



Papua New Guinea LNG Project

Independent Environmental and Social Consultant

IESC - PNG LNG Field Monitoring - Final Report

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ABBREVIATIONS AND ACRONYMS

ECADR	Alternative Dispute Resolution
ALS	Alternative Livelihood Strategy
asl	Above sea level
bbl	Barrel
BIMP	Biodiversity Implementation and Monitoring Program
BRC	(New Guinea) Binatang Research Centre
BS	Biodiversity Strategy
CA	Community Affairs
CBD	Convention on Biological Diversity
CBO	Community Based Organization
CDS	Community Development Support
CEPA	Conservation and Environment Protection Authority
CEXIM	Export-Import Bank of China
CLIP	Community Livelihood Improvement Project
COH	Culture of Health (EMPNG Program)
CoV	Co-Venturers
CP	Cathodic Protection
CTA	Common Terms Agreement
CV	Check valves
DPE	Department of Petroleum & Energy
E&S	Environmental and Social
EC	Enterprise Centre
ECA	Export Credit Agency
ECCP	Enhancing Conservation Capacity Program
EHS	Environmental Health & Safety
EIS	Environmental Impact Statement
EM	ExxonMobil
EMP	Environmental Management Plan
EMPNG	ExxonMobil PNG Limited (formerly EHL – Esso Highlands Limited)
EQR	Earthquake Recovery
ERP	Emissions Reduction Plan (ExxonMobil Program)
ESMP	Environment and Social Management Plan
ESMS	Environmental and Social Management System
GBIF	Global Biodiversity Information Facility
GIIP	Good International Industry Practice
GoPNG	Government of Papua New Guinea
H&S	Health and Safety
HGCP	Hides Gas Conditioning Plant
HGDC	Hides Gas Development Company
HWMF	Hides Waste Management Facility
IESC	Independent Environmental and Social Consultant
IFC	International Finance Corporation
ISOS	International SOS
JBIC	Japan Bank for International Cooperation
Km	Kilometer
KP	Kilometer Pipeline

NBSAPL&CA	Land and Community Affairs
LANCO	Landowner Company (companies created to support PNG LNG)
LI	Linear Infrastructure
LKEF	Lake Kutubu Environment Foundation
LNG	Liquefied Natural Gas
LOBID	Landowner Beneficiaries Identification
LTI	Lost Time Incident
M&E	Monitoring and Evaluation
MLV	Main Line Valves
MOC	Management of Change
MOH	Medicine and Occupational Health
MOU	Memorandum of Understanding
MTA	Million tons per annum
NAQIA	National Agriculture Quarantine and Inspection Authority
NBSAP	National Biodiversity Strategy and Action Plan
NC	Non-Conformance or Non-Compliance
NCCC	National Content Coordination Committee
NEXI	Nippon Export and Investment Insurance
NGO	Non-Governmental Organization
NNL	No Net Loss
O&M	Operation and Maintenance
OIMS	Operations Integrity Management System
OSL	Oil Search Limited
P1, P2, etc.	Priority 1 weed, Priority 2 weed, etc.
PCS	Pre-Construction Survey
PDL	Petroleum Development License
PIA	Project Impacted Areas
PMA	Program Monitoring Activity
PNG LNG	Papua New Guinea Liquefied Natural Gas Project
PS	Performance Standard
Q	Quarter
RAP	Resettlement Action Plan
RoW	Right-of-Way
SACE	Servizi Assicurativi del Commercio Estero
STP	Sewage Treatment Plant
TOR	Terms of Reference
TRIR	Total Recordable Incident Rate
TSS	Total suspended solids
TVET	Technical, Vocational Education and Training
TWM	Total Waste Management
UA	Upstream Area
USEXIM	Export-Import Bank of the United States
VLO	Village Liaison Officers
VMP	Vehicle Monitoring Plan
WCS	Wildlife Conservation Society
WMA	Wildlife Management Area
WMZ	Weed Management Zone
WP	Wellpad

EXECUTIVE SUMMARY

This report represents the 20th field monitoring and the 23rd post-financial close review of the Papua New Guinea Liquefied Natural Gas (PNG LNG) Project with ExxonMobil PNG Limited (EMPNG) as the Operator made by RINA Consulting S.p.A. of Genoa, Italy serving in the role of the Independent Environmental and Social Consultant (IESC) on behalf of Export Credit Agencies (ECAs) and Commercial Banks providing Project financing (Lenders). The review was based on the documentation provided to the IESC as well as field observations.

2023 was another good year for production, with 8.5 million tons (MTA Eq) and 113 LNG cargoes loaded. It should be recalled that the project was defined to the IESC in 2009 to be a development of 6.3 MTA Eq, so current production continues to be significantly more than originally projected. Angore well drilling is nearing completion and rig demobilization is anticipated to be underway before the completion of this report. The effort associated with the recovery from the M = 7.5 February 2018 earthquake is still ongoing. Since the time of the last IESC visit the budget has increased from \$560 million to \$583 million and costs as of the end of 2023 were \$476 million. Work is forecasted for completion in May 2025.

Environmental and Social Management System

The Environmental and Social Management System (ESMS) is a mature and active System. EMPNG continues to operate within their Production Environmental and Social Management Plan (ESMP) implemented through three Environmental Management Plans and seven Social Management Plans. There have been minor changes to the ESMS since the last IESC reporting, the most significant changes being the addition of procedures and standards relative to potable water, which follow WHO guidelines. Since the last IESC reporting period there have been no Lender-Reportable (Class II) MOCs.

At the time of the current IESC field visit the vacancies identified in February 2023 visit had been filled, but over the course of 2023 the lack of staff did impact the Project's ability to comply with ESMP commitments, especially with respect to biodiversity. We have still seen that EMPNG's senior staff are trying to do too many jobs and that there is not enough support staff. From the IESC perspective, EMPNG needs more time to demonstrate that current staffing is adequate to fulfill Project commitments before this topic can be removed as an issue.

A topic reviewed in detail in the last IESC report is the identification and management of an "Associated Facility." The issue of Associated Facilities was assigned a Level 1 Non-compliance in the last IESC report. What we expected to see during this visit was that EMPNG would have identified potential Associated Facilities, reviewed their operations and management, and undertaken a risk assessment to determine if EMPNG needs to exert influence to ensure the operations are undertaken safely and in reasonable compliance with environmental, social, and labor standards. This effort was not undertaken. Aside from the fact that it is a Production ESMP commitment to identify and influence management of Associated Facilities, and aside from the fact that the mismanagement of an Associated Facility can have human or environmental impact, the main driver to the identification and management of Associated Facilities is EMPNG's reputation and by association the Lenders. IESC will expect to see progress in the identification and management of Associated Facilities at the time of our next field visit.

Pollution Prevention

EMPNG continues to monitor Environmental Compliance Incidents (ECIs) and EMP Non-conformances (NCs), which indicates that the Environmental Management System is healthy. There were two ECIs recorded in 2023 that did not result in major environmental damage but did warrant a reexamination of procedures. One incident involving the cutting of primary forest was significant mainly because an access procedure was not implemented before the cutting took place. The other was the March 2023 release of water and drilling foam from Angore drilling that should have triggered a process whereby the local environmental authority, CEPA, was notified.

Waste and Water Management

Overall, there has been an increase in Upstream waste generated in 2023 due to the large volume of treated drill cuttings from HQ1/Angore and this volume reflects that the total amount of waste landfilled in 2023 was nearly double that of 2022. At the LNG Plant waste volumes have decreased reflective of the range of base operations and continued identification of qualified third-party waste management facilities. A milestone event expected in 2024 is the completion and use of the third-party TWM landfill at Roku near the LNG Plant. This should effectively eliminate the need for EMPNG to operate a landfill at the LNG Plant site.

Wastewater continues to be well managed. At the LNG Plant the Unidro STP was commissioned February 2023 and after 90 days stabilization was operational on 06 May 23. It now supplements the Toray STP, and both had good operations in 2023. Upstream STPs had good performance with the exception of a minor excursion of Ammonia-N from the HGCP plant. Surface water discharges have been compliant, except for the March 2023 Angore environmental incident with the water and foam discharge, which had high TSS and turbidity.

Groundwater monitoring around the HGCP and the LNG Plant continues to show no evidence of groundwater contamination. Conversely, at the Hides Waste Management Facility (HWMF), evidence of infiltration of leachate from the facility has been recorded since 2014. The data collected from the new wells were not conclusive in 2021,

but the 2022 and now the 2023 data confirm that the landfill and/or the reed bed is a source of groundwater contamination. The IESC recognizes there are no users of groundwater in the neighborhood of the HWMF and that impact to the nearby Tagari River is probably negligible. At this stage, as previously recommended, the risk of the contamination of the Tagari River should be quantified as part of a risk assessment undertaken with a fate and transport analysis. The risk assessment should be followed up with a commitment to undertake long-term monitoring to verify the expected results of the risk assessment with the note that closure of the landfill with an impermeable cap will probably solve the problem.

Hazardous Materials Management and Spill Prevention

Hazardous materials management practice is undertaken consistent with GIIP. Spills continue to be consistently recorded and their causes investigated, and procedures developed to minimize future spills. There were a total of 39 small spills in 2023 (predominantly hydraulic fluid) with none designated as recordable (>1 bbl). None of these spills had significant environmental consequences.

Air Quality and Noise

Substantial effort is being placed in the reduction of flaring. Routine flaring emissions continue to be reduced at both the LNG Plant and HGCP and 2023 set the record for lowest amount of flaring due to both ongoing flare reduction efforts and a reduced amount of downtime (Figure 4.6). This effort supports ExxonMobil's 2030 Emission Reduction Plan (ERP). The next round of stack emissions testing is planned for Q4 2024.

Noise monitoring was undertaken in 2023 with no problems reported. Nevertheless, a noise impact assessment was undertaken by Tetra Tech Coffey in 2023 for the current operations at the LNG Plant location on behalf of ExxonMobil PNG Antelope Limited (EMPNGA) that did identify issues with noise related to noise at the point of compliance (LNG Plant fence line). The Tetra Tech Coffey study recommended that EMPNG solicit a change to the Environmental Permit whereby the point of compliance would be the Nearest Sensitive Receptors (NSRs). EMPNG stated during the IESC Closeout meeting that CEPA has accepted this change to the Permit.

Erosion and Sediment Control

The effort associated with the recovery from the M = 7.5 February 2018 earthquake is nearing completion. Remediation efforts with Earthquake Recovery (EQR) are well advanced with \$476 million spent out of a budget of \$583 million, \$23 million more than the budget at the time of the last IESC field visit.

With respect to erosion and sediment control, IESC at the time of the February 2023 visit was able to report major success stories, especially at the Komo airfield. During this IESC visit, the airfield was revisited, as was the area of the HGCP and around Angore. Komo and Hides both look excellent, the result of good engineering, construction, and Mother Nature adding a lot of stabilizing vegetation. On this trip we looked at numerous points along the pipeline ROW, in particular along portions of the pipeline ROW we had not visited in the field for many years in the Gobe – Moro area with erosion and sediment controls working well. Mother Nature has also played a big role in preventing erosion along the ROW.

Ecological Management and Biodiversity

Staffing

As noted during the last report, the recruitment and retention of competent, experienced personnel within the Biodiversity Team has been challenging. At one point during 2023, staffing levels reached precariously low levels, dropping down to a single qualified employee for several months and it has taken time to recruit replacements. This has continued to have repercussions on implementation of the full work program and in increased pressures on existing staff having to maintain responsibilities across multiple roles. At the time of the visit, the Team had just completed the filling of all roles either through reallocation of internal personnel, new hires and engagement of experienced contractors.

Biodiversity strategy: PS6-relevant incidents, implementation of the mitigation hierarchy and monitoring

As noted above, there were two environmental incidents in 2023. PS6 potential consequences include:

- ✓ On Hides Ridge, the clearance of five access tracks from the main access road to the pipeline RoW – this happened without following due process for pre-clearance survey in critical habitat and without comprehending that additional precautions should be applied. Several large mature trees were cut, with two of the five tracks affecting nearly 1.5km² of virgin forest and disturbing two sites previously used for ongoing regeneration monitoring. Hides Ridge is one of EMPNG's three Priority Ecosystems;
- ✓ Following the uncontrolled release of foam discharge downstream of drilling Angore WP-C, rivers and banks in the immediate vicinity contained obvious quantities of foam. Releases to the receiving environment exceeded discharge limits for up to two months. EMPNG were not able to demonstrate that ecological damage to the freshwater ecosystem hadn't occurred.

Demonstrating avoidance of any impacts on stream conditions is key to preservation of upland streams and stream refuges in unstable landscapes, two of EMPNG's focal habitats. As EMPNG has continued site-specific work activities along parts of the RoW and existing infrastructure (e.g. extensive earthquake recovery activities, Angore pipeline construction, Angore drilling, etc.), the IESC consider that demonstration of avoidance is still an important objective. It has been some time since the last freshwater ecology survey campaign. EMPNG advise that sampling will occur later in 2024 – the company should ensure all relevant rivers and streams are included, not just those where incidents have occurred.

The IESC have observed several areas where impact mitigation approaches and activities do not align completely with the requirements of the EMP; observations are noted specifically on induced access controls and weed control areas in sections below and in the Issues Table.

The drilling rig will be moved from the Angore area up to Hides Ridge in a few months, with the potential for inadvertent import of weeds and pests (cane toads). At the time of the visit, the risk assessment and mitigation measures had not been developed – this should be a priority.

The amount of plastic litter observed at EMPNG worksites was considered unacceptable, and awareness should be raised immediately to prevent environmental and ecological damage. EMPNG is operating in Critical Habitat, and changes in behavior must happen as a priority.

Some highlights on the biodiversity monitoring program are below, but see main report sections for further detail:

- ✓ No update was provided on analysis of satellite imagery as a fresh imagery capture and analysis is scheduled for 2024. The new Guidelines produced to clarify the attribution of indirect Project impacts of land use change have not been applied retrospectively; IESC opinion is that doing so would help EMPNG to understand any gaps in past attribution where indirect land-use change had not been captured as Project related;
- ✓ EMPNG advised that the two-yearly PMA-3 detailed biodiversity surveys due in 2023 did not occur due to security constraints – these are rescheduled for June 2024. Previous PMA-3 surveys had observed an increased prevalence of feral dog predation and hunting pressure over successive survey years, noting that hunters were preferentially using the pipeline corridor for accessing hunting grounds that might otherwise have been more difficult to target. EMPNG had responded by developing a questionnaire to gather information from hunters, but this has taken some time to develop and fine-tune. The questionnaire will be used during the 2024 PMA-3 survey campaign;
- ✓ EMPNG presented their assessments of the biodiversity 'gained' from the offset programs to date for each of the three elevation zones. Gain is being calculated from averting losses i.e. protecting areas from threats that might have occurred were there to be no company-secured protection. The gain claimed by averted loss can be highly uncertain and inadvertently overestimated. Support to conservation groups such as the Lake Kutubu WMA Committee and the Lower Kikori Conservation Deed holder groups is highly valuable, but a claim to averting predicted losses should be backed up by ongoing demonstration that losses have not continued during the period of support, and ideally that habitat condition is improving. This should lead to the company's claim of biodiversity gain being more defensible.

Some highlights on the biodiversity offset program are below, but see main report sections for further detail:

- ✓ For 'conservation-enabling' activities, EMPNG have replaced the previous program of hosting the widely attended Communicating Conservation Meetings and publication conservation newsletters, and instead intend to facilitate the attendance of offset-program community representatives to the already-established UNDP Protected Area Forum meetings in Port Moresby. In addition, the two Master's students supported through EMPNG's collaboration with Binatang Research Centre have graduated this year. No new Master's students have been recruited for the 2024 intake due to resource constraints at both Binatang and EMPNG, but company support to another two students is again expected in 2025. The two PhD students supported continue their studies. There was no Conservation Ranger training funded in 2023 as planned.
- ✓ Support towards existing protected areas:
 - Mid-elevation zone offset: The pipeline RoW passes through the Lake Kutubu Wildlife Management Area (WMA), therefore for PS6 compliance, EMPNG has a number of responsibilities to ensure biodiversity values are enhanced. The IESC didn't have an opportunity to meet with representatives of the WMA Committee during this visit. EMPNG presented a status update on the administration, conservation and sustainable-livelihood activities undertaken by the WMA Committee. Reflecting the incredible fish endemicity in the lake and secure more sustainable fishing resources, the Committee have worked with two more Lake communities to commit their fishing grounds to no-fishing zones for a year, making a total of nine no-fishing areas currently within Lake Kutubu. Support towards the development of a management plan for the Lake Kutubu WMA protected area, as an existing commitment within EMPNG's 2012 Enhancement Plan, is a key aspect to help deliver necessary ecological benefits from the community-based conservation model currently being supported. Due to Biodiversity Team resource constraints, little progress was presented on development of the protected area management plan during 2023. However, EMPNG did present a Stakeholder Workshop Strategy which is intended to ensure the

broad stakeholder engagement that the IESC has emphasized will be vital to ensure the Plan developed is considered legitimate. The IESC again stresses the importance of the Lake Kutubu WMA protected area management plan being representative of the biodiversity values to be conserved, be scientifically robust, based on up-to-date information, setting clear ecological and ecosystem service preservation objectives and outcomes, and be well informed by a wide range of stakeholders' needs and opinions. On ensuring that all key biodiversity values are enhanced, the IESC retains the non-compliance relating to EMPNG's ongoing decision to not directly support freshwater ecology studies at the Lake, especially as threats to the endemic fish species from the introduction of invasive tilapia could impact its ecological integrity. Lake Kutubu is a Ramsar site, and important to EMPNG and Lenders due to this being the program chosen to deliver conservation benefits at the mid-elevation zone. It is also inside a protected area within which the Project has an ongoing footprint. Therefore, the IESC has requested that IESC/Lenders be kept informed on a more regular quarterly basis as the protected area management plan engagement and offset program is progressed.

- Lower elevation zone offset: EMPNG's program is designed to enable the creation of a new community-based, regionally gazetted protected area in the Lower Kikori. EMPNG's full-time coordinator and the Environmental Lawyer engaged by EMPNG have continued to help inform and guide the Lower Kikori communities on the establishment of Conservation Deeds, which are formal legal agreements within and between communities to map resources and conservation areas for preservation. The mapping has helped to resolve any land-owner uncertainties and conflicts, and as reported in previous IESC reports, has had widespread buy-in from the communities present. As a result of the considerable long-term effort from the Biodiversity Team and colleagues, eleven Conservation Deeds were signed at the end of 2023. With representatives of PNG's Conservation Environment Protection Authority (CEPA) present, a major ceremony was held with the communities in Kikori to sign the Deeds, including 109 clans living across two local level governments. The IESC was able to visit with several of the clan leaders plus others involved in the background efforts that went into development and finalization of the Deeds. EMPNG's long-term support has enabled the communities to start the conservation journey in alignment with CEPA's formal process. There is clearly a desire from community members for EMPNG to continue to facilitate the process for protected area gazettal with CEPA. The communities are very keen for CEPA to accompany EMPNG on follow-up visits so that formal assessment and application for gazettment of lands can be speedily progressed. They did note the urgency for this before any land- or rights-holders become disenfranchised with the process. Whilst in the Lower Kikori, the IESC also met with the Rangers trained as part of the Binatang collaboration noted above. The training course allowed the Rangers to learn practical aspects of conservation and share experiences with Rangers from other protected areas elsewhere in PNG. The IESC has passed on a number of recommendations they made on what can now be achieved through enhanced protection of their environment, including the need for further training and clarity in their enforcement role as Conservation Rangers,
- There is little progress to report on any offset program in EMPNG's upper Montane elevation. The largest proportion of overall residual biodiversity impact is greatest at this higher altitudinal zone, therefore the need for biodiversity gain required to compensate for losses is also greatest, through the creation of ecologically comparable areas managed for biodiversity. EMPNG had reported long-term security issues in Hela Province that had contributed to the stalling of program development. Although very slow to start, offset activities in this upper elevation zone started to gain some traction from 2021, but focus has again stalled relative to other elevation programs. The IESC recognizes the importance of a solid foundational framework for community-based conservation, however with the loss of personnel in the Biodiversity Team over the last few years, the Team has lost momentum in program implementation. The Biodiversity Strategy and therefore offset program is now over 13 years old, and Lenders would expect to see more progress at this stage of residual impact progression. A Level II non-compliance has been opened.
- Implementation of the new Alternative Livelihood Strategy at each of EMPNG's biodiversity offset program locations is welcomed although progress has been slow during 2023. This will be key to ensuring that community livelihoods and provision of resources and ecosystem services is not compromised by any restrictions imposed as a result of heightened conservation measures.

Induced Access

During construction, EMPNG road construction to support pipeline RoW construction resulted in the linking up of Santos/OSL roads between Kantobo and Gobe. This included construction of the Mubi Bridge and the Kaiam Bridge, thereby allowing vehicular access from Moro south to the Kopi Scraper Station and to the Omati landfill. The basis on which the EIS assessment of impacts and significance was based assumed that the use of project infrastructure by others would require assiduous control to maintain the conservation assets of the area, and that access should be controlled for Project use only, post-construction. The Project road and bridges were kept open, thereby enabling the 'Southern Highway'. It is imperative that EMPNG control access to Project roads to avoid and minimize impacts related to enhanced access such as increased hunting to more easily accessible areas, land clearance/logging and the transmission of weeds, pests and pathogens along the corridor.

The 2019 EMP: (1) requires access controls that restrict vehicular access to EMPNG roads, (2) requires access to only pre-authorized vehicles, and (3) defines the mitigation controls at access points along project roads. During the road-trip this visit, the IESC were able to observe how EMPNG's access control mitigation measures are being implemented on the ground. A number of access control points were observed to be not in compliance with the requirements of the EMP and the compliance of others are not clear (should be checked). Some of these control requirements have never been in place. These are described more fully in Table 5.1: Status of access controls and monitors versus EMP requirements in the main section.

Staffed gates are meant to have Access Monitors e.g. at Kaiam Bridge and near Gobe and are meant to record vehicle and destination details. However, the Monitors ultimately allow free movement of vehicles. As neither of the staffed gates were manned as observed during the IESC's visit, the data collected on vehicle frequency and types could be open to challenge and perhaps cannot be relied upon as an accurate reflection of the use of Project roads. Therefore, the existing Observation (M22.4) is increased in priority to a non-compliance Level II in the Issues Table.

Lenders should note the government has now embarked on a major multi-phased program to deliver 16,200 km of strategic roads on a rolling 20-year basis – the Connect PNG 2020-2040 Program (see brochure¹) – which includes the section of road linking Moro down to the Kaiam Bridge and seeks to develop Kikori as a seaport opportunity for transfer of goods up to the Highlands.

Reinstatement and Regeneration

The latest regular regeneration monitoring surveys were undertaken in March-April 2023, and EMPNG is expecting the survey results and analysis report in June 2024. Fieldwork from 2023 noted that 80% of the regeneration plots had remained intact and usable for survey, indicating that 20% of the plots had been disturbed or destroyed (including the plots impacts in the incident, noted above). IESC observations of RoW reinstatement and regeneration from the road-trip were generally positive and appear to be progressing well. IESC direct observations at the LNG Plant suggested that mangrove regeneration and habitat restoration had progress significantly relative to the annual change observed previously. No obvious signs of recent harvesting of mangrove trees were observed.

Invasive Species and Quarantine Management

The IESC were unable to meet with contractor weed control representatives due to a clash with their changeover schedule. Therefore an update on their activities and any limitations experienced (as noted in previous IESC reports) could not be discussed. However, EMPNG provided information on the current coverage of weed control. During road-trip discussions it appears the full RoW (e.g. south of Moro) is no longer under active site inspection and ongoing control by the weed control contractor, primarily due to availability of vehicles and Community Affairs Officers. The EMP requires control of P1 weeds in all Weed Management Zones south of Moro. The scope of the Weed Management Procedure similarly includes the full pipeline RoW and all AGIs and stipulates regular site inspections by the weed control contractor of all sites, including the Row and AGI's. This should be reviewed. The Weed Management Zones in the EMP do not align with those in the Weed Control Procedure, updated in 2022. An updated weed register was not available in time for review for this report.

The annual specialist weed audit was again undertaken by Binatang/BRC in 2023 achieving coverage of 584 transects. BRC's audit report notes a statistically significant trend of increasing weed diversity (P1-P3) over the period of 2019-2023, and of P1 species in particular. The total number of all weeds has more than doubled over the period 2019-2023. The highest increase has been observed in the number of P1 species in the Lower Montane, this being especially true of *Piper aduncum* where its abundance has rapidly increased in both the Foothills and Lower Montane zones. The report indicates that in 2023, the five most common P1 species represent 80% of all P1 species records. Weed communities appear to be displaying a rapid turnover in species composition between subsequent years of audits. For example: (1) 17 species of weed were newly recorded in 2023 i.e. not recorded previously, (2) of the species recorded in 2022, nine species were not recorded again in 2023, (3) 20 species recorded in 2018 and/or 2019 were not present in the 2023 survey. No reason was provided for this.

Regarding control, they recommend EMPNG actively control three species in particular: *Piper aduncum*, *Ludwigia leptocarpa* and *Desmodium sequax* in their areas of maximum abundance. Nevertheless the IESC highlights the EMP requires active control of all P1 species across all of the RoW and AGIs as per the EMP scope.

Finally, EMPNG maintain that certain P1 weeds currently found along the RoW in areas where they were not previously recorded, were actually *present* prior to construction but were not correctly identified at the time. The potential for weed transmission along the RoW was a significant impact predicted in the EIS and is therefore a risk of significant interest to Lenders. It is IESC opinion that EMPNG should consider an independent specialist review be undertaken to try to resolve this significant, alleged discrepancy.

Cane toads are still a problem to be mitigated, although numbers are reported to be decreasing, especially at the HGCP. As before, key from a Lender risk perspective is that the Project should continue to prevent and manage

¹ See for example, https://www.businessadvantagepng.com/wp-content/uploads/2020/09/DOW-The-Connect-PNG-A4-Text_ijm.pdf

the presence/spread of cane toads, and continue to receive specialist advice from external experts, reacting responsively to their recommendations.

Lenders will recall previous IESC reports noting that the last four PMA3 surveys at Hides Ridge (2015, 2017, 2019 and 2021) had found canopy trees along the edge of linear clearings becoming increasingly stressed, and in many cases, dying. They were thought to potentially represent the effects of the fungus and plant pathogen, *Phytophthora cinnamomi*, to which *Nothofagus* species and Papua New Guinea Oak *Castanopsis acuminatissima* are particularly susceptible. EMPNG provided information on specialist field surveys undertaken for the Project during 2023. Initial findings are summarized in the main report section, but essentially no recent mortality was observed in overstorey trees on the Hides Spine and RoW although a significant number of dead trees were seen, deemed to be the result of root destruction and disturbance associated with the original pipeline construction.

Social

Resettlement

Resettlement obligations carried over from 2022 were completed in 2023. Results of the outcome evaluations showed a combination of improved or maintained post-resettlement standard of living and livelihood conditions. Additional land was accessed for (i) pipeline remediation, (ii) construction of temporary Camp Site at Hides WPC, (iii) easement for repairs of high voltage cable at Hides WPD, and (iv) construction of new well at Hides WPF. Only one area acquired required preparation of a RAP Addendum. The IESC reviewed and accepted this Addendum. The IESC visited the location during the site visit and found the support measures appropriate.

Community Impacts Management-Community Security Conditions

Clan fighting continued to destabilize political and economic community conditions in the PNG LNG Project footprint over 2023, particularly in Hela Province where intra and inter-clan rivalries persist. According to the tradition and value system of the Huli culture, the elements which trigger tribal fights are, in order: (i) land disputes, (ii) conflicts over pigs and (iii) conflicts over women. In addition, other triggering causes of conflicts can be generational disputes and other long-standing grievances that escalate simple disputes.

The number of active clan conflicts in the Highlands continued to be particularly volatile in 2023, as they were in 2022. In addition to loss of life and property, tribal conflict also resulted in internal displacement of communities. Tribal conflicts in Hela province indirectly affected Project operations, causing precautionary temporary suspensions of external work fronts and logistics movements. Reportedly, although the number of violent incidents has not increased, their lethality has risen due to the continued spread of high-powered weapons, which remain a primary concern for the security of the upstream population and the Project.

Crime remained prevalent within communities across the EMPNG footprint. In 2023, incidents impacting these areas included assaults, kidnappings, thefts, civil disorder, robberies, rapes, vehicle hijackings, illegal roadblocks extracting unofficial 'tolls,' and murders. In January 2024, a State of Emergency was declared in Port Moresby due to an unprecedented outbreak of looting. EMPNG implemented precautionary security measures, including travel restrictions, which had no direct impact on personnel or operations, but which delayed the IESC field visit from February to May.

As mentioned above, EMPNG operations within the Highlands are under a "Severe" security threat characterization due to increased security complexity, increased law-and-order challenges, and significant security incidents. In addition to efforts to enhance the livelihoods of local communities, the Project includes communities in its security programs. An example is the case of the fractious area surrounding the Komo airport, where Community Affairs (CA) experimented with appointing two members from two conflicting clans as Village Liaison Officers (VLOs). This appointment forced them to engage in dialogue and initiate a phase of diplomatic conflict resolution, significantly reducing hostilities in the area. IESC considers this case emblematic of how the Project can serve as a mediator in the area and supports the EMPNG team in continuing in this direction.

Community Development Support

The IESC 2022 review requested the Project to make demonstrable effort to develop and begin implementation of a Project level CDS strategy and plans for its cross-functional programs

IESC believes that progress has been made in this regard. Many CDS activities were conducted throughout the year, although there were some delays compared to the schedule (the reasons for this are explained in more detail below). Overall, the organizational restructuring implemented last year seems to have paid off. The various teams responsible for managing social issues (CDS, CA and Land Advisor) proved to have the necessary competencies. Moreover, many members have long-term experience with the project, which is an added value. RINA encourages EMPNG to continue its efforts and ensure the needed support for CDS activities.

In 2023, CDS's total expenditure reached an all-time high (USD\$5,240,000.00 for Upstream, and USD\$828,000 for the LNG Plant site, for a total of USD\$6,068,000). Numerous activities were conducted, which included the delivery of health and education infrastructure along with initiatives for both local livelihood and law & justice development.

During the site visit, IESC had the opportunity to visit several of these interventions. In all cases, the stakeholders interviewed expressed gratitude for the support provided by EMPNG. Overall, the Project is seen as a benchmark for the area's development (at least concerning the Upstream sector); this is due to both the significant Project actions and the minimal presence of the PNG government in the area. This leads stakeholders to ask the Project for every request or issue arisen. The Project cannot meet all the requests it receives, although it shows a commitment to address them, within its responsibilities and capabilities. Concerning the latter, it has to be underlined that these have been limited by LANCO's performance both in upstream and plant areas. Indeed, several delays have been observed in the delivery of the CDS infrastructure projects. Reportedly, all LANCOs face challenges regarding their internal capabilities and efforts. Additionally, they are dealing with ongoing cash flow issues and internal administrative matters. IESC understands the limited scope of action for EMPNG in this regard; however, it encourages EMPNG to monitor the issue finding opportunities for improvement where possible.

Reportedly, 2024 will be more focused on – but not limited to – the provision of soft projects (e.g. school and health materials) rather than hard ones (infrastructure). According to the information provided, EMPNG has developed a forward plan, which was generally discussed during the socio-economic kickoff, nevertheless the plan itself and its details still have to be shared with IESC. This lack of provision of the plan (and therefore the impossibility for IESC to assess the planned interventions in detail), combined with above mentioned LANCOs issues and modest performance in terms of allocated budget expenditure (47%), constitutes a warning signal about the current and future social performance of the Project. For this reason, IESC recommends that EMPNG provide an overview (either in summarized form or as a diagram) of the activities of the various social teams (not limited to the CDS), how they integrate and operate synergistically, what their respective responsibilities are, and what the intervention plans are for the coming years. This information is necessary to adequately understand the real impact of the Project's social activities on the development of local communities.

National Content

PNG Nationals made up 88% of the Project's total workforce in 2023, 255 down from 3,315 at the end of 2022. Of the EMPNG workforce, 76% were nationals while third party contractors were 91% nationals. In terms of PNG workforce origins, workers from local areas continued to be the largest group (even if the percentage decreased from 44% to 35%) followed by national at 37% and regional at 28%. Of the 89% PNG workers, 35% are from Project Impact Areas. In terms of gender, females make up 18% of PNG workforce. In terms of Competency Enhancement, 225,000 training hours were delivered in 2023 - up from 148,000 hours in 2022 and representing an average of 60 hours of training per person.

Stakeholder Engagement and Consultation

The number of engagements decreased considerably compared to 2022, especially in the Highlands. According to the information provided, the 2022 peak in engagements was due to several work fronts starting such as EQR works, Angore Project construction work, drilling activities, and the CA team. The 2023 decrease is reportedly a result of work fronts being in an advanced stage which requires less engagement activities. Considering (i) the consistence of 2023 numbers with pre-Covid ones (2019) and (ii) that these engagement numbers are still relatively very high, given that the Project is in the tenth year of operation, IESC deems the explanations provided adequate, and the reduction in engagement activities normal; therefore, this is not assessed as an area of risk nor a cause for concern.

Community Grievance Management

The Project continues to effectively communicate and coordinate with the cross-functional team (Security, P&GA, Law, ERB). The number of community grievances recorded in 2023 is the lowest figure ever. Twelve grievances were recorded, all from Highland communities. The majority of grievances involved environment (5) followed by land access & compensation (4) and damages/claims (3). Most grievances were closed within the 100-day period. Two complicated grievances filed in 2023 required more than 100 days to resolve. Eight complicated grievances carried over from 2022 were closed in 2023. The number of issues slightly decreased during 2023 – 1,913 compared to 2,308 in 2022. The decrease is connected with the above-mentioned reduction of engagement activities, as issues are mainly raised during the latter. The main categories of issues were related to social, economic and land access queries and concerns.

According to the information provided during the site visit, the vegetation clearance of the ROW is assigned to the land-owning clans who are paid to clear the area, which happens twice a year. Payment is made to the clan representatives, who are then responsible for distributing the received sums among the clan members. Reportedly, the Project is facing two issues related to this matter: (i) clans use bank accounts solely to receive these payments, which lead to them being closed by the bank due to inactivity. This results in significant bureaucratic delays in reopening the accounts each time, and (ii) clan representatives often fail to distribute the earnings as they should, particularly towards those directly involved in vegetation clearance. This results in certain sections of the ROW remaining uncleared. IESC supports EM to find alternative solutions to ensure both the Project's safety and fair distribution of compensation among the affected population.

Landowner Beneficiary Payments

The Project's strategy remains to mitigate near-term risk, support resolution of underlying issues, and capture lessons for potential future projects. To these ends, the Project continues positive engagements with CoVs, PNG Government and other stakeholders. EMPNG provides logistical support to government activities as appropriate.

Progress is being made to deliver benefits to mandated beneficiaries:

- ✓ PDL 1: Account opening exercise re-commenced May 2024; elections for Gas Resource Company (GRC) Directors' expected to take place in June 2024 – critical final step to enable payment of royalties to beneficiaries;
- ✓ PDL 8: Ministerial Determinations in place for all 5 blocks as of Nov 2023; progression to clan account opening phase expected from 2H 2024 pending final legal clearance from the State;
- ✓ PDL 9: Ministerial Determinations in place for clan factions from Western and Hela Provinces as of May 2023; advice pending from State on timing to progress clan account opening phase.

Labor and Human Resources

Professional Development

The Project uses a variety of materials and activities to promote the professional development of its workforce. The main elements of these support measures in 2023 were:

- ✓ The Supervisor Network, which includes quarterly sessions designed to enhance the effectiveness of EMPNG Supervisors in their crucial roles within the organization;
- ✓ The Eda Wanwok Toastmasters Club, which is one of the most active clubs within EM PNG and met regularly throughout 2023. Toastmasters helps employees build confidence by enhancing their communication, leadership, and public speaking skills;
- ✓ Various Award Programs, such as:
 - LCM Awards, annual awards open to all staff, recognize, promote and reward outstanding examples of *Em Pasing Bilong long* ExxonMobil PNG values and behaviors,
 - Nambawan Awards, introduced in 2022, nominated by staff to recognize, promote and reward peers' outstanding performance by demonstrating *Em Pasing Bilong long* ExxonMobil PNG values and behaviors;
- ✓ Local subcontractors and labor access community project business opportunities, enhancing national content outcomes;
- ✓ Young adults of employment age are engaged, and the development of local supplier subcontractors has advanced.

Personal Development Activities

The Project also supports staff personal development with various activities including:

- ✓ Business Acumen Financial Literacy program;
- ✓ Collaboration with Bel Isi PNG;
- ✓ Organization of the Family Fun Day;
- ✓ Participation in the Independence Day Celebration.

The Project continued its Giving Back program with activities such as staff participation in:

- ✓ Grade 12 Career Expo;
- ✓ Buk Bilong Pikinini (Books for Children Program);
- ✓ Science Ambassador Program;
- ✓ National Development Summit;
- ✓ Support to mental health through 24/7 face-to-face counseling resumption through Magellan Healthcare, and group counseling available under EHAP Services.

Health and Safety

Community and Occupational Health

Community health continues to be a component of the CDS program with the objective of reducing the factors that limit the capacity of Papua New Guineans to fully participate in livelihood/economic activities by targeting high risk diseases and health complications. CDS health activities in Hela Province and the Southern Highlands in 2023 focused mainly on infrastructure development. In the LNG Plant area the focus in 2023 also was infrastructure development, but in both the Upstream and LNG Plant areas there were also collaborations developed and strengthened to jointly contribute to Provincial Health issues. Community health programs have been well implemented since the start of the Project.

The occupational health program is world class and continues to perform well in all areas (clinical operations, public health and industrial hygiene). The Culture of Health (COH) program following OIMS continues to be implemented with 1,481 participants for biometric screenings and physical activity challenges. The Industrial Hygiene Program continues to review worker exposure to chemicals and noise and verifies that personnel protective equipment is appropriate for the different work environments.

Occupational Safety

EMPNG Production safety performance through Q4 2023 continues to be excellent, better than 2022, although there was a single Lost Time Incident (LTI) that took place at Angore where a worker fell and broke his forearm. Even with this accident, the 2023 Lost Time Incident Rate (LTIR) was maintained at 0.01 normalized to 200,000-man hours and the Total Recordable Injury Rate (TRIR) was 0.03, both of which are much better than industry standards. Note that 1.3 is the average LTIR and 3.0 is the average TRIR across all industries in the United States.

Cultural Heritage

Cultural heritage management continues to be undertaken, currently in association with the pipeline repairs for the EQR project, as the work at Angore and along the Angore pipeline is complete, at least in terms of land disturbance. As such, there is little to report except that based on an interview with the Project Archaeologist, the process has gone well, and the Project has supported the archaeological program with the resources to do the work correctly.

1 INTRODUCTION

RINA Consulting (hereafter 'RINA'), formerly D'Appolonia S.p.A., located in Genoa, Italy, was appointed as the post-financial close Independent Environmental and Social Consultant (IESC) for the Papua New Guinea Liquefied Natural Gas Project (PNG LNG or the "Project") being developed by ExxonMobil PNG (EMPNG), the designated Operator and also representing a consortium of co-ventures including: Oil Search Limited; Kumul Petroleum Holdings Limited; Santos Limited; JX Nippon Oil and Gas Exploration Corporation; and Mineral Resources Development Company Limited, and their affiliates. RINA's role as the IESC is to support the Export Credit Agencies (ECAs) providing Project financing, including the Export-Import Bank of the United States (USEXIM); Japan Bank for International Cooperation (JBIC); Export Finance and Insurance Corporation (EFIC) of Australia; Servizi Assicurativi del Commercio Estero (SACE) from Italy; Export-Import Bank of China (CEXIM); and Nippon Export and Investment Insurance (NEXI), as well as a group of commercial banks, collectively referred to as the 'Lenders' or 'Lender Group'.

The overall role of RINA as the IESC within the PNG LNG Project is to evaluate conformance with commitments made by EMPNG within their Environmental and Social Management System (ESMS) including health and safety. The benchmark for the ESMS is now the Production Environmental and Social Management Plan (ESMP), supplemented by the associated environmental and social support plans, also including associated commitments made within the ExxonMobil Operations Integrity Management System (OIMS) and the documents associated with biodiversity management.

The IESC Terms of Reference (TOR) requirements refer to an evaluation of Project "compliance", whereas the reporting requirements of the TOR state that the reporting will include a "list of non-conformance findings". Within this report, the terms "compliance" and "conformance" are considered to be equivalent. In general, issues to be resolved are identified as non-conformances, but one of the requirements of the IESC is to identify any "material non-conformances" within the context of the Common Terms of Agreement (CTA). The IESC believes that a "material non-conformance" within the context of the CTA would need to be a Lender decision, but for the purposes of this report a potential "material non-conformance" would be a Level III non-conformance or repeated Level II non-conformances as defined in the Section 2 Issues Table. It is emphasized that a Level III non-conformance is not necessarily equivalent to a "material non-conformance" and that extensive discussions among EMPNG, Lenders and the IESC would need to take place before any "material non-conformance" is identified.

The IESC's review has included the environmental and social (E&S) and health and safety (H&S) management activities of EMPNG. This report is based on the second field visit undertaken since February 2019 due to various international restrictions imposed by the Papua New Guinean Ministry for Immigration and Border Security and uncertainties related to the outbreak of the Coronavirus (COVID-19) and is the reason why this report is for the 20th field visit, but the 23^d review. The review was based on the documentation provided to the IESC as well as field observations.

An activity that does not fall under the category of "monitoring" yet is within the scope of the CTA is a requirement for the IESC to certify certain non-Project operations (section 14.2(m)(iii) of CTA). Since the last review in February 2023, there have been no requirements for the IESC to prepare any supplemental certifications.

1.1 PRODUCTION OPERATIONS OVERVIEW

2023 was another good year for production, with 8.5 million tons (MTA Eq) and 113 LNG cargoes loaded. It should be recalled that the project was defined to the IESC in 2009 to be a development of 6.3 MTA Eq, so current production continues to be significantly more than originally projected. Figure 1.1 depicts 2023 LNG production. Although production from Hides has declined within projections, this decline was offset by increased associated gas production and production optimization and 2023 set some production records:

- ✓ Record Naphtha production day (July), week (June), month (June) and 13 naphtha cargoes (new annual record);
- ✓ Record CPF gas production day (August), week (August), month (June); and
- ✓ Record LNG Yield day (April).

Angore well drilling is nearing completion and rig demobilization is anticipated to be underway before the completion of this report. The drill rig will be moved to Wellpad F along the Hides spinline, and drilling will start at Well F2 to prove the Hides hanging wall reservoir and deepen to test the Hides footwall. The Angore pipeline to the HGCP is complete and First Gas is scheduled for Q3 2024.

The effort associated with the recovery from the M = 7.5 February 2018 earthquake is still ongoing. Since the time of the last IESC visit the budget has increased from \$560 million to \$583 million and costs as of the end of 2023 were \$476 million. Work at the HGCP is essentially complete with the last task remaining to repair the fire water tank and the remaining work is along the pipeline, forecasted for completion in May 2025. Remaining work for 2024 includes the completion of pipeline protection at the KP 65.9 river crossing, completion of the highly complex works

at KP 76, remobilization to complete works at KP 86, and mobilization to KPs 98.9 and 100. Some of the remaining work is technically difficult in areas with difficult access.

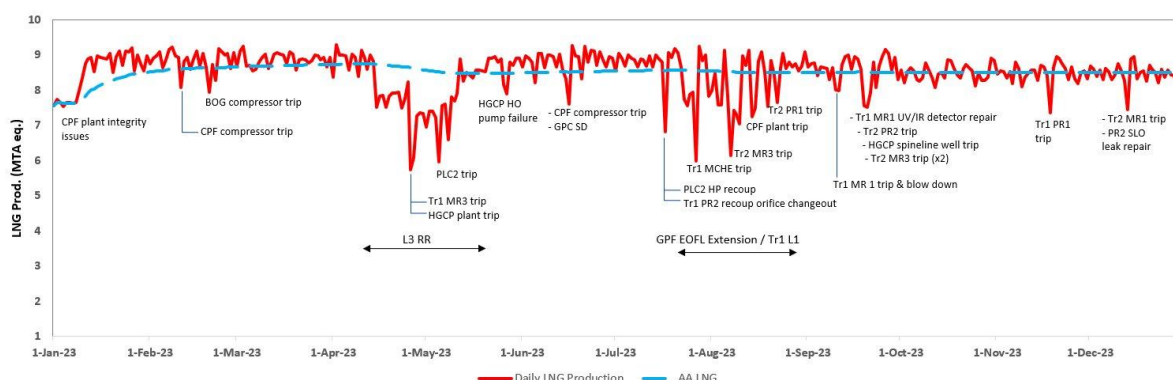


Figure 1.1: 2023 LNG Production

1.2 SOURCES OF INFORMATION

The main sources of information used to prepare this 20th IESC field trip report are primarily those provided by EMPNG, but RINA also obtained information by means of interviews with local stakeholders during the field visit in PNG as well as EMPNG employees. The information provided by EMPNG has included presentations made to the IESC and additional documents consistent with the trip schedule provided in Appendix A.

1.3 REPORT ORGANIZATION

Subsequent sections of this report are organized as follows:

- ✓ Section 2.0 – Issues Table;
- ✓ Section 3.0 – Environmental and Social Management;
- ✓ Section 4.0 – Pollution Prevention;
- ✓ Section 5.0 – Biodiversity and Ecological Management;
- ✓ Section 6.0 – Social;
- ✓ Section 7.0 – Labor and Human Resources;
- ✓ Section 8.0 – Health and Safety; and
- ✓ Section 9.0 – Cultural Heritage.

The basic findings of the review are presented in the form of observations, comments and recommendations that are generally described according to topics within each section. Significant findings are summarized in the Issues Table provided in Section 2.0.

2 ISSUES TABLE

This Chapter tabulates a summary of the non-conformances raised in this report, consistent with our TOR as discussed in Section 1.0. The Table has been structured to provide a color-coding for strict non-conformances raised during each site visit, as well as IESC observations for situations that if left unattended could result in a non-conformance. Non-conformance is referenced with respect to Project commitments as included in applicable Project documents and with respect to on-going compliance with Applicable Lender Environmental and Social (E&S) Standards. As noted in Section 1.0 of this report, “Applicable Lender Environmental and Social Standards” means the environmental and social standards applied by the Loan Facility Lenders to the Project in the form attached to Schedule H-1 (Environmental and Social – Applicable Lender Environmental and Social Standards) of the CTA. The nomenclature of the color-coded categorizations is assigned based on non-conformance levels similar to the non-conformance levels defined in the ESMP, somewhat revised to reflect the point of view of the IESC and to address that certain non-conformances need to be framed in the context of the Applicable Lender E&S Standards. The following descriptions are provided:

- ✓ **High:** Level III critical non-conformance, typically including observed damage to or a reasonable expectation of impending damage or irreversible impact to an identified resource or community and/or a major breach to a commitment as defined in Project documents or the Applicable Lender Environmental and Social Standards. A Level III non-conformance can also be based on repeated Level II non-conformances or intentional disregard of specific prohibitions or Project standards. In some cases, Level III non-conformances or repeated Level III non-conformances may, but not necessarily, represent a material non-compliance with the CTA. This would be decided on a case-by-case basis;
- ✓ **Medium:** Level II non-conformance representing a situation that has not yet resulted in clearly identified damage or irreversible impact to a sensitive or important resource or community but requires expeditious corrective action and site-specific attention to prevent such effects. A Level II non-conformance can also represent a significant breach of a commitment, or a risk of a significant breach if not expeditiously addressed, requiring corrective action as defined in Project documents or Applicable Lender Environmental and Social Standards. A Level II non-conformance can also be based on repeated Level I non-conformances;
- ✓ **Low:** Level I non-conformance not consistent with stated commitments as defined in Project documents, but not believed to represent an immediate threat or impact to an identified important resource or community. A Level I non-conformance can also represent a minor breach of a commitment requiring corrective action as defined in Applicable Lender Environmental and Social Standards; and
- ✓ **IESC Observation:** A potential non-conformance situation that could eventually become inconsistent with stated commitments as defined in Project documents or the Applicable Lender Environmental and Social Standards.

Item ID	Site Visit	Closing Date	Description	Non-Conformance	Reference	Status	Comments/Report Reference
Environmental and Social Management System							
M22.1	Feb '23		IESC's impression is that for various reasons, EMPNG is not fully staffed for EHS compliance.	Observation	Overall ESMS	Open	At the time of the current IESC field visit the vacancies identified in February 2023 visit had been filled, but over the course of 2023 the lack of staff did impact the Project's ability to comply with ESMP commitments, especially with respect to biodiversity. From the IESC perspective, EMPNG needs more time to demonstrate that current staffing is adequate to fulfill Project commitments before this topic can be removed as an issue.
M22.2	Feb '23		Associated facilities are not being stewarded consistent with the commitment in the ESMP for Production that these facilities would be managed consistent with the practices developed during construction.	Medium – Level II	ESMP - Production	Open	IESC did not encounter evidence that EMPNG had made any effort to identify associated facilities or undertake a risk assessment to at least identify if there are any activities undertaken by companies dependent on EMPNG (primarily LANCOS) that represent a risk to EMPNG.
Environmental Issues – Environmental Management							
M19.1	Desktop review Feb '20 Modified Feb '22 Modified Feb '23		Groundwater monitoring at the HWMF at Kopeanda indicates that waste management operations are impacting groundwater (added 2/2023).	Low – Level I	Upstream EMP Section 9	Open	2022 and 2023 sampling of leachate and groundwater leaves no doubt that groundwater at the HWMF at Kopeanda is being impacted by the landfill or reed bed. A risk assessment including a fate and transport analysis is still needed, together with a commitment to continue long-term monitoring. This would be a Level II NC except for the likelihood that the groundwater contamination does not have significant environmental or social impact.
Environmental Issues - Biodiversity and Ecological Management							
M20.1	Desktop review Feb 2021		<p>Freshwater ecology and protected area enhancement:</p> <p>As the Project is located within a legally protected area, it has additional responsibilities to ensure tangible benefits to protection of the area, for example carrying out research needed for it to meet its conservation aims.</p> <p>The Project has undertaken over a decade of solid foundational work with the Lake Kutubu WMA Committee as part of the mid-elevation offset program. However, there is a need to consider the gaps in alignment between the approach taken for offsetting residual impacts on specific biodiversity values versus the requirement to promote and enhance the conservation aims of the protected area within which the Project is located. The Project's intentional exclusion of an updated scientifically robust aquatic biodiversity survey in the Lake Kutubu WMA in 2017, to support the preservation of the freshwater ecosystem, is not in alignment with primary conservation aims of the protected area.</p>	Low – Level I	IFC PS6 Para.11	Open	<p>An updated freshwater biodiversity assessment aligned with the other components of the 2017 PMA3 biodiversity surveys would have provided a comprehensive snapshot of species diversity and abundance, as a basis for the revised WMA Management Plan conservation objectives.</p> <p>The IESC recommends the Project plan to include an updated appropriate assessment of the Lake Kutubu freshwater ecosystem via a PMA3-type biodiversity assessment survey as part of the foundation for enhancing the conservation aims of the WMA. This will provide up to date, PMA-3 comparable data on biodiversity values for input to the development of a Lake Kutubu WMA Management Plan for the protected area.</p> <p>(Report reference for background detail: Offset component 4 in Section 5.2.2.3)</p>

² In order to better track project progress and accomplishments, the issues identified during each site visit are identified by a letter (M) and number (e.g. M1) that identifies the site visit (e.g.: M1 for the first visit, M2 for the second visit, etc.) followed by a digit that identifies the specific issue found (e.g. M22.1 refers to issue 1 found in visit 22).

Item ID	Site Visit	Closing Date	Description	Non-Conformance	Reference	Status	Comments/Report Reference
M20.2	Desktop review Feb 2021		<p>Consequences of weed control challenges:</p> <p>As reported in previous IESC reports, access to key priority areas by the weed inspection and control contractors has been restricted. Security issues, the 2018 earthquake, and a lack of transportation for weed contractors to get to sites, have restricted the likelihood for effective, widespread weed inspection and control especially for Priority 1 weeds. Further security issues, lack of vector control personnel the COVID-19 pandemic and now earthquake recovery work all continue to mean that weed inspection/control is still hampered.</p> <p>Obviously, some of the challenges noted are outside of the control of the Project. However, the <i>consequences</i> of those challenges are that large parts of the Project's Upstream footprint, including priority ecosystem areas such as the Homa Benaria Ridge, weed inspection and control had been at a lower frequency than required)</p> <p>With regard to controlling Priority 1 weeds, the current situation is not consistent with stated commitments in the EMP objectives as presented in EMP Table 15-2 – weed exclusion and control is not occurring as required across all zones as stipulated. It is unclear whether the situation represents an immediate threat or impact to priority ecosystem areas. The IESC does not receive analyses of weed inspection/control findings or Project-induced weed distribution/abundance status relevant to closing this NC.</p>	Low: Level I	Upstream EMP	Open	<p>EMPNG should undertake an analysis of the weed inspection/control data of the Upstream area and present to Lenders:</p> <ul style="list-style-type: none"> ✓ Locations (distribution) of P1 weeds of key concern, currently compared to distribution during the PCS; ✓ Areas where P1 weeds are now so well established and persistent that repeated control is required or is proving difficult; ✓ Ecological consequences of P1 weeds remaining established in these areas e.g. any detrimental impacts on the ability of native species to thrive in their natural habitat; ✓ What adaptive management is necessary in the Project's approach? ✓ Outputs from EMPNG's Strategic Weed Control Review. <p>EMPNG needs to work with the weed inspection/control contractor to better resource the team, ensuring sufficient headcount and dedicated vehicles to access weed inspection/control sites as regularly as necessary to meet the requirements of the Upstream EMP i.e. to exclude and control P1 and P2 weeds.</p> <p>(Report reference for background detail: Sections 5.5.2.1 and 5.5.2.2)</p>
M21.1	Desktop review Feb 2022		<p>Project indirect impacts related to land use/land cover change:</p> <p>PMA-1 uses remote sensing to monitor forest loss, land use change and degradation in the Upstream Area as caused by impacts that are directly Project-related, indirectly Project-related (third party, induced), non-Project (third party, expansion of pre-existing activity), and/or natural change (e.g., landslide).</p> <p>The Project had not been classifying instances of Project-attributable forest loss and land use change/degradation accurately, where they could potentially be the result of indirect impacts. Only change related to direct Project impacts e.g. installation of new infrastructure, were being considered as Project-attributable.</p> <p>Local landowners have the right to clear their land but when this is in direct proximity to the pipeline RoW or infrastructure, and therefore access to those areas newly cleared may have been enhanced by the presence of the Project (as noted in the 2019 PMA3 survey report), this should be acknowledged and categorized accordingly.</p>	Observation	Biodiversity Strategy	Open	<p>EMPNG have now produced a set of Field Guidelines intended to assess Project-attributable impacts in a more consistent, repeatable manner.</p> <p>The database cataloguing all previous observations requiring follow-up inspection should now be reanalyzed according to the new guidelines. This will help the Project better understand any potential gaps in previous attribution analyses and ensure attributions of Project-related change (both direct and indirect) have been determined consistently.</p> <p>(Report reference for background detail: PMA1 in Section 5.2.2.1 of IESC report dated May 2022)</p>

Item ID	Site Visit	Closing Date	Description	Non-Conformance	Reference	Status	Comments/Report Reference
M21.2	Desktop review Feb 2022 Modified Feb 2023		<p>Plant pathogens: Dieback</p> <p>During 2015 - 2019 PMA-3 surveys, dieback was noted during transect work up on Hides Ridge. Dieback is caused by the plant pathogen, <i>Phytophthora cinnamomi</i>, and <i>Nothofagus</i> trees as occur on Hides Ridge are particularly susceptible.</p> <p>Although EMPNG took photos of the potential dieback and sent these for visual assessment by PMA3 team leaders, on the ground specialist surveys had not occurred.</p> <p>Studies have now commenced with field surveys and training undertaken during 2023 and visual observations reported. Some aspects of survey work are due to be completed in 2024, along with more detailed results, analysis and recommendations once further sampling and lab work is complete.</p>	Medium: Level II	<p>EMPNG's Dieback Infection Management Guidelines</p> <p>Upstream EMP Section 15.4 – 15.6</p> <p>Multiple PMA3 reports 2015 - 2021</p>	Open (escalated from an Observation to Level II in Feb 2023)	<p>The IESC acknowledges that studies have finally commenced during 2023.</p> <p>Further sampling, study and analysis are due to be undertaken, and the type of dieback determined (A1 or A2). Establishment of a suitable laboratory is necessary.</p> <p>Analysis should confirm whether adaptive management and active control measures should be implemented. If found to be A2, more stringent measures should be in place and/or re-evaluated, to prevent the movement of Type A2 (an introduced species) further into the priority ecosystem at Hides Ridge.</p> <p>(Report reference for background detail: PMA-3 in Section 5.2.2.1, and Dieback in Section 5.5.2.4)</p>
M22.3	Feb '23		<p>Hunting and feral dog predation:</p> <p>EMPNG's biodiversity survey specialists have noted increased prevalence of hunting and feral dog predation in the vicinity of the pipeline RoW and are observing reduced numbers of hunting-sensitive IUCN Threatened species around BAA2 survey sites.</p> <p>EMPNG have been developing questionnaires to use with communities, and these are due to be used during 2024, but the development of the work has taken too long considering the potential threat level associated with use of Project infrastructure and enhanced access.</p>	Observation		Open	<p>EMPNG needs to better understand the threats posed by hunters preferred use of Project infrastructure and enhanced access. The IESC was advised that the PMA3 study leaders have assisted with the revision of questionnaires for use during hunting surveys with communities.</p> <p>The PMA3 team will undertake hunting community surveys with relevant communities at both BAA1 and BAA2 sites during 2024.</p> <p>Provide results and an analysis on the threats and recommendations from the PMA3 study team, and information on the mitigation measures that EMPNG propose to implement.</p> <p>(Report reference PMA3 text in Section 5.2.2.2)</p>
M22.4	Feb '23		<p>Access controls:</p> <p>Access controls in situ are not in alignment with requirements as stated in the EMP, and the situation has continued for several years. During Q4 2022 and Q1 2023, Access Monitors have not been in place to record vehicles using Project roads, and report data for analysis.</p> <p>Observations made during the May 2024 visit have confirmed that current aspects of intended control measures as set out in the EMP are not in place at some locations and not clear in others. Some access controls have <i>never</i> aligned with those set out in the 2019 EMP (or previous versions).</p> <p>There have been no MoCs developed or passed to Lenders for these intentional, non-compliant occurrences.</p>	Medium: Level II (upgraded from an Observation May 2024)	Upstream EMP Section 17	Open	<p>In the first instance, again, EMPNG to provide a memo detailing how/when the physical access controls not yet meeting EMP requirements will be put into place.</p> <p>EMPNG should ensure that Access Monitors are back in position full-time and that full vehicle monitoring records are being submitted every day, as previously, and fully analyzed.</p> <p>EMPNG should amend control mechanisms so that they comply with the EMP and/or undertake MoCs to understand the implications of non-compliance with an appropriate adjustment to the EMP where deemed necessary.</p> <p>(Report reference Section 5.3.2)</p>

Item ID	Site Visit	Closing Date	Description	Non-Conformance	Reference	Status	Comments/Report Reference
M22.5	Feb '23		<p>Baseline weed mis-identification discrepancy</p> <p>EMPNG maintain that certain P1 weeds currently found along the RoW in areas where they were not previously recorded, were actually present prior to construction but were not correctly identified.</p> <p>Due to a number of P1 weeds now being found in areas where they were originally not observed there is a discrepancy that should be resolved in the interests of transparency and clarity.</p> <p>The EIS significance assessments related to weed impacts were based on planned mitigations being in place and implemented successfully e.g. limiting vehicular access along RoW and project roads. If implementation of mitigation measures have not been successful, the significance is therefore greater. This should be recognized, and the mitigation approach reassessed where necessary.</p>	Observation	Upstream EMP Section 17	Open	<p>The IESC recommends EMPNG consider an independent specialist evaluation and verification of baseline PCS and early weed audits versus more recent records of weed distribution, abundance and diversity.³</p> <p>The IESC believe an independent review of this data, of stated inconsistencies, of learnings, of risks/impacts related to construction/management of a long linear infrastructure in PNG, etc. is warranted. Lenders require assurance that potential impacts predicted in the EIS have not come to fruition and that the Project's mitigation approach is appropriate.</p> <p>(Report reference Section 5.5.2.2)</p>
M23.1	May '24		<p>Upper elevation biodiversity offset:</p> <p>The IESC recognizes the importance of a solid foundational framework for community-based conservation in the offset program, however with the loss of personnel in the Biodiversity Team over the last few years, the Team has lost momentum in program implementation.</p> <p>As the upper elevation zone has the largest Project footprint, and the Biodiversity Strategy and therefore offset program is now over 13 years old, Lenders would have expected EMPNG to have made much more progress in development of an offset program here.</p> <p>It is still not clear which biodiversity values EMPNG intends to compensate for at the upper elevation zone, how this will be accomplished and monitored, timeframes, interim/final targets and the conservation outcomes that will be delivered.</p>	Medium Level II	Biodiversity Strategy & PS6 Para 8 & 10	New	EMPNG should prepare an offset program to achieve both Biodiversity Strategy and NNL requirements, presented in a clear, timebound offset management plan targeted specifically for the upper elevation zone, for Lender/IESC approval.
M23.2	May '24		<p>Plastic litter at worksites:</p> <p>The extent of litter, primarily plastic litter, observed around worksites was unacceptable.</p> <p>EMPNG is operating in Critical and Natural Habitat, and has the responsibility to not significantly degrade this. Changes in behavior must happen as a priority.</p>	Low: Level I	PS6 Para 7 & 8, 9 & 10		<p>EMPNG needs to undertake a prioritized campaign to teach people not to discard their personal waste items.</p> <p>Avoidance of littering should be mandatory, and monitoring efforts stepped up to ensure practices improve.</p> <p>Alternative materials to plastic should be investigated for items typically discarded.</p>

³ EMPNG disagree with IESC opinion, and state that BRC contracted to undertake the weed audits currently are sufficiently independent.

Item ID	Site Visit	Closing Date	Description	Non-Conformance	Reference	Status	Comments/Report Reference
Social Issues – Labor Management							
M23.3	May '24		It is IESC's understanding that workers do not have the possibility to submit anonymous grievances. This should be guaranteed as defined in paragraph 20 of IFC PS 2.	Low: Level I	IFC PS2 Para 20	Open	IESC recommends EMPNG to address this issue by (i) implementing on its online platforms the possibility to submit an anonymous grievance, (ii) adequately informing the workforce on such matters. (Report reference Section 7.2.3)

3 ENVIRONMENTAL AND SOCIAL MANAGEMENT

3.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

The Environmental and Social Management System (ESMS) is a mature and active System. EMPNG continues to operate within their Production Environmental and Social Management Plan (ESMP) implemented through three Environmental Management Plans and seven Social Management Plans. There have been only minor changes to the ESMS since the last IESC report. An example is a minor change to update the Waste Management Protocol to include specific measures for wastewater storage especially in anaerobic conditions to prevent H₂S development. A more significant change was the addition of the “Potable Water Safety Management Plan” which appears to encompass procedures that have always been followed but compile procedures in a single document, still maintaining WHO standards.

3.2 ORGANIZATION AND STAFFING

At the time of the current IESC field visit the vacancies identified in February 2023 visit had been filled, but over the course of 2023 the lack of staff did impact the Project’s ability to comply with ESMP commitments, especially with respect to biodiversity. This subject is discussed in greater detail in Section 5.2.1.1. We have still seen that EMPNG’s senior staff are trying to do too many jobs and that there is not enough support staff. From the IESC perspective, EMPNG needs more time to demonstrate that current staffing is adequate to fulfill Project commitments before this topic can be removed as an issue.

3.3 MANAGEMENT OF CHANGE

Since the last IESC reporting period there have been no Lender-Reportable (Class II) MOCs. At the time of the last IESC field visit it was expected that an MOC would be made for changes associated with pipeline river crossings, but the crossing activities completed at KP 61 and 65 were able to be executed in accordance with the EMP, so no MOC was ultimately required.

3.4 INCIDENTS

EMPNG continues to monitor Environmental Compliance Incidents (ECIs) and EMP Non-conformances (NCs), which indicates that the Environmental Management System is healthy. There were two ECIs recorded in 2023 (Figure 3.1). The two ECIs did not result in major environmental damage but did warrant a reexamination of procedures.

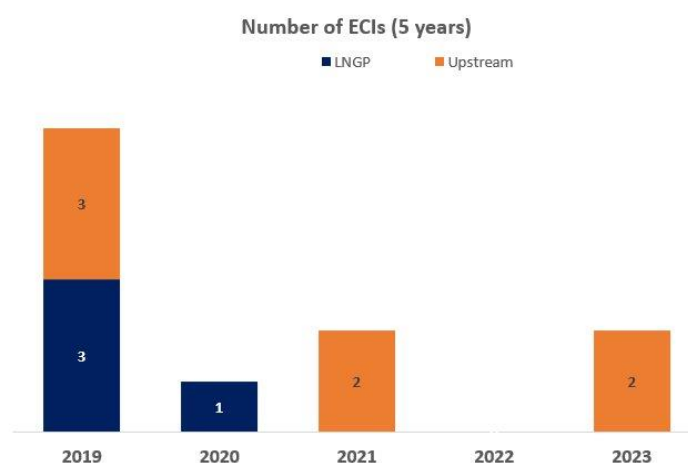


Figure 3.1: Environmental Compliance Incidents

The first incident occurred in March 2023 during drilling at Angore Wellpad C when water and foam under high pressure was released from the Blooie pipe (the discharge pipe from the air/foam drilling) into the surface water regime. A large mass of foam was present for several days and erosion was observed at the channel receiving discharge from the blooie line. Wells at both Hides and Angore start by drilling through the Darai Limestone which is karstic (full of fissures and caves) with an air-foam mixture, and 100% lost circulation is expected. Because there

is always the possibility that the foam will blow out at the surface through a cave and impact local communities (which has happened), contingency plans are in place to inform local communities of the possibility of foam and what the Project will do to mitigate any inconvenience, such as the temporary loss of potable water. The loss of foam through the blooie line with groundwater under high pressure was not expected and corrective actions were implemented to remediate the eroded surface and enhance sediment and erosion control measures. A freshwater ecology assessment is planned for post drilling.

As drilling is conducted with a non-toxic foam and this type of event was something for which a contingency plan was in place, at the time of the event it was not perceived to be an incident that needed to be reported to the Conservation and Environment Protection Authority (CEPA) or the Department of Petroleum & Energy (DPE). The problem was that foam releases are visually dramatic (Figure 3.2), and images of the event were viewed by the Regulators via social media. CEPA and DPE then requested a site visit, during which they were satisfied with the site setup, event discussions and management of related community grievance. The lesson learned is that it is necessary to manage incidents with the *perception* of environmental impact as if it were actual significant impact. The Regulators should have been informed at the time of the incident.



Figure 3.2: Foam Released from Angore Wellpad C in March 2023

The second incident took place in June 2023 when about 1,500 sq meter of primary forest was inadvertently cut by a 3d party contractor engaged to carry out the HV Cable splice repair scope along the Hides Spine that was impacted by the 2018 Earthquake. Two long-term biodiversity regeneration monitoring plots were also removed by this action. The contractor was allowed to cut primary forest on the basis of permission given by a field environmental representative. The problem was that EMPNG has a land access procedure that was not followed. An environmental and social review should have been conducted before the contractor was given permission and it is likely an alternative solution to the cutting of primary forest would have been found. The damage was not as significant as the procedural lapse.

3.5 ASSOCIATED FACILITIES

A topic reviewed in detail in the last IESC report is the identification and management of an “Associated Facility.” As described in the 2006 Performance Standard 1 followed by EMPNG: “Associated Facilities that are not funded as part of the project (funding may be provided separately by the client or by third parties including the government), and whose viability and existence depend exclusively on the project and whose goods or services are essential for the successful operation of the project.” As can be inferred from this description, Performance Standard 1 is not well written regarding Associated Facilities, which is why ExxonMobil and IESC worked out an acceptable procedure that is part of your Production ESMP.

The issue of Associated Facilities was assigned a Level 1 Non-compliance in the last IESC report. What we expected to see during this visit was that EMPNG would have identified potential associated facilities, reviewed their operations and management, and undertaken a risk assessment to determine if EMPNG needs to exert

influence to ensure the operations are undertaken safely and in reasonable compliance with environmental, social, and labor standards. This effort was not undertaken.

Aside from the fact that it is a Production ESMP commitment to identify and influence management of Associated Facilities, it is apparently a good time to review why it is a requirement of PS1 and why it is important to the Project. Aside from the fact that the mismanagement of an Associated Facility can have human or environmental impact, the main driver to the identification and management of Associated Facilities is your *reputation* and by association the Lenders. Examples:

- ✓ *Child or forced labor:* What if one of the local Lancos whose work is primarily with you was discovered to have child or forced labor by an NGO or by a news reporter? The headlines might read “ExxonMobil caught employing children” and something like that could quickly become viral;
- ✓ *Environmental accident:* What if a Lanco working for you had a major environmental accident like a big spill into a local stream? The headlines might read ExxonMobil has accident that causes major pollution to local community in the PNG Highlands.”;
- ✓ *A workplace or community death:* If one of the backhoes had toppled over the edge of the highwall you were using the last IESC visit (use currently discontinued), the headlines might read “Fatality cause by unsafe conditions at an ExxonMobil quarry.” If operations undertaken improperly at a Lanco quarry caused a slope failure that caused deaths in a local community, ExxonMobil would be blamed and targeted as the “deep pocket.” A similar event already occurred in 2011 with the Tumbi Landslide when ~24 people were killed. The landslide was at a location where your EPC contractor had temporarily operated a quarry. Public perception (at an international level) was that this was your fault and you paid ~\$2 million in compensation, and one of your Lenders, U.S. ExIm Bank, had to testify in U.S. Congress regarding the nature of this accident.

Your Production ESMP states: “*The approach to managing the risks and impacts associated with the operation of these facilities will be the same as that adopted for the construction phase, that is, commensurate with risk and impact, as well as the degree of influence that can be exerted on the third-party operator by the Project.*” IESC expects to see progress in the identification and management of Associated Facilities at the time of our next field visit.

4 POLLUTION PREVENTION

4.1 WASTE AND WATER MANAGEMENT

4.1.1 Project Strategy

EMPNG's objectives are to apply the waste management hierarchy (wastes will be preferentially and sequentially avoided, reduced, reused, recycled or recovered) and to dispose of all wastes at EMPNG facilities and approved third party facilities only. EMPNG's objectives are also to avoid significant impacts associated with the release of pollutants to surface water and groundwater and meet applicable discharge criteria. These applicable discharge requirements are those tabulated in Chapter 9 of the Upstream and LNG Plant EMPs.

4.1.2 Observations

4.1.2.1 [Waste Management](#)

Upstream

Overall, there has been an increase in Upstream waste generated in 2023 due to the large volume of treated drill cuttings from HQ1/Angore and this volume reflects that the total amount of waste landfilled in 2023 was nearly double that of 2022. (Figure 4.1).

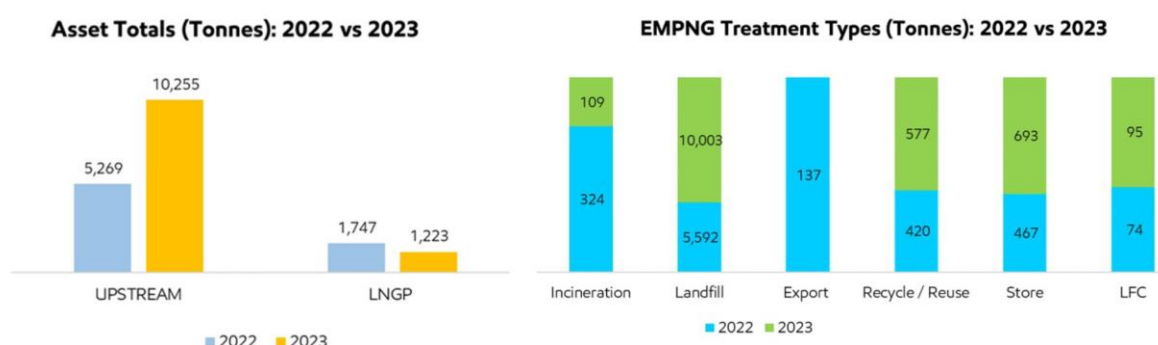


Figure 4.1: Total Project Waste Disposal 2022 and 2023

At the time of the last IESC visit the liner at the HWMF was observed to have been exposed unprotected to the elements for a long time and a recommendation was made to cover the liner for protection, although as presented in Section 4.1.2.2, the liner may already be compromised. The landfill liner has been covered with a geosynthetic and this issue is resolved (Figure 4.2).

The other issue identified at the Kopeanda WMF at the time of the last IESC visit was the improper ventilation of the MediBurn incinerator used to burn small amounts of medical waste and the carcasses of captured cane toads. Although an attempt was made to install appropriate ventilation, the new chimney failed, and the situation remains the same as encountered in February 2023. IESC questions whether there is any communication between the environmental and occupational health and safety groups as we would have thought that an occupational health and safety review would have flagged this change as a priority action.



Figure 4.2: Geosynthetic Cover over Landfill Liner at HWMF

LNG Plant

At the LNG Plant waste volumes have decreased reflective of the range of base operations and continued identification and use of qualified third-party waste management facilities. Third-party facilities previously used include the Total Waste Management (TWM) facility in Roku with capabilities to receive various restricted and non-restricted wastes, for export as well as for onsite incineration and Pasifika Eagle Chemicals approved to receive various restricted wastes, primarily for export with no capacity for onsite disposal. Since the last IESC visit a new facility, Carbon Recycling PNG, in Lae has been approved to receive and recycle waste oil only. Waste management at the LNG plant utilizes a landfill at the location of Construction Landfill C but expects to transition using a new landfill nearly completed at the TWM facility (Figure 4.3).



Figure 4.3: TWM Landfill – Close to Accepting Waste

IESC again visited the TWM facility during this field visit and found it to be professionally managed and working to develop state-of-the-art waste management solutions for PNG industry and not just EMPNG. IESC considers TWM to be a good partner for managing EMPNG's waste streams.

4.1.2.2 Water Management

Wastewater continues to be well managed. At the LNG Plant the Unidro STP was commissioned February 2023 and after 90 days stabilization was operational on 06 May 23. It now supplements the Toray STP, and both had good operations in 2023. Upstream STPs had good performance with the exception of a minor excursion of Ammonia-N from the HGCP plant due to clogging of the impeller sludge pump corrected by cleaning the impeller and returning it to operation. Surface water discharges have been compliant, except for the March 2023 Angore environmental incident with the foam discharge, which had high TSS and turbidity.

Groundwater monitoring around the HGCP and the LNG Plant continues to show no evidence of groundwater contamination. Conversely, at the Hides Waste Management Facility (HWMF), evidence of infiltration of leachate from the facility has been recorded since 2014. The data collected from the new wells were not conclusive in 2021, but the 2022 and now the 2023 data confirm that the landfill and/or the reed bed is a source of groundwater contamination. Testing of the leachate from the landfill highlights the presence of high ammonia-nitrogen, manganese, iron, barium, and potassium. The testing for these parameters (averaged over all of the testing from 2023) shows that there is a significant difference between upgradient and downgradient concentrations of the anomalous leachate parameters similar to what was shown in the last IESC report showing the 2022 data (Figure 4.4).



Figure 4.4: Average 2023 Concentrations of Main Leachate Parameters in Groundwater at HWMF

The IESC recognizes there are no users of groundwater in the neighborhood of the HWMF and that impact to the nearby Tagari River is probably negligible. At this stage, as previously recommended, the risk of the contamination

of the Tagari River should be quantified as part of a risk assessment undertaken with a fate and transport analysis. The risk assessment should be followed up with a commitment to undertake long-term monitoring to verify the expected results of the risk assessment with the note that closure of the landfill with an impermeable cap will probably solve the problem.

4.2 HAZARDOUS MATERIALS MANAGEMENT AND SPILL PREVENTION

4.2.1 Project Strategy

EMPNG's objectives are to prevent spills of hydrocarbons and chemicals and to respond effectively to spills should they occur. EMPNG also has standards for materials management where objectives are to avoid significant impacts associated with the procurement and use of raw materials and to use materials that are less hazardous or otherwise preferable from an environmental perspective, where practical.

4.2.2 Observations

Hazardous materials management practice is undertaken consistent with GIIP. Spills continue to be consistently recorded and their causes investigated, and procedures developed to minimize future spills. There was a total of 39 small spills in 2023 (predominantly hydraulic fluid) with none designated as recordable (>1 bbl). None of these spills had significant environmental consequences.

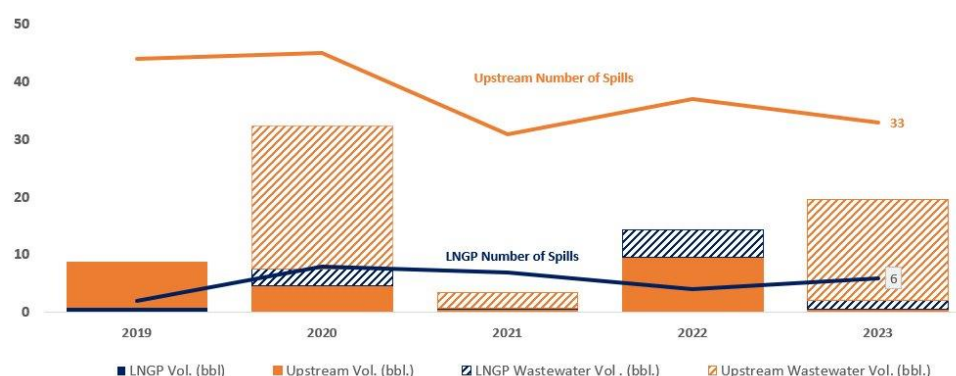


Figure 4.5: EMPNG Spill Performance – Volume (bbl) and Frequency

4.3 AIR QUALITY AND NOISE

4.3.1 Project Strategy

EMPNG's objectives are to avoid significant impacts associated with the release of pollutants to air and meet applicable emissions and air quality criteria. Requirements for noise control are those identified in the IFC General EHS Guidelines.

4.3.2 Observations

Substantial effort is being placed in the reduction of flaring. Flaring continues to be reduced at both the LNG Plant and HGCP and 2023 set the record for lowest amount of flaring due to both ongoing flare reduction efforts and a reduced amount of downtime (Figure 4.6). This effort supports ExxonMobil's 2030 Emission Reduction Plan (ERP). The next round of stack emissions testing is planned for Q4 2024.

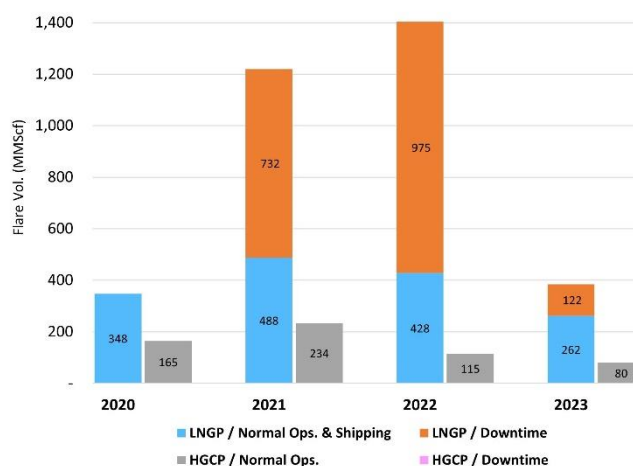


Figure 4.6: Flaring 2020 - 2023

EMPNG also tracks emissions in terms of greenhouse gases (GHG) and is actively attempting to reduce emissions as noted in the reduction of flaring. GHG Reduction Projects completed so far include:

- ✓ LNG Plant: Dynamic Matrix Controller automation to control fractionation level;
- ✓ LNG Plant: Install new temp controller to reduce excess LPG to flare;
- ✓ HGCP: Well shut-in automation on P/L Compressor.

As shown on Figure 4.7 most GHG emissions originate from the turbines at the LNG Plant. Figure 4.8 shows that GHG emissions have stabilized on an intensity basis (tons GHG per 100 tons of production) but overall GHG emissions were less in 2023 than in any of the previous five years. IESC is not in a position to evaluate the efficiency of the various systems producing emissions but has been informed by the Independent Technical Consultant (ITC) that they have world-class efficiency.

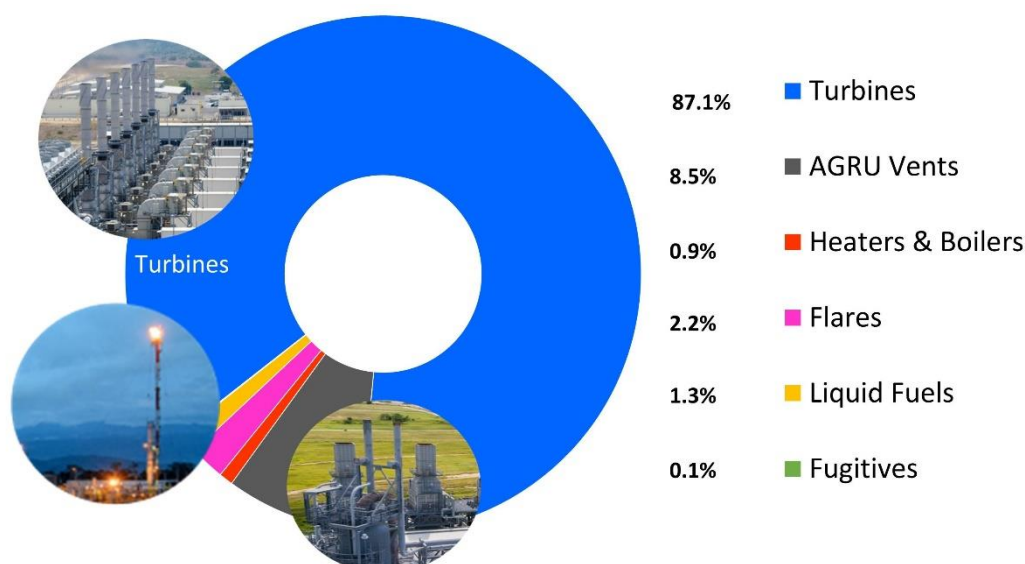


Figure 4.7: 2023 Project GHG Emissions by Component

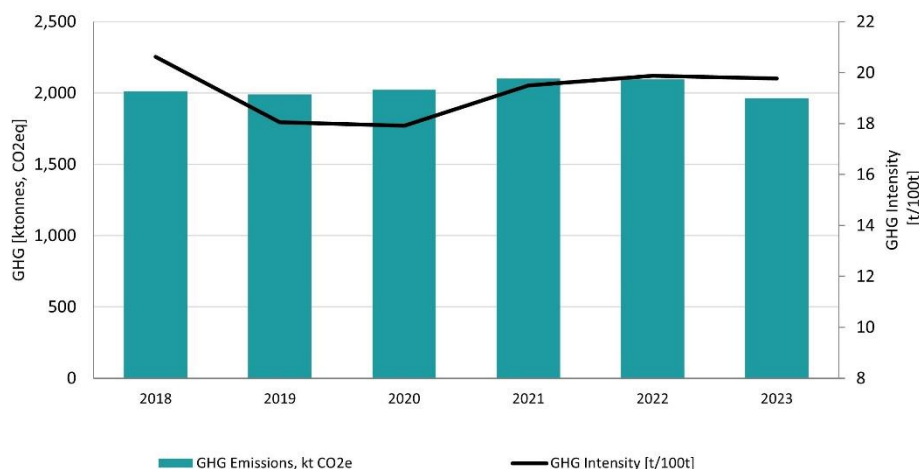


Figure 4.8: Project GHG Emissions – Gross Operated Basis

EMPNG is continuing to evaluate emission reduction opportunities consistent with ExxonMobil's 2030 Emission Reduction Plans and Near Zero Methane by 2050 ambition.

Noise monitoring was undertaken in 2023 with no problems reported to the IESC by EMPNG. Nevertheless, a noise impact assessment was undertaken by Tetra Tech Coffey in 2023 for the current operations at the LNG Plant location on behalf of ExxonMobil PNG Antelope Limited (EMPNGA) that did identify issues with noise. This study identified that the noise emissions resulting from the existing (normal) operation of the LNG Plant exceed the Environmental Permit EP-L3(210) during the nighttime at the perimeter fence line, which is the point of compliance for the Permit. However, where the noise limits are applied at the Noise Sensitive Receptors (NSR) in line with WHO and IFC / World Bank Guidelines, the noise limit is predicted to be achieved for existing (normal) operations. This prediction has to be made on the basis of modelling as actual noise measurements at NSRs exceed WHO and IFC / World Bank guidelines for reasons unrelated to plant operations. The Tetra Tech Coffey study recommended that EMPNG solicit a change to the Environmental Permit whereby the point of compliance would be the NSRs. EMPNG stated during the IESC Closeout meeting that CEPA has accepted this change to the Permit.

4.4 EROSION AND SEDIMENT CONTROL

4.4.1 Project Strategy

EMPNG's objectives are to control significant erosion and prevent sedimentation of surface waters.

4.4.2 Observations

The effort associated with the recovery from the M = 7.5 February 2018 earthquake is nearing completion. Remediation efforts with Earthquake Recovery (EQR) are well advanced with \$476 million spent out of a budget of \$583 million, \$23 million more than the budget at the time of the last IESC field visit. Repairs have been performed at three major areas:

- ✓ Hides (HGCP, Wellpads and Spine) where Phase 1 repairs are complete; Phase 2 minor scopes are complete with only the fire water tank repair still pending but expected to be completed in 2024;
- ✓ Komo Airfield Phase 1 where Phase 1 repairs are complete and the decision to start Phase 2 will not be made until a decision is made regarding if the full runway will be needed for future project work;
- ✓ Pipeline Right-of-Way (RoW) – ongoing.

Several remediation sites along the pipeline route were looked at from a helicopter tour with excellent work observed related to slope stabilization. These ROW repairs are technologically challenging through the use of micropiles, drainage improvements, and reinstatement. Ongoing work in 2024 includes:

- ✓ Completion of pipeline protection works at river crossing KP 65.9;
- ✓ Completion works at KP 76 high complexity repair site;

- ✓ Re-mobilization to KP 86 and complete works; and
- ✓ Mobilization to KP 98.9 and KP 100.

Pipeline ROW work is estimated to be completed in May 2025.

With respect to erosion and sediment control, IESC at the time of the February 2023 visit was able to report major success stories, especially at the Komo airfield. During this IESC visit, the airfield was revisited, as was the area of the HGCP and around Angore. Komo and Hides both look excellent, the result of good engineering, construction, and Mother Nature adding a lot of stabilizing vegetation. Angore suffered the incident with the blowout of water and foam from the Wellpad C blooie pipe, but the area has recovered, and the erosion and sediment control system generally performed well during the release.

On this trip we looked at numerous points along the pipeline ROW, in particular along portions of the pipeline ROW we had not visited in the field for many years in the Gobe – Moro area with erosion and sediment controls working well. Mother Nature has also played a big role in preventing erosion along the ROW. Figures 4.9 and 4.10 show before and after images of the pipeline ROW in the Moro – Gobe area.



Figure 4.9: ROW in Kikori Delta Area



Figure 4.10: ROW near Heartbreak Hill (~KP 170)

5 BIODIVERSITY AND ECOLOGICAL MANAGEMENT

5.1 INTRODUCTION

This section provides a record of IESC Observations and Recommendations associated with EMPNG's ecological management (terrestrial, marine and freshwater) including: the ecological monitoring of areas potentially impacted by the project to ensure the Biodiversity Strategy is being adequately implemented; the planning and implementation of the biodiversity offset program (to address those residual impacts remaining after impact avoidance and mitigation); the reinstatement and re-vegetation of areas cleared by the Project, including the Right-of-Way (RoW), camps, quarries, etc.; the management of issues related to invasive species, pests and plant pathogens (including importation quarantine management); and the avoidance of project-related induced access through the construction/retention of roads and the RoW corridor.

The whole Upstream Project area is deemed to be Critical Habitat, in accordance with IFC Performance Standard 6 (2006). EMPNG's overall strategy for biodiversity and ecological management is described in the Biodiversity Strategy and both Production-phase EMP's and associated documents.

Records from the EIA baseline studies and the Pre-Construction Surveys (see previous IESC reports for background) serve to establish the ecological conditions prior to any ground clearance or infrastructure development. These records include information on the presence of weeds, and the locations of ecological sensitivities such as (but not restricted to): pinnacles that contain bat colonies; potential Bulmer's fruit bat (*Aproteles bulmerae*) colonies; bird-of-paradise and bowerbird display grounds and trees; large individual trees (>1m diameter breast height); areas of Pandanus swamp forest; swamps in sinkholes less than 50m deep on Hides Ridge; and Nothofagus (beech) forest that require special hygiene measures (due to risk of dieback as caused by pathogens such as *Phytophthora cinnamomi*). These detailed records were compiled into Registers (i.e. Focal Habitats Register and Weed Register), and information on existing and ongoing ecological condition are being collected through continuing monitoring studies.

5.2 BIODIVERSITY STRATEGY AND IMPLEMENTATION

5.2.1 Project Strategy

EMPNG's commitment is to safeguard biodiversity in areas where the company operates and in particular, the biodiversity values in the Upstream area with this being deemed Critical Habitat. The Biodiversity Strategy was developed to guide the long-term management of terrestrial and freshwater biodiversity within the Upstream area. The Strategy provides an overview of EMPNG's overall approach to mitigating impacts on biodiversity in alignment with the avoid, reduce, remedy, and offset mitigation hierarchy. The goal of the Strategy is to retain the biodiversity values of the Upstream Project Area on a regional scale for the long term. To achieve the overall goal, EMPNG's objectives are to:

- i. maintain the intactness of the Upstream Area as a whole;
- ii. conserve priority ecosystems;
- iii. protect focal habitats; and
- iv. identify, measure and offset significant residual impacts.

In order to achieve these objectives, avoidance, mitigation and monitoring of biodiversity values takes place at three levels:

- ✓ the large scale, which is the entire Upstream Project Area – biodiversity values at this scale include extensive intact forest, high levels of flora and fauna diversity and endemic species, unique assemblages of species, species of conservation concern, and biodiversity of importance to local communities;
- ✓ the medium scale, which is represented by particularly valuable areas referred to as 'priority ecosystems', including forests in the Hides Ridge and high-altitude Homa-Benaria Ridge areas, the Lake Kutubu area and forests in the Juha area; and
- ✓ the small local-scale, which are sensitive habitats referred to as 'focal habitats' and significant ecological features; these include caves and pinnacles, sinkhole swamps, upland streams, stream refuges in unstable landscapes, lowland rivers in stable landscapes, off-river waterbodies, flora/fauna/habitats of cultural significance and lekking trees/grounds.

To ensure that implementation of the Biodiversity Strategy is effective, the Biodiversity Implementation and Monitoring Program (BIMP) assesses on the ground performance against the following five Key Performance Indicators (KPIs) (and each are supplemented by Supporting Indicators):

- v. intactness of forest;
- vi. trends in species diversity and abundance;
- vii. condition of focal habitats;
- viii. occurrence of invasive species/pathogens; and
- ix. accumulated offset gains progressing towards No Net Loss targets.

Four Programmed Monitoring Activities (PMAs) are used to collect information for analysis against these KPIs:

- ✓ PMA-1: remote sensing⁴ of broad-scale land cover every two years, designed to monitor forest loss, land use change and degradation in the Upstream Area as caused by impacts that are directly Project-related, indirectly Project-related (third party, induced), non-Project (third party, expansion of pre-existing activity), and/or natural change (e.g., landslide);
- ✓ PMA-2: annual 'condition' surveys of focal habitats and significant ecological features adjacent to and in the vicinity of the pipeline RoW, facilities and other infrastructures;
- ✓ PMA-3: species specialist-led biodiversity surveys, designed to collect and analyze priority flora, fauna and ecosystem data both in/around areas affected by the project and in protected areas enhanced and/or established through the offset program. Areas of focus for these surveys have been Hides Ridge in Hela Province (termed site BAA1) and Agogo Range near Moro in Southern Highlands Province (BAA2) which have been surveyed during 2015, 2017, 2019 and 2021. The 2017 surveys also covered additional areas at Wau & Uro Creeks in Lower Kikori, plus non-aquatic aspects of Lake Kutubu; and
- ✓ PMA-4: to assess the efficacy of the various components of the biodiversity offset program, and to establish, over time, EMPNG's progress with respect to achieving NNL of biodiversity.

In addition, three Environmental Management Plan (EMP) Protocols are used to inform the KPIs. IESC observations on their implementation are provided in sections of this chapter:

- ✓ Access Control: the protocol is to formalize the monitoring of vehicle access to and along PNG LNG project roads and infrastructure to prevent potentially damaging third party activities resulting from access;
- ✓ Regeneration Monitoring: the protocol is to formalize the collection and analysis of information relating to the regeneration of temporary work areas disturbed during construction and evaluated against established benchmarks; and
- ✓ Invasive Species and Plant Pathogens: the protocol is to formalize monitoring of the occurrence and distribution of invasive species, pests and plant pathogens, and provides guidance on remedial actions.

EMPNG will evaluate monitoring results gathered via the various PMAs and EMP protocols, and depending on the significance of the findings, implement adaptive actions through management response.

To address residual impacts on Critical Habitat, and in accordance with the Biodiversity Strategy, EMPNG is implementing a Biodiversity Offset Program to ensure no net loss (NNL) in biodiversity. The program components include protected area planning, supporting the national biodiversity strategy, building conservation capacity, enhancing existing protected areas and establishing new protected areas.

EMPNG's Biodiversity Strategy (BS) and Biodiversity Implementation and Monitoring Program (BIMP) documents are publicly available for download at <https://pnglng.com/Environment/Biodiversity-management>.

5.2.2 Observations

The observations and opinion reported herein are derived from a physical in-country site visit, presentations made by and discussions held with EMPNG, and documentation provided during and post-visit.

5.2.2.1 Staffing and Resources

The challenging human resource market for experienced biodiversity professionals has continued where multiple large-scale projects are all competing for the same talent pool in PNG. As noted during the last report, the

⁴ Landsat data was acquired for 2009, 2011, 2013 and 2015 periods for the entire Upstream Area (UA), and higher resolution RapidEye data was acquired for 2011, 2013 2015 and 2017 periods for a linear infrastructure (LI) corridor containing the PNG LNG RoW, facilities and all other infrastructure within the Upstream area. Landcover classification of 2019 data was primarily based on 10m Sentinel-2 imagery. A combination of imagery sources was used for the 2020 change analysis including Sentinel-1, Sentinel-2a, Sentinel-2b (Sentinel-2), and high resolution Maxar Imagery captured by WorldView satellites. Data from Sentinel-1 SAR (20m resolution) and Sentinel-2 (10m resolution) satellites was used for RPCM (Radar Persistent Change Monitoring) and Two-date Optical change detection, respectively

recruitment and retention of competent, experienced personnel within the Biodiversity Team has been challenging. At one point during 2023, staffing levels reached precariously low levels, dropping down to a single qualified employee for several months and it has taken time to recruit replacements noted in the last report. This has continued to have repercussions on implementation of the full work program (noted through this section) and in increased pressures on existing staff having to maintain responsibilities across multiple roles.

At the time of the site visit, however, the situation had improved with all organizational positions having finally been filled by March 2024, following a priority effort commencing in Aug 2023. Personnel have been recruited into the Team through a combination of internal personnel reallocation, new employee hires and the engagement of experienced external contractors on 12-month contracts. The incumbent in the Biodiversity Supervisor role has come from an internal promotion during 3Q 2023 and has been associated with the biodiversity work program for over a decade; although still juggling multiple roles, the incumbent will be fully allocated to the Supervisor role within the coming months. Momentum will now need to build, and some skill gaps filled, which the new Environmental, Regulatory and Biodiversity Manager plans to address through a training and development program.

5.2.2.2 [Biodiversity Strategy, Implementation of Mitigation Measures and Monitoring Program](#)

Avoidance of impacts on important ecology, including PS6 relevant Project incidents

There were two environmental non-compliance incidents in 2023, as noted in Section 3.4 above, both of which were PS6-relevant.

- ✓ On Hides Ridge, the clearance of five access tracks from the main access road to the pipeline RoW – this happened without following due process for pre-clearance survey in critical habitat and without comprehending that additional precaution should be applied. Several large mature trees were cut, with two of the five tracks affecting nearly 1.5 square kilometers of virgin forest and disturbing two sites previously used for ongoing regeneration monitoring. Hides Ridge is one of EMPNG's three Priority Ecosystems, noted for its unique assemblages of plants, the high diversity of high-altitude birds of paradise, concentrations of restricted-range and endemic species and the presence of Critically Endangered species. The Biodiversity Team member liaising with the 3rd party contractor undertaking the work should have followed the correct procedure prior to approving the work proposed in such a unique ecosystem. The Environmental, Regulatory and Biodiversity Manager will now need to approve any new requests for vegetation clearance when this is located in one of EMPNG's Priority Ecosystems;
- ✓ Following the uncontrolled release of foam discharge downstream of drilling Angore Wellpad C, rivers and banks in the immediate vicinity contained obvious quantities of foam EMPNG stated that water quality records at the Kaloma and Tubage creeks downstream of the WP-C indicated high levels of TSS and turbidity and that releases to the receiving environment exceeded discharge limits for up to two months. They considered the foam to be fairly benign but were not able to demonstrate that ecological damage to the freshwater ecosystem hadn't occurred. EMPNG plans to undertake freshwater ecology assessment once drilling is completed (WP-C drilling until end of May).

The IESC have observed several areas where impact mitigation approaches and activities do not align completely with the requirements of the EMP. Observations are noted specifically on induced access controls and weed control areas in sections below and in the Issues Table.

The drilling rig will be moved from the Angore area up to the Hides Ridge in a few months. There is the potential for inadvertent import of weeds and pests (see Section 5.5.2, cane toads) between Angore and the Hides Ridge ecosystem associated with the movement of drilling equipment, office containers and vehicles. At the time of the visit, the Biodiversity Team had not yet had a chance to undertake a risk assessment or identify/plan for appropriate precautions and mitigation measures to avoid any potential cross-contamination. Considering the observed constraints on the Biodiversity Team's time, the IESC recommend sufficient resources be prioritized for the Team to prioritize this work, in advance of the rig move.

The IESC also observed:

- ✓ Works associated with the laying of the fiber optic line from Hides WP-G down the Spine are using diesel generators, which create ongoing increased noise levels in what is a usually very quiet, priority ecosystem. The sooner the diesel generators can be removed the better;
- ✓ The amount of plastic litter observed at EMPNG worksites was considered unacceptable. EMPNG needs to undertake a prioritized campaign to teach/remind people to not discard their personal waste items. Avoidance of littering should be made mandatory, should be penalized, and litter removal and monitoring efforts stepped up to ensure practices improve. The IESC recommends that plastic lunchboxes are replaced with non-plastic alternatives. If non-plastic alternatives are deemed not suitable for storage of the lunches typically provided, then reassess what is typically provided for lunch e.g. sandwiches don't spill out of non-plastic lunchboxes. EMPNG is operating in Critical Habitat, and changes in behavior must happen as a priority.

Freshwater Ecology

Demonstrating avoidance of any construction impacts on stream conditions is key to preservation of upland streams and stream refuges in unstable landscapes, two of EMPNG's focal habitats. As EMPNG has continued site-specific work activities along parts of the RoW and existing infrastructure (e.g. extensive earthquake recovery activities, Angore pipeline construction, Angore drilling, etc.), the IESC considers that demonstration of avoidance is still an important deliverable.

Information on freshwater ecology has been presented since 2021, when the 2020 surveys were discussed. In response to IESC questions at the last site visit, EMPNG stated that freshwater ecology surveys were planned for 2023 or 2024. There was no update presented during this Feb 2024 visit, beyond advising of the proposed Angore WP-C survey although the intention to undertake surveys this year was reiterated during the road-trip.

Biodiversity Program Monitoring Activities

Monitoring campaigns have continued on a one/two/four-yearly cycle depending on frequency of data capture and analysis. PMA updates provided are summarized below.

PMA-1 Remote sensing update:

The Project is assessing the Upstream area through use of satellite imagery on a two-yearly cycle. The last analysis was conducted in 2020 (reported in the 2022 IESC report);

There was no update provided on PMA-1 during this visit; the next round of imagery capture and analysis is scheduled this year.

Lenders will recall the issues related to the attribution of indirect Project-related change in landcover noted in the IESC's 2022 report, that is, relating to whether anthropogenic changes in land cover and land use are deemed to be as a result of the Project's presence or enhanced access. The IESC had observed some inconsistency when EMPNG were determining whether newly cleared areas were related to the Project, and not necessarily classifying those that might have been legitimate indirect impacts (and therefore Project related). In response EMPNG produced Field Guidelines and a decision tree, to help assess attributable impacts in a more consistent, repeatable manner. The approach uses proximity and connectivity of the observed change to any PNG LNG footprint/activities, and references levels of evidence thresholds required to determine attribution. However, this procedure has not been used to retrospectively analyze data where the original inconsistencies had been highlighted. As per Observation M21.1, the IESC consider that the Project should use the procedure to retrospectively re-analyze attribution of indirect impacts related to past instances of relevant land cover change (to enable EMPNG to understand any gaps in previous attribution).

In response to IESC questions on the satellite-derived habitat-quality analysis (pilot) presented during the last trip, EMPNG noted whilst two of the objectives had been successful (establishing current condition and pre-offset landcover baselines at Lake Kutubu WMA), the third objective (assessing change in condition according to PMA-1 habitat classes) had been less so. The last IESC report had noted the development of a habitat condition change assessment for the Aird Hills WMA during 2023 but as the pilot at Lake Kutubu had not effectively assessed change in condition, an assessment of Aird Hills was not conducted. Alternative approaches to identify condition change are being assessed.

PMA-2 Visual observations of 'condition' of sensitive sites avoided by the Project but potentially affected due to their proximity to Project RoW, Project roads and access by communities:

Security issues and the loss of key staff from the Biodiversity Team continued to affect the Project's ability to undertake extensive periods of fieldwork. This meant that only three of the 20 PMA-2 sites observed in 2021 and 2022 were visited during 2023. These three sites, all on Hides Ridge, appeared to be in a healthy state.

All 20 sites will continue to remain on the PMA-2 register due to their proximity to infrastructure and nearby communities.

PMA-3 Rapid, standardized biodiversity survey updates:

EMPNG advised that the planned two-yearly PMA-3 survey anticipated for June 2023 did not occur, due to security issues. The surveys have been rescheduled for June 2024.

EMPNG have reprinted a further 500 copies of the PMA-3 Field Guide, and a full draft has been completed of the Field Guide to Frogs of the Kikori River Basin, PNG by Stephen J. Richards, co-leader of the PMA-3 survey program.

Two updates on specific PMA-3 items raised in previous surveys and IESC adaptive management recommendations:

- ✓ Dieback surveys: previous PMA-3 surveys had repeatedly observed potential dieback in canopy trees, especially in *Nothofagus* trees along the eastern (lower) half of Hides Ridge – see initial survey follow up in Section 5.5.2.4 below;
- ✓ Hunting surveys: the PMA3 team had observed an increase prevalence of feral dog predation and hunting pressure over successive survey years and noted that hunters were preferentially using the pipeline corridor for access to hunting grounds that might otherwise have been more difficult to target. The PMA-3 survey team had recommended that EMPNG better understand the observed threats. In 2021 EMPNG committed to develop and implement a pilot study in one of the PMA-3 survey areas. During the 2023 IESC review, EMPNG had concluded that the study outputs were found to be less than satisfactory and that alternative ways to gather the data from hunting communities would be explored. The IESC raised an Observation in the Issues Table (M22.3) to encourage EMPNG to demonstrate more urgency in completing this work; in IESC opinion the timescale from observation/specialist recommendation to characterizing the threat to addressing through enhanced mitigation measures was not cognizant of the potential threats posed to threatened species by this enhanced access. During this visit, EMPNG reported that the hunting questionnaire survey methodology has now been reviewed and adapted by the relevant team-members of the PMA-3 survey team and will be implemented during the postponed PMA-3 surveys scheduled for this year. How the findings are used to address hunting threats from pipeline-enhanced access will be a focus area during the next IESC review. Observation M22.3 is retained for future review.

The IESC had previously recommended the PMA-3 survey reports from 2017 and 2019 missions be published in the Ecology Report section of the PNG LNG website, alongside the 2015 report. The Project has added the 2019 and now the 2021 reports, but the 2017 report is still missing – see Recommendation.

As noted previously, some Lenders have specifically requested that EMPNG share PMA3 data directly with the Global Biodiversity Information Facility (aka GBIF, www.gbif.org) in alignment with the Equator Principles – they recognize that the majority of PMA-3 reports are published on the PNG LNG website, but there would likely be datasets of value to the GBIF community. Recommendation retained.

PMA-4 Evaluation of the efficacy of the offset program, tracking progress in achieving NNL of biodiversity:

EMPNG presented their graphs for each altitude level to represent biodiversity gain as claimed from offset program implementation to date, along with future trajectories of projected gain derived from predicted averted losses. For purposes of representing targets for No Net Loss (NNL), a combination of known construction footprint and previous PMA1 assessments have determined the calculated losses to offset: Note, EMPNG's offset framework includes a notional 50,000 hectares in each of the three elevation zones to allow for contingencies and uncertainties.

The presented graphs are shown in the figure below.

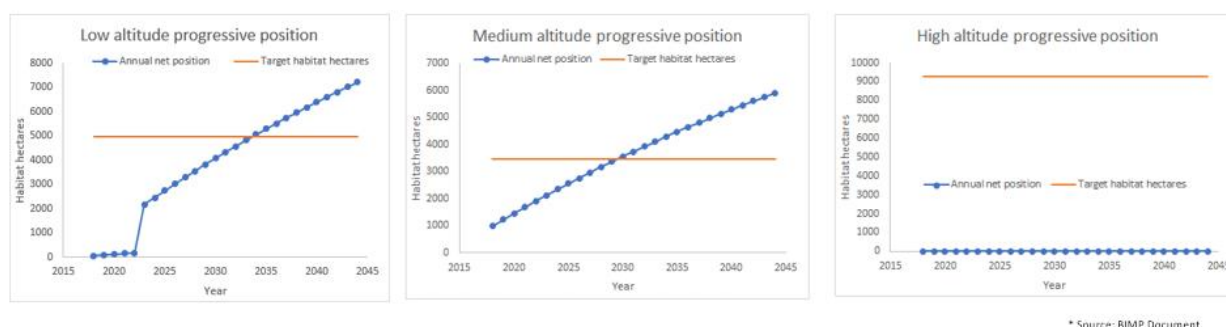


Figure 5.1: EMPNG's Representation of Current vs Future Biodiversity Gain

As noted in PMA-1 section above, the development of satellite-imagery derived assessments to demonstrate improvements in habitat condition at offset sites stalled through 2023. The preliminary results presented in Feb 2023 indicated over 2,000 ha of total change had been detected between the two years, however this change was deemed to be due to a changed forest type rather than an improvement in habitat condition. This scale of forest type change required further investigation, and as a result, the applicability of the approach to other offset areas was still under discussion. Another habitat change analysis, this time focusing on the Aird Hills WMA (2016 to 2022) was due to be undertaken during 2023. Nevertheless, the general approach was seen as beneficial as demonstrating improvement in biodiversity would help justify any claims made on 'gain' in biodiversity offset calculations. EMPNG agreed that best estimation averted loss would still be tracked but that supplementing this with habitat condition data would help ascertain actual loss/gain levels.

The gain claimed by averted loss can be highly uncertain and inadvertently overestimated⁵ and good practice requires there to be a genuine threat of loss that requires averting, otherwise the Project could be accused of claiming gains inappropriately. The signing of Conservation Deeds, as has now happened in the Lower Kikori, follows extensive facilitated community involvement; although being a legal declaration of conservation intent, should be combined with the demonstration of positive conservation outcomes so as to legitimately claim the associated gains. The IESC continues to recommend that such projections of gain derived from support to conservation activities be complemented by demonstrable improvements in habitat condition, as per the point on PMA1 above. Support to conservation groups such as the Lake Kutubu WMA Committee and the Conservation Deed holder groups is highly valuable, but a claim to averting predicted losses should be backed up by ongoing demonstration that losses have not continued during the period of support, and ideally that habitat is at least retained and restored successfully. This should lead to more defensible claims of biodiversity gain associated with the offset program.

5.2.2.3 Biodiversity Offsets

Offset Program Design and Early Implementation

To achieve NNL, EMPNG's offset program combines both direct and indirect (enabling) components. The Company has provided the IESC with updates on each component.

Offset Component 1: Protected area planning. Support to the Conservation and Environment Protection Authority (CEPA) in meeting its international Convention on Biological Diversity (CBD) commitments via production of a 'Protected Area System Plan' for a Kikori-wide river basin (on World Heritage 'Tentative' list).

As before, EMPNG considers this component complete with the publication of the 'Protected Area Planning for the Kikori River Basin' report written by WCS in 2017. They state the work has informed the identification of Project offset sites and protected areas established via Components 4 and 5 below. The Project had no update on the Government's progress for the Kikori Catchment as a UNESCO Cultural/Natural World Heritage Site, and the Kikori River Basin entry on the WHS website remains on the Tentative list dated 2006⁶.

Offset Component 2: Support the National Biodiversity Strategy and Action Plan (NBSAP). EMPNG's focus has been to support communication initiatives and networking workshops.

During the previous IESC visit, the Project confirmed their intention to continue funding towards this NBSAP-support component for the next five years. There were no EMPNG hosted Communicating Conservation Meetings or Newsletters in 2023 due to Biodiversity Team resource capacity constraints; EMPNG add they also do not wish to duplicate a process already established and running.

EMPNG had been keen to liaise with external multi-lateral organizations regarding co-sponsorship of the previously highly successful Communicating Conservation Meetings. Representatives from the Biodiversity Team attended the UNDP funded Protected Area Forum meeting in June 2023 and identified opportunities to support conservation champions from the various offset communities to attend Forum in the future, including 2024.

As there had been few active outputs of this offset program component for a few years, the IESC had recommended that EMPNG consider how else EMPNG could support the PNG government implementation of priority items within the NBSAP. The Team has reviewed the work program and consider that the existing program goes a long way towards aligning with the NBSAP various goals.

Offset Component 3: Enhancing Conservation Capacity Program (ECCP). EMPNG have continued the new collaboration on capacity enhancement with the New Guinea Binatang Research Center⁷ (BRC, or Binatang). EMPNG have committed to confirmed funding for the period 2022 to 2026.

This partnership supports a small number of PNG-national Master's/MPhil and PhD students on their post-graduate research programs. The two supported Master's students graduated in April 2024, and the two PhD students continue their studies. No new Master's students were supported for 2023 or 2024 but will be for 2025.

During the last IESC visit, the plan had been to expand the number of course attendees for the Conservation Ranger training, following on from the positive feedback received in 2022; however, no Ranger training had been conducted

⁵ Maseyk et al, 'Improving averted loss estimates for better biodiversity outcomes from offset exchanges', Oryx, 2021, 55(3), 393-403.

⁶ UNESCO WHS available at <https://whc.unesco.org/en/tentativelists/5060/> accessed in March 2021.

⁷ BRC supports EMPNG as service provider on a number of biodiversity work programs, including regeneration & weed audits.

in 2023. EMPNG have now recommitted to a larger Ranger Training Course that will be held in 2024 and annually thereafter.

Although funding had been committed, focused attention on this component has suffered from team resource constraints in both EMPNG's Biodiversity Team and at Binatang themselves.

Offset Component 4: Support for existing protected areas.

- (1) Enhancement of the Lake Kutubu WMA (Wildlife Management Area) in the middle elevation zone has been the primary focus for achieving this component.

EMPNG presented a status update on administration, conservation and sustainable-livelihood activities undertaken by the WMA Committee, now incorporated as the Lake Kutubu Environment Foundation (LKEF), a Community Based Organization (CBO). Slides presented noted the WMA Committee continuing to emphasize conservation awareness in the community using various opportunities around the lake, e.g. World Environment Day, the Kutubu Kundu & Digaso Festival and school visits. The WMA Committee have worked with two more Lake communities so as to commit their fishing grounds to no-fishing zones for a year, making a total of nine no-fishing areas currently within Lake Kutubu. The Committee have also set up waste collection points at Moro Market, in addition the village waste collection points to aim to reduce litter load in the Lake and surrounding environment. The Committee have applied for funding from PNG's Biodiversity Climate Fund and their expression of interest was approved for submission for 2nd stage (for full funding).

The Alternative Livelihood Strategy (ALS) scoping report provided previously has now been supplemented by an Alternative Livelihoods Strategy Rev.1 (Jan 2023) (ALS) – see ALS below and at Section 6.1.2.2.

The IESC didn't have the opportunity to meet with the Lake Kutubu WMA Committee representatives this visit due to their planned travel arrangements suffering disruption. As observed in previous years, EMPNG's support to the Lake Kutubu WMA Committee has been invaluable in building the capacity of Committee members to identify and undertake numerous WMA-relevant activities. Nevertheless, for a program within EMPNG's biodiversity offset to achieve No Net Loss, there is not yet a demonstrable direct linkage between ongoing efforts with the Committee and gains in biodiversity as related to offset monitoring activity PMA-4 above. In the IESC's opinion, EMPNG's 2015 Lake Kutubu Enhancement Plan is now out of date. Current activities and support should be refreshed in light of EMPNG's successful offset experiences in the Lower Kikori, PNG's new Protected Area Act, and the necessary efforts to support the development of a Lake Kutubu WMA protected area management plan on behalf of all stakeholders. Support towards the development of a management plan for the Lake Kutubu WMA protected area, as an existing commitment within EMPNG's 2015 Enhancement Plan, is a key aspect to help deliver necessary ecological benefits from the community-based conservation model currently being supported. Due to Biodiversity Team resource constraints, little progress was presented on development of the protected area management plan for Lake Kutubu. As explained more fully in the last IESC report, the need for timely stakeholder mapping and effective engagement with a broad range of stakeholders will be crucial for the protected area management plan to be considered legitimate, be informed by an appropriate range of views and therefore owned by the wider 'community' of stakeholders (see Recommendation, which is retained). In response, the company has now developed a Stakeholder Workshop Strategy (Rev.1 supplied following the visit). This presents the approach EMPNG will take with regard to engaging stakeholders on the development of the protected area management plan. It notes stakeholder mapping and analysis, preparation for and description of the process to undertake multiple workshops to gain the views and input from the necessary broad range of stakeholders, some of which will be outside of the normal engagement process for EMPNG. Detailed actions are yet to be developed within the Draft Action Plan, but the IESC commends the direction of travel that the Strategy proposes.

During the visit, the IESC and EMPNG management discussed a number of the issues raised in successive IESC reports about gaps in approach in this mid-elevation zone offset program – for example, the IESC non-conformance M20.1 (raised as an Observation in 2021 and up to a non-compliance Level 1 in 2023) relating to the gap in EMPNG not supporting freshwater ecology studies⁸, especially with regard to the importance of establishing a current reference point from which to develop management plan conservation objectives. As a result of the discussions this visit, the company supplied an Outlook document for their intentions at Lake Kutubu for 2024-25. This Outlook documents at a high level how EMPNG plans to prioritize two separate yet complementary initiatives in the next 12

⁸ As EMPNG pipeline passes through the WMA, a legally protected area, to align with PS6 requirements, the Program should be representative of the aquatic conservation objectives of the lake. Regarding conservation objectives and understanding baseline ecology, as flagged multiple times, the IESC's opinion is that EMPNG should be more cognizant of the conservation of the lake's unique freshwater ecology and therefore this be represented more fully in the support provided via the Project's WMA offset program. It is clear that the WMA Committee has significant interest in understanding the aquatic ecology of the lake and in maintaining the unique endemic fish populations for which the lake is internationally recognized. For background, Lenders should refer to the 2022 IESC report Sections 5.2.2.2 (Component 4) and 5.2.2.3 (responsibilities of clients operating in Protected Areas) and updates in the 2023 report.

months and documents the intention that the stakeholder workshops and ALS will provide opportunities to reassess priorities, identify and close gaps, and reflect these in the Management Plan and associated resourcing structures, capacities and potential partnerships.

The IESC again stresses the importance of the Lake Kutubu WMA protected area management plan being representative of the biodiversity values to be conserved, be scientifically robust, based on up-to-date information, setting clear ecological and ecosystem service preservation objectives and outcomes, and be well informed by a wide range of stakeholders' needs and opinions. Long-term engagement, adaptive management and clear target outcomes are equally important, and it is encouraging that the Project intends to follow IUCN protected area management plan guidance. Due to the importance of the work at Lake Kutubu, as this is EMPNG's chosen program to deliver conservation benefits at the mid-elevation zone and is a protected area within which the Project has ongoing footprint, the IESC has requested that IESC/Lenders be kept informed on a more regular (quarterly) basis as the protected area management plan engagement and offset program is progressed.

Lenders will recall mention in the last two IESC reports that EMPNG had flagged interest in developing a potential additional protected area to the west of the Lake Kutubu WMA. EMPNG had intended to undertake village/clan awareness and consultation workshops in 2023, but resource constraints in the Biodiversity Team meant this could proceed. During this visit EMPNG have confirmed that plans for this additional protected area may have been premature, and there are no current plans to proceed at that location. Nevertheless, they've indicated that other options may still be explored for conservation opportunity in the broader elevation zone in the near future.

(2) Lower altitudinal zone: Neiru WMA (previously called Aird Hills WMA in earlier IESC reports)

The company advises that they have re-engaged with the Neiru WMA Committee after 8 years. EMPNG has previously had intentions to support the WMA Committee and has had sporadic dialogue but there has been no concrete deliverables or concerted program. As CEPA has been engaging with the WMA Committee (now termed an 'interim' committee) to collect member details and build a profile for gazettal of the protected area, EMPNG have been able to help facilitate the process. EMPNG intends to continue to support the CEPA registration process and develop a Neiru WMA enhancement concept plan.

Offset Component 5: Establishing new protected areas.

a) At the Lower Elevation Zone (0-600m):

To fulfill the offset program at this lower elevation, EMPNG's program is designed to enable the creation of a new community-based, regionally gazetted protected area (in PNG legal terminology, a 'Community Conservation Area') in the vicinity of the existing Neiru (Aird Hills) WMA. This will require the establishment of a protected area management plan for the Lower Kikori which will help offset residual impacts on biodiversity values affected in the Project's lower elevation footprint. To achieve this, EMPNG is working with a growing number of communities in the Lower Kikori. The Project supports a full-time coordinator (part-time based in Kikori Station) to assist with support to the communities and the lower elevation offset program.

The Environmental Lawyer, engaged by EMPNG, has continued to help inform and guide the Lower Kikori communities on the establishment of Conservation Deeds, which are formal legal agreements within and between communities to map resources and conservation areas for preservation. The mapping has helped to resolve land-owner uncertainties and conflicts, and as reported in previous IESC reports, has had widespread buy-in from the communities present. The Deeds are formal legal agreements between communities, which include specific measures (e.g. fines) that can be enforced locally and in the PNG court system. The updated community conservation progress table is included below.

LKCE 2020-2023 Progress Chart										
		Pre-2020	2020	2021	2022	2023				
Kikori Delta Community	Initial community engagement	Resource Mapping	Review of resource mapping	GPS of sites	Initial identification of land for conservation	Conservation Deeds (1 st draft)	Conservation Deeds (2 nd draft)	Conservation Deeds (3 rd draft)	Conservation Deeds Finalised & Signed	
1 Goare & Kerewo Origin	Complete	Complete	Complete	Complete	Complete	Progressing	Progressing	Well Progressed	Complete	
2 Bisi	Complete	Complete	Complete	Complete	Well Progressed	Progressing	Progressing	Well Progressed	Complete	
3 Aiedio	Complete	Complete	Complete	Complete	Complete	Progressing	Progressing	Well Progressed	Complete	
4 Kemei	Complete	Complete	Complete	Complete	Complete	Progressing	Progressing	Well Progressed	Complete	
5 Doibo	Complete	Complete	Complete	Complete	Complete	Progressing	Progressing	Well Progressed	Complete	
6 Babeio/Veiru	Complete	Complete	Complete	Complete	Well Progressed	Progressing	Progressing			
7 Goro	Complete	Complete	Complete	Complete	Complete	Progressing	Progressing	Well Progressed	Complete	
8 Dopima	Complete	Complete	Complete	Complete	Complete	Progressing	Progressing	Well Progressed	Complete	
9 Aimahe	Complete	Complete	Complete	Complete	Complete	Progressing	Progressing	Well Progressed	Complete	
10 Mubagovo	Complete	Complete	Complete	Complete	Complete	Progressing	Progressing	Well Progressed	Complete	
11 Veraibari	Complete	Complete	Complete	Complete	Well Progressed	Progressing	Progressing	Well Progressed	Complete	
12 Waira	Complete	Progressing	Planned	Planned	Planned	Planned	Planned			
13 Apeawa	Complete	Complete	Complete	Complete	Complete	Progressing	Planned			
14 Omati	Complete	Progressing	Planned	Planned	Planned	Planned	Planned			
15 Lalau	Complete	Progressing	Planned	Planned	Planned	Planned	Planned			
16 Ero/Wouwou	Progressing	Planned	Planned	Planned	Planned	Planned	Planned			
17 Kopi	Complete	Progressing	Planned	Planned	Planned	Planned	Planned			
18 Kaiam	Complete	Progressing	Planned	Planned	Planned	Planned	Planned			

Figure 5.2: Lower Kikori Community Engagement Progress 2020-2023

As can be seen in the table, eleven Conservation Deeds were signed towards the end of 2023, the result of a considerable long-term effort from the Biodiversity Team and colleagues working in the Lower Kikori. A major ceremony was held with the communities to sign the Deeds, including 109 clans living across two local level governments, at a 3rd Yumi-Kikori Combined Conservation Meeting. PNG's Conservation Environment Protection Authority (CEPA) was represented by their Executive Officer and Terrestrial Protected Area Manager attended.

During the visit, the IESC Team met with several of the clan leaders who'd signed Deeds plus others involved in the development of community conservation groups in the Lower Kikori area. From the community members we spoke to, it was clear that conservation of natural resources is inherent within their current and ancestral philosophy. Community members are very aware of threats to their natural resources and environment from unmanaged development and over-exploitation of resources. There is clearly a desire for EMPNG to continue to facilitate the process for protected area gazettal with CEPA. CEPA has been engaging in the process and combined visits with EMPNG, and from conversations held with community members, appears to be very supportive of EMPNG's activities. EMPNG's long-term support has enabled the communities to start the conservation journey in alignment with CEPA's formal process: the first two key stages in CEPA's process of establishing protected areas are (1) making proposals for protection and (2) in getting agreements with customary landowners, rights holders, NGOs and local government, both of which are now in progress. For the community members met, they certainly appreciate that EMPNG has facilitated CEPA's engagement directly with them. The communities appear keen for CEPA to accompany EMPNG on follow-up visits so that formal assessment and application for gazettment of lands can be speedily progressed. They did note the urgency for this and requested that EMPNG managers visit three times a year instead of the two currently, before any land- or rights-holders become disenfranchised with the process.

EMPNG continue to be transparent in the challenges they are facing in supporting the establishment of the Community Conservation Areas, for example, in managing threats related to logging and commercial fishing, and managing competing conflicts of interest between clans and/or management committees.

As noted in Offset Component 3 above, EMPNG's support to training Conservation Rangers through the partnership with BRC has enabled five local candidates to participate in the 2-week training courses run in Madang. The IESC met with the now-trained Rangers whilst in Lower Kikori, and they were full of ideas on what can now be achieved through enhanced protection of their environment. The training course allowed the Rangers to learn practical aspects of conservation and share experiences with Rangers from other proposed/actual protected areas from other parts of PNG. When prompted by IESC questions on ideas to make their new roles more effective, they were hungry for more detailed training in various species groups, requesting fieldwork manuals and noticeboards be

placed in their areas of patrol. They sought more clarity on their Ranger roles with regard to enforcement methods and their areas of jurisdiction, plus requested more information on protected area management good practice (e.g. the IUCN protected area management guidance materials). They would appreciate closer mentoring with the PMA3 species specialist surveyors when they're in the area and the opportunity to attend the PNG Protected Area Forum mentioned above. They also noted that the BRC training should align with CEPA's Ranger registration process (gazetted of Rangers) and include training directly from some CEPA officials.

b) The Upper Elevation Zone

The Montane altitude (elevation >1200m) represents the largest proportion of the overall residual biodiversity impact for the Project. Therefore, the biodiversity gain required is greatest at this higher altitudinal zone, through the creation of ecologically comparable areas managed for biodiversity.

The Team continues to engage with communities and has now engaged directly with seven clans and clan leaders from PDL 1, bringing them into HGCP to discuss biodiversity values and invasive species, identify the values of the region and clarify clan leaders and members. The clans were encouraged to raise their concerns related to biodiversity in the area and highlighted increases in human settlements and activities related due to EMPNG operations, and how animals previously found in nearby hunting grounds were no longer found. EMPNG intends to develop a Montane Stakeholder and Communications Strategy and continue community consultations.

Prior to 2020, EMPNG had prioritized staff resources on the development of biodiversity offset programs in the lower two elevations and the IESC raised a non-compliance in 2020 for lack of priority at the upper elevation. EMPNG had reported long-term security issues in Hela Province that had contributed to the stalling of program development. From 2021, offset activities in this upper elevation zone started to gain some traction, however focus on the Montane Offset Program has again stalled relative to other elevation programs. The IESC recognizes the importance of a solid foundational framework for community-based conservation, however with the loss of personnel in the Biodiversity Team over the last few years, the Team has lost momentum in program implementation. The IESC is encouraged that new Team members are now in place, but as the upper elevation zone has the largest Project footprint, and EMPNG's Biodiversity Strategy (and therefore offset program) is now over 13 years old, a Level 2 non-compliance is opened – see Issues Table (Section 2).

Alternative Livelihood Strategy for Offset areas

EMPNG has significant experience in tailoring and implementing livelihood and community development programs, and the case for application at biodiversity offset program sites makes sense. The Alternative Livelihood Strategy (ALS) has now been finalized, version Rev.1 (Jan 2023). This defines a work program for implementation in each offset program area, recognizing that different location characteristics will mean tailored approaches, which will be defined in site-specific plans. Managing ALS in offset areas is to be welcomed, where the preservation of biodiversity values might otherwise restrict traditional access to natural resources to a greater or lesser extent – in addition, aspects of PS7 can be addressed by providing opportunities for development benefits. The IESC agrees that successful conservation should be cognizant of the needs of people in and around areas of high ecological and ecosystem value. As site-specific conservation objectives and sustainable natural resource plans (developed as part of the offset program) will be different for each offset area, so will the alternative livelihood activities – this complements a previous IESC recommendation to have site-specific offset management plans. The ALS program if suitably funded, resourced and managed through time should help the company achieve sustainable gains over the required timeframe and increase the chances of offset success.

The last IESC report noted that next steps would involve a scoping study using two or three of the existing offset areas to generate a SWOTs analysis (strengths, weaknesses, opportunities, threats), to then inform the development of a site-specific Alternative Livelihoods Plan. Unfortunately, due to the Biodiversity Team staffing constraints, development and implementation of the Strategy has not progressed. With the complement of Biodiversity Team staff and contractors now back to full capacity, the IESC will be looking for more progress during future reviews.

5.2.2.4 Legally Protected Areas

The IESC refers Lenders to the IESC's 2021 report for background on EMPNG's responsibilities in relation to PS6 (2006) Paragraph 11 relating to operating in a legally protected area, including those related to the promotion and enhancement of the conservation aims of the protected area. Also reference Section 5.2.2.2 above on Offset Component 4 (existing protected areas) for how the Project's support for conservation should address all priority biodiversity values within the protected area.

The Project has undertaken over a decade of solid foundational work with the WMA Committee as part of the mid-elevation offset program. The IESC Non-Conformance in the Issues Table recommends EMPNG consider the gaps in alignment between the approach taken for offsetting residual impacts on specific biodiversity values versus the requirement to promote and enhance the conservation aims of the protected area within which the Project is located.

The Project's previous exclusion from the 2017 PMA-3 scope of an updated scientifically robust aquatic biodiversity survey at Lake Kutubu to support the preservation of the freshwater ecosystem, is not in alignment with primary conservation aims of the protected area. The recent discussions with EMPNG management noted in the Lake Kutubu section above included points on freshwater ecosystem surveys as a fundamental foundation for the development of conservation objectives in the protected area management plan, and EMPNG's preference to wait to see what needs were raised by stakeholders during plan development. Nevertheless, the IESC continues to recommend the Project plan to include an updated appropriate assessment of the Lake Kutubu freshwater ecosystem via a PMA3-type biodiversity assessment survey as part of the foundation for enhancing the conservation aims of the WMA protected area.

5.2.3 Recommendations

1. EMPNG should use the updated PMA1 guidelines to retrospectively analyze areas of 'indirect' land-use change identified previously, in light of the discrepancy raised previously about whether change was indirectly Project-attributable— see PMA1 text in 5.2.2.2.
2. The IESC encourages the Project to seek improved engagement with conservation NGOs to help provide additional transparency and alternative viewpoints for the residual impact and offset programs.
3. The 2017 PMA3 biodiversity report should be posted on www.pnglng.com alongside the 2015, the 2019 and 2021 reports.
4. EMPNG to consider sharing PMA3 data directly with GBIF in alignment with the Equator Principles⁹.
5. EMPNG consider increasing the frequency of their management visits to the Lower Kikori area, to facilitate CEPA's direct engagement with those communities to progress the gazettement of protected areas.
6. EMPNG to consider the recommendations noted above from the Lower Kikori rangers in making their roles more effective and building further their capacity, whilst new Rangers continue to be trained. The IESC suggests that attendance at the Protected Area Forum also be facilitated for representatives from Lake Kutubu WMA Committee.

5.3 INDUCED ACCESS

5.3.1 Project Strategy

EMPNG's objective as per the EMP is to control vehicle access to Project roads and infrastructure, to prevent potentially damaging third party activities through enhanced access.

EMPNG has retained a number of RoW construction access tracks/roads for permanent use during the Production-phase, so as to allow emergency access, maintenance and delivery of fuel to above ground installations (AGIs), such as main line valves (MLV), check valves (CV) and cathodic protection stations (CP). Background on the justification for access and methods of access control is provided in the EMP and in previous IESC reports detailing our opinion on the status and effectiveness of each vehicle access control.

EMPNG's strategy is that access will generally be allowed only to EMPNG vehicles. The Project's management plans state access by third party vehicles serving operational needs may be sanctioned subject to prior approval from EMPNG, and that access by landowner vehicles may be sanctioned subject to approval from EMPNG. In both cases, access will be authorized only by designated EMPNG personnel. Vehicles will be inspected as deemed appropriate. A Vehicle Monitoring Plan (VMP) describes the process to be followed for vehicles seeking authorization to use EMPNG roads, and data is being gathered on type of vehicles passing through points where Access Monitors are located.

CEPA's Environmental Permit states that EMPNG is "required to establish and maintain systems to ensure project infrastructure and road systems are not used in any way to provide support of logging activity or any other uncontrolled access. Prevention of access should continue until such time as natural vegetation regrowth prevents their use."

⁹ During report finalisation, EMPNG confirmed that all PMA3 data is now shared with GBIF in accordance with their data repository standards.

5.3.2 Observations

Controlling access to Project infrastructure along the RoW

During construction, a Project road was built to link up OSL roads between Kantobo and Gobe. The Kaiam and Mubi bridges were also built, thereby allowing construction access from Moro south to the Kopi Scraper Station and to the Omati landfall. The basis for the EIS assessment of impacts and significance was that the Project road and bridges would require assiduous control to maintain the conservation assets of the area, and that access should be controlled for Project use only. The Project road and bridges were kept open post-construction, thereby enabling what the IESC has referred to in previous reports as the 'Southern Highway'. It is imperative that EMPNG control access to Project roads to avoid and minimize impacts related to enhanced access such as increased hunting to more easily accessible areas, land clearance/logging and the transmission of weeds, pests and pathogens.

The EMP Table 17.1 is as per the 2019 version available on www.pnglng.com, where mitigation (1) requires access controls that restrict vehicular access to EMPNG roads, (2) requires access to only pre-authorized vehicles, and (3) defines the mitigation controls at access points along project roads.

During this visit, the IESC was given the opportunity to drive this 'Highway', on a one-day road-trip from Kopi Scraper Station (south of Kaiam Bridge) up to Moro, in addition to chopper flyover for the majority of the RoW/road access from Komo to Kopi. From this visit, the IESC were able to update a number of observations from the last similar road trip approx. eight years ago.

Special attention was given to how EMPNG's 'access control' mitigation measures are being implemented in the field in line with the EMP. As noted in the Project Strategy paragraphs above, aspects relating to only allowing access to EMPNG vehicles are not being fully implemented on the Project's Gobe to Kantobo stretch of the 'Southern Highway', thereby allowing open access from Kaiam Bridge/Kikori River up to Moro. Also, landowner vehicular access being sanctioned by prior approval by EMPNG is not being applied in some circumstances e.g. Angore access road to Check Valve #1. Observations made in relation to all controls stated in the 2019 EMP are included in the table below – observations were made via the road-trip, or by air/chopper, or lastly by photos provided from EMPNG's Access Control PowerPoint file, provided following the visit.

The table below is adapted from one last compiled by the IESC for the 2020 report, and updated to flag gaps between reality and the EMP that helps to show that gaps have not closed.

Table 5.1: Status of access controls and monitors versus EMP requirements

	Access location / infrastructure	Access reason	Current Vehicle Access Control/Monitor Status from EMPNG
1	Hides Ridge	Producing wells	EMP requires: Staffed station at vehicle wash at base of well pad access road. <u>IESC observation:</u> Vehicle wash and check station is still operational. EMPNG advise that all vehicle access is logged, and all vehicles washed on entry to the road.
2	CV-1 near Tagari River crossing (access from Angore)	AGI (Above ground installation)	EMP requires: Unmanned boom-gate between Angore WP-B and the RoW. <u>IESC observation:</u> The gate as noted previously by EMPNG as having been removed, was reinstated but moved again (and now vandalized) but this time to the opposite side of the pipeline RoW, therefore providing zero control to vehicles in the vicinity of the RoW. The current placement of the broken gate is on the EMPNG track in a position that allows the landholder to operate multiple vehicles to/from their house. and there is no physical control measure in place. <u>Not in compliance with EMP</u>
3	Angore well pad access road, at end of public road from Idawi	Drilling and future producing wells	EMP requires: Monitor to be present. In an attempt to control access onto the well pad access roads, EMPNG had been working with the community on how the gate will be managed. <u>IESC observation:</u> Boom gate is present but wrecked, no monitor present. Vehicle tracks have been observed in the area previously, as noted in earlier IESC reports. <u>Not in compliance with EMP</u>
4	MLV-1 Benaria	AGI	EMP requires: unstaffed boom gate at junction of public road and pipeline construction track.

	Access location / infrastructure	Access reason	Current Vehicle Access Control/Monitor Status from EMPNG
			<p>However, there has never been a boom gate in place. IESC were advised in 2016 that the lockable boom gate would be in place and the temporary construction bridge would be removed before the end of the year - this did not occur due to security issues in the area. The IESC were then told that a locked boom-gate would be installed once the government has completed the installation of a permanent bridge to link Benaria Station to the public road.</p> <p><u>IESC observation</u> from the air: It is clear EMPNG's temporary construction bridge to access MLV-1 is still there, and there is still no boom gate, although the government replacement bridge has now been in place for several years. Vehicle Access Monitors are no longer in place at Benaria village, nor at the Project bridge/infrastructure. There were no photos in EMPNG's access control PowerPoint.</p> <p><u>Not in compliance with EMP</u></p>
5	MLV-2 & Homa-Benaria Ridge access track	AGI / Road	<p>EMP requires: access controlled via an unstaffed gate at the junction of the public road and the Homa Ridge Access Road i.e. the pipeline construction track.</p> <p><u>Photo updates from EMPNG</u>: it appears the gate is in place and locked. Could not quite see from the air during chopper ride due to cloud cover.</p>
6	MLV-3	AGI	<p>EMP requires: access controlled via an unstaffed gate at the junction of the public road and the RoW.</p> <p><u>Photo updates from EMPNG</u>: it appears the gate is in place and locked.</p>
7	MLV-4	AGI	<p>EMP requires: access controlled via an unstaffed gate at the junction of the public road and the RoW.</p> <p>Photo updates from EMPNG: it appears the gate is in place and usually locked, although photos acknowledge the gate is open.</p>
8	CV-2, Moro	AGI	EMP requires: no control necessary as rely on OSL road controls at Moro.
9	Agogo tie-in (KP101.8)	AGI	<p>EMP requires: unstaffed gate at the junction between the RoW and the OSL road.</p> <p><u>Photo updates from EMPNG</u>: it appears the gate is in place and locked.</p>
10	Kutubu MLV (KP 107.5)	AGI	<p>EMP requires: unstaffed gate at the junction between the road and the RoW.</p> <p><u>Photo updates from EMPNG</u>: it appears the gate is in place and locked.</p>
11	Moro/Kutubu to Kantobo OSL road, access to CP-1 (KP153).	AGI / Road	<p>EMP requires: access is controlled from the north via OSL staffed gates located at KP95 (CV2) and KP120 (Manu).</p> <p><u>IESC Observation</u>: did not notice being stopped at either of the OSL gates noted above.</p> <p>Unclear if in compliance with EMP – should be checked.</p>
12	Kantobo to Mubi River Bridge EMPNG road (Heartbreak Hill)	Road & Bridge	<p>EMP requires: access is controlled from the north as above, and from the south as below.</p> <p><u>IESC observations</u>: as above and below.</p>
13	Mubi River Bridge to Gobe EMPNG road (upgraded incl. Heartbreak Hill & Mubi Bridge)	Road / Bridge	<p>EMP requires: access is controlled from the south via staffed gates located close to Gobe.</p> <p><u>IESC Observation</u>: did not observe any staffed gates close to Gobe apart from OSL gates on the side-road to Gobe airfield.</p> <p><u>Photo updates from EMPNG</u>: For Mubi River to Gobe Road notes that the boom gate was found in an open position, and no Access Monitors present. These photos may be for the Gobe MLV* as termed Gobe access gate.</p> <p>Not clear if in compliance with EMP – should be checked.</p>

	Access location / infrastructure	Access reason	Current Vehicle Access Control/Monitor Status from EMPNG
14	Gobe MLV (KP192)	AGI	<p>EMP requires: unstaffed gate at the junction between the road and the RoW. There is a 1km access track retained from construction, from the public road to the MLV.</p> <p><u>IESC observation</u>: did not observe any closed unstaffed gate. There were no photos in the EMPNG PowerPoint supplied (unless called by a different name*).</p> <p>Not clear if in compliance with EMP – should be checked.</p>
15	CP-2 (KP227)	AGI	<p>EMP requires: unstaffed boom gate at the junction between the public access track and the RoW.</p> <p>IESC observation: did not observe any closed unstaffed gate. There were no photos in the EMPNG PowerPoint supplied.</p> <p>Not clear if in compliance with EMP – should be checked.</p>
16	KP232	AGI	<p>EMP requires: controlled via an unstaffed gate at the junction between the public road and the RoW.</p> <p>IESC observation: the boom gate was closed but no padlock was in place. The photos provided in the PowerPoint are mis-titled as KP 103 Agogo tie-in but confirm also that the boom gate was closed but not locked.</p>
17	Kopi Shore Base to Kopi Scraper Station	Road / Bridge	<p>EMP notes that access to Scraper Station is directly from the public road, so no access control is necessary.</p> <p>EMPNG previously advised that this road was formally handed over to the government in 2016 following their request in 2015.</p> <p>However, photo updates from EMPNG include images, state there is no functional boom gate in place, the bar/pole pivot was removed/broken, and the Access Monitor was not present. Requirement for ongoing access control and monitoring should be discussed internally.</p>
18	Kikori River Bridge	Road / Bridge	<p>EMP requires: staffed boom gate with Access Monitor gathering data</p> <p>IESC observation: the gate was still present but left in an open manner, the Access Monitor was not present.</p> <p><u>Not in compliance with EMP</u></p>

As noted in the table above, observations made during the May 2024 visit have confirmed that current aspects of intended control measures as set out in the EMP are not in place at some locations and not clear in others. Some controls have *never* aligned with those set out in the 2019 EMP (or previous versions). There have been no MoCs developed or passed to Lenders for these intentional, non-compliant occurrences, as would be necessary to assess whether changes to commitments and procedures will potentially have environmental and/or social consequences. Therefore the existing Observation (M22.4) is increased in priority to a non-compliance Level II being previously noted as an Observation, with gaps flagged multiple times in previous IESC reports and based on direct observations of a significant breach of a commitment.

Access Control – data collection of Upstream vehicle movements

The Access Monitors that are meant to be stationed at Kaiam Bridge and near Gobe are meant to record vehicle and destination details, but ultimately they allow free movement of vehicles along parts of the 'Southern Highway' section (the IESC questions again how this constitutes 'control' of access). EMPNG advise that a payment issue reported previously between clan members and the Clan Agency employing had impacted data collection in 2022/2023 but has now been resolved.

Nevertheless, no Access Monitors were observed on station during this visit. Therefore, the data collected by Access Monitors could be open to challenge, and perhaps cannot be relied upon to be accurate and truly reflective of the volume and type of vehicles i.e. there could potentially be unrecorded use by third party vehicles. EMPNG acknowledge that they are still not getting consistent data in. As per the Issues Table Observation M21.1 where a previous discrepancy related to PMA1 monitoring and assessment of direct & indirect impacts (and whether they are attributable to the Project) has not yet triggered a reanalysis of previous years forest loss characterization, this could be an area of concern for Lenders.

The last IESC report noted discrepancies between vehicle movement datasets provided over different years, with some data compared being different by +/- 500%. Prior to 2020, EMPNG had been proposing to change to a different data analysis methodology. Data presented to the IESC during this visit did not detail quarterly data as before but provided annual graphs with no data. EMPNG state that 2023 road usage is consistent with 2022 road users, with Santos and its contractors being the primary road users. They also state that no logging trucks were seen in the reporting year. Anecdotal conversations suggest that any timber extracted from the Lower Kikori area would be more likely to be exported from the area utilizing the 2022-opened Agiru Highway connecting the Kikori up to Semberigi and Erave using the EMPNG Kaiam Bridge.

Access Control – LNG Plant

IESC reports in 2018-2019 noted repeated vehicular incursions into the pipeline landfall RoW area, with evidence of mangrove trees being cut and extracted. During 2020/21, concrete blocks were placed blocking off the vehicular access route. EMPNG state that ongoing monitoring makes use of security cameras placed along the fenceline at the RoW pipeline landfall. They state there have been no further incursions onto the landfall RoW area.

The IESC visited the RoW landfall at the LNG Plant and did not see any evidence of fresh mangrove harvesting or vehicle tracks in the open back mangrove area.

Ownership of Roads / Infrastructure and Responsibility for Mitigation

EMPNG state there is no change in the current status of road-ownership negotiation descriptions:

- ✓ The Project road linking the Kopi shore base to the Kopi Scraper Station at KP was formally handed over to the government in 2016 following their request in 2015;
- ✓ EMPNG advises there has been no significant change to previous updates regarding any requests from the Government related to handover of Project road-infrastructure such as the **'Southern Highway'** (Gobe to Kantobo road section) and the **Kaiam Bridge** (see IESC report November 2016, Section 3.2 and Section 5.4.2 p.42-43 for background).
 - EMPNG completed an internal risk assessment for use in the event of a request to handover the Gobe-Kantobo section of the 'Southern Highway'. EMPNG now advise they plan to revisit the risk assessment mitigations,
 - EMPNG are preparing for when the request comes and intend to develop an MOU with the government to detail commitments for environmental and social protection once dialogue restarts.

Lenders should note: The government has now embarked on a major multi-phased program to deliver 16,200 km of strategic roads on a rolling 20-year basis – see the Connect PNG 2020-2040 Program (brochure¹⁰). The 'Southern Highway', the section of road linking Moro-Kantobo-Mubi Bridge-Gobe down to the Kaiam Bridge is referred to as the Gulf-Highlands Highway, or the Highlands-Gulf Corridor. It is also worth noting that the government is seeking to develop alternate seaports in the Kikori, maximizing the access opportunities right up to the Highlands. This may potentially have repercussions on the extent to which EMPNG can secure any long-term influence on environmental and social protection of the area surrounding their infrastructure in the Gulf and Southern Highlands provinces and will require careful consideration on risks posed.

The IESC retains at the end of this section the recommendation noted previously.

5.3.3 Recommendation

1. As previously, EMPNG should ensure as part of any negotiations with the PNG government regarding transfer of ownership of roads/infrastructure that every effort is made to prevent any ecological damage through third party access to areas, and therefore allow the company to uphold their commitments made to Lenders with regard to invasive species, induced access, and ecological management. Potential risks need to be fully understood and effective mitigation options discussed.

5.4 REINSTATEMENT AND REGENERATION

5.4.1 Project Strategy

EMPNG's objectives are to promote regeneration of temporary work areas disturbed during construction and achieve vegetation succession according to established benchmarks. Where new ground is disturbed, the

¹⁰ See for example, https://www.businessadvantagepng.com/wp-content/uploads/2020/09/DOW-The-Connect-PNG-A4-Text_ijm.pdf

objectives are to establish stable landform conditions and create ground conditions conducive to natural regeneration to then achieve vegetation succession as above.

The Regeneration Monitoring Program, undertaken every two years, uses fixed and random sampling and a benchmarking scoring system to evaluate the progression of plant community succession within the Upstream area. Project-affected areas undergoing natural restoration are visited, and progress compared against benchmark sites determined previously. The methodology is detailed in Appendix 3 of the Upstream EMP available at www.pnglng.com, and supplements EMPNG's regular aerial assessments of regenerating areas to check for evidence of encroachment or slope failure.

5.4.2 Observations

5.4.2.1 Regeneration Monitoring - Upstream

No updates on Upstream regeneration monitoring were presented by EMPNG during the last site visit.

The latest regular regeneration monitoring surveys were undertaken in March-April 2023, and EMPNG is expecting the survey results and analysis report in June 2024. They state the delays have been down to the same personnel being involved in undertaking EMPNG's weed audits simultaneously and through 2023.

The same 2017 field protocol has been utilized, enabling effective comparison of regeneration plot status over time. A fieldwork completion report detailing the survey logistics was provided and indicated that 80% of the regeneration plots had remained intact and usable for survey – however, this also indicated that 20% of the plots had been disturbed or destroyed. Binatang/BRC noted that the plots closest to communities were more impacted than plots further away. The 20% also included the two regeneration plots were accidentally destroyed during access track clearance on Hides Ridge, noted in the Incidents section above (5.2.2.2).

Results will be reported on in the next IESC review, although EMPNG note they see no reason to report why the progress noted during the previous surveys would not continue, plot disturbance notwithstanding.

IESC observations of RoW reinstatement and regeneration were generally positive and appear to be progressing well, albeit recognizing the trip coincided with the start of the rainy season when lush growth would be expected anyway. Similarly, regeneration of construction slopes and footprint around the boundaries of the HGCP, observed from walking the internal perimeter fence also looks satisfactory – only a few small areas of erosion were noted, and the HGCP Site Logistics Team attends and remedies any issues during their regular maintenance program.

5.4.2.2 Regeneration observations – mangroves at the LNG Plant

EMPNG presented static point photographs to indicate progress at each photo point over time, however the 2024 status photos were taken when the tide was in, so effective comparison to previous years was not feasible. The choice of photo locations for 2024 were not in the exact same place as previous images were captured. Only one of the photo points provide a comparison of 2024 versus 2017, the first year of photo point use, the others compared 2024 to 2023. These points suggest a lack of understanding of the reasons behind use of static photo points, to provide visual indications of change over the longer term.

IESC direct observations during the visit suggested that mangrove regeneration and habitat restoration had progress significantly relative to the annual change observed previously. No obvious signs of recent harvesting of mangrove trees were observed. EMPNG report more mangroves on the pipeline RoW than the same survey in January 2023. They note an increase in the presence of *Rhizophora stylosa* and *Lumnitzera racemosa* colonizing the ROW amongst the usual *Avicennia marina*. They note that increased numbers of red fingered crabs indicate the increasing functionality of the mangrove ecosystem, and seagrass beds are starting to occur in the shallow waters seaward of the landfall.

5.4.3 Recommendation

1. Reconsider why static photo points are being used and consider developing a protocol to ensure images are captured and utilized correctly.

5.5 INVASIVE SPECIES, PESTS AND PLANT PATHOGENS

5.5.1 Project Strategy

EMPNG's objectives are to prevent invasive species (i.e., priority weeds and pests) and plant pathogens from entering or becoming established in (or in the vicinity of) their facilities and infrastructure, and contain existing priority

weeds, pests and plant pathogens already present. A Weed Identification Manual has been developed, the Weed Monitoring Protocol revised (as per the revised audit approach in 2018), and a Register of Invasive Species, Pests and Pathogens was kept to track any changes in invasive species type, abundance and distribution (previously updated through external specialist audits). Now, records are made by EMPNG's external contractor ISOS and staff members where weed observations are noted, and control measures performed.

The project footprint was originally split into separate Weed Management Zones (WMZs), each delineating broad ecological units based on previously understood patterns of distribution and abundance of weed populations. These zones were used for the phased mitigation approach as pipeline construction/reinstatement progressed through the Project area – these WMZs are summarized in the Upstream EMP (2019). The current specialist monitoring approach utilized by BRC on the Project's behalf was developed and adopted in 2018 and assesses weed abundance and distribution across four elevation zones.

The EMP notes that invasive weeds exist in the natural environment but are categorized according to their potential for environmental harm and hence priority for management. The distinctions between different priorities of weeds are defined as: Priority 1 (P1) weeds have the ability to suppress and displace most native species especially in new disturbed areas; the Project aims to control and monitor all P1 weeds and exclude them from all work areas through active control. Priority 2 (P2) weeds have the ability to become locally dominant with potential to outcompete some native species; Priority 3 (P3) weeds have the potential to proliferate in new disturbed areas.

EMPNG commits to manage the threat of spread of *Phytophthora cinnamomi* by preventing the spread or introduction of Type A2 into unaffected areas, in particular ecologically sensitive areas susceptible to senescence.

With regard to quarantine implications of imports into PNG, EMPNG has developed and adopted quarantine requirements which aim to prevent the importation and spread of foreign invasive species, pests, pathogens or disease; quarantine requirements are contained within a Quarantine Procedure.

5.5.2 Observations

As predicted in the EIS, for the Operational period, the impacts associated with weeds and exotic fauna were considered likely to increase with time (EIS Table 18.20). It predicted that 'over the 30-year operational life of the PNG LNG Project, the potential impacts such as wildlife, dieback, weed & pest invasion and enhanced access to these remote and pristine parts of PNG present some of the greater challenges to the Project'. Also, 'possible introduction of weeds, pests and pathogens could immediately impact on the core set of significant areas along the pipeline routes'. 'The control of wildfire initiation, quarantine and the control of access along the PNG LNG Project infrastructure are fundamental mitigations required to manage any indirect impacts on the significant biological areas'.

5.5.2.1 Weeds Site Inspection and Control

EMPNG state their vector control contractor continues to undertake weekly monitoring comprising visual inspections of areas known to support weeds, detecting new outbreaks, and follows-up opportunistic observations by field teams and drivers. Records generated for daily, weekly and monthly reports are from the contractor to the Biodiversity Team who then updates the Weed Register and weed control is then tracked. EMPNG advised there is a contractor rep (or their back-to-back) at both Hides and Moro.

The IESC were unable to meet with contractor representatives due to a clash with their changeover schedule. Therefore, an update on their activities and any limitations experienced (as noted in previous IESC reports) could not be discussed. However, EMPNG provided information on the current coverage of weed control. During road-trip discussions it appears the full RoW (e.g. south of Moro) is no longer under active site inspection and ongoing control by the weed control contractor, primarily due to availability of vehicles and Community Affairs Officers. The EMP requires control of P1 weeds in all Weed Management Zones south of Moro including:

- ✓ From Lake Kutubu to Mubi River – Control P1 weeds species. Plus control P1 and P2 species from roadsides between Mubi River and Kantobo;
- ✓ From the Mubi River to the Kikori River – Control P1 weed species. Manage the zone as a quarantine buffer between lowland and upland/Highland sections;
- ✓ Kikori River to Omati – Manage P1 species within EMPNG facilities as needed and put in measures to manage the further introduction of P1 weed species.

The Weed Management Zones in the EMP do not align with those in the Weed Control Procedure, updated in 2022. The scope of the Procedure includes the full pipeline RoW and all AGIs and stipulates regular site inspections by the weed control contractor of all sites, including the Row and AGI's. This should be reviewed.

An updated weed register was not available in time for review for this report. Lenders will recall previous IESC reviews trying to gain an understanding of the distribution, abundance and spread of priority weeds, what ecological risks might arise from weeds observed in areas where they weren't seen previously, locations where weed control is particularly challenging, updates on priority areas for P1 high priority weeds control, etc. The deliverables required to close Non-Conformance M20.2 were not presented or made available and therefore it is retained.

The washdown unit was observed to be still in operation at Hides Spine, and EMPNG report the mobile unit at the MLV2 access road is still in place and operational.

5.5.2.2 Specialist Weed Audits

The annual weed audit was again undertaken by Binatang/BRC in 2023, this time covering 584 transects, slightly down from the peak of 672 in 2022, then previously 108 in 2018, 367 in 2019 and 389 in 2021 across four elevation zones: Lowlands (0-122m above sea level, asl), Foothills (140-1248 m asl), Lower Montane (1266 m asl) and Higher Montane (2574-2775m asl).

The 2023 survey recorded 109 weed species in total, including 17 P1 species (12% of total species), 12 P2s, the rest being lower priority P3s. BRC's audit report notes a statistically significant trend of increasing weed diversity (P1-P3) over the period of 2019-2023, and of P1 species in particular, as presented in the graphs below.

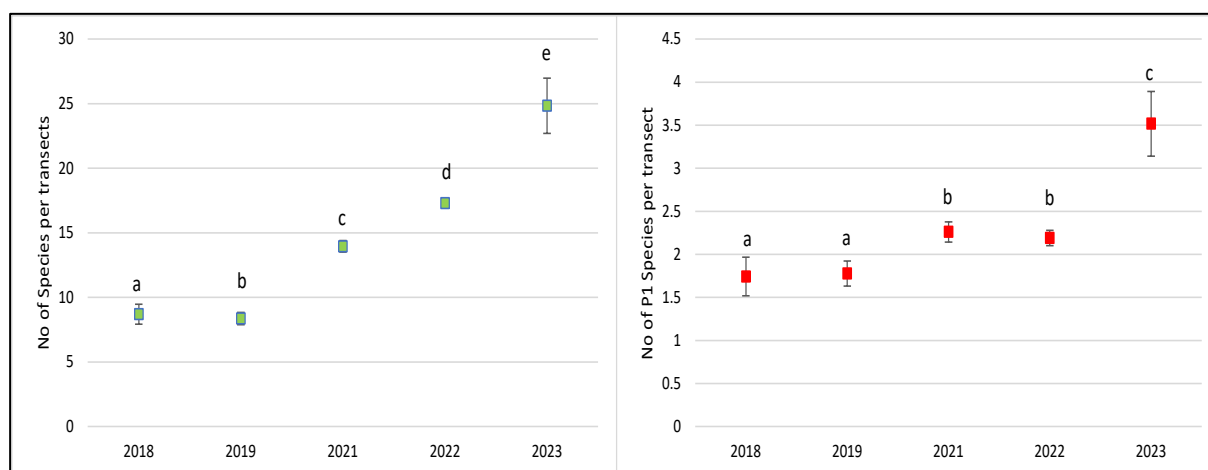


Figure 5.3: Trends in All Weeds (Left) and P1 Weeds (Right) Species Observed (BRC, 2024)

BRC concludes there is a general trend of increasing abundance of P1 weeds, and that the total number of all weeds has more than doubled over the period 2019-2022. Highest increase has been observed in the number of P1 species in the Lower Montane, and this being especially true of *Piper aduncum* where its abundance has rapidly increased in both the Foothills and Lower Montane zones. One P1 species, *Leucaena leucocephala*, newly found in 2023 is already noted as a new species of concern – although still low in numbers, the authors recommend specific monitoring through subsequent surveys.

The report indicates that in 2023, the five most common P1 species represent 80% of all P1 species records. There are variable patterns of elevation distribution for these five: *Piper aduncum* has the broadest elevation distribution, being the dominant P1 species in all zones; *Ludwigia leptocarpa* and *Cyperus involucratus* are predominantly lowland species; *Cenchrus purpureus* preferring mid-elevations; and *Desmodium sequax* predominantly a highland species. BRC do note, however, that weed species are typically distributed across wide elevation ranges so that adjacent zones share approximately 50% of all species – this is contrary to findings in earlier weed audits when the case was made that each elevation zone was more distinct, and therefore it was less likely that species might spread between different ecological zones.

Weed communities appear to display a rapid turnover in species composition between subsequent years of audits. For example: (1) 17 species of weed were newly recorded in 2023 i.e. not recorded previously, (2) of the species recorded in 2022, nine species were not recorded again in 2023, (3) 20 species recorded in 2018 and/or 2019 were not present in the 2023 survey. No reason was provided for this. Pure conjecture on the part of the IESC, but this might suggest that the regenerating RoW vegetation is still in a state of some flux and/or that species identification has proved challenging for the survey team.

BRC do note that herbaceous species are the most common species observed, followed by grasses and shrubs, with trees and vines being the least represented – perhaps indicative of the vegetation maintenance performed on the RoW, that cuts back any growth likely to form deep root structures over the pipeline/fiber optic cable. They note the dominance of herbaceous and grass life forms suggests a potential for decline in most of the weeds when the secondary succession progresses to the closed canopy forest stage (where herbs and grasses typically do not survive in the understory). However, the IESC notes the RoW will likely not be able to progress to closed canopy, due to the need for aerial surveillance by chopper along the pipeline and around AGIs.

Regarding control, they recommend EMPNG actively control three species in particular: *Piper aduncum*, *Ludwigia leptocarpa* and *Desmodium sequax* in their areas of maximum abundance [nevertheless the IESC highlights the EMP requires active control of *all* P1 species across all of the RoW and AGIs]. BRC also recommends (i) continuation of the annual surveys, (ii) that surveys are also conducted outside of Project footprint taking in various anthropogenic and natural disturbance regimes (in order to establish the benchmark values against which RoW data could be evaluated), and (iii) that experiments on the potential impact of *Piper aduncum* be continued.

This is BRC's fifth annual Upstream-wide weed audit, so real benefits will be delivered in years to come with continued use of a consistent methodology eventually resulting in a comparable long-term dataset.

During discussions, the point was raised that audit findings could potentially be skewed slightly, dependent on time of year of the BRC weeds audits versus the timing of Clan Caretaking RoW vegetation maintenance i.e. it may be more difficult to identify or notice weeds if cutting has recently occurred. EMPNG is aware of this and will review.

Finally, EMPNG maintain that certain P1 weeds currently found along the RoW in areas where they were not previously recorded, were actually *present* prior to construction but were not correctly identified at the time. For example, (1) Homa-Benaria Ridge is a key priority ecosystem and was deemed to be largely weed-free in 2012¹¹, but more latterly there have been approx. 20 species recorded, (2) during pre-construction the P1 weed *Ludwigia leptocarpa*, was only found in the Omati and Kikori areas, but by late 2013 was found further up the RoW at Moro, and by 2015 was found further up at Angore. Speaking in 2022 with a representative that participated in some of those PCS surveys, they advised that specialist vegetation scientists were employed to undertake the work and, in their opinion, it's considered highly unlikely that so many easily identifiable P1 weeds could have been *repeatedly* mis-identified. The potential for weed transmission along the RoW was a significant impact predicted in the EIS and is therefore a risk of significant interest to Lenders. A recent State of the Environment report¹² indicates that invasive species are an area of concern requiring urgent attention and listed as one of the top threats to Pacific Island resilience. It is IESC opinion that EMPNG should consider an independent specialist review be undertaken to try to resolve this significant, alleged discrepancy – the Observation M22.5 raised in 2023 is retained.

5.5.2.3 Cane Toads

As reported in the last few IESC reports, cane toads (*Rhinella marina*) have become an increasingly challenging invasive species in the Upstream Highlands area. This toxic pest affects native fauna that die due to ingestion of their poison and can create imbalance across ecosystems wherever they are found. Following the detections of cane toads at Kopi Shore base during construction, at Tamadigi (around 2012/13), in Moro-B in 2015, at HWMF in 2016, and HGCP in 2018, a recorded increase in the number of sightings at HGCP and HWMF has prompted an increased Project response.

As noted previously, the numbers of juveniles/adults recorded were initially quite staggering, although depending on location, numbers of juveniles and adults now appear to be decreasing. EMPNG state there were less than 10 adults and juveniles combined found at HGCP during 2023 and note that the weekly schedule of nightly inspections continues.

The HWMF at Kopeanda is still proving a difficult location to manage numbers. A Cane Toad Collector is based there full-time. Numbers of adults/juvenile cane toads caught are represented in the EMPNG graph below.

¹¹ EMPNG Biodiversity Strategy Rev.2

¹² State of the Environment and Conservation in the Pacific Islands: 2020 Regional Report. Apia, Samoa: Secretariat of the Pacific Regional Environment Program, 2021.

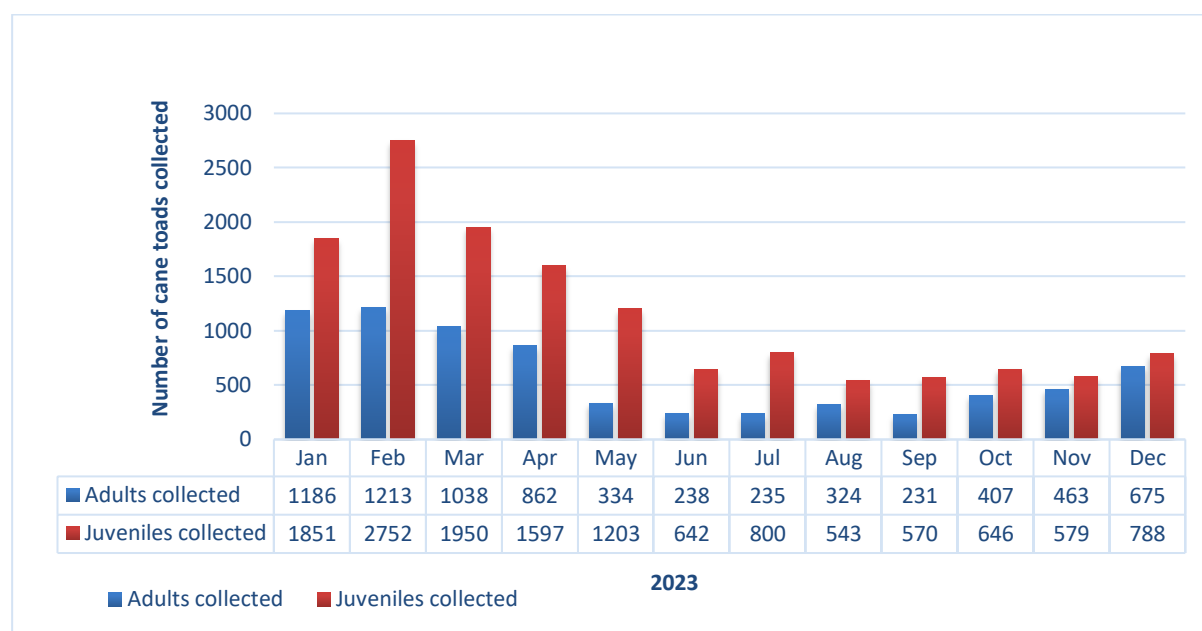


Figure 5.4: Number of Juveniles and Adult Cane Toads Managed at HWMF

The mobile vehicle washdown station is still located at MLV2 to check vehicles passing up the Homa Ridge access track when required for the 2018 earthquake recovery work program. The IESC observed that vehicle checks are no longer undertaken at HGCP or at Moro.

As before, key from a Lender risk perspective is that the Project should continue to prevent and manage the presence/spread of cane toads, and receive specialist advice from external experts, reacting responsively to their recommendations. The IESC acknowledges EMPNG are trying to locally manage a situation that is very challenging but suggests that EMPNG again consult with cane-toad management specialists to ensure their protocols, vehicle inspections and washdown locations are an effective approach to combatting unintentional transportation, appropriate for the Project's operations.

5.5.2.4 Plant Pathogens: Dieback

Lenders will recall previous IESC reports noting that the last four PMA3 surveys at Hides Ridge (2015, 2017, 2019 and 2021) had found canopy trees along the edge of linear clearings becoming increasingly stressed, and in many cases, dying. This was particularly evident for *Nothofagus* trees along the eastern (lower) half of Hides Ridge. The affected canopy trees on Hides Ridge were thought to potentially represent the effects of the fungus and plant pathogen, *Phytophthora cinnamomi*, to which *Nothofagus* species and Papua New Guinea Oak *Castanopsis acuminatissima* are particularly susceptible. The PMA-3 authors noted in their last field report the reduced field observations made on dieback due to changes in the Biodiversity Team, but they recommended the Team initiate regular quantitative assessments of vegetation condition along transects to provide a covariate of vegetation condition for future surveys. They also said similar assessments should be considered to more rigorously document dieback at regular time intervals at sites on Hides Ridge. They recommended further consideration to select an appropriate and rapid assessment method. The 2019 Upstream EMP highlights the need to apply the precautionary principle, to inspect and sample instances of outbreaks of the spread of the fungus *Phytophthora cinnamomi*.

As EMPNG had not reacted sufficiently during the reports from the PMA-3 team, last year the IESC raised a Level II non-compliance to stress the urgency in acting on their specialist advisor's recommendations and to understand the nature of any outbreaks or spread of *P. cinnamomi*.

During this visit, EMPNG provided information on specialist field surveys undertaken for the Project during 2023 by notable forest pathologist, Dr Frans Arentz and his team. The survey objectives were:

- ✓ Undertake visual inspection of known and potential dieback sites along the Hides Spine, the pipeline RoW between HGCP and Moro, and of previously documented dieback sites at Mano (K 124-126) to attribute potential causes;
- ✓ To train EMPNG field personnel to collect soil samples, critical to identifying *Phytophthora*;

- ✓ Sample new localities where dieback has been observed since 2011 (objective not noted in Dr Arentz field report but presented by EMPNG during the visit);
- ✓ Resample locations where A1 or A2 *P. cinnamomic* had been recovered during PCS surveys to help assess trends, A1/A2 presence/absence, dieback in the natural forest ecosystem.

Preliminary visual observations from this first phase of work were provided in a Field Report:

- ✓ A visual inspection of tree dieback of the Hides Spine and RoW by road, drone and chopper flyover: no recent mortality was observed in overstory trees, although a significant number of dead trees were seen. This was deemed to be the result of root destruction and disturbance associated with original pipeline construction. The drone did pick up some tree decline thought to be an ongoing (especially around KP+15, on the Spine) where yellowing/browning of leaves was observed in conjunction with some crown-thinning (suggesting the decline was current), and what appeared to be recent mortality of understory shrubs at several locations between WP-F and G on the Spine road;
- ✓ A chopper flyover of the RoW between HGCP and Moro: much of the tree mortality observed was considered related to original pipeline RoW construction, although significant areas of dead trees observed adjacent to village gardens between the HGCP and KP23;
- ✓ On the ground visual inspections at Manu KP123-125: there was no evidence of recent tree mortality, and the forest appeared to be in better condition than in 2021, although tree mortality from initial pipeline RoW construction was still evident;
- ✓ Soil samples were taken on Hides Ridge and at Manu, and the opportunity taken to train EMPNG field personnel in sampling and storage techniques. A total of 83 soil samples were collected from 23 locations. Soil samples are being stored at HGCP until such time that a suitable laboratory can be established. Soil samples could not be retrieved from all areas identified as necessary by Dr Arentz, but he has made specific recommendations to EMPNG where this should occur.

During construction, a lab was sited at Moro B camp. During their recent field work time in country, a lab at the LNG Plant was explored to look at its suitability for processing and isolation of *Phytophthora* from the soil samples – they note that the biggest hurdle will be finding sufficient space to bait more than an estimated 100+ soil samples, and the lab at the LNG Plant was not sufficiently large for this exercise. EMPNG presented that lab equipment would be commissioned at the HGCP during the second half of 2024.

More detailed results, analysis and recommendations will be provided once further sampling, study and lab work is complete.

The regular surveys as recommended by the PMA-3 report authors have not commenced.

The IESC non-compliance M21.2 is retained until the work and analysis is complete and any adaptive management is understood.

5.5.2.5 [Wallabies at LNG Plant](#)

As noted in the last IESC report, wallaby (*Macropus agilis*, IUCN Least Concern) numbers within the Project's LNG Plant boundary fence had reached a level whereby EMPNG senior management deemed them a risk to personnel safety and plant integrity. Since construction, the barrier of the boundary fence and abundance of maintained grass within the fence has created a relatively safe habitat and breeding space. The population had reached such a level that local hunters were hunting through the fence from the public road, gun shots had been heard and intruders were caught on CCTV trying to hunt wallabies at night inside the facility fence.

Following the initial cull under permit from CEPA in January 2023, EMPNG report that wallaby numbers have continued to increase within the fence. The next steps are to re-evaluate potential management options including non-lethal methods. With the early planning for pre-Papua LNG construction, the company will be developing a plan for long-term population monitoring and management and will provide the IESC with updates during the next review.

5.5.2.6 [Quarantine & Import/Export Permits](#)

The National Agriculture and Quarantine Inspection Authority (NAQIA) is the public-funded institution under the Ministry of Agriculture and Livestock whose role is the protection of Papua New Guinea from infectious pests and diseases that have the potential to seriously harm PNG's unique animal and plant life and affect economic growth. Prior to construction, a Lender concern was to ensure the project did not create undue pressure on NAQIA resources, hence the IESC has tracked EMPNG-related imports over time.

EMPNG provides data related to the number of total shipments imported into PNG by EMPNG or their contractors, the number of these shipments inspected by NAQIA, and the numbers of fumigations that NAQIA believe to be

necessary following that inspection (typically due to either dead or live species being found within, or incorrect/unclear documentation). As fumigations are meant to happen at the port of origin, refumigations should not be necessary if EMPNG's requirements to freight forwarders or shippers are properly followed – hence this is a good indicator of how well the process is going – key EMPNG data is shown in the IESC's graph below.

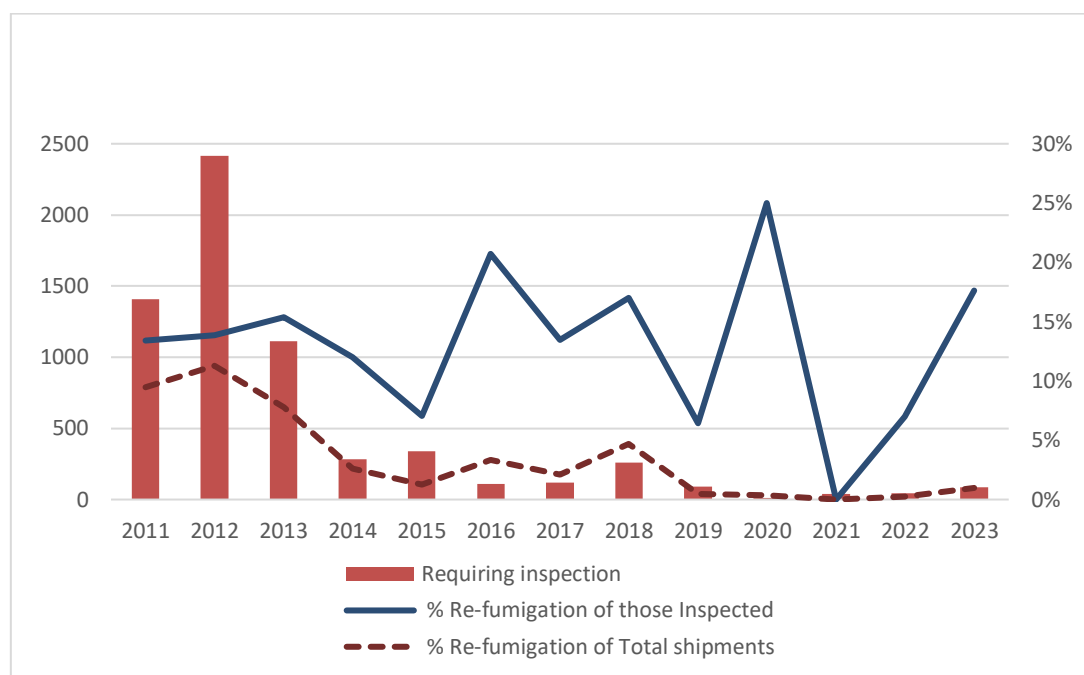


Figure 5.5: Number of Shipments Imported that Required Inspection on Arrival and Those Inspections Resulting in NAQIA Requiring a Re-fumigation

A discrepancy in the data for 2021 was noted in our last report; Figure 5.5 incorporates corrected data provided by EMPNG.

The data indicates that 2023 import volumes increased by around 74% over 2022 numbers, up to just over 1500 shipments, primarily due to equipment required to support the rate reduction activities related to maintenance work at HGCP.

The number of refumigations (15) as a proportion of total shipments has dropped, but refumigations required as a proportion of inspections (85) has increased over the two years from 2021. Of the 15 refumigations required in 2023, 10 were primarily down to one particular vendor importing from an origin where fumigation should have already occurred (as per EMPNG's scope of work). The IESC requested NAQIA's 'notices of detention' (which would detail the reasons for re-fumigation) to see if there was any pattern, but this information was not available in time for writing the report. The IESC recommends this be further investigated.

5.5.3 Recommendations

1. The Weed Management Zones in the EMP do not align with those in the Weed Control Procedure, updated in 2022. The scope of the Procedure includes the full pipeline RoW and all AGIs and stipulates regular site inspections by the weed control contractor of all sites, including the Row and AGI's but this is not occurring. This should be reviewed – relates to non-compliance M20.2.
2. EMPNG again consult with cane-toad management specialists to ensure their protocols, vehicle inspections and washdown locations are an effective approach to combatting unintentional transportation, appropriate for the Project's operations.
3. EMPNG Logistics should investigate the increase in the need for refumigations following NAQIA inspections (see graph) e.g. by analyzing the NAQIA Notice of Detention for each. These were requested but not made available at the time of writing this report.

6 SOCIAL

6.1 LAND ACCESS, RESETTLEMENT, AND LIVELIHOOD RESTORATION

6.1.1 Project Strategy

The Land Access, Resettlement and Livelihood Restoration Management Plan – Production applies to any new land access required during the Production phase and for managing the commitments for land that was obtained in the construction phase. This Plan supersedes the Resettlement Policy Framework developed for construction phase land acquisition. Livelihood restoration obligations for displacement that occurred during the construction phase, as well as evaluation of resettlement and livelihood restoration outcomes and the independent external audit of the resettlement and livelihood program, are also covered by this Plan. The independent external audit was completed in 2015.

The Plan defines the principles and approach to be used for management of the inter-linked activities related to accessing land, resettlement, and livelihood restoration. The content of the Plan is consistent with IFC Performance Standard (PS) 5.

6.1.2 Observations

6.1.2.1 Current Resettlement

Resettlement obligations concerning areas (i) KP0.90 Kutubu Spurline Exclusion Zone and (ii) KP65.9 Pipeline River Crossing carried over from 2022 were completed in 2023. Results of the outcome evaluation showed a combination of improved or maintained post-resettlement standard of living and livelihood conditions.

New Land accessed Areas 2023-2024

Additional land was accessed for (i) pipeline remediation, (ii) construction of temporary Camp Site at Hides WPC, (iii) easement for repairs of high voltage cable at Hides WPD, and (iv) construction of new well at Hides WPF.

Only one area acquired required preparation of a RAP Addendum. The IESC reviewed and accepted this Addendum. RAP Addendums were not required for the other areas acquired as acquisition caused no or only minimal economic impacts for which owners/users preferred compensation.

The area concerned by the RAP Addendum was KP65.9, affected by pipeline remediation activities which required extra workspace. One household was physically and economically displaced. Relevant agreements were signed, and compensation was paid at full replacement value. Impacted gardens were fallow gardens of minor dimensions, thus livelihood restoration was not required. The household was offered a package which included (besides cash compensation), options of (i) solar panels plus battery and lighting or (ii) water tank (1000L tank) and accessories required to install the water tank. The household selected the latter option. The IESC visited the location during the site visit and found the support measures appropriate.

6.1.2.2 Alternative Livelihoods Strategy related to the Biodiversity Offset Program

The PNG LNG project has implemented a Biodiversity Offset program to achieve "No Net Loss" of biodiversity (see more details in section 5.2.2.2). This involves creating measurable conservation outcomes to offset unavoidable impacts and engaging local communities in managing existing and new protected areas. Areas targeted by the program are, among others, Lake Kutubu, Aird Hills, and Wau Creek. In this framework, the Project provided a document named *Alternative Livelihood Strategy (ALS)*, whose main objective is to set the strategy to provide development opportunities through alternative livelihood initiatives, ensuring that community subsistence and livelihoods remain unaffected by the Offset program. These initiatives not only will provide long-term benefits to local communities, but also will permit EMPNG to meet its obligations under the Project Loan Agreement and IFC Performance Standards. IESC has reviewed the document and finds it coherent and adequately developed. However, the strategy is considered preliminary (it is intended as a pre-scoping document), and although the next steps to be taken are generally defined, the timelines (and relevant commitment) for the Project to develop and implement the ALS are not provided. Given that the implementation of this strategy must go in parallel with the implementation of the Biodiversity Offset Program, IESC will closely monitor relevant progress during the next monitoring visit.

6.1.3 Recommendations

None arising from this review.

6.2 COMMUNITY IMPACTS MANAGEMENT AND SECURITY

6.2.1 Project Strategy

Project commitments to community impacts management during Production are contained in the Community Health, Safety and Security Management Plan – Production that addresses health, safety and security from a community perspective. See Section 8.2 in this report for IESC comments on Community Health.

The objectives of this Plan are to:

- ✓ avoid or limit risks to and impacts on the health, safety and security of the community during the production phase from both routine and non-routine circumstances through implementing targeted prevention programs to reduce risks, along with the implementation of an effective monitoring and evaluation program;
- ✓ ensure that safeguarding of personnel and property is conducted in an appropriate manner that avoids or limits risks to the community's safety and security; and
- ✓ maintain a monitoring and evaluation program that is community-based, participatory, and transparent and covers all phases of production and decommissioning.

Elements of the Production Community Development Support (CDS) Management Plan also apply as it relates to community development support activities undertaken to mitigate the impacts or potential risks generated by Company activities with the objective to avoid or reduce the risk of adverse social impacts on Papua.

6.2.2 Observations

Based on the IESC's long review history of the Project, we feel that understanding of the security conditions in which the Project and its surrounding communities operate is essential as the Project goes forward. The discussion below focuses on the main security community contextual circumstances.

Tribal Conflicts

- ✓ Clan fighting continued to destabilize political and economic community conditions in the PNG LNG Project footprint, particularly in Hela Province where intra and inter-clan rivalries persist. According to the tradition and value system of the Huli culture, the elements which trigger tribal fights are, in order: (i) land disputes, (ii) conflicts over pigs and (iii) conflicts over women. In addition, other triggering causes of conflicts can be generational disputes and other long-standing grievances that escalate simple disputes. The GoPNG, through official Peace and Good Order Committee work and by Hela Provincial Law and Justice advocacy, has been actively involved in mediating tribal conflicts and promoting dialogue between disputing factions in the Upstream Operating Area;
- ✓ The number of active clan conflicts in the Highlands continued to be particularly volatile in 2023, as they were in 2022. In addition to loss of life and property, tribal conflict also resulted in internal displacement of communities. Tribal conflicts in Hela province indirectly affected Project operations, causing precautionary temporary suspensions of external work fronts and logistics movements. Reportedly, although the number of violent incidents has not increased, their lethality has risen due to the continued spread of high-powered weapons, which remain a primary concern for the security of the Upstream population and the Project.

Crime

- ✓ Crime remained prevalent within communities across the EMPNG footprint. In 2023, incidents impacting these areas included assaults, kidnappings, thefts, civil disorder, robberies, rapes, vehicle hijackings, illegal roadblocks extracting unofficial 'tolls,' and murders. In January 2024, a State of Emergency was declared in Port Moresby due to an unprecedented outbreak of looting. EMPNG implemented precautionary security measures, including travel restrictions, which had no direct impact on personnel or operations, but delayed the IESC field visit from February to May. Crime continues to be exacerbated by ongoing socio-economic issues and unemployment, along with ineffective judicial mechanisms and infrequent prosecution of offenders. In 2023, PNG and Australia signed a new bilateral security cooperation agreement focused heavily on PNG's internal security, with Australia committing to develop the capabilities of the PNG police force and military. Additionally, 2023 saw further development of foreign donor-supported programs in Hela to improve law and justice processes.

Effects of Alcohol

- ✓ Drug and alcohol use continued to be a major source of insecurity in local communities, leading to antisocial behavior, criminal activities, and public disturbances throughout the Project area. Clan payback traditions often turned alcohol-related violence into destabilizing and persistent clan conflicts. During 2023 provincial

governments and security forces continued to conduct outreach and awareness programs in response to the negative impacts of excessive alcohol consumption on law and order.

Project Effects

As mentioned above, EMPNG operations within the Highlands are under a “Severe” security threat characterization due to increased security complexity, increased law-and-order challenges, and significant security incidents. In addition to efforts to enhance the livelihoods of local communities, the Project includes communities in its security programs. An example is the case of the fractious area surrounding the Komo airport, where Community Affairs (CA) experimented with appointing two members from two conflicting clans as Village Liaison Officers (VLOs). This appointment forced them to engage in dialogue and initiate a phase of diplomatic conflict resolution, significantly reducing hostilities in the area. IESC considers this case emblematic of how the Project can serve as a mediator in the area and supports the EMPNG team in continuing in this direction.

Enga Landslide

On 24 May 2024, a landslide occurred in Mulitaka, Enga province.¹³ More than six village have been destroyed and at least 2,000 victims are estimated. The area is about 100 km away from Project sites, thus not physically affected, but the project’s workforce has been indirectly affected as many are from Enga Province and have family and acquaintances there. Reportedly, ExxonMobil has committed up to PGK \$1M in financial assistance and are in the process of supporting with in-kind donations of 40,000L of diesel fuel to aid first responders and the recovery efforts.

6.2.3 Comment

None arising from this review.

6.3 COMMUNITY DEVELOPMENT SUPPORT PROGRAM

6.3.1 Project Strategy

Project commitments related to community development support are described in the Community Development Support Management Plan – Production. This Plan covers all community development support activities undertaken by the Project. The objectives of the CDS program apply also to project functions undertaking other community support initiatives.

The objectives of EMPNG community development support activities are to:

- ✓ promote development of conditions that strengthen communities’ ability to benefit from the Project’s presence;
- ✓ avoid or reduce the risk of adverse social impacts on PNG communities;
- ✓ provide opportunities for sustainable development benefits in a culturally appropriate manner; and
- ✓ ensure that the development process fosters full respect for the dignity, human rights, aspirations, cultures and natural resource-based livelihoods of Indigenous Peoples, thus meeting both local regulatory and IFC Performance Standard 7: Indigenous Peoples (2006) requirements.

6.3.2 Observations

6.3.2.1 Update on IESC Recommendations from 2022 IESC Review

The IESC 2022 review requested the Project to make demonstrable effort to develop and begin implementation of a Project level CDS strategy and plans for its cross-functional programs

IESC believes that progress has been made in this regard. Many CDS activities were conducted throughout the year, although there were some delays compared to the schedule (the reasons for this are explained in more detail below). Overall, the organizational restructuring implemented last year seems to have paid off. The various teams responsible for managing social issues (CDS, CA and Land Advisor) proved to have the necessary competencies. Moreover, many members have long-term experience with the project, which is an added value. RINA encourages EMPNG to continue its efforts and ensure the needed support for CDS activities.

Reportedly, during 2023, a new process has been introduced to enhance cross-functional transparency and coordination across various programs. The CDS team conducted its first workshop to review ongoing projects and begin planning the CDS Three-year Plan. In addition, a scope was created and published to hire a consultant for

¹³ https://en.wikipedia.org/wiki/2024_Enga_landslide

Measurement and Evaluation (M&E) and community needs analyses. Finally, the CDS team continues to collaborate closely with cross-functional teams and key external stakeholders to ensure the program is well-suited to its purpose and aligns with shared objectives.

In 2023, CDS's total expenditure reached an all-time high (USD\$5,240,000 for Upstream, and USD\$828,000 for the LNG Plant site, for a total of USD\$6,068,000). Numerous activities were conducted, which included the delivery of health (see section 8.2.1) and education infrastructure along with initiatives for both local livelihood and law & justice development.

Education

Upstream:

Executed possibly the most extensive CDS education infrastructure support program in the history of CDS.

- ✓ construction of two double classrooms (in Juni and Hupikini Primary Schools) and the construction (ongoing) of five staff houses (in Undupi, Tugupawi and Para Primary Schools);
- ✓ completion of six fencing structures;
- ✓ installed a science laboratory at St. Paul's Komo Junior Day High School, leading to its accreditation as a secondary school authorized to teach Year 11 and 12 students.

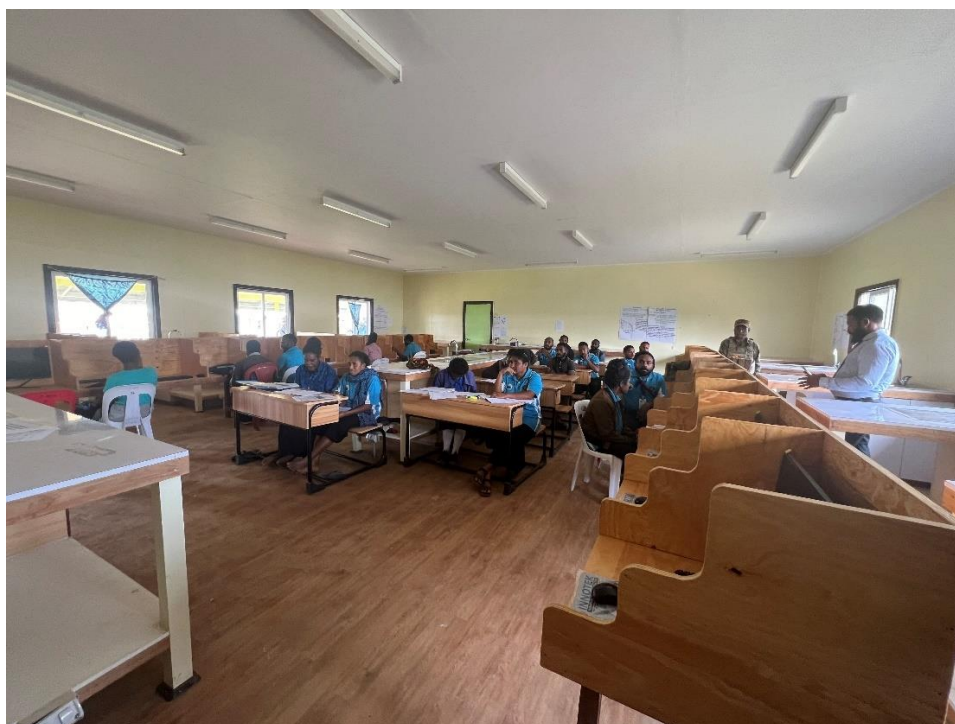


Figure 6.1: The Science Laboratory at St. Paul's Komo Junior Day High School

Plant Area:

Reportedly, CDS financed its most extensive infrastructure program since the program's inception.

- ✓ construction of two two-story double classrooms, two staff houses, two double classrooms, one school administration building, and one village courthouse currently ongoing;
- ✓ ongoing support for school commemorative events such as Schools Awards Day and Graduation. Support also extends to the Road Access Corridor communities of Baruni and Hanuabada.

These interventions were supported by the continuous development of several partnerships established or enhanced with local actors to collectively boost provincial education results. Finally, PNG LNG scholarships continued to be assigned in 2023, with 100 education positions (valued at PGK1,815,904) awarded (30x continuing students, 30x Higher Ed and 40x TVET awards).

Livelihood

Upstream:

- ✓ Support provided to the Weekly Fresh Produce Market, aiding local farmers who supply produce to local service providers such as Hides Alliance Group and Angore Alliance Group.



Figure 6.2: The Weekly Fresh Produce Market Which Serves Local Service Providers Hides Alliance Group and Angore Alliance Group

- ✓ In 2023, a total of 203 markets were held by three core groups, generating a total revenue of K265,081. Paija Women's Agri-business Group accounted for the highest revenue, with 68% of sales, followed by Komo Youth for Change with 22%, and Teni Angore Loose Particle Youth with 10%. Since its inception in 2016, the fresh produce market livelihood program has generated revenue of K1,233,977 for the three local groups;
- ✓ In early 2024, the livelihood program expanded to include spice production to broaden market opportunities. In this regard the CLIP (Community Livelihood Improvement Project) program has expanded to include spice training for 160 farmers across Upstream PDL 1, 7, and 8 locations;
- ✓ Furthermore, financial literacy training was provided to 160 women from 10 local SME groups under the CLIP program;
- ✓ In 2023, EMPNG donated more than 3000 solar kits to support Homa Paua communities along the pipeline Right of Way.

Plant area:

- ✓ Built and completed the Boera stormwater drain. This will help mitigation of damage to community infrastructure and lowers the risk of contaminant spread by establishing efficient filtration systems;

- ✓ Initiated in 2022, the Feasibility Study on the Caution Bay Fisheries Management Program was finalized in 2023. This extensive study focused on fisheries livelihoods in the LNG Plant communities to guide the development of a Fisheries Management Plan aimed at fostering economic growth opportunities.

Law & Justice

Upstream:

- ✓ Sport remains a pivotal tool for encouraging youth participation, fostering sportsmanship, teamwork, and community cohesion. In 2023, EMPNG finalized the construction of basketball and volleyball courts across Hides, as well as basketball courts in Angore;
- ✓ A new Local Level Government Chamber was constructed in Komo to support Provincial plans for developing Komo as Hela's second growth township. The project is scheduled to be officially inaugurated in 2024;
- ✓ Supplies were delivered to the Rural Women's Development Foundation in Hela Province, providing essential support to multiple safe houses and aiding in the rehabilitation of survivors of sorcery-related violence or tribal fighting displaced victims.

Plant area:

- ✓ Construction of the Papa Village Court House, supported by the design from the PNG Department of Justice village court;
- ✓ Assistance provided for the Festive Season Neighborhood Watch Program, including provisions for community volunteer rations to manage law and order issues during the festive season. Reportedly, collaborative effort between LLG Ward Councilors and the Village Court led to the establishment of this joint initiative.

During the site visit, IESC had the opportunity to visit several of these interventions. In all cases, the stakeholders interviewed expressed gratitude for the support provided by EMPNG. Overall, the Project is seen as a benchmark for the area's development (at least concerning the upstream sector), this is due to both the significant Project actions and the minimal presence of the PNG government in the area. This leads stakeholders to ask the Project for every request or issue arisen. The Project cannot meet all the requests it receives, although it shows a commitment to address them, within its responsibilities and capabilities. Concerning the latter, it has to be underlined that these have been limited by LANCO's performance both in Upstream and LNG Plant areas. Indeed, several delays have been observed in the delivery of the CDS infrastructure projects. Reportedly, all LANCOs face challenges regarding their internal capabilities and efforts. Additionally, they are dealing with ongoing cash flow issues and internal administrative matters. IESC understands the limited scope of action for EMPNG in this regard; however, it encourages EMPNG to monitor the issue finding opportunities for improvement where possible.

Reportedly, 2024 will be more focused – but not limited to – the provision of soft projects (e.g. school and health materials) rather than hard ones (infrastructure). According to the information provided, EMPNG has developed a forward plan, which was generally discussed during the socio-economic kickoff, nevertheless the plan itself and its details still have to be shared with IESC. This lack of provision of the plan (and therefore the impossibility for IESC to assess the planned interventions in detail), combined with above mentioned LANCO issues and modest performance in terms of allocated budget expenditure (47%), constitutes a warning signal about the current and future social performance of the Project. For this reason, IESC recommends that EMPNG provide an overview (either in summarized form or as a diagram) of the activities of the various social teams (not limited to the CDS), how they integrate and operate synergistically, what their respective responsibilities are, and what the intervention plans are for the coming years. This information is necessary to adequately understand the real impact of the Project's social activities on the development of local communities.

6.3.2.2 Summary Overview 2015 - 2023

Overall Upstream

- ✓ Achieved 47% actual spend against budget allocation in 2023, RINA understand that this is mainly due to LANCO performance;
- ✓ Change in Grant Design has continued to be a key enabler supporting umbrella LANCOs Hides Gas Development Company and Kutmor to deliver project milestones in the Upstream Project impact areas;
- ✓ Education and Health were by far the largest investment categories in 2023. Of the total expenditure, 84% was allocated to infrastructure, including the delivery of classrooms and staff houses valued at US\$4,380,146;
- ✓ In 2023, the PNG LNG scholarships program was expanded to include TVET (Technical, Vocational Education and Training) courses. This expansion aims to bridge the gap in community access to education and training where higher education requirements are unattainable.

Overall Plant Site Area

- ✓ In 2023, total community project investment for the Plant Site reached USD \$828,000;
- ✓ Education was the largest investment category in 2023. Of the total expenditure, 97% was dedicated to infrastructure, including the delivery of classrooms and staff houses valued at USD \$803,160;
- ✓ Funding was distributed equitably across all four villages, with the largest allocation to Porebada, followed by Papa, Boera, and then Lealea. The significant spending in Papa and Porebada is attributed to higher-value projects proportionate to their populations.

Continuing Community Issues/Business Risks

- ✓ Law and order challenges are still present in most Project area communities;
- ✓ Difficulty in managing business development and employment expectations from Upstream Landowner companies;
- ✓ CDS project deliveries are behind schedule due to ongoing cash flow issues and internal administrative matters experienced across at LANCOs;
- ✓ Ongoing access to basic education and low literacy rates continue to be a challenge in meeting the quota for higher education scholarships in the Upstream area;
- ✓ In the LNG Plant area, there are also current and future land access issues for implementing CDS projects, as communities are now facing a shortage of communal land, due to the fact that most of the land in the area is state-owned and privately owned.

6.3.3 Recommendation

In order to adequately understand the real impact of the Project's social activities on providing wide support to local communities, IESC recommends that EMPNG provide an overview (either in summarized form or as a diagram) of the activities of the various social teams (not limited to the CDS), how they integrate and operate synergistically, what their respective responsibilities are, and plans for the coming years.

6.4 NATIONAL CONTENT PROGRAM COMPONENT

6.4.1 Project Strategy

A key objective of the Project's National Content (NC) strategy is to replace expatriate staff with PNG citizens through both targeted recruitment and training and development. In addition, national content requirements set out in a National Content Exhibit are contained in agreements with key contractors. The exhibit states that contractors shall "develop and implement a Local and National Content Plan in accordance with the requirements in this Exhibit." The Exhibit requires maximization of employment of PNG citizens in all job categories and sourcing of all the PNG works will be in accordance with the requirements of this Exhibit and relevant law. The first priority is to be given to local people (proximate to Company locations), while the second priority is to regional citizens, and third priority to persons elsewhere in PNG. It also specifies that the contractors should give preference to local LANCOs for provision of employees.

6.4.2 Observations

6.4.2.1 National Content Plan

EMPNG National Content Plan focuses on the future - Suppliers and Workforce Development:

- ✓ Increased nationalization rates;
- ✓ Increased PNG business participation.

The Plan strives to sustainably optimize local content development:

- ✓ Facilitating the ability to operate without interruption by managing expectations;
- ✓ Building community support through capacity programs.

The Plan supports development of local skills, economic growth and improvements in the standard of living through the implementation of the plan. The NC Plan also aligns with EMPNG's Planning and Budget (P&B) cycle to

leverage considerations for workforce and supplier planning for the forthcoming year as well as proceeding years. Some of the considerations for possible National Content 'demand' for the planning cycle are:

- ✓ Company workforce (employees and 'hat' contractors);
- ✓ Onsite contractor workforce;
- ✓ Company Suppliers: goods as well as services.

6.4.2.2 Workforce Statistics

PNG Nationals made up 88% of the Project's total workforce in 2023, 255 down from 3,315 at the end of 2022. Of the EMPNG workforce, 76% were nationals while third party contractors were 91% nationals.

In terms of PNG workforce origins, workers from local areas continued to be the largest group (even if the percentage decreased from 44% to 35%) followed by national at 37% and regional at 28%.

Of the 88% PNG workers, 35% are from Project Impact Areas. In terms of gender, females make up 18% of PNG workforce.

Table 6.1: Workforce Statistics

Statistics on Workforce	Year End 2021	Year End 2022	Year End 2023	Statistics on Workforce
Total Workforce across Project	3,339	3,772	3,714	Total Workforce across Project
PNG Workforce (% nationalization)	2,978 (89%)	3,315 (88%)	3,255 (88%)	PNG Workforce (% nationalization)
EMPNG* PNG Workforce (% nationalization)	604 (80%)	647 (76%)	713 (76%)	EMPNG* PNG Workforce (% nationalization)
3 rd Party Contractor PNG Workforce (% nationalization)	2,374 (92%)	2,668 (91%)	2,542 (91%)	3 rd Party Contractor PNG Workforce (% nationalization)
PNG Citizens Female workers (% Female)	579 (19%)	633 (19%)	672 (18%)	PNG Citizens Female workers (% Female)
<u>Origins of PNG Workforce</u>				
Local Origin – P1 (%)	1,333 (45%)	1,474 (44%)	1,153 (35%)	Local Origin – P1 (%)
Regional Origin – P2 (%)	751 (25%)	762 (23%)	901 (28%)	Regional Origin – P2 (%)
National Non-Project Areas – P3 (%)	894 (30%)	1,079 (33%)	1,201 (37%)	National Non-Project Areas – P3 (%)
<u>PNG Workforce by Job Type</u>				
Management (%)	167 (5%)	77 (2%)	18 (1%)	Management (%)
Office (%)	529 (16%)	609 (18%)	588 (18%)	Office (%)

Statistics on Workforce	Year End 2021	Year End 2022	Year End 2023	Statistics on Workforce
Field (%)	2,643 (79%)	2,629 (79%)	2,649 (81%)	Field (%)

*direct hire employees or employees from recruiting agencies

6.4.2.3 Workforce Development – Competency Enhancement

In terms of Competency Enhancement, 225,000 training hours were delivered in 2023 - up from 148,000 hours in 2022 and representing an average of 60 hours of training per person. Training highlights include:

- ✓ Supervisory skills development continues through the supervisor network & effectiveness sessions each quarter;
- ✓ 5th year of graduate management program – on-boarded seven graduates in 2023 (total of 13) - first batch have settled into host function;
- ✓ On-boarded 14 engineering graduates and two interns;
- ✓ Nine PNG employees on expatriate assignment.

6.4.2.4 Operations and Maintenance (O&M) Progress

Recruitment Highlights in 2023

Papua New Guineans in the O&M training recruitment program to date:

- ✓ A total of 322 Papua New Guineans have been recruited and trained through the PNG LNG Operations & Maintenance (O&M) Training Program;
- ✓ Intake 2 reached a 10-year milestone;
- ✓ For Intake 8, 28 Trainees graduated in October 2023 from Kumul Petroleum Academy (Operations 16, Maintenance 12 of which six electrical and six mechanical);
- ✓ For Intake 9, 18 Trainees were selected and began training at Kumul Petroleum Academy in August 2023 (Operations 12, Maintenance 6 all involved in instrumentation training).

O&M Competency Building

- ✓ Of the total 322 Papua New Guineans trained through the PNG LNG O&M Training Program, 256 (80%) are active, of which eighteen are currently training at Kumul Petroleum Academy. Within the active ones, 73% are male and 27% are female.
 - 238 (74%) are active employees
 - 217 in Operations & Maintenance roles,
 - Twenty-one in “Above Field” roles;
 - 66 (20%) have been demobilized from the Company;
- ✓ Reportedly, Papua New Guineans recruited through O&M Training Program have progressed into increasingly senior roles, taking over positions previously held by expatriates who were training and mentoring the Papua New Guinea staff. Currently national PNG employees account for 67% of the leadership roles, while expats account for 33%.

6.4.2.5 Local Procurement and Supplier Development – Highlights

Local Supplier Spend

- ✓ During the Production phase to date EMPNG has spent over PGK6.8b (approximately USD 1,750,292,466) in-country split between Papua New Guinean businesses (PGK4.4b) and PGK2.2b with Lancos;
- ✓ More than PGK833 million spent by EMPNG in-country in 2023, of which over PGK358 million with Lancos (compared PGK292 million in 2022);
- ✓ 131 Papua New Guinean owned businesses engaged by EMPNG for production-related activities includes 10 Lancos.

Enhancing Current Lancos – LABA & HESL

Laba Holdings

- ✓ Institute of Banking and Business Management (IBBM) Enterprise Centre (EC) kick-started Business Advisory, Mentoring and Training as part of Quality Management System (QMS) audit gap closure which included;
 - Development of a 3-year Corporate Plan,
 - Board charter and related policies under review; and
 - 5 staff members in key positions underwent supervisory training.

HESL and Turra Holdings (JV between Laba and HGDC)

- ✓ Business Assessment completed with 2 Star Rating. Assessment Report presented to management;
- ✓ Both companies preparing for QMS Audit as next step.

Nares Engineering

- ✓ QMS Audit done on the current management system in line with ISO 9001 Standard requirements. Audit Report presented to management; and
- ✓ All gaps have been identified with a plan established to close these gaps benchmarked against ISO requirements.

Other Focus Areas

- ✓ IBBM EC Support Management Portal refreshed and rebranded as Bisnis PNG will go live in the second half of 2024.

External Engagement on National Content

- ✓ EMPNG participated in the 38th Australia-Papua New Guinea Business Forum and Trade Expo held in Port Moresby in May 2023;
- ✓ EMPNG representatives joined PNG Government and business leaders at the Business Council of PNG's National Content Conference (conducted in August 2023) which is part of the Praivet Gavamani Konekt 2 (PGK2) program;
- ✓ EMPNG representatives attended and participated in the inaugural PNG Chamber of Resources and Energy's Community Affairs and National Content Conference and Exhibition (CANCONEX) held at University of Technology in Lae in August 2023;
- ✓ National Content team prepared and presented *EMPNG's 2022 Annual Local Business Development Report and 2022 Employment, Training and Development Report* to the Petroleum Industry Regulator, the Department of Petroleum, who requested the attendance of other sister Departments and Agencies, including the Departments of Commerce and Industry, Higher Education, Research, Science and Technology, and Labour and Industrial Relations, amongst others.
- ✓ PNG Chamber of Resources and Energy conference held in Sydney (December 2023), Australia topped off the end of year calendar events. National content was one of the key focus areas of discussion.

6.4.3 Recommendations

None arising from this review.

6.5 STAKEHOLDER ENGAGEMENT AND COMMUNITY GRIEVANCE MANAGEMENT

6.5.1 Project Strategy

The Project commitments with respect to stakeholder engagement are contained in the Stakeholder Engagement Management Plan – Production. This Plan describes the processes and actions applicable during Production. The overall objective for stakeholder engagement during Production remains to keep all stakeholders informed with respect to their specific interests, engage people in decisions that directly affect them, and maintain stakeholder confidence and trust in the Project and its activities through open, informative, inclusive and timely communications.

A Village Liaison Officer Strategy for the Production Phase supports implementation of the Management Plan and the Land and Community Affairs Plan.

6.5.2 Observations

6.5.2.1 Engagement Overview, January - December 2023

The number of engagements decreased considerably compared to 2022, especially in the Highlands. According to the information provided, the 2022 peak in engagements was due to several work fronts starting such as EQR works, Angore Project construction work, drilling activities, and the CA team. The 2023 decrease is reportedly a result of work fronts being in an advanced stage which requires less engagement activities. Considering (i) the consistence of 2023 numbers with pre-Covid ones (2019) and (ii) that these engagement numbers are still relatively very high, given that the Project is in the tenth year of operation, IESC deems the explanations provided adequate, and the reduction in engagement activities normal, and therefore this is not assessed as an area of risk nor a cause for concern.

In addition, it is worth mentioning that in mid-2023, Land & Community Affairs launched the IsoMetrix Mobile app to capture and report community engagements in real time and assist with engagement fatigue management. Reportedly, cross-functional teams continue to collaborate to address external issues and grievances, and a security implication checkbox has been implemented in IsoMetrix engagement reporting. The positive impacts of the IsoMetrix app in tracking the conducted engagement activities seem to be already evident, with the number of engagements recorded having increased in the second half of 2023.

Table 6.2: Community Engagements in 2022

Location	Engagements 2021	Engagements 2022	Attendees 2021	Attendees 2022
Highlands	10,636	6,909	43,000	26,317
Plant Site	1,634	1,219	6,868	5,948
POM Area	40	13	40	22

6.5.2.2 Issues and Grievances Overview January - December 2023

The Project continues to effectively communicate and coordinate with cross-functional teams (Security, P&GA, Law, ERB) to enhance the effectiveness of grievance and issues management.

Grievances

The number of community grievances recorded in 2023 is the lowest figure ever. Twelve grievances were recorded, all from Highlands communities. The majority of grievances involved environment (5) followed by land access and compensation (4) and damages/claims (3).

Most grievances were closed within the 100-day period. Two complicated grievances filed in 2023 required more than 100 days to resolve. Eight complicated grievances carried over from 2022 were closed in 2023. The Project attributes its ability to close most grievances quickly to internal L&CA, as well as cross-functional communication and coordination. Grievances taking longer to close typically require assessment by the different cross-functional teams, especially where environmental testing, field assessments, and assessment reports have needed to be compiled.

Issues

The number of issues slightly decreased during 2023 – 1,913 compared to 2,308 in 2022. The decrease is connected with the above-mentioned reduction of engagement activities, as issues are mainly raised during the latter. The main categories of issues were related to social, economic and land access queries and concerns.

Vegetation clearance related Issues

According to the information provided during the site visit, the vegetation clearance of the ROW is assigned to the land-owning clans who are paid approximately 1,000 USD per km to clear the area, this happens twice a year (for

a total of approximately 2,000 USD paid per Km yearly). Payment is made to the clan representatives, who are then responsible for distributing the received sums among the clan members.

Reportedly, the Project is facing two issues related to this matter:

- ✓ Clans use bank accounts solely to receive these payments, which lead to them being closed by the bank due to inactivity. This results in significant bureaucratic delays in reopening the accounts each time;
- ✓ Clan representatives often fail to distribute the earnings as they should, particularly towards those directly involved in vegetation clearance. This results in certain sections of the ROW remaining uncleared.

IESC supports EM to find alternative solutions to ensure both the Project's safety and fair distribution of compensation among the affected population.

6.5.3 Recommendations

None arising from this review.

6.6 STATE CLAN BENEFITS INTERFACE - UPDATE

6.6.1 Project Strategy

The PNG Government is responsible and accountable for determination and payment of landowner beneficiary royalty and equity dividends. EMPNG's goal is to influence and support the Government in its effort to pay landowner State Cash benefits in accordance with the laws of PNG. Its main challenge in this objective is to help ensure safe, accurate, timely and effective delivery of cash benefits without having any actual control over the process. The IESC notes that the Projects' assiduous documentation of its support for the benefit sharing process is critical for risk management.

6.6.2 Observations on Status

The Project's strategy remains to mitigate near-term risk, support resolution of underlying issues, and capture lessons for potential future projects. To these ends, the Project continues to engage positively with the Co-Venturers, PNG Government and other key stakeholders. Continued progress is being made to deliver benefits to mandated beneficiaries.

The information given below is the Project's best understanding of the status of benefits distribution. Benefits distribution and related LOBID / ADR processes are managed and executed by the Government. EMPNG provides logistical support to related government activities as appropriate.

Status of benefit payments to Project Licensed Areas are as follows:

Downstream

- ✓ 3rd royalty payment made in Nov 2022; 2nd Gas Resource Director's elections held in Dec 2022 with all 4 incumbents re-elected.

Upstream

- ✓ PDL 7: Inaugural royalty payments of PGK19.6M made in March 2022;
- ✓ PDL 1: Account opening exercise re-commenced May 2024; elections for Gas Resource Company (GRC) Directors' expected to take place in June 2024 – critical final step to enable payment of royalties to beneficiaries;
- ✓ PDL 8: Ministerial Determinations in place for all five blocks as of Nov 2023; progression to clan account opening phase expected from Q3-4 2024 pending final legal clearance from the State;
- ✓ PDL 9: Ministerial Determinations in place for clan factions from Western and Hela Provinces as of May 2023; advice pending from State on timing to progress clan account opening phase;
- ✓ Pipeline Segments: 2nd royalty payments made for Segments 8, 4, 5, 7, 1, 2 and 3 in Q3 2022; and
- ✓ GRC Director's election for Segment 6 currently pending clearance from Courts to proceed.

6.6.3 Recommendations

None arising from this review.

7 LABOR AND HUMAN RESOURCES

7.1 PROJECT STRATEGY

Project labor commitments are defined in the Labor and Working Conditions Management Plan – Production (the “Plan”). The Plan describes the requirements and expectations in terms of compliance, reporting, roles, supervision and training with respect to labor and working conditions, including camp accommodation. It covers all production activities for Upstream Facilities, the Pipelines and the LNG Plant. This Plan is expected to be adopted and applicable to EMPNG contractors, recognizing that EMPNG’s effectiveness in managing third parties will vary in accordance with the leverage EMPNG is able to exercise. To the extent that EMPNG can exert influence over its supply chain, the principles in this Plan will also apply.

The objectives of the Plan are to:

- ✓ promote fair and equitable labor practices for the fair treatment, non-discrimination and equal opportunity of workers;
- ✓ establish, manage and promote a healthy management-worker relationship;
- ✓ protect workers’ rights including migrant and third-party workers; and
- ✓ promote healthy, safe, secure and comfortable accommodation that does not impact negatively on the communities in the surrounding area.

7.2 OBSERVATIONS

7.2.1 Professional Development

The Project uses a variety of materials and activities to promote the professional development of its workforce. The main elements of these support measures in 2023 were:

- ✓ The Supervisor Network, which includes quarterly sessions designed to enhance the effectiveness of EMPNG Supervisors in their crucial roles within the organization. During such sessions, Senior Management directly interact with Supervisors to discuss and receive feedback on important current topics such as Business Unit Goals, the Employee Development Cycle, and the latest updates on the company’s policies and programs;
- ✓ The Eda Wanwok Toastmasters Club, which is one of the most active clubs within EM PNG, met regularly throughout 2023. Toastmasters helps employees build confidence by enhancing their communication, leadership, and public speaking skills. Reportedly last year, Gregory Soweni, a member of EM PNG’s Toastmasters, won first place in the International Speech category at the Pacifica Division Conference;
- ✓ Various Award Programs, such as:
 - LCM Awards, annual awards open to all staff, recognize, promote and reward outstanding examples of *Em Pasing Bilong long* ExxonMobil PNG values and behaviors. Nominations are made by the Country Leadership Team and selection is by the Employee Development Committee,
 - Nambawan Awards, introduced in 2022, nominated by staff to recognize, promote and reward peers’ outstanding performance by demonstrating *Em Pasing Bilong long* ExxonMobil PNG values and behaviors. Nominated staff receive vouchers;
- ✓ Local subcontractors and labor access community project business opportunities, enhancing national content outcomes;
- ✓ Young adults of employment age are engaged, and the development of local supplier subcontractors has advanced.

7.2.2 Personal Development

The Project also supports staff personal development with various activities including:

- ✓ Business Acumen Financial Literacy program;
- ✓ Collaboration with Bel Isi PNG;
- ✓ Organization of the Family Fun Day;
- ✓ Participation in the Independence Day Celebration.

The Project continued its Giving Back program with activities such as staff participation in:

- ✓ Grade 12 Career Expo;
- ✓ Buk Bilong Pikinini (Books for Children Program);
- ✓ Science Ambassador Program;
- ✓ National Development Summit.

In terms of mental health, the Employee Assistance Program (EAP) continued. It provides confidential, professional counseling for employees and their eligible family members, including spouses and dependents. It offers support for personal issues, clinical referrals, well-being coaching, and financial services. Counseling is available 24/7 via a toll-free number, with counselors visiting EM Haus and Camp sites monthly.

7.2.3 Labor Grievance Management

The "HR Direct" system continues to be highly utilized allowing for employees to direct questions to appropriate teams through an automated system. In 2023, 625 employee inquiries were received and assessed and closed. The average response time is within a day. Positive feedback from 70% of employees (it was 98% in 2022). Most inquiries were related to Emergency Loans, Savings Plan, Service Awards and Leave entitlements. No time was lost due to industrial action.

It is IESC's understanding that workers do not have the possibility to submit anonymous grievances. This should be guaranteed as defined in paragraph 20 of IFC PS 2. This combined with the reduced percentage of positive feedback received (which, should be noted, is still relatively high), can be seen as an early warning sign regarding the effectiveness of the workers' grievance mechanism in place. IESC recommends that EMPNG address this issue by implementing on its online platforms a system for submitting anonymous grievances and adequately informing the workforce of this system and how to use it.

Camp Performance Indicators:

- ✓ Types of issues primarily related to minor maintenance issues (e.g. replace light bulbs, plumbing repairs, light carpentry work);
- ✓ Rare complaints about food and the majority of feedback requests repeat menu items that are popular. Catering tracks Happy or Not customer KIOS daily showing that most customers (95%) provide positive feedback weekly;
- ✓ Lodging Complaints – Rare occurrences of complaints about the "Room Type" A, B or C. Some residents request to move to a different room type;
- ✓ Recreational amenities have been maintained on a Camp Resident usage:
 - "Green Zone" includes a music room, BBQ, movies, karaoke,
 - Gyms, indoor basketball and rugby/soccer fields are active, though some other sports facilities are not currently active (outdoor basketball and volleyball, tennis and outdoor golf driving range).

7.2.4 Employee Retention

As general observation, in the past, IESC observed the Project's difficulty in retaining its employees, culminating in the biodiversity team being reduced to just one individual in 2023. According to the information gathered, this problem doesn't seem to have been overcome yet, particularly regarding the environmental and biodiversity teams, where a minority of members are long-term employed by the Project, impacting the effectiveness and quality of the work conducted. Fortunately, this does not seem to affect the social team, where the majority of national employees have been with the Project for a long time. However, considering the growing number of large projects in the country and the subsequent increased competitiveness regarding job opportunities within the national labor market, IESC suggests EMPNG to address the issue by ensuring competitive salaries and working conditions to appropriately retain its human capital.

7.3 RECOMMENDATIONS

- ✓ EMPNG must implement a system for submission of an anonymous grievance submission;
- ✓ EMPNG needs to address the retention issue avoiding the loss of human capital crucial to adequate environmental, social and biodiversity performance.

8 HEALTH AND SAFETY

The PNG LNG Project has a well-developed program to manage both occupational health and safety of workers, as well as a community health and safety program. The success of both programs has been based on the understanding that community and occupational health and safety are linked and interdependent on one another.

8.1 OCCUPATIONAL HEALTH AND SAFETY

8.1.1 Project Strategy

Occupational health and safety are managed independently of the Production ESMP within the ExxonMobil Operations Integrity Management System (OIMS), which is summarized within the ESMP such that the linkages between OIMS and environmental and social management are well defined. The ultimate goal of managing personnel safety is to achieve an incident-free workplace where “Nobody Gets Hurt”. Over the past few years the OIMS system has evolved to establish annual continuous improvement goals and objectives in a number of areas, including:

- ✓ Personnel Safety Management System (PSMS);
- ✓ Life-Saving Rules and Actions (LSRAs) and Start Work Checks;
- ✓ Human performance;
- ✓ Culture of Health;
- ✓ Training.

The focus of this evolving OIMS system is to work to reduce or eliminate fatalities and life-altering injuries. Accordingly, the PSMS is designed to consistently deliver “safety in the moment” by more effectively managing safeguards before and during higher-risk work. A core component of PSMS is ExxonMobil’s Life Saving Rules & Actions (LSRAs) where employees and contractors are expected to work cooperatively to execute the LSRAs for routine work activities that have higher risk elements. To improve the health, quality of life, and productivity of employees, ExxonMobil provides a comprehensive Culture of Health program that provides an environment and resources that actively and consistently promote healthy and safe behaviors. This includes encouraging biometric screening, periodic health surveys, access to wellbeing champions, resources to help employees with resiliency, and more. The Culture of Health program as implemented in PNG also includes protecting company personnel from health hazards prevailing in the environment with the recognition that there needs to be a linkage between occupational and community health programs.

8.1.2 Observations

8.1.2.1 Worker Safety

EMPNG Production safety performance through Q4 2023 continues to be excellent, better than 2022, although there was a single Lost Time Incident (LTI) that took place at Angore where a worker fell and broke his forearm. Even with this accident, the 2023 Lost Time Incident Rate (LTIR) was maintained at 0.01 normalized to 200,000-man hours and the Total Recordable Injury Rate (TRIR) was 0.03, both of which are much better than industry standards. Note that 1.3 is the average LTIR and 3.0 is the average TRIR across all industries in the United States.

Workforce	2022	2023
LTIR	0.01	0.01
TRIR	0.09	0.03
Work-hours	18,668,502	21,075,194

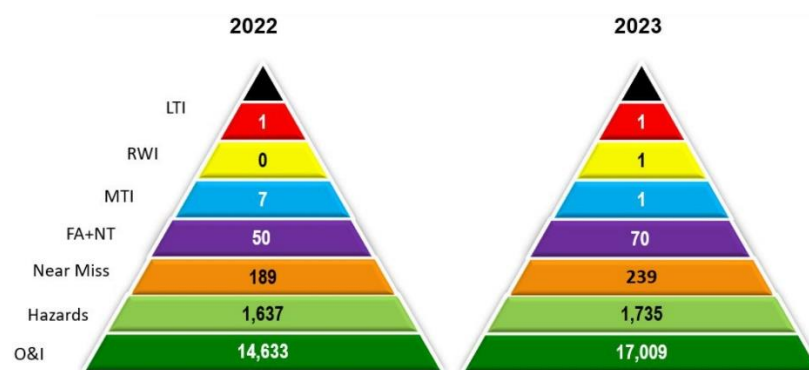


Figure 8.1: Safety Record 2022 - 2023

8.1.2.2 Worker Health

The occupational health program is world class and continues to perform well in all areas (clinical operations, public health and industrial hygiene). A few highlights include:

- ✓ 14,560 clinic consultations across all clinics (40% Occ. Health - 60% non-Occ. Health);
- ✓ Organized blood drives at EM Haus & LNG Plant: 310 bags donated to POM General Hospital;
- ✓ TB Control Program: 2,269 individuals screened;
- ✓ TB Control Program moved to 2 yearly screening consistent with WHO and CDC guidance;
- ✓ 15 Medical Evacuations and Urgent Referrals in total (10 Medevacs | 5 urgent referrals);
- ✓ Revised the Potable Water plan to align with government and MOH testing parameters and frequencies, resulting in time efficiencies and cost savings.

The Culture of Health (COH) program following OIMS continues to be implemented with 1,481 participants for biometric screenings and physical activity challenges. The Industrial Hygiene Program continues to review worker exposure to chemicals and noise and verifies that personnel protective equipment is appropriate for the different work environments.

8.1.3 Recommendations

The H&S program continues to be implemented as a “best practice” system. The IESC does not offer any recommendations arising from the present review.

8.2 COMMUNITY HEALTH

8.2.1 Observations

Community health continues to be a component of the CDS program with the objective of reducing the factors that limit the capacity of Papua New Guineans to fully participate in livelihood/economic activities by targeting high risk diseases and health complications. CDS health activities in Hela Province and the Southern Highlands in 2023 focused mainly on infrastructure development:

- ✓ The Edauwi Community Health Post is nearing completion and is estimated to benefit approximately 8,000 community members by improving access to quality health services, and emergency medical care and facilities for people in Angore;
- ✓ 46 water catchment structures across the Upstream PIA and Right of Way were delivered in 2023, contributing to reducing risk of water borne diseases and increasing access to safe drinking water.

There were also collaborations developed and strengthened to jointly contribute to Provincial Health issues:

- ✓ Engagements with Hela Provincial Health Authority prior to infrastructure projects for approved design standards, including required bill of quantities and material listing;
- ✓ Ongoing engagement with the Hela Province Health Authority (HPHA) and key partners to advance synergies on future projects and ensure alignment with provincial health plans.

In the LNG Plant area the focus in 2023 was infrastructure development:

- ✓ Three fully-furnished First Aid Centers were delivered to Papa and Lealea Primary Schools, and Porebada Redscar High School;
- ✓ Two Pharmacy and Storage Units were delivered to the Central Provincial Health Authority site – Bautama.

There were also collaborations developed and strengthened to jointly contribute to Provincial Health issues, including ongoing engagement with the Central Provincial Health Authority, school leadership and Ward Councilors to advance synergies on current and future projects, and ensure alignment with provincial health plans

Community health programs have been well implemented since the start of the Project.

8.2.2 Recommendations

None arising from this review.

9 CULTURAL HERITAGE

9.1 PROJECT STRATEGY

Production has adopted the Cultural Heritage Program from Construction:

- ✓ Cultural Heritage Management Protocol;
- ✓ Cultural Heritage Investigation and Salvage Protocol; and
- ✓ Chance Finds Protocol.

EMPNG's objectives are to avoid impacts to cultural heritage sites, including archaeological and oral tradition sites and to manage cultural heritage sites in consultation with landowners.

9.2 OBSERVATIONS

Cultural heritage management continues to be undertaken, currently in association with the pipeline repairs for the EQR project, as the work at Angore and along the Angore pipeline is complete, at least in terms of land disturbance. As such, there is little to report except that based on an interview with the Project Archaeologist, the process has gone well, and the Project has supported the archaeological program with the resources to do the work correctly.

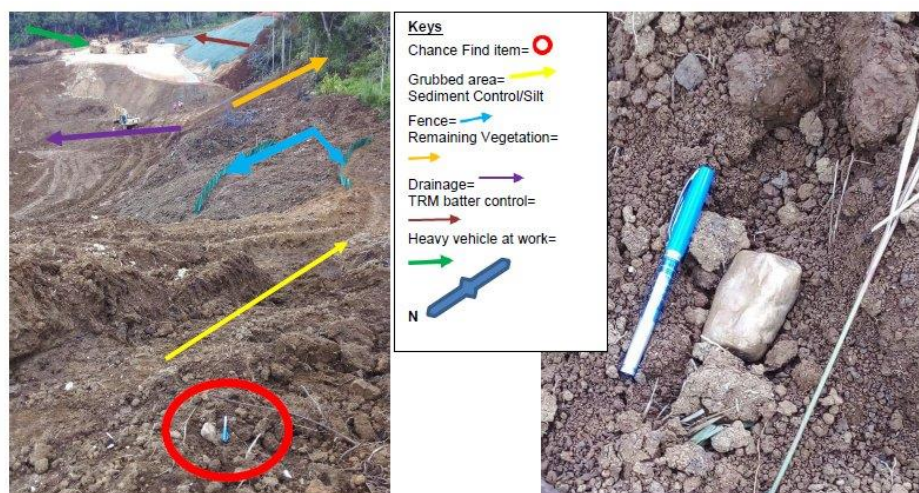


Figure 9.1: Portion of Chance Find Record from Angore