noise of car passing by (1x).
7	9:17 – 9:18 hrs.	Noise of heavy truck passing by (1x).
10	9:18 – 9:19 hrs.	Noise of car passing by (1x).
11	9:19 – 9:20 hrs.	Noise of car passing by (1x).
12	9:20 – 9:21 hrs.	Noise of car passing by (2x).
13	9:27 – 9:28 hrs.	Noise of car passing by (2x).
14	9:30 – 9:31 hrs.	Noise of light truck passing by (1x); noise of heavy truck passing by (2x) and noise of car passing by (1x).
15	9:33 – 9:34 hrs.	Noise of car passing by (1x).
16	9:34 – 9:35 hrs.	Noise of car passing by (1x); noise of light truck passing by (1x) and heavy truck passing by (1x).
17	9:35 – 9:36 hrs.	Noise of car passing by (3x).
18	9:36 – 9:37 hrs.	Noise of car passing by (1x).
19	9:37 – 9:38 hrs.	Noise of light truck passing by (1x).
20	9:38 – 9:39 hrs.	Noise of light truck passing by (1x).

Appendix 5: Water Quality Baseline Data

Appendix 5A In-situ Field Measurement Procedures

The following procedure was followed for the in-situ measurements:

1. In-situ testing have been carried out with a team of 2 people (buddy system) where one member was responsible for making all notes (including every action), photos and GPS coordinates, while the other member does the measurements.
2. General observations of the weather, water level, depth, flow direction of the water, visual characteristics of the collected water and the environment (visible pollution, waste material, odor, etc.) have been included in the field sheets and pictures have been taken and GPS coordinated recorded.
3. Water was collected in a 10L bucket at one location (WQ5). This bucket has been pre-rinsed three times before collecting the water for each location. For the other four locations, direct measurements have been carried out.
4. In-situ measurements of pH, Electrical Conductivity (EC in mS), Temperature (°C), Total Dissolved Salts (TDS in ppt), Dissolved Oxygen (DO in mg / l), Turbidity (NTU) and Salinity (ppt) were caried out with a water quality meter (Scuba-75A Multiparameter), calibrated according to factory standards before the field measurements on the 24th of July 2023.
5. Field equipment was cleaned (using demi water) each time prior to the measurement. The probe of the Scuba-75A Multiparameter has been pre-rinsed with demi water and the collected water. Hereafter the measurements have been carried using the water in the bucket.
6. All results have been recorded in a field sheet.

Appendix 5B Photo Reporting

25 July 2023	
  WQ1: In the swamp at the north side of the Oost-West verbinding, approx. 825 m west of CEP03. The location was overgrown with low to high vegetation. The water color was light brown and the clarity was slightly turbid.	   WQ2: In the swamp at the north side of the Oost-West verbinding, approx. 75 m south of CEP02. The area was covered with mangrove trees and partially dead mangroves. The water color was dark brown and turbid.
   WQ3: At the sluicegate within the Coronie Swamp whic draines water towards the Zoetwater kanaal. A Canal along the Oost-West verbinding. The water color was very light brown and the clarity was almost clear.	   WQ4: Lozing 68 (Burnside) Canal along the Oost-West verbinding. The canal is regulated by a sluice at the south side of the road, were one of the gates was open at the time of the measurement. The water color was light brown and the clarity was slightly turbid.

WQ5: In the swamp at the north side of the Oost-West verbinding, approx. 2 km west of CEP01. The water color was brown and the clarity was turbid.

Appendix 5C Field Observation Sheet

General		Comments	
Project	IS-426 – Limited Environmental and Social Impact Assessment (ESIA) for the 2D Seismic Exploration Program and the Exploration Drilling Program in the Coronie Area	1	No Secchie measurement was conducted at locationWQ2 and WQ5, due to low water levels.
Request nr.:	IS-426		
Requester:	Staatsolie		
Sampling date:	25-Jul-2023	2	
Number of measurement:	5		
Type of water body:	Surface water	3	
Measured by:	A. Nakchedi/ C.Karjoëtomo		
Measurement locations:	Coronie (Canals and Swamps)	4	
Weather:	See Below		

Location ID / Description	Coordinates (UTM/WGS84)		Sampling time / Weather	Temp (C°)	pH	DO (mg/l)	EC (µS/cm)	TDS (mg/L)	Salinity (ppt)	Turbidity (NTU)	Secchi (cm)	Color	Clarity	Other remarks (Odor, etc)
	Easting	Northing												
WQ1 In the swamp at the north side of the Oost-West verbinding, approx. 825 m west of CEP03. The location was overgrown with low to high vegetation.	615168.54	637488.50	03:34 PM Sunny/Cloud cover	27.25	6.34	2.89	92	58	0.04	8.54	42	Light brown	Slightly turbid	Precipitated and floating particles observed. No odor observed. Fishes have been observed in the water. No contamination observed.
WQ2 In the swamp at the north side of the Oost-West verbinding, approx. 75 m south of CEP02. The area was covered with mangrove trees and partially dead mangroves.	584893.99	647203.77	3:02 PM Sunny/ Cloud cover	29.15	7.92	0.54	28270	18090	17.32	18.08	-	Dark brown	Turbid	Precipitated and floating particles. No odor observed. Fishes have been observed in the water. Area with dead magroves were observed approx. 155 east from the measurement location. No contamination observed.
WQ3 At the sluicegate within the Coronie Swamp whic draines water towards the Zoetwater kanaal. A Canal along the Oost-West verbinding.	573242.66	648484.48	8:17 AM Sunny	29.50	5.63	0.14	89	57	0.04	0.00	56	Very light brown	Almost clear	Floating particles observed in the water. No odor observed. No contamination observed.
WQ4 Lozing 68 (Burnside) Canal along the Oost-West verbinding. The canal is regulated by a sluice at the south side of the road. The gates were open at the time of the measurement.	564732.66	652360.21	8:49 AM Sunny	27.90	5.34	4.18	94	60	0.04	36.72	22	Light brown	Slightly turbid	Floating particles observed in the water. No odor observed. No contamination observed.
WQ5 In the swamp at the north side of the Oost-West verbinding, approx. 2 km west of CEP01.	548376.93	652620.47	9:31 PM Sunny	28.38	5.70	2.90	388	249	0.18	27.97	-	Brown	Turbid	Precipitated and floating particles observed. Muddy odor observed. Grass have been observed. No contamination observed.

Appendix 6: Stakeholder Consultation

Appendix 6A: Minutes of Meeting

Project:	Beperkt Milieu en Sociale Effectenanalyse voor het 2D Seismisch Programma en het Exploratie Boorprogramma in het Coronie-blok
Project Code:	IS-426
Onderwerp:	Consultatie meeting met LBB- Natuurbeheer Regio West
Aanwezigen:	ILACO: Fortune M. Natuurbeheer regio west: Kanhai M.
Locatie:	Telefonisch
Datum:	22 augustus 2023
Tijd:	9:30 – 10:00
Opgesteld door:	Fortune M.

Onderwerp	Discussie/Opmerkingen
Agenda	- Inleiding en project achtergrond - Vragen en feedback - Sluiting
Samenvatting antwoorden op gestelde vragen	Activiteiten van Natuurbeheer in het project gebied: Natuurbeheer regio west is verantwoordelijk voor beheer, controle en educatie in het gebied. Controle wordt voornamelijk langs de Oost- Westverbinding gedaan tot Coppename punt, nabij de rijsvelden en langs de kust. Per maand zijn er vier (4) controle momenten. Gebruik controle post te Burnsite De controle post te Burnside in Coronie is nog niet in gebruik, gezien water en elektriciteit nog moet worden aangesloten. Het huidige kantoor is in Nickerie. Observaties tijdens controle momenten Er worden niet vaak illegale zaken tegen gekomen. Vaak zijn er mensen afkomstig uit andere gebieden, voorbeeld mensen vanuit Saramacca die voor de kust bij Coppename punt op vogels jagen. Een beperking voor Natuurbeheer is dat zij niet over een zeewaardige boor beschikken. Feedback op basis van vorige projecten: • Tijdens het vorig project in Nickerie waarbij Natuurbeheer ook betrokken was in het veld, kwam het over dat de hun aanwezigheid niet gewenst was bij de contractor. Mogelijk door geen goede communicatie of afspraken. Indien Natuurbeheer binnen dit project betrokken zal worden moet dit goed worden gecommuniceerd met de contractor. • Verder was het team ongeveer 20 dagen mee in het veld, maar er was geen vergoeding hiervoor gegeven. Het is niet verplicht, maar zou wenselijk zijn.

Appendix 6B: Stakeholder List from Staatsolie

No.	Name	Area	Phone #	E-mail	Adres	Remarks FROM Staatsolie
1	Wanda Sandvliet	Coppename km. 99 - 100	8570753	ireensandvliet@gmail.com	Drietabikistraat no. 38, Tamenga	
2	R. Verwey	Coppename km. 120 - 121	8601261		Metaalstraat no. 12	Oude bron
3	Jeane Scheuer	Coppename km. 108 (Naast Perceel Tjon A Loi)	7620129		Commisarisweg, zijstraat hendrik narainstraat no. 8	
4	Glenn Garden	Coppename km. 97	8529806		Tempeh str. #9, De boerbuiten	LAD: 8827/93 D3628/ Beschikking nummer D441
5	Elaine Anson	Coppename km. 98	8501989	mar7windzak@gmail.com		
6	Johan Feller	Coppename km. 121	7127758	lugardmar82@gmail.com		
7	Stg. Drus Armand (voorzitter Eugene Pengel)	Coppename (Jenny) perc. 237	8966862			
8	Krisman Karnadi	Coppename km. 98	8662476			
9	Edmond Karnadi	Coppename km. 98	86484571			
10	Erman Karnadi	Coppename km. 98	8518034			
11	Alimin Soerotaroeno	Coppename km. 98	8967291			
12	Djoemirin Moeljoredjo	Coppename km. 98	8814111			
13	Papardai Ramnarain Autar	Coppename km.108	8876624/ 8144290 (app)			
14	Ponimin Wongsodjiwo	Coppename km. 99,5 perc. 143	8712623			
15	Eugene Windzak	Burnside	8661945			Contact via dochter Cindy Windzak. Betreft boedel.

Appendix 6C: Stakeholder Consultation and Resident Survey

Detailed data collected during the stakeholder consultation with possible landowners and during the resident survey, is described in the section below.

Approach
Possible landowners that were consulted, was based on information provided by Staatsolie. The approach of the resident survey was, selecting random residents (who were present and wanted to participate) along the Oost-Westverbinding (km 94- 150) and the side roads in Totness; taking into account the location of the wells and seismic lines.

Findings
The possible landowners that were consulted, mostly live or have a land in the Coppename area (between km 98- 100). Only one person was from Burnside. From the overall survey (possible landowners and residents), the major part was from between Totness and Burnside (km 138 and 150), see figure below.

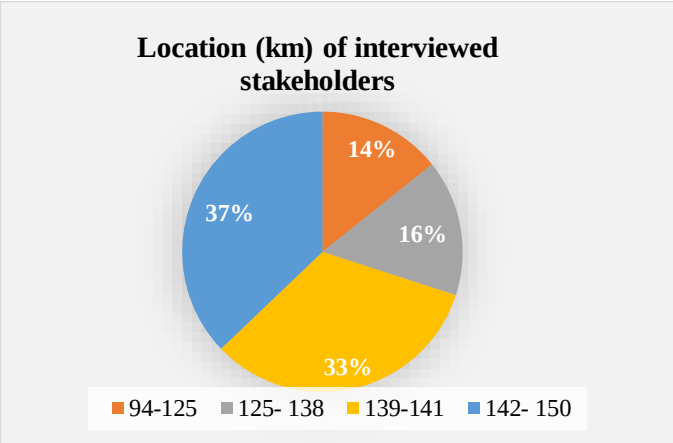


Figure 1: Overview location of interview (possible) landowner and residents

During the overall survey, representatives from 70 households, of which 64% male and 36% female, were interviewed (see Figure 2). The majority of the respondents (41%) were between 40 and 60 years old, followed by 39% who were older than 60 years. The other respondents consisted of 19% between 20 and 40 years old and 1% younger than 20 years (see Figure 2). Further, it was observed that the majority of the respondent (74%) have lived longer than 10 years in Coronie. The other respondents, have lived between 6- 10 years in Coronie (12%) and 14% has lived 1-5 years in Coronie (Firgure 2). The results of survey also indicated that the majority of the respondents use their land for residential area and also for agriculture activities. Some only use their land for economic activities only, such as agriculture activities, animal husbandry or beekeeping.

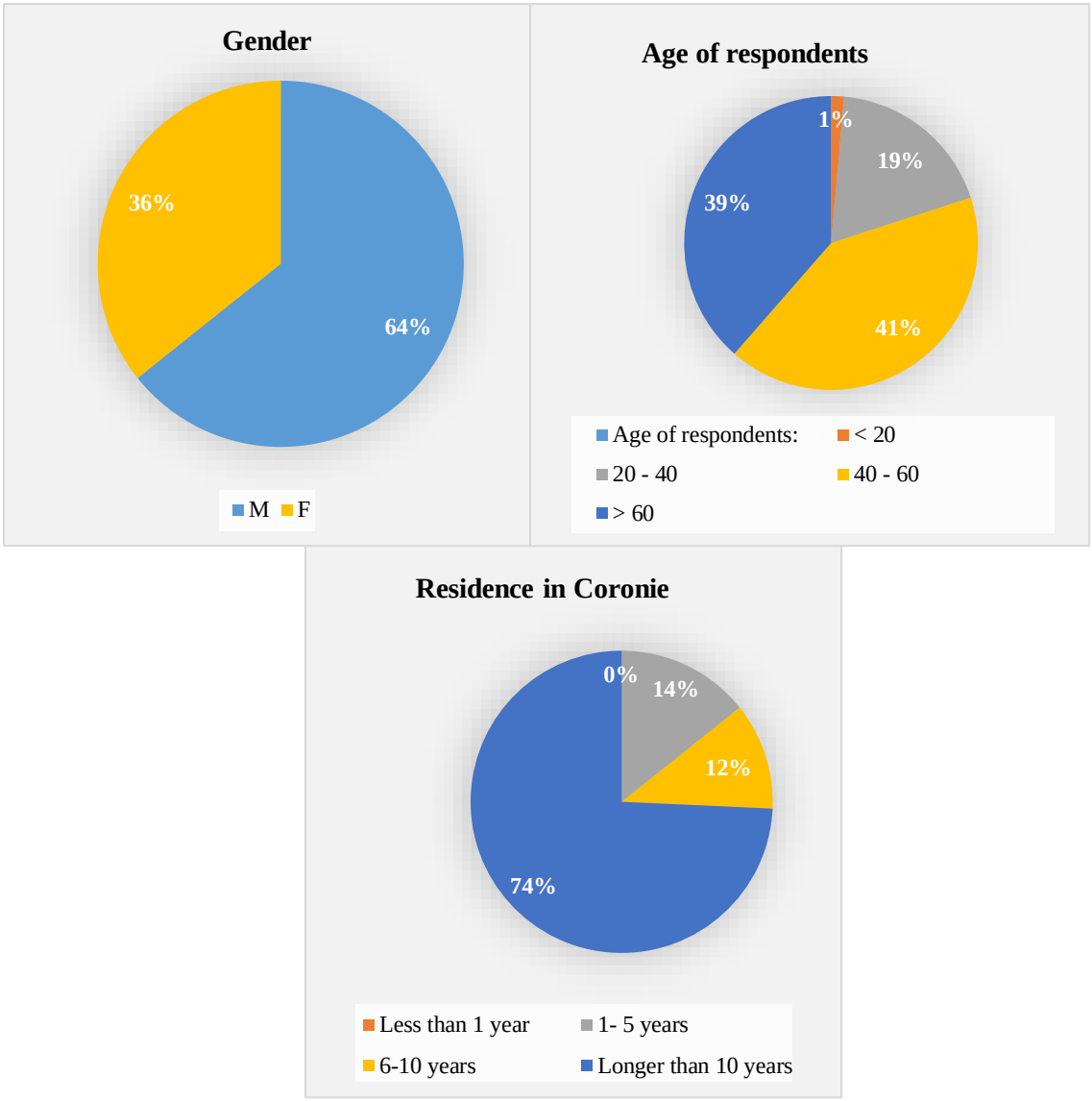


Figure 2: Overview Demographic results survey

Appendix 6D: BID document

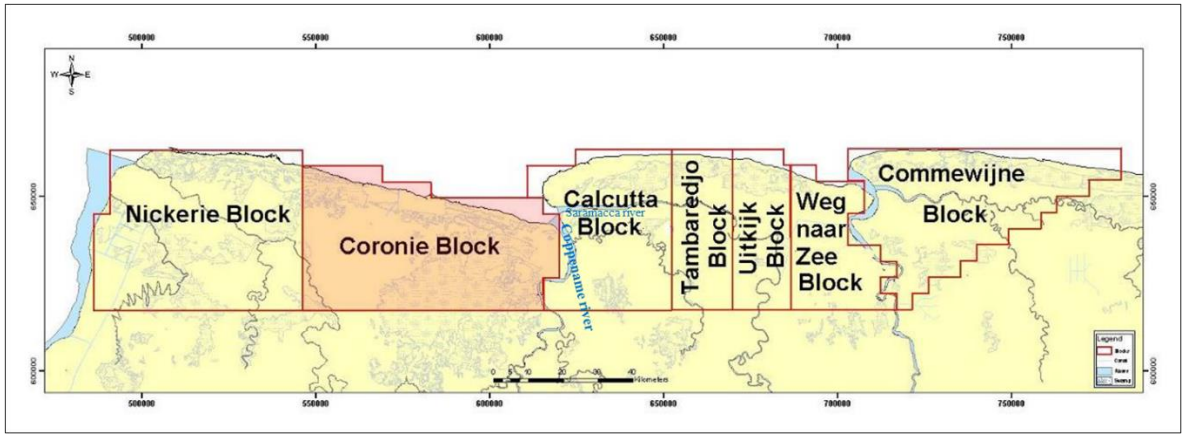
Informatie Brochure

Beperkte Milieu en Sociaal Effectenanalyse

(Limited Environmental and Social Impact Assessment) voor het

2D Seismisch Programma en het Exploratie Boorprogramma in het Coronie-blok

mei 2023



Samengesteld ten behoeve van Staatsolie Maatschappij Suriname N.V.

door

ILACO

ISO 9001:2015 certified

Inleiding

De Staatsolie Upstream Operatie heeft als een van de strategische doelen het behouden van haar gemiddelde dagelijkse olieproductie. In verband hiermee heeft Staatsolie het voornemen om een 2D seismisch programma op droogland en in zwampgebied, en een exploratie boorprogramma op droogland, uit te voeren in het Coronie-blok, zie **Figuur 1**. Voor het 2D seismisch programma zijn er vijf (5) seismische lijnen met een totale lengte van ± 200 km nodig. Voor het exploratie boorprogramma worden er drie (3) putten geboord in het droogland gebied.

Voor dit project is er een beperkte Milieu- en Sociale Effectenbeoordeling of -analyse (Environmental and Social Impact Assessment, ESIA) vereist door het Nationaal Instituut voor Milieu en Ontwikkeling in Suriname (NIMOS). Voor de samenstelling van de beperkte ESIA is het advies- en ingenieursbureau ILACO Suriname N.V. (ILACO) aangetrokken. Deze brochure verschaft informatie over het project en de samenstelling van de ESIA ten behoeve van de stakeholders.

Korte project beschrijving

Het projectgebied bevindt zich in het Coronie-blok, ten oosten van het Nickerie-blok, ten westen van het Calcutta-blok en wordt begrensd door de Coppename-rivier (zie **Figuur 1**). Het Coronie-blok is verdeeld in twee delen (noord en zuid) door de 'Oost-West Verbinding', een belangrijke openbare weg die oost en west Suriname verbindt. De projectactiviteiten zullen worden uitgevoerd in beide delen van het concessiegebied. Het gebied is verdeeld in droogland (noord) dat bereikbaar is met voertuigen, terwijl in het zuiden het gebied over het algemeen moerassig (zwampgebied) is en alleen per boot of zwampboot (airboat) via een bestaand pad kan worden bereikt.

2D seismisch programma

Het 2D seismisch programma zal worden uitgevoerd in het noorden (droogland) en in het zuiden (zwamp gebied) van het Coronie-blok (**Figuur 1**). Het doel van het programma is om 2D seismische gegevens te verzamelen in het projectgebied waarbij vijf (5) seismische lijnen, van ongeveer 200 km, worden verworven. Van de vijf (5) seismische lijnen hebben drie (3) lijnen een zuid-noord oriëntatie en twee (2) lijnen hebben een zuidoost-noordwest oriëntatie. Een (1) seismische lijn (zuidoost-noordwest) is op land en de overige vier (4) lijnen gaan door de zwamp.

Het droogland kan met voertuigen worden bereikt door de bestaande wegen en dammen en het zwampgebied kan met boten worden bereikt door de bestaande waterwegen. Voor nieuwe waterwegen zullen lijnen worden open gekapt waarbij vegetatie, zoals laag groeiende vegetatie en stuikgewassen, zal worden verwijderd om door de paden te kunnen lopen. Er worden geen grote bomen weggehaald. De toegangswegen en paden (trails) zullen één tot twee meter (1-2 m) breed zijn.

De activiteiten die binnen het 2D seismisch programma zullen plaatsvinden zijn:

- Constructie van aanlegsteigers/ ophaalpunten: voor het transport van personeel en materialen.
- Kapwerkzaamheden, schoonmaken van de lijnen om toegang te krijgen tot het projectgebied en aanleg van paden voor het transport van materialen (kleine boorpijpen, waterpompen, ontvangers, hydrofoons) en personeel
- Transport van personeel en materialen voor de acquisitie (per boot)
- Boren van schietgaten en het laden met explosieven
- Opnameapparatuur ter plaatse voor veldverwerking (registratie).
- Verlaten van de lijnen waarbij kabels, afvalmateriaal en obstakels zullen worden verwijderd
- Het uitvoeren van een close-out inspectie alvorens het projectgebied zal worden verlaten.

Het 2D seismisch programma zal van start gaan in het 3^{e} kwartaal van 2023 en duurt ongeveer zes (6) maanden.

Exploratie boorprogramma

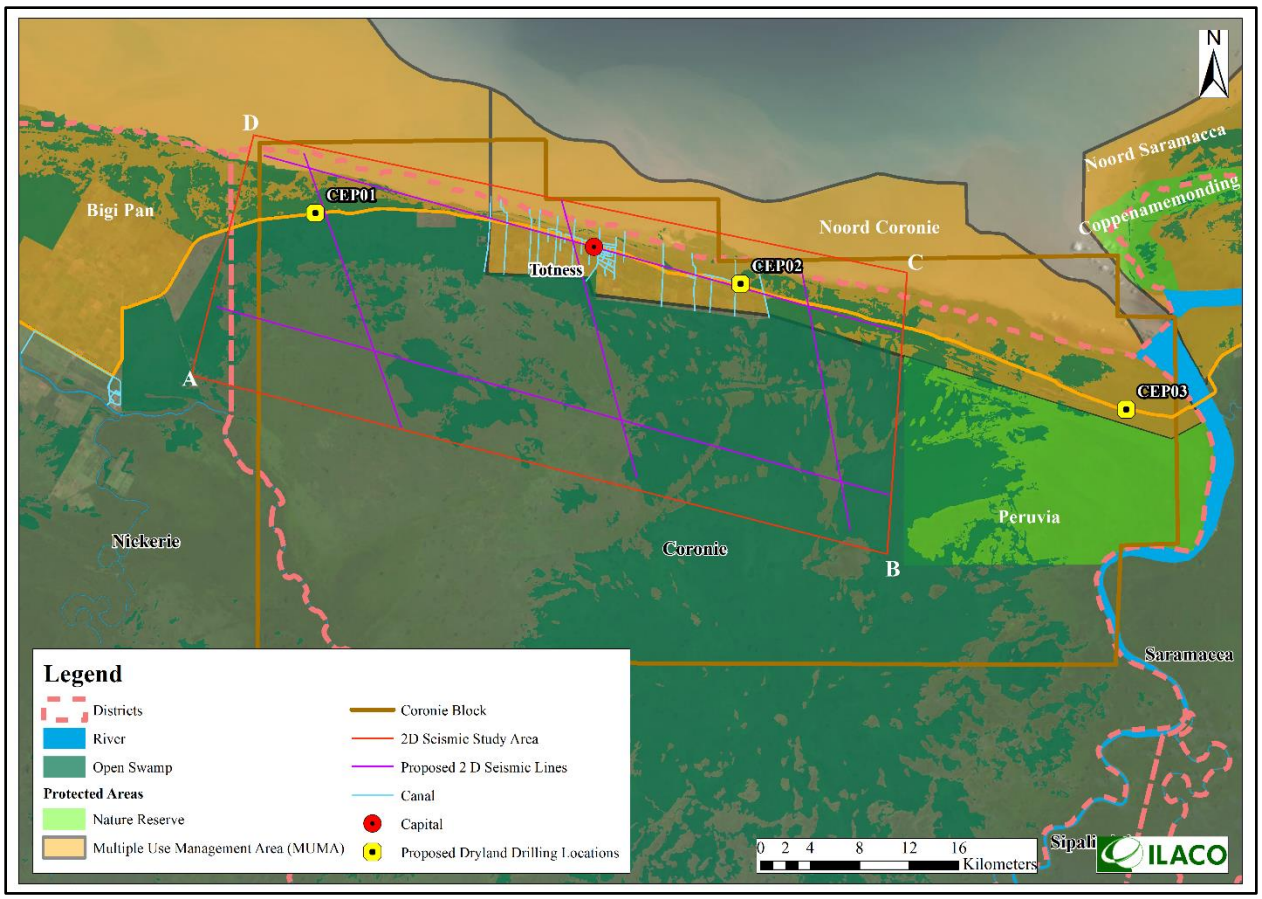
Het exploratie boorprogramma zal uitgevoerd worden in het noorden van het droogland gebied van het Coronie-blok. De planning is om drie (3) exploratieputten te boren langs de Oost-West Verbinding (**Figuur 1** in geel aangegeven). De doelen van het exploratie boorprogramma zijn namelijk, het testen van de geologische observaties die tijdens de technische evaluaties zijn geïdentificeerd, het beoordelen van het koolwaterstof potentieel in het gebied en het onderzoek op de aanwezigheid van potentieel paleoceen en andere reservoirs in het Coronie-blok. De boringen zullen plaatsvinden van het westen naar het oosten.

Het exploratie boorprogramma zal in drie (3) fasen worden uitgevoerd, namelijk een constructiefase, een operationele fase en een ontmantelingsfase. De voorbereidingen en booractiviteiten zullen in het 2^{e} kwartaal van 2024 van start gaan en duren tot eind juni 2024.

In de constructiefase worden de locaties voor de drie exploratieputten voorbereid. Een gebied van ongeveer 51 x 33 m is per exploratieput vereist. Indien parkeerplaats voor voertuigen ook nodig blijkt te zijn dan is er een gebied van maximaal 60 x 50 m vereist. De boorlocaties liggen dicht bij de Oost-West Verbindingsweg, waardoor toegangswegen (van 4 m breed) naar de boorlocatie afwezig of kort zullen zijn. De boorlocaties en de nodige toegangswegen vanaf de openbare weg vormen het (de) projectgebied(en). De projectgebieden zijn omringd door een sloot die aangesloten zal zijn op de dichtstbijzijnde waterweg. De voorgestelde boorlocaties kunnen op terreinen van grondeigenaren liggen waarmee vooraf aan de uitvoering afspraken zullen worden gemaakt en vastgelegd.

In de operatiefase zal een mobiel boorplatform op het land worden ingezet. De mobilisatie van het boorplatform en hulpmaterieel gaan vanuit Saramacca of Nickerie naar de boorlocaties in Coronie. Voor het transporteren van materiaal en personeel zal er gebruik gemaakt worden van de openbare weg. Uitzonderlijke transporten zullen door de politie worden begeleid. Dit wordt in overleg met de relevante instanties gepland en tijdig doorgegeven aan relevante stakeholders om de overlast voor overige weggebruikers tot een minimum te beperken.

In de ontmantelingsfase zullen de boorputten worden afgesloten met cement. Alle faciliteiten, materialen en equipment zullen uit het gebied worden verwijderd. Aangelegde dammen zullen worden geëgaliseerd en gegraven sloten worden opgevuld. Het gebied wordt na de booractiviteiten zoveel mogelijk in de oorspronkelijke staat achtergelaten.



Figuur 1: Overzichtskaart van het 2D seismisch programma en de exploratie boorlocaties in het Coronie-blok

Korte beschrijving van het studiegebied

Het projectgebied van het 2D seismisch programma en het exploratie boorprogramma, liggen in het Coronie-blok, ten oosten van het Nickerie-blok en ten westen van het Calcutta-blok, en grenst aan de Coppename rivier. Het Coronie-blok wordt in twee delen verdeeld (Noord en Zuid) door de 'Oost-West Verbinding'. Binnen het Coronie-blok zijn er twee beschermde gebieden waargenomen, namelijk het Peruvia Natuur Reservaat in het oostelijk gedeelte en de Coronie Multiple Use Management Area (MUMA) in het noordelijk gedeelte. Het projectgebied ligt in de vlakke en zeer laaggelegen jonge kustvlakte en wordt gedomineerd door laaggelegen kleiplaten die zwampen vormen. Verder zijn uitgestrekte zoetwater zwampen waargenomen, die de Coronie zwamp vormen (D. Noordam & P.A. Teunissen, 2008). De voornaamste ecosystemen in het Coronie-blok zijn (D. Noordam & P.A. Teunissen, 2008; D. Noordam, 2014):

- Zwamp vegetatie, variërend van open kruidachtige zwampen, open tot gesloten Pterocarpus ("Watrabebe") zwampbos tot hoog zwampbos. Open tot gesloten bos van (vuur resistente) Mauritiaanse ("Morisi") palmen geven aan dat het Coronie zwamp vaak brandde in het verleden.
- Binnen de risten komen droogland, zwampbos en open kruidachtige moerassen voor. Het ecosysteem schijnt aangetast te zijn door brand en hoge zwamp waterniveaus ("verdrinking").
- Het estuarium heeft zoet tot brakwater open zwampen in het zuiden en mangrovebossen in het noorden. Secties met dode mangrovebomen komen ook voor.

Het projectgebied ligt grotendeels op droogland in het noorden en voornamelijk in de Coronie zwamp in het zuiden. De bewoonde gebieden worden aangetroffen in het oosten van Coronie langs de Oost-West

verbinding, in de buurt van de hoofdplaats Totness. Binnen dit gebied zijn zeer kleinschalige landbouwgebieden aanwezig.

De Milieu en Sociale Effectenanalyse

In het Coronie-blok zijn er eerder ESIA's uitgevoerd in 2008 voor seismische activiteiten en in 2014 voor exploratieboringen. Voor de samenstelling van de ESIA zal ILACO gebruik maken van deze voorgaande studies:

1. Limited Milieu en Sociaal Effectenanalyse voor exploratieboringen in het Coronie droogland gebied (2014)
2. Voorbereiding Milieu en Sociaal Effectenanalyse voor het 2D seismisch overzicht 2008 in de kustvlakte van Suriname (2008)
3. Update voorbereiding Milieu en Sociaal Effecten Analyse voor olie exploratieactiviteiten in Coronie Prospective Area in Suriname (2008)
4. Voorbereiding Milieu en Sociaal Effectenanalyse voor olie exploratieactiviteiten in Coronie Prospective Area in Suriname (2007)

Naast de voorgaande studies zal er ook additionele data in het veld worden verzameld middels veldbezoeken, het verrichten van geluidsmetingen en waterkwaliteit in-situ metingen in het projectgebied.

Inspraak van en overleg met het publiek en de relevante autoriteiten is fundamenteel voor het ESIA-proces. Hierbij worden belanghebbenden en geïnteresseerde partijen in de gelegenheid gesteld om onduidelijkheden en bezorgdheden over het project naar voren te brengen. Na opmaak van het scopingrapport (onderzoeksplan) zal dit aan de stakeholders worden gepresenteerd in een publieke vergadering. Daarna zal het ESIA-onderzoek worden verricht na ontvangst van goedkeuring door het NIMOS op het scopingrapport. Na het indienen van het concept ESIA-rapport bij het NIMOS, zullen de resultaten in een publieke vergadering aan de stakeholders worden gepresenteerd. Op basis van de feedback, ontvangen tijdens de publieke vergadering en van het NIMOS, zal het conceptrapport worden aangepast en ingediend bij het NIMOS ter verkrijging van een advies voor de uitvoering van het 2D seismisch programma en het exploratie boorprogramma in het Coronie-blok.

Voor nadere informatie kunt u altijd contact opnemen met:

ILACO Suriname N.V.
S.V. Voorwaartslaan 18-Paramaribo
Tel no: +597-431270
Email: **info@ilaconv.com**

Appendix 6E: Questionnaire

Vragen landowners/ Residents

GPS #:

	Naam	
	Leeftijd	
	Perceel adres (KM)	
	Huishouden grootte (Uit hoeveel leden bestaat uw huishouden?)	
	Hoelang woont u al op dit adres (Coronie)?	
	Waar werkt u?	
	Contact gegevens (telefoon nummer/ email)	
1	Voor welke doeleinden wordt uw perceel momenteel gebruikt? ☐ Woonlocatie ☐ Landbouw ☐ Veeteelt ☐ Bijenteelt (waar heeft u bijenkasten) ☐ Anders, ……..	
2	Zijn er derden die gebruik maken van uw terrein bijv. voor vissen, jagen, zandafgravingen, etc.?	
3	(Indien het perceel niet of deels niet gebruikt wordt momenteel) Zijn er concrete toekomstplannen voor het gebied?	
4	Gaat u zelf elders vissen of jagen in Coronie? Waar? Waarop wordt er gejaagd? Welke vis soorten wordt er gevangen?	

5	Weet u waar er aan zandafgraving wordt gedaan?	
6	Hoe geschied de ontwatering (drainage) van het gebied?	
7	Bent u op de hoogte van grote ontwikkelingen in het gebied?	
8	Is er een buurt organisatie of platform waarvan u deel uit maak?	
9	Op de kaart zijn de geplande seismische lijnen en boorlocaties aangegeven. Ligt een seismische lijn of boorlocatie misschien op uw perceel? ☐ Ja, namelijk seismische lijn …… of boorlocatie ……. ☐ Nee	
10	Indien blijkt dat een boorlocatie of seismische lijn door uw perceel loopt en Staatsolie gebruik van wil maken, staat u open voor een gesprek en onderhandeling met Staatsolie?	
11	Heeft u zorgpunten omtrent het project? Indien zorgpunt, hoe zo dit het best opgelost kunnen worden volgens u?	

12	Heeft Staatsolie al eerder contact met u gemaakt omtrent dit project? Was u of een vertegenwoordiger van u op de Scoping meeting van 10 mei 2023? Indien nee, was u uitgenodigd? Had u erbij willen zijn?	
13	Had u op een andere manier de informatie willen krijgen (vb. document opsturen)? Hoe kan in het vervolg Staatsolie u het best bereiken? (oproep in de krant, facebook, telefonisch, etc.)	
14	Bent u bekend met eerdere projecten van Staatsolie in Coronie? Indien ja, heeft u of anderen in het verleden hinder/ last gehad als gevolg van voorgaande projecten van Staatsolie (Paradise Oil Suriname) in de nabije gebieden? o Zo ja, wat waren de klachten?	
15	Heeft u de klachten doorgegeven en aan wie (Staatsolie, DC, anders)? Zijn de klachten (naar tevredenheid) behandeld?	
16	Heeft u ook positieve ervaringen met Staatsolie?	

Appendix 7: Public Consultation

Minutes of Meeting

Project:	Beperkte Milieu en Sociale Effectenanalyse voor het 2D Seismisch Programma en het Exploratie Boorprogramma in het Coronie-blok
Project Code:	IS-426
Onderwerp:	ESIA publieke bijeenkomst
Aanwezigen:	ILACO: Koenjbiharie S./ Fortune M./ Naigi A./ Welzijn B. Staatsolie: Soekhlal R./ Sanches J./ Chotkan R./ Sairras G./ August N./ Indiaan M./ Ramdajal R. Stakeholders: zie presentielijst
Locatie:	CCC-gebouw, Coronie
Datum:	31 oktober 2023
Tijd:	10:00 – 12:00
Opgesteld door:	Fortune M./ Naigi A.

Onderwerp	**Discussie/Opmerkingen**
Agenda	- Opening en introductie - Project achtergrond - Resultaten ESIA-onderzoek - Vragen en feedback - Sluiting
Opening en introductie	Mevr. J. Sanches van Staatsolie opende de vergadering, gevolgd door een korte introductie van zowel Staatsolie en ILACO alsook het doel van de bijeenkomst. Het doel van de bijeenkomst was: De resultaten van de baseline studie en de potentiële effecten en mitigerende maatregelen te delen met de aanwezigen. De eerste presentatie werd gehouden door Dhr. R. Ramdajal (Staatsolie). Hij presenteerde het project, de projectactiviteiten en een tijdlijn. Vervolgens presenteerden mw. M. Fortune en mw. A. Naigi (ILACO) de resultaten van het ESIA.
Vragen	**Mr. S. Kuik (Slimgas N.V.):** Wordt er met een geluidsbron bedoeld het gebruik van explosieven? **Mr. R. Ramdajal (Staatsolie):** Ja, die zijn heel klein en worden op een diepe van ongeveer 2 meter geplaatst. Er is niet veel te merken bij het ontploffen hiervan (te vergelijken met simpel vuurwerk). **Mr. S. Kuik (Slimgas N.V.)**: 1. Waarom is het rapport in het Engels geschreven? Dit maakt het voor de gemiddelde Coroniaan moeilijk te begrijpen. 2. Het rapport is opgesteld door dezelfde personen die het veldwerk hebben uitgevoerd en is oppervlakkig geschreven. De diepgang ontbreekt. 3. Het rapport mist informatie over wanneer bepaalde activiteiten zijn uitgevoerd en door wie, en het ontbeert wetenschappelijke onderbouwing. Waar zijn de journals van de observaties die zijn gedaan? 4. Er is geen Swamp Simulation Analysis Report (SSAR) voor de Coronie-zwamp, die meer dan 120 ecosystemen herbergt, uitgevoerd. Dit is essentieel onderdeel dat ontbreekt. 5. Het lijkt erop dat er nader onderzoek nodig is voordat het project kan worden goedgekeurd. **Mw. S. Koenjbiharie (ILACO):** Bedankte mr. Kuik voor de kritische opmerkingen en nodigde hem uit voor een gesprek om de details en achtergrondinformatie waar hij naar op zoek is verder te bespreken en in te kijken in het rapport. Dit kan helpen om de zorgpunten en vragen weg te nemen.

	Mr. Feller (bewoner): Een bewoner en agrariër in Coronie (woont al 40 jaren in het district), deelde een beknopte geschiedenis van het poldersysteem in Coronie. Hij benadrukte het belang van het laten stromen van zoetwater richting de zee om de groei van parwa mogelijk te maken, wat essentieel is voor de ontwikkeling van het ecosysteem. Hij noemde verschillende projecten die dit proces hebben beïnvloed, zoals de aanleg van een poldersysteem in mangrovebossen en de mislukking van een waterkerende dam. Volgens hem is het cruciaal om het probleem van de zwamp grondig te onderzoeken en hij staat kritisch tegenover het voorgestelde project van Staatsolie. Bovendien benadrukte hij dat er behoefte is aan beleid op dit gebied. **Mevr. J. Sanches (Staatsolie):** Bedankte mr. Feller voor zijn opmerkingen en verzekerde dat deze zullen worden meegenomen in de overwegingen. **Mw. Lagenborst- Seyers:** stelde enkele belangrijke vragen met betrekking tot oliewinning in het district: 1. Wat zijn de milieueffecten van oliewinning in het district en welke maatregelen worden genomen om negatieve impact te minimaliseren? 2. Welke financiële voordelen zal de gemeenschap ontvangen van de oliewinning en hoe worden deze voordelen verdeeld? 3. Hoe wordt de veiligheid van de oliewinningsactiviteiten gegarandeerd om mogelijke ongevallen te voorkomen? 4. Wat zijn de lang termijnplannen voor het beheer van olie-inkomsten en zal dit de lokale economie ten goede komen? 5. Zullen er banen beschikbaar zijn voor de lokale gemeenschap en zo ja, welke stappen worden ondernomen om hen op te leiden en in dienst te nemen? 6. Hoe wordt toezicht gehouden op de oliewinningsactiviteiten om ervoor te zorgen dat deze in overeenstemming zijn met de wet- en regelgeving? **Mevr. J. Sanches (Staatsolie):** De effecten en mitigatiemaatregelen zijn zojuist gepresenteerd door ILACO. Voor meer informatie hierover kan contact worden opgenomen met ILACO. Wat betreft werkgelegenheid kunnen mensen solliciteren, en Staatsolie probeert bij de uitvoering van projecten in de districten zoveel mogelijk mensen uit de omgeving bij het project te betrekken. Het project heeft een korte duur van 6 maanden, met drie bronnen die geboord en afgesloten zullen worden. Er zullen minimale diensten zijn en afspraken met de landeigenaren. Voor lang termijnprojecten kan een verzoek worden ingediend bij Staatsolie als daar behoefte aan is. **Mr. N. August (Staatsolie):** Voegde toe dat er drie partijen bij het proces betrokken zijn: Staatsolie, ILACO voor het onderzoek, en het NIMOS als derde partij die het onderzoek van ILACO controleert om te zorgen dat dit voldoet aan de geldende standaarden en richtlijnen. De eerste fase kan 1-5 jaar duren, en als er succes is in de eerste fase, namelijk als er olie wordt gevonden, zal er een gedetailleerd milieuonderzoek worden uitgevoerd voor het ontwikkelingsproces van de boorputten. De diepgang waar mr. Kuik het over heeft zit in deze fase, dus de fase van het daadwerkelijk ontwikkelen van een boorput. **Mr. M. Oostburg:** Is er iemand aanwezig van de directie van Staatsolie? **Mevr. J. Sanches:** Nee. **Mr. M. Oostburg:** Vind het jammer dat er bij zo'n belangrijke meeting niemand van de directie aanwezig is. Verder gaf mr. Oostburg aan dat hij vindt dat Staatsolie weinig heeft gedaan voor Saramacca en voor Brokopondo o.a. tijdens het wateroverlastprobleem. Welke garantie heeft Coronie dat Staatsolie dat hier dus wel zal doen. **Mr. R. Hooplot:** 1. Wat zijn de lessons-learned van Staatsolie in Saramacca, waaruit Coronie van kan leren en zijn deze beschikbaar?

	2. Een boorlocatie is dicht bij het Peruvia natuurreservaat. Waarom wordt er niet nu al een gedetailleerd onderzoek verricht in geval er olie gevonden wordt? De klei dam (waterkerende dam) heeft gaten in, waardoor mensen overlast hebben tijdens regenval. Verder is de zee dichtbij de Oost- Westverbinding nabij Ingi Kondre. Over deze problemen wordt er niet gesproken. 3. Er is gesproken over een landgebruik overeenkomsten. Wie gaat dit controleren en de mensen ondersteunen bij de onderhandeling? Er moeten trainingen worden verzorgd zodat de Coronianen hun eigen productie ter hand kunnen nemen en diensten kunnen leveren aan de contractor/ Staatsolie. 4. Heeft het NIMOS de deskundigheid om Staatsolie te controleren? Is het project is uitgevoerd volgens de Milieuraamwet? Er moeten meer specifieke wetten worden ingevoerd om tegen zulke situaties te strijden. Het is raar dat Suriname werkt met een raamwet terwijl er veel gebeurt op milieugebied. **Mr. R. Soekhlal (Staatsolie):** Bij het presenteren van de lessons-learned zouden ook de bewoners van Saramacca, input moeten geven. Het verhaal moet van beide kanten gehoord worden. Verder zijn er naast oliewinning ook andere activiteiten in Saramacca waardoor niet aangegeven kan worden dat Staatsolie volledig verantwoordelijk is voor het gebeuren in Saramacca. Het is een wederzijds gebeuren met de DC en regering. Staatsolie kan de lessons-learned vanuit de operatie en de sociale effecten delen. Maar dat zal op een ander moment kunnen worden gedeeld. **Mevr. Joan Wielzen (parlementariër):** t.a.v. wetgeving vraagt de oppositie steeds aan de regering waarom deze wetten niet op de agenda worden geplaatst. Waarom worden deze boringen gepland aan land, terwijl er reeds boringen, die geen olie hebben aangetoond, zijn uitgevoerd in het gebied? Verder starten in 2028 de offshore activiteiten. Dus zijn deze boringen nog nodig in het district? **Mr. N. August (Staatsolie):** De tijdlijn van 2028 kan beïnvloed worden door ontwikkelingen in de wereld. Verder raken de oude velden verouderd. Er moet dus steeds naar reserves worden gezocht om de raffinaderij van olie te voorzien. We moeten niet afhankelijk gaan worden van alleen de offshore activiteiten. **Mr. S. Kuik (Slimgas N.V.):** Op bladzijden 13, 14 en 15 van het ESIA-rapport wordt er gesproken over het opzetten en daarna standaarden van het NIMOS. Het NIMOS mag geen standaarden opzetten, dat mag alleen het Standaarden Bureau. En er is ook een milieuraamwet in Suriname die nog steeds op tafel ligt bij de makers van wetgeving en beleid. Wanneer gaat het uiteindelijk in werking treden? Geeft verder aan dat er een Coöperatie Wederopbouw in Coronie opkomst is om het project op te schorten. **Mw. S. Koenjbiharie (ILACO):** De Milieuraamwet is reeds goedgekeurd. Verwijst verder naar het rapport met het hoofdstuk over wet -en regelgeving waaraan Staatsolie zich allemaal moet houden. **Mr. E. Ritfeld:** Hoelang is Staatsolie al bezig in Coronie? Waarom is Staatsolie niet eerlijk? **Mr. Feller:** Coronie is een agrarisch district. Het heeft potentie om zich te ontwikkelen in de agrarische sector. Verder haalt dhr. Feller het SAMAP-project aan als geslaagd project dat heeft bijgedragen aan ontwikkeling agrarische sector in Coronie. Dhr. Feller haalde de kwaliteit van het water aan en dat het water zonder contaminatie vrij zou moeten stromen naar zee. De rijstteelt waar pesticide wordt gebruikt is genoemd. Er komt zout water uit de kraan met een waarde van 15 millisiemens (mS) terwijl het zwampwater een waarde heeft van 0.05 mS. **Mw. S. Koenjbiharie (ILACO):** Bij de mitigerende maatregelen is hier aandacht aan besteed. Daarom hebben wij metingen gedaan om vast te stellen wat de huidige waterkwaliteit is. Ook is de hydrologie meegenomen. Er is aangegeven dat hiernaar moet worden gekeken alvorens Staatsolie begint met het project.

	Mr. S. Mallone (Ex-hoofd LBB): heeft enkele vragen en gaf ook een korte toelichting van het Peruvia reservaat. Is het project meegenomen in het districtsplan of het Meerjaren Ontwikkelingsplan (MOP)? Waarom is ecotoerisme niet meegenomen in het rapport van ILACO? De lessons-learned moeten meegenomen worden in de districtsplan en MOP. Verder zijn er beheersplannen opgenomen voor Coronie? De sociaaleconomische punten moeten gelist worden in een plan omdat het op ressort niveau en nationaal niveau verder meegenomen wordt in plannen van de overheid. Ook moeten de districtsactiviteiten van de komende periode verder opgesomd worden. Het gedeelte waar de Peruvia natuurreservaat ligt, is belangrijk om haar bossen bomen en schelpritsen. Peruvia is een van de grootste schelpritsen in Suriname. Coronie bestaat 95% alleen uit water. De Peruvia rits houdt Coronie in stand en als er in deze rits een storing komt dan moet men al gaan voorbereiden op een grote calamiteit. The lessons-learned uit Saramacca-Coppename Monding natuurreservaat moeten meegenomen worden. **Mw. C. Etnel:** Welke rehabilitatie plannen zijn meegenomen. Is verder geen voorstander van het project, gezien er al eerder onderzoek is uitgevoerd waarbij de kwaliteit niet goed was. Waarom worden er nu weer boringen verricht? **Mr. N. August (Staatsolie):** Er is zeker gedacht aan een rehabilitatieplan waarbij de terreinen waarvan Staatsolie gebruikt zal maken, mocht het projectvoorstel doorgaan, in een goede staat zullen worden achtergelaten. Hiervoor zullen vooraf eerst goede afspraken worden gemaakt met de desbetreffende perceel eigenaar. Verder zullen de boorputten dicht gecementeerd worden. Er wordt ook een eindcontrole gedaan.
Sluiting	Mevr. Sanches J. van Staatsolie bedankt eenieder voor hun aanwezigheid en bijdrage en sluit de bijeenkomst.

STAATSOLIE

Presentielijst

Activiteit: ***2D Seismisch en Exploratie Boorprogramma in het Coronie-block***

Datum: *31 oktober 2023*

Locatie: *Cultureel Centrum Coronie, Totness/ Coronie*

Naam	Organisatie	Telefoonnummer	Emailadres	Paraaf
1. Winter, Maikel	DC Coronie	235139	secretariaatcoronie@hotmail.com	
2. Austerlitz, Ronny	KPS Coronie	235122	pol-cor@hotmail.com	
3. Landmeter, Freddy	KPS Coronie	235122	pol-cor@hotmail.com	
4. Sewnath, Monique	NIMOS	490044	msewnath@nimos.org	
5. Kasijo, Sherena	NIMOS	432546	skasijo@nimos.org	
6. Schmeltz, Refael	NIMOS	762648	[illegible]	
7. Abrahams, Errol		8841605		
8. Bendt, Angila		8589841	Patnan76@hotmail.com	
9. Berrenstein, Haydi		8787895	secr.soba@gmail.com	
10. Blankendal, Sanaya		8729549	blankendalnayaraycia@gmail.com	
11. Bouterse, Rodney		8989114	bouterse@hotmail.com	

12. Donk, Ray		8914383	chelmysamred@gmail.com	
13. Doorson, Le-Roy Cher Leonel		8655251	Leroydoorson86@gmail.com	
14. Etnel, Claudette		8600856	cetnel24@gmail.com	
15. Etnel, Patricia		8589841	Patnan76@hotmail.com	
16. Faerber, Judith		8545618	Singlemotherproject@gmail.com	
17. Feller, Alexander		235053		
18 Fernald, Imro		8460848	imrofernald1@gmail.com	
19. Franklin, Jennifer		7465380	winstonmarc310@gmail.com	
20. Gajadien, Harripersad		8813946		
21. Hasselbaink, Rozana		7459493	rozannahasselbaink34@gmail.com	
22. Jasatirta, Eugene		8922310	jasatirtaeugene@gmail.com	
23. Kerseborn, Igillio		8955860	gabrielleleoniedamien32@gmail.com	
24. Kerseborn- Lynch, Leonie		8955860	gabrielleleoniedamien32@gmail.com	
25. Khodabaks, Mohamed		8858966	sjaakkhodabaks@gmail.com	
26. Korsten, Delano Henk		8216865	delahkorsten@gmail.com	
27. Kuik, Samuel		8577370	samuel@slimgasnv.com	
28. Lont, Glenn		7169332	glenn@efodnv.com	

29. Malone, Stan		8878433	stanmalone.sm@gmail.com	
30. Matadin, Rohid		8879471	matadinrohid00@gmail.com	
31. Molly, Vincent		8711352		
32. Monkou, Hortence		7147266	hbmonkou@gmail.com	
33. Ost, Steven		8635358	stevenrost@hotmail.com	
34. Ost-Winter, Charissa		8650921	char2.winter1@gmail.com	
35. Pigot Verwey, Gracilio		31636442511	graspico@gmail.com	
36. Plak, Gitana		8553359	coprocosur@hotmail.com	
37. Rollings, Irayda Euredyce		8793618	Iraydarollings77@.gmail.com	
38. Scheuer, Djeliesa		8917720	fl8285187@gmail.com	
39. Seayers- Lagenhorst, Melinda		8117926	Lagenhorstmelinda@gmail.com	
40. Seayers, ~~Lloyd~~ Roy		8918567	seayersroy63@gmail.com	
41. Sedoc, Clearance		8880885	Patnan76@hotmail.com	
42. Shepper, Françoise Shirley		8813307	francoiseshepper@outlook.com	
43. Tarnadi, Remie		8724873	rtarnadi@gmail.com	
44. Tolud, Grasita		8622752	lunorstabeco@gmail.com	
45. Van der Weijden, Peter		8779656	vanderweijdenpeter@gmail.com	

46. Verwey, Ronald		7503744	roverwey@hotmail.com	
47. Vriesde, Harold		8768258	hvriesdebalsemhof@gmail.com	
48. Vroom, Maureen		8898021	mauvroom@yahoo.com	
49. Vroom, Steven		8885062	vroomjohn28@gmail.com	
50. Vroom, Urtha		8879298	Lisvoorn@gmail.com	
51. Wielzen, Joan	DNA	7149989	j.wielzen@dna.sr	
52. Doorson, Cher		8655251	Leroydoorson86@gmail.com	
53. Doorson, Leonel		8655251	Leroydoorson86@gmail.com	
54. Kooyman S		431270		
55. Ritfeld. E		8877070	Visser	E.R
56.				
57. Hooplot	Ramon	7100420	ramonhooplot@hotmail.com	
58. Dors Alhie		8900426		
59. Sedoc, Jasmina		8856534		
60. Verwey, Albert		8558720	alterego1943@gmail.com	
61. M.Zunder		8748627	marlinzunder@g.mail.com	
62. Verwey	Bianca	8762208		

63. Udenhout M	min. L.V.V	8788158	udenhout28@hotmail.com	
64. Sylvester E.	min RoS.	7140330		
65. Lemsberg A-	Antonius	8539042	Skyhamerosi@gmail.com	
66. Doorson G	R.R. lid	740660.		
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Appraisal 2023-2024

Presentatie EMMP
Appraisal boorprogramma 2023-2024
(TAM-Uit, TAM-West, TNW-Zuid)

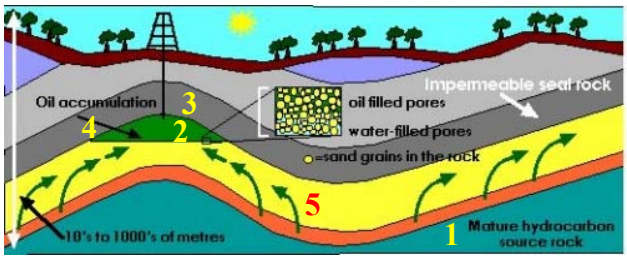
27 October 2023

STAATSOLIE Confidence in our own abilities

Programma

- 18:00u. Welkom en introductie
  Jacintha Sanches, CC Officer
- 18:05u. – 18:30u. Overzicht van het Appraisal Boorprogramma
  Charita Ramdas, R&D Productie Geoloog
- 18:30u. – 19:00u. Overzicht van EMMP resultaten ILACO
  Shareen Koendjbiharie, Projectleider
- 19:00u. – 19:45u. Vragen- en discussieronde
- 19:45u. Sluiting

Wat is Appraisal?



- **Appraisal** putten→ **verkennings boringen** die worden uitgevoerd **nadat olie is ontdekt**, om de **omvang** van het veld, **de reserves**, de mogelijke **productiesnelheid** en de **eigenschappen** van de olie te beoordelen
- Aardolie komt voor in onderaardse permeabele lagen, zogenaamde **reservoirs** die door impermeabele lagen (kleilagen) worden afgedekt.

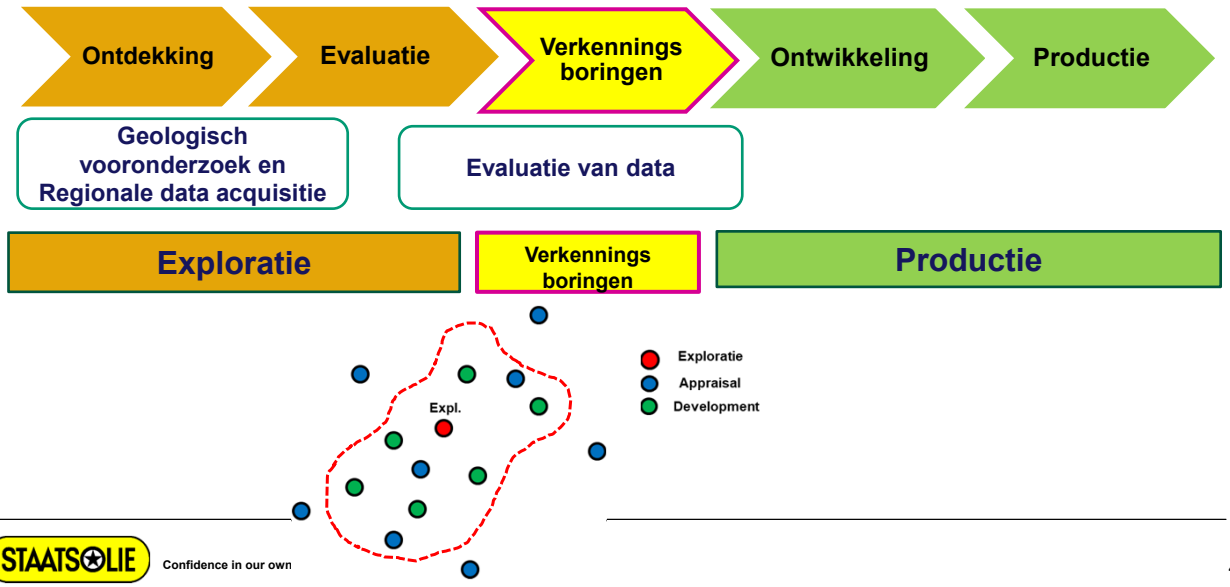
Meest belangrijke parameters voor de aanwezigheid van olie:

1. Moeder gesteente (Source rock)
2. Reservoir
3. Een afdichtende boven en benedenlaag (kleilaag)
4. Een olieval (trap) &
5. Olie die er naar toe is gestroomd (migratie)

STAATSOLIE Confidence in our own abilities

3

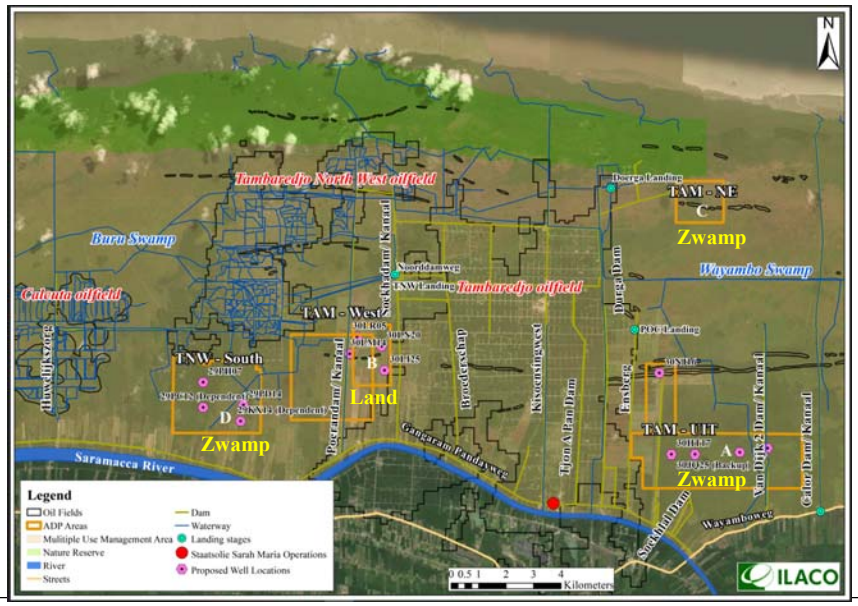
Levenscyclus olieveld



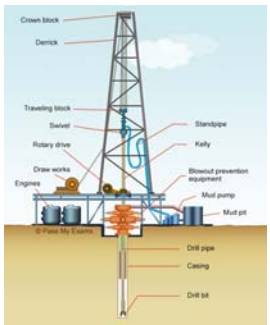
STAATSOLIE Confidence in our own

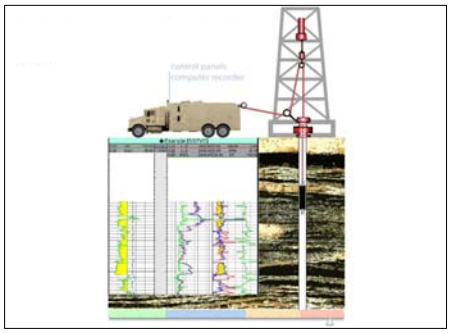
4

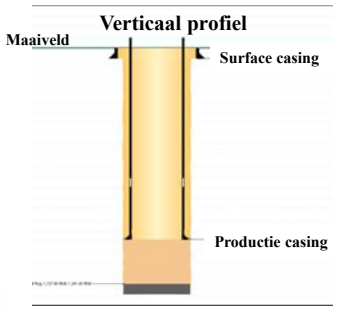
Kaart met voorgestelde gebieden & boringen



Boren tot Productie Test







Boren
Totale Diepte (400-500 meters)

Metingen

In productie name & Productie Test

Put afsluiten en het gebied verlaten

Operationele fase

- **Constructie werkzaamheden**
- **Transport van boormachine en randappartuur naar het gebied.**
- **Transport van materialen**
- **Transport van personeel**


Land Rig opstelling


Zwamp Rig opstelling

Tijdlijn

Periode	2022		2023														2024			
	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23		Dec-23		Jan-24	Feb-24	Mar-24	Apr-24
Legal activiteiten																				
Milieu Effecten Studie (EMMP)																				
Public Consultation																				
Voorbereidingsactiviteiten																				
Constructie (aanleg routes & traces																				
Booractiviteiten																				
Mobilisatie van de Rig																				
Boren en Evalueren																				
Besluitvorming																				

Beperkte Milieu en Sociale Effectenanalyse voor het Staatsolie 2D Seismisch Programma en het Exploratie Boorprogramma in het Coronie-block

(Limited Environmental and Social Impact Assessment (ESIA) for the 2D Seismic Exploration Program and the Exploration Drilling Program in the Coronie Area)

ESIA PUBLIEKE BIJEENKOMST

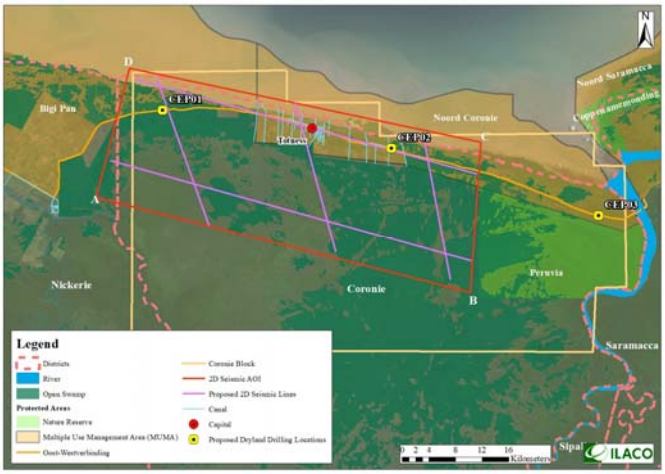
31 oktober 2023

Opbouw ESIA presentatie

- Introductie
- Aard van de ESIA studie
- Overzicht studiegebied
- Resultaten baseline studies
- Potentiële effecten en mitigerende maatregelen
- Conclusie
- Vragen ronde
- Sluiting

Introductie (1/2)

- Staatsolie heeft het voornemen om een 2D seismisch programma op droogland en in zwampgebied, en een exploratie boorprogramma op droogland, uit te voeren in het Coronie-blok.
- Beperkte Milieu en Sociale Effectenbeoordeling of analyse (Limited Environmental and Social Impact Assessment, ESIA) is vereist.



Introductie (2/2)

- Advies-en ingenieurs bureau ILACO Suriname N.V. (ILACO) is aangetrokken om de ESIA studie uit te voeren.

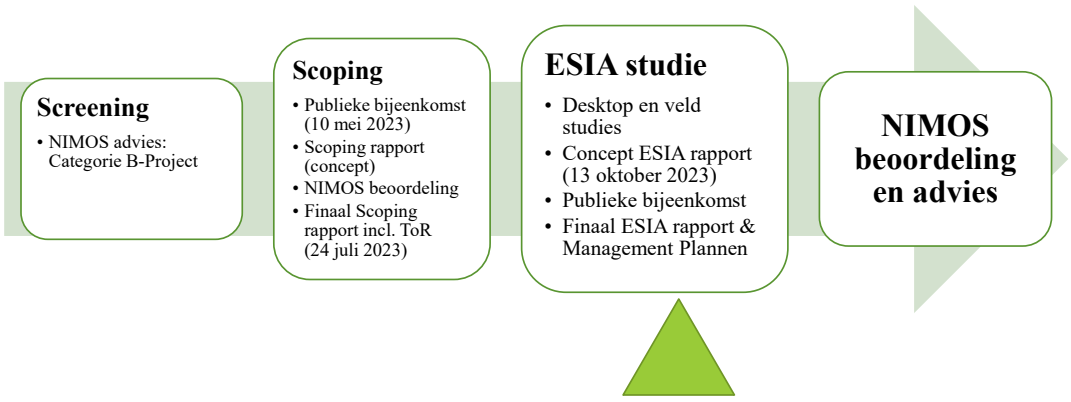
ESIA Team	
Shareen Koenjbiharie	Team Leider/ ESIA Specialist
Dirk Noordam	Senior ESIA Expert
Arshna Naigi	Stakeholder & Communication Specialist
Marie Fortune	Daily Project Coordination

Aard van de studie (1/2)

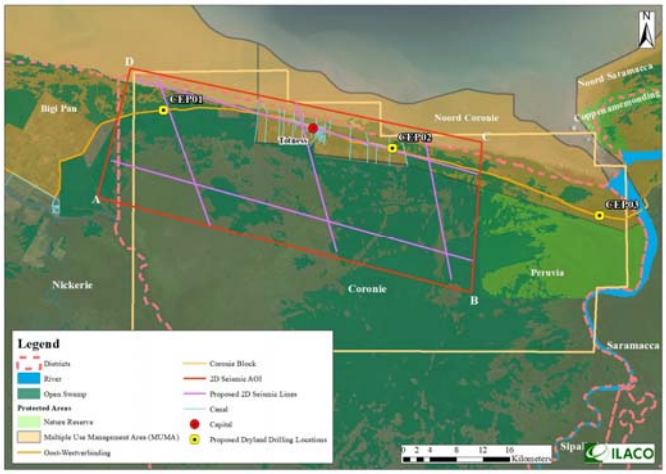
- **Conform huidige milieuwetgeving, richtlijnen van het NIMOS**
  - *De Milieu Raamwet (2020)*
  - *Algemene Richtlijnen voor Milieu Effecten Rapportages (MER), 2009 en 2021*
  - *Richtlijnen voor Sociale Impact Assessment, 2005*
- **Aanvullend:** internationale richtlijnen en best practices: WHO/World Bank/IFC

- **Doel ESIA:**
  1. Het **informeren en verkrijgen van bijdrage**n van belanghebbenden, inclusief relevante autoriteiten en lokale bewoners en ingaan op hun relevante aandacht- en zorgpunten.
  2. Het in kaart brengen van de **biofysische en socio-economische omstandigheden** van het onderzoeksgebied.
  3. Het **beoordelen van de mogelijke milieu en socio-economische impacts** die kunnen voortvloeien uit het project.
  4. Het identificeren van **mitigerende maatregelen** om impact te kunnen aanpakken en/of elimineren.
  5. Het ontwikkelen van een **beheersplan** en bijbehorende procedures.

Het ESIA Proces (2/2)



Overzicht studiegebied



Omvat het:

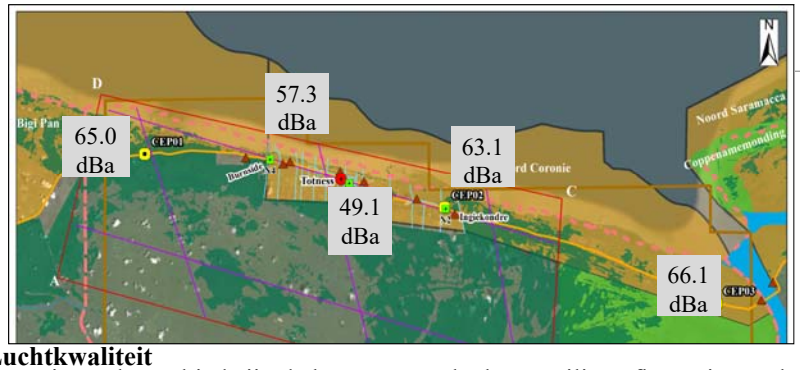
- Projectgebied,
- Toegangswegen, en
- Directe omgeving

Bijna identiek als de Coronie blok

ESIA Studie

- Vaststellen van de baseline situatie ter plaatse en in de omgeving:
  - Milieu studies:
    1. Waterkwaliteitsmetingen➔ veldmetingen (5 locaties)
    2. Geluidsmetingen ➔ veldmetingen (5 locaties)
    3. Ecosysteem ➔ desktop studie en veldobservaties
  - Sociaaleconomische studie
    1. Bezoek aan studiegebied (in kaart brengen gevoelige receptoren, langgebruik, etc.)
    2. Vervolg een-op-een bijeenkomsten met relevante stakeholders en huishoudsurvey
- Milieu en sociale effectenanalyse
- Opstellen van het draft ESIA rapport inclusief management plannen

Milieu Baseline- Bio-fysisch: Geluid en luchtkwaliteit



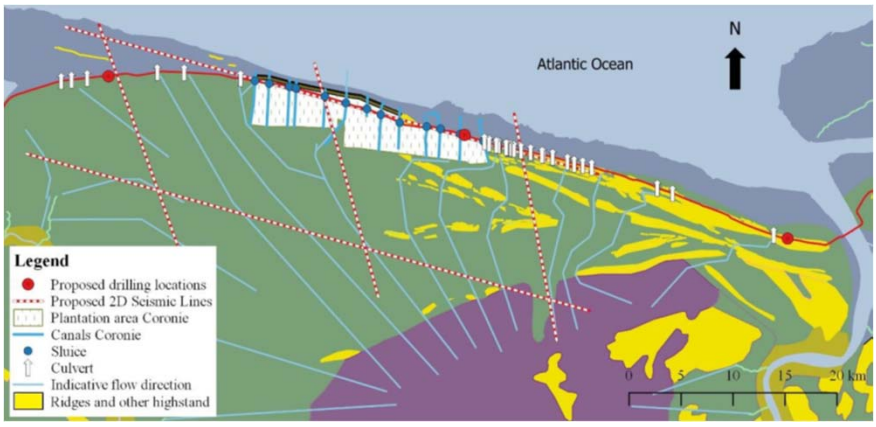
Luchtkwaliteit

- Binnen het gebied zijn de bronnen van luchtvervuiling afkomstig van lokaalverkeer, landbouwactiviteiten en enkele kleine faciliteiten met motoren, zoals generatoren.

Geluid

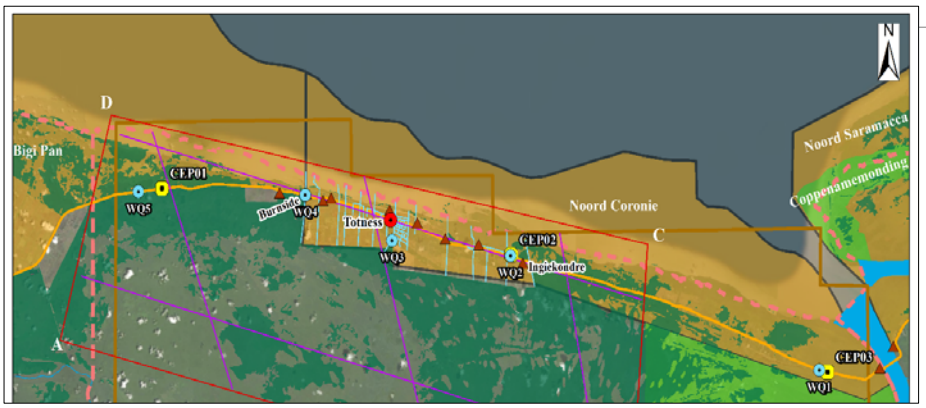
- Hoogst gemeten waarden langs de Oost-Westverbinding nabij rurale gebieden (verkeer)
- Bij bewoners langs de Oost-Westverbinding➔ overschrijding van de dag richtlijn van de WHO/IFC van 55 dBa voor residentiele gebieden
- In het woongebied in Totness (niet langs de Oost-Westverbinding) geluidsniveau beneden de richtlijn

Milieu Baseline- Bio-fysisch: hydrologie



- Aanwezigheid van zoet en brakwater zwampen.
- Water van Coronie zwamp stroomt richting:
  - Coppename rivier
  - Wayambo rivier
  - Nickerie rivier
  - Via afwateringstructuren onden de Oostwestverbinding (duikers, sluizen, kanalen) richting zee

Milieu Baseline- Bio-fysisch: Waterkwaliteit



Locatie: WQ2

Locatie: WQ3

Milieu Baseline- Bio-fysisch : Waterkwaliteit

Locatie	Temp (C°)	pH	DO (mg/l)	EC (µS/cm)	Turbidity (NTU)
WQ1- Zwamp ten noorden Oost-Westverbinding, 825 m west CEP03.	27,2	6,3	2,9	92	8,5
WQ2- Zwamp ten noorden Oost-Westverbinding, 75 m zuid van CEP02.	29,1	7,9	0,5	**28.270**	18,1
WQ3- Sluis Zoetwater Kanaal.	29,5	5,6	0,1	89	0,0
WQ4- Lozing 68 (Burnside)	27,9	5,3	4,2	94	36,7
WQ5- Zwamp ten noorden van Oost-Westverbinding, 2 km west van CEP01.	28,4	5,7	2,9	388	28,0

- Uit de meetwaarden in de zoetwater zwamp (WQ1, WQ3 en WQ4) en de kustzwamp (WQ2 en WQ5) werden er geen zichtbare verontreinigingen en geen onnatuurlijke geuren waargenomen.
- Bij WQ2, hoge EC (zoutgehalte) waarden (28.270 µS/cm) gemeten. Dode Mangrove bomen geobserveerd. Overige locaties waarden tussen 92 en 388 µS/cm.
- Vier (4) verschillende milieus:
  - Brakke tot zoute kustzwampen
  - Het landbouwgebied met zoetwater omstandigheden
  - Zoetwater zwampen
  - Zwampen die door regenwater gevoed worden

Locatie: WQ2

Milieu Baseline- Bio-fysisch: Vegetatie en fauna

Vegetatie nabij boorlocaties

- CEP01 en CEP02: parwa bos (zwarte mangrove)
- CEP03: zoetwater zwampbos

Vegetatie nabij seismische lijnen

De seismische lijnen lopen door:

- Open kustzwampen en mangroven
- Open tot gesloten zoetwater ecosystemen
- Landbouwgebied met cultuurgronden
- Lage tot hoge secundaire vegetatie

Nabij CEP03: Zoetwater zwampbos

Mautirts palmen ten zuiden van Oost-Westverbinding

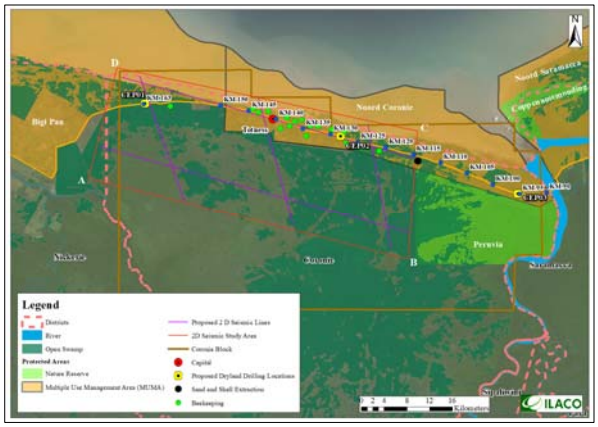
Mangrove vegetatie nabij Ingi Kondre (dode bomen ook waargenomen)

Dode mangrove bomen ten noorden van de Oost- Westverbinding (km 154- 155)

Milieu Baseline- Bio-fysisch: Vegetatie en fauna

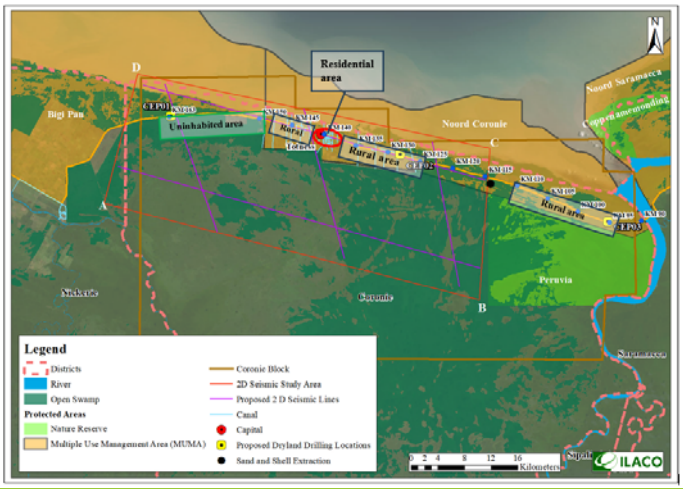
- Mangrove bossen dienen als:
  - Voedings- en broedplaatsen voor kustvogels (Rode Ibis) en reigersoorten (broedseizoen van maart/april tot juli/augustus en van maart tot september).
  - Voedselgebieden voor trekvogels uit Noord-Amerika.
  - Kraamkamers voor mariene vis- en garnalensoorten.
- Langs de Oost-Westverbinding nabij de voorgestelde boorlocaties zijn er geen unieke, zeldzame, bedreigde, kwetsbare of biogeografisch belangrijke planten- of diersoorten aanwezig.
- Jaguar (IUCN Rode Lijst van 2023) komen af en toe voor in bewoonde gebieden.
- Fauna in de Coronie zwamp: zwamp vogels, zoogdieren, papegaaien, reptielen (kaaiman), zwamp vissen (kwikwi, krobia, pataka, walapa).
- Beschermde gebieden:
  - Bigi Pan en Noord Coronie MUMA ➔ zijn belangrijke vogelgebieden (Important Bird Areas (IBA)).

Sociaal economisch Baseline: Economische activiteiten



- Overheidskantoren en andere faciliteiten➔ voornamelijk aanwezig in Totness
- Voornamelijke economische activiteiten:
  - Landbouw (rijst en verschillende droge gewassen)
  - Visserij
  - Veeteelt en bijenteelt
  - Mijnbouw (zandafgraving)
- Geplande activiteiten:
  - Hydrologische studie van de Coroniezwamp
  - Continuering Jenny- Henar rehabilitatie project
  - Agrarische ontwikkeling (kokosnoot aanplant) nabij de Oost- Westverbinding km 170

Sociaal economisch Baseline: Receptoren



- Bewoning langs de Oost-Westverbinding en voornamelijk tussen Ingi Kondre en Burnside
- Gebied kan verdeeld worden in residentieel en ruraal gebied.

- Nabij boorlocatie CEP01 en CEP03 → onbewoond
- Nabij boorlocatie CEP02→ woning in aanbouw geobserveerd.

Sociaal economisch Baseline: Receptoren

Gevoelige receptoren dichtbij de seismische lijn:

- Nabij Hamilton, Km 132: RGD kliniek, een school, kerk en begraafplaats
- Omgeving Mary's Hope, Km 138: de seismische lijn kruist een agrarisch terrein.
- Totness, tussen km 138 en 141: Verschillende gebouwen zoals een winkel, huizen, een kinderdagverblijf en overheidskantoren in de Geraniumstraat. Verder in de omgeving zijn er twee begraafplaatsen en de drinkwatervoorzieningsstations (SWM-stations).
- Burnside, tussen km 148 en 149: Enkele huizen.

Sociaal economisch Baseline: stakeholder consultatie

- **Wie:**
  - Natuurbeheer Regio West;
  - Potentiele landeigenaren (13);
  - Willekeurig geselecteerde huishoudens (70) verspreid in het studiegebied.
- **Wanneer:**
  - Periode tussen 2 - 23 augustus 2023
- **Hoe:**
  - Individuele gesprekken (telefonisch en fysiek)
  - Huis aan huis survey

Sociaal economisch Baseline: stakeholder consultatie

Aandachtspunten:

- Milieu- en eigendomsschade
- Risico op overstroming van kustgebieden als gevolg van projectactiviteiten
- Verstoringen van het levensonderhoud van personen betrokken bij landbouw en bijenteelt binnen de projectgebieden
- Tijdige, duidelijke en transparante communicatie vanuit Staatsolie en contractor, gedurende alle fasen van het project

Belangrijkste potentiële milieu- en sociale effecten (hoge en matige significatie) en mitigerende maatregelen

Algemeen

Effecten (wat?)	Project	Receptor	Mitigerende maatregelen
Verlies van sociale licentie om te opereren als gevolg van projectactiviteiten	Seismisch en Drilling	Algemeen	• Erop toezien dat de **maatregelen worden opgevolgd** door de seismische contractor • Erop toezien dat **landgebruik overeenkomsten** zijn getekend met landeigenaren (waar van toepassing) • **Communicatie** en het delen van informatie over project activiteiten (overheid, landeigenaren en omwonenden) • Verifieer de naleving van verschillende **beheersplannen** (afvalbeheersplan, communicatie plan)
Sociale conflicten en de gezondheid, veiligheid en beveiliging van de gemeenschap	Seismisch en Drilling	Lokale gemeenschap	• Het betrekken van de bevolking gedurende alle fasen van het project • Erop toezien dat **landgebruik overeenkomsten** zijn getekend met landeigenaren (waar van toepassing) • Erop toezien dat het personeel van Staatolie op de hoogte is van de HSEQ-vereisten

Algemeen

Effecten (wat?)	Project	Receptor	Mitigerende maatregelen
Inkomensgeneratie voor lokale bedrijven en werkgelegenheid voor lokale werknemers door de lokale inkoop van goederen en diensten. (positief impact)	Seismisch en drilling	Lokale gemeenschap	• Goederen/ materiaal en diensten zoveel mogelijk **lokaal betrekken**, voor zover mogelijk • **Bouw/versterk de capaciteit van lokale arbeidskrachten** om de vaardigheden te verwerven die nodig zijn voor het project

Natuurbescherming/ ecosystemen

Effecten (wat?)	Project	Receptor	Mitigerende maatregelen
Natuurbescherming: activiteiten in de MUMA's kunnen de integriteit en de condities van deze gebieden schaden.	Seismisch en drilling	Natuurbescherming	• Organiseer een awareness programma om contractors bewust te maken van de omgeving waarin ze werken, met name in de buurt van MUMA • Samenwerking met LBB- Natuurbeheer
Schade aan het ecosysteem, verlies van hoog zwampbos en vegetatie in de MUMA's.	Drilling	Vegetatie en wilde dieren	• Verstoring van het gebied tot een minimum beperken door middel van een geoptimaliseerde planning.

ILACO

Oppervlaktewater bronnen

Effecten (wat?)	Project	Receptor	Mitigerende maatregelen
Watervervuiling door gemorste of gelekte olie, vet of brandstof, of boorvloeistof en voltooiingsvloeistof tijdens booroperaties.	Drilling	Aquatische leven, watergebruikers en grondeigenaren	• Erop toezien dat lekvrije containers en opslagtanks worden gebruik • Erop toezien dat een noodplan beschikbaar is in geval van een olielekkage
Verstopping van waterwegen en veranderingen in hydrologie en drainage als gevolg van de aanleg van toegangswegen en de voorbereiding van boorlocaties.		Lokale gemeenschap	• Het beperken van de aanleg van nieuwe paden (trails) in zwampen • Gebruik lekvrije containers en opslag tanks • Zorg voor een rampenplan (Oil Spill Response Plan) voor olielekkages • Materiaal gereed hebben voor opruimen van mogelijke olielekkages • Dagelijkse visuele inspecties van pijpen en kranen

Landgebruik

Effecten (wat?)	Project	Receptor	Mitigerende maatregelen
Potentiële eigendomsschade, inclusief impact op het levensonderhoud.	Drilling	Lokale gemeenschap en grondeigenaren	• Overeenkomst tussen Staatsolie en grondeigenaren voordat de werkzaamheden beginnen • Erop toezien dat afval, lekkage of morsing van brandstof opgeruimd worden
Na afronding van de projectactiviteiten blijft er schade aan eigendommen of afval achter.	Seismisch	Staatsolie personeel en contractor	• Erop toezien dat Staatsolie en (indien van toepassing) de grondeigenaar het land inspecteren en eventuele problemen, schade of andere kwesties documenteren • Erop toezien dat geïdentificeerde problemen worden aangepakt

Arbeidsgezondheid en veiligheid

Effecten (wat?)	Project	Receptor	Mitigerende maatregelen
Arbeidsgezondheid en veiligheid (aanvallen door wilde dieren zoals bijen, slangen, algemene zwamp veiligheid zoals hydratatie, ziekten overgedragen door vectoren (muggen), zonnebrand en andere milieu-gevaren zoals instabiele grond, door water overgedragen ziekten, extreme weersomstandigheden).	Seismisch en Drilling	Staatsolie personeel en contractor	• Beschermende kleding voor personeel, • Veiligheidsbewust creëren bij personeel over o.a. bijen- en slangenactiviteit • Het hebben van eerste hulp voorzieningen en veiligheidstraining voor het hele team. • Duidelijke communicatie plan creëren in noodgevallen • Het raadplegen van lokale experts of autoriteiten die bekend zijn met de specifieke risico's in het zwampgebied.

Conclusie en Aanbevelingen

De belangrijkste mogelijke effecten met een matige of hoge significant die een impact kunnen hebben op diverse receptoren:

- Oppervlaktewaterbronnen
- Natuurbescherming/ Ecosysteem
- Landgebruik
- Arbeidsgezondheid en veiligheid

Conclusie en Aanbevelingen

Aanbevelingen:

1. Het EMMP moet tijdens alle projectfasen worden geïmplementeerd.
2. Tijdens de plannings- en voorbereidingsfase van elk project moet het volgende worden uitgevoerd:
   a. Registraties van waarnemingen nabij de boorlocaties en seismische lijnen.
   b. Gedetailleerde beoordelingen uitvoeren, zoals hydrologische en bodemprofielbeoordelingen.
   c. Identificeer landeigenaren en volg procedures en mitigatiemaatregelen uit het EMMP.
3. Onderhoud communicatie met landeigenaren en lokale bewoners volgens het het Communicatie beleid van Staatsolie en het Stakeholder Engagement Plan (SEP) voor dit project
4. Informeer belanghebbenden over het klachtenproces en behandel klachten volgens de procedure.
5. Voer voortdurende milieucontroles uit tijdens de projecten en neem corrigerende maatregelen bij eventuele niet-naleving.

DANK VOOR UW AANDACHT

Vragen, opmerkingen, suggesties?

Hoe verder?

NIMOS Review
Publieke inzage en NIMOS Review

Finaal ESIA rapport en Management Plan

Aanbevelingen en advies door NIMOS

→ 16 oktober - 16 november 2023

→ november 2023

Publieke inzage van het rapport bij het NIMOS

- Rapport: https://sites.google.com/view/nimos-eia-repository/home)
- Vragen stellen en feedback/commentaar geven tot en met 16 november 2023

Contact Informatie

- **ILACO:**

Email: info@ilaconv.com
Tel: +597- 431270

Shareen Koenjbiharie
Email: s.koenjbiharie@ilaconv.comm

Marie Fortune
Email: m.fortune@ilaconv.com

- **Staatsolie:**

Tel: 375222 toestel 66359 of 66353

- **NIMOS:**

Email: esa@nimos.org

STAATSOLIE

Vertrouwen in eigen kunnen

Uitnodiging voor een informatiebijeenkomst in Coronie

In het noordelijk deel van het district Coronie zullen er een 2D-seismisch onderzoek en exploratieboringen worden uitgevoerd. Als voorbereiding hierop is er een onderzoek gedaan naar eventuele milieu- en sociale effecten op het gebied. De resultaten van dit onderzoek zijn opgenomen in de '*Limited Environmental and Social Impact Assessment (ESIA) for the 2D seismic exploration program and the exploration drilling program in the Coronie area*'.

Wij nodigen alle geïnteresseerden en belanghebbenden uit voor een vergadering waarop de resultaten van de ESIA zullen worden gepresenteerd.

Datum: dinsdag 31 oktober 2023
Tijd: 10.00 - 12.00 uur
Plaats: CCC-gebouw Coronie
Adres: J.S.P. Kraagweg, Totness

Opgave voor deelname kan tot en met maandag 30 oktober per e-mail op info@staatsolie.com met als onderwerp 'Informatiebijeenkomst Coronie' of via het telefoonnummer 375222 toestel 66359 of 66353.

De voorlopige bevindingen van het milieu- en sociale effectenonderzoek zijn ter inzage via https://drive.google.com/file/d/1lSJFUx5sV9xw9MgwsSOQJXGktWo2Rgwe/view?usp=drive_web of https://www.staatsolie.com/:media/lipb3yol/limited-esia-coronie_final-draft-report_131023.pdf.

Scan om te registreren

Scan voor de ESIA

Minutes of Meeting

Project:	Beperkte Milieu en Sociale Effectenanalyse voor het 2D Seismisch Programma en het Exploratie Boorprogramma in het Coronie-blok
Project Code:	IS-426
Onderwerp:	Stakeholder gesprek
Aanwezigen:	ILACO: Koenjbiharie S./ Fortune M. Staatsolie: Soekhlal R./ Riedewald M./ August N. Stakeholders: Mr. Sinester/ Mr. Oosterwolde (vertegenwoordigers van groep intellectuelen van Coronie)
Locatie:	Staatsolie (hoofdkantoor) vergaderzaal
Datum:	14 november 2023
Tijd:	12:30 – 14:30
Opgesteld door:	Fortune M.

Onderwerp	**Discussie/Opmerkingen**
Agenda	- Opening en introductie - Aandachtspunten stakeholders - Sluiting
Opening en introductie	Mevr. M. Riedewald van Staatsolie opende de vergadering, gevolgd door een korte introductie van de aanwezigen. Hierna kregen de dhr. Sinester en dhr. Oosterwolde de gelegenheid om hun aandachtspunten te bespreken.
Samenvatting besproken punten	Tijdens de bespreking heeft Mr. Sinester het volgende aangegeven: • Er is geen bezwaar tegen het feit dat Staatsolie activiteiten uitvoert in Coronie, maar er mogen geen boringen plaatsvinden in het zuidelijke deel van de Coronie-zwamp. De boringen dienen ten noorden van de Oost-westverbinding te worden uitgevoerd. Wat betreft het seismisch onderzoek in de zwamp, bestaat er geen direct bezwaar. • Er zijn verschillende plannen voor de Coronie-zwamp, waaronder de ontwikkeling van ecotoerisme, aquacultuur en drinkwaterproductie en vereisen de oprichting van een waterbeheerder of autoriteit. Het is van groot belang dat deze plannen worden geïmplementeerd. Daarom is niet alleen de oprichting van een waterbeheerder nodig, maar ook de ondersteuning van Staatsolie. Staatsolie zou dus niet moeten vertrekken uit Coronie; integendeel, het is van essentieel belang dat Staatsolie de gemeenschap ondersteunt bij de uitvoering van deze plannen. • De Coroniaanse gemeenschap verwacht een vervolg meeting over dit project. • Overige vragen: 1. Zijn er momenteel activiteiten van Staatsolie gaande in de zwamp? De stakeholders hebben plannen om over Coronie te vliegen om vast te leggen wat er momenteel in de zwamp gebeurt. Staatsolie: Nee, op dit moment voert Staatsolie geen activiteiten uit in de zwamp. 2. Bestaat POC nog? Staatsolie: Ja, POC bestaat nog steeds, maar met de focus op de ondiepe offshore. 3. Indien er oliebronnen worden geboord in Coronie (niet in de zwamp), moet er sprake zijn van een gemeenschappelijk voordeel voor Coronie. De stakeholders streven naar een eerlijke verdeling van de voordelen van de olievondsten in Coronie. Dit moet niet alleen bedoeld zijn voor degene op wiens perceel de bron zal worden geboord, omdat de ondergronds ook door de percelen van de buren stroomt. Staatsolie: Dit is duidelijk. Echter,

	in geval van schade en/of compensatie zal alleen met de betreffende landeigenaar worden onderhandeld. Staatsolie gaf verder aan dat het huidig onderzoek bedoeld is om na te gaan of er olie aanwezig is in het gebied. Op basis van de resultaten kan er worden besloten om dit gebied verder te ontwikkelen. Voor het verder in ontwikkeling brengen van het gebied zal er additionele milieuonderzoek verricht moeten worden.
Sluiting	De meeting werd afgesloten met de volgende punten: • Staatsolie wacht goedkeuring/ advies van het NIMOS af voor vervolgactiviteiten. • Voor de start van het project zal er een wederom een meeting met de stakeholders worden gehouden. • Staatsolie kijkt uit naar een concreet plan van de groep, zodat de nodige ondersteuning gegeven kan worden.

Appendix 8: Table of Concordance NIMOS

Project : Limited Environmental and Social Impact Assessment (ESIA) for the 2D Seismic Exploration Program and the Exploration Drilling Program in the Coronie Area
Our reference : IS-426/ 23/307
Date : 5 December 2023

Table of Concordance

No	Page	Subject	Comments NIMOS	Response Consultant	Report Reference
General Comments					
1	A Waste Management Plan is missing in the draft EIS. Please include this.			Noted. The Waste Management Plan will be submitted as a separate file.	See separate document.
2	Why is the numbering in the figures from west to east but the documents speak from east to west?			Noted and corrected.	Revised ESIA report
3	Please correct the typos such as 3D instead of 2D, HSEE instead of HSSE, photos instead of Photo's, and others.			Noted and corrected.	Revised ESIA report
Executive Summary					
4	9	Coronie Dike	Shouldn't it be "Coronie Dijk" instead of "Coronie Dike", because "Oost-Westverbinding" is also in Dutch.	Noted and corrected.	Revised ESIA report
5		Alinea 4 point 5 "four different environments"	Perhaps it is better to put "ecosystems" instead of "environments"	Noted and corrected.	Revised ESIA report
1 Introduction					
6	14	1.4 Methodology Paragraph 1 lines 1-2 "There are four phases in the ESIA process, namely Screening, Scoping, Environmental Assessment and NIMOS review."	There are 5 phases in the ESIA process. The decisionmaking and monitoring phase must be included.	Noted. Phase 5 will be included.	Revised ESIA report, Chapter 1.4, page 14.

3 Project description					
7	29	3.3.3. Project Planning, Point 1…indicated with the red lines in Fig. 5	Is it red lines or yellow?	The waterways are indicated with the blue lines. This have been corrected.	Revised ESIA report
8	30	3.3.4 Project activities A contractor will be hired for the execution of this project.	Is it already known who the contractor will be?	The contractor has not been selected yet. Identification and selection of the seismic contractor is planned for January 204.	
9	39	3.4.7 Equipment and manpower input	A "Table 3" has been posted. But (1) There is already a table 3 and they do not match; (2) in order it should be "Table 10" and (3) it does not appear in "List of Tables" at all.	Noted and corrected.	Revised ESIA report
10		3.5 Project Alternatives While technical alternatives have been thoroughly assessed, no viable options have been identified.	Can a summary be given of those technical alternatives which has been thoroughly assessed?	Other alternatives for data collection that have been assessed are Airborne Gravity Gradiometry (AGG/FTG) and Surface resistivity.	
4 Description of the existing environment					
11	44	4.2.5 Land and Soil	Not every information of Figure 14 is elaborated in Table 12	Only soil types within the project area are described in Table 12.	
12	49	Table 13: Summary of water quality measurements 25 July 2023	Can BOD and COD measurements be conducted?	Table 13 provides results of conducted in-situ measurements. The parameters BOD and COD were not deemed necessary, because the project will not result in organic effluent release to surface water. No impact on BOD or COD is to be expected. However, these parameters have been included as part of the monitoring for the exploration drilling project.	Revised ESIA report, chapter 7.3.4.1.

13	55	4.4.1. Administrative structure 3rd Alinea these include government offices such as Agriculture, livestock, and fisheries (Min LVV)	On page 58, chapter 4.4.4.1 Agriculture, there is written Ministry of Agriculture, Animal Husbandry and Fisheries. Please use one same name for this Ministry.	Noted and corrected.	Revised ESIA report
6 Environmental Impact Assessment					
14	71	6.2.1 The 2D Seismic Exploration Program Table 20: Bio-physical Impacts with Proposed Mitigation Measures for the 2D seismic operation	Why are some text highlighted in yellow?	Impacts with a minor significance are highlighted in yellow.	-
15	84	6.2.2.Exploration Drilling Program Table 20: Bio-physical Impacts with Proposed Mitigation Measures for the 2D seismic operation; Solid waste and sewage	Can waste separation practices amongst personnel be promoted?	This is already included in the mitigation measures: Promote waste reduction, re-use, recycling amongst personnel.	See Table 20 and 22, respectively page 74 and 84.
7 Environmental Management and Monitoring Plan					
16	99	7.2.4.2 Reporting Based on data from above reports, HSSE Representative will compile a Project Completion Report that will be sent to NIMOS.	Besides the completion report, also monitoring and compliance report on a quarterly basis should be sent to NIMOS.	Noted. A Compliance and Monitoring report will be included in the reporting list.	Revised ESIA report
17	110	7.3.4.2 Reporting Based on data from above reports, HSSE Representative will compile a Project	Besides the completion report, also monitoring and compliance reports on a quarterly basis should be sent to NIMOS.	Noted. A Compliance and Monitoring report will be included in the reporting list.	Revised ESIA report

		Completion Report that will be sent to NIMOS.			
Appendix 4: Noise Baseline Report					
18	12	3.3. Noise conditions	Please see the reference, it is written as (see)	Noted and corrected.	Revised ESIA report