



**Verified Carbon
Standard**

SOUTH BARITO KAPUAS PROJECT



PT NUSANTARA RAYA SOLUSI



Zero-Carbon Forest Investments

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CONTENTS

1	PROJECT DETAILS.....	15
1.1	Summary Description of the Project	15
1.2	Audit History.....	19
1.3	Sectoral Scope and Project Type	20
1.4	Project Eligibility	20
1.5	Project Design	22
1.6	Project Proponent	23
1.7	Other Entities Involved in the Project	24
1.8	Ownership.....	26
1.9	Project Start Date	29
1.10	Project Crediting Period	29
1.11	Project Scale and Estimated GHG Emission Reductions or Removals	30
1.12	Description of the Project Activity	32
1.13	Project Location	38
1.14	Conditions Prior to Project Initiation	39
1.15	Compliance with Laws, Statutes and Other Regulatory Frameworks	54
1.16	Double Counting and Participation under Other GHG Programs	57
1.17	Double Claiming, Other Forms of Credit, and Scope 3 Emissions.....	58
1.18	Sustainable Development Contributions	58
1.19	Additional Information Relevant to the Project	60
2	SAFEGUARDS AND STAKEHOLDER ENGAGEMENT	63
2.1	Stakeholder Engagement and Consultation.....	63
2.2	Risks to Stakeholders and the Environment.....	78
2.3	Respect for Human Rights and Equity	79
2.4	Ecosystem Health	85
3	APPLICATION OF METHODOLOGY.....	91
3.1	Title and Reference of Methodology	91
3.2	Applicability of Methodology	91
3.3	Project Boundary	102
3.4	Baseline Scenario	104
3.5	Additionality	106

3.6	Methodology Deviations	109
4	QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS.....	110
4.1	Baseline Emissions	110
4.2	Project Emissions	149
4.3	Leakage Emissions	170
4.4	Estimated GHG Emission Reductions and Carbon Dioxide Removals	172
5	MONITORING	175
5.1	Data and Parameters Available at Validation	175
5.2	Data and Parameters Monitored.....	189
5.3	Monitoring Plan.....	201
	APPENDIX 1: COMMERCIALLY SENSITIVE INFORMATION.....	209
	APPENDIX 2: STAKEHOLDER IDENTIFICATION.....	211
	APPENDIX 3: LEGAL OR CUSTOMARY TENURE/ACCESS RIGHTS	222
	APPENDIX 4: STAKEHOLDER DIVERSITY	223
	APPENDIX 5: HCV 5 AND 6 MAP.....	227
	APPENDIX 6: MOU CONSENT	228
	APPENDIX 7: STANDARD OPERATION PROCEDURE-GRIEVANCE MECHANISM	236
	APPENDIX 8: POLICY AND SOP RELEVANT TO GENDER EQUITY IN LABOR AND WORK.....	239
	APPENDIX 9: POLICY AND SOP RELEVANT TO HUMAN TRAFFICKING, FORCED LABOR, AND CHILD LABOR.....	240
	APPENDIX 10: BENEFIT SHARING.....	241

Table of Figures

Figure 1-1 Project Theory of Change	37
Figure 1-2 Project Boundary Satellite Overlay	38
Figure 1-3 Average monthly and yearly rainfall	41
Figure 1-4 Forest Inventory Approach	50
Figure 2-1 Project Grievance Mechanism	77
Figure 2-2 Benefit Sharing Plan	84
Figure 5-1 Project Reporting and Monitoring Process	207

Table of Maps

Map 1-1 Location of Indonesian Province of Kalimantan Tengah	15
Map 1-2 Location of the Project Within the Province of Kalimantan Tengah	16
Map 1-3 Ministry of Environment and Forestry (KLHK) Land Use of the Project Area	18
Map 1-4 PBPH Boundaries: (Boundary of Forest Concession)	39
Map 1-5 Hydrology Map of the Project Area	42
Map 1-6 Elevation Range in Project Area	43
Map 1-7 Location of Soil Survey Points	44
Map 1-8 Soil Types in Project Area	45
Map 1-9 Location and Depth of Peat in the Project Area	47
Map 1-10 Ecosystem Map at Landscape Level	48
Map 1-11 Current Landcover Map	49
Map 1-12 Location of Forest Inventory Clusters	51
Map 1-13 Location of Villages adjacent to the Project Area	53
Map 2-1 Community Land Tenure Claims within the Project Area	69
Map 2-2 Landcover Map 2012	88
Map 2-3 Landcover Map 2022	89
Map 2-4 Landcover Change 2012-2022	90
Map 3-1 Location of Potential Project Activities	103
Map 4-1: Project Activities in the Project Area	112

Table of Tables

Table 1-1 Process to Secure Project Area Land Rights	28
Table 1-2 Project Coordinates	38
Table 1-3 Rainfall data 2010 – 2022 (mm)	41
Table 1-4 Elevation Range in Project Area	43
Table 1-5 Soil Type Distributions in the Project Area	45
Table 1-6 Peat Depth	46
Table 1-7 Ecosystems in Project Area	47
Table 1-8 Land Cover in the Project Area Distributed by Peat and Mineral Soil	49
Table 1-9 Estimates of above ground biomass	51
Table 1-10 Precision of the estimates of above ground biomass	51
Table 1-11 List of Villages Adjacent to the Project Area	52
Table 1-12 Regulations Relating to the PBPH License	55
Table 1-13 Compliance with PBPH Requirements	55
Table 1-14 Regulation relating to the Carbon Business	56
Table 1-15 Regulations Relating to Employees	56

Table 1-16 SDGs and Project Activities.....	60
Table 2-1 FPIC Status of Villages.....	76
Table 2-2 List of endangered and critically endangered fauna species in Project area	87
Table 2-3 List of endangered and critically endangered flora species in Project Area	87
Table 2-4 Total Landcover Area in Ha for a given year.....	90
Table 2-5 Land Cover 2022-Land Change Analysis	90
Table 3-1 Areas of potential baseline activities.....	105
Table 3-2 Barriers to Additionality.....	109
Table 4-1 Variables used in the schematization of quantification of GHG emissions from microbial decompositions of peatland dissolved organic carbon from water bodies in peatlands in the Baseline Scenario.	113
Table 4-2 Baseline Plantation Development Program	115
Table 4-3 Emissions factors for plantation growth and yield	119
Table 4-4 The long-term average carbon stocks for <i>Acacia crassicarpa</i> and <i>Acacia mangium</i> plantations.....	119
Table 4-5 Land-Use Change of all Stratum	121
Table 4-6 Average AGB of all strata	122
Table 4-7 Baseline carbon stock change by land cover type	122
Table 4-8 Average root to shoot ratio for Indonesia	122
Table 4-9 Average BM estimates of all Stratum.....	123
Table 4-10 The dimensions and density of new canals created during the baseline development.....	124
Table 4-11 Baseline peatland WRC area table	124
Table 4-12 Baseline plantation canals and drains surface area table	125
Table 4-13 Emission factors from drained peat soil	128
Table 4-14 Emission factors from surface area of canals	128
Table 4-15 Areas converted to plantations by land cover and year in the baseline for REDD	129
Table 4-16 Above ground tree carbon stock in the baseline for REDD	129
Table 4-17 Below ground tree carbon stock in the baseline for REDD	130
Table 4-18 Below ground tree carbon stock depletion for REDD	131
Table 4-19 Total carbon emissions from AGB and BGB for REDD.....	132
Table 4-20 Areas of drained land for CIW.....	133
Table 4-21 Canal surface area statistics for CIW.....	133
Table 4-22 Baseline GHG emissions from peat soils for CIW	134
Table 4-23 GHG emissions from ditches and other open water bodies in peatlands for CIW	134
Table 4-24 Areas converted to plantations by land cover and year in the baseline for REDD+CIW	135
Table 4-25 Above ground tree carbon stock in the baseline for REDD+CIW	135
Table 4-26 Below ground tree carbon stock in the baseline for REDD+CIW	136
Table 4-27 Below ground tree carbon stock depletion for REDD+CIW.....	137
Table 4-28 Total emissions reductions from AGB and BGB for REDD+CIW	138
Table 4-29 Areas of drained land for REDD+CIW	139
Table 4-30 Canal surface area statistics for REDD+CIW	139
Table 4-31 Baseline GHG emissions from peat soils for REDD+CIW.....	140
Table 4-32 GHG emissions from ditches and other open water bodies in peatlands for REDD+CIW	140
Table 4-33 Areas of drained land for RWE	141
Table 4-34 Canal surface area statistics for RWE	141
Table 4-35 Baseline GHG emissions from peat soils for RWE.....	142

Table 4-36 GHG emissions from ditches and other open water bodies in peatlands for RWE	142
Table 4-37 Areas converted to plantations by land cover and year in the baseline for REDD+RWE.....	143
Table 4-38 Above ground tree carbon stock in the baseline for REDD+RWE	143
Table 4-39 Below ground tree carbon stock in the baseline for REDD+RWE	144
Table 4-40 Below ground tree carbon stock depletion for REDD+RWE	145
Table 4-41 Total emissions reductions from AGB and BGB for REDD+RWE.....	146
Table 4-42 Areas of drained land for REDD+RWE	147
Table 4-43 Canal surface area statistics for REDD+RWE.....	147
Table 4-44 Baseline GHG emissions from peat soils for REDD+RWE	148
Table 4-45 GHG emissions from ditches and other open water bodies in peatlands for REDD+RWE.....	148
Table 4-46 Activity class of each stratum.....	151
Table 4-47 Variables adopted for the systematic organization of measurements for GHG emissions arising from microbial peat decomposition and dissolving organic carbon from peatlands under the Project Scenario	153
Table 4-48 Eligible area for deforestation for REDD and REDD+CIW activities.....	156
Table 4-49 Stratification employed for calculation of GHG emissions, the area (ha), and the CO ₂ and CH ₄ default factors used in each stratum for the specific land use	161
Table 4-50 Emission factors of surface area of canals.....	162
Table 4-51 Area of avoided deforestation in the Project Scenario for REDD.....	165
Table 4-52 Ex-ante net carbon stock changes because of forest carbon stock enhancement in the Project Area for REDD.....	165
Table 4-53 Area of avoided deforestation in the Project Scenario for REDD+CIW	167
Table 4-54 Ex-ante net carbon stock changes because of forest carbon stock enhancement in the Project Area for REDD+CIW	167
Table 4-55 Areas converted to plantations by land cover and year in the baseline for REDD+RWE.....	169
Table 4-56 Ex-ante net carbon stock changes because of forest carbon stock enhancement in the Project Area for REDD+RWE	169
Table 5-1 Project roles and responsibilities	208
Table 0-1 Identified Stakeholders likely to be impacted by the Project.	211

GLOSSARY

ITEM	Description
2030 Agenda	The United Nations 2030 Agenda for Sustainable Development.
AFOLU	Agriculture, Forestry and Other Land Uses.
APD	Avoided Planned Deforestation.
APDD	Avoided Planned Deforestation and Degradation.
Baseline Scenario	The Project Baseline Scenario under the Technical Proposal as described in more detail in Section 4.1.
BPBD (<i>Badan Penanggulangan Bencana Daerah</i>)	An Indonesian Department for Regional Disaster Management.
BPD (<i>Badan Pembangunan Daerah</i>)	An Indonesian Regional Development Board.
BMKG (<i>Badan Meteorologi, Klimatologi dan Geofisika</i>)	Indonesia Meteorology, Climatology, and Geophysical Agency.
BKPM (<i>Badan Koordinasi Penanaman Modal</i>)	The Indonesian Investment Coordination Board.
BRGM (<i>Badan Restorasi Gambut dan Mangrove</i>)	The Indonesian Peat and Mangrove Restoration Board.
Carbon Economy Laws	Law No. 98 of 2021 on the Economic Value of Carbon and implementing Regulation of the Ministry of the Environment and Forestry No. 21 of 2022.
CCB	VCS Community, Climate and Biodiversity principles.
CIW	Conservation of Intact Wetlands.

Community Relations Team	The Project's Community Relationship Team established in collaboration between the Project Proponent and the University of Palangka Raya.
CRO	Community Relations Officer.
Damang	A Dayak community traditional leader.
Dinas Kehutanan	The Central Kalimantan Provincial Forestry Service.
El Niño	The warm and negative phase of the El Niño–Southern Oscillation climate pattern.
Farmer Groups	Farmer groups (Kelompok Tani) and forest farmer groups (Kelompok Tani Hutan), typically loosely formed associations.
FGD	Focus group discussions conducted by the Community Relations Team.
Fire Management Plan	The Project's fire management plan developed under the Fire Prevention and Control Cooperation Agreement.
Fire Prevention and Control Cooperation Agreement.	Fire Prevention and Control Cooperation Agreement between NRS, the Yayasan, and LLPM.
Forest Inventory Survey	The Remote Sensing and Forest Inventory Report issued by Ata Marie in December 2023.
Forestry Laws	Law No 41/1999 of the Ministry of Forestry, and Ministerial Regulation No. 14/2004 of the Ministry of Forestry.
FPIC	Free, prior and informed consent from local communities for any activities undertaken on land subject to legal tenure or customary rights of use.
FPIC Report	The Free, Prior Informed Consent Report issued by LLPM.

FSC	The Forestry Stewardship Council.
garden (<i>kebun</i>)	Planted land, typically growing small quantities of vegetable, herb or fruit crops.
GOI	The Government of the Republic of Indonesia.
GHG	Greenhouse Gases, typically measured in tCO ₂ e.
Governor Recommendation	Recommendation of the Governor of Central Kalimantan under Letter No. 570/2/IUPHHK-RE/IX/DPMPSTP.2021 dated 15 September 2021 issued through the Central Kalimantan Investment and One Stop Integrated Service Office.
ha	Hectare or 10,000 square meters.
HCV	High Conservation Value assessment as described by the Principles and Criteria for Forest Stewardship promulgated by the FSC FSC-STD-01-001 (V5-0).
HES	PT Hamparan Eco Semesta, a corporation established under the laws of Indonesia owned by the Yayasan, which is the holding company of the Project Proponent.
HP (<i>Hutan Produksi</i>)	Production Forest.
HTI (<i>Hutan Tanaman Industri</i>)	Industrial Production Forest.
Kalimantan Tengah	Central Kalimantan.
KPH (<i>Kesatuan Pengelolaan Hutan</i>)	Forest Management Unit.
KPHL (<i>Kesatuan Pengelolaan Hutan Lindung</i>)	Protected Forest Management Unit.
KPHP (<i>Kesatuan Pengelolaan Hutan Produksi</i>)	Production Forest Management Unit.
IDCTA	The Indonesian Carbon Trading Association.

In-Principle License (<i>Ijin Prinsip</i>)	In-Principle License No. 12042211116204001 dated 11 April 2022 issued by the One Stop Service of BKPM setting out a commitment to grant the PBPH in respect of the Project Area in principle, subject to conditions set out therein.
IPB (<i>Institut Pertanian Bogor</i>)	Bogor Agricultural Institute.
ISO	International Organization for Standardization.
Iuran	Land rent payable by the Project Proponent in respect of the Project Area.
KPH (<i>Kawasan Pengelolaan Hutan</i>)	Forest Management Unit.
KPHL (<i>Kawasan Pengelolaan Hutan Lindung</i>)	Protected Forest Management Unit.
KLHK (<i>Kementrian Lingkungan Hidup Dan Kehutanan</i>)	The Indonesian Ministry of Environment & Forestry.
Manggala AGNI	An Indonesian Regional Fire Department.
La Niña	The colder counterpart of El Niño, as part of the broader El Niño–Southern Oscillation (ENSO) climate pattern.
LoAA	A Letter of Authorization and Approval to export carbon credits with an NDC corresponding adjustment under the Carbon Economy Law.
LPPM (<i>Lembaga Penelitian, Pengabdian Masyarakat</i>)	Cultural Research and Community Service Institution at Palangka Raya University.
Manggala Agni	An Indonesian Regional Fire Department
Mantir	An assistant to Damang,
MoU	A formal memorandum of understanding with a village signed as part of the FPIC process.
MPA (<i>Masyarakat Peduli Api</i>)	Community Fire Prevention Group.
MRV	The Project monitoring, verification and reporting procedures as detailed in Section 5.3.

NDC	The Nationally Determined Contribution of a contracting party to the Paris Agreement.
NGO	Non-Governmental Organization.
NTFP	Non-timber forest products, being any harvestable products or economic services other than timber that is produced in forests.
NRS	PT Nusantara Raya Solusi, a corporation established under the laws of Indonesia, which is the holder of the PBPH license in respect of the Project.
Paris Agreement	The United Nations Framework Convention for Climate Change signed in Paris in 2015.
Participatory Rural Assessment or PRA	The participatory rural assessment process established by the Institute of Development Studies (UK).
PBPH (<i>Perizinan Berusaha Pemanfaatan Hutan</i>)	Forest Utilization Business License issued as a Decree of the Minister of Investment/Head of the Investment Coordination Board No. 91203088528770005 dated 4 August 2023.
Peat	According to the Peat Regulation, land formed through the accumulation of organic materials with a composition of more than 65%.
Peat Ecosystem and Soil Survey	an inventory of soils and Peat Ecosystems on a Scale of 1:50,000 conducted by IPB.
Peat Regulation	Ministry of Agriculture No. 14 of 2009 on guidelines of peat land utilization for palm oil cultivation.
Project	The South Barito Kapuas Project as described in Section 1.1.
Project Activities	REDD activities to reduce GHG emissions as described in Section 1.3.

Project Area	The 39,853 Ha area licensed to the Project Proponent to conduct the Project under the PBPH as described in Section 1.2.
Project Proponent	PT Nusantara Raya Solusi, a corporation established under the laws of Indonesia, which is the holder of the PBPH license in respect of the Project.
Project Scenario	Conducting the Project as a conservation project as set out in this Project Design Document.
Project Start Date	12 September 2022, the date on which Project Activities commenced in the Project Area.
Provincial Government	The Provincial Government of Central Kalimantan.
PSP	Permanent Sample Plot.
REDD	Reduced Emissions from Deforestation and Degradation.
RKT (<i>Rencana Kerja Tahunan</i>)	The annual statutory management plan for the Project Area.
RKU (<i>Rencana Kerja Usaha</i>)	The 10-year statutory management plan for the Project Area.
Rapid Rural Assessment or RRA	The rapid rural assessment process established by the Institute of Development Studies (UK).
RT (<i>Rukun Tetangga</i>)	A formal neighborhood association classified under Indonesian which is comprised of multiple families and has administrative responsibilities.
RW (<i>Rukun Warga</i>)	A community association consisting of several RTs with administrative responsibilities.
RWE	Restoring Wetland Ecosystems.

SDGs	The United Nations Sustainable Development Goals.
SEIA	The Social Economic Impact Assessment and discussions around benefit sharing exercise conducted by the Project Proponent.
Smart Patrol	Fire Prevention, Security and Biodiversity Monitoring teams applying the Project's Spatial Monitoring and Reporting Tool (SMART).
Soil Surveyor	IPB as the author of the Peat Ecosystem and Soil Survey
SOP	The Project Proponent's standard operating procedures for managing a specific matter
SRN (<i>Sistem Registri Nasional</i>)	The National Registration System for Indonesian carbon credits established under the Carbon Economy Law.
Technical Proposal	A Technical Proposal from the third-party deforestation agent submitted to Dinas Kehutanan in connection with the PBPH license grant process.
Technical Recommendation	A technical recommendation from Dinas Kehutanan in respect of the Project issued as Letter No. 522/2209/II.2/Dishut dated 10 September 2021.
TSP	Temporary Sample Plot.
tCO₂e	Metric tons of carbon dioxide equivalent.
UKL-UPL (<i>Upaya Pengelolaan Lingkungan Hidup dan Upaya Pemantauan Lingkungan Hidup</i>)	Indonesian statutory Environmental Impact Assessment.
UN	United Nations.
University of Palangka Raya	The state university in Central Kalimantan, which has collaborated with the Project

	Proponent on multiple aspects of the Project, including fire prevention, community relations, nursery establishment and reforestation.
VCS	Verified Carbon Standard.
Verra	Verra, a 501(c)(3) organization established under the laws of the United States.
VCUs	Verified Carbon Units.
village (desa)	A formal community classification under Indonesian law with administrative responsibilities.
Village Development Index	The Village Development Index published by the Ministry of Villages, Development of Disadvantaged Regions and Transmigration (December 2023).
WRC	Wetland Restoration and Conservation
Yayasan	Yayasan Hamparan Eco Semesta, a not-for-profit foundation established under the laws of Indonesia which is the ultimate owner of the Project Proponent.
ZCF	Zero Carbon Forestry Management Pte Ltd, an asset manager which coordinates investment into the Project and acts as consultant to the Project.

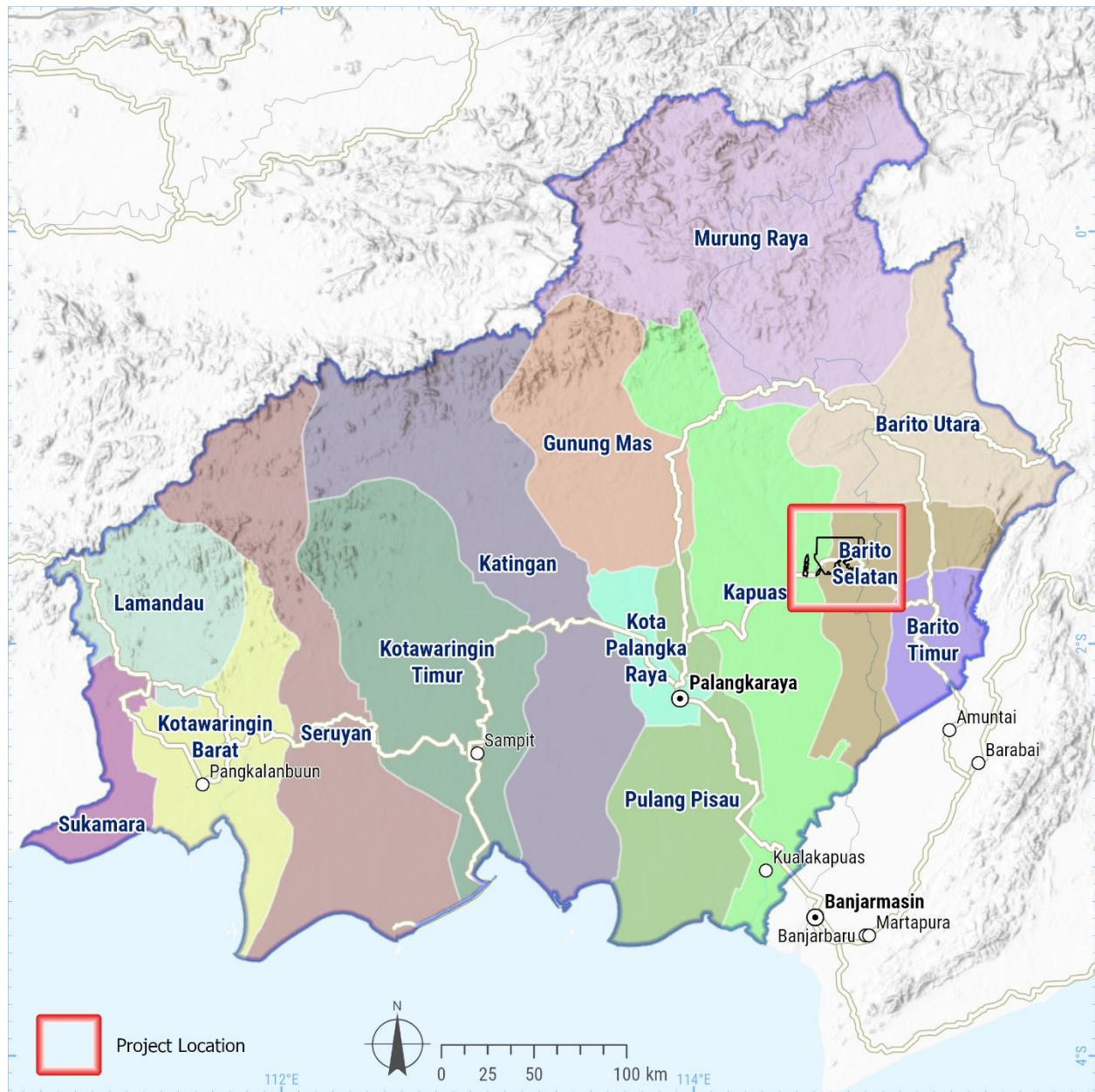
1 PROJECT DETAILS

1.1 Summary Description of the Project

The South Barito Kapuas Project (the “**Project**”) is located in the Barito Selatan and Kapuas Regencies of the Central Kalimantan Province, Indonesia (Map 1-1 and Map 1-2), and covers a concession area of 39,853 ha (the “**Project Area**”). The Project resides in a tropical forest landscape comprising a mixture of dryland (mineral soil) forest and peatland forest which has been licensed for ecosystem restoration and conservation. Four land cover strata have been identified in the Project Area, namely forest, young scrub, smallholder agriculture, and open degraded land (including mining sites). Forest is by far the most dominant land cover stratum, covering about 88% of the Project Area, which is divided into forest (60%), heath forest (18%), and old scrub (10%).



Map 1-1 Location of Indonesian Province of Kalimantan Tengah



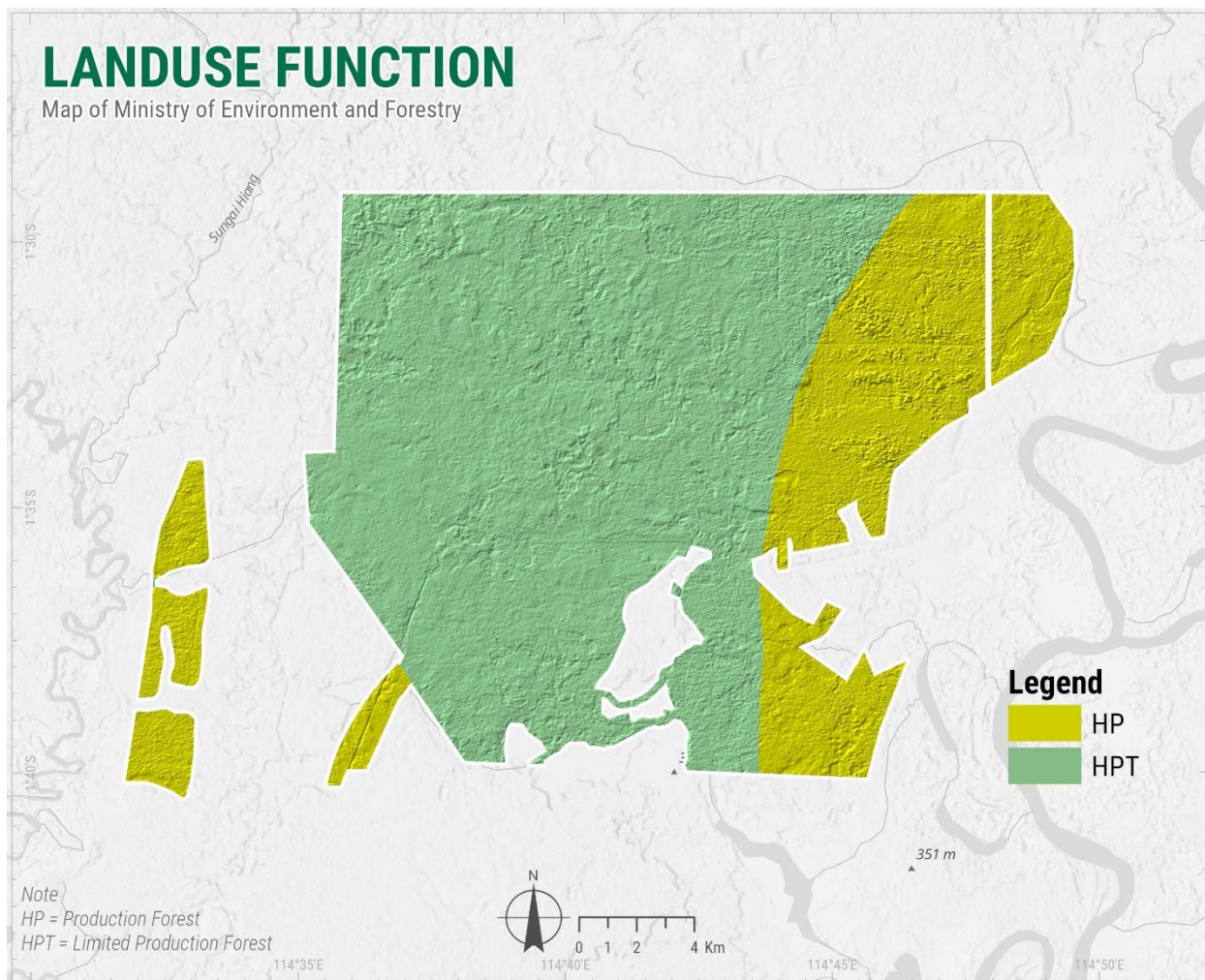
Map 1-2 Location of the Project Within the Province of Kalimantan Tengah

The Project is owned and operated by PT Nusantara Raya Solusi (“**NRS**” or the “**Project Proponent**”), an Indonesian company which is ultimately owned by Yayasan Hamparan Eco Semesta (“**Yayasan**”), an Indonesian not-for-profit foundation, via a holding company PT Hamparan Eco Semesta (“**HES**”). The Project Proponent was founded to be the owner and operator of rainforest and mangrove conservation projects. The sole business of the Project Proponent is to operate and manage the Project as an ecosystem restoration project in accordance with a Forest Utilization Business License (*Perizinan Berusaha Pemanfaatan Hutan* or “**PBPH**”) issued by the Indonesian Ministry of the Environment and Forestry (*Kementerian Lingkungan Hidup dan Kehutanan* or “**KLHK**”). Pursuant to the PBPH and the Forestry Laws, the Project Proponent has the right to operate within the Project Area for a period of up to 120 years.

The Project Proponent has entered into a collaborative arrangement with Zero Carbon Forestry Management Pte Ltd (“**ZCF**”), a Singapore-based asset management firm specializing in forest conservation investments. Pursuant to its investment agreements, ZCF and its associated entities have funded the development costs of the Project and ZCF has an ongoing supervisory role in providing professional expertise to assist the Yayasan and the Project Proponent in the design of the Project and the formulation and execution of strategic management plans. The collaboration aims to ensure the Project is administered sustainably, fostering environmental vitality and biodiversity, and creating economic benefits for communities in addition to its climate objectives.

The historical and current land-use activity in and around the Project Area includes both formal and informal economic activities, including commercial crop plantations, production forest-commercial selective logging, industrial oil palm plantation, smallholder oil palm plantation, saw-mills, and mining. A major trans-Kalimantan highway was completed in 2009 intersecting the Project Area, creating increased vulnerability to unplanned and informal deforestation activities and encroachment on the natural environment. Parts of the concession have been impacted by fires during historical El Niño years.

The Project Area was earmarked for economic use by the Central Kalimantan Provincial Forestry Service (*Dinas Kehutanan Provinsi Kalimantan Tengah* or “**Dinas Kehutanan**”) in early 2021, who received several official submissions for a PBPH from major commercial forestry groups to use the Project Area for industrial forestry purposes. To prevent the inevitable conversion of the natural forest that this would entail, the Project Proponent submitted a competing application for a PBPH with a view to ecosystem restoration, and was extremely privileged to receive the support of both the Provincial Government and KLHK in approving its application.



Map 1-3 Ministry of Environment and Forestry (KLHK) Land Use of the Project Area

According to documentation received from government departments, without the establishment of the Project, the whole Project Area would have been legally converted into industrial forest plantation (*Hutan Tanaman Industri* or “HTI”). Therefore, the Project seeks to prevent the planned deforestation scenario through the following activities (see above Map 1-3).

- **Prevention of the clearing, drainage (for peatland areas) and conversion** of 30,515 ha natural forest to an industrial forest plantation, including 16,634 ha of forest on mineral soil (APDD), 10,148 ha of forest on currently undrained peat land (APDD-CIW) and 3,733 ha of forest on currently drained peat land (APDD-RWE). The APDD-RWE activity will include restoration of hydrological functions through rewetting efforts.
- **Prevention of the drainage and conversion** of 1,031 ha of peatland and wetland on non-forest land to an industrial forest plantation (CIW).
- **Restoration of hydrological functions** in 1,223 ha of currently drained peatland (RWE) through rewetting efforts

The Project will prevent all future forest clearing in the Project Area, and implement the following programs to achieve targets on emission reduction, community development, and biodiversity conservation:

- **Forest Preservation Program:** The Project has established a team and infrastructure for land use monitoring, improved forest protection, and law enforcement in the Project Area.
- **Forest Fire Control Program:** The Project has established a team and infrastructure to provide fire protection in and around the Project Area.
- **Reforestation of Degraded Forest and Peatland Areas:** The Project has established nurseries with a view to replanting degraded forest and peatland areas aiming to return the degraded areas to their natural state. Reforestation activities will include a selection of native tree species to maintain biodiversity, including high value species to promote community involvement in the reforestation and preservation programs.
- **Preservation of Wetland Areas:** The Project is removing drainage through activities such as water management and back filling man-made canals which were previously used for logging activities, to rewet degraded wetland areas.
- **Community Engagement Program:** The Project maintains a Community Relations Team and community engagement program to manage all interactions with communities that will support good community relations, resolve claims and disputes, and coordinates community involvement in the Project.
- **Community Sustainable Development Program:** The Project is designed to promote land use through sustainable forest use activities such as the harvesting of non-timber forest products (“NTFP”), medicinal plants, rattan, pineapple, and beekeeping for natural forest honey harvesting and beekeeping, to enable sustainable economic benefits of the forest for local communities in harmony with the natural environment and traditional practices.
- **Smart Patrol:** The Project is developing technological initiatives to monitor fire and security risks, maintain a biodiversity database and implement biodiversity monitoring.

The successful implementation of the Project is calculated to result in total removals and reductions in carbon emissions of approximately 65,678,428 tCO₂e and generate approximately 59,110,585 of Verified Carbon Units (“VCUs”) over an initial Project term of 60 years. The Project is expected to be extended beyond its initial term for a further period of 60 years in accordance with the maximum term of the PBPH license under the Forestry Laws.

1.2 Audit History

This is the first PDD submission and there are no audits to record.

1.3 Sectoral Scope and Project Type

Sectoral scope	VCS Scope 14 Agriculture, Forestry and Other Land Use (“AFOLU”)
AFOLU project category ¹	Reducing Emission from Deforestation and Degradation (“REDD”) in the category of Avoided Planned Deforestation (“APD”) and Wetland Restoration and Conservation (“WRC”).
Project activity type	Avoided Planned Deforestation & Degradation (“APDD”) - Activities that reduce net greenhouse gas (“GHG”) emissions by stopping or reducing deforestation or degradation on forest lands that are legally authorized and documented for conversion to other land use. Conservation of Intact Wetlands (“CIW”) - Activities that reduce GHG emissions by avoiding degradation and/or the conversion of wetlands that are intact or partially altered while still maintaining their natural functions. Restoring Wetland Ecosystems (“RWE”) - Activities that reduce GHG emissions by the restoration of wetlands that are drained by rewetting and returning them to their original natural functions.

1.4 Project Eligibility

1.4.1 General eligibility

1. The Project conforms to the general and AFOLU specific requirements of section 3.1 and 3.2 and is not excluded under Table 2.1 of the VCS Standard, version 4.4.
2. Forested areas within the Project Area meet an international definition of “forest” and were qualified as forest for a minimum of 10 years before the Project Start Date. The definition of “forest” may include mature forests, secondary forests, and degraded forests. Under the VCS program, “secondary forest” is forest considered as having been cleared, having recovered naturally, being at least 10 years old, and meeting the lower limit of the forest threshold parameters at the start of the Project.

¹ See Appendix 1 of the VCS Standard

3. The Project avoids planned deforestation and planned wetlands degradation in the Project Area. As a result, the Project falls under the Reducing Emissions from Deforestation and Degradation (REDD) and Wetlands Restoration and Conservation (WRC) categories pursuant to section 3.2.1, 3.2.8, 3.5.1, and Appendix A1.8 & A1.15, A1.16 of the VCS Standard, version 4.4.
4. The Project Baseline Scenario involves:
 - The clearing, drainage (for peatland areas) and conversion of 30,515 ha natural forest to an industrial forest plantation, including 16,634 ha of forest on mineral soil, 10,148 ha of forest on currently undrained peat land and 3,733 ha of forest on currently drained peat land.
 - The drainage and conversion of 1,031 ha of peatland and wetland on non-forest land to an industrial forest plantation.
 - Continued emissions from 1,223 ha of currently drained peatland.
5. The Baseline Scenario conforms to the methodological requirements and Sections 3.13.1 – 3.13.3 of the VCS Standard, version 4.4.
6. The lifetime of the Project is 60 years as permitted by section 3.9.3 of the VCS Standard, version 4.4.
7. The Project will be validated within the five-year requirement as required in section 3.11.4 VCS Standard, version 4.4.
8. The Project has implemented the current and valid, approved, and up-to-date methodology to calculate its greenhouse gas emissions (GHG) reductions in a conservative manner as required by sections 3.1.2 and 3.1.3 of the VCS Standard, version 4.4.
9. The Project has established legally mandated riparian zones adjacent to primary Peat Dome Forest in and around rivers, streams, and other significant water bodies within the Project Area.
10. The Project has demonstrated its additionality requirements as set forth in section 3.14 of the VCS Standard, version 4.4.

1.4.2 AFOLU project eligibility

The Project includes reduced emissions from deforestation and degradation (AFOLU REDD category) and wetland restoration and conservation (AFOLU WRC category).

AFOLU REDD activities principally comprise Avoided Planned Deforestation (APD). The Project will permanently protect the remaining natural forest areas from planned conversion to industrial forest plantations and reduce net GHG emissions by reducing deforestation. The forest is classified according to Indonesian Forestry Laws, being areas greater than 0.5 hectares containing trees higher than five meters, with a canopy cover over 10%.

AFOLU WRC activities include Conservation of Intact Wetlands (CIW) under Avoiding Planned Wetland Degradation (APWD). The Project will permanently protect the peatland soil areas from planned development into plantations, and from the resultant peatland drainage implemented during plantation development. The Project will retain the existing intact wetlands and maintain and improve the natural wetland functions of hydrology, sediment supply, salinity characteristics, water quality and native plant communities. The protected wetlands are classified as peatlands according to the Indonesian Peat Regulation having a high organic content (>65%) in a soil layer greater than 50cm.

AFOLU WRC activities also include Restoring Wetland Ecosystems (RWE). The Project will reduce GHG emissions by the restoration of drained and degraded wetlands by rewetting through the damming and water management of canals located in the Project area as well as revegetation to return their original natural functions.

For the ten-year period prior to the Project Start Date 2022), there has been no clearing or conversion within the Project Area and no native ecosystems have been converted, cleared, drained, or degraded to generate GHG credits. The evidence is presented in Section 2.4.3 below.

1.4.3 Transfer project eligibility

The project is not a transfer project or a CPA seeking registration.

1.5 Project Design

- ☐ Single location or installation
- ☒ Multiple locations or project activity instances (but not a grouped project)
- ☐ Grouped project

1.5.1 Grouped project design

N/A

1.6 Project Proponent

Organization name	PT Nusantara Solusi Raya
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Title	President Director
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Organization name	PT Nusantara Solusi Raya
Contact person	Mayang Pratiwi
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Email	mayangpratiwi@nusantararayasolusi.com

Organization name	PT Nusantara Solusi Raya
Contact person	Alana Tomaso
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Telephone	+62-811-995-4197
Email	alanatomaso@hesfoundation.org

1.7 Other Entities Involved in the Project

Organization name	Yayasan Hamparan Eco Semesta
Role in the project	Overall Supervision and Oversight
Contact person	Wanda Aristiani Evans
Title	Overseer (<i>Pengawas</i>)
Address	Sequis Center, floor 7, Jl. Jenderal Sudirman No.71, RT.5/RW.3, Senayan, Kec. Kby. Baru, Kota Jakarta Selatan, Jakarta 12190
Telephone	+62 878-6696-9660
Email	wandaevans@hesfoundation.org

Organization name	PT Hamparan Eco Semesta
Role in the project	Community Development and Engagement
Contact person	Helda Yanti
Title	Program Manager
Address	Sequis Center, floor 7, Jl. Jenderal Sudirman No.71, RT.5/RW.3, Senayan, Kec. Kby. Baru, Kota Jakarta Selatan, Jakarta 12190
Telephone	+62 821-2534-6944
Email	heldayanti@hesfoundation.org

Organization name	Zero Carbon Forestry Management Pte Ltd
Role in the project	Investment Manager and Project Consultant
Contact person	Joel Hogarth
Title	Director
Address	113 Depot Road, #09-1023, Singapore 100113
Telephone	+65 9137 5102
Email	joelhogarth@zcfinvestments.com

Organization name	Ata Marie Group Ltd
Role in the project	Forest Inventory Survey, Carbon Modelling and Project Document Preparation
Contact person	George Kuru
Title	Director
Address	Ruko Darmawangsa Square Unit 5, 4th Floor. Jl Darmawangsa 6 Kebayoran Baru. Jakarta Selatan 12160. Indonesia
Telephone	+62 21 72789411
Email	george.kuru@ata-marie.co.id

Organization name	Agriculture Faculty of Bogor Agriculture Institute (“IPB”)
Role in the project	Soil Surveyor
Contact person	Ir. Hermanu Widjaja, MSc
Title	Team Leader
Address	Jl. Meranti, Kampus IPB Dramaga Bogor, Indonesia (16680)
Telephone	+62 251 – 862 9350
Email	hermanuwi@apps.ipb.ac.id

Organization name	LPPM Universitas Palangka Raya
Role in the project	Social Assessment And FPIC
Contact person	Dr. Ir. Evi Veronica
Title	Chairman
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Telephone	+62 811521199
Email	Informasi@lppm.upr.ac.id

Organization name	PT Konsultan Karbon Lestari
Role in the project	SRN Consultant
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Address	Epicentrum Walk Unit A259, 5 th Floor, Jakarta Selatan
Telephone	+62 812-3787-0351
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1.8 Ownership

The Project is owned by the Project Proponent. The Project Proponent has been granted a Forest Utilization Business License (*Perizinan Berusaha Pemanfaatan Hutan* or “**PBPH**”) pursuant to the Decree of the Minister of Investment/Head of the Investment Coordination Board (BKPM) No. 91203088528770005, dated 4 August 2023, to operate within the Project Area.

The Project Area is located in South Barito and Kapuas Regencies, in the province of Central Kalimantan, Indonesia as shown on the map in section 1.13 below. The PBPH license issued for the Project Area is a multi-use forestry business activities license, which covers all forms of commercial and non-commercial forestry usage. However, the Project Proponent submitted its application for the PBPH as well as its environmental impact assessment (*Upaya Pengelolaan Lingkungan Hidup dan Upaya Pemantauan Lingkungan Hidup* or “**UKL-UPL**”) and statutory work plan (*Rencana Kerja Usaha* or “**RKU**”) on the basis the Project Area would be purely a conservation and restoration project with NTFP and sustainable agro-forestry for the benefit of local communities.

A summary of the application process is set out below in accordance with relevant Indonesian regulations including (i) Government Regulation No. 23 of 2021 concerning Forestry Management, and (ii) KLHK Regulation No. 8 of 2021 concerning Forest Management and Preparation of Forest Management Plans, and Forest Utilization in Protected Forests and Production Forests.

Milestone	Descriptions
Application to Provincial Government	On 28 June 2021, the Project Proponent submitted an application to the Provincial Government for a PBPH in respect of approximately 52,000 ha including the Project Area. This application, seeking a Technical Recommendation and Governors Recommendation for the PBPH to be conducted as an ecosystem restoration project, was lodged with the Central Kalimantan Investment and One-Stop Integrated Services Office.

Technical Recommendation from Provincial Forestry Service	The Project Proponent obtained Technical Recommendation from the Head of the Central Kalimantan Provincial Forestry Service through Letter No. 522/2209/II.2/Dishut, dated 10 September 2021.
Recommendation from Governor of Central Kalimantan	The Project Proponent obtained Governor of Central Kalimantan's Recommendation Letter referenced as No. 570/2/IUPHHK-RE/IX/DPMPTSP.2021, dated 15 September 2021 recommending the Project Proponent be granted a PBPH for ecosystem restoration for an area of approximately 52,000 ha, which included the Project Area. The Governor Recommendation was formally issued through the Central Kalimantan Investment and One-Stop Integrated Services Office.
In-Principle License (<i>Ijin Prinsip</i>) for PBPH.	The Project Proponent was granted an In-Principle License (<i>Ijin Prinsip</i>) No. 12042211116204001, dated 11 April 2022, by the Minister of Investment/Head of the Investment Coordination Board, in respect of an area of approximately 42,000 ha, which included the Project Area. The In-Principle License was granted based on the recommendation of the Ministry of the Environment and Forestry following a lengthy consultation process. In the discussions leading up to the In-Principle License grant, the Project Proponent voluntarily relinquished approximately 10,000 ha of land from the applications due to overlapping community land claims, although is still in discussions to conserve the community land as part of a joint community project. The In-Principle License required the Project Proponent to complete various conditions, including geographical coordinate mapping, approval of its environmental plan (UKL-UPL) and payment of land-rent (<i>luran</i>).
Geographical Coordinate Mapping (<i>tata batas</i>)	The Project Proponent received Letter No. S.179/BPHPX-2/2022 dated 22 April 2022, from the Directorate General of Sustainable Forest Management - Production Forest Management Center Region X confirming the completion of geographical coordinate mapping of the Project Area
17 January 2023 Environmental plan (UKL-UPL) approval.	The Project Proponent received Letter No. SK.162/MENLHK-PKTL/PDLUK/PLA.4/1/2023, dated 17 January 2023, from the Minister of Environment and Forestry confirming approval of the Project environmental plan (UKL-UPL).

	The approval followed a lengthy public consultation process in which the Project Proponent voluntarily relinquished a further approximately 2,000 ha due to overlapping land claims. The UKL-UPL includes a description of the Project design as a conservation project specifically for carbon storage and sequestration services, in addition to sustainable agro-forestry and the harvesting of NTFP.
PBPH land-rent (<i>luran</i>) Payment	On 15 May 2023, the Project Proponent paid the PBPH land-rent (<i>luran</i>) as stipulated in the Payment Request Letter (Surat Permintaan Pembayaran) for the Forest Utilization Business License (Izin Usaha Pemanfaatan Hasil Hutan) No. S.461/PHL/IPHH/HPL.4/4/2023 dated 18 April 2023.
Full License	The Project Proponent was granted the Decree of the Minister of Investment/Head of the Investment Coordination Board No. 91203088528770005 dated 4 August 2023. This decree officially grants the full PBPH license for the Project Area.

Table 1-1 Process to Secure Project Area Land Rights

The Project has acquired the necessary approvals from the relevant national, provincial and regency authorities to develop and implement the Project and conduct Project Activities in the Project Area.

1.9 Project Start Date

Project start date	12 September 2022
Justification	Section 3.8 of VCS Standard, version 4.4 defines the Project Start Date of an AFOLU project as “the date on which activities that led to the generation of GHG reductions or removals are implemented (e.g. preparing land for seeding, planting, changing agricultural or forestry practices, rewetting, restoring hydrological functions, or implementing management or protection plans).” The Project Start Date is 12 September 2022, which is the date of the signing and the implementation of the Fire Prevention and Control Cooperation Agreement between the Project Proponent, the Yayasan, and LPPM. The Fire Prevention and Control Cooperation Agreement focuses on two key activities: (i) land fire control and forest rehabilitation, and (ii) initial research into medicinal plants and ethnobotany within the Project Area.”

1.10 Project Crediting Period

Crediting period	60 years
Start and end date of first or fixed crediting period	12 September 2022 to 11 September 2082

1.11 Project Scale and Estimated GHG Emission Reductions or Removals

☐ < 300,000 tCO₂e /year (project)

☒ ≥ 300,000 tCO₂e/year (large project)

Each core activity (REDD / CIW / RWE) is modelled according to their respective activity start dates. The total emissions for all activities have been compiled taking into account variable start dates as follows:

The Project Start Date is specified as 12 September 2022. The annual emissions assume that the year commences on 12 September of the start year and concludes on 11 September of the following year. For simplicity purposes, the first year is referred to as 2022 and the final year as 2081.

Activity start dates based on project implementation commencement events.

Calendar year of crediting period	Estimated GHG emission reductions or removals (tCO ₂ e)
2022	1,007,052
2023	1,929,689
2024	1,690,929
2025	1,633,739
2026	1,453,018
2027	1,744,837
2028	1,877,711
2029	1,961,466
2030	2,087,137
2031	1,667,940
2032	1,536,612
2033	1,508,068
2034	1,483,592
2035	1,461,698
2036	1,445,937
2037	1,428,151
2038	1,414,316
2039	1,403,206
2040	1,387,007
2041	1,353,152
2042	1,293,585
2043	1,293,007
2044	1,293,007
2045	1,021,595
2046	904,293
2047	862,111
2048	844,683
2049	844,683
2050	844,683

2051	844,683
2052	844,683
2053	844,683
2054	844,683
2055	844,683
2056	844,683
2057	844,683
2058	844,683
2059	844,683
2060	844,683
2061	844,683
2062	844,683
2063	844,683
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2066	844,683
2067	844,683
2068	844,683
2069	844,683
2070	844,683
2071	844,683
2072	844,683
2073	844,683
2074	844,683
2075	844,683
2076	844,683
2077	844,683
2078	844,683
2079	838,525
2080	835,823
2081	835,796
Total	66,838,175
Average	1,113,970

1.12 Description of the Project Activity

The Project aims to reduce GHG emissions from deforestation and degradation of forest and peatland ecosystem through avoiding its planned conversion to an industrial forestry plantation and wetland restoration and conservation activities. The Project Area is not located within a jurisdiction covered by a Jurisdictional REDD+ Program or a jurisdictional forestry baseline.

The historical and current land-use activity in and around the Project Area includes both formal and informal economic activities, including production forest-commercial selective logging, smallholder agriculture including oil palm plantation, pineapple and other crops, and mining. A major trans-Kalimantan highway was completed in 2009 intersecting the Project Area, creating increased vulnerability to unplanned and informal deforestation activities and encroachment on the natural environment. Starting in 2022, a coal transport road was constructed across the east part of the Project Area in a north-south direction. These roads, along with a narrow buffer left and right, are excluded from the Project Area, but the existence of these roads also creates increased vulnerability to informal deforestation activities within the concession. A license for a further mining road has been granted and its impact on the Project Area is currently under discussion.

Parts of the Project Area have been impacted by fires during historical El-Niño years.

The Project Area was earmarked for economic use by the Central Kalimantan Provincial Forestry Service (*Dinas Kehutanan Provinsi Kalimantan Tengah* or “**Dinas Kehutanan**”) in early 2021, who received several official submissions for a PBPH from major forestry groups to use the Project Area for industrial forestry purposes. To prevent the inevitable conversion of the natural forest that this would entail, the Project Proponent submitted a competing application for a PBPH with a view to ecosystem restoration, and was extremely privileged to receive the support of both the provincial government and KLHK in approving its application.

According to documentation received from government departments, without the establishment of the Project, the whole Project Area would have been legally converted into industrial forest plantation (*Hutan Tanaman Industri* or “**HTI**”). In this Baseline Scenario, natural forests would be cleared followed by planting of Acacia monoculture plantations over a period of 7-10 years. This would be accompanied by water table management systems which would drain the peatland. Chemical fertilizers would be used to maintain plantation productivity. Every 5-7 years the Acacia would be harvested through clear felling and then replanted.

The activities implemented by the Project have been designed to reduce direct threats that historically occurred and are currently occurring in the Project Area. Prior to the Project Start Date, forest degradation mostly occurred from selective logging that took place in and around the Project Area. This was exacerbated by the canals built by the former selective logging concessions and possibly also by illegal loggers. The Project has commenced water management activities in respect of the man-made canals to rewet the surrounding peatland.

The Project design includes an economic buffer zone along the trans-Kalimantan highway intersecting the Project, designed to enhance community livelihoods with the quid pro quo of forming a hard protective barrier for the natural forests. The Project Proponent will also work with local communities to develop sustainable economic activities consistent with its conservation objectives such as marketing of NTFP, medicinal plants, rattan, pineapple, and beekeeping & natural forest honey harvesting, with the objective of incentivizing local communities to work alongside and protect the natural forest and its biodiversity.

The Project will prevent all future forest clearing in the Project Area, and implement the following programs to achieve targets on emission reduction, community development, and biodiversity conservation:

- **Forest Preservation Program:** The Project has established a team and infrastructure for land use monitoring, improved forest protection, and law enforcement in the Project Area.
- **Forest Fire Control Program:** The Project has established a team and infrastructure to provide fire protection in and around the Project Area.
- **Reforestation of Degraded Forest and Peatland Areas:** The Project has established nurseries with a view to replanting degraded forest and peatland areas aiming to return the degraded areas to their natural state. Reforestation activities will include a selection of native tree species to maintain biodiversity, including high value species to promote community involvement in the reforestation and preservation programs.
- **Preservation of Wetland Areas:** The Project is removing drainage through activities such as water management and back filling man-made canals which were previously used for logging activities, to rewet degraded wetland areas.
- **Community Engagement Program:** The Project maintains a Community Relations team and community engagement program to manage all interactions with communities that will support good community relations, resolve claims and disputes, and coordinate community involvement in the Project.
- **Community Sustainable Development Program:** The Project is designed to promote land use through sustainable forest use activities such as the harvesting of non-timber forest products (“NTFP”), medicinal plants, rattan, pineapple, and beekeeping for natural forest honey harvesting and beekeeping, to enable sustainable economic benefits of the forest for local communities in harmony with the natural environment and traditional practices.
- **SMART Patrol:** The Project is developing technological initiatives to monitor fire and security risks, maintain a biodiversity database and implement biodiversity monitoring.

1.12.1 Specifically, the Project will undertake the following activities with the projected results.

Outcome or Impact Estimated by the End of Project Lifetime	Stakeholders Involved	Project Activities	Timeline
1. Conservation /restoration of 30,515 ha of natural forest, including: a. Avoidance of 16,634 ha of deforestation for plantations on mineral soil (APDD). b. Avoidance of 10,148 ha of deforestation for plantations on currently undrained peat land (APDD-CIW). c. Avoidance of 3,733 ha of deforestation on currently drained peat land (APDD-RWE). d. Enrichment planting in severely degraded and understocked forest areas.	• KPH • KPHL • Dinas Lingkungan Hidup dan Kehutanan • Local communities	Nursery, Revegetation using native species.	First 10 years of Project.
2. Preservation of wetland ecosystems, achieved through: a. Avoidance of 10,148 ha of drainage for plantations on currently undrained forested peat land (APDD-CIW). b. Avoidance of 1,031 ha of drainage for plantations on currently undrained non-forest on peat land (CIW). c. Rewetting of 3,733 ha of currently drained peat land (APDD-RWE). <i>Note: there is potential reforestation of non-forest areas on peatland, but these areas have been classified as CIW for this project.</i>	• BRGM • Local communities	Rewetting, Canal water management, Canal backfilling.	First 10 years of Project. The exception being rewetting / canal water management which commenced in 2023 and will be completed in 2024.
3. Elimination of illegal logging and natural forest land clearing in the Project Area, achieved through: a. Establishment of a forest preservation team responsible for detection of illegal logging and natural forest land clearing. b. Establishment of a community monitoring and preservation program to report the commencement of any illegal logging activities and natural	• KPH • KPHL • Dinas Lingkungan Hidup dan Kehutanan • Local communities • Forest Police • Police	Participative forest patrols involving communities, awareness raising in communities, Training	Throughout the Project lifetime

Outcome or Impact Estimated by the End of Project Lifetime	Stakeholders Involved	Project Activities	Timeline
forest land clearing to the forest preservation team. c. Establishment of relationships with regulatory authorities to enforce forest protection programs.			
4. Fire prevention and fire threat reduction, achieved through: a. Reduction of human activity in the Project Area. b. Establishment of fire detection capability in the Project Area c. Community based program to improve agricultural practices (non-fire practices) to reduce fire risks. d. Establishment of trained and equipped fire-fighting teams in the project as an extension of the company's plantation firefighting capability.	• Manggala AGNI • BPBD • MPA • Local communities	MPA, Forest patrol, Community development program, Fire management training.	Throughout the Project lifetime
5. Preservation of Biodiversity and rare terrestrial species through a. the preservation of the wetlands & Biodiversity habitat. b. Increasing biodiversity habitats through the reforestation program. c. Increasing animal numbers through improved access and specific programs.	• Dinas Lingkungan Hidup dan Kehutanan • Local communities • University • NGO	SMART patrol, Development of biodiversity database, Revegetation.	Throughout the Project lifetime.
6. Increased economic welfare through: a. Employment opportunities directly in the Project or through the improving economic climate related to Project Activities. b. Improved livelihoods through improved yields from farming and fishing endeavors due to the Project Activities.	• Dinas Pemberdayaan Masyarakat dan Desa • Dinas Koperasi • Dinas Pariwisata • University • Local communities	Eco Tourism, Marketing of NTFP, Sustainable livelihoods improvement training.	Throughout the Project lifetime

Outcome or Impact Estimated by the End of Project Lifetime	Stakeholders Involved	Project Activities	Timeline
7. Forest Protection - Establish partnership-based forest management to address tenure conflict in the Project Area which leads to forest encroachment. - Revegetation of degraded forest area using native species and assisted forest regeneration approach.	- KPH - KPHL - Provincial & District Government - Local communities	Training, revegetation, forest patrol.	Throughout the Project lifetime

1.12.2 The Project Proponent expects to submit the Project for verification under the Climate, Community and Biodiversity Standards upon completion of its CCB program design which is being developed to achieve three key outcomes based on the Theory of Change (TOC) (See Figure 1-1):

1. Climate

- Conservation of existing natural forest, peatland and wetland areas.
- Improved peatland condition and hydrological function.
- An increase in community welfare through the development of alternative sustainable income opportunities.

2. Community

- Improved livelihood of indigenous and local communities.
- Improved capacity of indigenous and local communities to actively involved in ER project.

3. Biodiversity

- The habitat of rare, endemic, and endangered flora and fauna is restored and preserved.
- Planting programs involve a biodiverse selection of nursery grown native species to restore the canopy and enhance the natural environment.

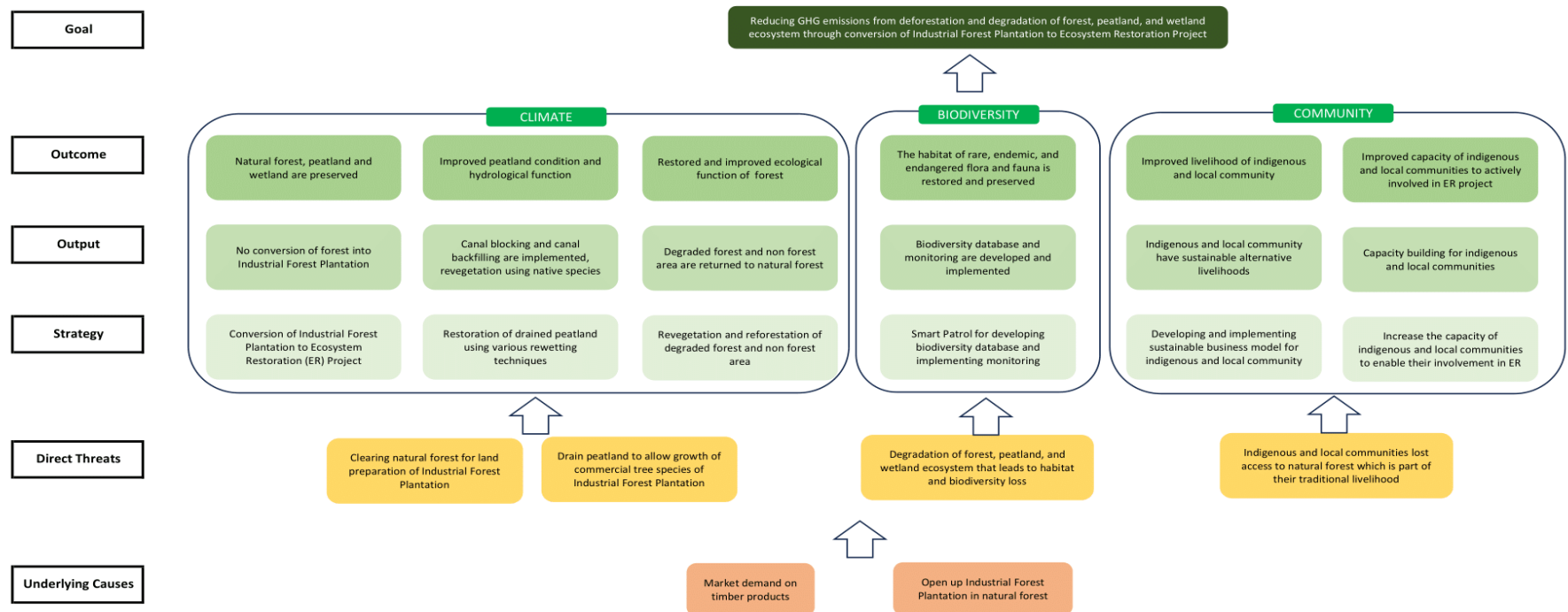


Figure 1-1 Project Theory of Change

1.13 Project Location

The Project Area is located approximately 175 km south of the Equator on the island of Borneo, in the South Barito and Kapuas Regencies of the Central Kalimantan Province, Indonesia (See Figure 1-2 below) and covers a concession area of 39,853 ha. It comprises one large eastern block of 38,782 ha and three smaller blocks in the west of 1,071 ha. The Project Area is approximately 110 km to the northeast of Palangkaraya, the capital of Central Kalimantan Province. The Project Area is located between the Kapuas and Barito rivers.

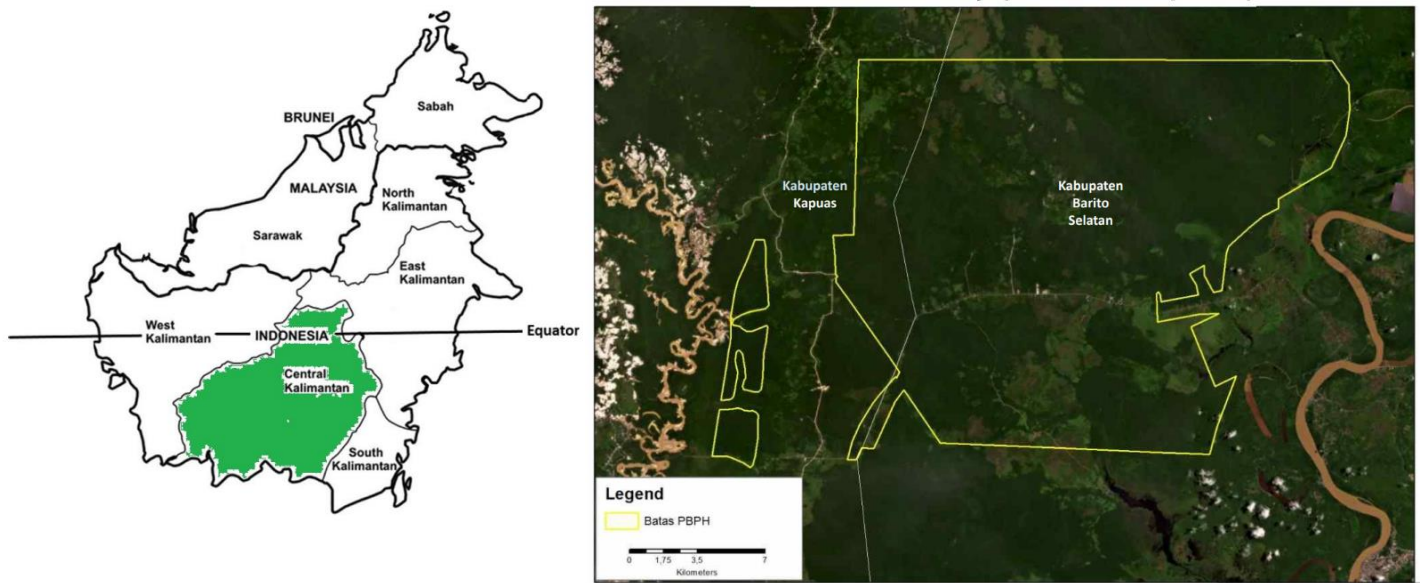


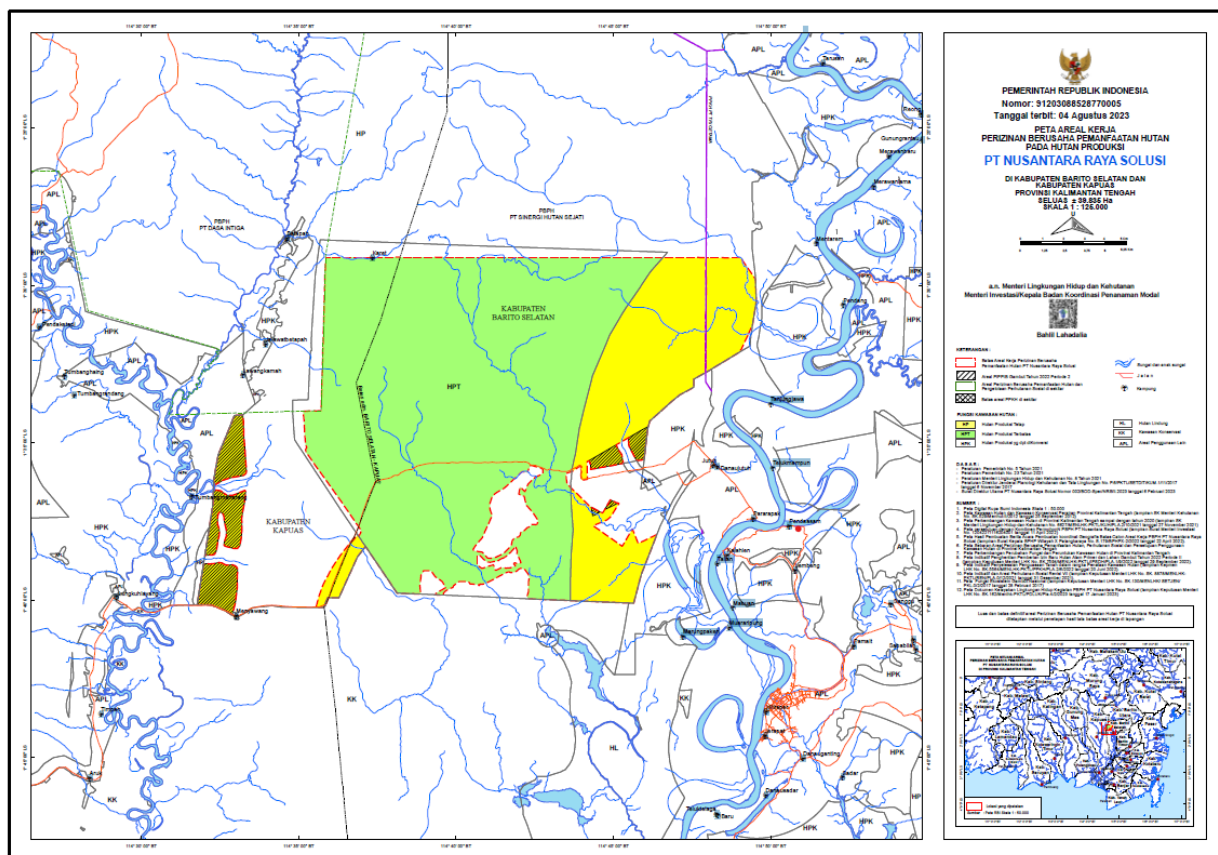
Figure 1-2 Project Boundary Satellite Overlay

The Project's geographical coordinates are as indicated below:

Location NRS	Decima Degrees	Degree Minute Second
Latitude (S)	1.484 - 1.672	1° 29' 02.4" S - 1° 40' 19.2" S
Longitude (E)	114.528 - 114.836	114° 31' 40.8" E - 114° 50' 09.6" E

Table 1-2 Project Coordinates

Based on the PBPH license, the administrative boundaries of the Project Area are set out in the below map.



Map 1-4 PBPH Boundaries: (Boundary of Forest Concession)

1.14 Conditions Prior to Project Initiation

1.14.1 Historical and Current Land Use

The Project resides in a tropical forest landscape comprising a mixture of dryland (mineral soil) forest and peatland forest, plus areas of non-forest due primarily to historical shifting cultivation and other smallholder agriculture activity. In addition, some parts of the Project Area have been impacted by fires during historical El Niño years.

The historical and current land-use activity in and around the Project Area includes both formal and informal economic activities, including production forest, commercial selective logging, smallholder agriculture including oil palm plantation, pineapple and other crops, and mining. A major trans-Kalimantan highway was completed in 2009 intersecting the Project Area, creating increased vulnerability to unplanned and informal deforestation activities and encroachment on the natural environment. Starting in 2022, a coal transport road was constructed across the east part of the Project Area in a north–south direction. These roads along with a narrow buffer left and right are excluded from the Project Area, but the existence of these roads also create increased vulnerability to informal deforestation activities within the concession. A license for a further mining road has been granted and its impact on the Project Area is currently under discussion.

Community activity (comprising principally of NTFP and shifting agriculture) has been mainly on more fertile mineral soil areas and areas with road or river access. Current smallholder agriculture is mostly located close to existing roads – the less accessible areas of historical activity in the north-west have mostly been abandoned as communities in those areas have switched their livelihood focus to mining.

Illegal logging activities have targeted areas of forest with high value timber potential which are scattered across the Project Area and are not shown on the map.

1.14.2 Baseline Scenario.

According to documentation received from government departments, without the establishment of the Project, the whole Project Area would have been legally converted into an industrial forest plantation (*Hutan Tanaman Industri* or “HTI”). In this Baseline Scenario, natural forests would be cleared followed by the planting of Acacia monoculture plantations over a period of 7-10 years. This would be accompanied by drainage and water table management systems which would drain the peatland. Chemical fertilizers would be used to maintain plantation productivity. Every 5-7 years the Acacia would be harvested through clear felling and then replanted. The Baseline Scenario is analyzed in more detail in Section 3.4.

1.14.3 Climate

According to Schmid and Ferguson's climate classification, Central Kalimantan Province has type A climate, which is characterized by the presence of a higher number of wet months than dry months with rainfall evenly distributed across all regions. A dry period generally occurs every year from June to September. Overall rainfall is influenced by the El Niño and La Niña weather effects, with noticeably higher temperatures and drier conditions experienced in El Niño years.

Rainfall data from 2010 to 2022 shows that the highest average rainfall was in 2016 (312 mm on average), followed by 2020 with an average of 291 mm per month. November is the month with the most precipitation in the last 13 years, with an average of 353 mm. Detailed data and rainfall graphs around the company are presented in Table 1-3 and Figure 1-3.

Month	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Average per month
January	288	453	480	311	285	404	384	311	114	175	306	199	348	312
February	171	199	385	377	169	252	337	222	399	149	404	286	310	282
March	304	211	261	362	305	405	392	411	303	172	203	313	303	303
April	320	320	295	345	266	254	258	225	168	177	407	225	285	273
May	280	283	233	391	352	117	331	241	124	51	315	263	327	254
June	264	117	84	95	214	198	113	187	73	148	178	129	245	157
July	291	132	180	342	130	67	343	133	112	48	387	81	194	188
August	135	107	114	82	229	14	113	210	45	128	186	205	104	129
September	244	80	156	185	64	0	186	85	108	20	171	311	271	145
October	410	172	158	203	57	0	387	128	245	66	334	176	303	203
November	334	316	292	248	315	434	585	294	493	106	378	406	384	353
December	310	423	282	341	364	204	319	338	310	259	221	281	185	295
Average per Year	279	235	243	273	229	196	312	232	208	125	291	240	272	

Table 1-3 Rainfall data 2010 – 2022 (mm)

Source: Badan Meteorologi Klimatologi dan Geofisika (BMKG) – Stasiun Meteorologi Buntok

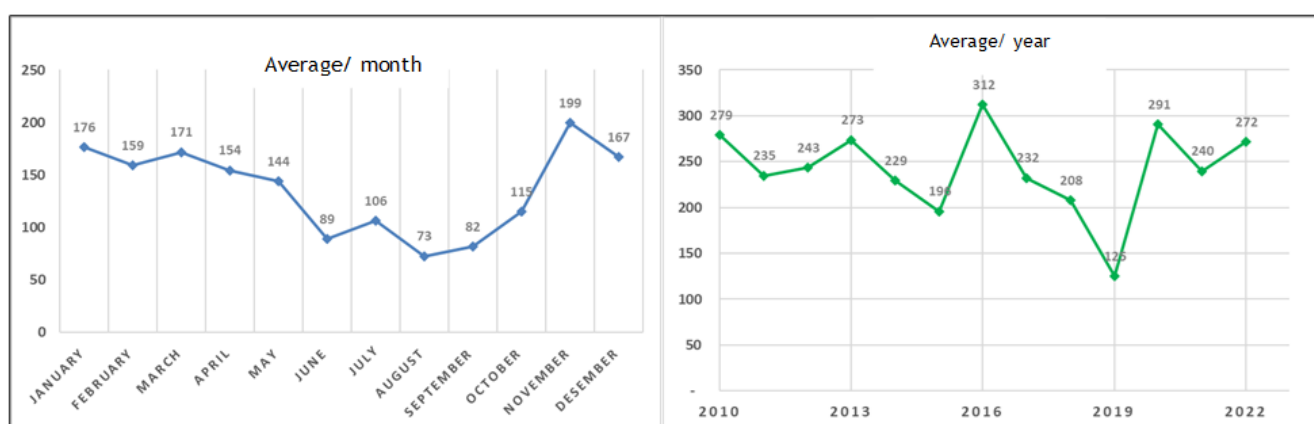


Figure 1-3 Average monthly and yearly rainfall

1.14.4 Hydrology

The Project Area is located between the Kapuas River in the west and the Barito River in the east. These main rivers are not tidal, but river levels drop significantly during the dry season and often overflow into floodplain and wetland areas during the rainy season.

Almost all the Project Area drains in a south-easterly direction into the Barito River via three tributaries: the Madara, Perigi and Sabur Rivers. Only the very western parts of the Project Area drain south-west into the Kapuas River. Peatland areas are located in the south and eastern parts of the Project Area (see Section 1.14.6).

Annual rainfall in Indonesia's peatland areas is generally high, but uneven throughout the year. This results in the emergence of a period of long deficit during the dry season during which the water table falls. The water balance of Indonesia's peat swamp forests is dominated by surface runoff and evapotranspiration. Only a small fraction constitutes groundwater flow. A

However, the peatland hydrology is vulnerable to man-made drainage, particularly for drainage of agricultural land and canals used for human transportation and extraction of timber. The Project aims to prevent and reverse man-made drainage, restoring the wetlands to their natural state.

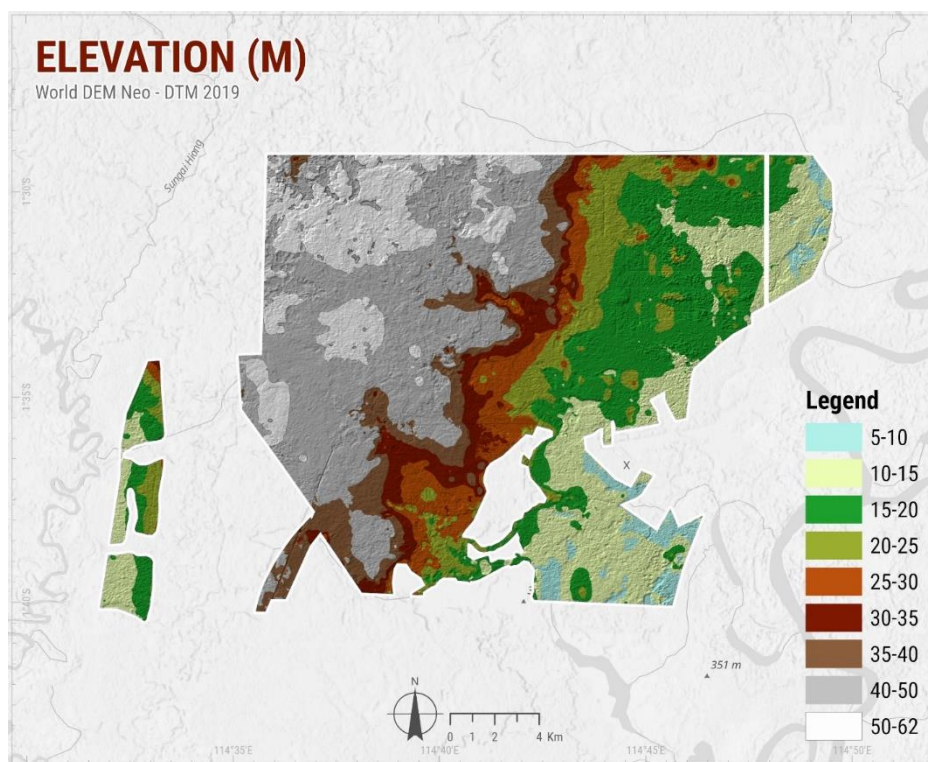


Most of the South Barito Regency area is lowland with a height ranging from 5-40 meters above sea level (masl). In the middle part, hills can be found with variations in topography from sloping to steep, with a slope intensity pattern that increases towards the north. The northern part is a series of hills with steep topography. This part of the region extends from northwest to east.

Table 1-4 and Map 1-6 shows the elevation range across the Project Area. The Project Area lies at an altitude between 5-88 masl, with the highest parts being in the north-west of the Project Area, and the lower (peatland) areas in the south and east.

Elevation (masl)	Area (ha)	%
0-10	208	0.5%
10-20	2,982	7.5%
20-30	9,432	23.7%
30-50	14,291	35.9%
50-88	12,922	32.4%
Total	39,835	100.0%

Table 1-4 Elevation Range in Project Area



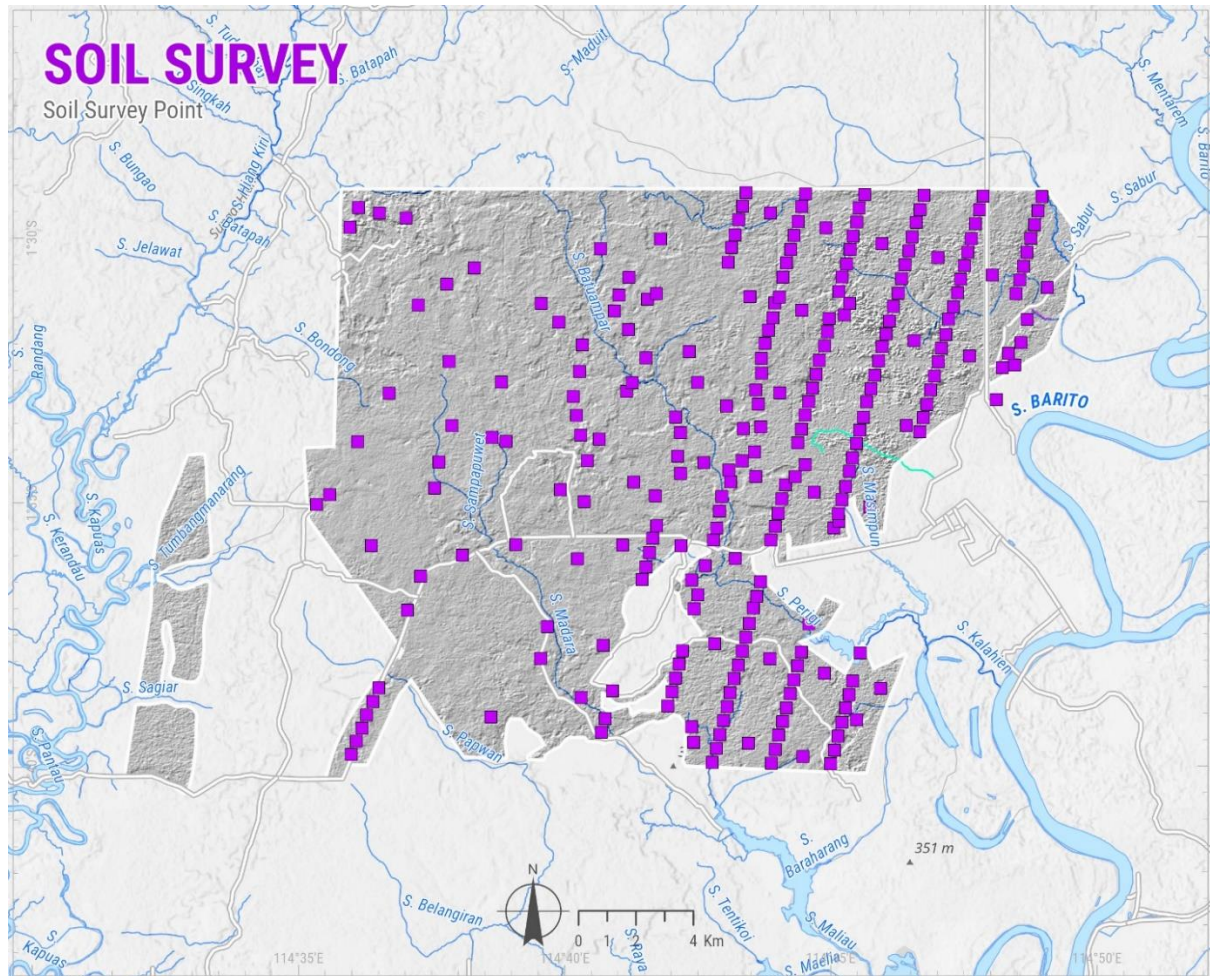
Map 1-6 Elevation Range in Project Area

1.14.6 Soil and Peatland Distribution

Based on Peatland Hydrological Unit Map (SK 129/MENLHK/SETJEN/PKL.0/2/2017), 19,294 ha (48.4%) of the Project Area is in the Sungai Kapuas-Sungai Barito Peatland Hydrological Unit (*Kesatuan Hidrologi Gambut/KHG*), within which development is permitted on 22.3% (*Fungsi Budidaya*), and 26.1% is allocated for protection (*Fungsi Lindung*). The remaining area does not belong to any KHG.

In 2023, The Bogor Agricultural Institute (*Institut Pertanian Bogor* or “IPB”) carried out an inventory of soils and peat ecosystems on a scale of 1:50,000 (“**Peat Ecosystem and Soil Survey**”) in accordance with Minister of Environment and Forestry Regulation No.

P14/MENLHK/SETJEN/KUM.1/2 /2017. Map 1-9 shows the peat/soil survey sampling point distribution.



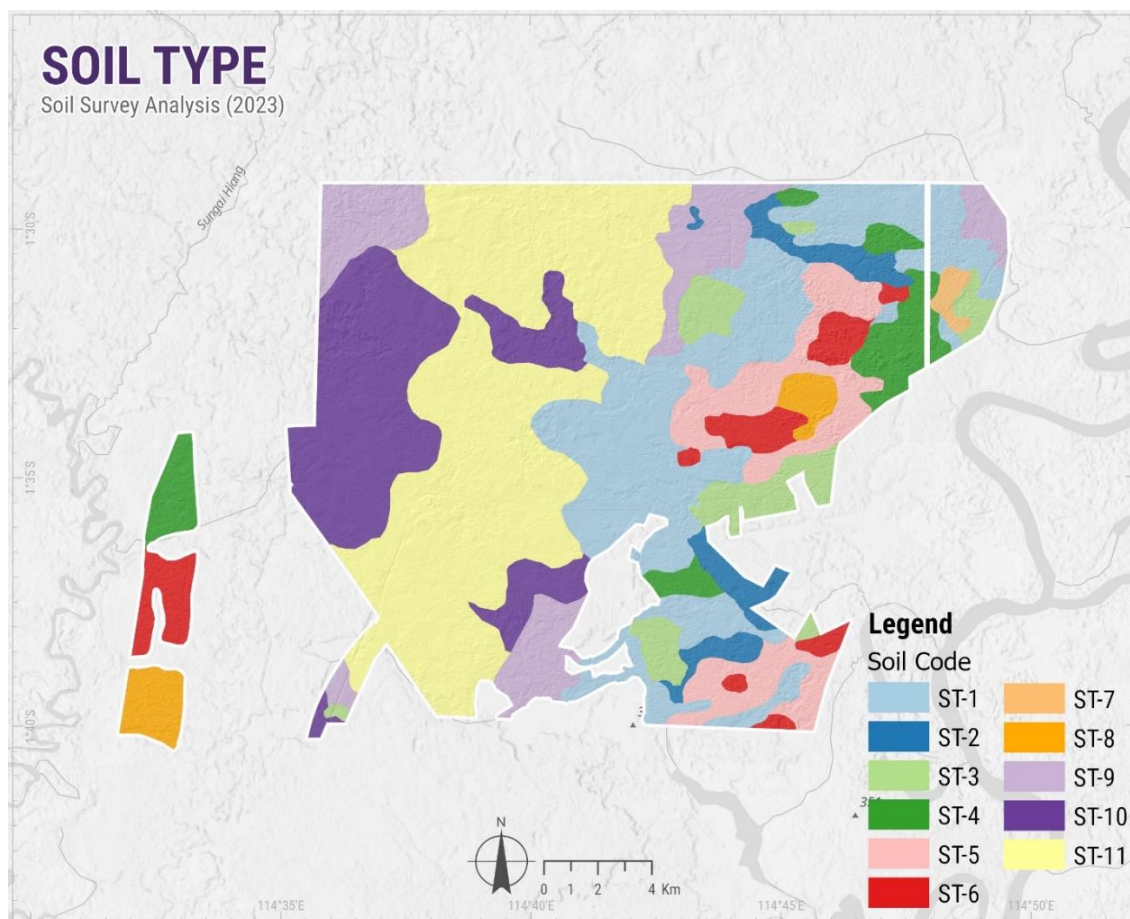
Map 1-7 Location of Soil Survey Points

The results of spatial analysis of survey data from the Peat Ecosystem and Soil Survey (2023) are presented in Table 1-7²

² Strictly speaking Peatlands is defined as having peat of depth greater than 50 cm. The recommendation of the soil experts is that in this project, shallow peat with class ST1 averaging 50 cm peat depth is defined as peat in Indonesia.

No	Soil Type	Soil Type	Peat Depth	Area	
				ha	(%)
1	Upland (Tanah Mineral)			21123,68	53,0
	ST-9	Typic Udipsamment	-	3489,41	8,76
	ST-10	Spodic Dystrudept	-	5697,17	14,3
	ST-11	Lithic Haplorthod & Typic Haplorthod	-	11937,10	29,97
2	Peat Land (Lahan Gambut)			18711,23	47,0
	ST-1	Histic Psammaquent & Typic Udipsamment	< 50	7823,70	19,6
	ST-2	Terric Haplosaprist	50 - 100	1303,81	3,3
	ST-3	Terric Haplosaprist	100 - 150	1877,35	4,7
	ST-4	Terric Haplosaprist	150 - 200	1909,66	4,8
	ST-5	Typic Haplosaprist & Typic Haplohemist	200 - 300	3028,28	7,6
	ST-6	Typic Haplosaprist	300 - 400	1658,57	4,2
	ST-7	Typic Haplosaprist	400 - 500	203,25	0,5
	ST-8	Typic Haplosaprist	500 - 700	906,61	2,3
	Total (1 + 2)			39834,92	100,0

Table 1-5 Soil Type Distributions in the Project Area



Map 1-8 Soil Types in Project Area

Peat Distribution and Depth

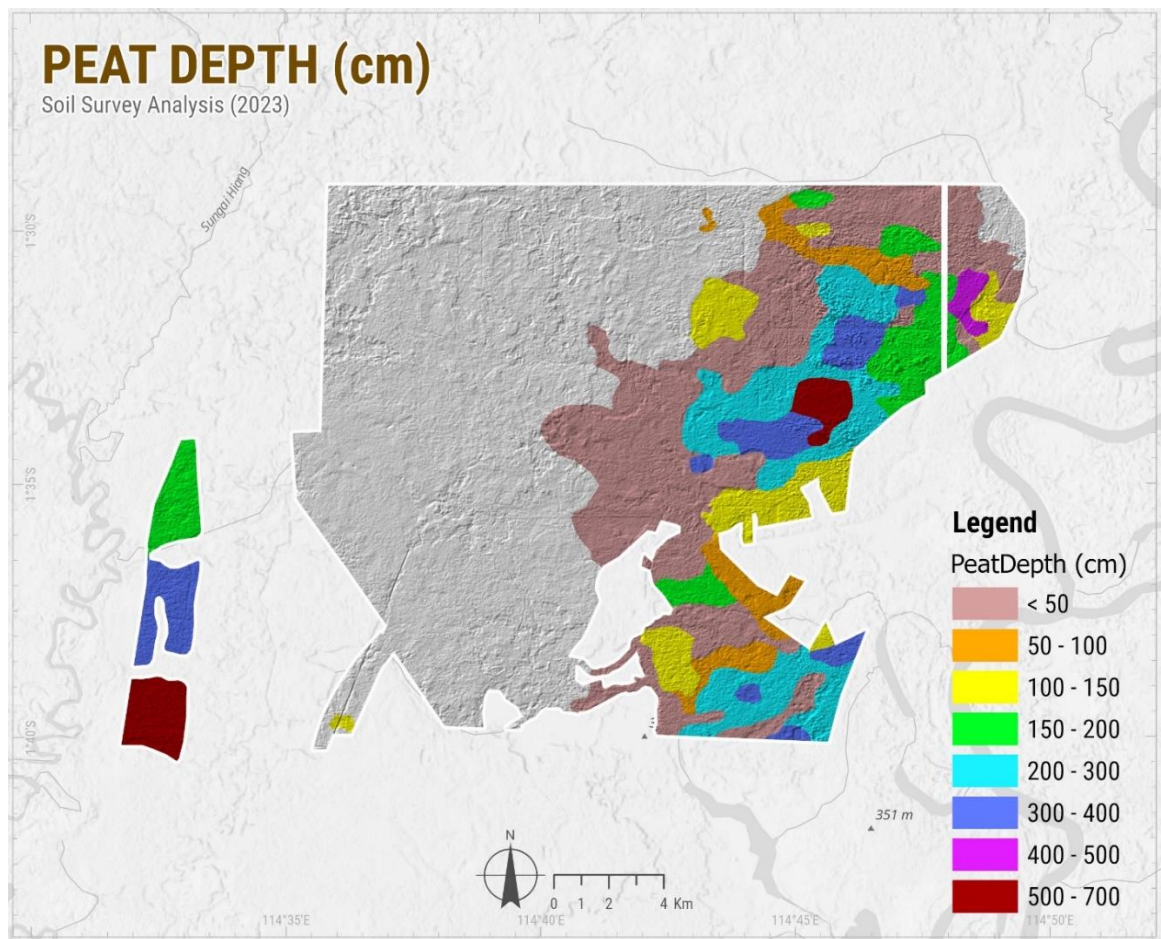
Based on the results of the Peat Ecosystem and Soil Survey the Project Area consists of 18,711 ha (47%) of peat land area and 21,124 ha (53%) of mineral soil. The peat land area is further

broken down into utilization zone 15,923 ha (40%) and protection 2,768 ha (7%). The thickness of the peat ranges from 8 cm to 695 cm. The distribution of peat soil thickness is presented in Table 1-6 and Map 1-9 Location and Depth of Peat in the Project AreaMap 1-9 below.

No	Soil Type	Peat Depth Class (cm)	Area (ha)	Percentage (%)
A	<i>Upland Soil</i>			
1	ST-9, ST-10, ST-11	-	21,123.68	53.0
B	<i>Peat Land</i>			
B-1	Utilization (Kawasan Budidaya E.G.)		15,942.80	40.0
2	ST-1	< 50	7,823.70	19.6
3	ST-2	50 – 100	1,303.81	3.3
4	ST-3	100 – 150	1,877.35	4.7
5	ST-4	150 – 200	1,909.66	4.8
6	ST-5	200 – 300	3,028.28	7.6
B-2	Protection (Kawasan Lindung E.G)		2,768.43	7.0
7	ST-6	300 – 400	1,658.57	4.2
8	ST-7	400 – 500	203.25	0.5
9	ST-8	500 – 700	906.61	2.3
	Total		39,834.92	100.0

Table 1-6 Peat Depth

Source: Soil Survey IPB, 2023



Map 1-9 Location and Depth of Peat in the Project Area

1.14.7 Ecosystems

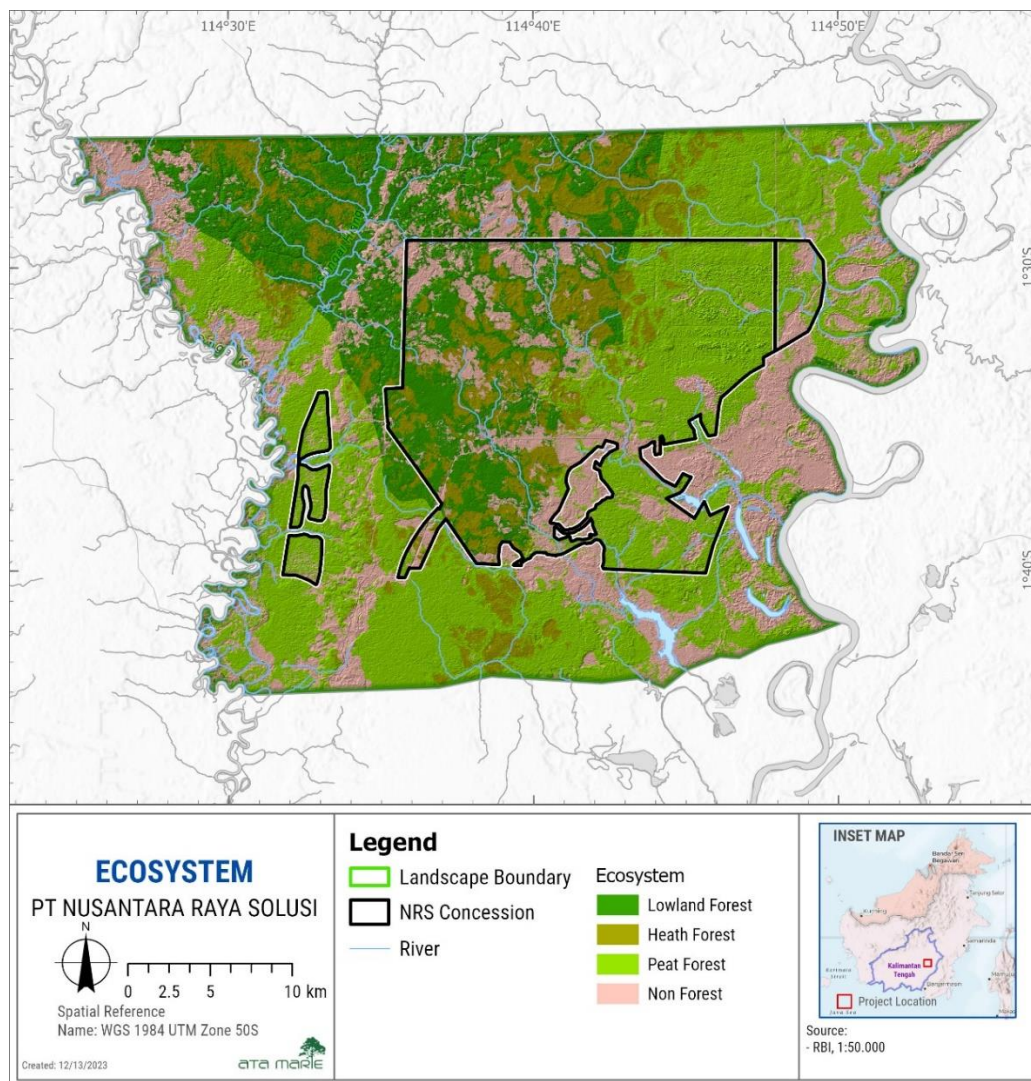
Dominant ecosystems³ are peat forest and lowland forest ecosystems, followed by heath forest. Heath forest distribution is sporadic due to soil conditions,

Table 1-7 and Map 1-10 describe ecosystems in the Project Area.

Ecosystem	Area (ha)	%
Heath (<i>kerangas</i>) Forest Ecosystem	6,850	17.2%
Lowland Forest	8,957	22.5%
Peat Forest Ecosystem	15,721	39.5%
Non-Forest	8,307	20.8%
Grand Total	39,835	100.0%

Table 1-7 Ecosystems in Project Area

³ Ecosystems refer to the class of forest based on its original natural state. The current land cover classification reflects considerable modifications to the original state due to logging, forest degradation, soil disturbance and other factors.



Map 1-10 Ecosystem Map at Landscape Level

1.14.8 Land Cover

Land cover stratification was carried out initially through interpretation of the latest satellite imagery coverage (object-based analysis methodology), followed up by in-field verification. The image used is Sentinel 2A Image Coverage dated 2 September 2023.

Remote sensing was carried out following the Ata Marie Forest Carbon Inventory manual.

The results of image interpretation and field verification of the Project Area are presented in Table 1-8 and Map 1-11

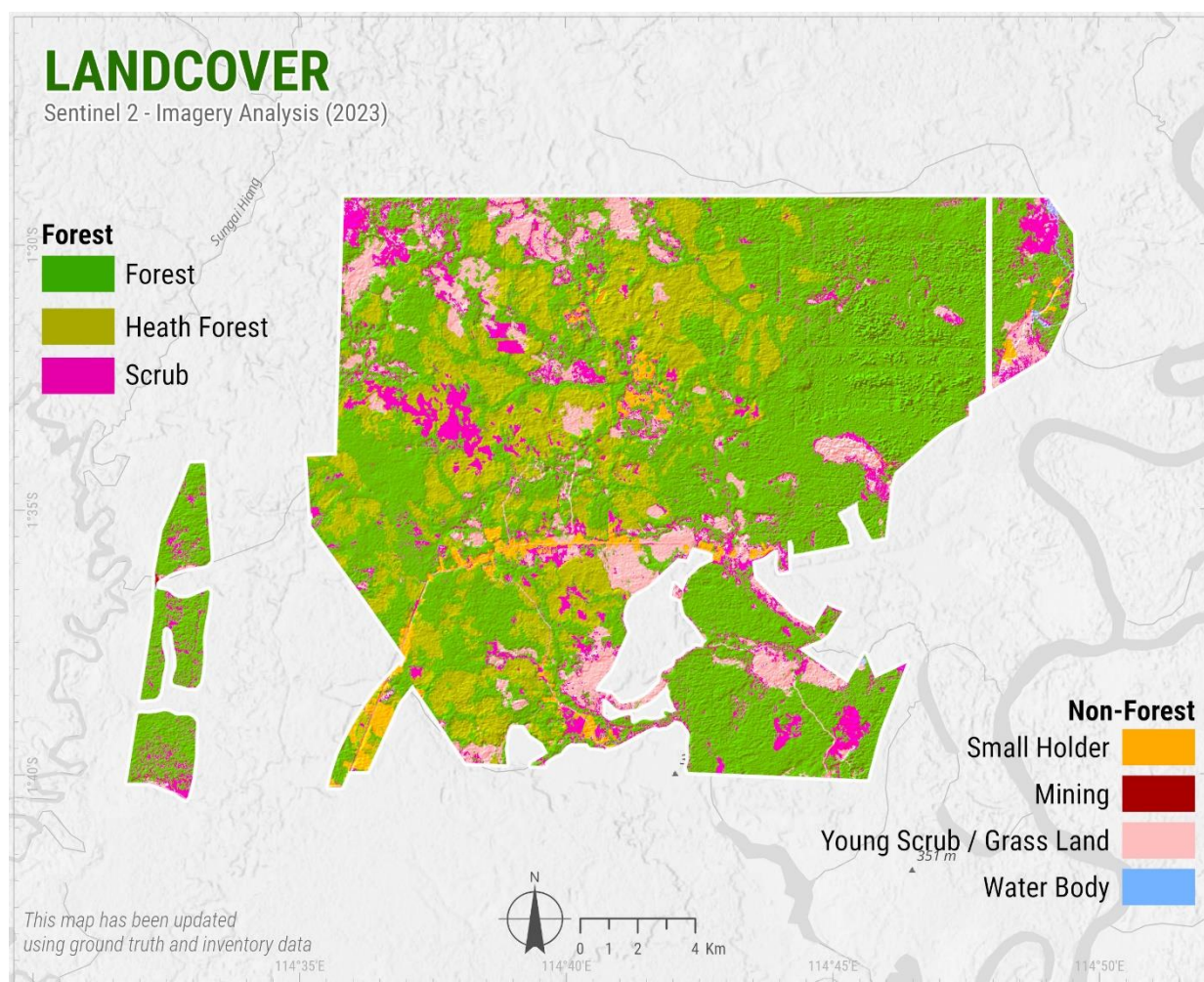
Seven land cover strata have been identified in the Project Area, including three strata considered to be forest. Combined, the three forest strata are dominant, covering about 88% of the Project Area.

The Project plans to carry out enrichment planting activities in understocked/degraded areas.

Forest / non-Forest	Land Cover Strata	Mineral	Peat	Total	%
		Area (ha)			
Forest	Forest (including Degraded Forest)	10,138	14,540	24,678	62.2%
	Heath Forest (<i>kerangas</i>)	6,013	837	6,850	17.0%
	Scrub	2,219	1,584	3,803	9.5%
	Sub Total Forest	18,370	16,960	35,330	88.7%
Non-Forest	Non-Forest (young scrub and grassland)	2,132	1,477	3,609	9.1%
	Smallholder agriculture	597	248	845	2.1%
	Mining	0	3	3	0.0%
	Water Bodies	24	22	47	0.1%
Total		21,124	18,711	39,835	100%

Table 1-8 Land Cover in the Project Area Distributed by Peat and Mineral Soil

Source: Satellite Imagery Interpretation Sentinel-2A accessed on 2 September 2023



Map 1-11 Current Landcover Map

1.14.9 Biomass and Carbon Stock

In 2023 the Project Proponent commissioned Ata Marie to carry out a forest inventory in the Project Area to assess above ground live biomass, as well as collect floral species distribution data for use in biodiversity assessments (the “Forest Inventory Survey”). Figure 1-4 describes the forest inventory approach.

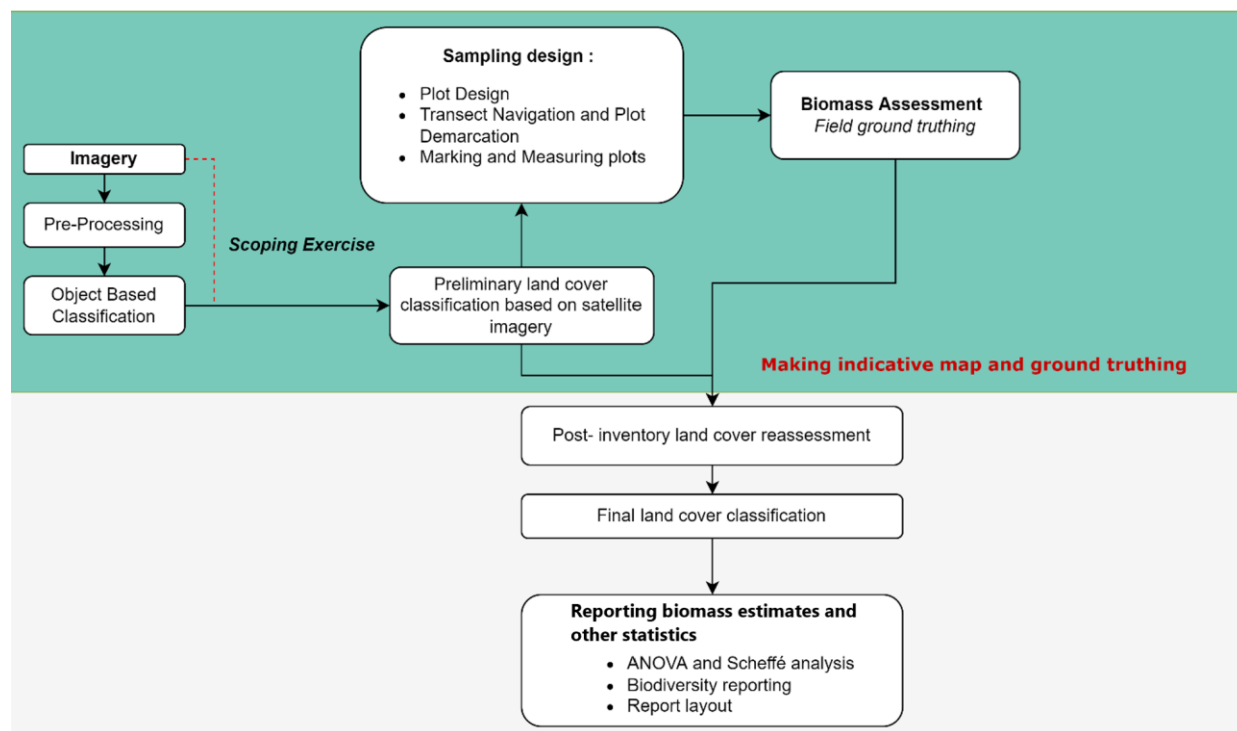


Figure 1-4 Forest Inventory Approach

Field sampling was carried out from 6 September – 9 October 2023. The Forest Inventory Survey implemented following the Ata Marie Forest Carbon Inventory manual. A total of 320 sample plots (plot area 600 m²) were measured. Plots were laid out in clusters of five plots – in total 64 clusters were measured. Each cluster includes one permanent sample plot (PSP) and four temporary sample plots (TSP).

Four land cover strata were targeted in the inventory: forest (193 plots), heath forest/*kerangas* (60 plots), scrub (40 plots) and young scrub/grassland (25 plots).

Data collected in plots included species, diameter at breast height, tree height, and commercial log dimensions. In addition to tree data, plot location was captured using GPS, photo documentation and site condition was recorded at each plot. The Forest Inventory Survey focused on trees with a diameter of ≥5 cm.

The Remote Sensing and Forest Inventory Report describes the objectives, methodology and results in more detail.

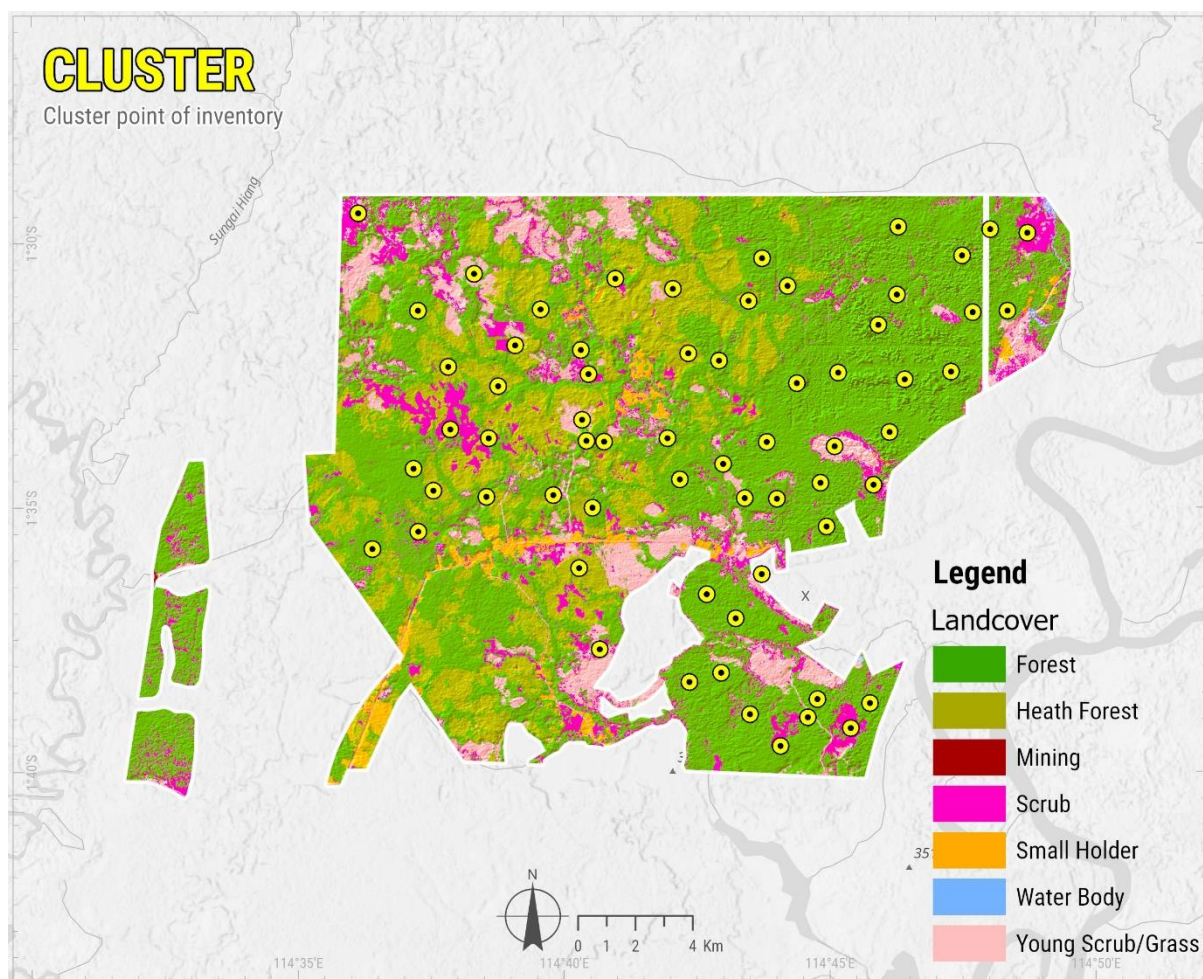
Table 1-9 shows the estimates of above-ground biomass and the precision of the estimates for each of the three forest strata. Table 1-10 shows the precision of the estimates of above-ground biomass for the three forest strata.

Parameter		Unit	Forest	Heath Forest	Scrub	Young Scrub/Grass
Above ground biomass	Biomass	tons.DM.ha ⁻¹	166.6	125.2	71.5	30.0
	Carbon	tons.C.ha ⁻¹	78.3	58.8	33.6	14.1
	CO2E	tons.CO ₂ E.ha ⁻¹	287.1	215.8	123.3	51.6

Table 1-9 Estimates of above ground biomass

Land cover	N	Mean AGB (kg.C/ha)	t (0.95,2)	SE	Precision (%)	SD	VAR	95% CI	Lower 95% CI	Upper 95% CI
Forest	193	78,284	1.972	2,716	6.84	37,729	1,423,479,316	5,357	72,927	83,640
Heath Forest	60	58,844	2.001	2,598	8.84	20,126	405,061,637	5,199	53,645	64,043
Scrub	42	33,626	2.020	3,876	23.28	25,119	630,963,842	7,828	25,798	41,454

Table 1-10 Precision of the estimates of above ground biomass



Map 1-12 Location of Forest Inventory Clusters

1.14.10 Communities

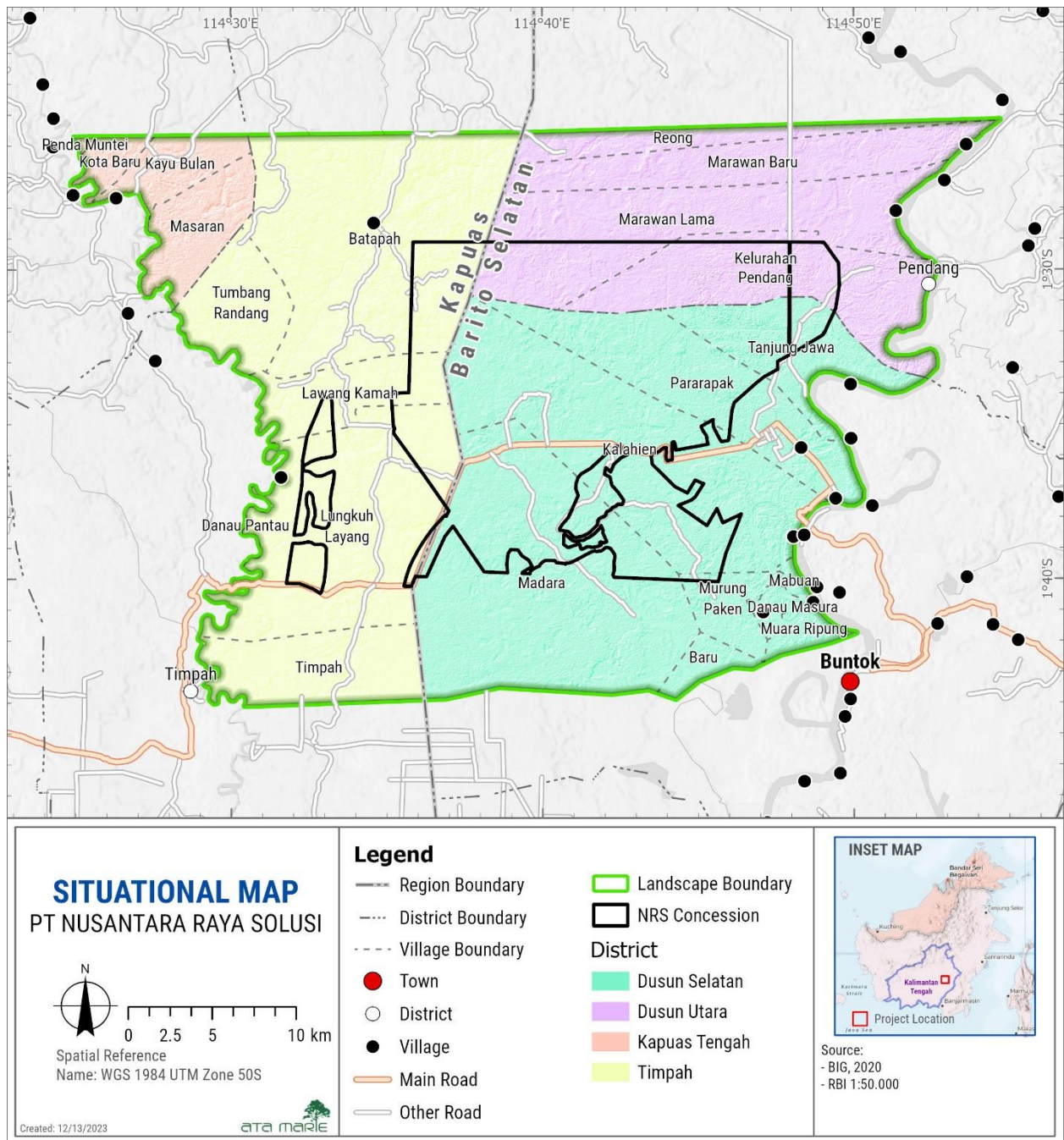
There are no communities in the Project Area itself, however there are 10 communities in the surrounding areas adjacent to the Project Area. Most of the overlapping claims were addressed in the process of obtaining the PBPH license, in which approximately 12,000 ha was voluntarily relinquished due to overlapping claims. However, administrative districts of

certain villages overlap portions of the Project Area and certain tenure claims and customary or historical usage was identified in the FPIC process. Section 2 discusses these rights in detail.

Table 1-11 lists the ten villages adjacent to the Project Area.

Regency	District	Villages/Sub-District
Barito Selatan	Dusun Selatan	Kalahien
		Pararapak
		Tanjung Jawa
		Madara
		Murung Paken
	Dusun Utara	Merawan Lama
		Pendang
Kapuas	Timpah	Batapah
		Lawang Kamah
		Lungkuh Layang
TOTAL		

Table 1-11 List of Villages Adjacent to the Project Area



Map 1-13 Location of Villages adjacent to the Project Area

The Project Proponent has established a Community Relations Team to engage actively with the communities adjacent to the Project Area. In addition, the Project Proponent has engaged the Cultural Research Institute (*Lembaga Penelitian, Pengabdian Masyarakat* or “LPPM”) at Palangka Raya University to engage with the communities and participate in the Community Relations Team. LPPM has been instrumental in conveying the project objectives and identifying the conditions, needs and concerns of the communities as well as communication in the local Dayak languages. LPPM have worked with the communities, taking into account

their feedback, in a process to secure Free Prior Informed Consent (“**FPIC**”) from the ten communities. Project Activities are not commenced in Project Areas until FPIC consents are obtained from any communities which may be affected by those activities. The LPPM findings and results of the FPIC process are set out in a Free Prior Informed Consent Report (“**FPIC Report**”).

Stakeholder engagement is further discussed in Section 2

1.15 Compliance with Laws, Statutes and Other Regulatory Frameworks

The Project is designed and implemented in full compliance with Indonesian national laws and international treaties, particularly on land use, forestry, REDD+, AFOLU, and climate agreements.

A summary of the key laws, statutes, other regulatory frameworks and best practices adhered to by the Project is set out in the following tables.

Regulations Related to PBPH:

No.	Name of Law, Regulation or Decree
1.	Law No. 41 Year 1999 concerning Forestry
2.	Law No. 26 Year 2007 concerning Spatial Planning as lastly amended by Law No. 6 Year 2023 on the Stipulation of Government Regulation in Lieu of Law No. 2 of 2022 on Job Creation to Become Law (the “ Job Creation Law ”)
3.	Law No. 40 Year 2007 concerning Limited Liability Company as most recently amended by Job Creation Law
4.	Law No. 32 Year 2009 concerning Environmental Protection and Management as most recently amended by Job Creation Law
5.	Government Regulation No. 71 Year 2014 concerning Protection and Management of Peat Ecosystem as most recently amended by Government Regulation No. 57 Year 2016
6.	Law No. 18 Year 2013 concerning Prevention and Eradication of Forest Destruction as most recently amended by the Job Creation Law
7.	Government Regulation No. 5 Year 2021 concerning Implementation of Risk Base Business Licensing
8.	Government Regulation No. 22 Year 2021 concerning Environmental Protection, Organization and Management
9.	Government Regulation No. 23 Year 2021 concerning Implementation of Forestry
10.	Presidential Instruction No. 5 Year 2019 Cessation of Granting New Licenses and Improving Governance of Primary Natural Forests and Peatlands
11.	KLHK Regulation No. P.60/MENLHK/SETJEN/KUM.1/10/2019 Year 2019 concerning Procedures for Preparing, Determining and Amending Peat Ecosystem Protection and Management Plans
12.	KLHK Regulation No. P.10/MENLHK/SETJEN/KUM.1/3/2019 Year 2019 concerning Determination, Designation and Management of Peat Dome Peaks Based on Peat Hydrological Units
13.	KLHK Regulation No. 3 Year 2021 concerning Business Activity Standards in the Implementation of Risk-Based Business Licensing in the Environment and Forestry Sector

14.	KLHK Regulation No. 4 Year 2021 concerning List of Business and/or Activities Required to Have Environmental Impact Analysis, Environmental Management Efforts, and Environmental Monitoring Efforts or Statement of Environmental Management and Monitoring Ability
15.	KLHK Regulation No. 8 Year 2021 concerning Forest Management and Preparation of Forest Management Plans, and Forest Utilization in Protected Forests and Production Forests
16.	Law No. 5 Year 1990 concerning Nature Conservation and Its Ecosystem
17.	Government Regulation No. 23 Year 2021 concerning Forestry Governance
18.	KLHK Regulation No. 7 Year 2023 concerning Rules of Carbon Trade in Forestry Sector
19.	KLHK Regulation No P.20/MENLHK/SETJEN/KUM.1/6/2018 concerning protected animals and plants

Table 1-12 Regulations Relating to the PBPH License

Section 1.8 sets out the timeline of the process for the grant of the PBPH license in respect of the Project Area. As a PBPH license holder, Project Proponent is required to comply with ongoing obligations as set out below.

No.	Obligations	Documents Evidencing Such Obligations
1.	Develop a 10-year statutory work plan for long-term forest utilization business (<i>rencana kerja usaha</i> or “ <i>RKU</i> ”)	The Project Proponent submitted the draft RKT to KLHK on 27 November 2023.
2.	Develop an annual work plan (<i>rencana kerja tahunan</i> or “ <i>RKT</i> ”)	The Project Proponent submitted the draft RKT to KLHK on 27 November 2023.
3.	Demarcation of the work area boundaries	The Project Proponent submitted the demarcation of the works area boundaries to KLHK on 14 November 2023.
4.	Recruitment of qualified forestry professionals	Recruitment Process currently underway.

Table 1-13 Compliance with PBPH Requirements

Regulations related to the Carbon Business:

No.	Name of Law, Regulation or Decree
1.	Law No. 7 Year 2021 concerning Harmonization of Tax Regulation
2.	Law No. 4 Year 2023 concerning Financial Sector Development and Strengthening
3.	Presidential Decree No. 98 Year 2021 concerning Implementation of Carbon Pricing to Achieve the Nationally Determined Contribution Target and Control Over Greenhouse Gas Emissions in the National Development
4.	KLHK Regulation No. 21 Year 2022 concerning Procedures for the Application of Carbon Economic Value
5.	KLHK Regulation No. 7 Year 2023 concerning Guideline of Carbon Trading in the Forestry Sector
6.	KLHK Decree No. 168/MENLHK/PKLT/PLA.1/2/2022 concerning Indonesia’s Forestry and Other Land Use (FOLU) Net sink 2030 for Climate Change Control

7.	KLHK Decree No. SK.716/Menlhk/Setjen/KUM.1/6/2023 concerning the Integration of Carbon Value Mechanisms in Partnership Agreements and Business Licenses in the Field of Environment and Forestry
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Table 1-14 Regulation relating to the Carbon Business

The Project is also in compliance with the prevailing Indonesian regulations relating to the operation of a carbon project set out above.

Regulations Related to Manpower:

No.	Name of Law, Regulation or Decree
1.	Law No. 13 Year 2003 concerning Manpower as lastly amended by Job Creation Law
2.	Law No. 24 Year 2011 concerning Social Security Administrative Body as lastly amended by Job Creation Law
3.	Law No. 7 Year 1981 concerning Mandatory Manpower Report in Companies
4.	Presidential Regulation No. 82 Year 2018 concerning Health Insurance as lastly amended by Presidential Regulation No. 64 Year 2020
5.	DKI Jakarta Governor Decree No. 1153 Year 2022 concerning Provincial Minimum Wage for 2023
6.	Central Kalimantan Governor Decree No. 188.44/448/2022 concerning Regency/City Minimum Wage for 2023

Table 1-15 Regulations Relating to Employees

The Project Proponent is in compliance with all Indonesian manpower regulations as set out above.

1.16 Double Counting and Participation under Other GHG Programs

1.16.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☒ Yes ☐ No

If yes, provide required evidence of no double issuance as outlined by the VCS Standard.

In compliance with the Indonesian Carbon Economy Laws, the Project Proponent is submitting an application to the Indonesian National Registration System (“**SRN**”) in parallel with its submission under this Project Design Document.

The Project Proponent is establishing protocols with the Verra registry team to ensure the credits issued by SRN are issued with a parallel Verra registration number which tracks the SRN registration number, and that the SRN and Verra registrations cannot be traded independently. Accordingly, Project credits can be traded either domestically (as SRN units) or internationally (as VCUs), but not separately, and each credit can only be claimed once.

In international carbon accounting, the activities of the Project are counted towards Indonesia’s Nationally Determined Contribution (“**NDC**”). The Project Proponent intends to apply for a Letter of Authorization and Approval (“**LoAA**”) from KLHK in accordance with the Carbon Economy Laws, to permit Project VCUs to be treated as internationally transferred mitigation outcomes with the benefit of a corresponding adjustment under Article 6 of the Paris Agreement and/or other applicable international treaties. International purchasers may not claim contributions towards a different country’s NDC except strictly in accordance with the provisions of LoAA and the relevant treaties.

1.16.2 Registration in Other GHG Programs

Is the project registered or seeking registration under any other GHG programs?

☒ Yes ☐ No

To comply with Indonesian regulation, the project is registered under Indonesian National Registration System (SRN) with account no./registered ID 012-XI-2022-3365.

1.16.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

1.17 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.17.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit?

☐ Yes ☒ No

1.17.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the VCS Program Definitions for definition of GHG-related environmental credit system.

☒ Yes ☐ No

As outlined in Section 1.16.1, procedures are being developed with Verra to ensure no double claiming as outlined by the VCS Standard.

1.17.3 Supply Chain (Scope 3) Emissions

Do the Project Activities specified in Section 4 affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

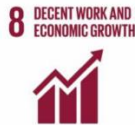
Is the Project Proponent(s) or authorized representative a buyer or seller of the product(s) (goods or services) that are part of a supply chain?

☐ Yes ☒ No

1.18 Sustainable Development Contributions

The Government of the Republic of Indonesia (“GOI”) has made commitments under the UN’s Sustainable Development Goal (“SDG”) program to address climate change issues by reducing GHG emissions in forest landscapes against a 2015 business as usual (BAU) scenario. This includes decreasing deforestation and protection of peatlands under SDG 13 - Climate Action and SDG15 – Life on Land – Forest Protection. Indonesia has expressed its strong commitment to the 2030 Agenda and the SDGs overall. By granting the PBPH license for the Project, the GOI has shown its commitment to these two SDGs through the activity of avoiding planned deforestation.

The Project aims to support the achievement of SDG as outlined in the Table 1-16 below.

SDG		Relevant Project Activity
	SDG 1: No Poverty	The Project aims to employ the local community and provide additional income through their participation in the Project Activity implementation. This will contribute to achievement of Indonesia's SDG to eradicate poverty.
	SDG 5: Gender Equality	The Project will ensure active and meaningful involvement of woman in Project implementation (e.g. in sustainable livelihood program, fire management training).
	SDG 8: Decent Economic Growth	The Project creates various alternative livelihood activities, such as harvesting of NTFP, beekeeping, sustainable agro-forestry and partnership-based forest management. This will contribute to achievement of Indonesia's SDG to achieve better economic growth by combating unemployment and increasing participation from vulnerable group such as youth and women.
	SDG 13: Climate Action	The Project aims to work with local communities to create adaptation and mitigation strategies to combat increasing pressure from palm oil production expansion, timber extraction and other socio-economic factors that have negatively impacted the natural resources in the Project Area. Sequestration is accomplished through the planting and growing of trees and sequestering carbon by peatland soil. Emission reduction is achieved by conserving forests, natural peatland, and restoring degraded peatland through rewetting effort. This will contribute to Indonesia's SDG target to reduce deforestation and land-use diversion.
	SDG 15: Life on Land	The Project aims to increase the abundance, diversity, and critical habitat of endangered and endemic wildlife by protecting natural forest and peatland, as well as restoring degraded peatland and revegetation of bare land. This will contribute to Indonesia's SDG target to prevent a higher rate of forest degradation to ensure the survival of civilization in the future. The project will work with local communities in and around the Project area, thus increasing local participation in forest management and incorporating private and public participation in

		conservation programs. This will contribute to a more effective protection for Indonesia's forests cover.
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Table 1-16 SDGs and Project Activities

1.19 Additional Information Relevant to the Project

1.19.1 Leakage Management

In general, nature based solutions projects are subject to risks from market leakage and activity displacement. This is likely due to the greater scope of possible leakage sources, in addition to the difficulty in estimating an accurate leakage belt. Leakage risks must be considered by the Project with assessments of both top-down and bottom-up risks, alongside project-specific safeguards. Project assessment of leakage risks looks at both the possible sources of leakage and any safeguards put in place by a project to mitigate them.

Two leakage modules are applicable to this Project:

- VMD0009 Estimation of emissions from activity shifting for avoiding planned deforestation/forest degradation and avoiding planned wetland degradation (LK-ASP)
- VMD0044 Estimation of emissions from ecological leakage (LK-ECO)

Six modules are not applicable for this Project because they relate to activities outside of the scope of the Project.

- VMD0010 Estimation of emissions from activity shifting for avoiding unplanned deforestation and avoiding unplanned wetland degradation (LK-ASU)
- VMD0011 Estimation of emissions from market effects (LK-ME)
- VMD0010 Estimation of emissions from activity shifting for avoiding unplanned deforestation and avoiding unplanned wetland degradation (LK-ASU)
- VMD0011 Estimation of emissions from market-effects (LK-ME)
- VMD0012 Estimation of emissions from displacement of fuelwood extraction (LK-DFW)
- VMD0043 Estimation of emissions from displacement of pre-project agricultural activities (LK-ARR)

Whilst, it is possible that the third parties that applied for the PBPH on the basis of an industrial forestry plantation might seek to apply for other PBPH licences that might result in deforestation, these parties can only choose from the lands already allocated by the Ministry of Environment and Forestry – these land designations are fixed and have not changed to any significant extent. Leakage does not need to be considered where the land use designation of the class of agent (forest plantation companies) has not changed.

The Project Area is not currently suffering from significant deforestation by illegal activities which would be displaced to contiguous areas. There are no villages within the Project Area and the local population in the ten villages outside the Project Area who are active within the Project Area do not carry out significant deforestation by illegal activities. As such this type of activity shifting is not considered to be a Project risk.

The Project will implement three strategies to manage potential leakage.

The first strategy of the Project to manage leakage is done at the national level by being an advocate for conservation and restoration projects. This accords with the ambition of the GOI to reduce deforestation of peatland so the Project Proponent expects the GOI to be aligned in this respect.

The second strategy is implemented at the regional level by engaging with relevant stakeholders from Government and the non-government sectors. The objective is to make the local population aware of the importance of fire control, maintaining natural forest cover and conserving biodiversity. These activities are undertaken by the Project Proponent and carried out with the support and involvement from the local provincial government bodies.

The Project Proponent is working closely with IPB and the University of Palangka Raya – an influential entity in Central Kalimantan concerning restoration and conservation— to develop the Fire Management Plan at the concession, carry out the FPIC process, and educational activities.

The third strategy is implemented at the Project level, covering the activities as follows:

- Working with the local communities to promote the benefits for health and the environment of the Project and the threats to health and the environment of illegal activities which lead to deforestation.
- Taking active steps to reduce and remove the threat of leakage from any displacement of planned deforestation activities and ecological leakage. The specific steps will be devised following consultation with local communities.
- Gathering production and water table data from the Project Area which will be collected, analysed, and compiled upon each verification event to estimate activity shifting and ecological leakage.

1.19.2 Commercially Sensitive Information

The Project Proponent has included summaries and findings in this document, however some of the source materials are deemed to be commercially sensitive. Appendix 1 sets out a list of commercially sensitive information.

1.19.3 Further Information

The Project forms part of an identified strategy by the GOI and KLHK to enable the private sector to conduct ecosystem restoration projects as a viable economic alternative land use to deforestation and conversion to commercial plantations. The objective is to reduce

deforestation, attract foreign investment and improve livelihoods whilst also creating a measurable, additional carbon benefit and avoiding leakage.

The decision to conduct the Project both as an Indonesian Project registered with SRN, and as an international Project registered with Verra was taken to maximize the domestic and international market for the Project, in accordance with a taskforce established by IDCTA and Verra for the purpose. The Project is required to comply with both national Indonesian and international Verra standards, and has voluntarily taken the most conservative approach in any situation where there is a difference between the two. The Project is also subject to monitoring, verification and validation which must be compliant with both standards.

The active participation of both Indonesian and Verra registry, methodology and standards teams to create a coherent framework for inclusion of SRN credits as VCUs, while eliminating the possibility for double claiming has been a critical element of bringing Indonesian Projects registered with SRN under the Carbon Economy Laws to an international VCU market. The Project proponents highly value the support of all participants – national and international – in the collaboration which has made this possible.

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

The Project Proponent followed the following steps as listed below to identify the stakeholders who will be impacted by the Project.

Stakeholder Identification

The Project Proponent has established a dedicated community relations team (“Community Relations Team”) to conduct all aspects of the stakeholder identification and consultation process. The Community Relations Team was established in collaboration with the University of Palangka Raya and includes speakers fluent in Bahasa Indonesia and the local Dayak languages.

1. Pre survey

A pre-survey was conducted using Rapid Rural Appraisal (RRA) approach, transect, field observation, informal discussions, and focus group discussions (FGD).

2. Identification Meetings

A series of meetings was conducted with the communities, community leaders, and other relevant institutions to gather primary data and convey information about deforestation, climate change and how the Project will help reduce GHG emissions and provide benefits to the local communities.

3. Documentation Review

Following the pre-survey, undertook literature and legal documents review to analyze the primary data.

Stakeholders identified through the process comprise:

- Local communities conducting formal and informal economic activities, including:
 - Agriculture
 - NTFP harvesting
 - Logging
 - Hunting
 - Fishing
 - Animal husbandry

	○ Beekeeping • Local Associations including: ○ Forest Farmers Group (<i>Kelompok Tani Hutan</i>) ○ Farmers Group (<i>Kelompok Tani</i>) ○ Women's Groups (<i>Kelompok Wanita</i>) ○ Community-based Fire Prevention Group (<i>Masyarakat Peduli Api</i>) • Government and Community leaders ○ Customary leaders (<i>Mantir, Damang</i>) ○ Villager government (<i>Pemerintah Desa</i>) ○ Sub-district Government (<i>Pemerintah Kecamatan</i>) ○ Regency Government (<i>Pemerintah Kabupaten</i>) • Non-Government Organizations: ○ Borneo Nature Foundation ○ University of Palangka Raya The detailed result of these studies and identified stakeholders likely impacted by the Project is presented in Appendix 2
Legal or customary tenure/access rights	The Project fully recognizes legal and customary access rights and community land tenure in line with existing Indonesian national and sub-national regulations. During the process of application for the PBPH license, approximately 12,000 ha of land was excluded from the draft license area in recognition of overlapping claims. The initial Governor Recommendation was in respect of an area of approximately 52,000 ha, which was reduced to the current Project Area of 39,853 ha mainly due to overlapping claims. The Project Proponent plans to engage with the relevant communities to determine if the relinquished areas can be developed as community-based conservation areas in the future. Following grant of the full PBPH License, the Community Relations Team undertook participatory mapping, and an HCV 5 and 6 assessment and spatial analysis to identify any legal or customary tenure or access rights and potential conflicts within the Project Area. The team identified all land use within the Project Area regardless of whether this was substantiated with formal legal rights. The team has established and implemented SOP to receive and assess claims in an open and transparent manner. This exercise

was conducted in consultation with local communities and the Dinas Kehutanan.

The participatory mapping identified active smallholder farmers operating within the Project Area, primarily along the major roads and rivers.

There are several Farmer Groups and other stakeholders claiming land use rights within the Project Area. The result is presented in Map 2-1

Land use claims vary in terms of legal status. Some of the Farmer Groups have been recognized by the Regional KLHK office and others not. Not all the groups are actively working on the land and those that are working generally have a small active footprint.

There are two large land use right claims in the north of the Project Area (blue color in Map 2-1) which arise from villages significantly located further north of the Project Area; however, the participatory mapping exercise did not identify any land use rights over land in the Project Area.

Many of the Farmer Group areas have not been formally delineated, and in some cases field surveys conducted by the Project Proponent have identified Farmer Groups working outside the claimed area.

According to KLHK regulations, Farmers Groups working on forest land are required to seek permission from KLHK to work in partnership with concession license holders (i.e. the Project Proponent) and are not permitted to carry out deforestation. Therefore, the existence of these groups is not viewed as a threat to the Project – The Project Proponent views these groups as partner organizations in community livelihood programs and in Community Engagement in general.

Accordingly, the Project Proponent aims to include these groups as part of the Project design in a transition to more sustainable agro-forestry and NTFP harvesting methods. Areas which are currently planted and actively farmed will not be affected by the Project. In addition, the Project Proponent also intends to collaborate with KPH (*Forest Management Unit*) as an extension of the Forest Service at the site level. This includes preparing a work plan for areas managed by KPH to ensure alignment with Project Activities.

The participatory mapping exercise also identified village administration areas which overlap with the Project Area; while these did not comprise legal claims, consent of the relevant villages

	was sought and obtained for Project Activities taking place in these areas prior to commencing those Project Activities. The Project Proponent maintains SOPs to ensure all the above claims are received and assessed in an open and transparent manner. The detailed results of the participatory mapping exercise are presented in Appendix 3.
Stakeholder diversity and changes over time	There are 10 villages proximate to the Project Area. The inhabitants of those villages are predominantly of Dayak ethnicity with several sub-ethnic groups namely: Bakumpai, Dusun, Ma'anyam in South Barito District, and Ngaju, and Kapuas in Kapuas District. The immigrant population in these villages comes from the Bugis, Banjar, Javanese, Sundanese, Madurese, Batak, Flores ethnicity and makes up relatively small numbers (17%). Grouped by religion, villagers from Dayak sub-ethnic groups (except for Bakumpai), as well as immigrants of Batak and Flores origin are mostly Christian (57%) or Kaharingan Hindus (9%). Villages from Bakumpai sub-ethnic group and other immigrants from other regions are mostly Muslim (34%). According to the Village Development Index, out of 10 villages, eight villages are categorized as “developing villages”, one village as a “developed village” and one village is categorized as “underdeveloped”. Villagers around the Project Area have multiple sources of livelihoods, mostly in the agricultural, animal husbandry or fishery sectors. Agricultural activities traditionally include rice farming, as well as growing rubber and cash crops, and collection of non-timber forest products such as rattan. Service and support industries include trading agricultural and farming equipment, commercial and domestic construction and maintenance, and retail distribution of food and domestic supplies. Among the younger generation of villagers, a growing number are employed in formal occupations such as teachers or civil servants, or employees of first-generation businesses. By sub-ethnicity, most Dusun and Ma'anyan groups engage in cultivating rubber, rattan, and farming, while Bakumpai groups generally work in the fisheries sector. Access to education and technology has been (and continues to be) transformative for local communities. Primary education is available to all communities, and completion rates for middle and secondary school education are increasing. Access to internet is primarily through mobile services, however, broadband access is becoming

	available along routes such as the Trans-Kalimantan Highway, which will open up possibilities for improved internet access. The Project Community Relations Team did not receive reports of conflicts due to the cultural and religious diversity surrounding the Project Area. The communities appear to have long-standing ancestral and familial ties and appear to live in cooperation with each other. The geographical spacing and low population density also contribute to reducing opportunity for conflict as there is little competition for land and resources. The Project does not expect any changes in social diversity and composition due to the implementation of the Project. Detailed information on stakeholders' diversity is presented in Appendix 4.
Expected changes in well-being	In 2015 (an El-Niño year), parts of the Project Area were impacted by forest and peat fires. These fires resulted in health problems, especially upper respiratory tract infections. Since this incident, these areas have been prone to smaller scale recurring forest and peat fires. By implementing rewetting activities such as canal water management, canal backfilling, rolling out fire control systems and procedures, and revegetation of degraded land, and promoting ecosystem restoration with communities, the Project is expected to significantly reduce the forest and peat fire potential within the Project Area. SMART Patrols are already actively taking steps to identify and mitigate fire risks as well as to provide rapid response for fire extinguishment. As a result, fewer fire incidents will prevent the occurrence of respiratory infections in communities. The Project plans to provide training and awareness-raising activities to the communities, particularly about the importance of protecting forests, peatlands, and habitats for biodiversity. A better protected natural environment will provide better ecological functions (including biodiversity habitat) and will improve the well-being of the communities. Local communities will be involved in the project activities implementation such as nursery, revegetation, and Smart Patrol. These activities will provide additional income to households in the Project Area. The Community Engagement Team is working with community groups to develop sustainable alternative livelihoods, such as production and marketing of NTFP, animal husbandry and bee keeping. This will help assist in reducing their reliance on less

	sustainable livelihoods such as artisanal mining, illegal logging, and wildlife hunting.
Location of stakeholders	Most settlements are located outside the Project Area itself on the banks of the Barito and Kapuas Rivers (see Section 1.14.9). Community gardens are generally located around settlements, along the Barito River, and the lakes, swamps, and tributaries that flow into it (Ihi, Perigi, Maduit, Madara and Mentarem Rivers) or along either side of roads. (Trans Kalimantan Highway and Jalan Pendang, Jalan Sampapulut, Jalan Sasameh, Jalan Madara). Project Activities will include locations outside the Project Area as required based on discussions with community stakeholders. This will include community livelihood program development activities, fire prevention and control activities, and canal water management activities.
Location of resources	The participatory mapping process identified several agricultural and community lands in the Project Area. Residents of Pararapak Village harvest wood and medicinal plants. Residents of Batapah Village harvest resin and forest fruit. On Jalan Pendang there are community gardens, houses, and swallow houses. In Murung Paken there are rubber, rattan, and fruit gardens owned by the community. The Detailed location of resources is presented the HCV 5 and 6 map in Appendix 5.

2.1.2 Stakeholder Consultation and Ongoing Communication

The stakeholder consultation process and ongoing communication with the stakeholders is detailed below.

Date of stakeholder consultation	Preliminary Field Study: 1–30 June 2023: Initial Stakeholder socialization: 17-28 July 2023. Participatory Land Tenure and HCV 5 and 6 Mapping: 6-22 October 2023 Social Economic Impact Assessment (“SEIA”) and Discussions around Benefit Sharing Mechanism: 6-22 October 2023.
Stakeholder engagement process	The Project Proponent collaborated with LPPM from the University of Palangka Raya in planning and implementing stakeholder identification and engagement. The LPPM team includes indigenous people (Dayak - both women and men) who are native speakers and experienced in facilitating community engagement process in Central Kalimantan. This is to ensure that voices of all community members and member groups, including marginalized groups, are taken into account and can be discussed in an open forum without fear of external pressure. Initial stakeholder consultation included an introduction to and discussion of Verra, the relevant Verra standards, how these could impact on community activities in practice, and the VCS validation and verification processes. Baseline data collection processes included a combination of meetings, focus group discussions/workshops, 1-on-1 household level discussions, and field surveys. Field surveys were carried out to identify community land uses and areas and to identify HCV 5 (community basic needs) and HCV 6 (cultural site) areas. Engagement activities were planned well in advance through both oral messaging (arrangements through preliminary meetings with community leaders) and written invitations. Throughout the engagement process, the LPPM/UPR team requested the presence and active participation of a broad range of groups in the communities including: • Farmers Groups (<i>Kelompok Tani</i>) • Women’s Groups (<i>Kelompok Wanita</i>) • Village government (<i>Pemerintah Desa</i>)

	• Customary leaders • Youth groups • Religious groups • Fishermen • Artisanal miners • Hunters • NTFP harvesters Outcomes of meetings were collated into minutes of meetings which were read out at the end of all meetings and edited as required and agreed in a participative process. Large scale maps were printed for all meetings and field surveys, where community members could draw information directly. The proposed activities were communicated with the local communities during a local stakeholder consultation that was organized on 6-22 October 2023.
Consultation outcome	The six-month engagement process by the LPPM/UPR team and the Project Proponents Community Relationship officers as described above (including the FPIC process) resulted in the preparation of M.O.U. documents outlining the future co-operation between the Project Proponent and individual communities. As of December 2023, MOUs have been finalized and signed by seven villages (see Table 2-1 below), and discussions with the other three villagers are in progress. Discussion of potential risks, costs and benefits was a key part of the engagement process. The key risk identified during the consultation process is the community's concern about limitations to access to land and forest resources. It was agreed that there should be no elimination of community access to the forests for NTFP harvesting. The agreed approach to addressing land tenure and any grievances that may arise is as follows: 1. The Project Proponent will respect pre-existing community land use rights and customary land rights in line with the laws of Indonesia. 2. Areas of current community land use for agriculture (the smallholder agriculture land cover strata in the land cover

	map) have been identified and removed from the Projects carbon crediting area. 3. All other areas are included in the Projects carbon crediting area. 4. Registered forest farmer groups will work in co-operation with the Project Proponent, and in line with Government regulations. 5. All claims will be addressed in a transparent process through the Grievance redress procedure described in Section 2.1.4. Communities are generally lacking in capital for livelihood improvement and so the benefit sharing approach proposed by the Project Proponent was viewed positively. However, delays in the implementation of the programs were seen as a potential risk. Details on the stakeholder engagement process can be found in the FPIC report prepared by LPPM/UPR.
Ongoing communication	The Project maintains a Community Relations Team which has an ongoing communications system in place with the local communities surrounding the Project Area, including designated local community relations officers (“CROs”) from the Project Proponents staff for each community. The CROs maintain relations with local officials, local community groups and villagers. The CROs act as the main point of contact for any claims, issues, grievances or other communications.
Stakeholder input	Key concerns from local communities are summarized as follows: • Loss of access to the land, agricultural fields, and gardens they operate inside the Project Area. • Restricted access to harvest NTFP. • Restricted canal transportation access. • The emergence of social conflict due to unfair or non-transparent implementation of Project Activities or benefit sharing. • Loss of livelihoods that would be restricted by the Project, such as logging, artisanal mining or land clearing for shifting agriculture Communities' inputs were then taken into consideration, and the Project design tried to address those requests and concerns brought up during the stakeholder engagement process, as follows:

Provide clear information about the project and criteria of community involvement for all villages. This was reflected in the FPIC process. Posters about the project and contacts were prepared and displayed in each village to provide sufficient information for local communities in a transparent way.

Revegetation – the Project will establish a native species nursery and revegetation program in the bare land and degraded areas. Local communities will be hired as labor. The Project Proponent will collaborate with the community and adopt local wisdom in selecting tree species, provision of seeds, planting and maintenance methods. The community has extensive knowledge about the tree species that can adapt to the local ecosystem. They also have empirical experience in planting and cultivation.

Water management and canal backfilling – The Project would backfill the old legacy canals to rewet the landscape in areas that have canals in place from the times of illegal logging. Local communities will be hired as labor to support this activity. The Project Proponent will ensure that the community will still have the right to use the canals to access the Project Area as agreed during the community engagement process.

Zero-Burning Agriculture – since shifting agriculture and fire for land clearing are still practiced by communities, the Project will establish zero-burning agriculture programs to assist villagers in learning zero-burn cultivation techniques. In addition, communities will be encouraged to use organic and mycorrhizal fertilizers as well as using Multi-Purpose Tree Species to develop agroforestry in their agricultural lands.

No elimination of community access to the forests – local communities will not be prevented from entering the forest. The Project will promote sustainable NTFP harvesting methods by providing training for local communities.

Sustainable livelihood alternative – the activities will be carried out in collaboration with each village, with the goal of enhancing the local economy and at the same time reducing pressure on the surrounding natural ecosystem. Post harvest small and medium enterprise will be developed to add value to NTFP and agricultural products to help communities transition from non-sustainable livelihood such as artisanal mining and illegal logging to more sustainable practices.

2.1.3 Free Prior and Informed Consent

The table below describes the outcome of the FPIC process. Further details can be found in the FPIC Report.

Obtaining consent	The Project Proponent implemented the following process to obtain consent from the communities:  1. Scoping and Dissemination. This step identified communities which are active in the Project Area. Identification includes general information such as village name, administrative boundaries, demographics, and livelihood, particularly economic activities conducted in the Project Area. This process was followed by initial socialization of the Project and community consent was obtained to conduct a full assessment of peat, forest inventory, biodiversity, and social interests in and around the Project Area 2. Planning, Research and Assessment. This step involved a series of discussions with provincial, district and sub-district governments regarding the Project design. A social economy impact and land tenure assessment was carried out to provide basic information on potential conflicts, risks, and vulnerable groups in the Project Area. The Project Proponent also developed programs which could be carried out in collaboration with local communities, a procedure for feedback and complaints, and the framework of a benefit sharing mechanism. During this process it was identified that all relevant communities were part of a village for administrative purposes and it was decided that formal consents should be obtained from each of the 10 villages surrounding the Project Area. 3. Discussion and Negotiation. This process was conducted over a period of several months to socialize the results of the planning, research and assessment with local communities, with a particular emphasis on the positive and negative impacts that the Project may bring. Discussions focused on addressing community concerns and developing specific proposals to mitigate any actual or perceived negative impacts. Negotiations included discussion of treatment of areas with overlapping tenure, local community aspirations and how sustainable livelihoods could be developed to replace any unsustainable activities. This
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resulted in specific proposals to include in a draft Memorandum of Understanding (“MoU”).

4. **Points of Agreement.** Matters agreed in the discussion and negotiation process were then included in the MoU draft, which included specific consent to proposed Project Activities. Several meetings were then organized with the villages to review and discuss the MoU draft. All sections of the community were involved in the MoU process, and the text of the MoU was read out and explained both in Bahasa Indonesia and the local Dayak languages. Discussions with communities were conducted directly with village traditional leaders, as well as ‘town hall’ discussions with local neighborhood offices “Rukun Tetangga” (RT). This enabled participation at all levels of the community to reflect a more diverse selection of opinion.
5. **Consultation.** Following development of the draft MoU, the community was provided sufficient space and time to consult with outside advisers including local governments, NGOs, community and religious leaders, representatives from Palangka Raya University and other parties they considered credible regarding the draft MoU. Feedback was received and reflected in the MoU and discussions continued until a final text was agreed. Once agreement was reached, the MoU (consent) was signed by both parties.
6. **Signing.** Once the agreed text of an MoU has been finalized, a formal village meeting is organized to arrange a formal signing of the MoU. Project Activities that affect the relevant villages are specifically set out in the MoU and are not conducted until the MoU is signed

Outcome of FPIC

The FPIC status of the 10 villages surrounding the Project area as of December 2023 is as shown below in Table 2-1. Six villages and one sub-district have provided consent to the Project Proponent to implement the Project. Meanwhile, three villages are still in the process of discussion and negotiation regarding the protection of community rights and access to land and forests and agreement is expected shortly.

No	Village/Ward	FPIC					
		S1	S2	S3	S4	S5	S6
1	Kalahien	V	V	V	V	V	V
2	Pararapak	V	V	V	V	V	V
3	Tanjung Jawa	V	V	V	V	V	V
4	Murung Paken	V	V	V	V	V	V
5	Kelurahan Pendang	V	V	V	V	V	V
6	Marawan Lama	V	V	V	V	V	V

7	Batapah	V	V	V	V	V	V
8	Madara	V					
9	Lawang Kamah	V					
10	Lungkuh Layang	V					

Table 2-1 FPIC Status of Villages

A copy of the MoUs agreed with the villages can be found in Appendix 6.

2.1.4 Grievance Redress Procedure

The Table below details the Project's grievance redress procedures which are designed to resolve any issues that may arise between the Project and the stakeholders.

Development process

The Project Proponent has established grievance redress procedure to receive and resolve any complaints and conflicts which may arise between the Project Proponent and local stakeholders. This process was designed during SEIA meetings between 6-22 October 2023.

The grievance redress procedure respects local problem-solving mechanisms that prioritize peaceful dialogues and consensual agreement between parties. Grievances are traditionally brought to a Mantir or Damang at the RT level for mediation. In the customary scheme, the Mantir or Damang has wide flexibility to propose solutions, including the ability to impose customary fines (*jipen*). If no agreement can be reached at this level, the matter is escalated to a higher level, such as RW or village administration. Finally, if deliberations still reach an impasse, the disputing parties may take their case to administrative authorities such as Dinas Kehutanan or KLHK – or, in appropriate cases the police or court.

Grievance redress procedure

In resolving grievances, the Project Proponent will prioritize consultative methods centered on dialogue. Any effective grievance handling must resolve or settle grievances in an efficient, timely and appropriate manner through a fair and transparent process to achieve consensual agreement between parties. Once a potential grievance has been received and assessed, further action may be taken to verify the claims. Once the grievance is confirmed, an Action Plan will be designed in consultation with concerned parties to resolve/settle it, and proper implementation will be monitored. The Project Proponent will provide progress updates to relevant stakeholders and manage any follow-up action where necessary. See Figure 2-2 below.

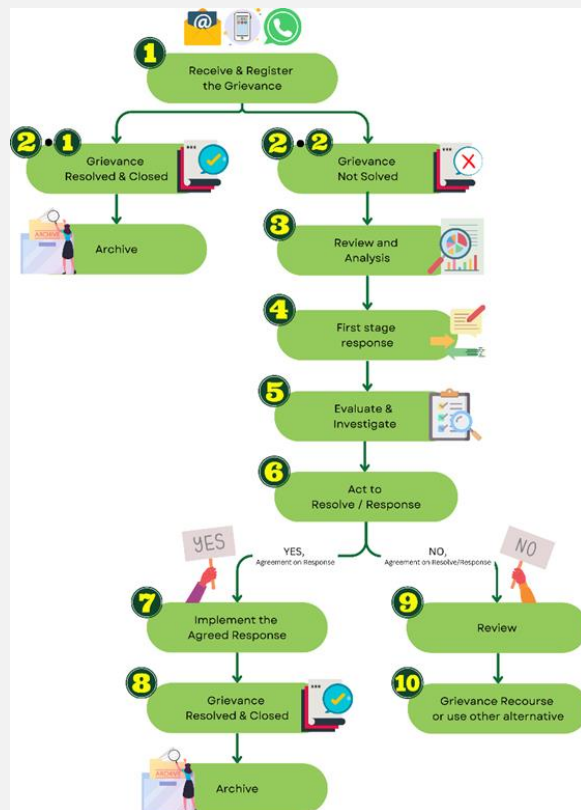


Figure 2-1 Project Grievance Mechanism

The SOP on Grievance Mechanism is presented in Appendix 7.

2.1.5 Public Comments

The Project has not yet entered the public comment stage.

Comments received	Actions taken
N/A	N/A.
...	

2.2 Risks to Stakeholders and the Environment

The table below describes the risk assessment associated with the Project and the potential impact on stakeholders and the actions threat can be taken to prevent the risk event to mitigate the impact on the stakeholders.

	Risks identified	Mitigation or preventative measure taken
Risks to stakeholder participation	Communities have claims to the Project Areas of varying types. These include overlapping administrative areas, claims to tenure, as well as customary and historic use of the Project Area.	The Project undertakes all reasonable efforts to mitigate negative impacts on the community and replace unsustainable historic land use with sustainable use. The potential tenure issues have been addressed during the consultation process described in Section 2.1.3 and consent obtained to the proposed Project Activities. The Project does not anticipate any negative economic impacts to due to Project Activities since communities will continue to have access to the forest to gather NTFP and the Project will actively promote the planting of high value species which can be harvested in a sustainable manner. The Project itself does not create any anthropogenic risks to the community as its primary activities are forest conservation and peatland restoration. The Project also expects to create socio-economic benefits through its

		community development activities which will further mitigate community participation risk.
Working conditions	No risk identified.	The Project complies with all manpower regulations in Indonesia. This includes compliance with statutory minimum wage requirements, health and safety and working condition requirements.
Safety of women and girls	No risk identified.	The Project has established anti-discrimination and gender inclusion SOP to prevent discrimination and sexual harassment. The Project Proponent has a no-child labor policy in place. The Project will establish collaboration with women and youth groups on project implementation in achieving inclusiveness.
Safety of minority and marginalized groups, including children	No risk identified.	
Pollutants (air, noise, discharges to water, generation of waste, release of hazardous materials)	No risk identified.	The Project will not use chemical fertilizers and will promote sustainable and organic cultivation approach.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

The Project Proponent's Labor and Work Policies are summarized in the table below.

Discrimination and sexual harassment	The Project has established anti-discrimination and gender inclusion SOP to prevent discrimination and sexual harassment. The Project Proponent has no-child labor policy in place in compliance with the Government of Indonesia's regulations. The Project will establish collaboration with women groups and youth groups to implement inclusiveness principles
Management experience	The Project management team has substantial experience in implementing land management and forestry activity under a variety of international standards such as FSC.

	To support the management of its ecosystem restoration effort, the Project Proponent has entered a collaborative arrangement with ZCF. Pursuant to a consulting agreement, ZCF will lend its professional expertise to assist the Project Proponent in the formulation and execution of strategic management plans. To support the implementation of Project Activities on the ground, the Project Proponent has signed a Memorandum of Understanding with Palangka Raya University as a technical adviser for a fire prevention program and local culture. The University has a long and positive portfolio in these areas through its Research and Community Service Institution. They also had experiences working with Government Institutions such as the Indonesian Peatland and Mangrove Restoration Agency and the Ministry of Environment and Forestry. The Project Proponent has signed a Letter of Intent with Borneo Nature Foundation to conduct biodiversity surveys including Orangutan in the Project Area. BNF is a not-for-profit wildlife and biodiversity conservation and research organization that has protected and safeguarded tropical rainforests the environment and indigenous culture in Borneo since 1999. BNF has experience with Orangutan Tropical Peatland Projects in Central Kalimantan.
Gender equity in labor and work	The Project Proponent has prepared and implemented human resource policies concerning gender equity in labor and work which adheres to Indonesia's laws and regulations, with regards to: • no gender discrimination in the hiring process, it should be fair and inclusive, promoting diversity and equal opportunities for all individuals regardless of their gender, race, ethnicity, or other characteristics, • prevention of sexual exploitation and abuse at work, • paid parental leave policies for women, • offering opportunities for career advancement and leadership roles for women within the organization. The company policies and SOP relevant to gender equality in labor and work can be found in Appendix 8. Gender consideration will also feature in the Fire Prevention and Management Training, in which women will be included. Facts on the ground show that if forest and land fires have been going on for some time, men are usually involved in extinguishing fires located far from settlements so that those left behind in the village are women, the elderly and children. It is also common for men to migrate to work elsewhere (either permanent migration or temporary migration), so that

	women inevitably must be actively involved in fire extinguishment if the fire spreads near gardens and residential areas.
Human trafficking, forced labor, and child labor	The Project Proponent has prepared and implemented human resources policy which will prevent the hiring process related to human trafficking, forced labor, and child labor in any aspect of its operations, including within its supply chain. The policy and SOP adhere to Indonesia's laws and regulations. The Project Proponent will conduct regular audits to ensure compliance with anti-trafficking and labor laws as well as implementing age verification processes to ensure compliance with child labor laws, both internally and within its supply chain. The policies and SOP relevant to human trafficking, forced labor, and child labor can be found in Appendix 9.

2.3.2 Human Rights

The Project Proponent fully recognizes and respects customary rights and land use claims through:

1. **Free Prior Informed Consent:** The Project ensures that indigenous people and customary right holders are consulted and give their free, prior and informed consent before any activities are carried out on their land or territories.
2. **Respect for customary land rights (*ulayat*):** The Project respects the land rights of indigenous people and customary right holders, ensuring that their land tenure and property rights are recognized and protected. The Project will not enforce any involuntary relocation. Based on the participatory mapping process, there are no permanent human settlements in the Project Area.
3. **Recognition of traditional knowledge:** The Project acknowledges and values the traditional knowledge of indigenous people and customary right holders in sustainable forest management and biodiversity conservation. The local wisdom and traditional knowledge are incorporated into the Project design and reflected in the implementation of Project Activities.
4. **Participation and representation:** The Project includes the meaningful participation and representation of indigenous people and customary right holders in decision-making processes related to forest conservation and management. Local communities are given adequate space and time to consult internal and external advisers before making any decision related to the Project.
5. **Non-discrimination:** The Project ensures that indigenous people and customary right holders are not discriminated against and are treated equally and fairly in all aspects of the Project implementation.
6. **Grievance and redress mechanisms:** The Project establishes effective grievance mechanisms to address any violations of the rights of indigenous people and customary right holders and provides access to remedy for any adverse impacts of the project.

7. **Monitoring and Evaluation** All Project Proponent activities are monitored and evaluated based on the project monitoring plans and standard operation procedures.

2.3.3 Indigenous Peoples and Cultural Heritage

The Project Proponent conducted an HCV 6 assessment to identify areas critical to maintaining the cultural identity of local communities. This includes areas that are culturally important and sacred or have religious significance. The Project Proponent recognized and incorporated the critical cultural heritage of indigenous people in the Project design and its social and environmental management system guidelines to ensure culturally sensitive and sustainable conservation efforts. By respecting indigenous knowledge, practices, rights, and participation, the Project implementation can be more effective in achieving both ecological and cultural preservation goals.

2.3.4 Property Rights

The Project Proponent respects the rights of indigenous peoples, local communities and customary rights holders.

Rights to territories and resources	Indigenous and local communities in Indonesia can hold customary rights to land and its natural resources through formal or informal rights. Formal rights can take the form of land title, government concessions or documented rights of use. In addition, some village administrative districts overlap with a portion of the Project Area. Informal rights are often based on longstanding traditional use and stewardship of the forest area. These customary and collective rights can include access to forests for subsistence activities such as hunting, gathering, and shifting agriculture, as well as culturally or religiously related purposes within their customary territories. Informal rights often operate alongside the formal state land registration and concession grant system. This can lead to conflicts between formal law and traditional rights. While Indonesia's legal system does recognize customary law, it can be difficult to ascertain the legal situation in cases where the state grants concession rights over an area (such as the Project Area) in which there are customary rights of indigenous communities. During the participatory mapping, it was identified that there were small holders and Farmer Groups actively working within the Project Area. The result is presented in 2-12.
Respect for property rights	The Project Proponent conducted land tenure mapping, and HCV 5 and 6 assessments to identify overlapping tenure areas and customary rights before the commencement of the Project. The Project uses a participation approach and consultation based on PRA principles as described above. The Project aims to respect all customary and

	traditional rights and will not affect any continuing use of the land by Farmer Groups. However, there are cases where traditional use of the land is inconsistent with the Project's objectives of conservation, for example logging in natural forest and extraction through man-made canals. These instances were discussed in detail during the FPIC process outlined in Section 2.1.3 and specific solutions to these cases were agreed in the MoUs signed with the villages.
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2.3.5 Benefit Sharing

The table below illustrates the Project Proponent's approach to benefit sharing with the local communities.

Process used to design the benefit sharing plan	Discussions regarding benefit sharing were held during the SEIA meetings held over the period 6-22 October 2023. The meetings were organized at the village town halls in a deliberative manner to adhere to local tradition. The meetings were facilitated by a facilitator from the University of Palangka Raya who spoke in the local language. The meetings were attended by community representatives who are active in the Project Area, traditional leaders, and community leaders. In these meetings, representatives from the Project Proponent explained the proposed Project Activities and the benefits that would be received by the community. The discussion results were documented as points of agreement which were included in the draft MoUs between the Project Proponent and the affected villages. The draft MoU was then discussed in detail with the community with the results being incorporated into an agreed text. After the final text was agreed, the MoU was signed by representatives of the Project Proponent and the affected communities, and a copy provided to the community and village government. If in the future the community wishes to submit changes or reviews, The Grievance and Redress Mechanism scheme can be used as described in Section 2.1.4 above
Summary of the benefit sharing plan	The way in which benefits from the Project that will be disbursed to communities affected by the Project implementation can be seen below in Figure 2-3. There will be four channels of distribution. Each channel will have a connection to forest conservation and peatland rehabilitation efforts as well as community development.

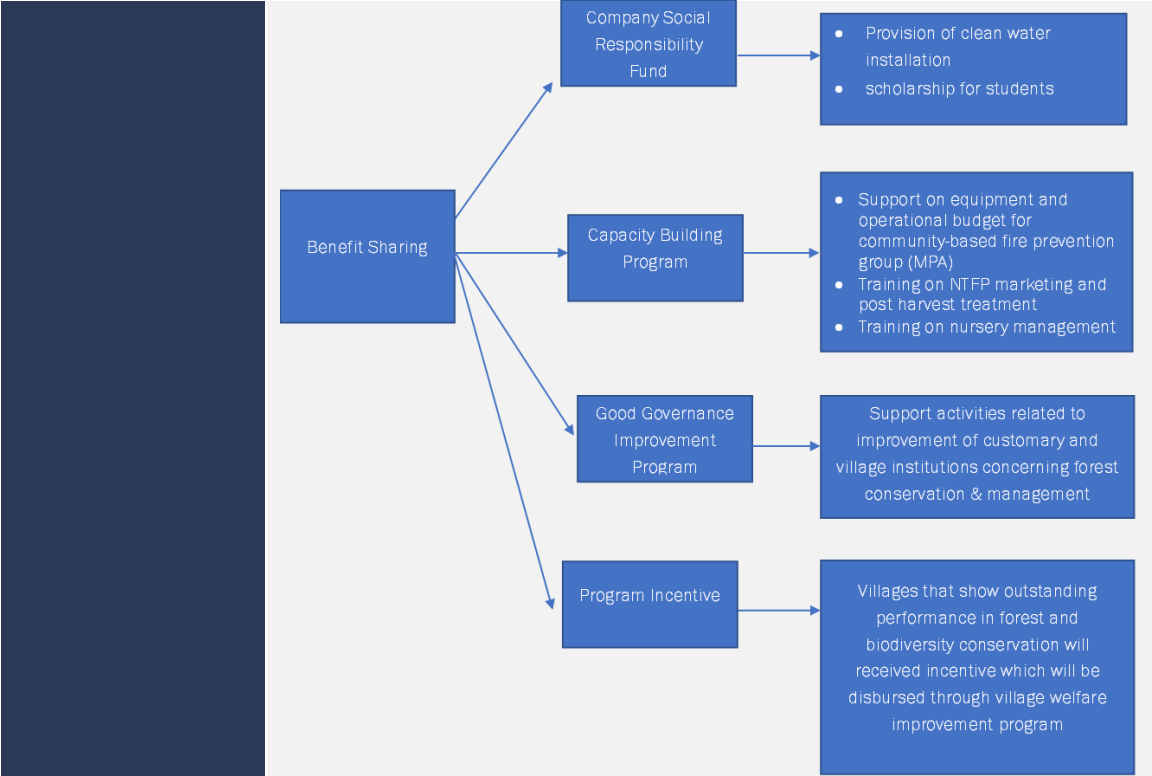


Figure 2-2 Benefit Sharing Plan

Approval and dissemination of benefit sharing plan	The draft MoU and benefit sharing plan were discussed in detail with the community The discussion results were documented as points of agreement which were included in the draft MoUs between the Project Proponent and the affected villages. The draft MoUs were then discussed in detail with the community with the results being incorporated into an agreed text. After the final text was agreed, the MoUs were signed by representatives of the Project Proponent and the affected communities, and a copy provided to the community and village government. If in the future the community wishes to submit changes or reviews, the Grievance and Redress Mechanism scheme can be used as described in Section 2.1.4 above.
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2.4 Ecosystem Health

The Project Proponent has identified and listed below potential risk mitigations that apply to the project.

	Risks identified	Mitigation or preventative measure taken
Impacts on biodiversity and ecosystems	No risk identified	By retaining and protecting the existing forest and managing ecological functions, the Project will protect or enhance aspects of biodiversity, water quality, and other ecosystem services.
Soil degradation and soil erosion	No risk identified	The Project will restore degraded peatland, therefore reducing land subsidence and peatland degradation. The revegetation of bare and degraded forest will also help to prevent soil degradation and erosion.
Water consumption and stress	No risk identified	The Project will restore degraded peatland by blocking the legacy canals with hand-built dams made primarily out of natural material, i.e. locally acquired gravel, wood, and soil. This effort will improve the hydrological function of peatland. The Project will also maintain the water table level in the intact peatland according to Indonesian regulations concerning peatland.
Usage of fertilizers	No risk identified	The Project will replant and revegetate bare land and degraded areas with native vegetation species, without the use of chemical fertilizers,

The Project has undertaken formal environmental impact assessments (UKL/UPL) for the above-described project activities as described in Section 1.12.

The changes that will be made to the Project Area will be the introduction of monitoring equipment (i.e. piezometer, camera trap, and the very small amount of supporting

infrastructure required for those instruments). This activity does not have any foreseeable negative environmental or socio-economic impacts.

2.4.1 Rare, Threatened, and Endangered species

Is the project located in or adjacent to habitats for rare, threatened, or endangered species?

☒ Yes

☐ No

All species listed below are native to the project area and its habitats. The species listed below are either Rare, Threatened or Endangered or Endemic to the Project Area based on IUCN Red List and KLHK list of endangered and protected species. The presence of these species was confirmed in a biodiversity study of the Project Area conducted by the Project Proponent in 2023.

Species and habitat	One of Project outcome is “the habitat of rare, endemic, and endangered flora and fauna is restored and preserved”. Project activities related to this outcome are restoration of degraded peatland, revegetation of bare and degraded areas using native species, and conservation of intact natural forest. All efforts will contribute to the habitat improvement of endangered and critically endangered species as well as their food sources. The list of rare, endemic, and endangered flora and fauna in the Project Area is presented in Table 2-2 below.					
	No	Type Fauna			Common Name	Local Name
		IUCN Red List Status: Endangered				
	1	Mamalia	Family	Genus Species	Clouded leopard	<i>Kucing tandang</i>
	2	Mamalia	Felidae	<i>Prionailurus planiceps</i>	Flat-headed cat	<i>Macan dahan</i>
	3	Mamalia	Hylobatidae	<i>Hylobates albibarbis</i>	White-bearded gibbon	<i>Owa janggut putih</i>
	4	Aves	Chloropseidae	<i>Chloropsis sonnerati</i>	Greater Green Leafbird	<i>Cica-daun besar</i>
	5	Aves	Ciconiidae	<i>Ciconia stormi</i>	Storm's Stork	<i>Bangau</i>
	6	Herpetofauna	Geoemydidae	<i>Heosemys spinosa</i>	Spiny Turtle	<i>Kura-kura Matahari</i>
		IUCN Red List Status: Critically Endangered				
	1	Mamalia	Hominidae	<i>Pongo pygmaeus</i>	Borneo orangutan	<i>Orang utan</i>

Table 2-2 List of endangered and critically endangered fauna species in Project area				
No	Type Flora	Family	Genus Species	Local Name
	UCN Red List Status: Endangered			
1	Tree	Dipterocarpaceae	<i>Shorea ovata</i>	<i>Meranti merah tua, Meranti madirawan</i>
2	Tree	Dipterocarpaceae	<i>Shorea pachyphylla</i>	<i>Meranti mesupang</i>
3	Tree	Dipterocarpaceae	<i>Shorea teysmanniana</i>	<i>Meranti daun halus</i>
	UCN Red List Status: Critically Endangered			
1	Tree	Dipterocarpaceae	<i>Hopea micrantha</i>	<i>Kerangas</i>
2	Tree	Dipterocarpaceae	<i>Shorea platycarpa</i>	<i>Meranti paya</i>
3	Tree	Thymelaeaceae	<i>Gonystylus bancanus</i>	<i>Ramin</i>
Table 2-3 List of endangered and critically endangered flora species in Project Area				

2.4.2 Introduction of species

No non-native species will be introduced by the Project.

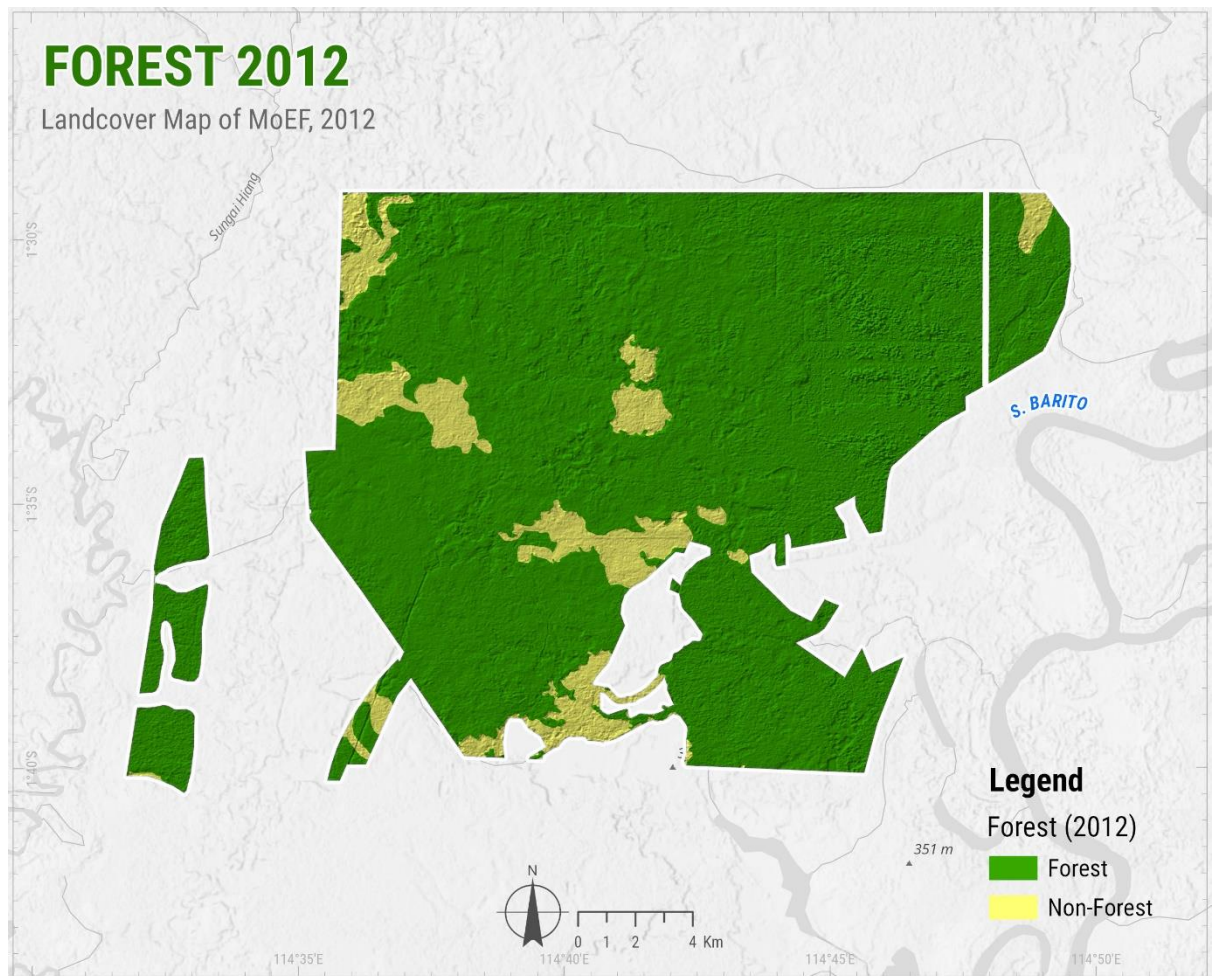
Species introduced	Classification	Justification for use	Adverse effects and mitigation
N/A	N/A	N/A	N/A

No Invasive Species were identified during the 2023 Biodiversity Study

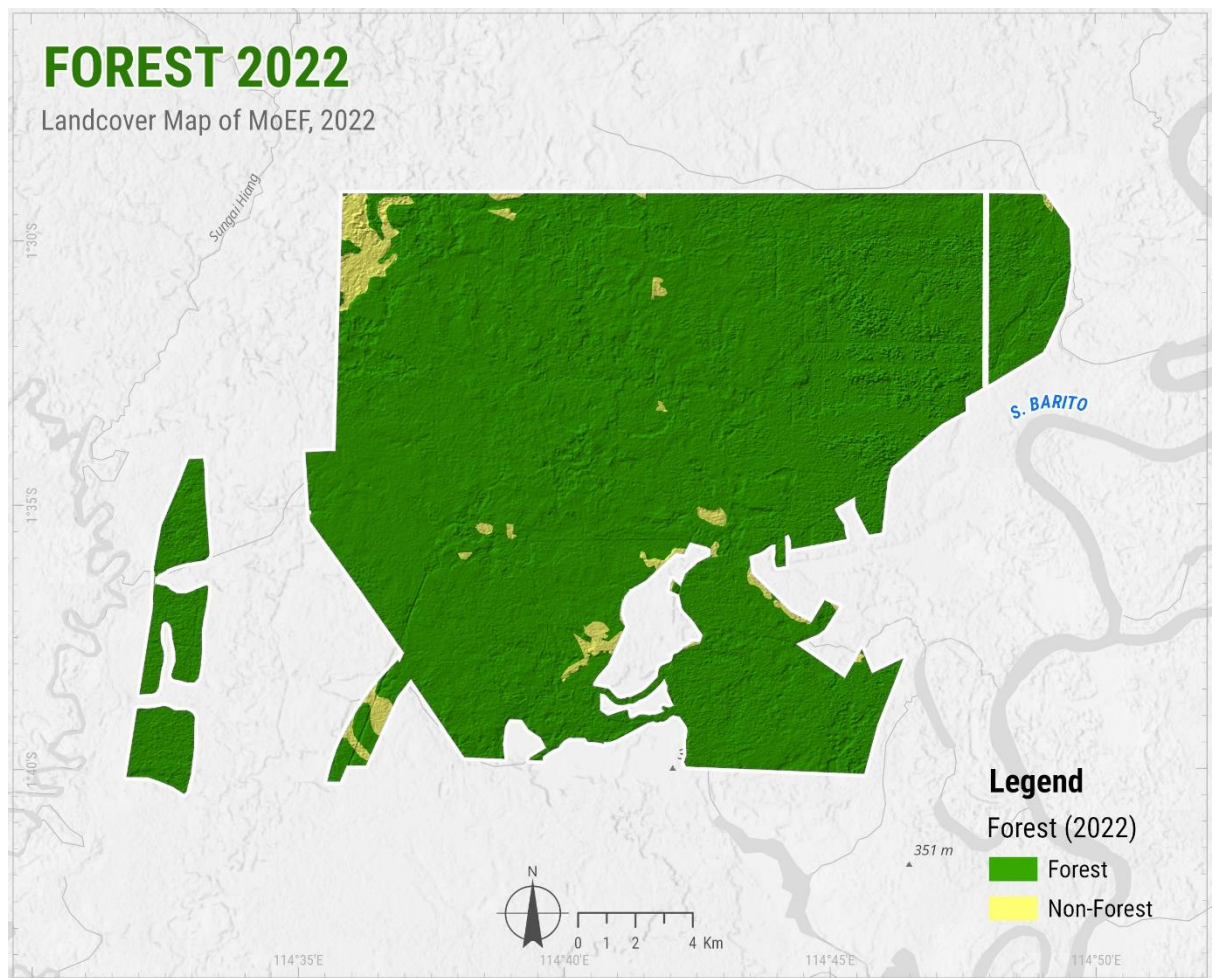
Existing invasive species	Mitigation measures to prevent spread or continued existence of invasive species
None Identified during the Bio-Diversity Study	

2.4.3 Ecosystem conversion

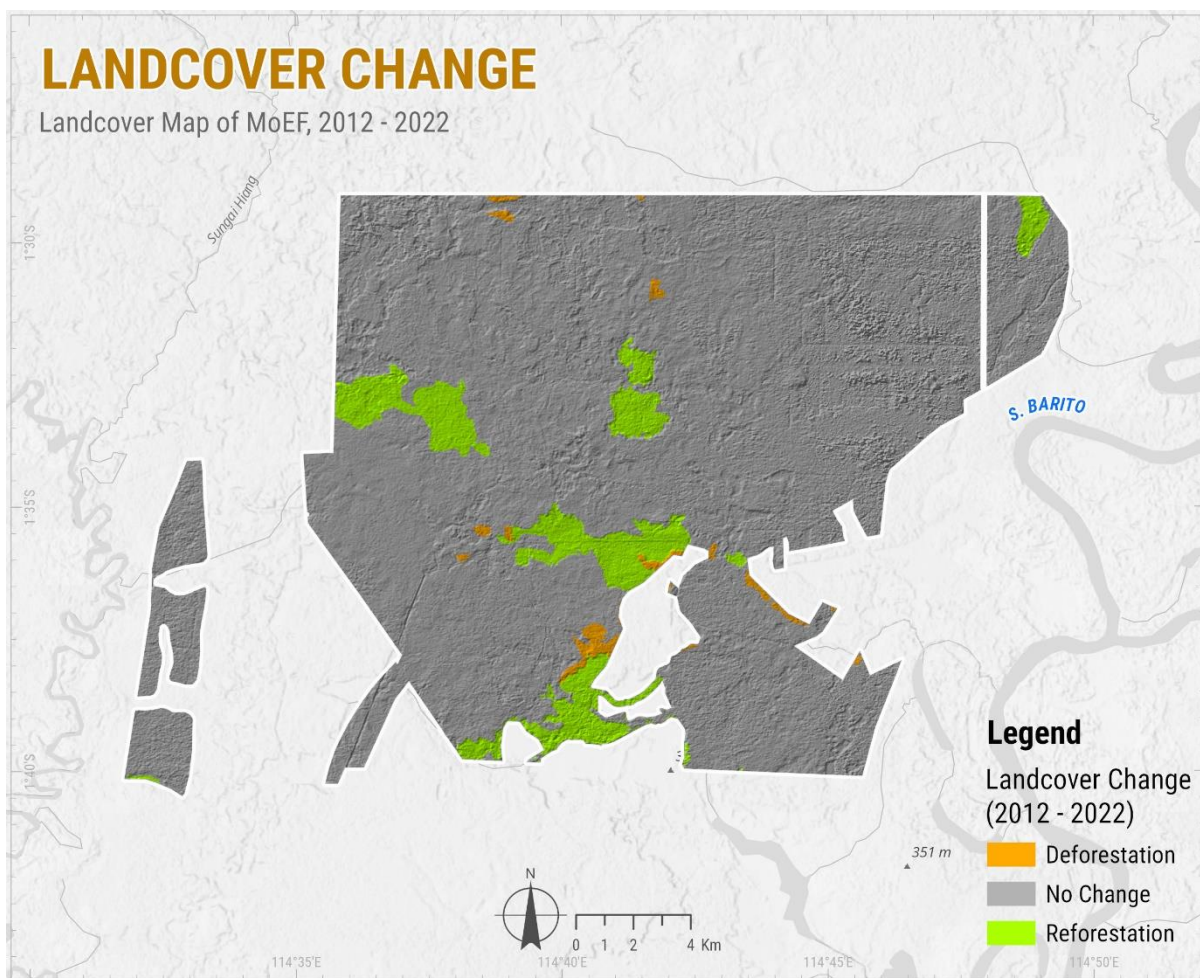
Spatial analysis and primary data collection on the ground have been conducted to get data on historical land types and ecosystem in the Project Area. The result shows that the Project Area was not cleared or drained of existing natural ecosystems in the 10-year period, and we have seen a net increase in forested areas as more employment opportunities, such as mining or civil service, have presented in the surrounding areas, which are accessible through increased road access, which has led to a decrease in shifting agriculture (See Maps 2-2, 2-3, 2-4 & Tables 2-4, 2-5).



Map 2-2 Landcover Map 2012



Map 2-3 Landcover Map 2022



Map 2-4 Landcover Change 2012-2022

Land Cover	2012	2022	Difference
Forest Area	36,256	38,786	2,529
Non-Forest	3,578	1,049	-2,529

Table 2-4 Total Landcover Area in Ha for a given year

Forest 2012	Forest 2022	Area (ha)	Land Use Change
Forest	Forest	35,893	No Land Use Change
Non-Forest	Non-Forest	686	
Forest	Non-Forest	363	Deforestation
Non-Forest	Forest	2,893	Reforestation

Table 2-5 Land Cover 2022-Land Change Analysis

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Type (methodology, tool or module)	Reference ID	Title	Version
Methodology	VM0007	REDD+ Methodology Framework	1.6
Module	VMD0001	Estimation of carbon stocks in the above- and belowground biomass in live tree and non-tree pools	1.2
Module	VMD0006	Estimation of baseline carbon stock changes and greenhouse gas emissions from planned deforestation/forest degradation and planned wetland degradation	1.4
Module	VMD0042	Estimation of baseline soil carbon stock changes and greenhouse gas emissions in peatland rewetting and conservation project activities	1.1
Module	VMD0009	Estimation of emissions from activity shifting for avoiding planned deforestation/forest degradation and avoiding planned wetland degradation	1.3
Module	VMD0044	Estimation of emissions from ecological leakage	1.1
Methodological Module	VMD0013	Estimation of greenhouse gas emissions from biomass and peat burning	1.3
Methodology	VMD0015	Methods for monitoring of GHG emissions and removals in REDD and CIW projects	2.2
Methodology	VMD0046	Methods for monitoring of soil carbon stock changes and greenhouse gas emissions and removals in peatland rewetting and conservation project activities	1.1
Methodology	VMD0016	Methods for Stratification of the Project Area	1.3
Module	VMD0017	Estimation of Uncertainty for REDD+ Project Activities	2.2
Module	VMD0019	Methods to project future conditions	1.0

3.2 Applicability of Methodology

Methodology ID	Applicability condition	Justification of compliance
VM0007 REDD+ MF, 4.2 All Project Activities	All land areas registered under the Clean Development Mechanism (CDM) or under any other GHG program (both voluntary and compliance-oriented) must be transparently reported and excluded from the Project Area. The exclusion of land in the Project Area from any other GHG program must be monitored over time and reported in the monitoring reports.	Condition met. In compliance with the Indonesian Carbon Economy Law, the Project Proponent has submitted an application to the Indonesian National Registration System (“SRN”) in parallel with its submission under this Project Design Document. The Project Proponent is establishing protocols with the Verra registry team to ensure the credits issued by SRN are issued with a parallel Verra registration number which tracks the SRN registration number, and that the SRN and Verra registrations cannot be traded independently. Accordingly, while Project credits can be traded either domestically (as SRN units) or internationally (as VCUs), but not separately, each credit can only be claimed once.
VM0007 REDD+-MF, 4.3.1 - All REDD Activity Types	Land in the Project Area has qualified as forest (following the definition used by VCS; in addition, see Section 5.1.2) for at least the 10 years prior to the project start date. Mangrove forests are excluded from any tree height requirement in a forest definition, as they consist of (close to) 100% mangrove species, which often do not reach the same height as other tree species and occupy contiguous areas and their functioning as a forest is independent of tree height.	Condition met. Land-use records indicate that all land subject to REDD project activities in the Project Area is covered by tropical forest and has qualified as such under the applicable definition for at least 10 years. There are no mangroves in the Project Area.
VM0007 REDD+ MF, 4.3.1 - All REDD Activity Types	If land within the Project Area is peatland or tidal wetlands and emissions from the SOC pool is deemed significant, the relevant WRC modules must be applied alongside other relevant modules.	Condition met. All relevant WRC modules have been applied to estimate emissions from peat soils.

VM0007 REDD+ MF, 4.3.1 - All REDD Activity Types	Baseline deforestation and forest degradation in the Project Area fall within one or more of the following categories: Unplanned deforestation (VCS category AUDD) Planned deforestation/degradation (VCS category APD) Degradation through extraction of wood for fuel (fuelwood and charcoal production) (VCS category AUDD)	Condition met. Baseline deforestation falls in the category of APD. See § 2.2.1. The Project Area does not include any significant unplanned deforestation or forest degradation and is not modelled in either the baseline of the project scenario.
VM0007 REDD+ MF, 4.3.1 - All REDD Activity Types	Leakage avoidance activities must not include: Agricultural lands that are flooded to increase production (e.g., rice paddy) Intensifying livestock production through use of feed-lots¹⁰ and/or manure lagoons.	Condition met. The Project does not promote either establishment of agriculture on flooded land or intensification of livestock production.
VM0007 REDD+ MF, 4.3.3 - Avoiding Planned Deforestation/ Degradation	Avoiding planned deforestation/degradation activities are applicable under the following condition: Where conversion of forest lands to a deforested condition must be legally permitted.	Condition met. The PBPH license permits the Project Area to be converted to a deforested condition. A portion of the Project Area is protected by law, for which no credits are being claimed.
VM0007 REDD+MF, 4.5.1 - All WRC Activity Types	WRC activities are not eligible under the following conditions: Project activities lower the water table, unless the project converts open water to tidal wetlands, or improves the hydrological connection to impounded waters. Changes in hydrology do not result in the accumulation or maintenance of SOC stock, noting that a) this pertains to projects that intend to sequester carbon through sedimentation and/or vegetation development and b) this does not pertain to projects that increase salinity to reduce CH₄ emissions. Projects that aim to decrease CH₄ emissions through increased salinity must account for any changes in SOC stocks.	Condition met. The Project Activities do not lower the water table, hydrological connection of the peatland does not lead to increase of emissions outside of the Project Area and do not include burning of organic soil and does not include the use of fertilizers.

	Hydrological connectivity of the Project Area with adjacent areas leads to a significant increase in GHG emissions outside the Project Area. Project activities include the burning of organic soil. Nitrogen fertilizer(s), such as chemical fertilizer or manure, are applied in the Project Area during the project crediting period.	
VM0007 REDD+ MF, 4.5.3 CIW Project Activities	This methodology is applicable to conservation of undrained and partially drained peatland (CUPP) activities on Project Areas that meet the VCS definition for peatland (see VCS Program Definitions). Project activities conserving tidal wetlands may include: Protecting at-risk wetlands (e.g., establishing conservation easements, establishing community supported management agreements, establishing protective government regulations, and preventing disruption of water and/ or sediment supply to wetland areas) Improving water management on drained wetlands Maintaining or improving water quality for seagrass meadows Recharging sediment to avoid drowning of coastal wetlands Creating accommodation space for wetlands migrating with sea-level rise	Condition met. The module is applicable because the Project has both undrained and partially drained peatlands that meet the VCS definition. Regarding conserving tidal wetlands, the Project has no tidal wetlands and so this portion of the applicability condition is not applicable.
VM0007 REDD+ MF, Avoiding Planned Wetland Degradation (APWD)	Avoiding planned wetland degradation activities are eligible under the following condition: Conversion of intact or partially altered wetlands to a degraded condition must be legally permitted.	Condition met. The PBPH license permits the Project Area to be converted to a degraded condition. A portion of the Project Area is protected by law, for which no credits are being claimed.

VMD0001 CP-AB	This module is applicable to all forest types and age classes. Inclusion of the above-ground tree biomass pool as part of the project boundary is mandatory as per the framework module REDD-MF.	Condition met. The Project Area includes a variety of forest types all of which are applicable to the module (i.e., all forest types and classes applicable). Further the Project includes above ground biomass as a carbon pool.
VMD0001 CP-AB	Non-tree aboveground biomass must be included as part of the project boundary if the following applicability criteria are met (per framework module REDD-MF): Stocks of non-tree aboveground biomass are greater in the baseline than in the project scenario, and Non-tree aboveground biomass is determined to be significant (using the T-SIG module). Belowground (tree and non-tree) biomass is not required for inclusion in the project boundary because omission is conservative.	Condition met. Non-tree above-ground biomass is excluded because it is greater in the Project Scenario than in the Baseline Scenario, and non tree biomass was not determined to be significant the baseline scenario assumes that all-natural forest biomass will be cleared for the establishment of forest plantations, and this will logically reduce baseline biomass to zero including non-tree above-ground biomass to zero and significantly less than in the Project Scenario. Furthermore, the tier 2 emission factors for understory is between 3.30% to 4.94% of Above Ground Biomass which is significantly less than the estimates of total tree biomass used in the Baseline and Project Scenarios. Below ground tree biomass (tree roots) and below ground non- tree biomass (organic soil) is included as it is allowed.
VMD0006 BL-PL	The module is applicable for estimating the baseline emissions on forest lands (usually privately or government owned) that are legally authorized and documented to be converted to non-forest land.	Condition met. The PBPH license permits the Project Area to be converted to a deforested condition. A portion of the Project Area is protected by law, for which no credits are being claimed.

VMD0006 BL-PL	Where, pre-project, unsustainable fuelwood collection is occurring within the project boundaries Modules BL-DFW and LK-DFW must be used to determine potential leakage.	Condition not applicable. There is no history of fuelwood collection in the Project Area and this activity is excluded from the Baseline and Project Scenarios. The Project does not avoid unsustainable fuelwood collection.
VMD0009 LK-ASP	The module is applicable for estimating the leakage emissions due to activity shifting from forest lands that are legally authorized and documented to be converted to non-forest land, including activity shifting to forested peatland that is drained because of project implementation. Under these situations, displacement of baseline activities can be controlled and measured directly by monitoring the baseline deforestation agents or class of agents.	Condition met. The PBPH license permits the Project Area to be converted to a deforested condition. A portion of the Project Area is protected by law for which no credits are being claimed.
VMD0009 LK-ASP	This tool must be used for projects in areas where planned deforestation happens on forested peatlands, regardless of the absence of peatland within the project boundaries.	Condition met– The tool is used because the Project Area includes peatland licensed for planned deforestation.
VMD0009 LK-ASP	The module is mandatory if module BL-PL has been used to define the baseline, and the applicability conditions in module BL-PL must be complied with in full.	Condition met. The Project has used module BL-PL and complied with BL-PL in full.
VMD0013 E-BPB	This module is applicable to REDD project activities with emissions from biomass burning and REDD-WRC project activities with emissions from biomass and/or peat burning.	Condition met. CP does not have any fire in its baseline because there is no significant anthropogenic burning occurring in the Project Area in the baseline. Nature fire risk is virtually absent in the peat swamp, as it is too wet for lightning strikes, even in the “dry season”.
VMD0015 M-REDD	Strata as defined in the relevant baseline modules are fixed and may not be changed without baseline revision.	Condition met. Strata are fixed. Strata may be revised upon baseline adjustment at year 7.

VMD0015 M-REDD	The module is mandatory for REDD, REDD-CIW, and stand-alone CIW project activities.	Condition Met: The Project has applied all relevant aspects of VM0015 M-REDD REDD, CIW-REDD, and stand-alone CIW Project Activities.
VMD0015 M-REDD	Where selective logging is taking place in the project case: Emissions from logging may be omitted if it can be demonstrated the emissions are de minimis using Tool T-SIG. If emissions from logging are not omitted as de minimis, logging may only take place within forest management areas that possess and maintain a Forest Stewardship Council (FSC) certificate for the years when selective logging occurs. Logging operations may only conduct selective logging that maintains a land cover that meets the definition of forest within the project boundary. All trees cut for timber extraction during logging operations must have a DBH greater than 30 cm. During logging operations, only the bole/log of the felled tree may be removed. The top/crown of the tree must remain within the forested area. The logging practices cannot include the piling and/or burning of logging slash. The volume of timber harvested must be measured and monitored.	Condition not applicable. The Project does not involve selective logging.
VMD0016 X-STR	In the case of REDD, above-ground biomass stratification is only used for pre-deforestation forest classes, and strata are the same in the baseline and the project scenario. Post-deforestation land use is not stratified. Instead, average post-deforestation stock values (e.g., simple, or historical area-weighted approaches are used, as per module BL-UP).	Condition met. Above ground biomass stratification is only used for pre-deforestation forest classes, and strata are the same in the Baseline and the Project Scenario. Post-deforestation areas are classified simply as "plantation".

VMD0016 X-STR	For peatland rewetting and conservation project activities this module must be used to delineate non-peat versus peat and to stratify the peat according to peat depth and soil emission characteristics unless it can be demonstrated that the expected emissions from the soil organic carbon pool or change in the soil organic carbon pool in the project scenario are de minimis	Condition met.
VMD0016 X-STR	In the case of WRC project activities, the project boundary must be designed such that the negative effect of drainage activities that occur outside the Project Area on the project GHG benefits are minimized.	Condition met. The Project is taking significant steps to maintain the intactness of hydrology in the Project Area. The Project is monitoring areas outside the Project Area which could be under threat of disturbance to minimize potential impacts in terms of drainage.
VMD0017 X-UNC	The module is mandatory when using VCS methodology VM0007. It is applicable for estimating the uncertainty of estimates of emissions and removals of CO₂-e generated from REDD and WRC project activities. The module focuses on the following sources of uncertainty: Determination of rates of deforestation and degradation Uncertainty associated with estimation of stocks in carbon pools and changes in carbon stocks. Uncertainty associated with estimation of peat emissions. Uncertainty in assessment of project emissions	Condition met. X-UNC has been used throughout to estimate uncertainties associated with this Project.
VMD0017 X-UNC	Where an uncertainty value is not known or cannot be simply calculated, then a project must justify that it is using an indisputably conservative number and an uncertainty of 0% may be used for this component.	Condition met. In all cases where an uncertainty value is not known or cannot be simply calculated, the Project provides a justification that the value used is an indisputably conservative number (or an IPCC default value as instructed by VM0007).

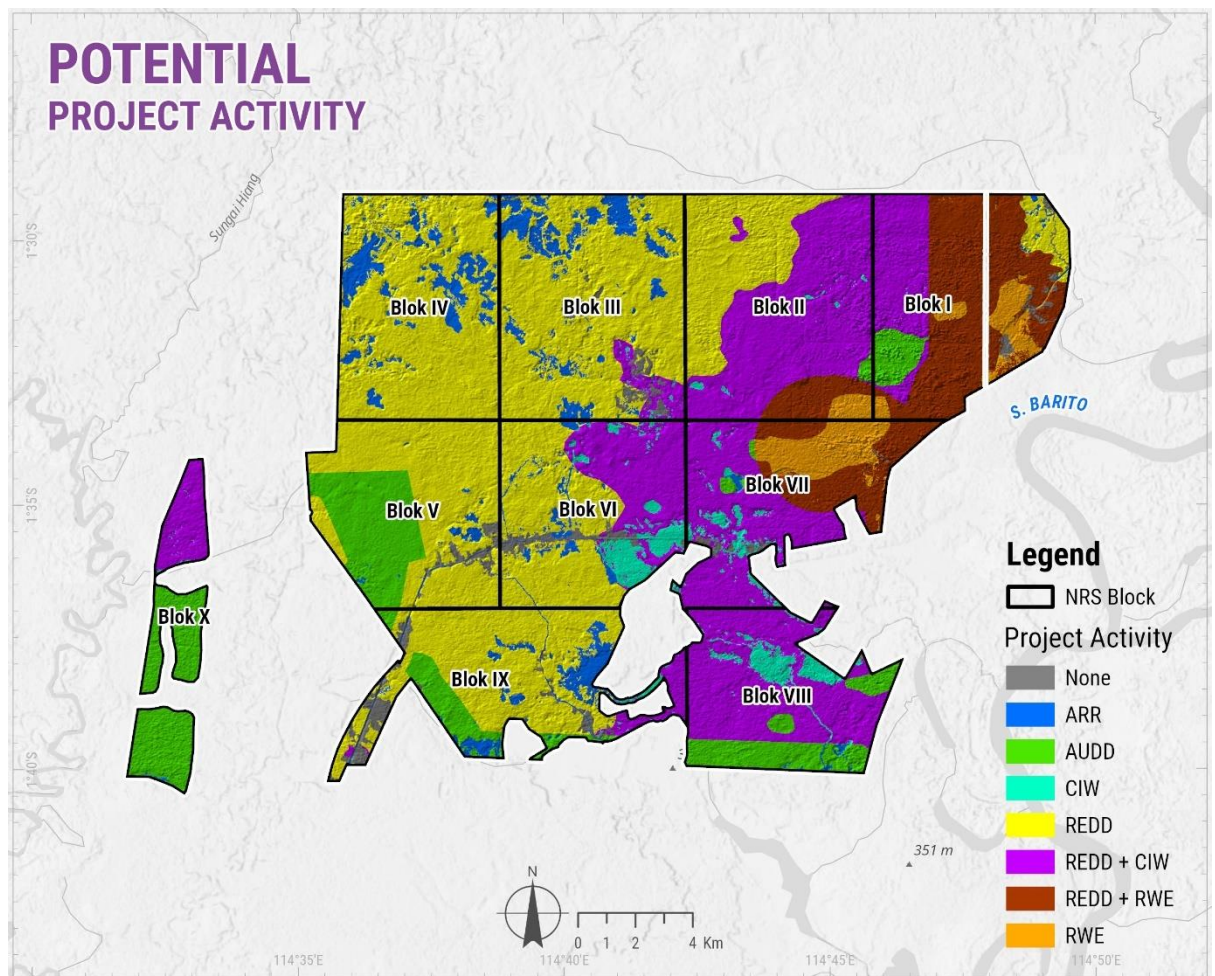
VMD0017 X-UNC	Guidance on uncertainty – a precision target of a 95% confidence interval half-width equal to or less than 15% of the recorded value shall be targeted. This is especially important in terms of project planning for measurement of carbon stocks; enough measurement plots should be included to achieve this precision level across the measured stocks.	Condition met. Uncertainty requirements have been considered in project planning and carbon stock calculations.
VMD0042 BL-PEAT	This module is applicable to Rewetting of Drained Peatlands (RDP) and CUPP activities on Project Areas that meet the VCS definition for peatland. The scope of this module is limited to domed peatlands in the tropical climate zone.	Condition met. RDP does not apply but CUPP applies.
VMD0042 BL-PEAT	It must be demonstrated by using the latest version of the CDM A/R methodological tool: "Tool for testing significance of GHG emissions in A/R CDM project activities" (T-SIG) that N ₂ O emissions in the project scenario are not significant, or it must be demonstrated that N ₂ O emissions will not increase in the project scenario compared to the baseline scenario, and therefore N ₂ O emissions need not be accounted for.	Condition met. GHG emissions (specifically N₂O) are excluded from the Baseline and Project Scenarios. The potential emissions sources are fire and nitrogenous fertilizer applications, which are both assumed to be absent in both the Baseline and Project Scenarios. Therefore, the net GHG emissions from both the Baseline and Project Scenarios are estimated to be zero which is less than 5% of the total decreases in carbon pools and increases in emissions and less than 5% of net anthropogenic removals by sinks.
VMD0042 BL-PEAT	In the baseline scenario, the peatland must be (partially) drained. At project start, the peatland may still be undrained.	Condition met. The baseline scenario is of industrial biomass plantation in peat soil that requires substantial water table management (i.e., lowering). At the start of the project almost all the Project Area remained undrained.

VMD0044 LK-ECO	Leakage caused by hydrological connectivity is avoided by project design and site selection, as outlined in Chapter 5 (Procedures of VMD0044).	Condition met. Ecological Leakage does not occur in the Project.
VMD0046 M-PEAT	This module is applicable to RDP and CUPP activities as defined in the VCS Standard.	Condition met: The Project is one where the undrained peatland is preserved i.e., Conservation of undrained and partially drained peatlands (CUPP) a.k.a. Conservation of Intact Wetlands (CIW)
VMD0046 M-PEAT	The Project Area must meet the VCS definition for peatland. This module is limited to domed peatlands in the tropical climate zone.	This Project Area is in an area with layering of naturally accumulating organic matter (peat). The Project is in a tropical climate zone and on a wetlands forest peat dome system.
VMD0046 M-PEAT	It must be demonstrated using tool T-SIG that N ₂ O emissions in the project scenario are not significant, or it must be demonstrated that N ₂ O emissions will not increase in the project scenario compared to the baseline scenario, and therefore N ₂ O emissions need not be accounted for.	Condition met: The Baseline and Project Scenarios exclude emissions from fire and so N ₂ O emissions from fire are not calculated. Furthermore, N ₂ O emissions in the baseline assessment are entirely the result of the application of fertilizers to plantations. The project scenario excluded all plantation development and resulted in the elimination of all N ₂ O emissions from fertilizer, thus N ₂ O emissions will not increase.
VMD0046 M-PEAT	In the baseline scenario the peatland must be drained or partially drained.	Condition met: Under the Baseline Scenario, the peatland area would have been drained for Acacia plantation activity.
VMD0046 M-PEAT	At project start the peatland may still be undrained.	Condition met: At the Project Start Date the peatland area was not drained for industrial plantation activity.

VMD0046 M-PEAT		It must be demonstrated using Module LK-ECO that ecological leakage must not occur	Condition met: Ecological Leakage does not occur in this Project and all measures have been taken to ensure Ecological Leakage remains = 0. [LK-ECO].
T-SIG EB	31	The tool shall be used in the application of an A/R CDM approved methodology to an A/R CDM project activity: To determine which decreases in carbon pools and increases in emissions of the greenhouse gases measured in CO₂ equivalents that result from the implementation of the A/R project activity, are insignificant and can be neglected. b) To ensure that it is valid to neglect decreases in carbon pools and increases in GHG emissions by sources stated as being insignificant in the applicability conditions of an A/R CDM methodology.	Condition met. T-Sig was used to guide the selection of GHG emissions and carbon pools.
T-ADD EB 35 Annex 19		Forestation of the land within the proposed project boundary performed with or without being registered as the A/R CDM project activity shall not lead to violation of any applicable law even if the law is not enforced.	Condition met – The Project included “Step 0” of the Tool as an additional procedure as part of the stepwise additionality analysis mandated by T-ADD.
T-ADD EB 35 Annex 19		This tool is not applicable to small - scale afforestation and reforestation project activities.	Condition not applicable

3.3 Project Boundary

Source		Gas	Included?	Justification/Explanation
Baseline	Deforestation	CO ₂	Yes	Live biomass losses because of deforestation are included
		CH ₄	N/A	
		N ₂ O	N/A	
		Other	N/A	
	Microbial decomposition / Oxidation of drained peat.	CO ₂	Yes	All drained peatland is considered a CO ₂ emissions source. However, Emissions from peat exposed to aerobic decomposition by spreading or piling following the establishment or maintenance of ditches are conservatively omitted as per BL-PEAT – Section 5.3. Initially, IPCC default factors will be used for the baseline and Project to estimate emissions, later in the project measurements will be performed to develop site-specific emission models, and if needed, in the reference regions for the baseline
		CH ₄	Yes	IPCC default factors will be used to estimate CH ₄ emissions in the baseline and Project. All drained peatland is considered a CH ₄ emissions source. However, emissions from peat exposed to aerobic decomposition by spreading or piling following the establishment or maintenance of ditches are conservatively be omitted as per BL-PEAT – Section 5.3.
		N ₂ O	No	Excluded as per applicability condition in module BL-PEAT
		Other	No	Not applicable



The map above shows all the emissions reduction activities feasible within the Project Area. The actual Project Activities only includes APDD (REDD), CIW and RWE. ARR and AUDD have been excluded from the emissions reduction calculation. However, ARR and AUDD activities will still be conducted and benefits from these activities are treated as environmental co-benefits for the purpose of this Project.

3.4 Baseline Scenario

The historical and current land-use activity in and around the Project's area are industrial plantation, production forest-commercial selective logging, industrial oil palm plantation, smallholder oil palm plantation, and mining. When the Project Proponent submitted its application for PBPH license for ecosystem restoration and conservation activities, it did so in competition with other applicants for a PBPH license intending to carry out logging and/or harvesting of forest products followed by commercial plantation of oil palm or acacia trees on the deforested land. Without the establishment of the Project, the whole concession area would be legally converted into industrial forest plantation (*Hutan Tanaman Industri* or HTI).

Baseline scenarios for Project Activities are identified as follows:

- **Avoided planned deforestation and forest degradation (APDD)** on forested lands designated for annual plantation development based on meeting national eligibility criteria or plantation development based on the forest function and soil function classifications.
- **Conservation of Intact Wetlands (CIW)** located on undrained peatland soils designated for annual plantation development based on meeting national eligibility criteria or plantation development based on the forest function and soil function classifications.
- **Restoration of Wetlands Ecosystems (RWE)** located on drained peatland soils which will be restored by water management and backfilling of drainage canals and other drains to its original rewetted condition.

The activities above can be further classified according to combinations of APDD with other wetland activities generating APDD+CIW and APDD+RWE.

Its assumed remaining non-forest lands will return to its natural state through a combination of natural regeneration and assisted natural regeneration. However, the project proponent will not be claiming emissions reductions under ARR because the costs involved in monitoring ARR performance verses the actual credits that could be earnt make claiming VCUs under ARR uneconomic.

In addition, the Project will protect conservation areas within the concession boundary. However, the Project Proponent will not be claiming emissions reductions under AUDD because the low amounts of deforestation observed in the historical period and the costs of monitoring make claiming VCUs under AUDD uneconomic.

The total area of Project Activities is 32,759 hectares and the total area of non-Project Activities are 7,067 hectares.

REDD+ Categories	REDD+ Activities	Mineral soils	Peat Soils	Total
REDD	APDD	16,634	0	16,634
	APDD+CIW	0	10,148	10,148
	CIW	0	1,031	1,031
	APDD+RWE	0	3,733	3,733
	RWE	0	1,214	1,214
	AUDD	1,737	2,250	3,987
ARR	ARR	2,132	62	2,193
No REDD+ Activities		622	265	886
Total		21,124	18,702	39,826

Table 3-1 Areas of potential baseline activities

The way and steps for identification of baseline scenario are described in Section 3.5 using Verra tool VT0001 – T-ADD "Tool for the demonstration and assessment of additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) project activities. Version 3.0.

3.5 Additionality

3.5.1 Regulatory Surplus

Is the Project located in an UNFCCC Annex 1 or Non-Annex 1 country?

☐ Annex 1 country ☒ Non-Annex 1 country

Are the Project Activities mandated by any law, statute, or other regulatory framework?

☒ Yes ☐ No

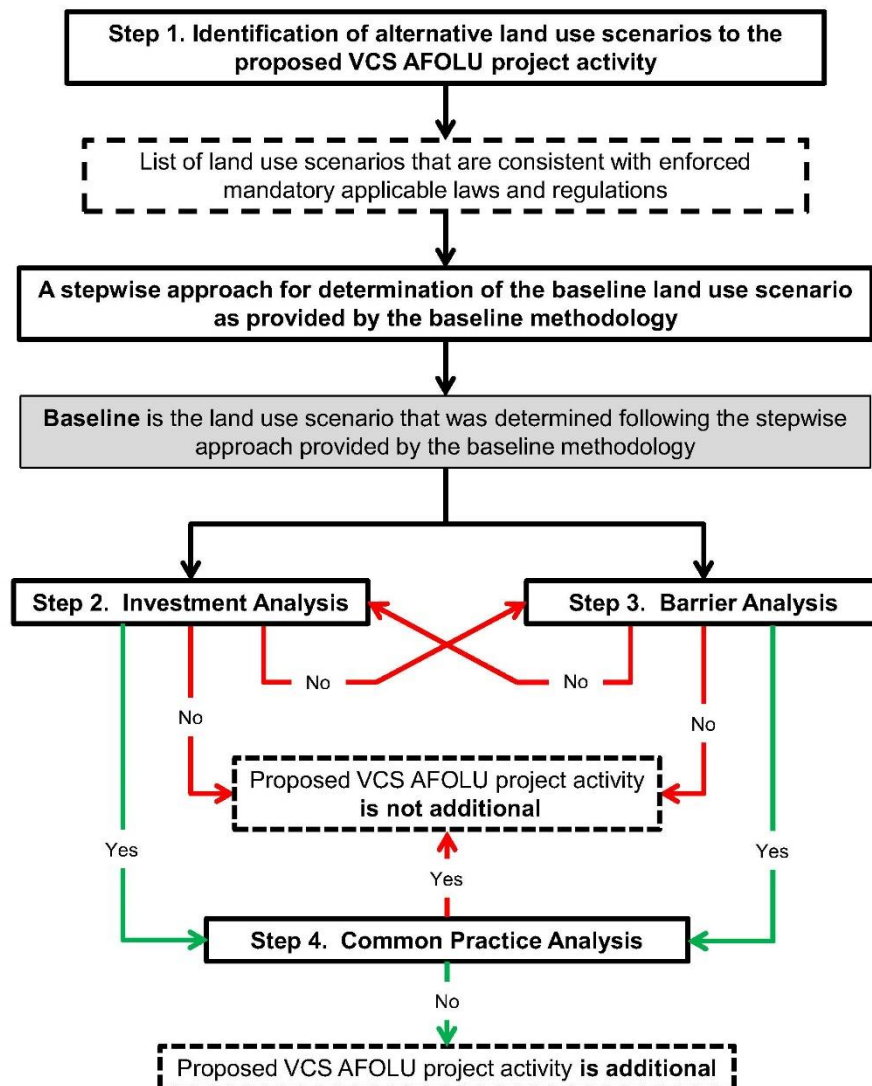
If the Project is located inside a Non-Annex 1 country and the Project Activities are mandated by a law, statute, or other regulatory framework, are such laws, statutes, or regulatory frameworks systematically enforced?

☒ Yes ☐ No

3.5.2 Additionality Methods

Additionality requirements are described in VT0001: tool for the demonstration and assessment of additionality in VCS Agriculture, Forestry, and Other Land Use (AFOLU) project activities Version 3.0; 1 February 2012.

Figure 1: Indicative flowchart of the *Tool for the Demonstration and Assessment of Additionality in VCS AFOLU Project Activities*.



3.5.3 Assessment of Additionality

The Project Scenario involves protection of lands from planned and unplanned deforestation, the protection of wetlands from degradation, the restoration of degraded wetlands and reforestation. Of these activities, emissions reductions will only be claimed for avoided planned deforestation and forest degradation (APDD), conservation of intact wetlands (CIW) and restoration of wetland ecosystems (RWE). Emissions reductions are not being claimed for reforestation nor avoidance of unplanned deforestation and forestation and benefits from these activities are treated as environmental co-benefits for the purpose of this Project.

The major consideration for assessment of Project additionality is that there is a realistic and legal alternative Baseline Scenario for the Project Areas in the form of industrial forest plantation development and the Project meets step 1 requirements.

An investment analysis based on existing plantations has been prepared that demonstrates the financial feasibility of the baseline and the financial infeasibility of Project Activity without GHG credits. The investment analysis for the Project is clear-cut and meets the requirements of step 2. The investment analysis can be implemented using a simple discounted cash flow analysis although the methodology offers several alternatives.

As step 2 investment analysis clearly demonstrates additionality, then Step 3 barrier analysis is not strictly required. However, persuasive arguments can be made that there are several barriers to the proposed Project Activities that would block its implementation if it were not registered as a VCS carbon project. These include:

- Conservation is inherently a costly activity that does not produce income independently of GHG credits. Similar large scale conservation project activities have rarely if ever occurred without government support, grants and non-commercial finance.
- Debt funding is not available for this type of Project Activity.
- The Project Activities could not occur without the benefit of VCS approaches and institutional support of VCS that is leading to resolution of social conflicts, land claims and widespread illegal activities, and unclear land tenure and probably several other factors.

These barriers are additional to the extent that the Project Proponent will be unable to implement the Project Activities if they are not expected to be registered as a VCS project. This can be established by formal documentation confirming that condition.

Furthermore, it can be easily established that these barriers to the Project Activities do not restrict the agent of deforestation from implementing the plantation development Baseline Scenario.

These barriers are summarized in the table below:

Barriers	Relevance to the Project context as capable to prevent the implementation of the Project Activity if not registered as a VCS carbon project
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Institutional barriers	Yes. This barrier was mitigated once the Project Proponent was granted the PBPH license to the Project area.
Investment barriers	Yes. The Project Activities would not be economically viable or able to attract investment if not for the income from GHG credits.
Technological barriers	No
Barriers related to local tradition	No
Barriers relating to land tenure, ownership, inheritance, and property rights	No
Barriers relating to markets, transport, and storage	No
Barriers due to local ecological conditions such as: degraded soil (e.g., erosion, salination, etc.); catastrophic natural and / or human-induced events (e.g., landslides, fire, etc.).	No
Barriers due to social conditions such as: shortage of available labor to undertake the ARR project activity; lack of skilled and/or professionally trained labor force.	No

Table 3-2 Barriers to Additionality

Step 4 requires proof that similar Project Activities do not commonly occur without the sale of GHG credits to subsidize them. Conservation is inherently a costly activity that does not produce income independently of GHG credits. While large scale forest conservation and protection activities do occur, they require Government funding or non-profit / donor-based financing to happen. There are similar VCS projects applying VM0007 methodology framework around the world. A common practice analysis shall be conducted prior to verification of the Project performance and the result will clearly demonstrate additionality as per step 4 requirements.

3.6 Methodology Deviations

The Project has not employed any deviations from the methodologies outlined in this Section.

4 QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

The Project has used VM0007 (REDD-MF), VMD0006 (BL-PL) and VMD0042 (BL-PEAT) to assess the Project's baseline. The Baseline Scenario uses the third-party Technical Proposal submitted by the agent of deforestation to Dinas Kehutanan for commercial plantation development as part of the PBPH license application process for the Project Area.

4.1.1 General Procedures and Assumptions

VMD0042 (BL-PEAT) § 5.1.1 requires that a set of "General Procedures and Assumptions" are followed in assessing Baseline emissions; the Project makes additional assumptions as well related to the APD component of the Project.

The Project baseline emissions and carbon stock assumptions were assessed based on an analysis of the Baseline Scenario. Accounted emissions resulted from the following:

- Avoided deforestation.
- Avoided microbial peat decomposition.
- Avoided organic carbon dissolved from water bodies.
- Reforestation of non-forest areas.

Emissions reductions from wetlands include:

- Avoided wetland degradation through avoided drainage and avoided plantation development.
- Restoring Wetland Ecosystems (RWE) through water management and backfilling of drains and canals and retweeting of drained peat lands.
- Dike or canal collapses, which would have closed naturally over time.
- Any progressive subsidence resulting in a raising of relative depths in the water table, increasingly thinner aerobic layers, and reduced CO₂ emission rates.

All assumptions made by the Project team are based on expert assessments considering verifiable scientific experience for the local area and published scientific documentation available. All such assumptions were made on a conservative basis.

The Project also has assumed that the baseline deforesting agent would perform regular maintenance of canals for drainage and transportation purposes.

Emissions from peat exposed to aerobic decomposition by spreading or piling following the establishment or maintenance of ditches are conservatively omitted as per BL-PEAT – Section 5.3.

The Project assumed because of the known fire record for the Project Area that no uncontrolled burning of peat would occur in the Project Area. These emissions are not accounted for since the loss is insignificant. It was therefore considered conservative to omit GHG emissions from biomass burning in the baseline.

Baseline emissions have been calculated on an annual basis. This has been done as baseline changes in land cover classes and drainage status during the Project lifetime determine (changes in) emissions of CO₂ and CH₄.

The Project has followed the requirements of VM0007 v1.6 § 5.4.2.

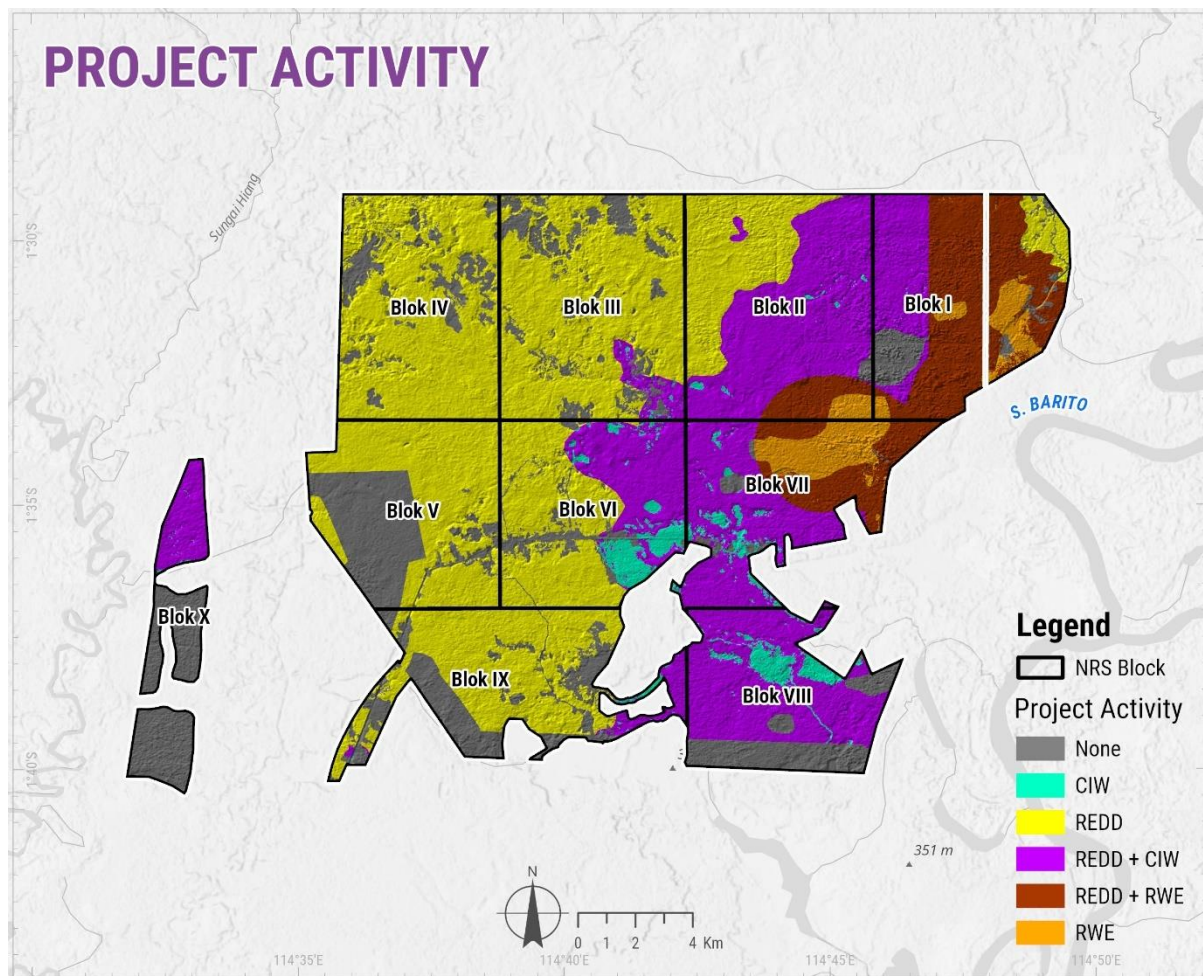
4.1.2 Description of Project Activities

As a result of the Project reporting separate Project Activities, separate baseline emissions calculations have been prepared for each of the five separate Project Activities that would occur in comparison to the Baseline Scenario.

The Project will undertake the following activities:

1. **REDD** – Avoiding planned deforestation.
2. **CIW** – Avoiding wetland degradation with no avoiding planned deforestation. This includes:
 - a. Peatland with bare land cover to be converted into plantation under the Baseline Scenario
 - b. Peatland that is classified as conservation lands but will be rewetted in the Baseline Scenario when plantations on adjacent areas are converted to plantation.
3. **REDD+CIW** - Avoiding wetland degradation with avoiding planned deforestation.
4. **RWE** – Restoring wetland ecosystems through rewetting of drained peat land through the blocking of drains and canals.
5. **REDD+RWE** - Restoring wetland ecosystems with avoiding planned deforestation.

See the map below for location of Project Activities



Map 4-1: Project Activities in the Project Area

The Project intends to conduct some reforestation, with a planned program of planting 150 ha over three years plus additional planting thereafter if required. The main strategy is to enhance existing on-going natural regeneration with assisted natural regeneration using strategic planting of selected species to enhance native and endemic species biodiversity and improvement of the habitat of rare, threatened and endangered species within the Project Area. The Project however has elected to omit ARR from claimed emissions reductions because of the relatively small scale of ARR activities, and the high costs for ARR monitoring and reporting.

The area developed into plantations under the Baseline Scenario in any given year is expected to be clear-felled of all forest cover, then drained and converted to plantations.

Quantification of GHG emissions from microbial decompositions of peat and water bodies in peatlands has been carried out by using a spatially and temporally explicit approach. Each baseline stratum was discretized into parcels of the smallest land or water body unit with relatively uniform combinations of spatial variables as given in the table below. Temporal discretization has been used by sequencing the calculation into 1-year time-steps, while temporal variables determine the sequence of strata changes. Temporal variability of GHG emission parameters and temporal restrictions to GHG emissions are presented in the table

below. The schematization assures the proper use of GHG emission parameters at the correct spatial location and the correct time.

Variables	Description
(A) Spatial Variables	
(A1) Soil type	Distinction between peat or non-peat. This is used to exclude all non-peat parcels from GHG calculation.
(A2) Initial peat thickness available for microbial decompositions	Derived from the Peat Ecosystem and Soil Survey maps. These maps are used to determine the initial condition for subsequent calculations of the remaining peat layer available for microbial decompositions. In the Project, there are no non-peat parcels and so this requirement is redundant
(A3) Initial stratum	Stratum of the corresponding parcel at the Project Start Date. This is used to determine the correct emission factor for the corresponding parcel for the duration before B1 and B2 (in this table, below) take effect.
(B) Temporal Variables	
(B1) Year of drainage	Determines the onset of conversion from the initial stratum to the drained stratum and sets all the drainage-related parameters/variables accordingly, such as initial consolidations, bulk density changes, etc. This does not take effect if the initial stratum of the parcel is already drained. Together with B2, this is used to determine the correct Emission Factor for the corresponding parcel.
(B2) Year of deforestation/ planting of the baseline land cover	Determines the onset of conversion of initial stratum to deforested/planted stratum. Together with B1, this is used to determine the correct Emission Factor for the corresponding parcel.
(B3) PDT	The Peat Depletion Timeline (PDT) is the period that it takes to deplete the remaining peat layer by microbial decomposition (conservatively will be assumed that PDT is reached once the remaining peat layer has reached 20 cm). Once the PDT is reached in each stratum, all GHG emissions in that stratum are set to zero.

Table 4-1 Variables used in the schematization of quantification of GHG emissions from microbial decompositions of peatland dissolved organic carbon from water bodies in peatlands in the Baseline Scenario.

4.1.3 Methods for Quantifying Baseline Emissions from REDD (BL-PL)

The methods for estimating net carbon stock changes and GHG emissions from planned deforestation under the baseline scenario are described in module BL-PL §5.

4.1.3.1 Part 1 - Calculating annual area of planned deforestation.

Step 1.1 - Identification of agent of planned deforestation

The agent of planned deforestation is the third-party forestry company which submitted the Technical Proposal. The baseline involves the third-party developing plantations on lands scheduled for plantation development as contemplated by the Technical Proposal.

Step 1.2. - Area of planned deforestation

The area of planned plantation development and deforestation is described in section 3.4 called “REDD and WRC Boundaries.” This area applies to all forested land within the plantation development (“development area”) within the geographical boundaries of the Project Area. The APD boundaries are generated by intersecting the forest area stratification boundaries with the planned plantation development boundaries and identifying all areas of forest subject to planned deforestation. The specific areas for planned deforestation REDD, REDD+CIW and REDD+RWE activities are described in sections 4.1.5, 4.1.7 and 4.1.9 respectively.

Step 1.3. - Rate of planned deforestation

The planned deforestation rate is specified in the third-party Technical Proposal. The plan divides the development into 10 years planting program. Each year has areas designated for land clearing and plantation establishment. The baseline management plan is a valid and reasonable proposition, meeting Indonesian legal requirements, permissible under the regulations, practical in terms of plantation siting and practical implementation, and technically feasible from an operational perspective.

Step 1.4 - Likelihood of planned deforestation

Since all wood plantation concessions are zoned for deforestation, are under the private control of the concessionaire, and not under government control for the entire duration of the concession license, the likelihood of deforestation (L-Di) is assumed to be equal to 100%.

Step 1.5 - Risk of abandonment

Since the Project Proponent will be managing all forest lands within the Project Area, the risk of abandonment is low. Furthermore, as the third party would have had a commercial interest in developing the area under the Technical Proposal, the Baseline assumes no risk of abandonment.

Step 1.6 - Annual area of deforestation

The annual area of deforestation is directly derived from the Technical Proposal.

The actual planned rate of deforestation is shown in the table below.

Land Cover Strata	Areas converted to plantations by land cover and year										
	(A _{planned,i})										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Forest	3,380.5	3,880.6	1,934.1	2,109.5	1,592.8	1,719.5	2,369.9	1,878.7	1,540.4	422.9	20,828.9
Heath Forest	0.0	967.5	1,777.9	857.2	661.8	1,168.8	20.7	0.0	860.6	0.0	6,314.6
Scrub	384.2	134.3	510.7	749.9	237.7	353.7	322.0	318.3	306.3	53.9	3,371.0
Total	3,764.8	4,982.4	4,222.7	3,716.6	2,492.4	3,242.0	2,712.6	2,197.0	2,707.3	476.8	30,514.5

Table 4-2 Baseline Plantation Development Program

4.1.3.2 Part 2 - Baseline Carbon Stock Change

The Project next applies Part 2 – Baseline Carbon Stock Change as per VMD0006 (BL-PL). For terrestrial carbon pools, stock changes in each pool are calculated by subtracting post-deforestation carbon stocks from forest carbon stocks equations 6 to 11 of VMD0006 BL-PL.

$$\Delta C_{AB,tree,i} = C_{AB,tree,bsl,i} - C_{AB,tree,post,i} \quad (6)$$

$$\Delta C_{AB,non-tree,i} = C_{AB,non-tree,bsl,i} - C_{AB,non-tree,post,i} \quad (7)$$

$$\Delta C_{BB,tree,i} = C_{BB,tree,bsl,i} - C_{BB,tree,post,i} \quad (8)$$

$$\Delta C_{BB,non-tree,i} = C_{BB,non-tree,bsl,i} - C_{BB,non-tree,post,i} \quad (9)$$

$$\Delta C_{DW,i} = C_{DW,bsl,i} - C_{DW,post,i} \quad (10)$$

$$\Delta C_{LI,i} = C_{LI,bsl,i} - C_{LI,post,i} \quad (11)$$

$$\Delta C_{SOC,i} = C_{SOC,bsl,i} - C_{SOC,PD-BSL,i} \quad (12)$$

Where:

$\Delta C_{AB,tree,i}$	= Baseline carbon stock change in aboveground tree biomass in stratum i ; t CO ₂ -e ha ⁻¹
$C_{AB,tree,bsl,i}$	= Forest carbon stock in aboveground tree biomass in stratum i ; t CO ₂ -e ha ⁻¹
$C_{AB,tree,post,i}$	= Post-deforestation carbon stock in aboveground tree biomass in stratum i ; t CO ₂ -e ha ⁻¹
$\Delta C_{BB,tree,i}$	= Baseline carbon stock change in belowground tree biomass in stratum i ; t CO ₂ -e ha ⁻¹
$C_{BB,tree,bsl,i}$	= Forest carbon stock in belowground tree biomass in stratum i ; t CO ₂ -e ha ⁻¹
$C_{BB,tree,post,i}$	= Post-deforestation carbon stock in belowground tree biomass in stratum i ; t CO ₂ -e ha ⁻¹
$\Delta C_{AB,non-tree,i}$	= Baseline carbon stock change in aboveground non-tree biomass in stratum i ; t CO ₂ -e ha ⁻¹
$C_{AB,non-tree,bsl,i}$	= Forest carbon stock in aboveground non-tree vegetation in stratum i ; t CO ₂ -e ha ⁻¹
$C_{AB,non-tree,post,i}$	= Post-deforestation carbon stock in aboveground non-tree vegetation in stratum i ; t CO ₂ -e ha ⁻¹
$\Delta C_{BB,non-tree,i}$	= Baseline carbon stock change in belowground non-tree biomass in stratum i ; t CO ₂ -e ha ⁻¹
$C_{BB,non-tree,bsl,i}$	= Forest carbon stock in belowground non-tree biomass in stratum i ; t CO ₂ -e ha ⁻¹
$C_{BB,non-tree,post,i}$	= Post-deforestation carbon stock in belowground non-tree biomass in stratum i ; t CO ₂ -e ha ⁻¹
$\Delta C_{DW,i}$	= Baseline carbon stock change in dead wood in stratum i ; t CO ₂ -e ha ⁻¹

$C_{DW,bsl,i}$	= Forest carbon stock in dead wood in stratum i ; t CO ₂ -e ha ⁻¹
$C_{DW,post,i}$	= Post-deforestation carbon stock in dead wood in stratum i ; t CO ₂ -e ha ⁻¹
$\Delta C_{LI,i}$	= Baseline carbon stock change in litter in stratum i ; t CO ₂ -e ha ⁻¹
$C_{LI,bsl,i}$	= Forest carbon stock in litter in stratum i ; t CO ₂ -e ha ⁻¹
$C_{LI,post,i}$	= Post-deforestation carbon stock in litter in stratum i ; t CO ₂ -e ha ⁻¹
$\Delta C_{SOC,i}$	= Baseline carbon stock change in soil organic carbon in stratum i ; t CO ₂ -e ha ⁻¹
$C_{SOC,bsl,i}$	= Forest carbon stock in soil organic carbon in stratum i ; t CO ₂ -e ha ⁻¹
$C_{SOC,PD-BSL,i}$	= Post-deforestation carbon stock in soil organic carbon in stratum i ; t CO ₂ -e ha ⁻¹
i	= 1, 2, 3, ... M strata

Note that non-tree vegetation/biomass, deadwood, and litter are not included in the Project. Soil organic carbon is not calculated for APWD-REDD projects under this methodology.

Stock changes in above ground biomass are emitted at the time of deforestation. Following deforestation, emissions from below ground biomass are calculated as being emitted at an annual rate of 10% of stock change for 10 years from equation 13 of VMD0006 BL-PL.

$$\begin{aligned} \Delta C_{BSL,i,t} = & AA_{planned,i,t} * (\Delta C_{AB_{tree,i}} - \Delta C_{WP,i} + \Delta C_{AB_{non-tree,i}} + \Delta C_{LI,i}) + \\ & (\sum_{t-10}^t AA_{planned,i,t}) * (\Delta C_{BB_{tree,i}} + \Delta C_{BB_{non-tree,i}} + \Delta C_{DW,i}) * \left(\frac{1}{10}\right) + \\ & (\sum_{t-20}^t AA_{unplanned,i,t}) * (C_{WP100,i} + \Delta C_{SOC,i}) * \left(\frac{1}{20}\right) \end{aligned} \quad (13)$$

Where:

$\Delta C_{BSL,i,t}$	= Sum of the baseline carbon stock change in all terrestrial pools in stratum i in year t ; t CO ₂ -e
$AA_{planned,i,t}$	= Annual area of baseline planned deforestation for stratum i in year t ; ha
$C_{WP100,i}$	= Carbon stock entering the wood products pool at the time of deforestation that is expected to be emitted over 100-years from stratum i ; t CO ₂ -e ha ⁻¹
$\Delta C_{AB,tree,i}$	= Baseline carbon stock change in aboveground tree biomass in stratum i ; t CO ₂ -e ha ⁻¹
$\Delta C_{BB,tree,i}$	= Baseline carbon stock change in belowground tree biomass in stratum i ; t CO ₂ -e ha ⁻¹
$\Delta C_{AB,non-tree,i}$	= Baseline carbon stock change in aboveground non-tree biomass in stratum i ; t CO ₂ -e ha ⁻¹
$\Delta C_{BB,non-tree,i}$	= Baseline carbon stock change in belowground non-tree biomass in stratum i ; t CO ₂ -e ha ⁻¹
$\Delta C_{WP,i}$	= Baseline carbon stock change in wood products in stratum i ; t CO ₂ -e ha ⁻¹

$\Delta C_{DW,i}$	=	Baseline carbon stock change in dead wood in stratum i ; t CO ₂ -e ha ⁻¹
$\Delta C_{LI,i}$	=	Baseline carbon stock change in litter in stratum i ; t CO ₂ -e ha ⁻¹
$\Delta C_{SOC,i}$	=	Baseline carbon stock change in soil organic carbon in stratum i ; t CO ₂ -e ha ⁻¹
i	=	1, 2, 3, ... M strata
t	=	1, 2, 3, ... t^* years elapsed since the projected start of the project activity

Note that wood products pool, non-tree vegetation/biomass, deadwood, and litter are not included in the Project. Soil organic carbon is not calculated for APWD-REDD projects under this methodology but is accounted for in the CIW and RWE emissions estimation process.

Per BL-PL, net carbon stock changes in the baseline are equal to pre-deforestation stocks minus the long-term average carbon stock in the post-deforestation land-use (acacia plantation), as defined in equation of VMD0006 BL-PL.

$$\Delta C_{AB,tree,i} = C_{AB,tree,bsl,i} - C_{AB,tree,post,i} \quad (6)$$

Where:

$\Delta C_{AB,tree,i}$ = Baseline carbon stock change in aboveground tree biomass in stratum i ; t CO₂-e ha⁻¹

$C_{AB,tree,BSL,i}$ = Forest carbon stock in aboveground tree biomass in stratum i ; t CO₂-e ha⁻¹

$C_{AB,tree,post,i}$ = Post-deforestation carbon stock in aboveground tree biomass in stratum i ; t CO₂-e ha⁻¹

Pre-deforestation stock is equal to the average carbon density estimated from biomass plots in the Project Area.

The long-term average carbon stock is based on the post deforestation land-use of *Acacia crassiparva* / *Acacia mangium* plantations. BL-PL specifies that the mean stock across the cycle be used to estimate post-deforestation carbon stocks.

The mean carbon stock is calculated from the biomass dynamics of *Acacia* in plantations with a rotation of five years (Heriansyah et. al., 2007)⁴.

These are summarized below:

Factor	Value	Unit
BCEF	0.5453	
Average harvest volume quantity	19.99	t.DM/ha
Average harvest biomass quantity	19.99	t.DM/ha
Harvest age	5	years

Table 4-3 Emissions factors for plantation growth and yield

The long-term average carbon stock of *Acacia crassiparva* is calculated using the methodology described in “AFOLU Guidance: Example for Calculating the Long-Term Average Carbon Stock for ARR Projects with Harvesting”. The calculation is shown in the table below:

Year	Current Annual Increment		Total Biomass
	m ³ /ha/yr	t.DM/ha/yr	t.DM/ha
1	2.2	1.2	1.2
2	10.6	5.8	7.0
3	18.6	10.1	17.1
4	23.8	13.0	30.1
5	26.5	14.5	44.6
Average			19.99

Table 4-4 The long-term average carbon stocks for *Acacia crassiparva* and *Acacia mangium* plantations

⁴ GROWTH CHARACTERISTICS AND BIOMASS ACCUMULATIONS OF ACACIA MANGIUM UNDER DIFFERENT MANAGEMENT PRACTICES IN INDONESIA (I. Heriansyah, K. Miyakuni, T. Kato, Y. Kiyono & Y. Kanazawa), Journal of Tropical Forest Science 19(4): 226–235 (2007)

4.1.3.3 Emissions Calculations from Planned Deforestation (REDD)

The baseline net GHG emissions from terrestrial carbon pools for planned deforestation are calculated using equation 1 of module VMD0006 BL-PL:

$$\Delta C_{BSL,planned} = \sum_{t=1}^{t^*} \sum_{i=1}^M (\Delta C_{BSL,i,t} + GHG_{BSL-E,i,t}) \quad (1)$$

Where:

$\Delta C_{BSL,planned}$	= Net greenhouse gas emissions in the baseline from planned deforestation up to year t^* ; t CO ₂ -e
$\Delta C_{BSL,i,t}$	= Net carbon stock changes in all pools in the baseline stratum i in year t ; t CO ₂ -e
$GHG_{BSL-E,i,t}$	= Greenhouse gas emissions as a result of deforestation activities within the project boundary in the baseline stratum i in year t ; t CO ₂ -e yr ⁻¹
i	= 1, 2, 3, ... M strata
t	= 1, 2, 3, ... t^* years elapsed since the projected start of the project activity

The Project does not include emissions from fossil fuel emissions or biomass burning. However, we assume that fertilizer will be applied to plantation areas in the baseline scenario only and assume that some N₂O emissions would occur. Nonetheless, as VM0007 in table 7 at §5.4.2, indicates, we should include N₂O as a carbon pool, but it may be excluded from the accounting if it is “excluded from the baseline” so long as fertilizer use is not enhanced as a leakage avoidance mechanism. As such §5, Part 3 of PL-PL Green House Gas Emissions is not used.

To calculate the emissions from deforestation we use the following approach:

Determine the annual area of planned plantation development and associated deforestation for REDD and REDD+CIW baseline scenarios by land cover strata. The land-use change and associated deforestation for the whole Project Area is summarized in the table below.

Land Cover Strata	Description	Area Beginning	Area Baseline	Land-Use Change
		(ha)		
Plantation	Plantation and associated infrastructure. This stratum represents typical <i>Acacia</i> plantations on mineral soils and peatland in Indonesia. For peatland plantation development, drainage is required, and forest covers are removed if present. <i>Acacia</i> planting starts in the same year as deforestation. The development of drainage constructions is assumed to happen just before- or at the same year as the deforestation/planting.	0	30,514.5	30,514.5
Forest	Secondary forest. Most of this forest type is allocated for conversion to plantations.	20,828.9	0	-20,828.9
Heath Forest	Low yield forest – often referred to Kerangas – growing acidic sandy soils (often overlaid with peat, often lacking in nutrients especially nitrogen. Most of this forest type is allocated for conversion to plantations.	6,314.6	0	-6,314.6
Scrub	Highly degraded natural forests. Most of this forest type is allocated for conversion to plantations.	3,371.0	0	-3,371.0
Total		30,514.5	30,514.5	0

Table 4-5 Land-Use Change of all Stratum

1. We calculate the quantity of the average per hectare above ground biomass (AGB) and its CO₂ equivalent GHG emissions from the cleared forest using the forest inventory data. This is reported separately and summarized below. The conversion factor for biomass weight to molecular carbon weight is 0.47⁵ and the conversion factor for molecular carbon to CO₂E is 3.667⁶. The total above ground biomass emissions in CO₂E from deforestation are calculated by multiplying the area of each land cover stratum deforested each year by the average AGB for the stratum.

Parameter		Forest	Heath Forest	Scrub	Unit
Above ground biomass	Biomass	166.6	125.2	71.5	tons.DM.ha ⁻¹
	Carbon	78.3	58.8	33.6	tons.C.ha ⁻¹
	CO ₂ E	287.1	215.8	123.3	tons.CO ₂ E.ha ⁻¹
Below ground biomass	Biomass	43.0	32.3	18.5	tons.DM.ha ⁻¹
	Carbon	20.2	15.2	8.7	tons.C.ha ⁻¹
	CO ₂ E	74.1	55.7	31.8	tons.CO ₂ E.ha ⁻¹
Total tree biomass	Biomass	209.6	157.5	90.0	tons.DM.ha ⁻¹
	Carbon	98.5	74.0	42.3	tons.C.ha ⁻¹
	CO ₂ E	361.2	271.5	155.1	tons.CO ₂ E.ha ⁻¹

Table 4-6 Average AGB of all strata

2. The baseline carbon stock change in aboveground tree biomass ($\Delta C_{AB\ tree,i}$) are calculated from the forest carbon in AGB minus the long-term average carbon stock of Acacia as per the table below.

Land cover	C _{AB tree_BSL,i}		C _{AB tree_post,i}		$\Delta C_{AB\ tree,i}$	
	t.dm ha ⁻¹	t.CO ₂ -e ha ⁻¹	t.dm ha ⁻¹	t.CO ₂ -e ha ⁻¹	t.dm ha ⁻¹	t.CO ₂ -e ha ⁻¹
Forest	166.6	287.1	20.0	34.5	146.6	252.6
Heath Forest	125.2	215.8	20.0	34.5	105.2	181.3
Scrub	71.5	123.3	20.0	34.5	51.6	88.9

Table 4-7 Baseline carbon stock change by land cover type

3. The below ground biomass emissions in CO₂E are calculated by multiplying the above ground biomass estimate for each of each land cover stratum deforested by the appropriate root to shoot ratio. The 2022 Forest reference emissions level was used to the root to shoot ratio for Indonesian forests. This specifies a root to shoot ratio of 29% for secondary dryland forests and 22% for secondary swamp forest.

Forest types	Ratio to AGB tree (%)		
	Sapling	Understorey	Root
Primary dryland forest	0.2%	0.5%	29%
Secondary dryland forest	1.1%	2.7%	29%
Primary swamp forest,	11.4%	2.4%	22%
Secondary swamp forest	11.1%	3.8%	22%
Primary mangrove forest	0.0%	0.0%	31%
Secondary mangrove forest	0.0%	0.0%	12%

Table 4-8 Average root to shoot ratio for Indonesia

⁵ Intergovernmental Panel on Climate Change. 2016. 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Table 4.3 Carbon Fraction of Aboveground Forest Biomass

⁶ Supra Warren. et al. 2017

Land cover	C _{BB tree_BSL,i}		C _{BB tree_post,i}		ΔC _{BB tree,i}	
	t.dm ha ⁻¹	t.CO ₂ -e ha ⁻¹	t.dm ha ⁻¹	t.CO ₂ -e ha ⁻¹	t.dm ha ⁻¹	t.CO ₂ -e ha ⁻¹
Forest	43.0	74.1	5.2	8.9	37.8	65.2
Heath Forest	32.3	55.7	5.2	8.9	27.2	46.8
Scrub	18.5	31.8	5.2	8.9	13.3	22.9

Table 4-9 Average BM estimates of all Stratum

4.1.4 Methods for Quantifying Baseline Emissions from WRC (BL-PEAT)

The methods for estimating net carbon stock changes and assessing GHG emissions in the baseline scenario from WRC activities are described in Module BL-PEAT, §5.2 through §5.5 and are set forth below.

4.1.4.1 Area of peat drained by plantation development.

Internal studies conducted by the Project Developer, in consultation with plantation management professions, has estimated that the quantity of canals required is shown in the table below:

Canal type	Density (m/ha)	Width (m)	Area (m ² /ha)
Main canal	1.87	12	22.14
Branch canal	12.12	7.64	92.57
Perimeter canal	0.50	5.42	2.71
Large field drains	12.50	2.00	25.00
Small field drains	53.33	1.2	64.00

Table 4-10 The dimensions and density of new canals created during the baseline development.

When totaled, the area of land occupied by canals is approximately 2.06%.

Peatland degradation is modelled according to the following assumptions.

1. Peatland degradation will occur in conjunction with the plantation development program specified in the Technical Proposal.
2. It is assumed all the natural forest areas within the development area will be clear-felled and developed into either plantation or infrastructure.

The area of WRC is estimated as follows:

Year		APDD+CIW	CIW	APDD+RWE	RWE
		(ha)			
2022	4,961.7	1,039.3	2.5	3,732.7	187.2
2023	7,883.3	3,933.3	30.1	3,732.7	187.2
2024	8,150.5	4,179.5	51.1	3,732.7	187.2
2025	8,150.5	4,179.5	51.1	3,732.7	187.2
2026	8,150.5	4,179.5	51.1	3,732.7	187.2
2027	9,765.1	5,400.5	444.7	3,732.7	187.2
2028	11,776.3	7,208.6	647.8	3,732.7	187.2
2029	14,294	9,405.6	968.5	3,732.7	187.2
2030	14,612	9,671.5	1,020.6	3,732.7	187.2
2031	15,099	10,148.3	1,030.8	3,732.7	187.2

Table 4-11 Baseline peatland WRC area table

The surface area of plantation canals and drains is estimated as follows:

Year	Total	REDD+CIW	CIW	APDD+RWE	RWE
	(ha)				
0	21.5	21.4	0.1	76.9	3.9
1	81.6	81.0	0.6	76.9	3.9
2	87.2	86.1	1.1	76.9	3.9
3	87.2	86.1	1.1	76.9	3.9
4	87.2	86.1	1.1	76.9	3.9
5	120.4	111.3	9.2	76.9	3.9
6	161.8	148.5	13.3	76.9	3.9
7	213.7	193.8	20.0	76.9	3.9
8	220.3	199.2	21.0	76.9	3.9
9	230.3	209.1	21.2	76.9	3.9

Table 4-12 Baseline plantation canals and drains surface area table

4.1.4.2 Assessing Baseline Greenhouse Gas Emissions from Terrestrial Carbon Pools from Peatland Rewetting and Conservation Projects

The Project applies VMD0042 (BL-PEAT) in assessing GHG emissions in the baseline scenario according to §5.2 of the module for CIW activity.

The Project also notes that it has followed the requirements of VM0007 v1.6 § 5.4.2 and included N₂O as a carbon pool because of the potential for Nitrogen fertilizer application in the baseline scenario. However, because no nitrogen fertilizer application occurs in the Project Scenario, it has been excluded from the GHG emission reduction accounting as suggested in table 7, § 5.4.2 of VM0007 v1.6.

Total Baseline Emissions from Peatlands

The baseline net GHG emissions from peat in the baseline are calculated from equations 1 - 4 of VMD006 BL-PEAT.

$$GHG_{BSL-PEAT} = \sum_{t=1}^{t^*} \sum_{i=1}^M (A_{peatsoil-BSL,i,t} \times GHG_{peatsoil-BSL,i,t} + A_{ditch-BSL,i,t} \times GHG_{peatditch-BSL,i,t} + A_{peatburn-BSL,i,t} \times GHG_{peatburn-BSL,i,t}) \quad (1)$$

Where:

$GHG_{BSL-PEAT}$	Net GHG emissions in the WRC baseline scenario on peatland up to year t^* (t CO ₂ e)
$GHG_{peatsoil-BSL,i,t}$	GHG emissions from the peat soil within the project boundary in the baseline scenario in stratum i at year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
$GHG_{peatditch-BSL,i,t}$	GHG emissions from water bodies in the baseline scenario in stratum i at year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
$GHG_{peatburn-BSL,i,t}$	GHG emissions from burning of peat in the base line scenario in stratum i at year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
$A_{peatsoil-BSL,i,t}$	Area of peatland (not open water, not burnt) in stratum i in year t in the baseline scenario (ha)
$A_{ditch-BSL,i,t}$	Area of ditch and other open water in stratum i in year t in the baseline scenario (ha)
$A_{peatburn-BSL,i,t}$	Area of peat burnt in stratum i in year t in the baseline scenario (ha)
i	1, 2, 3 ... M strata in the baseline scenario (unitless)
t	1, 2, 3, ... t^* times elapsed since the project start (yr)

For all strata i where the project duration exceeds the peat depletion time (PDT or t_{PDT}), for $t > t_{PDT-BSL,i}$ the following applies:

$$GHG_{peatsoil-BSL,i,t} = 0 \quad (2)$$

$$GHG_{peatditch-BSL,i,t} = 0 \quad (3)$$

$$GHG_{peatburn-BSL,i,t} = 0 \quad (4)$$

Where:

$t_{PDT-BSL,i}$	Peat Depletion Time in the baseline scenario in stratum i in years elapsed since the project start; estimated in Module X-STR (yr)
$GHG_{peatsoil-BSL,i,t}$	GHG emissions from the peat soil within the project boundary in the baseline scenario in stratum i at year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
$GHG_{peatditch-BSL,i,t}$	GHG emissions from water bodies at year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
$GHG_{peatburn-BSL,i,t}$	GHG emissions from burning of peat in the base line scenario in stratum i at year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
i	1, 2, 3 ... M_{BSL} strata in the baseline scenario (unitless)
t	1, 2, 3, ... t^* time elapsed since the project start (yr)

In this baseline, we include net GHG emissions from peatland degradation and from ditches. We do not include emissions from peat burning because it is considered optional.

Baseline Emissions from Peat Drainage

GHG emissions from the peat soil per stratum because of drainage in the baseline scenario are estimated equation 6 of VMD0042 BL-PEAT⁷:

$$GHG_{proxy-BSL,i,t} = GHG_{proxy-CO_2,i,t} + GHG_{proxy-CH_4,i,t} \quad (6)$$

Where:

$GHG_{proxy-BSL,i,t}$	GHG emissions in relation to the chosen proxy in the baseline scenario in stratum i at year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
$GHG_{proxy-CO_2,i,t}$	Emission of CO ₂ in relation to the chosen proxy in stratum i at year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
$GHG_{proxy-CH_4,i,t}$	Emission of CH ₄ in relation to the chosen proxy in stratum i at year t ; can conservatively be omitted in the baseline scenario (t CO ₂ e ha ⁻¹ yr ⁻¹)
i	1, 2, 3 ... M_{BSL} strata ⁵ in the baseline scenario (unitless)
t	1, 2, 3, ... t^* time elapsed since the project start (yr)

⁷ VMD0042 ver. 1.1 §5.1.1 at bullet point 5 (p. 6) indicates that "In peatland rewetting and conservation projects, emissions from peat fires are always lower compared to the baseline emissions and emissions from peat fires can conservatively be neglected. Accounting for peat fires emissions in the baseline is therefore optional.

The annual emissions of CO₂ and CH₄ from drained peat soil are estimated using the IPCC allometrics.

Land Use	GHG	Emission factor	
Fully drained peatland areas	CO ₂ -C	20	tons CO ₂ -C ha ⁻¹ yr ⁻¹
	CH ₄	2.7	kg CH ₄ ha ⁻¹ yr ⁻¹
Intergovernmental Panel on Climate Change. 2013. 2013 Supplement to the 2006 IPCC guidelines for national greenhouse gas inventories: Wetlands. Methodological guidance on lands with wet and drained soils and constructed wetlands for wastewater treatment. Gyldenkaerne, S. and Lin, E. (eds). Japan: Institute for Global Environmental Strategies [IGES].			

Table 4-13 Emission factors from drained peat soil

Baseline GHG emissions from ditches and other open water bodies in peatlands

GHG emissions from ditches and other water bodies in the baseline are derived based on ditched area and area of open water combined with an emission factor as per equation 7 of VMD0042 BL-PEAT:

$$GHG_{peatditch-BSL,i,t} = GHG_{peatditch-CO_2,i,t} + GHG_{peatditch-CH_4,i,t} \quad (7)$$

Where:

$GHG_{peatditch-BSL,i,t}$	GHG emissions from ditch and other open water stratum i at year t in the baseline scenario (t CO ₂ e ha ⁻¹ yr ⁻¹)
$GHG_{peatditch-CO_2,i,t}$	Emission of CO ₂ from ditch and open water stratum i at year t in the baseline scenario (t CO ₂ e ha ⁻¹ yr ⁻¹)
$GHG_{peatditch-CH_4,i,t}$	Emission of CH ₄ from ditch and open water stratum i at year t in the baseline scenario (t CO ₂ e ha ⁻¹ yr ⁻¹)
i	1, 2, 3 ... M_{BSL} strata ⁶ in the baseline scenario (unitless)
t	1, 2, 3, ... t^* time elapsed since the project start (yr)

The annual emissions of dissolved organic carbon (DOC) and CH₄ from ditches and other open water bodies are estimated using IPCC allometrics.

Land Use	GHG	Emission factor	
Surface area of canals	Degradation	CH ₄	2,259
	Dissolved Organic Carbon	DOC	0.82
Intergovernmental Panel on Climate Change. 2013. 2013 Supplement to the 2006 IPCC guidelines for national greenhouse gas inventories: Wetlands. Methodological guidance on lands with wet and drained soils and constructed wetlands for wastewater treatment. Gyldenkaerne, S. and Lin, E. (eds). Japan: Institute for Global Environmental Strategies [IGES].			

Table 4-14 Emission factors from surface area of canals

DOC is then converted to CO₂E by multiplication using the CO₂ to molecular C conversion factor of 3.667⁸.

⁸ Supra Indonesian National Carbon Accounting System. 2015:1

4.1.5 Baseline Emissions - REDD

4.1.5.1 Baseline emissions from deforestation

Area of land deforested in baseline

The REDD activity encompasses landscapes on mineral soils and will have planned deforestation under this scenario. The area of land planned for deforestation and conversion to plantations under REDD is 16,633 hectares.

Land Cover Strata	Areas converted to plantations by concession, land cover and year on REDD areas										
	(A _{planned,i})										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Forest	113.1	1,182.1	1,740.4	2,109.5	1,592.8	949.5	0.0	0.0	1,336.0	0.0	9,023.4
Heath	0.0	508.5	1,773.5	857.2	661.8	818.4	0.0	0.0	858.3	0.0	5,477.7
Scrub	162.8	19.2	462.6	749.9	237.7	253.1	0.0	0.0	247.1	0.0	2,132.4
Total	275.9	1,709.8	3,976.5	3,716.6	2,492.4	2,021.0	0.0	0.0	2,441.4	0.0	16,633.5

Table 4-15 Areas converted to plantations by land cover and year in the baseline for REDD

Changes in terrestrial above ground tree carbon pools in the baseline

The carbon stock changes in above ground biomass are calculated according to the methods described in 4.1.3.2 and summarized in the table below.

Above ground tree carbon stock in the baseline (C _{AB_tree_bsl,i}) on REDD areas							
Year	Above ground tree biomass in baseline (C _{AB_tree_bsl,i})				Baseline carbon stock change in above ground biomass		
	Primary Forest	Forest	Heath Forest	Scrub	AGB (t)	CO2-C (t)	CO2-E (t) (ΔC _{AB_tree_bsl,i})
Pre project	0	1,322,570	576,307	109,933			
1	0	1,305,988	576,307	101,541	24,973	11,737	43,041
2	0	1,132,726	522,809	100,551	227,750	107,043	392,525
3	0	877,639	336,221	76,702	465,525	218,797	802,327
4	0	568,450	246,038	38,041	438,032	205,875	754,944
5	0	334,989	176,405	25,786	315,348	148,214	543,500
6	0	195,818	90,298	12,740	238,325	112,013	410,750
7	0	195,818	90,298	12,740	0	0	0
8	0	195,818	90,298	12,740	0	0	0
9	0	0	0	0	298,856	140,463	515,076
10	0	0	0	0	0	0	0
Total					2,008,810	944,140	3,462,163

Table 4-16 Above ground tree carbon stock in the baseline for REDD

Changes in terrestrial below ground tree carbon pools in the baseline

The carbon stock changes in below ground biomass are calculated according to the methods described in 4.1.3.2 and summarized in the table below.

Below ground tree carbon stock in the baseline ($C_{BB_tree_bsl,i}$)							
Year	Below ground tree biomass in baseline ($C_{BB_tree_bsl,i}$)				Baseline carbon stock change in below ground biomass		
	Primary Forest	Forest	Heath Forest	Scrub	BGB (t)	CO2-C (t)	CO2-E (t) ($\Delta C_{BB_tree_bsl,i}$)
Pre project	0	383,545	167,129	31,881			
1	0	378,737	167,129	29,447	7,242	3,404	12,482
2	0	328,491	151,615	29,160	66,048	31,042	113,832
3	0	254,515	97,504	22,243	135,002	63,451	232,675
4	0	164,851	71,351	11,032	127,029	59,704	218,934
5	0	97,147	51,158	7,478	91,451	42,982	157,615
6	0	56,787	26,187	3,695	69,114	32,484	119,117
7	0	56,787	26,187	3,695	0	0	0
8	0	56,787	26,187	3,695	0	0	0
9	0	0	0	0	86,668	40,734	149,372
10	0	0	0	0	0	0	0
Total					582,555	273,801	1,004,027

Table 4-17 Below ground tree carbon stock in the baseline for REDD

The GHG emissions from depletion of BGB are shown in the table below.

Below ground tree carbon stock depletion (CBB_tree_bsl,i)													
Year	Annual below ground biomass by depletion year										Baseline carbon stock change in below ground biomass		
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	AGB (t)	CO ₂ -C (t)	CO ₂ -E (t) ($\Delta C_{BB_tree_bsl,i}$)
Pre project	724										724	340	1,248
1	6,605	724									7,329	3,445	12,631
2	13,500	6,605	724								20,829	9,790	35,899
3	12,703	13,500	6,605	724							33,532	15,760	57,792
4	9,145	12,703	13,500	6,605	724						42,677	20,058	73,554
5	6,911	9,145	12,703	13,500	6,605	724					49,589	23,307	85,466
6	0	6,911	9,145	12,703	13,500	6,605	724				49,589	23,307	85,466
7	0	0	6,911	9,145	12,703	13,500	6,605	724			49,589	23,307	85,466
8	8,667	0	0	6,911	9,145	12,703	13,500	6,605	724		58,255	27,380	100,403
9	0	8,667	0	0	6,911	9,145	12,703	13,500	6,605	724	58,255	27,380	100,403
10		0	8,667	0	0	6,911	9,145	12,703	13,500	6,605	57,531	27,040	99,155
11			0	8,667	0	0	6,911	9,145	12,703	13,500	50,927	23,935	87,771
12				0	8,667	0	0	6,911	9,145	12,703	37,426	17,590	64,504
13					0	8,667	0	0	6,911	9,145	24,723	11,620	42,610
14						0	8,667	0	0	6,911	15,578	7,322	26,849
15							0	8,667	0	0	8,667	4,073	14,937
16								0	8,667	0	8,667	4,073	14,937
17									0	8,667	8,667	4,073	14,937
18										0	0	0	0
Total	58,255	58,255	58,255	58,255	58,255	58,255	58,255	58,255	58,255	58,255	582,555	273,801	1,004,027

Table 4-18 Below ground tree carbon stock depletion for REDD

Changes in total terrestrial tree carbon pools in the baseline

Total carbon emissions from AGB and BGB ($C_{AB_tree_bsl,i} + C_{BB_tree_bsl,i}$)			
Year	Above ground tree biomass depletion in baseline ($C_{AB_tree_bsl,i}$)	Below ground tree biomass depletion in baseline ($C_{BB_tree_bsl,i}$)	Total biomass depletion in baseline
1	43,041	1,248	44,289
2	392,525	12,631	405,157
3	802,327	35,899	838,226
4	754,944	57,792	812,737
5	543,500	73,554	617,054
6	410,750	85,466	496,215
7	0	85,466	85,466
8	0	85,466	85,466
9	515,076	100,403	615,479
10	0	100,403	100,403
11	0	99,155	99,155
12	0	87,771	87,771
13	0	64,504	64,504
14	0	42,610	42,610
15	0	26,849	26,849
16	0	14,937	14,937
17	0	14,937	14,937
18	0	14,937	14,937
19	0	0	0
Total	3,462,163	1,004,027	4,466,190

Table 4-19 Total carbon emissions from AGB and BGB for REDD

Greenhouse Gas Emissions from deforestation in the baseline

The Project has followed the requirements of VM0007 v1.6 § 5.4.2 and included N₂O as a carbon pool because of the potential for Nitrogen fertilizer application in the Baseline Scenario. However, because no nitrogen fertilizer application occurs in the Project Scenario, it has been excluded from the GHG emission reduction accounting as suggested in table 7, § 5.4.2 of VM0007 v1.6.

4.1.6 Baseline Emissions – CIW

4.1.6.1 Baseline emissions from peat soils

Areas of drained land and surface areas of drains in the baseline

The CIW activity encompasses landscapes that are undrained, and which will avoid drainage under the Project. Under the baseline, canals will be built, and the area drained resulting in peat soil GHG emissions from peatland degradation and GHG emissions from drains. The area has no forest cover and is therefore ineligible for REDD.

The area of avoided wetland drainage in the CIW activity starts at 0 hectares and increases to 3,869 hectares. After the 10th year, the drained area remains constant.

Year	Drained area estimates (ha) ($A_{\text{peatsoil-BSL},i,t}$)
1	2.5
2	30.1
3	51.1
4	51.1
5	51.1
6	444.7
7	647.8
8	968.5
9	1,020.6
10	1,030.8

Table 4-20 Areas of drained land for CIW

The surface area of the canals in CIW activity is as follows:

Year	Surface area of drainage canals (ha) ($A_{\text{ditch-BSL},i,t}$)
1	0.1
2	0.6
3	1.1
4	1.1
5	1.1
6	9.2
7	13.3
8	20.0
9	21.0
10	21.2

Table 4-21 Canal surface area statistics for CIW

Baseline emissions from peat soil

Baseline emissions from peat soil Baseline GHG emissions from peat soils (GH _{proxy-BSL,i,t})			
Year	Total GHG (t CO ₂ -E) (GHG _{proxy-BSL,i,t})	CO ₂ -C (t CO ₂ -E) (GHG _{proxy-CO2,i,t})	CH ₄ (t CO ₂ -E) (GHG _{proxy-CH4,i,t})
1	187	187	0
2	2,210	2,207	2
3	3,755	3,751	4
4	3,755	3,751	4
5	3,755	3,751	4
6	32,645	32,611	34
7	47,557	47,508	49
8	71,105	71,031	73
9	74,925	74,848	77
10	75,677	75,599	78
11 - 60	75,677	75,599	78

Table 4-22 Baseline GHG emissions from peat soils for CIW

Baseline GHG emissions from ditches and other open water bodies in peatlands

Baseline GHG emissions from ditches and other open water bodies in peatlands (GH _{peatditch-BSL,i,t})			
Year	Total GHG (t CO ₂ -E) (GHG _{peatditch-BSL,i,t})	DOC (t CO ₂ -E) (GHG _{peatditch-CO2,i,t})	CH ₄ (t CO ₂ -E) (GHG _{peatditch-CH4,i,t})
1	3	0	3
2	41	2	39
3	70	3	67
4	70	3	67
5	70	3	67
6	607	28	579
7	884	40	844
8	1,322	60	1,262
9	1,393	63	1,330
10	1,407	64	1,343
11-60	1,407	64	1,343

Table 4-23 GHG emissions from ditches and other open water bodies in peatlands for CIW

Baseline Emissions from Peat Burning

Emissions from peat burning are excluded from the baseline assessment as there is no significant history or threat of peat or biomass burning in the baseline period. VM0007 Ver 1.6 at table 9 in section 5.4.4 also indicates that “it is conservative to exclude”.

4.1.7 Baseline Emissions - REDD+CIW

4.1.7.1 Baseline emissions from deforestation

Area of land deforested in baseline

The REDD+CIW activity encompasses landscapes on peatland soils and will have planned deforestation under this scenario. The area of land planned for deforestation and conversion to plantations under REDD+CIW is 10,148 ha.

Land Cover Strata	Areas converted to plantations by concession, land cover and year on REDD+CIW areas										
	(A _{planned,i})										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Forest	1,015.2	2,320.3	193.7	0.0	0.0	770.0	1,559.2	1,878.7	204.4	422.9	8,364.5
Heath	0.0	459.1	4.4	0.0	0.0	350.3	20.7	0.0	2.4	0.0	836.9
Scrub	24.1	114.6	48.0	0.0	0.0	100.6	228.2	318.3	59.1	53.9	946.9
Total	1,039.3	2,894.0	246.2	0.0	0.0	1,221.0	1,808.1	2,197.0	265.9	476.8	10,148.3

Table 4-24 Areas converted to plantations by land cover and year in the baseline for REDD+CIW

Changes in terrestrial above ground tree carbon pools in the baseline

The carbon stock changes in above ground biomass are calculated according to the methods described in 4.1.3.2 and summarized in the table below.

Above ground tree carbon stock in the baseline (C _{AB_tree_bsl,i}) on REDD+CIW areas							
Year	Above ground tree biomass in baseline (C _{AB_tree_bsl,i})				Baseline carbon stock change in above ground biomass		
	Primary Forest	Forest	Heath Forest	Scrub	AGB (t)	CO2-C (t)	CO2-E (t) (ΔC _{AB_tree_bsl,i})
Pre project	0	1,225,986	88,052	48,818			
1	0	1,077,183	88,052	47,575	150,045	70,521	258,602
2	0	737,094	39,754	41,668	394,295	185,319	679,563
3	0	708,700	39,287	39,191	31,338	14,729	54,011
4	0	708,700	39,287	39,191	0	0	0
5	0	708,700	39,287	39,191	0	0	0
6	0	595,836	2,430	34,002	154,910	72,808	266,985
7	0	367,307	250	22,239	242,472	113,962	417,898
8	0	91,943	250	5,829	291,774	137,134	502,869
9	0	61,982	0	2,781	33,260	15,632	57,323
10	0	0	0	0	64,762	30,438	111,617
Total					1,362,856	640,542	2,348,869

Table 4-25 Above ground tree carbon stock in the baseline for REDD+CIW

Changes in terrestrial below ground tree carbon pools in the baseline

The carbon stock changes in below ground biomass are calculated according to the methods described in 4.1.3.2 and summarized in the table below.

Below ground tree carbon stock in the baseline ($C_{BB_tree_bsl,i}$)							
Year	Below ground tree biomass in baseline ($C_{BB_tree_bsl,i}$)				Baseline carbon stock change in below ground biomass		
	Primary Forest	Forest	Heath Forest	Scrub	BGB (t)	CO2-C (t)	CO2-E (t) ($\Delta C_{BB_tree_bsl,i}$)
Pre project	0	269,717	19,371	10,740			
1	0	236,980	19,371	10,467	33,010	15,515	56,892
2	0	162,161	8,746	9,167	86,745	40,770	149,504
3	0	155,914	8,643	8,622	6,894	3,240	11,882
4	0	155,914	8,643	8,622	0	0	0
5	0	155,914	8,643	8,622	0	0	0
6	0	131,084	534	7,481	34,080	16,018	58,737
7	0	80,808	55	4,893	53,344	25,072	91,938
8	0	20,227	55	1,282	64,190	30,169	110,631
9	0	13,636	0	612	7,317	3,439	12,611
10	0	0	0	0	14,248	6,696	24,556
Total					299,828	140,919	516,751

Table 4-26 Below ground tree carbon stock in the baseline for REDD+CIW

The GHG emissions from depletion of BGB are shown in the table below.

Below ground tree carbon stock depletion (C _{BB_tree_bsl,i})													
Year	Annual below ground biomass by depletion year										Baseline carbon stock change in below ground biomass		
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	AGB (t)	CO ₂ -C (t)	CO2-E (t) (ΔC _{BB_tree_bsl,i})
Pre project	3,301										3,301	1,551	5,689
1	8,674	3,301									11,975	5,628	20,640
2	689	8,674	3,301								12,665	5,953	21,828
3	0	689	8,674	3,301							12,665	5,953	21,828
4	0	0	689	8,674	3,301						12,665	5,953	21,828
5	3,408	0	0	689	8,674	3,301					16,073	7,554	27,702
6	5,334	3,408	0	0	689	8,674	3,301				21,407	10,061	36,895
7	6,419	5,334	3,408	0	0	689	8,674	3,301			27,826	13,078	47,958
8	732	6,419	5,334	3,408	0	0	689	8,674	3,301		28,558	13,422	49,220
9	1,425	732	6,419	5,334	3,408	0	0	689	8,674	3,301	29,983	14,092	51,675
10		1,425	732	6,419	5,334	3,408	0	0	689	8,674	26,682	12,540	45,986
11			1,425	732	6,419	5,334	3,408	0	0	689	18,007	8,463	31,035
12				1,425	732	6,419	5,334	3,408	0	0	17,318	8,139	29,847
13					1,425	732	6,419	5,334	3,408	0	17,318	8,139	29,847
14						1,425	732	6,419	5,334	3,408	17,318	8,139	29,847
15							1,425	732	6,419	5,334	13,910	6,538	23,974
16								1,425	732	6,419	8,576	4,030	14,780
17									1,425	732	2,156	1,014	3,717
18										1,425	1,425	670	2,456
Total	29,983	29,983	29,983	29,983	29,983	29,983	29,983	29,983	29,983	28,558	298,404	140,250	514,296

Table 4-27 Below ground tree carbon stock depletion for REDD+CIW

Changes in total terrestrial tree carbon pools in the baseline

Total carbon emissions from AGB and BGB ($C_{AB_tree_bsl,i} + C_{BB_tree_bsl,i}$)			
Year	Above ground tree biomass depletion in baseline ($C_{AB_tree_bsl,i}$)	Below ground tree biomass depletion in baseline ($C_{BB_tree_bsl,i}$)	Total biomass depletion in baseline
1	258,602	5,689	264,291
2	679,563	20,640	700,203
3	54,011	21,828	75,838
4	0	21,828	21,828
5	0	21,828	21,828
6	266,985	27,702	294,687
7	417,898	36,895	454,793
8	502,869	47,958	550,828
9	57,323	49,220	106,543
10	111,617	51,675	163,293
11	0	45,986	45,986
12	0	31,035	31,035
13	0	29,847	29,847
14	0	29,847	29,847
15	0	29,847	29,847
16	0	23,974	23,974
17	0	14,780	14,780
18	0	3,717	3,717
19	0	2,456	2,456
Total	2,348,869	516,751	2,865,621

Table 4-28 Total emissions reductions from AGB and BGB for REDD+CIW

Greenhouse Gas Emissions from deforestation in the baseline

The Project has followed the requirements of VM0007 v1.6 § 5.4.2 and included N₂O as a carbon pool because of the potential for Nitrogen fertilizer application in the Baseline Scenario. However, because no nitrogen fertilizer application occurs in the Project Scenario, it has been excluded from the GHG emission reduction accounting as suggested in table 7, § 5.4.2 of VM0007 v1.6.

4.1.7.2 Baseline emissions from peat soils

Areas of drained land and surface areas of drains in the baseline

The REDD+CIW activity encompasses landscapes that are undrained, and which will avoid drainage under the Project. Under the baseline, canals will be built and the area drained resulting in peat soil GHG emissions from peatland degradation and GHG emissions from drains. The area has forest cover and is therefore eligible for REDD.

The area of avoided wetland drainage in the REDD+CIW activity starts at 0 hectares and increases to 10,148 hectares. After the 10th year, the drained area remains constant.

Year	Drained area estimates (ha) ($A_{\text{peatsoil-BSL},i,t}$)
1	1,039.3
2	3,933.3
3	4,179.5
4	4,179.5
5	4,179.5
6	5,400.5
7	7,208.6
8	9,405.6
9	9,671.5
10	10,148.3

Table 4-29 Areas of drained land for REDD+CIW

The surface area of the canals in REDD+CIW activity is as follows:

Year	Surface area of drainage canals (ha) ($A_{\text{ditch-BSL},i,t}$)
1	21.4
2	81.0
3	86.1
4	86.1
5	86.1
6	111.3
7	148.5
8	193.8
9	199.2
10	209.1

Table 4-30 Canal surface area statistics for REDD+CIW

Baseline emissions from peat soil

Baseline emissions from peat soil Baseline GHG emissions from peat soils (GH _{proxy-BSL,i,t})			
Year	Total GHG (t CO ₂ -E) (GHG _{proxy-BSL,i,t})	CO ₂ -C (t CO ₂ -E) (GHG _{proxy-CO2,i,t})	CH ₄ (t CO ₂ -E) (GHG _{proxy-CH4,i,t})
1	76,303	76,225	79
2	288,766	288,468	297
3	306,841	306,525	316
4	306,841	306,525	316
5	306,841	306,525	316
6	396,481	396,073	408
7	529,221	528,676	545
8	690,516	689,805	711
9	710,040	709,309	731
10	745,046	744,278	767
11 – 60	745,046	744,278	767

Table 4-31 Baseline GHG emissions from peat soils for REDD+CIW

Baseline GHG emissions from ditches and other open water bodies in peatlands

Baseline GHG emissions from ditches and other open water bodies in peatlands (GH _{peatditch-BSL,i,t})			
Year	Total GHG (t CO ₂ -E) (GHG _{peatditch-BSL,i,t})	DOC (t CO ₂ -E) (GHG _{peatditch-CO2,i,t})	CH ₄ (t CO ₂ -E) (GHG _{peatditch-CH4,i,t})
1	1,419	64	1,354
2	5,369	244	5,125
3	5,705	259	5,446
4	5,705	259	5,446
5	5,705	259	5,446
6	7,371	335	7,037
7	9,839	447	9,393
8	12,838	583	12,255
9	13,201	599	12,602
10	13,852	629	13,223
11-60	13,852	629	13,223

Table 4-32 GHG emissions from ditches and other open water bodies in peatlands for REDD+CIW

Baseline Emissions from Peat Burning

Emissions from peat burning are excluded from the baseline assessment as there is no significant history or threat of peat or biomass burning in the baseline period. VM0007 1.6 at table 9 in section 5.4.4 also indicates that “it is conservative to exclude”.

4.1.8 Baseline Emissions – RWE

Baseline emissions from peat soils

Areas of drained land and surface areas of drains in the baseline

The RWE activity encompasses landscapes that are drained at the commencement of the Project and will continue undrained under the Baseline Scenario. Under the Project Scenario, the drainage canals and ditches will be blocked, and the landscape rewetted. The area has no forest cover and is therefore ineligible for REDD.

The area of RWE activity starts at 1,214 hectares and remains constant.

Year	Drained area estimates (ha) ($A_{\text{peatsoil-BSL},i,t}$)
1	1,214.0
2	1,214.0
3	1,214.0
4	1,214.0
5	1,214.0
6	1,214.0
7	1,214.0
8	1,214.0
9	1,214.0
10	1,214.0

Table 4-33 Areas of drained land for RWE

The surface area of the canals in RWE activity is as follows:

Year	Surface area of drainage canals (ha) ($A_{\text{ditch-BSL},i,t}$)
1	25.0
2	25.0
3	25.0
4	25.0
5	25.0
6	25.0
7	25.0
8	25.0
9	25.0
10	25.0

Table 4-34 Canal surface area statistics for RWE

Baseline emissions from peat soil

Baseline emissions from peat soil Baseline GHG emissions from peat soils (GH _{proxy-BSL,i,t})			
Year	Total GHG (tCO ₂ -E) (GHG _{proxy-BSL,i,t})	CO ₂ -C (tCO ₂ -E) (GHG _{proxy-CO2,i,t})	CH ₄ (tCO ₂ -E) (GHG _{proxy-CH4,i,t})
1	89,125	89,033	92
2	89,125	89,033	92
3	89,125	89,033	92
4	89,125	89,033	92
5	89,125	89,033	92
6	89,125	89,033	92
7	89,125	89,033	92
8	89,125	89,033	92
9	89,125	89,033	92
10	89,125	89,033	92
11 - 60	89,125	89,033	92

Table 4-35 Baseline GHG emissions from peat soils for RWE

Baseline GHG emissions from ditches and other open water bodies in peatlands

Baseline GHG emissions from ditches and other open water bodies in peatlands (GH _{peatditch-BSL,i,t})			
Year	Total GHG (t CO ₂ -E) (GHG _{peatditch-BSL,i,t})	DOC (t CO ₂ -E) (GHG _{peatditch-CO2,i,t})	CH ₄ (t CO ₂ -E) (GHG _{peatditch-CH4,i,t})
1	1,657	75	1,582
2	1,657	75	1,582
3	1,657	75	1,582
4	1,657	75	1,582
5	1,657	75	1,582
6	1,657	75	1,582
7	1,657	75	1,582
8	1,657	75	1,582
9	1,657	75	1,582
10	1,657	75	1,582
11-60	1,657	75	1,582

Table 4-36 GHG emissions from ditches and other open water bodies in peatlands for RWE

Baseline Emissions from Peat Burning

Emissions from peat burning are excluded from the baseline assessment as there is no significant history or threat of peat or biomass burning in the baseline period. VM0007 Ver 1.6 at table 9 in section 5.4.4 also indicates that “it is conservative to exclude”.

4.1.9 Baseline Emissions - REDD+RWE

Baseline emissions from deforestation

Area of land deforested in baseline

The REDD+RWE activity encompasses landscapes on peatland soils that have been previously drained and will have planned deforestation under this scenario. The area of land planned for deforestation and conversion to plantations under REDD+RWE is 3,733 ha.

Land Cover Strata	Areas converted to plantations by concession, land cover and year on REDD+RWE areas										
	(A _{planned,i})										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Forest	2,252.2	378.1	0.0	0.0	0.0	0.0	810.7	0.0	0.0	0.0	3,441.0
Heath	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scrub	197.4	0.5	0.0	0.0	0.0	0.0	93.8	0.0	0.0	0.0	291.7
Total	2,449.5	378.7	0.0	0.0	0.0	0.0	904.5	0.0	0.0	0.0	3,732.7

Table 4-37 Areas converted to plantations by land cover and year in the baseline for REDD+RWE

Changes in terrestrial above ground tree carbon pools in the baseline

The carbon stock changes in above ground biomass are calculated according to the methods described in 4.1.3.2 and summarized in the table below.

Above ground tree carbon stock in the baseline (C _{AB_tree_bsl,i}) on REDD+RWE areas							
Year	Above ground tree biomass in baseline (C _{AB_tree_bsl,i})				Baseline carbon stock change in above ground biomass		
	Primary Forest	Forest	Heath Forest	Scrub	AGB (t)	CO ₂ -C (t)	CO ₂ -E (t) (ΔC _{AB_tree_bsl,i})
Pre project	0	504,349	0	15,039			
1	0	174,248	0	4,864	340,276	159,930	586,462
2	0	118,825	0	4,837	55,450	26,062	95,568
3	0	118,825	0	4,837	0	0	0
4	0	118,825	0	4,837	0	0	0
5	0	118,825	0	4,837	0	0	0
6	0	118,825	0	4,837	0	0	0
7	0	0	0	0	123,662	58,121	213,130
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Total					519,388	244,112	895,160

Table 4-38 Above ground tree carbon stock in the baseline for REDD+RWE

Changes in terrestrial below ground tree carbon pools in the baseline

The carbon stock changes in below ground biomass are calculated according to the methods described in 4.1.3.2 and summarized in the table below.

Below ground tree carbon stock in the baseline ($C_{BB_tree_bsl,i}$)							
Year	Below ground tree biomass in baseline ($C_{BB_tree_bsl,i}$)				Baseline carbon stock change in below ground biomass		
	Primary Forest	Forest	Heath Forest	Scrub	BGB (t)	CO2-C (t)	CO2-E (t) ($\Delta C_{BB_tree_bsl,i}$)
Pre project	0	110,957	0	3,309			
1	0	38,335	0	1,070	74,861	35,185	129,022
2	0	26,141	0	1,064	12,199	5,734	21,025
3	0	26,141	0	1,064	0	0	0
4	0	26,141	0	1,064	0	0	0
5	0	26,141	0	1,064	0	0	0
6	0	26,141	0	1,064	0	0	0
7	0	0	0	0	27,206	12,787	46,889
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
Total					114,265	53,705	196,935

Table 4-39 Below ground tree carbon stock in the baseline for REDD+RWE

The GHG emissions from depletion of BGB are shown in the table below.

Below ground tree carbon stock depletion (C _{BB_tree_bsl,i})													
Year	Annual below ground biomass by depletion year										Baseline carbon stock change in below ground biomass		
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	AGB (t)	CO ₂ -C (t)	CO ₂ -E (t) (ΔC _{BB_tree_bsl,i})
Pre project	7,486										7,486	3,518	12,902
1	1,220	7,486									8,706	4,092	15,005
2	0	1,220	7,486								8,706	4,092	15,005
3	0	0	1,220	7,486							8,706	4,092	15,005
4	0	0	0	1,220	7,486						8,706	4,092	15,005
5	0	0	0	0	1,220	7,486					8,706	4,092	15,005
6	2,721	0	0	0	0	1,220	7,486				11,427	5,370	19,694
7	0	2,721	0	0	0	0	1,220	7,486			11,427	5,370	19,694
8	0	0	2,721	0	0	0	0	1,220	7,486		11,427	5,370	19,694
9	0	0	0	2,721	0	0	0	0	1,220	7,486	11,427	5,370	19,694
10		0	0	0	2,721	0	0	0	0	1,220	3,940	1,852	6,791
11			0	0	0	2,721	0	0	0	0	2,721	1,279	4,689
12				0	0	0	2,721	0	0	0	2,721	1,279	4,689
13					0	0	0	2,721	0	0	2,721	1,279	4,689
14						0	0	0	2,721	0	2,721	1,279	4,689
15							0	0	0	2,721	2,721	1,279	4,689
16								0	0	0	0	0	0
17									0	0	0	0	0
18										0	0	0	0
Total	11,427	11,427	11,427	11,427	11,427	11,427	11,427	11,427	11,427	11,427	114,265	53,705	196,935

Table 4-40 Below ground tree carbon stock depletion for REDD+RWE

Changes in total terrestrial tree carbon pools in the baseline

Total carbon emissions from AGB and BGB ($C_{AB_tree_bsl,i} + C_{BB_tree_bsl,i}$)			
Year	Above ground tree biomass depletion in baseline ($C_{AB_tree_bsl,i}$)	Below ground tree biomass depletion in baseline ($C_{BB_tree_bsl,i}$)	Total biomass depletion in baseline
1	586,462	12,902	599,364
2	95,568	15,005	110,573
3	0	15,005	15,005
4	0	15,005	15,005
5	0	15,005	15,005
6	0	15,005	15,005
7	213,130	19,694	232,823
8	0	19,694	19,694
9	0	19,694	19,694
10	0	19,694	19,694
11	0	6,791	6,791
12	0	4,689	4,689
13	0	4,689	4,689
14	0	4,689	4,689
15	0	4,689	4,689
16	0	4,689	4,689
17	0	0	0
18	0	0	0
19	0	0	0
Total	895,160	196,935	1,092,095

Table 4-41 Total emissions reductions from AGB and BGB for REDD+RWE

Greenhouse Gas Emissions from deforestation in the baseline

The Project has followed the requirements of VM0007 v1.6 § 5.4.2 and included N₂O as a carbon pool because of the potential for Nitrogen fertilizer application in the Baseline Scenario. However, because no nitrogen fertilizer application occurs in the Project Scenario, it has been excluded from the GHG emission reduction accounting as suggested in Table 7, § 5.4.2 of VM0007 v1.6.

Baseline emissions from peat soils

Areas of drained land and surface areas of drains in the baseline

The RWE activity encompasses landscapes that are drained at the commencement of the Project and will continue to be drained under the Baseline Scenario. Under the Project Scenario, the drainage canals and ditches will be blocked and the landscape rewetted. The area has forest cover and is therefore eligible for REDD.

Under the baseline, new canals will be built specifically to support plantation management, and these will effectively replace the original drains.

The area of REDD+RWE activity starts at 3,733 hectares and remains constant.

Year	Drained area estimates (ha) ($A_{\text{peatsoil-BSL},i,t}$)
1	3,732.7
2	3,732.7
3	3,732.7
4	3,732.7
5	3,732.7
6	3,732.7
7	3,732.7
8	3,732.7
9	3,732.7
10	3,732.7

Table 4-42 Areas of drained land for REDD+RWE

The surface area of the canals in REDD+RWE activity is as follows:

Year	Surface area of drainage canals (ha) ($A_{\text{ditch-BSL},i,t}$)
1	76.9
2	76.9
3	76.9
4	76.9
5	76.9
6	76.9
7	76.9
8	76.9
9	76.9
10	76.9

Table 4-43 Canal surface area statistics for REDD+RWE

Baseline emissions from peat soil

Baseline emissions from peat soil Baseline GHG emissions from peat soils (GH _{proxy-BSL,i,t})			
Year	Total GHG (t CO ₂ -E) (GHG _{proxy-BSL,i,t})	CO ₂ -C (t CO ₂ -E) (GHG _{proxy-CO2,i,t})	CH ₄ (t CO ₂ -E) (GHG _{proxy-CH4,i,t})
1	274,039	273,757	282
2	274,039	273,757	282
3	274,039	273,757	282
4	274,039	273,757	282
5	274,039	273,757	282
6	274,039	273,757	282
7	274,039	273,757	282
8	274,039	273,757	282
9	274,039	273,757	282
10	274,039	273,757	282
11 – 60	274,039	273,757	282

Table 4-44 Baseline GHG emissions from peat soils for REDD+RWE

Baseline GHG emissions from ditches and other open water bodies in peatlands

Baseline GHG emissions from ditches and other open water bodies in peatlands (GH _{peatditch-BSL,i,t})			
Year	Total GHG (t CO ₂ -E) (GHG _{peatditch-BSL,i,t})	DOC (t CO ₂ -E) (GHG _{peatditch-CO2,i,t})	CH ₄ (t CO ₂ -E) (GHG _{peatditch-CH4,i,t})
1	5,095	231	4,864
2	5,095	231	4,864
3	5,095	231	4,864
4	5,095	231	4,864
5	5,095	231	4,864
6	5,095	231	4,864
7	5,095	231	4,864
8	5,095	231	4,864
9	5,095	231	4,864
10	5,095	231	4,864
11-60	5,095	231	4,864

Table 4-45 GHG emissions from ditches and other open water bodies in peatlands for REDD+RWE

Baseline Emissions from Peat Burning

Emissions from peat burning are excluded from the baseline assessment as there is no significant history or threat of peat or biomass burning in the baseline period. VM0007 ver 1.6 at table 9 in section 5.4.4 also indicates that “it is conservative to exclude”.

4.1.10 Significant Sources of Baseline Emissions

Most exclusions were implemented based on conservatism which is permitted under VM0007. The Project has included all mandatory carbon pools, and all other required sources of GHG emissions have either been included or conservatively excluded.

Two sources of GHG emissions have been excluded for reasons of insignificance. These are the burning of woody biomass and peat combustion. These emission sources are excluded because of the complete absence of fire, or the drivers of fire which are occupation and deforestation, in the Project Area over the period of the baseline measurement period from 12 September 2012 to 11 September 2022. Because of the absence of fires, emissions from burning of woody biomass and peat combustion in the Project are assumed to be zero and are conservatively omitted. The relative contribution (RE%) from woody biomass and peat combustion based on measured fires events is estimated as zero and less than the 5% threshold of their respective pools as specified in T-SIG. Note that fire events will be monitored and included in the Project if they occur in the future.

Mineral soil carbon pool was excluded. Carbon pools in this pool may increase due to implementation of the Project Activity, however, the increase is expected to be less than 5% and it is disregarded for reasons of significance and conservatively excluded.

All sources of GHG emissions have been included or conservatively excluded and mandatory pools included. The net emissions from the baseline scenario between 12 September 2022 and 11 September 2082 is 65,678,428 t.CO₂-e. This is equivalent to average annual baseline emissions of 1,094,640 tCO₂-e / yr⁻¹.

4.2 Project Emissions

4.2.1 General Procedures and Assumptions

In the future, emissions from the Project Area (including any changes in those emissions) will be in part determined from specific site data. When no specific site data is available, necessary calculations can rely on IPCC default emissions factors, proxy analysis, and any national GHG allometrics based on published scientific research data.

Project scenario emissions accounted for were based on:

1. Water bodies,
2. Above ground stock changes in biomass due to REDD, and
3. Microbial peat decompositions.

Planned Project Activities in relation to climate were:

1. Undrained peatland conservation,
2. Deforestation and forest degradation avoidance, and
3. Fire control and prevention for nil burning.

Revegetation, fire control, and prevention in the Project are being operationally implemented. However, it is noted that these activities are not included in emissions reduction estimates. This is also conservative.

It is assumed that uncontrolled burning will not occur in the Project Area during the Project Period since rewetting and fire prevention are conducted - therefore no GHG emissions are expected. Notwithstanding this, any emissions resulting from fires that do occur will be accounted for (using VMD0013 (E-BPB) ver. 1.2) under the established fire monitoring plan within the broader fire management activities. The Project assumes that zero non-human induced rewetting will form part of the Project Scenario.

N₂O emissions in the Project are not accounted for because there will be no fertilizer applications. Furthermore, rewetting of organic soils decreases N₂O emissions rapidly and falls to virtually zero by the raising of the water table depth, in the event this depth is below the surface by <20cm. CH₄ emissions may be higher before stabilizing to levels seen in undrained or never-drained areas during the transient period immediately after rewetting activities. Emissions of CH₄ from rewetting activities in the relevant strata sites commencing from the Project Start Date will be monitored directly. Once sufficient data has been collected from those sites, emissions of CH₄ will be assessed again and any variability accounted for in quantifications of GHG emissions based on specific site data.

Project area

Emission Characteristics in Project Scenario

The Project Area under the Project Scenario has been stratified according to three classification categories:

- **Land cover** - including Forest, Heath Forest, Scrub, and Non-Forest.
- **Soil and soil depth** – Peat by 50cm peat depth classes; and
- **Water body** - Water body and land.

The Project Scenario Map development process involved the following delineations as at Project Start Date:

- Existing water bodies such as rivers and lakes, and
- Forest and non-forest areas, with further stratification into land cover types.

Emission Characteristic Stratification for WRC Under Project Scenario

Emission Characteristic Stratification for REDD Under Project Scenario

During the Project Period, there is no deforestation or forest degradation anticipated under the Project Scenario in any area where there is planned deforestation.

Uncontrolled burning is assumed to be zero after Project initiation, given the fire prevention programs. There is no significant history of unplanned deforestation and forest degradation from

illegal land clearing and there is assumed to be no unplanned deforestation and forest degradation.

Carbon enhancement is likely to take place based on the Project Scenario because of forest regrowth expected in all forested areas following Project commencement. Measurements of biomass accumulation will be taken as part of periodic monitoring activities.

Emission Characteristic Stratification for ARR Under Project Scenario

The main ARR activities under the Project Scenario will be enrichment and reforestation planting aimed at restoring the natural forest to a primary forest condition. All emissions reductions from these activities are excluded from the Project emissions calculation and ARR is not a GHG activity under the Project.

Emission Characteristic Stratification for WRC Under Project Scenario

The locations of WRC and REDD activities under the Project Scenario are mapped by considering:

1. Initial land use, land cover,
2. Historical timing of land-use changes and drainage status, and
3. Peatland coverage:

Description of Strata	Area		Activity class
	(ha)	%	
Forested land with mineral soils and avoiding deforestation from plantation development: Mineral soils with forest cover present at Project Start Date, planned for forest clearing and conversion to plantation.	16,634	52%	REDD
Non-forested peatland, undrained and avoiding peatland degradation from plantation development: Peatland without forest cover at Project Start Date due to prior logging and land clearing.	1,031	3%	CIW
Forested peatland, undrained and avoiding deforestation and avoiding peatland degradation, from plantation development: Peatland with forest cover present at Project Start Date, no drainage impact from human-made legacy canals, planned for forest clearing, drainage, and conversion to plantation.	10,148	32%	CIW+ REDD
Non-forested peatland and drained but not allocated for plantation development: Peatland without forest cover at Project Start Date due to prior logging and land clearing.	187	1%	RWE
Forested peatland, undrained and avoiding deforestation and avoiding peatland degradation, from plantation development: Peatland with forest cover present at Project Start Date, drainage impact from human-made legacy canals, planned for forest clearing, drainage, and conversion to plantation.	3,733	12%	REDD+RWE
Total	31,733	100%	

Table 4-46 Activity class of each stratum

Under the Project, the Project Proponent plans to replant selected non-forest areas and restore degraded forest areas. The ARR activities are not included in the Project emissions estimates and are not described in detail here.

The strata that are distinguished in the Project Scenario based on this analysis are undrained peatland.

The quantum of GHG emissions resulting from microbial peat decomposition and loss of DOC via peatlands water bodies has been measured using an explicit temporal and spatial methodology.

4.2.2 Project Emissions Modelling Approach

Separate Project emissions calculations have been prepared for five separate Project Activities:

1. REDD - Restoration of natural forest with avoiding planned deforestation.
2. CIW – Avoiding wetland degradation with no avoiding planned deforestation.
3. REDD+CIW - Avoiding wetland degradation with avoiding planned deforestation.
4. RWE – Restoration of wetland Ecosystems.
5. REDD+RWE – Restoration of wetland Ecosystems with avoiding planned deforestation.

All the areas developed into plantations under the baseline are protected under the respective Project Activity. Existing legacy canals will be blocked in the first year of operations and the drained areas rewetted.

For each stratum in the Project Scenario has been subdivided into the smallest parcel units of land or water body and have relatively uniform spatial variables. Temporal variability for Project emissions is accounted for by organizing calculations into discrete timing 1-year units. The table below outlines each of the following:

- Variables that determine strata change sequences,
- Temporal variability of parameters for GHG emissions, and
- Temporal restrictions on GHG emissions.

This schematization provides the assurance that GHG emission parameters at the correct spatial location and the correct time have been appropriately used.

Variables	Description
(A) Spatial Variables	
(A1) Type of soil	Distinction between peat and non-peat. This is used to exclude all non-peat parcels from WRC GHG calculation.
(A2) Initial peat thickness available for microbial decomposition	Derived from DEM and Peat Thickness Map. This is used as the initial condition for subsequent calculations of the remaining available peat for microbial decompositions
(A3) Initial stratum within the peat area	The stratum of the corresponding parcel at Project Start Date before conversion into other (rewetted) stratum takes effect.
(B) Temporal Variables	
(B1) Remaining peat thickness available for microbial decompositions and burnings	Employed for determining whether Project Scenario PDT has been reached for the corresponding land parcel in the corresponding year.

Table 4-47 Variables adopted for the systematic organization of measurements for GHG emissions arising from microbial peat decomposition and dissolving organic carbon from peatlands under the Project Scenario

4.2.3 Emissions calculations for REDD

Total Project Emissions from REDD

For the project area of REDD project activities, the net GHG emissions in the Project case is equal to the sum of stock changes due to deforestation and forest degradation plus the total GHG emissions minus any eligible forest carbon stock enhancement from VCS Module VMD0015 - M-PEAT equation 1:

$$\Delta C_{WPS-REDD} = \sum_{t=1}^{t^*} \sum_{i=1}^M (\Delta C_{P,DefPA,i,t} + \Delta C_{P,Deg,i,t} + \Delta C_{P,DistPA,i,t} + GHG_{P-E,i,t} - \Delta C_{P,Enh,i,t}) \quad (1)$$

Where:

$\Delta C_{WPS-REDD}$	Net GHG emissions in the REDD project scenario up to year t^* ; t CO ₂ -e
$\Delta C_{P,DefPA,i,t}$	Net carbon stock change as a result of deforestation in the project area in the project case in stratum i in year t ; t CO ₂ -e
$\Delta C_{P,Deg,i,t}$	Net carbon stock change as a result of degradation in the project area in the project case in stratum i in year t ; t CO ₂ -e
$\Delta C_{P,DistPA,i,t}$	Net carbon stock change as a result of natural disturbance in the project area in the project case in stratum i in year t ; t CO ₂ -e
$GHG_{P-E,i,t}$	Greenhouse gas emissions as a result of deforestation and degradation activities within the project area in the project case in stratum i in year t ; t CO ₂ -e
$\Delta C_{P,Enh,i,t}$	Net carbon stock change as a result of forest growth and sequestration during the project in areas projected to be deforested in the baseline ² in stratum i in year t ; t CO ₂ -e
i	1, 2, 3, ... M strata
t	1, 2, 3, ... t^* years elapsed since the start of the project activity

Note under the Project Scenario, it is assumed that all deforestation and forest degradation will be avoided and that no net carbon stock changes will occur as a result natural disturbance. Therefore, the only contributor to net GHG emissions from REDD will be reductions in emissions from forest carbon stock enhancement. The net GHG emissions from REDD are calculated using this equation and reported separately for REDD, REDD-CIW and REDD-RWE.

Project Emissions from Deforestation and Forest Degradation

During the Project period:

1. There will be no deforestation anticipated under the project scenario and no associated emissions,
2. There will be no forest degradation anticipated under the Project Scenario and no associated emissions, and
3. There will be no emissions from uncontrolled biomass burning.

Because the Project assumes no fire and no uncontrolled burning, then the estimation of GHG emissions from biomass and peat burning as described in VCS Module VMD0013 – E-BPB do not apply for this Project.

Carbon Enhancement from Forest Growth

After the Project Start Date, forested areas that would otherwise have been converted to plantations or faced degradation are expected to benefit from regrowth and the associated biomass accumulation and CO₂ removal. Under VMD0015 M-REDD Version 2.2, changes to net ex-ante carbon stock resulting from enhancement of forest carbon stock is multiplied by the areas where carbon stock is accumulating and the difference in carbon stock (between baseline and project case) using from equation 25 of VMD0015 M-REDD.

$$\Delta C_{P,Enh,i,t} = \sum_{t=1}^t \sum_{i=1}^M ((C_{P,i,t} - C_{BSL,i}) * A_{Enh,PL,i,t}) \quad (25)$$

Where:

$\Delta C_{P,Enh,i,t}$	Net carbon stock changes as a result of forest carbon stock enhancement in stratum i in the project area in year t ; t CO ₂ -e
$C_{P,i,t}$	Carbon stock in all pools in the project case in stratum i in year t ; t CO ₂ -e
$C_{BSL,i}$	Carbon stock in all pools in the baseline in stratum i ; t CO ₂ -e ha ⁻¹
$A_{Enh,PL,i,t}$	Project area in stratum i in which carbon stocks are accumulating but that would have undergone planned deforestation in the baseline scenario in year t ; ha
i	1, 2, 3, ... M strata
t	1, 2, 3, ... t^* years elapsed since the start of the project activity

The process for calculating forest growth in the avoided deforested areas is as follows:

1. The forests are classified by forest type:
 - a. Forest,
 - b. Heath Forest, and
 - c. Scrub.

Each of these forest types has an average tree biomass estimate.

2. The forests are further classified into the year of baseline land clearing.
3. The above ground biomass growth rates of each forest type are based on the following IPCC allometrics:

- a. It is assumed that the remaining forest will accumulate biomass until an average ABG of 348 t/ha is attained. This is estimated as the average AGB for naturally regenerated tropical forests in Insular Asia⁹.
- b. For all forest types, 2.7 t ha⁻¹ of biomass until an average biomass of 348 t/ha is attained.

The eligible area is determined from the area due to be deforested each year in the baseline using equation 26 of VMD0015 M-REDD:

$$A_{Enh,PL,i,t} = D\%_{planned,i,t} * A_{planned,i,t} \quad (26)$$

Where:

$A_{Enh,PL,i,t}$	Project area in stratum i in which carbon stocks are accumulating but that would have undergone planned deforestation in the baseline scenario in year t ; ha
$D\%_{planned,i,t}$	Projected annual proportion of land that will be deforested in stratum i in year t ; %
$A_{planned,i}$	Total area of planned deforestation over the entire project lifetime for stratum i ; ha
i	1, 2, 3, ... M strata
t	1, 2, 3, ... t^* years elapsed since the projected start of the project activity

The planned areas of deforestation for REDD and REDD+CIW activities are:

Land Cover Strata	Areas converted to plantations by concession, land cover and year										
	$(A_{planned,i})$										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Forest	3,380.5	3,880.6	1,934.1	2,109.5	1,592.8	1,719.5	2,369.9	1,878.7	1,540.4	422.9	20,828.9
Heath Forest	0.0	967.5	1,777.9	857.2	661.8	1,168.8	20.7	0.0	860.6	0.0	6,314.6
Scrub	384.2	134.3	510.7	749.9	237.7	353.7	322.0	318.3	306.3	53.9	3,371.0
Total	3,764.8	4,982.4	4,222.7	3,716.6	2,492.4	3,242.0	2,712.6	2,197.0	2,707.3	476.8	30,514.5

Table 4-48 Eligible area for deforestation for REDD and REDD+CIW activities

The source for these allometrics is the IPCC Good Practice Guidance for LULUCF 2003, table 3A.1.5 and 3A.1.2.

Under this full restoration of above ground biomass to primary forest levels will be attained within 67.2, 82.5 and 102.4 years respectively for the forest, heath forest and scrub forest, respectively. Carbon stock in the baseline stratum is equal to the C stock of forest at the Project Start Date. Carbon stock enhancement will be monitored according to the VCS methodology VMD0015 module M-REDD and will be reported at each monitoring event.

⁹ Intergovernmental Panel on Climate Change. 2016. *2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Table 4.7 Above-Ground Biomass in Forests

Project Emissions from Greenhouse Gases

The calculation of Project GHG emissions using equation 30 of VMD0015 M-REDD:

$$GHG_{P,E,i,t} = E_{FC,i,t} + E_{BiomassBurn,i,t} + N_2O_{direct-N,i,t} \quad (30)$$

Where:

$GHG_{P,E,i,t}$	Greenhouse gas emissions as a result of deforestation activities within the project area in the project case in stratum i in year t ; t CO ₂ -e
$E_{FC,i,t}$	Emission from fossil fuel combustion in stratum i within the project area in year t ; t CO ₂ -e
$E_{BiomassBurn,i,t}$	Non-CO ₂ emissions due to biomass burning in stratum i in year t ; t CO ₂ -e
$N_2O_{direct-N,i,t}$	Direct N ₂ O emission as a result of nitrogen application on the alternative land use in stratum i within the project area in year t ; t CO ₂ -e
i	1, 2, 3, ... M strata
t	1, 2, 3, ... t^* years elapsed since the start of the REDD VCS project activity

No GHG emissions are included in the Project Scenario as:

- There is no expectation of deforestation or forest degradation.
- There is no expectation of planned or unplanned forest fires.
- Fossil fuel combustion is not included.
- The Project does not include any land use that uses fertilizers.

4.2.4 Emissions calculations for WRC

Total Project Emissions from Peatlands

The Project has followed §5.1 of M-Peat to determine the net CO₂-equivalent emissions resulting from microbial peat decompositions and water bodies for each land parcel within the Project Area (taking into consideration the temporal and spatial variability). They were estimated using project equation 30 which was obtained from equation 1 of VMD0046 M-PEAT, as shown below:

$$GHG_{WPS-PEAT} = \sum_{t=1}^{t^*} \sum_{i=1}^M (A_{peatsoil-WPS,i,t} \times GHG_{peatsoil-WPS,i,t} + A_{ditch-WPS,i,t} \times GHG_{peatditch-WPS,i,t} + A_{peatburn-WPS,i,t} \times GHG_{peatburn-WPS,i,t}) \quad (1)$$

Where:

$GHG_{WPS-PEAT}$	Net GHG emissions in the WRC project scenario on peatland up to year t^* (t CO ₂ e)
$GHG_{peatsoil-WPS,i,t}$	GHG emissions from microbial decomposition of the peat soil within the project boundary in the project scenario in stratum i in year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
$GHG_{peatditch-WPS,i,t}$	GHG emissions from water bodies within the project boundary in the project scenario in stratum i in year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
$GHG_{peatburn-WPS,i,t}$	GHG emissions from burning of peat within the project boundary in the project scenario in stratum i in year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
$A_{peatsoil-WPS,i,t}$	Area of peatland (not open water, not burnt) in stratum i in year t in the project scenario (ha)
$A_{ditch-WPS,i,t}$	Area of ditch and other open water in stratum i in year t in the project scenario (ha)
$A_{peatburn-WPS,i,t}$	Area of peat burnt in stratum i in year t in the project scenario (ha)
i	1, 2, 3 ... M_{WPS} strata in the project scenario (unitless)
t	1, 2, 3, ... t^* time elapsed since the project start (years)

Note under the Project Scenario, it is assumed that no fires will occur. The area of peat burnt and the GHG emissions emitted from peat soil fires will be assumed to equal zero. Therefore, the only contributor to net GHG emissions from CIW will be GHG emissions from:

- Microbial decomposition of peat soil
- Water bodies

The net GHG emissions from WRC under the Project Scenario for REDD-CIW and CIW will be zero. The net GHG emissions from WRC under the Project Scenario for REDD-RWE and RWE will be calculated accordingly until the rewetting is conducted in the first year – in practice this means there are no net emissions prior to RWE start date.

Project Emissions from Peat Soil Degradation

The Project assessed GHG emissions from soil pursuant to §5.2 of M-Peat using Equation 2 of VMD0046 M-PEAT:

$$GHG_{peatsoil-WPS,i,t} = GHG_{proxy-WPS,i,t}$$

Where:

$GHG_{peatsoil-WPS,i,t}$	Greenhouse gas emissions from microbial decomposition of the peat soil within the project boundary in the project scenario in stratum i in year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
$GHG_{proxy-WPS,i,t}$	GHG emissions as per the chosen proxy in the project scenario in stratum i in year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
i	1, 2, 3 ... M_{WPS} strata in the project scenario (unitless)
t	1, 2, 3, ... t^* time elapsed since the project start (years)

Peat soil GHG emissions consist of CO₂ and CH₄, calculated employing equation 31 of VMD0046 M-PEAT as shown below:

$$GHG_{proxy-WPS,i,t} = GHG_{proxy-CO_2,i,t} + GHG_{proxy-CH_4,i,t} \quad (31)$$

Where:

$GHG_{proxy-WPS,i,t}$	GHG emissions as per the chosen proxy in the project scenario in stratum i in year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
$GHG_{proxy-CO_2,i,t}$	Emission of CO ₂ as per the chosen proxy in stratum i in year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
$GHG_{proxy-CH_4,i,t}$	Emission of CH ₄ as per the chosen proxy in stratum i in year t (t CO ₂ e ha ⁻¹ yr ⁻¹)
i	1, 2, 3 ... M_{WPS} strata ⁵ in the project scenario (unitless)
t	1, 2, 3, ... t^* time elapsed since the project start (years)

Processes for quantifying carbon stock dynamics and peat losses are like those applied to the baseline scenario (see §3.4). The only differences include 1) stratification, 2) strata sequence, and 3) the absence of burning in the Project Scenario that has been assumed.

Subsidence in relation to Peat Microbial Decomposition

For consistency between remaining peat carbon stock and yearly net CO₂-e emissions, yearly loss rates for peat and carbon stock under the Project Scenario were calculated on an annual basis applying the following:

- the rate of emissions stemming from peat microbial decompositions (CO₂ and CH₄),
- bulk peat density above the water table, and

- a conservative carbon content value of 52.08 kg.kg⁻¹ dry mass¹⁰.

Project equation 32 below was used for these calculations, it was acquired from equation 13 of VMD0016 X-STR:

$$Rate_{peatloss,i,t} = \frac{\sum_{i=1}^M (GHG_{peatsoil,i,t} + GHG_{peatburn,i,t})}{A_{i,t} \times C_{vol_lower,i,t}} \times 10 \times \frac{12}{44} \quad (32)$$

Where:

$Rate_{peatloss,i,t}$	Rate of peat loss due to subsidence and fire in stratum i in year t (m yr ⁻¹)
$GHG_{peatsoil,CO_2,i,t}$	CO ₂ emissions from the peat soil in stratum i in year t (t CO ₂ e yr ⁻¹)
$GHG_{peatburn,CO_2,i,t}$	CO ₂ emissions from burning of peat in stratum i in year t (t CO ₂ e yr ⁻¹)
$A_{i,t}$	Area of stratum i in year t in baseline or project scenario ($A_{WPS,i,t}$ or $A_{BSL,i,t}$) (ha)
$C_{vol_lower,i,t}$	Volumetric carbon content of the peat below the water table in stratum i in year t (kg C m ⁻³)
12/44	Factor to change from t CO ₂ e yr ⁻¹ to t C yr ⁻¹
10	Conversion from kg m ⁻² to t ha ⁻¹

A yearly assessment for the duration of the Project's total lifetime was conducted for remaining peat thickness, based on the peat loss rate resulting from peat microbial decomposition. Project equation 33 below was used for these calculations, it was acquired from equation 9 of VMD0016 X-STR:

$$Depth_{peat-WPS,i,t100} = Depth_{peat-WPS,i,t0} - \sum_{t=1}^{t=100} Rate_{peatloss-WPS,i,t} \quad (33)$$

Where:

$Depth_{peat-WPS,i,t100}$	Average peat depth in the project scenario in stratum i at $t = 100$ (m)
$Depth_{peat-WPS,i,t0}$	Average peat depth in the project scenario in stratum i at project start (m)
$Rate_{peatloss-WPS,i,t}$	Rate of peat loss due to subsidence and fire in the project scenario in stratum i in year t ; alternatively, a conservative (high) value may be applied that remains constant over time (m yr ⁻¹)

Assurance was if there are no GHG emissions that have been accounted for in all parcels of stratum by tracking yearly peat carbon stock and thickness in the Baseline Scenario once any available peat carbon stock has been depleted. On a conservative basis, it is assumed that peat is depleted when peat thickness available for decomposition has been reduced to 20cm.

The below tables provide detail on the Project emission factors and stratification related to WRC:

¹⁰ Supra Warren. et al. 2017.

Description	IPCC default emission factor for CO ₂	IPCC default emission factor for CH ₄	IPCC default emission factor for N ₂ O	IPCC default emission factor for DOC
	(t.CO ₂ -C ha ⁻¹ yr ⁻¹)	(kg.CH ₄ ha ⁻¹ yr ⁻¹)	(kg.N ₂ O ha ⁻¹ yr ⁻¹)	(t.CO ₂ -E ha ⁻¹ yr ⁻¹)
Undrained deforested peatland	0	0	0	Not Applicable
Drained deforested peatland	20	2.7	1.2	Not Applicable
Undrained peatland forest	0	0	0	Not Applicable
Drained peatland forest	20	2.7	5.3	Not Applicable
Water bodies (rivers and canals) on peatland present at Project Start Date	Not Applicable	Not Applicable	Not Applicable	0.82

Table 4-49 Stratification employed for calculation of GHG emissions, the area (ha), and the CO₂ and CH₄ default factors used in each stratum for the specific land use

Project GHG emissions from ditches and other open water bodies in peatlands

The Project assesses GHG emissions from ditches and other open water bodies pursuant to §5.4 of PL-PEAT. The emissions in the baseline are derived based on ditched area and area of open water combined with an emission factor as per project equation 34 of VMD0042 BL-PEAT:

$$GHG_{peatditch-WPS,i,t} = GHG_{peatditch-CO_2,i,t} + GHG_{peatditch-CH_4,i,t} \quad (34)$$

Where:

$GHG_{peatditch-WPS,i,t}$	GHG emissions from ditch and other open water stratum i in year t in the project scenario (t CO ₂ e ha ⁻¹ yr ⁻¹)
$GHG_{peatditch-CO_2,i,t}$	Emission of CO ₂ from ditch and open water stratum i in year t in the project scenario (t CO ₂ e ha ⁻¹ yr ⁻¹)
$GHG_{peatditch-CH_4,i,t}$	Emission of CH ₄ from ditch and open water stratum i in year t in the project scenario (t CO ₂ e ha ⁻¹ yr ⁻¹)
i	1, 2, 3 ... M_{WPS} strata ⁶ in the project scenario (unitless)
t	1, 2, 3, ... t^* time elapsed since the project start (years)

The annual emissions of dissolved organic carbon (DOC) and CH₄ from ditches and other open water bodies are estimated using IPCC allometrics.

Land Use	GHG	Emission factor		
Surface area of canals	Degradation	CH ₄	2,259	kg CH ₄ ha ⁻¹ yr ⁻¹
	Dissolved Organic Carbon	DOC	0.82	tons C ha ⁻¹ yr ⁻¹
Intergovernmental Panel on Climate Change. 2013. 2013 Supplement to the 2006 IPCC guidelines for national greenhouse gas inventories: Wetlands. Methodological guidance on lands with wet and drained soils and constructed wetlands for wastewater treatment. Gyldenkaerne, S. and Lin, E. (eds). Japan: Institute for Global Environmental Strategies [IGES].				

Table 4-50 Emission factors of surface area of canals

DOC is then converted to CO₂E by multiplication using the CO₂ to molecular C conversion factor of 3.667¹¹.

Emissions from Uncontrolled Peat Burning

Uncontrolled burning is assumed not to be present under the Project Scenario, since rewetting of peatland and best-practice fire management (such as fire control and prevention, zero burning policies, and others as determined by the relevant authorities) are implemented as Project Activities.

Since the Project Start Date, the Project Proponent has maintained a comprehensive Fire Management Plan with respect to the Project. Should uncontrolled burning occur during the Project lifetime, any area of fire scare and burn scar depth should be mapped within three months

¹¹ *Supra* Indonesian National Carbon Accounting System. 2015:1

of the fire event. Historical hotspot tracking and direct observation data will determine the repetition of burning events in the Project Area, with maps generated of burning areas during the Project lifetime. Deductions from emissions reductions will be undertaken for equivalent and quantified GHG emissions from uncontrolled burning.

GHG emissions from peat burning will be calculated considering:

- dry mass loss based on burn scar,
- burn depths,
- combustion factors,
- peat bulk density, and
- GHG potential of specific GHG species.

GHG emissions from the loss of biomass because of burning are quantified based on:

- type of land cover,
- combustion factors, and
- GHG potential of specific GHG species.

Scar depths for repeated burnings in the first, second and third (plus) instances of burning will be assumed as 18, 11, and 4cm in depth.

Procedures for the quantifying of peat burning GHG emissions are undertaken in line with the VCS methodology VM0007 and Module VMD0013 E-BPB.

[Emissions reductions from peat combustion, using fire reduction premium.](#)

Uncontrolled burning is assumed not to be present under the Project Scenario (or the Baseline Scenario for that matter), since rewetting of peatland and best-practice fire management (such as fire control and prevention, zero burning policies, and others as determined by the relevant authorities) are implemented as Project Activities. The emissions from this source from peat combustion are assumed to be zero.

4.2.5 Future approaches for calculating Project emissions.

For determining GHG and carbon fluxes resulting from microbial decomposition of peat under the Project Scenario, different approaches will be used in the future. Within the Project lifetime, site-specific measurement approaches (IPCC TIER 2 and TIER 3) will be conducted, and data collected to minimize uncertainties in estimated emissions in relation to water table temporal and spatial variations. This will enable the gathering of site-specific data sets for quantifying Project emissions for all non-forest strata and strata with the most dynamic water table. For stratum that remains unaffected by deforestation and drainage, the IPCC factors approach will be applied throughout the Project lifetime since water table depths are less dynamic unless substantial changes in emission characteristics are observed.

In the future, estimates of Project emissions will be calculated using two TIER 3 methods. As these methods are complementary, they can be used effectively for minimizing uncertainty and allow cross-checking.

- Method 1: Monitoring soil subsidence - over the long-term, soil subsidence provides a reliable proxy for estimation of peat soil carbon losses.
- Method 2: Measuring direct CO₂ emissions (CH₄ to follow) - data will be used to establish empirical models specific to site and strata by combining proxies such as soil temperature, soil moisture, and water table depth.

Water table depths and soil subsidence must be established and operated through the Project lifetime over the next 60 years.

4.2.6 Project Emissions - REDD

Project emissions reductions from REDD

Area of avoided deforestation in the Project Scenario

The REDD activity encompasses landscapes on mineral soils and will have avoided planned deforestation under this scenario. The area of land for avoided planned deforestation and conversion to plantations under REDD is 16,633 hectares.

Land Cover Strata	Areas converted to plantations by concession, land cover and year on REDD areas										
	(A _{planned,i})										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Forest	113.1	1,182.1	1,740.4	2,109.5	1,592.8	949.5	0.0	0.0	1,336.0	0.0	9,023.4
Heath	0.0	508.5	1,773.5	857.2	661.8	818.4	0.0	0.0	858.3	0.0	5,477.7
Scrub	162.8	19.2	462.6	749.9	237.7	253.1	0.0	0.0	247.1	0.0	2,132.4
Total	275.9	1,709.8	3,976.5	3,716.6	2,492.4	2,021.0	0.0	0.0	2,441.4	0.0	16,633.5

Table 4-51 Area of avoided deforestation in the Project Scenario for REDD

Growth of Avoided Deforestation Areas

The carbon stock changes in above ground biomass are calculated according to the methods described in 4.2.3.2 and summarized in the table below.

Growth of Avoided Deforestation Areas						
Year	Areas of avoided deforestation (ha)			Growth of avoided deforested forests		
	Forest	Heath forest	Scrub	AGB (t)	BGB (t)	CO ₂ E (t)
1	113.1	0.0	162.8	1,284	372	1,656
2	1,295.2	508.5	182.0	9,240	2,680	11,920
3	3,035.6	2,282.0	644.6	27,744	8,046	35,790
4	5,145.1	3,139.1	1,394.5	45,039	13,061	58,101
5	6,737.9	3,801.0	1,632.2	56,637	16,425	73,062
6	7,687.4	4,619.4	1,885.3	66,042	19,152	85,194
7	7,687.4	4,619.4	1,885.3	66,042	19,152	85,194
8	7,687.4	4,619.4	1,885.3	66,042	19,152	85,194
9	9,023.4	5,477.7	2,132.4	77,403	22,447	99,850
10	9,023.4	5,477.7	2,132.4	77,403	22,447	99,850
11-60	9,023.4	5,477.7	2,132.4	77,403	22,447	99,850

Table 4-52 Ex-ante net carbon stock changes because of forest carbon stock enhancement in the Project Area for REDD

4.2.7 Project Emissions - CIW

Project emissions from peat soils

Areas of drained land and surface areas of drains in the baseline

There are no legacy canals in CIW Project Activity area and all the landscape is fully wetted.

Project Emissions from Peat Soil

Because the landscape is fully wetted, there are no peat soil emissions in the CIW Project Activity area.

Project GHG emissions from ditches and other open water bodies in peatlands

Because there are no legacy canals in CIW Project Activity area, there are GHG emissions from ditches in the CIW Project Activity area.

Project Emissions from Peat Burning

Emissions from peat burning are excluded from the Project Scenario.

4.2.8 Project Emissions – REDD+CIW

Project emissions reductions from REDD+CIW

Area of avoided deforestation in the Project Scenario

The REDD+CIW activity encompasses landscapes on peatland soils and will have planned deforestation under this scenario. The area of land planned for deforestation and conversion to plantations under REDD+CIW is 10,148 ha.

Land Cover Strata	Areas converted to plantations by concession, land cover and year on REDD+CIW areas										
	(A _{planned,i})										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Forest	1,015.2	2,320.3	193.7	0.0	0.0	770.0	1,559.2	1,878.7	204.4	422.9	8,364.5
Heath	0.0	459.1	4.4	0.0	0.0	350.3	20.7	0.0	2.4	0.0	836.9
Scrub	24.1	114.6	48.0	0.0	0.0	100.6	228.2	318.3	59.1	53.9	946.9
Total	1,039.3	2,894.0	246.2	0.0	0.0	1,221.0	1,808.1	2,197.0	265.9	476.8	10,148.3

Table 4-53 Area of avoided deforestation in the Project Scenario for REDD+CIW

Growth of Avoided Deforestation Areas

The carbon stock changes in above ground biomass are calculated according to the methods described in §4.2.3.2 and summarized in the table below.

Growth of Avoided Deforestation Areas						
Year	Areas of avoided deforestation (ha)			Growth of avoided deforested forests		
	Forest	Heath forest	Scrub	AGB (t)	BGB (t)	CO ₂ E (t)
1	1,015	0	24	4,836	1,064	5,900
2	3,336	459	139	18,303	4,027	22,330
3	3,529	464	187	19,449	4,279	23,728
4	3,529	464	187	19,449	4,279	23,728
5	3,529	464	187	19,449	4,279	23,728
6	4,299	814	287	25,131	5,529	30,660
7	5,858	835	516	33,545	7,380	40,924
8	7,737	835	834	43,768	9,629	53,397
9	7,942	837	893	45,006	9,901	54,907
10	8,364	837	947	47,224	10,389	57,614
11-60	8,364	837	947	47,224	10,389	57,614

Table 4-54 Ex-ante net carbon stock changes because of forest carbon stock enhancement in the Project Area for REDD+CIW

Project emissions from peat soils

Areas of drained land and surface areas of drains in the baseline

There are no legacy canals in CIW+REDD Project Activity area and all the landscape is fully wetted.

Project Emissions from Peat Soil

Because the landscape is fully wetted, there are no peat soil emissions in the CIW+REDD Project Activity area.

Project GHG emissions from ditches and other open water bodies in peatlands

Because there are no legacy canals in CIW+REDD Project Activity area, there are GHG emissions from ditches in the CIW+REDD Project Activity area.

Project Emissions from Peat Burning

Emissions from peat burning are excluded from the Project Scenario.

4.2.9 Project Emissions - RWE

Project emissions from peat soils

Areas of drained land and surface areas of drains in the baseline

There are legacy canals in RWE Project Activity area. These canals will be subject to water management and backfilling until the landscape is fully wetted.

Project emissions from Peat Soil

Emissions from biodegradation will be generated prior to the backfilling of the canals. After the landscape is fully wetted, there will be no peat soil emissions in the RWE Project Activity area.

Project GHG emissions from ditches and other open water bodies in peatlands

Emissions from ditches and other open water bodies will be generated prior to the blocking of the canals. After the landscape is fully wetted, there will be emissions from ditches in the RWE Project Activity area.

Project Emissions from Peat Burning

Emissions from peat burning are excluded from the Project Scenario.

4.2.10 Project Emissions – REDD+RWE

Project emissions reductions from REDD+RWE

Area of avoided deforestation in the Project Scenario

The REDD+RWE activity encompasses landscapes on peatland soils that have been previously drained and will have planned deforestation under this scenario. The area of land planned for deforestation and conversion to plantations under REDD+RWE is 3,733 ha.

Land Cover Strata	Areas converted to plantations by concession, land cover and year on REDD+RWE areas										
	(A _{planned,i})										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Forest	2,252.2	378.1	0.0	0.0	0.0	0.0	810.7	0.0	0.0	0.0	3,441.0
Heath	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Scrub	197.4	0.5	0.0	0.0	0.0	0.0	93.8	0.0	0.0	0.0	291.7
Total	2,449.5	378.7	0.0	0.0	0.0	0.0	904.5	0.0	0.0	0.0	3,732.7

Table 4-55 Areas converted to plantations by land cover and year in the baseline for REDD+RWE

Growth of Avoided Deforestation Areas

The carbon stock changes in above ground biomass are calculated according to the methods described in §4.2.3.2 and summarized in the table below.

Growth of Avoided Deforestation Areas						
Year	Areas of avoided deforestation (ha)			Growth of avoided deforested forests		
	Forest	Heath forest	Scrub	AGB (t)	BGB (t)	CO ₂ E (t)
1	2,252	0	197	11,399	2,508	13,906
2	2,630	0	198	13,161	2,895	16,056
3	2,630	0	198	13,161	2,895	16,056
4	2,630	0	198	13,161	2,895	16,056
5	2,630	0	198	13,161	2,895	16,056
6	2,630	0	198	13,161	2,895	16,056
7	3,441	0	292	17,370	3,821	21,191
8	3,441	0	292	17,370	3,821	21,191
9	3,441	0	292	17,370	3,821	21,191
10	3,441	0	292	17,370	3,821	21,191
11-60	3,441	0	292	17,370	3,821	21,191

Table 4-56 Ex-ante net carbon stock changes because of forest carbon stock enhancement in the Project Area for REDD+RWE

Project emissions from peat soils

Areas of drained land and surface areas of drains in the baseline

There are legacy canals in REDD+RWE Project Activity area. These canals will be blocked and the landscape fully rewetted.

Project emissions from Peat Soil

Emissions from biodegradation will be generated prior to the blocking of the canals. After the landscape is fully wetted, there will be no peat soil emissions in the REDD+RWE Project Activity area.

Project GHG emissions from ditches and other open water bodies in peatlands

Emissions from ditches and other open water bodies will be generated prior to the blocking of the canals. After the landscape is fully wetted, there will be emissions from ditches in the REDD+RWE Project Activity area.

4.3 Leakage Emissions

4.3.1 Leakage from Activity Shifting for Avoided Planned Deforestation and Planned Degradation (LK-ASP)

Module LK-ASP is the applicable methodology for estimating the leakage emissions due to activity shifting from forest lands that are legally authorized and documented to be converted to non-forest land, including activity shifting to forested peatland that is drained because of project implementation. Under these situations, displacement of baseline activities can be controlled and measured directly by monitoring the baseline deforestation agents or class of agents. This tool must be used for projects in areas where planned deforestation happens on forested peatlands, regardless of the absence of peatland within the project boundaries.

Section 5.1 of LK-ASP describes the applicability of the module:

“Where the specific deforestation agent can be identified, leakage does not need to be considered where it can be demonstrated that the management plans and/or land-use designations of the deforestation agent’s other lands (which must be identified by location) have not materially changed as a result of the project (e.g., the deforestation agent has not designated new lands as timber concessions, increased harvest rates in lands already managed for timber, cleared intact forests for agricultural production or increased fertilizer use to enhance agricultural yields).

Further, in this module, leakage does not need to be considered where only the agent class has been identified but verifiable information exists to demonstrate that the management plans and/or land use designations of the whole class of deforestation agent’s other lands have not materially changed due to the project activities.

Likewise, leakage does not need to be accounted for where it can be demonstrated that it is unrelated to the project and responds to factors outside the control of Project Proponents (e.g., markets, policies, etc.). Project Proponents must present verifiable information demonstrating this situation, such as official documents, market analysis, peer-reviewed literature and other relevant sources, as well as an assessment showing how and to what extent it affected their leakage accounting."

A specific agent of deforestation has been identified, the third-party forestry company which submitted the Technical Proposal. In applying LK-ASP, the following conditions have been considered:

- The specific deforestation agent for the Project Area has been identified.
- The Project Proponent does not hold other forest concession licenses that it can log.
- The deforestation agent has no plans to acquire other forestry concessions for the purposes of securing additional wood supply due to the implementation of the Project.
- Deforestation may occur in the local landscape, but outside of the Project Area and unrelated to the Project, through palm plantation development and perhaps forest plantation development.

Because of these conditions above, leakage from activity shifting from planned deforestation does not need to be considered for the estimation of Project emissions reductions and removals. However, factors associated with leakage need to be monitored during Project implementation and accounted for if it becomes significant. The monitoring requirements for LK-ASP are discussed further in section 5.3.2 of this report.

4.3.2 Ecological Leakage (LK-ECO)

VMD0044 Module LK-ECO requires that ecological leakage affecting the soil (peat) carbon pool does not occur, by ensuring that the effect of hydrological connectivity with adjacent areas is insignificant.

There are several conditions that severely limit the possibility of ecological leakage in these landscapes:

1. The Project is located near to Barito river, which is a natural water catchment for peatland area adjacent to it. The Project has studied the hydrological system carefully and, with the consent of the relevant stakeholders initiated water management and canal blocking in a point outside the Project Area that is significant in maintaining water table levels inside the Project Area. The Project has also decided with relevant stakeholders, such as communities and neighboring companies to maintain the canal blocking. Therefore, it is expected that any soil drainage activities adjacent lands that are on the other side of a waterway, will have no significant impact on the water table levels in the Project Area.
2. The extent of peatland in the landscape is largely contained within the boundaries of the Project Area.

3. The villages bordering the project area have very little agricultural cultivation areas.

It is assumed that ecological leakage does not occur in the Project for the following reasons:

1. There is rewetting of drained areas in the Project and but no significant impact on adjacent areas.
2. There is little hydrological connectivity between the Project area and the adjacent lands. In many areas the project is bounded by waterways which hydrologically isolate the project. In other areas, the peatland areas in the project change into mineral soils at the boundary.

Because of these conditions above, leakage does not need to be considered for the estimation of project emissions reductions and removals. However, factors associated with ecological leakage need to be monitored during project implementation and accounted for if it becomes significant. The monitoring requirements for LK-ASP are discussed further in section 5.3.2 of this report.

4.3.3 Estimation of Net Emissions from Leakage

Leakage from activity shifting from planned deforestation does not need to be considered for the estimation of project emissions reductions and removals under (LK-ASP).

Leakage from ecological leakage from peatland degradation does not need to be considered for the estimation of project emissions reductions and removals under (LK-ECO).

In conclusion, the total emissions for the Project from Leakage is “0”.

4.4 Estimated GHG Emission Reductions and Carbon Dioxide Removals

The information required to assess permanence risk is set out in the below table.

State the non-permanence risk rating (%)	10%
Has the non-permanence risk report been attached as either an appendix or a separate document?	☒ Yes ☐ No
For ARR and IFM projects with harvesting, state, in tCO ₂ e, the Long-term Average (LTA).	N/A
Has the LTA been updated based on monitored data, if applicable?	☒ Yes ☐ No If no, provide justification.
State, in tCO ₂ e, the expected total GHG benefit to date.	
Is the number of GHG credits issued below the LTA?	☒ Yes ☐ No If no, provide justification.

The Baseline Scenario and Project Activities have been separately modelled in sections 4.1 and 4.2 respectively. Each core activity (REDD / CIW / RWE) is modelled according to their respective activity start dates. The total emissions for all activities have been compiled taking into account variable start dates as follows:

1. The Project Start Date is specified as 12/09/2022. The annual emissions assume that the year commences on 12/9 of the start year and concludes on 11/9 of the following year. For simplicity purposes, the first year is referred to as 2022 and the final year as 2081.
2. Activities have their own start dates based on project implementation commencement events. REDD and CIW have a start date of 12/09/2022. RWE has a start date of 16/09/2023. For reporting purposes, the annual emissions estimate from sections 4.1 and 4.2 respectively have been adjusted to account for the start dates in the Project model. The Project model start date aligns with the REDD/CIW start date and no adjustment is required. The RWE start date is approximately 1.3 years after the Project Start Date and the RWE emissions have reallocated to fit into the different timelines of the Project.

Vintage period	Estimated baseline emissions (tCO2e)	Estimated project emissions (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated reduction VCU (tCO2e)	Estimated removal VCU (tCO2e)	Estimated total VCUs (tCO2e)
2022	985,728	-21,324	0	985,728	-21,324	906,347
2023	1,879,404	-50,285	0	1,512,296	-417,392	1,736,720
2024	1,615,355	-75,574	0	1,245,439	-445,490	1,521,836
2025	1,535,855	-97,885	0	1,165,939	-467,800	1,470,365
2026	1,340,172	-112,846	0	970,256	-482,762	1,307,716
2027	1,612,927	-131,910	0	1,243,011	-501,826	1,570,353
2028	1,730,452	-147,258	0	1,360,537	-517,174	1,689,940
2029	1,801,683	-159,782	0	1,431,767	-529,698	1,765,319
2030	1,911,190	-175,948	0	1,541,274	-545,863	1,878,424
2031	1,489,286	-178,655	0	1,119,370	-548,570	1,501,146
2032	1,357,958	-178,655	0	988,042	-548,570	1,382,951
2033	1,329,414	-178,655	0	959,498	-548,570	1,357,261
2034	1,304,937	-178,655	0	935,021	-548,570	1,335,232
2035	1,283,044	-178,655	0	913,128	-548,570	1,315,528
2036	1,267,282	-178,655	0	897,366	-548,570	1,301,343
2037	1,249,497	-178,655	0	879,581	-548,570	1,285,336
2038	1,235,661	-178,655	0	865,745	-548,570	1,272,884
2039	1,224,551	-178,655	0	854,635	-548,570	1,262,885
2040	1,208,353	-178,655	0	838,437	-548,570	1,248,306
2041	1,174,497	-178,655	0	835,981	-517,171	1,217,837
2042	1,114,931	-178,655	0	835,981	-457,604	1,164,227
2043	1,114,353	-178,655	0	835,981	-457,026	1,163,707
2044	1,114,353	-178,655	0	835,981	-457,026	1,163,707
2045	842,941	-178,655	0	564,569	-457,026	919,436

2046	725,639	-178,655	0	447,267	-457,026	813,864
2047	683,457	-178,655	0	405,085	-457,026	775,900
2048	666,028	-178,655	0	387,657	-457,026	760,215
2049	666,028	-178,655	0	387,657	-457,026	760,215
2050	666,028	-178,655	0	387,657	-457,026	760,215
2051	666,028	-178,655	0	387,657	-457,026	760,215
2052	666,028	-178,655	0	387,657	-457,026	760,215
2053	666,028	-178,655	0	387,657	-457,026	760,215
2054	666,028	-178,655	0	387,657	-457,026	760,215
2055	666,028	-178,655	0	387,657	-457,026	760,215
2056	666,028	-178,655	0	387,657	-457,026	760,215
2057	666,028	-178,655	0	387,657	-457,026	760,215
2058	666,028	-178,655	0	387,657	-457,026	760,215
2059	666,028	-178,655	0	387,657	-457,026	760,215
2060	666,028	-178,655	0	387,657	-457,026	760,215
2061	666,028	-178,655	0	387,657	-457,026	760,215
2062	666,028	-178,655	0	387,657	-457,026	760,215
2063	666,028	-178,655	0	387,657	-457,026	760,215
2064	666,028	-178,655	0	387,657	-457,026	760,215
2065	666,028	-178,655	0	387,657	-457,026	760,215
2066	666,028	-178,655	0	387,657	-457,026	760,215
2067	666,028	-178,655	0	387,657	-457,026	760,215
2068	666,028	-178,655	0	387,657	-457,026	760,215
2069	666,028	-178,655	0	387,657	-457,026	760,215
2070	666,028	-178,655	0	387,657	-457,026	760,215
2071	666,028	-178,655	0	387,657	-457,026	760,215
2072	666,028	-178,655	0	387,657	-457,026	760,215
2073	666,028	-178,655	0	387,657	-457,026	760,215
2074	666,028	-178,655	0	387,657	-457,026	760,215
2075	666,028	-178,655	0	387,657	-457,026	760,215
2076	666,028	-178,655	0	387,657	-457,026	760,215
2077	666,028	-178,655	0	387,657	-457,026	760,215
2078	666,028	-178,655	0	387,657	-457,026	760,215
2079	659,870	-178,655	0	387,657	-450,868	754,672
2080	657,168	-178,655	0	387,657	-448,166	752,241
2081	657,142	-178,655	0	387,657	-448,139	752,217
Total	56,753,977	#####	0	38,648,258	-28,189,917	60,154,358

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	$\Delta C_{BSL,planned}$
Data unit	t CO ₂ e
Description	Net greenhouse gas emissions in the baseline from planned deforestation
Source of data	<i>Module BL-PL</i>
Value applied	8,423,906 (CAB_tree + CBG_tree)
Justification of choice of data or description of measurement methods and procedures applied (Justification)	Derived and justified in §4.1 of the PDD in which the baseline is set and calculated as required by BL-PL.
Purpose of Data	Calculation of baseline emissions
Comments	Parameter is from REDD-MF

Data / Parameter	GHG _{BSL-WRC}
Data unit	t CO ₂ e
Description	Net greenhouse gas emissions in the WRC baseline scenario up to year t*
Source of data	<i>Module BL-PL</i>
Value applied	48,330,071
Justification	See Module BL-PL.
Purpose of Data	Calculation of baseline emissions
Comments	Parameter is from REDD-MF

Data / Parameter	Project Forest Cover Monitoring Map
Data unit	Dimensionless
Description	Map showing the location of forest land within the Project Area at the beginning of each monitoring period. If within the Project Area some forest land is cleared, the benchmark map must show the deforested areas at each monitoring event
Source of data	Remote sensing in combination with GPS data collected during ground truthing
Value applied	0
Justification	The minimum map accuracy must be 90% for the classification of forest/non-forest in the remote sensing imagery. If the classification accuracy is less than 90% then the map is not acceptable for further analysis. More remote sensing data and ground truthing data will be needed to produce a product that reaches the 90% minimum mapping accuracy. Frequency: Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Purpose of Data	Calculation of forest cover
Comments	Where forest land contains more than one forest class, the map must be stratified into forest classes using module X-STR. Parameter is from M-REDD
Data / Parameter	CF
Data unit	t C t d.m. ⁻¹
Description	Carbon fraction of dry matter in t C t ⁻¹ d.m.
Source of data	Values from the literature (e.g., IPCC 2006 INV GLs AFOLU Chapter 4 Table 4.3) shall be used if available, otherwise default value of 0.47 t C t ⁻¹ d.m. can be used
Value applied	0.47
Justification	Globally accepted default value derived from IPCC 2006GL
Purpose of Data	Calculation of carbon stock
Comments	Parameter is found in modules M-REDD and CB-AB
Data / Parameter	CF _j
Data unit	t C t d.m. ⁻¹
Description	Carbon fraction of biomass for tree species j
Source of data	Values from the literature (e.g., IPCC 2006 INV GLs AFOLU Chapter 4 Table 4.3) shall be used if available, otherwise default value of 0.47 t C t ⁻¹ d.m. can be used
Value applied	0.47 or species specific value.
Justification	IPCC 2006GL
Purpose of Data	Calculation of carbon stock
Comments	Where new species are encountered while monitoring, new carbon fraction values must be sourced from the literature or otherwise use the default value. Parameter is from M-REDD

Data / Parameter	D_j
Data unit	t d.m. m ⁻³
Description	Density of wood by species from World Wood Database
Source of data	See wood density allometrics attached
Value applied	
Justification	Derived from World Wood Database. See also Module CP-AB
Purpose of Data	Calculation of wood density
Comments	Parameter is from M-REDD

Data / Parameter	D_{MN}
Data unit	t d.m. m ⁻³
Description	Mean wood density of commercially harvested species.
Source of data	See wood density allometrics attached
Value applied	
Justification	Derived from World Wood Database. See also Module CP-AB
Purpose of Data	Calculation of wood density of commercially harvested species.
Comments	Parameter is from M-REDD

Data / Parameter	$f_j(X,Y)$
Data unit	t d.m. tree ⁻¹
Description	Allometric equation for species j linking measured tree variable(s) to aboveground biomass of living trees, expressed as t d.m. tree ⁻¹
Source of data	Chave, J., C. Andalo, S. Brown, M. A. Cairns, J. Q. Chambers, D. Eamus, H. Folster, F. Fromard, N. Higuchi, T. Kira, J.-P. Lescure, B. W. Nelson, H. Ogawa, H. Puig, B. Riera, T. Yamakura. 2005. Tree allometry and improved estimation of carbon stocks and balance in tropical forests. <i>Oecologia</i> 145: 87-99. The formula is: $AGB = 0.0776 * (WOOD \ DENSITY) * (DBH) * (DBH) * (Estimated \ Height)^{0.94}$ Diameter at breast height (DBH) and Estimated Height are generated from forest inventory. Wood density uses the World Wood Database
Value applied	Module CP-AB – see also the reference
Justification	Derived from Chave, J., C. Andalo, S. Brown, M. A. Cairns, J. Q. Chambers, D. Eamus, H. Folster, F. Fromard, N. Higuchi, T. Kira, J.-P. Lescure, B. W. Nelson, H. Ogawa, H. Puig, B. Riera, T. Yamakura. 2005. Tree allometry and improved estimation of carbon stocks and balance in tropical forests. <i>Oecologia</i> 145: 87-99.
Purpose of Data	Calculation of aboveground biomass
Comments	It is necessary to validate the applicability of equations used. Source data from which equation was derived should be reviewed and confirmed to be representative of the forest type/species and conditions in the Project and covering the range of potential independent variable values. Parameter is found in modules M-REDD and CB-AB

Data / Parameter	$A_{planned,I}$
Data unit	ha
Description	Total area of planned deforestation over the fixed baseline period for stratum I
Source of data	GPS coordinates and/or Remote Sensing data and/or legal parcel records
Value applied	See Tree Planting Plan
Justification	Derived and justified in §4.1 of the PDD in which the baseline is set and calculated as required by BL-PL.
Purpose of Data	Calculation of baseline planned deforestation
Comments	Parameter from module M-REDD

Data / Parameter	$C_{BSL,I,t100}$
Data unit	t C ha ⁻¹
Description	Peat carbon stock in the baseline scenario in peat depth stratum I at t=100
Source of data	Module X-STR
Value applied	103,338,280
Justification	Derived and justified in §4.1 of the PDD in which the project emissions are described.
Purpose of Data	Calculation of peat carbon stock
Comments	Parameter from module M-REDD

Data / Parameter	$C_{AB_tree,peatdome}$
Data unit	t CO ₂ e ha ⁻¹
Description	Mean aboveground tree biomass carbon stock of trees in peat dome forest.
Source of data	Module CP-AB
Value applied	343.47
Justification	Derived from and justified in §3.3 of the PDD.
Purpose of Data	Calculation of carbon stock
Comments	Parameter from module M-REDD

Data / Parameter	$C_{AB_tree,dense\ swamp\ forest}$
Data unit	t CO ₂ e ha ⁻¹
Description	Mean aboveground tree biomass carbon stock of trees in secondary forest
Source of data	Module CP-AB
Value applied	287.1
Justification	Derived from and justified in §3.3 of the PDD.
Purpose of Data	Calculation of carbon stock
Comments	Parameter from module M-REDD

Data / Parameter	$C_{AB_tree,medium\ swamp\ forest}$
Data unit	t CO ₂ e ha ⁻¹
Description	Mean aboveground tree biomass carbon stock of trees in heath forest
Source of data	<i>Module CP-AB</i>
Value applied	215.8
Justification	Derived from and justified in §3.3 of the PDD.
Purpose of Data	Calculation of carbon stock
Comments	Parameter from module M-REDD and BL-PL

Data / Parameter	$C_{AB_tree,sparse\ swamp\ forest}$
Data unit	t CO ₂ e ha ⁻¹
Description	Mean aboveground tree biomass carbon stock of trees in scrub forest
Source of data	<i>Module CP-AB</i>
Value applied	123.3
Justification	Derived from and justified in §3.3 of the PDD.
Purpose of Data	Calculation of carbon stock
Comments	Parameter from module M-REDD and BL-PL

Data / Parameter	$N_2O_{direct-N,i,t}$
Data unit	t CO ₂ e
Description	Direct N ₂ O emission because of nitrogen application on the alternative land use within the project boundary in stratum i in year t
Source of data	Module E-NA
Value applied	Not Applicable
Justification	Justified in § 4.2 of the PDD. See also Module E-NA
Purpose of Data	Calculation of N ₂ O emissions on the alternative land use
Comments	Parameter from module M-REDD

Data / Parameter	R																																
Data unit	t root d.m. t ⁻¹ shoot d.m.																																
Description	Root to shoot ratio appropriate to species or forest type / biome; note that as defined here, root to shoot ratio is applied as belowground biomass per unit area: above ground biomass per unit area (not on a per stem basis)																																
Source of data	<table><tr><td></td><td colspan="3">Ratio to AGB tree (%)</td></tr><tr><td>Forest types</td><td>Sapling</td><td>Understorey</td><td>Root</td></tr><tr><td>Primary dryland forest</td><td>0.2%</td><td>0.5%</td><td>29%</td></tr><tr><td>Secondary dryland forest</td><td>1.1%</td><td>2.7%</td><td>29%</td></tr><tr><td>Primary swamp forest,</td><td>11.4%</td><td>2.4%</td><td>22%</td></tr><tr><td>Secondary swamp forest</td><td>11.1%</td><td>3.8%</td><td>22%</td></tr><tr><td>Primary mangrove forest</td><td>0.0%</td><td>0.0%</td><td>31%</td></tr><tr><td>Secondary mangrove forest</td><td>0.0%</td><td>0.0%</td><td>12%</td></tr></table>		Ratio to AGB tree (%)			Forest types	Sapling	Understorey	Root	Primary dryland forest	0.2%	0.5%	29%	Secondary dryland forest	1.1%	2.7%	29%	Primary swamp forest,	11.4%	2.4%	22%	Secondary swamp forest	11.1%	3.8%	22%	Primary mangrove forest	0.0%	0.0%	31%	Secondary mangrove forest	0.0%	0.0%	12%
	Ratio to AGB tree (%)																																
Forest types	Sapling	Understorey	Root																														
Primary dryland forest	0.2%	0.5%	29%																														
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Primary mangrove forest	0.0%	0.0%	31%																														
Secondary mangrove forest	0.0%	0.0%	12%																														
Value applied	29% secondary dryland forest forest 22% secondary swamp forest																																
Justification	Derived from Table 4, National forest reference level for deforestation, forest degradation and enhancement of forest carbon stock. Republic of Indonesia. 2022 See also Module CP-AB																																
Purpose of Data	Calculation of carbon stock																																
Comments	See Module CP-AB Parameter is found in modules M-REDD and CB-AB																																

Data / Parameter	ABSL _{i,t} or A _{i,t}
Data unit	ha
Description	Area of baseline stratum I in year t
Source of data	Own assessment
Value applied	
Justification	Delineation of strata is preferably done using a Geographical Information System (GIS), which allows for integrating data from different sources (including GPS coordinates and remote sensing data). Applied techniques must follow international standards of application or local standards as laid out in pertinent scientific literature or handbooks. The area of peat burnt (A_{peatburn-WPS,i,t} for the project scenario from Module M-PEAT and A_{peatburn-BSL,i,t} for the baseline scenario from Module BL-PEAT) and area of peatland (not open water, not burnt) (A_{peatsoil-WPS,i,t} for the project scenario from Module M-PEAT and A_{peatsoil-BSL,i,t} for the baseline scenario from Module BL-PEAT) determine the difference between the remaining carbon stock in the project scenario and baseline scenarios after 100 years. In the procedures in Section 5.4 these areas are together referred to as A_{WPS,i,t} and ABSL_{i,t}.
Purpose of Data	Calculation of peat carbon stock
Comments	Parameter from module X-STR

Data / Parameter	$Depth_{peat-BSL,I,t0}$
Data unit	m
Description	Average peat depth in the baseline scenario and the project scenario in stratum I at project start
Source of data	Existing peat depth maps and/or field assessment and/or in combination with remote sensing data.
Value applied	
Justification	Procedures for monitoring peat depth are given in Module <i>M-PEAT</i> and in this module. Peat depths can be derived from - Existing peat depth maps - Literature datasets involving the project or similar areas. - Field measurements, e.g., using a peat corer. Remote sensing to derive height of the peat surface above datum. To determine the PDT, where relevant, peat depth may be determined as the depth of the peat layer down to a level where no further oxidation or other losses occur (e.g., the average water table depth).
Purpose of Data	Calculation of baseline emissions
Comments	In the absence of peer-reviewed data sources, the Project Proponent must justify that the data used is representative and that standard methods have been used. Parameter from module X-STR

Data / Parameter	$Depth_{peat-WPS,I,t0}$
Data unit	m
Description	Average peat depth in the baseline scenario and the project scenario in stratum I at project start
Source of data	Existing peat depth maps and/or field assessment and/or in combination with remote sensing data.
Value applied	
Justification	Procedures for monitoring peat depth are given in Module <i>M-PEAT</i> and in this module. Peat depths can be derived from - Existing peat depth maps - Literature datasets involving the project or similar areas. - Field measurements, e.g., using a peat corer. Remote sensing to derive height of the peat surface above datum. For determining the PDT, where relevant, peat depth may be determined as the depth of the peat layer down to a level where no further oxidation or other losses occur (e.g., the average water table depth).
Purpose of Data	Calculation of baseline emissions
Comments	In the absence of peer-reviewed data sources, the Project Proponent must justify that the data used is representative and that standard methods have been used. Parameter from module X-STR

Data / Parameter	$Sub_{initial-BSL,i}$
Data unit	m yr ⁻¹

Description	Subsidence in the initial years after drainage in stratum i
Source of data	Default factor from scientific literature or field assessments in peatland areas in the same region that underwent equal land use development as projected for the baseline scenario.
Value applied	0.0143
Justification	Procedures for measuring soil subsidence are described in Module M-PEAT
Purpose of Data	Calculation of baseline GHG emissions
Comments	Parameter from module X-STR

Data / Parameter	$\text{Rate}_{\text{peatloss-BSL},I,t}; \text{Rate}_{\text{peatloss-BSL},i}$
Data unit	m yr^{-1}
Description	Rate of peat loss due to subsidence and fire in the baseline scenario in stratum I in year t; a conservative (low) value may be applied that remains constant over time; Subsidence in the initial years after drainage is not included in this rate. Rate of peat loss due to subsidence and fire in the baseline scenario in stratum I; a conservative (high) value must be applied that remains constant over the time from $t = 0$ to PDT
Source of data	Default factor from scientific literature or field assessments in peatland areas that are like the project area (proxy area)
Value applied	0
Justification	See VMD0016 X-STR Section 5.4. Subsidence in the initial years after drainage is not included in this rate. Also, there is no fire modelled in the baseline and the losses are estimated as 0.
Purpose of Data	Calculation of baseline emissions
Comments	Parameter from module X-STR

Data / Parameter	$C_{\text{vol_lower,BSL},I,t}; C_{\text{vol_lower,WPS},I,t}$
Data unit	kg C m^{-3}
Description	Volumetric carbon content of the peat below the water table in the project scenario in stratum I in year t
Source of data	Module M-PEAT
Value applied	52 kg C m^{-3} based on bulk density (0.093 g cm^{-3}), carbon content 56% (Anshari et al., 2010; Page et al., 2011; Hooijer et al., 2012).
Justification	Anshari et al., 2010, Drainage and land use impacts on changes in selected peat properties and peat degradation in West Kalimantan Province, Indonesia, Biogeosciences, 7, 3403-3419; Page et al., 2011. Global and regional importance of the tropical peatland carbon pool, Global change Biology. 17:2, 798-818; Hooijer et al., 2012. Subsidence and carbon loss in drained tropical peatlands. Biogeosciences 9, 1053-1071. See also Module M-PEAT
Purpose of Data	Calculation of project emissions
Comments	See Module M-PEAT Parameter from module X-STR

Data / Parameter	$\text{GHG}_{\text{peatsoil},\text{CO}_2,I,t}$
Data unit	$\text{t CO}_2\text{e yr}^{-1}$
Description	CO_2 emissions from microbial decomposition of the peat soil in stratum I in year t
Source of data	Module BL-PEAT
Value applied	47,081,968

Justification	Justified in §4.1 of the PDD. See also module BL-PEAT
Purpose of Data	Calculation of baseline emissions
Comments	Parameter from module X-STR

Data / Parameter	VC
Data unit	kg C m ⁻³
Description	Volumetric organic carbon content
Source of data	Direct measurements and/or literature involving the project area or similar areas
Value applied	140 kg C/m ³ based on soil survey conducted in 2023.
Justification	Soil survey results: Average peat density 0.253 t.DM/m ³ Average organic C% 55.4%
Purpose of Data	Calculation of baseline emissions Calculation of the maximum quantity of GHG emission reductions that may be claimed by the project
Comments	Parameter from module X-STR

Data / Parameter	E _{REDD_BSL,SS,I,Pool#}
Data unit	t CO ₂ e
Description	Carbon stock or GHG sources (e.g., trees, down dead wood, soil organic carbon, emission from fertilizer addition, emission from biomass burning etc.) in the REDD baseline scenario
Source of data	The terms denoting significant carbon stocks, GHG sources or leakage emissions used in calculating net emission reductions from the following relevant modules: CP-AB, E-NA.
Value applied	Not applicable
Justification	See relevant modules noted above in Source of Data.
Purpose of Data	Calculation of uncertainty
Comments	The ex-ante estimation must be derived directly from the estimations originating in the relevant modules: CP-AB, E-NA. Parameter from module X-UNC

Data / Parameter	U _{REDD_BSL,SS,I,pool#}
Data unit	%
Description	Percentage uncertainty (expressed as 95% confidence interval as a percentage of the mean where appropriate) for carbon stocks and greenhouse gas sources in the REDD baseline scenario (1, 2...n represent different carbon pools and/or GHG sources)
Source of data	Calculations arising from field measurement data
Value applied	+/- 15%
Justification	As per X-UNC. Uncertainty in pools derived from field measurement with 95% confidence interval calculated as the standard error of the averaged plot measurements in each stratum multiplied by the t value for the 95% confidence level. For wood products the uncertainty should be the confidence interval around the volume of timber extracted from the forest. For emission sources conservative parameters should be used sufficient to allow the uncertainty to be set as zero.

Purpose of Data	Calculation of uncertainty
Comments	Baseline stocks and sources are estimated ex ante for each baseline period. Parameter from module X-UNC

Data / Parameter	$U^{*,l,t}$
Data unit	t CO ₂ e ha ⁻¹ yr ⁻¹
Description	Uncertainty in parameter * in stratum l in year t * = parameters E _{proxy-CO2,t} , E _{proxy-CH4,t} , E _{peatditch-CO2,t} , E _{peatditch-CH4,t} and E _{peatburn-BSL} ,
Source of data	Module X-UNC
Value applied	0.15
Justification	Where regression models are used to estimate emissions from oxidation of peat from proxy parameters, uncertainty is calculated by referencing the 95% confidence limits of the regression model, calculated using standard regression analysis techniques. For the value of the referenced proxy in year t, the half-width of the 95% confidence interval for the dependent variable (emissions) is calculated to produce parameters U*t. Where emissions are estimated applying a discrete default factor, uncertainty, U*t, is simply calculated by referencing the 95% confidence limit of the default factor estimate, or assigned as zero if an indisputably conservative factor is used.
Purpose of Data	Calculation of uncertainty
Comments	Parameter from module X-UNC

Data / Parameter	$C_{vol_upper,l,t}$ and $C_{vol_lower,l,t}$
Data unit	g C cm ⁻³
Description	Average volumetric carbon content of the peat above and below the water table in stratum l at year t
Source of data	Own measurements
Value applied	0.140 g C / cm ³
Justification	Justified in §4.2 of the PDD. Estimated laboratory analysis soil survey samples.
Purpose of Data	Calculation of project emissions.
Comments	M-PEAT Section 5.6.5 – if subsidence is chosen as proxy. Parameter from module M-PEAT

Data / Parameter	$D_{peatburn,l,t}$
Data unit	m yr ⁻¹
Description	The peat fire depth, or fire scar depth per year
Source of data	Data sources or own measurements
Value applied	0
Justification	Field measurements or remote sensing, expert judgment, literature (e.g., Ballhorn <i>et al.</i> 2009; Couwenberg <i>et al.</i> 2010; Van der Werf <i>et al.</i> 2010; IPCC) and/or datasets of historic burn depths involving the project or similar areas
Purpose of Data	Calculation of project emissions.
Comments	See M-PEAT Section 5.6.8 Parameter from module M-PEAT

Data / Parameter	CC
Data unit	%

Description	Carbon concentration of the peat
Source of data	Anshari et al., 2010; Page et al., 2011; Hooijer et al., 2012
Value applied	55.4%
Justification	Measured by laboratory testing of soil survey samples
Purpose of Data	Calculation of project emissions
Comments	See M-PEAT Section 5.6.5 – if subsidence is chosen as proxy. Parameter from module M-PEAT

Data / Parameter	A_p
Data unit	ha
Description	Total area of peat in the project area (in case of rewetting projects) or proxy area (in case of conservation projects)
Source of data	Module X-STR
Value applied	130,090.00
Justification	Justified in §4.2 of the PDD. See also Module X-STR
Purpose of Data	Calculation of project emissions
Comments	Parameter from module M-PEAT

Data / Parameter	$A_{\text{peatburn-BSL},i,t}$
Data unit	ha
Description	Area of peat burnt in stratum i in year t in the project scenario
Source of data	Module X-STR
Value applied	Not Applicable
Justification	Justified in §4.1 of the PDD. See also Module X-STR. Also, the area of peat burnt can be assessed using field observations and/or remote sensing using best-practice methods (see e.g., Congalton 1991; Congalton et al., 2008). Remote sensing-based data on burnt peat areas must be validated by field observations or other, higher resolution remote sensing data. When using remote sensing, data must be georeferenced into a common geodetic system, for example using the UTM system using best-practice methods in remote sensing (see e.g., Congalton 1991; Congalton et al., 2008). Semi-automated image classification approaches may be applied. Strata must be validated by reference data collected in the field, other official documentation or from recent independent higher resolution remote sensing imagery. See Module X-STR for procedures to delineate all peat strata
Purpose of Data	Calculation of baseline emissions
Comments	Parameter from module M-PEAT & BL-PEAT

Data / Parameter	$\text{GHG}_{\text{peatsoil,BSL},i,t}$
Data unit	$\text{CO}_2\text{e y}^{-1}$
Description	CO_2 emissions from microbial decomposition of the peat soil within the project boundary in the baseline scenario in stratum i in year t
Source of data	Module BL-PEAT
Value applied	47,081,968

Justification	See Module BL-PEAT
Purpose of data	Calculation of baseline emissions
Comments	Parameter from module M-PEAT

Data / Parameter	$L-D_i$
Data unit	%
Description	Likelihood of deforestation in stratum I
Source of data	Module BL-PL
Value applied	1
Justification	For all areas not both under Government control and zoned for deforestation, $L-D_i$ must be equal to 1. For areas under Government control and zoned for deforestation $L-D_i$ must be calculated as the summed proxy areas in the appropriate stratum divided by the areas within these proxy areas that have been deforested within the previous five years.
Purpose of Data	Calculation of projected deforestation
Comments	Alternatively, BCEF, where not directly available, can be calculated as wood density (t dry mass m ⁻³ green volume) * BEF (Biomass Expansion Factor = ratio of aboveground biomass to biomass of the commercial volume). If using BCEFs developed outside the project country (cases I and (d) above under Source of data), it is necessary to validate the applicability of BCEFs used. Parameter is found in BL-PL

Data / Parameter	$GHG_{BSL-PEAT}$
Data unit	t CO ₂ e
Description	Net GHG emissions in the WRC baseline scenario up to year t*
Source of data	Module BL-PEAT
Value applied	48,330,071
Justification	Derived and justified in §4.1 of the PDD in which the baseline is set and calculated as required by BL-PEAT
Purpose of Data	Calculation of baseline emissions
Comments	Parameter is found in module BL-PL A

Data / Parameter	$GHG_{peatburn-BSL,i,t}$
Data unit	t CO ₂ e ha ⁻¹ y ⁻¹
Description	GHG emissions from burning of peat in the baseline scenario in stratum i at year t
Source of data	(IPCC) default factors, literature values or direct measurements
Value applied	Not Applicable
Justification	Justified in §4.1 of the PDD. Procedures for assessing GHG emissions from burning of biomass and peat are provided in Module E-BPB.
Purpose of Data	Calculation of baseline emissions
Comments	Parameter is found in module BL-PEAT

Data / Parameter	GHG _{proxy-CO2,I,t}
Data unit	t CO ₂ e ha ⁻¹ y ⁻¹
Description	Emission of CO ₂ in relation to the chosen proxy in stratum I at year t
Source of data	(IPCC) default factors, literature values or direct measurements IPCC (2013) Supplement to the 2006 IPCC guidelines for national greenhouse gas inventories: Wetlands. Methodological guidance on lands with wet and drained soils and constructed wetlands for wastewater treatment. Gyldenkaerne, S. and Lin, E. (eds). Japan: Institute for Global Environmental Strategies [IGES].
Value applied	73.34
Justification	Justified in §4.1 of the PDD. See also Module M-PEAT
Purpose of Data	Calculation of baseline emissions
Comments	Proxies must comply with VCS requirements on proxies. It must be demonstrated that the proxy used is strongly correlated with CO ₂ emissions by referring to IPCC, literature, or own data. When referring to own data, comparison with literature values must be made. Parameter is found in module BL-PEAT

Data / Parameter	GHG _{proxy-CH4,I,t}
Data unit	t CH ₄ ha ⁻¹ y ⁻¹
Description	Emission of CH ₄ in relation to the chosen proxy in stratum I at year t
Source of data	IPCC (2013) Supplement to the 2006 IPCC guidelines for national greenhouse gas inventories: Wetlands. Methodological guidance on lands with wet and drained soils and constructed wetlands for wastewater treatment. Gyldenkaerne, S. and Lin, E. (eds). Japan: Institute for Global Environmental Strategies [IGES].
Value applied	0.0756
Justification	Justified in §4.1 of the PDD. See also Module M-PEAT
Purpose of Data	Calculation of baseline emissions
Comments	Proxies must comply with VCS requirements on proxies. It must be demonstrated that the proxy used is strongly correlated with CO ₂ emissions by referring to IPCC, literature, or own data. When referring to own data, comparison with literature values must be made. Parameter is found in module BL-PEAT

Data / Parameter	GHG _{peatditch-CO2,I,t}
Data unit	t CO ₂ e ha ⁻¹ y ⁻¹
Description	Emission of CO ₂ from ditch and open water stratum I at year t
Source of data	Project-specific values; appropriate literature sources
Value applied	3.01
Justification	Justified in §4.1 of the PDD. See also Module M-PEAT
Purpose of Data	Calculation of baseline emissions
Comments	Parameter is found in module BL-PEAT

Data / Parameter	GHG _{peatditch-CH₄,I,t}
Data unit	t CO ₂ e ha ⁻¹ y ⁻¹
Description	Emission of CH ₄ from ditch and open water stratum I at year t
Source of data	Intergovernmental Panel on Climate Change. 2013. 2013 Supplement to the 2006 IPCC guidelines for national greenhouse gas inventories: Wetlands. Methodological guidance on lands with wet and drained soils and constructed wetlands for wastewater treatment. Gyldenkaerne, S. and Lin, E. (eds). Japan: Institute for Global Environmental Strategies [IGES].
Value applied	63.25
Justification	Justified in §4.1 of the PDD. See also Module M-PEAT and IPCC 2013GL.
Purpose of Data	Calculation of baseline emissions
Comments	Parameter is found in module BL-PEAT

Data / Parameter	A _{peatsoil-BSL,I,t}
Data unit	ha
Description	Area of peatland (not open water, not burnt) in stratum I in year t in the project scenario
Source of data	Module X-STR
Value applied	15,099
Justification	Justified in §4.1 of the PDD. See also Module X-STR
Purpose of Data	Calculation of baseline emissions
Comments	Parameter is found in module BL-PEAT

Data / Parameter	A _{ditch-BSL,I,t}
Data unit	ha
Description	Total area of ditch and other open water stratum I in year t in the baseline scenario
Source of data	Module X-STR
Value applied	230.3
Justification	Justified in §4.1 of the PDD. See also Module X-STR
Purpose of Data	Calculation of baseline emissions
Comments	Parameter is found in module BL-PEAT

Data / Parameter	t _{PDT-BSL,I}
Data unit	yr
Description	Peat depletion time (PDT) in the baseline scenario in stratum I in years elapsed since the project start
Source of data	Module X-STR
Value applied	>100 years
Justification	Justified in §4.1 of the PDD. See also Module X-STR
Purpose of Data	Calculation of baseline emissions
Comments	Parameter is found in module BL-PEAT and in LK-ASP

Data / Parameter	Hist _{Hai}
Data unit	ha
Description	Average annual area of deforestation by the baseline agent of deforestation in stratum I for the 5 years prior to project implementation
Source of data	Data sources or own measurements

Value applied	0
Justification	Analysis of remote sensing data and/or legal records and/or survey information for lands owned or controlled or previously owned or controlled by the baseline agent of deforestation.
Purpose of Data	Calculation of annual deforestation by the baseline agent
Comments	Must be re-evaluated whenever the baseline is revised. Parameter is found in module LK-ASP

Data / Parameter	GHG _{LK-ECO}
Data unit	t CO ₂ e
Description	Net GHG emissions due to ecological leakage from the WRC project activity up to year t
Source of data	On the ground observations, remotely sensed data, and GIS.
Value applied	0
Justification	Under the applicability conditions of this methodology, ecological leakage affecting the soil (peat) carbon pool does not occur, by ensuring that the effect of hydrological connectivity with adjacent areas is insignificant, as outlined in §5 of LK-ASP.
Purpose of Data	Calculation of Leakage
Comments	All the Project's areas where blocking canals occurs are a significant distance from any adjacent area, thus the risk of ecological is insignificant.

5.2 Data and Parameters Monitored

Data / Parameter	$\Delta C_{WPS-REDD}$
Data unit	t CO ₂ e
Description	Net greenhouse gas emissions within the project area under the project scenario;
Source of data	M-REDD
Description of MM&P	See Module M-REDD
Frequency	Upon each verification event. See also Module M-REDD
Value applied	- 10,084,198 t CO ₂ e
Monitoring equipment	See Module M-REDD
QA/QC	See Module M-REDD
Purpose of data	Calculation of project emissions
Calculation method	See Module M-REDD
Comments	Parameter is found in REDD-MF

Data / Parameter	$\Delta C_{LK-AS,planned}$
Data unit	t CO ₂ e
Description	Net greenhouse gas emissions due to activity shifting leakage for projects preventing planned deforestation
Source of data	Public records of Indonesian HTI concessions from KLHK. See also Module LK-ASP
Description of MM&P	See Module LK-ASP
Frequency	Upon each verification event. See also Module LK-ASP
Value applied	0
Monitoring equipment	GIS and remote sensing images. See also Module LK-ASP
QA/QC	See Module LK-ASP
Purpose of data	Calculation of leakage
Calculation method	See Module LK-ASP

Comments	Parameter is found in REDD-MF
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Data / Parameter	GHG _{WPS-WRC}
Data unit	t CO ₂ e
Description	Net GHG emissions in the WRC project scenario up to year t*
Source of data	Module M-PEAT
Description of MM&P	See Module M-PEAT
Frequency	Upon each verification event. See also Module M-PEAT
Value applied	0
Monitoring equipment	See Module M-PEAT
QA/QC	See Module M-PEAT
Purpose of data	Calculation of project emissions
Calculation method	See Module M-PEAT
Comments	Parameter is found in REDD-MF

Data / Parameter	GHG _{LK-ECO}
Data unit	t CO ₂ e
Description	Net GHG emissions due to ecological leakage from the WRC project activity up to year t
Source of data	Module LK-ECO
Description of MM&P	See Module LK-ECO
Frequency	See Module LK-ECO
Value applied	0
Monitoring equipment	See Module LK-ECO
QA/QC	See Module LK-ECO
Purpose of data	Calculation of leakage
Calculation method	See Module LK-ECO
Comments	Parameter is found in REDD-MF

Data / Parameter	Project Forest Cover Monitoring Map
Data unit	Dimensionless
Description	Map showing the location of forest land within the project area at the beginning of each monitoring period. If within the Project Area some forest land is cleared, the benchmark map must show the deforested areas at each monitoring event
Source of data	Remote sensing in combination with GPS data collected during ground truthing
Description of MM&P	See Module M-REDD
Frequency	See Module M-REDD
Value applied	Maps provided for 2022-2082. No evidence or indication of deforestation or forest degradation.
Monitoring equipment	See Module M-REDD
QA/QC	See Module M-REDD
Purpose of data	The minimum map accuracy must be 90% for the classification of forest/non-forest in the remote sensing imagery. If the classification accuracy is less than 90% then the map is not acceptable for further analysis. More remote sensing data and ground truthing data will be needed to produce a product that reaches the 90% minimum mapping accuracy. Frequency: Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Calculation method	See Module M-REDD

Comments	Where forest land contains more than one forest class, the map must be stratified into forest classes using module X-STR. Parameter is from module M-REDD
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Data / Parameter	ADefPA,I,u,t
Data unit	Ha
Description	Area of recorded deforestation in the project area in stratum I converted to land use u at time t
Source of data	Remote sensing imagery
Description of MM&P	See Module M-REDD
Frequency	Frequency: Must be monitored at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Value applied	0 ha. There is no deforestation or forest degradation detected during the monitoring period.
Monitoring equipment	See Module M-REDD
QA/QC	See Module M-REDD
Purpose of data	Calculation of deforestation
Calculation method	See Module M-REDD
Comments	Ex-ante, an estimation shall be made of deforestation in the with-project case. If the belief is that zero deforestation will occur within the project boundaries then this parameter may be set to zero if clear infrastructure, hiring, and policies are in place to prevent deforestation. Parameter is from module M-REDD

Data / Parameter	FLU
Data unit	Dimensionless
Description	Land use factor before or after conversion
Source of data	Stock Change Factors are provided in Tables 5.5, 5.10, and 6.2 of the IPCC 2006GL Volume 4
Description of MM&P	See Module M-REDD
Frequency	See Module M-REDD
Value applied	Factor = 1. No FLU because there is no skid trail creation detected during the monitoring period.
Monitoring equipment	See Module M-REDD
QA/QC	See Module M-REDD
Purpose of data	"Stock Change Factors as defined in IPCC 2006GL are equal to the carbon stock in the altered condition as a proportion of the reference carbon stock. The management factor after conversion can be conservative
Calculation method	See Module M-REDD
Comments	Parameter is from module M-REDD

Data / Parameter	FMG
Data unit	Dimensionless
Description	Management factor before or after conversion
Source of data	Stock Change Factors are provided in Tables 5.5, 5.10, and 6.2 of the IPCC 2006GL Volume 4
Description of MM&P	See Module M-REDD
Frequency	See Module M-REDD
Value applied	Factor = 1. No FMG because there is no skid trail creation detected during the monitoring period.

Monitoring equipment	See Module M-REDD
QA/QC	See Module M-REDD
Purpose of data	"Stock Change Factors as defined in IPCC 2006GL are equal to the carbon stock in the altered condition as a proportion of the reference carbon stock.
Calculation method	See Module M-REDD
Comments	Parameter is from module M-REDD

Data / Parameter	F_i
Data unit	Dimensionless
Description	Input factor before or after conversion
Source of data	Stock Change Factors are provided in Tables 5.5, 5.10, and 6.2 of the IPCC 2006GL Volume 4
Description of MM&P	See Module M-REDD
Frequency	See Module M-REDD
Value applied	Factor = 1.
Monitoring equipment	See Module M-REDD
QA/QC	See Module M-REDD
Purpose of data	"Stock Change Factors as defined in IPCC 2006GL are equal to the carbon stock in the altered condition as a proportion of the reference carbon stock.
Calculation method	The land use factor after conversion can be conservatively assumed to equate 1, the default value for medium input.
Comments	Parameter is from module M-REDD

Data / Parameter	$A_{planned,i}$
Data unit	Ha
Description	Total area of planned deforestation over the entire project lifetime for stratum i
Source of data	Data sources or own measurements
Description of MM&P	GPS coordinates and/or remote sensing data and/or legal parcel records. Ex ante, $A_{planned,i}$ must be determined as described in Module BL-PL
Frequency	Must be examined at least every 5 years or if verification occurs on a frequency of less than every 5 years examination must occur prior to any verification event
Value applied	30,514 ha of planned deforestation
Monitoring equipment	See Module BL-PL
QA/QC	See section 9.3 of REDD+ MF or other VCS methodology that uses this module.
Purpose of data	Calculation of baseline deforestation
Calculation method	See Module BL-PL
Comments	See Module BL-PL Parameter is from modules M-REDD, BL-PL & LK-ASP

Data / Parameter	$\Delta C_{BSL,i}$
Data unit	$tCO_2e\ ha^{-1}$
Description	Net carbon stock changes from planned deforestation in all pools in the baseline stratum i
Source of data	Module BL-PL
Description of MM&P	See Module BL-PL
Frequency	See Module BL-PL

Value applied	18,508,104
Monitoring equipment	See Module BL-PL
QA/QC	See Module BL-PL
Purpose of data	Calculation of leakage emissions, analysis of remote sensing data and/or legal records and/or survey information for lands owned or controlled or previously owned or controlled by the baseline agent of deforestation.
Calculation method	See Module BL-PL
Comments	Must be re-evaluated whenever the baseline is revised. Parameter is found in modules M-REDD & LK-ASP

Data / Parameter	CAB_tree, Secondary forest
Data unit	t CO ₂ e /ha
Description	Carbon stock in aboveground biomass of trees in plot spa in stratum i
Source of data	NRS Forest Inventory 2023
Description of MM&P	See Module CP-AB
Frequency	See Module CP-AB
Value applied	287.1
Monitoring equipment	See Module CP-AB
QA/QC	See Module CP-AB
Purpose of data	Calculation of aboveground biomass
Calculation method	See Module CP-AB
Comments	Parameter is from module M-REDD

Data / Parameter	CAB_tree,heath forest
Data unit	t CO ₂ e /ha
Description	Carbon stock in aboveground biomass of trees in plot sp in stratum i
Source of data	Nrs Forest Inventory
Description of MM&P	See Module CP-AB
Frequency	See Module CP-AB
Value applied	215.8
Monitoring equipment	See Module CP-AB
QA/QC	See Module CP-AB
Purpose of data	Calculation of aboveground biomass
Calculation method	See Module CP-AB
Comments	Parameter is from module M-REDD

Data / Parameter	CAB_tree,scrub
Data unit	t CO ₂ e /ha
Description	Carbon stock in aboveground biomass of trees in plot sp in stratum i
Source of data	See Module CP-AB
Description of MM&P	See Module CP-AB
Frequency	See Module CP-AB
Value applied	123.3
Monitoring equipment	See Module CP-AB
QA/QC	See Module CP-AB
Purpose of data	Calculation of aboveground biomass
Calculation method	See Module CP-AB
Comments	Parameter is from module M-REDD

Data / Parameter	$A_{WPS,I,t}$ Or $A_{I,t}$
Data unit	Ha
Description	Area of project stratum I in year t
Source of data	Own assessment
Description of MM&P	GIS coverages, ground survey data and/or remote imagery (satellite or aerial photographs), as outlined in Section 5. The area of peat burnt ($A_{peatburn-WPS,I,t}$ for the project scenario from Module <i>M-PEAT</i> and $A_{peatburn-BSL,I,t}$ for the baseline scenario from Module <i>BL-PEAT</i>) and area of peatland (not open water, not burnt) ($A_{peatsoil-WPS,I,t}$ for the project scenario from Module <i>M-PEAT</i> and $A_{peatsoil-BSL,I,t}$ for the baseline scenario from Module <i>BL-PEAT</i>) determine the difference between the remaining carbon stock in the project scenario and baseline scenarios after 100 years. In the procedures in Section 5.4 these areas are together referred to as $A_{WPS,I,t}$ and $A_{BSL,I,t}$.
Frequency	At each monitoring event
Value applied	15,099.0
Monitoring equipment	See Module M-PEAT
QA/QC	See Section 9.3 of <i>REDD+ MF</i> or other VCS methodology that uses this module.
Purpose of data	Calculation of project emissions
Calculation method	See Module M-PEAT
Comments	the area for $A_{WPS,I,t100}$ must be used. Parameter is from module X-STR

Data / Parameter	$Rate_{peatloss-WPS,I,t}$
Data unit	m yr ⁻¹
Description	Rate of peat loss due to subsidence and fire in the project scenario in stratum I in year t
Source of data	Module M-PEAT
Description of MM&P	See Module M-PEAT
Frequency	See Module M-PEAT
Value applied	The rate of peat loss due to subsidence and fire due in the project scenario is approximately 1.43 cm/year over the monitoring period.
Monitoring equipment	See Module M-PEAT
QA/QC	Calculation of baseline emissions
Purpose of data	See Module X-STR
Calculation method	See Module X-STR
Comments	Parameter is from module X-STR

Data / Parameter	$GHG_{peatsoil,CO2,I,t}$
Data unit	tCO ₂ e yr ⁻¹
Description	GHG emissions from microbial decomposition of the peat soil in stratum I in year t
Source of data	Module M-PEAT
Description of MM&P	See Module M-PEAT
Frequency	See Module M-PEAT
Value applied	GHG emissions from microbial decomposition of the peat soil within the project boundary in the baseline scenario during the

	monitoring period (12 September 2022 to 11 September 2082) is 47,081,968 tCO ₂ e.
Monitoring equipment	See Module BL-PEAT
QA/QC	See Module BL-PEAT
Purpose of data	Calculation of project emissions. See module M-PEAT
Calculation method	See Module M-PEAT
Comments	Parameter is from module X-STR

Data / Parameter	EREDD,WPS,SS,I, Pool#
Data unit	tCO ₂ e
Description	Percentage of uncertainty of Carbon stock or GHG sources (e.g., trees, down dead wood, soil organic carbon, emission from fertilizer addition, emission from biomass burning etc.) in the project scenario
Source of data	The terms denoting significant carbon stocks, GHG sources or leakage emissions used in calculating net emission reductions from the following relevant modules: CP-AB, CP-D, CP-L, CP-S, CP-W, E-BB, E-FFC, E-NA.
Description of MM&P	See Module X-UNC
Frequency	See Module X-UNC
Value applied	5.5%
Monitoring equipment	See Module X-UNC
QA/QC	See Module X-UNC
Purpose of data	Calculation of uncertainty
Calculation method	See Module X-UNC
Comments	The ex-ante estimation shall be derived directly from the estimations originating in the relevant modules: CP-AB, CP-D, CP-L, CP-S, CP-W, E-BB, E-FFC, E-NA. Parameter stems from module X-UNC

Data / Parameter	URED, WPS, SS, I, pool#
Data unit	%
Description	Percentage uncertainty (expressed as 95% confidence interval as a percentage of the mean where appropriate) for carbon stocks and greenhouse gas sources in the project case (1, 2...n represent different carbon pools and/or GHG sources)
Source of data	Calculations arising from field measurement data
Description of MM&P	See Module X-UNC
Frequency	See Module X-UNC
Value applied	The calculated uncertainty in the AGB carbon stock inventory was 8.65%.
Monitoring equipment	See Module X-UNC
QA/QC	See Module X-UNC
Purpose of data	“Calculation of uncertainty. Uncertainty in pools derived from field measurement with 95% confidence interval calculated as the standard error of the averaged plot measurements in each stratum multiplied by the t value for the 95% confidence level.
Calculation method	For wood products the uncertainty should be the confidence interval around the volume of timber extracted from the forest. For emission sources conservative parameters should be used sufficient to allow the uncertainty to be set as zero.”

Comments	The ex-ante estimation shall be derived directly from the estimations originating in the relevant modules: CP-AB, CP-D, CP-L, CP-S, CP-W, E-BB, E-FFC, E-NA. Parameter stems from module X-UNC
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Data / Parameter	GHG _{peatburn-WPS,I,t}
Data unit	tCO ₂ e ha ⁻¹ y ⁻¹
Description	CO ₂ emissions from burning of peat within the project boundary in the project scenario in stratum <i>I</i> in year <i>t</i>
Source of data	IPCC default factors, literature, or direct measurements
Description of MM&P	See Module M-PEAT
Frequency	At each monitoring period
Value applied	0 tCO ₂ e ha ⁻¹ y ⁻¹ . No fire or burning of peat detected during the monitoring period.
Monitoring equipment	GIS and remote sensed images; see also Module M-PEAT
QA/QC	See Module M-PEAT
Purpose of data	Calculation of project emissions
Calculation method	See Module M-PEAT
Comments	Parameter is found in M-PEAT

Data / Parameter	GHG _{proxy-CO₂,I,t}
Data unit	tCO ₂ e ha ⁻¹ y ⁻¹
Description	Soil emission of CO ₂ as per the chosen proxy in stratum <i>I</i> at year <i>t</i>
Source of data	(IPCC) default factors, literature values or direct measurements
Description of MM&P	The estimation of GHG emissions in rewetted (for RPD projects) or undrained or partially drained (for CUPP projects) peat follows similar procedures as described in Module <i>BL-PEAT</i> .
Frequency	At each monitoring period
Value applied	Soil emission of CO ₂ in rewetted peat was estimated to be 0 tCO ₂ e ha ⁻¹ y ⁻¹ .
Monitoring equipment	See Module BL-PEAT
QA/QC	See Section 9.3 of REDD+ MF or other VCS methodology that uses this module
Purpose of data	Calculation of baseline emissions.
Calculation method	See Module BL-PEAT
Comments	Proxies must comply with VCS requirements on proxies. ¹¹ It must be demonstrated that the proxy used is strongly correlated with CO ₂ emissions by referring to IPCC, literature, or own data. When referring to own data, comparison with literature values must be made. Parameter is found in M-PEAT

Data / Parameter	GHG _{proxy-CH₄,I,t}
Data unit	t CH ₄ ha ⁻¹ y ⁻¹
Description	Soil emission of CH ₄ as per the chosen proxy in stratum <i>I</i> at year <i>t</i>
Source of data	(IPCC) default factors, literature values or direct measurements
Description of MM&P	The estimation of GHG emissions in rewetted (for RPD projects) or undrained or partially drained (for CUPP projects) peat follows similar procedures as described in Module <i>BL-PEAT</i> .
Frequency	At each monitoring period
Value applied	Soil emission of CH ₄ in rewetted peat was estimated to be 0 t CH ₄ ha ⁻¹ y ⁻¹ .
Monitoring equipment	See Module BL-PEAT

QA/QC	See Section 9.3 of <i>REDD+ MF</i> or other VCS methodology that uses this module
Purpose of data	Calculation of project emissions
Calculation method	See Module BL-PEAT
Comments	Proxies must comply with VCS requirements on proxies. ¹² It must be demonstrated that the proxy used is strongly correlated with CO ₂ emissions by referring to IPCC, literature, or own data. When referring to own data, comparison with literature values must be made. Parameter is found in M-PEAT

Data / Parameter	Apeatsoil-WPS,I,t
Data unit	Ha
Description	Area of peatland (not open water, not burnt) in stratum I in year t in the project scenario
Source of data	Module X-STR
Description of MM&P	See Module X-STR
Frequency	See Module X-STR
Value applied	15,099 ha
Monitoring equipment	See Module M-PEAT
QA/QC	See Section 9.3 of <i>REDD+ MF</i> or other VCS methodology that uses this module
Purpose of data	Calculation of baseline emissions. Module X-STR
Calculation method	See Module X-STR
Comments	Parameter is found in M-PEAT

Data / Parameter	Aditch-WPS,I,t
Data unit	Ha
Description	Total area of ditch and other open water stratum I in year t in the baseline scenario
Source of data	Module X-STR
Description of MM&P	See Module X-STR
Frequency	See Module X-STR
Value applied	230.3
Monitoring equipment	See Module X-STR
QA/QC	See Section 9.3 of <i>REDD+ MF</i> or other VCS methodology that uses this module
Purpose of data	Calculation of project emissions. Module X-STR
Calculation method	See Module X-STR
Comments	Parameter is found in M-PEAT

Data / Parameter	Apeatburn-WPS,I,t
Data unit	Ha
Description	Area of peat burnt in stratum I in year t in the project scenario
Source of data	Module X-STR
Description of MM&P	The area of peat burnt can be assessed using field observations and/or remote sensing using best-practice methods (see e.g., Congalton 1991; Congalton <i>et al.</i> , 2008). Remote sensing-based data on burnt peat areas must be validated by field observations or other, higher resolution remote sensing data. When using remote sensing, data must be georeferenced into a common geodetic system, for example using the UTM system using best-practice methods in remote sensing (see e.g., Congalton 1991; Congalton <i>et al.</i> , 2008). Semi-automated image classification approaches may be applied. Strata must be validated by reference

	data collected in the field, other official documentation or from recent independent higher resolution remote sensing imagery.
Frequency	See Module X-STR
Value applied	Area = 0 hectares. No peat burning was detected during the monitoring period.
Monitoring equipment	See Module X-STR
QA/QC	See Section 9.3 of <i>REDD+ MF</i> or other VCS methodology that uses this module
Purpose of data	Calculation of project emissions.
Calculation method	See Module M-PEAT
Comments	Parameter is found in M-PEAT

Data / Parameter	GHG _{peatditch-CO2,I,t}
Data unit	CO ₂ e ha ⁻¹ y ⁻¹
Description	Emission of CO ₂ from ditch and open water stratum I at year t
Source of data	Project-specific values; appropriate literature sources
Description of MM&P	See Module M-PEAT
Frequency	See Module M-PEAT
Value applied	3.01 tCO ₂ e ha ⁻¹ y ⁻¹ . Source: Intergovernmental Panel on Climate Change. 2013. 2013 Supplement to the 2006 IPCC guidelines for national greenhouse gas inventories: Wetlands. Methodological guidance on lands with wet and drained soils and constructed wetlands for wastewater treatment. Gyldenkaerne, S. and Lin, E. (eds). Japan: Institute for Global Environmental Strategies [IGES].
Monitoring equipment	See Module M-PEAT
QA/QC	See Module M-PEAT
Purpose of data	Calculation of baseline emissions. See Module M-PEAT
Calculation method	See Module M-PEAT
Comments	Parameter is found in M-PEAT

Data / Parameter	GHG _{peatditch-CH4,I,t}
Data unit	CO ₂ e ha ⁻¹ y ⁻¹
Description	Emission of CH ₄ from ditch and open water stratum I at year t
Source of data	Project-specific values; appropriate literature sources
Description of MM&P	See Module M-PEAT
Frequency	See Module M-PEAT
Value applied	2,259 kg CH ₄ ha ⁻¹ yr ⁻¹ equivalent to 63.2 tCO ₂ e ha ⁻¹ y ⁻¹ . Source: Intergovernmental Panel on Climate Change. 2013. 2013 Supplement to the 2006 IPCC guidelines for national greenhouse gas inventories: Wetlands. Methodological guidance on lands with wet and drained soils and constructed wetlands for wastewater treatment. Gyldenkaerne, S. and Lin, E. (eds). Japan: Institute for Global Environmental Strategies [IGES].
Monitoring equipment	See Module BL-PEAT
QA/QC	See Module M-PEAT
Purpose of data	Calculation of baseline emissions. See Module X-STR
Calculation method	See Module M-PEAT
Comments	Parameter is found in M-PEAT

Data / Parameter	N
Data unit	Dimensionless

Description	Number of sample points
Source of data	Recording and archiving of number of sample points
Description of measurement methods and procedures to be applied (Description of MM&P)	See Module CP-AB
Frequency of monitoring/recording (Frequency)	Monitoring must occur at least every ten years for baseline renewal. Where carbon stock enhancement is included, monitoring shall occur at least every five years
Value applied	Not Applicable
Monitoring equipment	See Module CP-AB
QA/QC procedures to be applied (QA/QC)	See Module CP-AB
Purpose of data	Monitoring
Calculation method	See Module CP-AB
Comments	Where carbon stock estimation occurs only for determination of the baseline this parameter shall be known <i>ex-ante</i> . Where part of project monitoring, <i>ex-ante</i> the number of sample plots shall be estimated based on projected sample

Data / Parameter	DBH
Data unit	Cm
Description	Diameter at breast height of a tree in cm
Source of data	Field measurements in sample plots
Description of MM&P	Typically measured 1.3m aboveground. Measure all trees above some minimum DBH in the sample plots. The minimum DBH varies depending on tree species and climate; for instance, the minimum DBH may be as small as 2.5 cm or as high as 20 cm, but for humid tropical forests 10 cm is commonly used. Minimum DBH employed in inventories is held constant for the duration of the project.
Frequency	Monitoring must occur at least every ten years for baseline renewal. Where carbon stock enhancement is included, monitoring shall occur at least every five years
Value applied	Not Applicable
Monitoring equipment	See Module CP-AB
QA/QC	Standard quality control / quality assurance (QA/QC) procedures for forest inventory including field data collection and data management shall be applied. Use or adaptation of QA/QCs already applied in national forest monitoring, or available from published handbooks, or from the IPCC GPG LULUCF 2003, is recommended.
Purpose of data	Carbon stock in AGB
Calculation method	See Module CP-AB
Comments	Where carbon stock estimation occurs only for determination of the baseline this parameter shall be known <i>ex-ante</i> . Where part of project monitoring, <i>ex-ante</i> DBH shall be estimated based on projections of growth.

Data / Parameter	H
Data unit	M
Description	Total height of tree
Source of data	Field measurements in sample plots
Description of MM&P	See Module CP-AB
Frequency	Monitoring must occur at least every ten years for baseline renewal.

	Where carbon stock enhancement is included, monitoring shall occur at least every five years
Value applied	Not Applicable
Monitoring equipment	See Module CP-AB
QA/QC	See Module CP-AB
Purpose of data	See Module CP-AB
Calculation method	See Module CP-AB
Comments	Where carbon stock estimation occurs only for determination of the baseline this parameter shall be known <i>ex-ante</i> . Where part of project monitoring, <i>ex-ante</i> height shall be estimated based on projections of growth.

Data / Parameter	Ecological leakage process as described in Table 5.1
Data unit	Not Applicable
Description	Not Applicable
Source of data	On the ground observations, remote sensed data, and GIS
Description of MM&P	See Module LK-ECO
Frequency	At each monitoring
Value applied	0
Monitoring equipment	See Module LK-ECO
QA/QC	See Module LK-ECO and REDD+ MF
Purpose of data	Assessing avoidance of leakage emissions
Calculation method	See Module LK-ECO for process – not calculations
Comments	Not Applicable

5.3 Monitoring Plan

The Proponent will implement a Monitoring Reporting and Verification (MRV) system as described in the following sections

5.3.1 Monitoring Methods

The Project is required to undertake periodic monitoring of the Project and leakage area.

The Project Monitoring Reporting and Verification (MRV) system uses a dynamic system that seeks to identify, assess, and create a mitigation plan for potential risks that might arise concerning the Project. The system is established to ensure a process for monitoring Project progress and documenting lessons learned or corrections that may be needed and incorporating them into Project decision-making for future monitoring periods.

The Project Proponent has a set of procedures and systems in place that regulate the management of documents, the procedures for verification and validation, etc. The company has developed quality assurance and quality control (QA/QC) systems. These procedures will establish how the company will handle complaints or non-conformities, etc.

The MRV Plan will be prepared during the project implementation; it is based on 10 main activities:

1. Remote Sensed Monitoring – Natural Disturbances/Anthropogenic Disturbances
2. Field Monitoring
 - a. Permanent Sample Plot (PSP) Inventory
 - b. Illegal Activities and Fire
 - c. Ground Water Table & Subsidence Monitoring
 - d. Changes of Peat Carbon Stock (i.e., bulk density and carbon contents) & Peat Depth
 - e. Weather Monitoring
 - f. Biodiversity Monitoring
3. Leakage Monitoring
4. Uncertainty Monitoring
5. Non-Permanence Risk Assessment
6. Quality Assurance/ Quality Control
7. Training
8. Data and Document Management
9. VCU Calculations
10. Stakeholder Access to Online Selected Documents

5.3.2 General Approaches for Monitoring

The monitoring plan incorporates the latest scientific findings and new technologies as they become available to increase effectiveness of existing practices systematically.

The monitoring plan includes monitoring changes in land cover, peat thickness and water table level, as per the latest VCS VM0007 REDD+ Methodology Framework (REDD+ MF) requirements.

5.3.3 MRV Plan Content

Remotely Sensed Monitoring

Prior to verification and at least every five years, satellite images will be acquired by the Project Proponent of the Project Area. Those images will be analyzed to determine any evidence of forest loss or forest changes, either from natural disturbances or from human-induced changes.

Field Monitoring

Permanent Sample Plot Inventory

The Project has established a network of 64 Permanent Sample Plots that will be monitored upon verification but at least every five years. In practice, at least 50% of the plots will be measured at each monitoring event.

Prior to plot measurement, the labels on each tree will be checked. In-growth (trees that have attained 5cm DBH since the previous plot measurement) will be identified and labelled for measurement. Trees that have died since the previous plot measurement will be identified – these should be measured in the current measurement event. Trees that were declared dead in the previous measurement event should be checked to confirm the “dead” status – these trees can be confirmed as dead and permanently removed from the live tree list for subsequent PSP measurements.

The parameters and forest dynamics will then be measured, analyzed, and compiled to estimate the carbon stock changes for above-ground biomass and regrowth of the forest.

Illegal Activities and Fire

Illegal logging is not considered a viable threat of the Project as there are no communities that reside directly in the Project Area. Furthermore, the closest communities have limited means to access the Project Area (i.e., by boat or on foot without roads). Nonetheless, on-the-ground conditions can change rapidly in Kalimantan.

The Project will maintain guard posts at strategic locations in the Project Area. The Project staff will determine the number and best locations for the guard posts and establish them in the first three years of the project. The guard posts will record and monitor all access into the Project Area. Regular field patrols by boat and foot will occur in the project area both for unauthorized activity and for fire.

The Project will monitor all areas for fire through SMART Patrols.

Ground Water Table & Subsidence Monitoring

The Project will install several in situ automatic level-loggers, dip wells and subsidence poles to monitor the peat characteristics. The Project Proponent will seek advice about the design of peat monitoring systems and install water monitoring systems within 2 years of project commencement. These will be used to monitor water conditions and assess ecological leakage issues.

Changes of Peat Carbon Stock & Peat Depth

In line with water table levels, changes in carbon stocks must also be monitored. Monitoring is required at least every 10 years, but the Project is committed to monitoring at least once every 5 years. Peat depth will also be reassessed at least every 10 years at the baseline review event. The sample size of the peat depth in line with the current methodological requirements unless a methodological deviation is agreed to with the VCS. It can be assumed that the sample size will be at least as intensive as past efforts.

All resampling will be conducted in transects that cross the concessions in line with the current methodological requirements to ensure a new depth map can be generated. The Project will also work with the VCS to consider the appropriateness of the above considering the updated requirements in VCS VMD046 (M-PEAT)¹². The change of carbon stocks in peats indicate the rate of peat accumulation if the change is positive. On the other hand, the negative change of carbon stock indicates peat as a source of carbon. The ratio of carbon and nitrogen indicates the potential peat decomposition.

Weather Monitoring

Currently, the Project has access to weather data from BKM (Indonesia Meteorology, Climatology, and Geophysical Agency) which operates a weather station in Sanggu, Buntok. Rainfall, temperature, wind speed and humidity are essential variables for assessing the health of peatlands and will be monitored in an ongoing fashion. Weather monitoring is also important to assist with monitoring water balance, anticipating dry seasons and documenting when rain deficit occurs.

Biodiversity Monitoring

The Project plans to implement SMART Patrol activities in collaboration with local communities. The local communities will be trained to collect biodiversity data and the staff of the Project Proponent will facilitate the documentation process. Camera traps will be installed in the Project Area at the later stage of Project implementation to support the biodiversity monitoring, particularly for the animal species.

¹² VMD0016 v1.2 (X-STR) requires 4 measurements per km², which effectively means 640 depth point measurements in the 16,000 ha Project area. The methodological requirement of VMD0016 at §5.3.1 is neither reasonable nor necessary to produce an accurate peat depth map.

Leakage Monitoring

Appropriate production and water table data from the Project Area and Project Zone will be collected, analyzed, and compiled upon each verification event to estimate activity shifting and ecological leakage.

Uncertainty Monitoring

Uncertainty linked to the parameters monitored will be automatically calculated using excel models.

Non-Permanence Risk Assessment

The non-permanence risk tool will be reviewed upon each verification event and updated with respect to any relevant data collected.

Quality Assurance/Quality Control

The Project will implement a rigorous QA/QC system to ensure the long-term accuracy of the data that is collected, to ensure a robust data storage system and to create a systematic data management structure. This system will be reviewed annually to guarantee the accuracy of the MRV program.

Training

All new personnel participating in PSPs inventory/control, water table monitoring, etc. will be trained in following PSP Inventory/Control/Monitoring Procedures specifications and standard Project practices, as much as is reasonably possible. Training will be provided to ensure consistent data collection of all monitoring equipment and techniques.

Data and Document Management

All data and documents are reviewed and controlled, managed, and stored in a manner that complies with standard Project practices, or as much as is reasonably possible. Data will be stored and managed following the Project's data management procedures and will be kept for at least 10 years.

VCU Calculation

For each verification event, VCU vintage is estimated and updated based on the parameters monitoring results.

Stakeholder Access to Online Selected Documents

The role of stakeholders is significant for contributing to the performance of the Project. Having access to selected monitoring documents would help stakeholders to participate in the monitoring platform. The Project will report to stakeholders at least annually, including the local

community through annual reporting which will be available online. The Community Relations teams will also provide reporting directly to the local communities.

5.3.4 Sampling Approach

In general terms though, the overarching goal of monitoring is to ensure the accurate scientific description of the changes to the landscape over time. The Project therefore aims to achieve a target precision level for its monitoring at a 95% confidence interval, +/- 10%, which is sufficient for the requirements of VCS and GHG project level monitoring. Should the monitoring not achieve the target precision requirements, then additional monitoring will be conducted until the targets are met.

REDD Project Category

For each monitoring period, the Project will acquire appropriate data from remote sensing platforms to determine if there are obvious changes in land cover, if there are obvious areas of disturbance, this will be investigated and sampled for AGB. Otherwise, AGB and regrowth of the project area where GHG crediting takes place will be conducted by remeasurement of PSPs. Any areas that might have been subject to fire disturbance will also be sampled for loss of AGB and loss of peat.

Remote Sensing Monitoring

The Project will collect remote sensing imagery on a continuous basis. Images acquired are for the entirety of the project area and from multiple satellite sources, primarily Landsat 8 (15m resolution) and Sentinel (resolution) and others as required.

Above ground biomass

40 AGB inventory plots have been established. It is assumed that these plots will be completely remeasured for the baseline reassessment prior to 2026.

Illegal Activities and Fire

Additionally, security rangers man chosen guard-posts on the boundary of the Project Area on river access ways and roadways. All movements of people into the Project Area will be recorded and reported as much as practicable and suspicious activities are managed through security SOP and protocols. The Project Proponent will monitor the potential for illegal activities and fires on a 24/7 basis. Additionally, security rangers man guard-posts on the boundary of the Project area on river access ways and roadways. All movements of people into the Project Area will be recorded and reported, and suspicious activities are managed through security SOP and protocols.

The Project Proponent has a sophisticated hotspot fire monitoring program and Fire Management Plan developed in conjunction with the University of Palangka Raya. The Project Proponent will receive regular reports on fire risks and fires within their boundaries and within the Project. A

procedure is in place to determine fire management activities in response to the daily fire risk assessment.

WRC Project Category

For each monitoring period the Project Proponent will assess the effectiveness of the WRC program and its ability to maintain a natural water table level. This will be done by regular monitoring of water table levels (via dip wells or level-loggers) and potential increase or decrease of the peat (via subsidence poles). The project will also monitor rainfall daily to correlate water table with natural precipitation.

Ground Water Table & Subsidence Monitoring

The Project Proponent will maintain an extensive network of ground water and subsidence monitoring stations.

Peat Carbon Stock

Peat Carbon stock will be resampled at each baseline event. Peat sampling is conducted for depth and carbon content pursuant to the respective SOPs. Ongoing sampling will be done to at least the same level of intensity that was originally undertaken for the Project. However, as the sampling requirements for peat have altered with the latest methodological updates in September of 2020, sampling will be conducted in transects crossing the Project Area at the sampling rate noted above in §5.3.2.1. It is assumed that these Peat Carbon stock and depth will be completely remeasured for the baseline reassessment prior to December 2031.

5.3.5 Procedures for handling non-conformances with the validated monitoring plan

The Project Proponent maintains a system of procedures to handle internal auditing and non-conformities that are addressed through the Project Proponents SOPs that incorporate multiple QA/QC measures. All QA/QC systems are based on ISO certified systems. Please note that at the time of this report the Project Proponent has commenced the procedures to become ISO certified. All data is collected, recorded, stored, and reported. All data is subject to review and approval by team leaders or project managers concerning specific written SOPs, which cover different levels of operations and data management. SOPs will be developed and made available to validators on request.

5.3.6 Organizational structure, responsibilities, and competencies of the personnel

The Project Proponent is developing an organizational structure to meet the specific operational needs and functions of the Project. A generic process and governance diagram has been prepared and shown in the following section. The Project Proponent is now in the process of defining roles, responsibilities and competencies required for the Project and is actively recruiting staff.

5.3.7 Governance and Implementation Structures

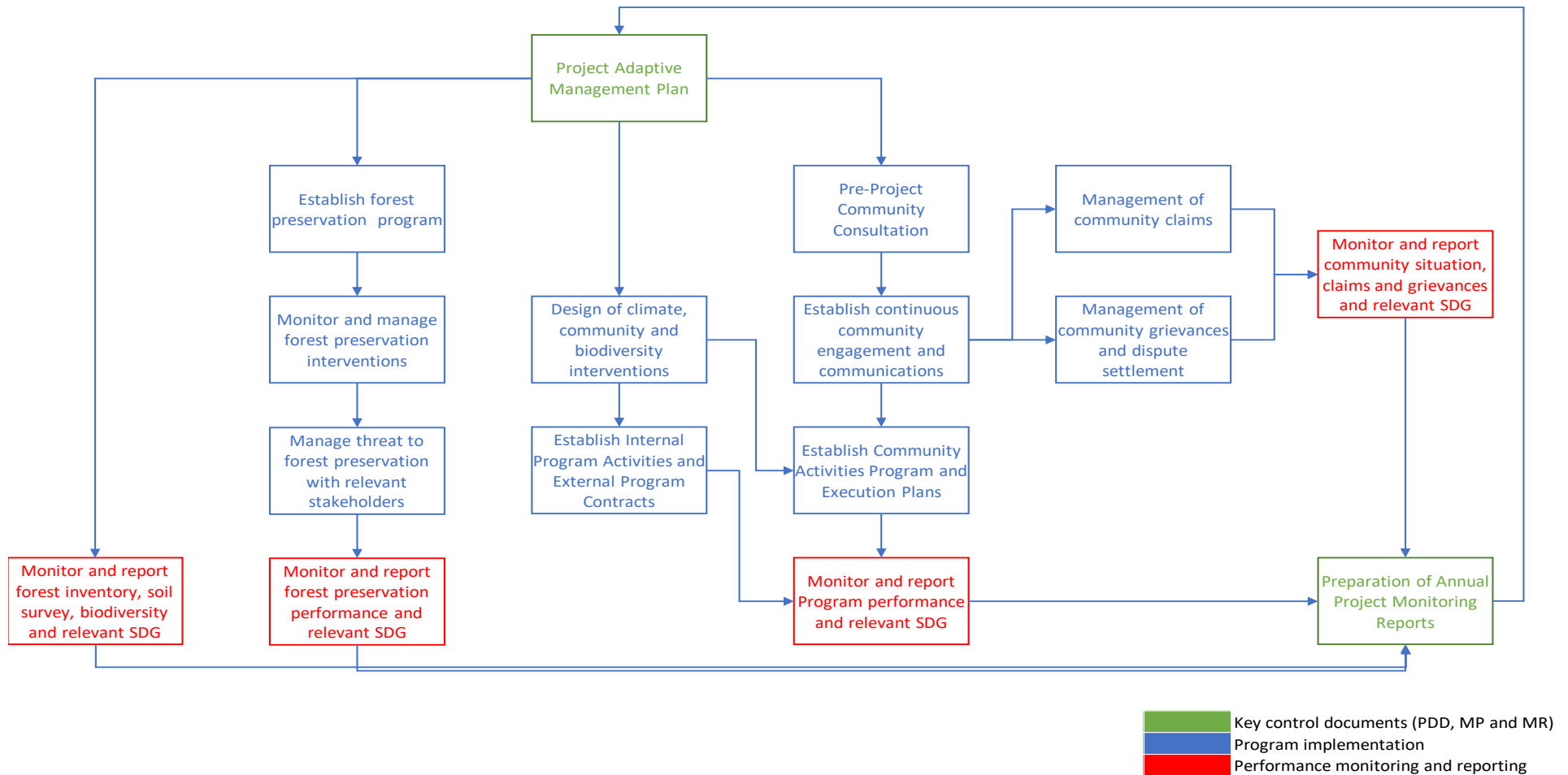


Figure 5-1 Project Reporting and Monitoring Process

The Project Proponent plans to implement the above process and monitoring systems (See diagram above), with responsibilities for each team / division as set out below.

Division	Responsibilities
Carbon General Management Team	Preparation of adaptive management and quality assurance plan
	Preparation of monitoring report
	Maintain program Quality assurance plan
Forest Preservation and Monitoring Division	Managing and reporting forest security program
	Monitoring forest, climate, and biodiversity status
Community Relations Team	Community ongoing consultation and engagement
	Negotiation of community agreements
	Management of community engagement
	Management of claims and grievances
Operations Management Division	Design of climate, community, and biodiversity programs
	Management of field interventions, data compilation, processing for progress reporting and quality control
Administration Division	Financial accounts, human resources

Table 5-1 Project roles and responsibilities

APPENDIX 1: Commercially Sensitive Information

The following is a non-exclusive list of information that the Project has deemed commercially sensitive and is not publicly available but will be made available to the auditor during validation and verification.

Section	Information	Justification
	Financial Projections and Budgets	Commercially sensitive and confidential to the Project Proponent and its investors.
	Digital Shape Files of the Project Area, and any other GIS shape files used to delineate any areas in or around or impacting the Project.	Subject to Copyright.
	Satellite and Drone Imagery	Subject to copyright.
	Governmental communications and documents received from government departments for the confidential use of the Project Proponent in connection with the Project.	Confidential between the relevant government departments and the Project Proponent.
	Original Biomass Inventories including filed notes, hardcopies, digital copies, etc.	Commercially sensitive and too detailed for public inspection.
	Original Community and Social Surveys including filed notes, hardcopies, digital copies, etc.	Commercially sensitive and contain personal data.
	Legal Agreements between implementing partners, technical partners, communities, and government.	Confidential to the Parties.

	Project Models used to generate carbon emission reductions and removals, including any relevant field data, remote sensing data, etc.	Commercially sensitive.
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APPENDIX 2: Stakeholder Identification

The stakeholder identification process was carried out using PRA principles with the following steps:

1. A pre-survey was conducted under RRA principles, including transect, field observation, informal discussions and FGD at health facilities, schools, small and medium enterprise groups, and women groups.
2. Interviews and FGD activities were carried out to find out: (1) sources of livelihood for the community in and around the Project area, (2) Land use and land ownership status, and (3) Important areas that have cultural, historical and cultural values, including the need for traditional rituals, (4). Important figures in the village including village officials, BPD, traditional leaders, women's leaders, Farmer Groups, MPA, and fishermen.
3. The Project Proponent commissioned a consulting team to conduct a series of meetings with community, community leaders, and other relevant institutions to gather primary data and to convey information about climate change and how the Project will help reduce GHG emissions and provide benefits to the local community.
4. A full HCV 6 assessment was conducted to review literature and legal documents review and analyze socio-economic and cultural diversity among stakeholders within and adjacent to the Project Area. The identification includes both institutional and community stakeholders.

Table 0-1 Identified Stakeholders likely to be impacted by the Project.

Name of stakeholder	Description	Relevance for the Project
Villagers	A villager is an individual who lives in the 10 villages adjacent to the Project Area	High on climate, community and biodiversity objective
Forest Farmers Groups Kelompok Tani Hutan (KTH)	A group of people or farmers who manage forest-based businesses in the Project Area.	High on climate, community and biodiversity objective
Farmers Group/ Kelompok Tani	A group of people who make a living from traditional farming (e.g. vegetables, rice), fruit gardens and agroforestry (e.g. cultivating and collecting rubber, rattan).	High on climate, community and biodiversity objective
Fishermen	Individuals or groups of people making a living from traditional fisheries and/or aquaculture.	High on climate, community and biodiversity objective
Illegal loggers	Individuals or groups of people making a living from the extraction of commercial timber and selling logs to	High on climate, community and biodiversity objective

	middlemen or sawmills without legal permit.	
Hunters	Individuals or groups of people who hunt wild animals for commercial purposes.	High on climate, community and biodiversity objective
NTFP collectors	Individuals or groups of people who harvest medicinal plants, honey, and resin for commercial purposes.	High on climate, community and biodiversity objective
Womens Groups and Family Groups	Groups of women entrepreneurs who manage micro enterprises such as craft, and pineapple-based food, and family welfare and empowerment groups (<i>Pemberdayaan dan Kesejahteraan Keluarga</i>)	High on climate, community and biodiversity objective
Community-based Fire Prevention/ Masyarakat Peduli Api (MPA)	Community groups who undertake voluntarily work to prevent and handle forest and peatland fires.	High on climate, community and biodiversity objective
Community leaders	Representing a specific community group of people, provide guidance and direction to the community in terms of social life/interaction (Community, Customary, and Religious Leaders).	High on climate, community and biodiversity objective
Mantir, Damang (Customary leader)	Their tasks are: - to ensure that traditional practices, ceremonies, and rituals associated with the land, sacred sites, and intergenerational knowledge transmission are respected and preserved, - mediator as conflicts arise in the community, - resource person who provides advice to the community in terms of social interaction.	High on climate, community and biodiversity objective
Middlemen or traders	Collecting forest and agricultural products (rubber, NTFP, pineapple) from communities,	Medium to low on CCB Objective
Village government	The level of Local Government with legal and policy authority at the village level,	High on climate, community and biodiversity objective

Sub-district Government	The level of Local Government with legal and policy authority at the sub-district level,	High on climate, community and biodiversity objective
District Government	The level of Local Government with legal and policy authority at the district level and responsible for programs from the National government institutions.	High on climate, community and biodiversity objective
Borneo Nature Foundation	Local non-governmental organization with a focus on research in biodiversity conservation in Borneo,	Medium on climate, community and biodiversity objective
University of Palangka Raya	Focus on research, facilitator, and advice related to climate, peat, biodiversity, and community.	Medium to high on climate, community and biodiversity objective
Private sector	Various concessions and private companies (mining, working around Project area.	Medium to high on climate, community and biodiversity objective

The efforts to identify relevant stakeholders of the Project were divided into three differently focused group discussions and literature/legal documents review:

- Preliminary Field Study: 1-30 June 2023 in 10 villages
- Initial Stakeholder Socialization: 17-28 July 2023 in 10 villages
- Participatory Land Tenure and HCV 5 and 6 Mapping: 6-22 October 2023
- Social Economic Impact Assessment ('SEIA") and Discussions around Benefit Sharing Mechanism: 6-22 October 2023.
- Carbon Focused meeting(s) with relevant government institutions
- Social and economic study
- Governance and institutional study

No	Activities	Date	Total Participant
Communities			
1	Initial socialization of the NRS program in 10 villages and 3 Government agencies	July 2023	244 people
2	Further socialization in Madara Village	September 2023	43 people
3	FGD during Participatory mapping in 7 villages	September 2023	214 people

4	FGD during SEIA dan Benefit Sharing Mechanism Assessment as well as Consent signed in 7 Villages	October 2023	292 people
Government institution			
5	Initial socialization of the NRS program in 10 villages and 3 Government agencies	July 2023	3 institutions and 10 villages
6	Socialization and consultation of NRS Restoration Ecosystem Program in Government in the provincial, district and sub-district level	September 2023	26 Institution

All the above activities were conducted under the CCB principles and guidelines of Free, Prior Informed Consent (FPIC).

A list of stakeholder meetings is set out below:

No.	Meeting	Date	Content	Participants
1	Initial socialization of The Project	17072023	1) Introduce PT NRS to Forestry Agency in Central Kalimantan, 2) Consultation for NRS Full Assessment Survey	1 representative from Forestry Agency of Central Kalimantan and 8 people from PT NRS
2	Initial socialization of The Project	18072023	Consultation of PT NRS with Forest Management Unit or KPHP Kapuas	1 Representative from KPHP Kapuas and 5 people from PT NRS
3	Initial socialization of The Project	18072023	Consultation of PT NRS with Forest Management Unit or KPHL Gerbang Barito	3 Representatives from KPHL Gerbang Barito and 5 people from PT NRS
4	Initial socialization of The Project	18072023	1) Introduce the NRS officially to stakeholders 2) Obtain consent from the community to conduct an appraisal or full assessment survey.	23 Villagers from Desa Madara dan 10 People from PT NRS and HES
5	Initial socialization of The Project	20072023	1) Introduce the PT NRS officially to stakeholders 2) Obtain consent from the community to conduct an appraisal or full assessment survey.	18 people from Kalahien Village (MPA Chairman and members, Village Secretary, BPD Secretary, Village Administration, and Youth Organization Chairman) and 5 people from PT NRS and HES
6	Initial socialization of The Project	20072023	1) Introduce the PT NRS officially to stakeholders 2) Obtain consent from the community to conduct an appraisal or full assessment survey.	22 people from Batapah Village (including the Chairman of the BPD, Village Head, RT Head, Village Administration, Religious Representatives, Mantir Adat, Community Leaders, and Women's Representatives) and 5 people from the PT NRS.
7	Initial socialization of The Project	20072023	1) Introduce the PT NRS officially to stakeholders 2) Obtain consent from the community to conduct an appraisal or full assessment survey.	25 people from Murung Paken Village (including the Village Head, Chairman and Vice Chairman of BPD, Mantir Adat, and Village Administration) and 4 people from PT NRS and HES
8	Initial socialization of The Project	21072023	1) Introduce the PT NRS officially to stakeholders 2) Obtain consent from the community to conduct an appraisal or full assessment survey.	27 villagers from Tanjung Jawa (including Village Head, BPD Chair, Village Secretary, PKK Chair, RT Chair, Adat Representative, and Village Administration) and 6 people from PT NRS and HES
9	Initial socialization of The Project	22072023	1) Introduce the PT NRS officially to stakeholders	36 villagers from Marawan Lama (including Village Head,

			2) Obtain consent from the community to conduct an appraisal or full assessment survey.	BPD Chairman and Deputy, Mantir Adat, RT Heads, Community Leaders, and Linmas) and 5 people from PT NRS and HES
10	Initial socialization of The Project	24072023	1) Introduce the PT NRS officially to stakeholders 2) Obtain consent from the community to conduct an appraisal or full assessment survey.	29 people from Lungkuh Layang village (including representatives of the sub-district head, village head, neighborhood head, religious leaders, village administration, and members of the police) and 5 people from PT NRS and HES
11	Initial socialization of The Project	25072023	1) Introduce the PT NRS officially to stakeholders 2) Obtain consent from the community to conduct an appraisal or full assessment survey.	25 people from Pararapak Village (including the Village Head, Babinsa, Head of RT, Head of Dayak Customary Council/DAD, Head of PKK, Mantir Adat, and Village Government) and 10 people from PT NRS, HES, and KKN students.
12	Initial socialization of The Project	26072023	1) Introduce the PT NRS officially to stakeholders 2) Obtain consent from the community to conduct an appraisal or full assessment survey.	24 people from Pendang Village (including RT Head, RW Head, Damang Secretary, Village Government, Babinsa, and Bhabinkamtibmas) and 3 people from PT NRS and HES
13	Initial socialization of The Project	28072023	1) Introduce the PT NRS officially to stakeholders 2) Obtain consent from the community to conduct an appraisal or full assessment survey.	15 villagers from Lawang Kamah (including the Head of RT, Village Head, Head of RT, Village Administration, Village Secretary, and Village Administration) and 9 people from PT NRS and HES
14	Follow-up Socialization of PT NRS in Madara Village	27092023	1) Introduce the PT NRS officially to stakeholders 2) Obtain consent from the community to conduct an appraisal or full assessment survey.	43 residents of Madara Village, and 2 people from PT NRS
15	Socialization and consultation of the project ecosystem restoration activities	04092023	1) Socialisation of PT Nusantara Raya Solusi (profile, legality, work location, and work programme), 2) Solicit direction/input from the local government regarding PT NRS programme in the future	17 government officials and NGO members including: 1. Central Kalimantan Province National and Political Unity Agency 2. Regional Development Planning Research and Development Agency of Central Kalimantan Province

				3. Central Kalimantan Provincial Forest Service 4. Palangka Raya Region X Sustainable Forest Management Centre 5. Energy and Mineral Resources Agency of Central Kalimantan Province 6. Central Kalimantan Regional Climate Change Control Centre 7. Kapuas Hulu Production Forest Management Unit 8. Gerbang Barito Protection Forest Management Unit 9. Central Kalimantan Natural Resources Conservation Centre 10. Central Kalimantan Public Works and Spatial Planning Office 11. Central Kalimantan Labour and Transmigration Agency 12. Provincial Environment Office. Central Kalimantan 13. Borneo Nature Foundation (BNF) 14. Regional Commissariat of the Association of Indonesian Forest Entrepreneurs (APHI) of Central Kalimantan And 1 Advisor from UPR
16	Socialization and consultation of the project ecosystem restoration activities	06092023	1) Socialisation of PT Nusantara Raya Solusi (profile, legality, work location, and work programme), 2) Solicit direction/input from the local government regarding PT NRS programme in the future	12 government officials including: 1. Head of Kapuas Regency National and Political Unity Agency 2. Secretary of the Kapuas Regency Fisheries Service 3. Kapuas District Environment Office 4. Head of the Kapuas District Regional Development Planning Agency 5. Head of Timpah sub-district 6. Head of the Public Works and Spatial Planning Agency

				7. Head of the Industry, Trade, Cooperatives and SMEs Office of Kapuas Regency. And 1 Advisor from UPR
17	Socialization and consultation of the project ecosystem restoration activities	08092023	1) Socialization of PT Nusantara Raya Solusi (profile, legality, work location, and work program), 2) Solicit direction/input from the local government regarding PT NRS program in the future	13 government officials including: 1. South Barito District Environment Office 2. South Barito District Labor and Transmigration Office 3. Food Security, Fisheries and Agriculture Office of South Barito District 4. Sub-district Head of South Hamlet 5. Head of the National Unity and Political Agency of South Barito Regency And 1 Advisor from UPR
18	Participatory Assessment And Land Mapping in Kalahien Village	15092023	Obtain information regarding community livelihood from FGD. Obtain GIS point from overlapping area between the village and company	18 Kalahien villagers including village chief, village government officials, village council representative, and Mantir Adat
19	Participatory Assessment And Land Mapping in Pararapak Village	21092023	Obtain information regarding community livelihood from FGD. Obtain GIS point from overlapping area between the village and company	28 Pararapak villagers including village chief, village government officials, village council representative, and Mantir Adat
20	Participatory Assessment And Land Mapping in Murung Paken Village	23092023	Obtain information regarding community livelihood from FGD. Obtain GIS point from overlapping area between the village and company	16 Murung Paken villagers including village chief, village government officials, village council representative, and Mantir Adat
21	Participatory Assessment And Land Mapping in Batapah Village	25092023	Obtain information regarding community livelihood from FGD. Obtain GIS point from overlapping area between the village and company	20 Batapah villagers including village chief, village government officials, village council representative, and Mantir Adat
22	Participatory Assessment And Land Mapping in Tanjung Jawa Village	25092023	Obtain information regarding community livelihood from FGD. Obtain GIS point from overlapping area	31 Tanjung Jawa villagers including village chief, village government officials, village council representative, and Mantir Adat, and 6 people from LPPM UPR team

			between the village and company	
23	Participatory Assessment And Land Mapping in Pendang Neighborhood	27092023	Obtain information regarding community livelihood from FGD. Obtain GIS point from overlapping area between the village and company	23 Pendang villagers including village chief, village government officials, village council representative, and Mantir Adat, and 5 people from LPPM UPR team
24	Participatory Assessment And Land Mapping in Marawan Lama Village (RT9 and RT10)	10102023	Obtain information regarding community livelihood from FGD. Obtain GIS point from overlapping area between the village and company	17 villagers from RT7 and RT8 Marawan Lama including the Neighborhood Association Chief, as well as 4 people from LPPM UPR team
25	Participatory Assessment And Land Mapping in Marawan Lama Village (RT5 and RT6)	11102023	Obtain information regarding community livelihood from FGD. Obtain GIS point from overlapping area between the village and company	10 villagers from RT5 Marawan Lama including the Neighborhood Association Chief, as well as 4 people from LPPM UPR team
26	Participatory Assessment And Land Mapping in Marawan Lama Village (RT3 and RT4)	12102023	Obtain information regarding community livelihood from FGD. Obtain GIS point from overlapping area between the village and company	13 villagers from RT3 Marawan Lama including the Neighborhood Association Chief, as well as 4 people from LPPM UPR team
27	Participatory Assessment And Land Mapping in Marawan Lama Village (RT1 and RT2 – Dusun Mantarem)	13102023	Obtain information regarding community livelihood from FGD. Obtain GIS point from overlapping area between the village and company	22 villagers from RT1 and RT2 Marawan Lama including the Neighborhood Association Chief, as well as 4 people from LPPM UPR team
28	Participatory Assessment And Land Mapping in Marawan Lama Village (RT7 and RT8)	13102023	Obtain information regarding community livelihood from FGD. Obtain GIS point from overlapping area between the village and company	16 villagers from RT7 and RT8 Marawan Lama including the Neighborhood Association Chief, as well as 4 people from LPPM UPR team
29	SEIA and benefits sharing mechanism, Discussion on MoU Draft with community, and Agreement/signing the Consent in Kalahien Village	06102023	Discussion regarding Benefit Sharing with community Consent letter discussion and signing	29 Kalahien villagers including village chief, village government officials, village council representative, and Mantir Adat

30	SEIA and benefits sharing mechanism, Discussion on MoU Draft with community, and Agreement/signing the Consent in Pararapak Village	07102023	Discussion regarding Benefit Sharing with community Consent letter discussion and signing	27 Pararapak villagers including village chief, village government officials, village council representative, and Mantir Adat
31	SEIA and benefits sharing mechanism in Pendang Neighborhood	07102023	Discussion regarding Benefit Sharing from Ecosystem Restoration activity for the community Coordinate points data collection	38 Pendang Neighborhood villagers including Fishery Group Representative, Land Owner Representative, and Woman Represtative, as well as 4 people from LPPM UPR team
32	SEIA and benefits sharing mechanism, Discussion on MoU Draft with community, and Agreement/signing the Consent in Murung Paken Village	08102023	Discussion regarding Benefit Sharing from Ecosystem Restoration activity for the community Consent letter discussion and signing	26 Murung Paken villagers including village chief, village government officials, village council representative, and Mantir Adat
33	SEIA and benefits sharing mechanism in Tanjung Jawa Village	08102023	Discussion regarding Benefit Sharing from Ecosystem Restoration activity for the community Coordinate points data collection	38 Tanjung Jawa villagers including Land Owner Represtative and Woman Representative, as well as 5 people from LPPM UPR team
34	Discussion on MoU Draft with community, and Agreement/signing the Consent in Pendang Neighborhood	12102023	Consent letter discussion and signing	26 Pendang Neighborhood villagers including Neighborhood Chief, Fishery Group Representative, Land Owner Representative, Woman Represtative, MPA Represtative, and Farmer Group Representative, as well as 5 people from LPPM UPR team
35	SEIA and benefits sharing mechanism, Discussion on MoU Draft with community, and Agreement/signing the Consent in Tanjung Jawa Village	14102023	Consent letter discussion and signing	41 Tanjung Jawa villagers including village chief, village government officials, village council representative, and Mantir Adat, as well as 4 people from LPPM UPR team
36	SEIA and benefits sharing mechanism, Discussion on MoU Draft with community, and Agreement/signing the Consent in Batapah Village	20102023	Discussion regarding Benefit Sharing with community Consent letter discussion and signing	25 Batapah villagers including village chief, village government officials, village council representative, and Mantir Adat, as well as 2 people from LPPM UPR team

37	SEIA and benefits sharing mechanism, Discussion on MoU Draft with community, and Agreement/signing the Consent in Marawan Lama Village	22102023	Discussion regarding Benefit Sharing with community Consent letter discussion and signing	42 Marawan Lama villagers including village chief, village government officials, village council representative, and Mantir Adat, as well as 1 person from LPPM UPR
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APPENDIX 3: LEGAL OR CUSTOMARY TENURE/ACCESS RIGHTS

The Project fully recognizes customary rights and community land tenure. The Project has conducted participatory land-use mapping and HCV 5 and 6 with the following objectives:

1. Identification and mapping of community ownership and rights to land
2. Identification of types of land use on community-owned lands
3. Identification of the community's rights and obligations on the lands they own.
4. Identification of overlapping areas between the community, government, and the private sector.
5. Opportunities for cooperation between various parties on community land and the Project Area.
6. Identify areas that are important for meeting community needs for sources of food, clean water, traditional medicine, and other basic needs.
7. Based on the result of step 6, identify community groups who heavily depend on these areas, identify customary or village rules regarding access, utilization and obligations for village communities or outsiders in utilizing the area, identify threats or problems faced by these areas.
8. Identify areas of cultural and spiritual importance to the community.
9. Based on the result of step 8, identify customary or village rules regarding access, utilization and obligations for village communities or outsiders in utilizing the area, and identify threats or problems faced by this area.

In general, land ownership of communities within and around the Project Area is divided into two categories, private ownership and public/communal ownership. The communal ownership in this area refers to village administrative land. This land is usually used as public facilities such as schools, health facilities, soccer field, and religious facilities (mosques, churches).

With respect to private land, there are two types of ownership, formal land rights, such as land ownership certificates (*Surat Kepemilikan Tanah*) and informal *ulayat* land which is inherited by communities over generations. Community land ownership is largely based on customary regulations and is closely related to shifting cultivation practices. After shifting agricultural land declines in fertility, communities may plant perennial crops such as rubber and fruit that form agroforestry. These perennials also serve as markers of land ownership claims by local communities.

APPENDIX 4: Stakeholder Diversity

The diversity of communities adjacent to the Project Area is presented in Table below

Appendix Table 1 Stakeholder Diversity

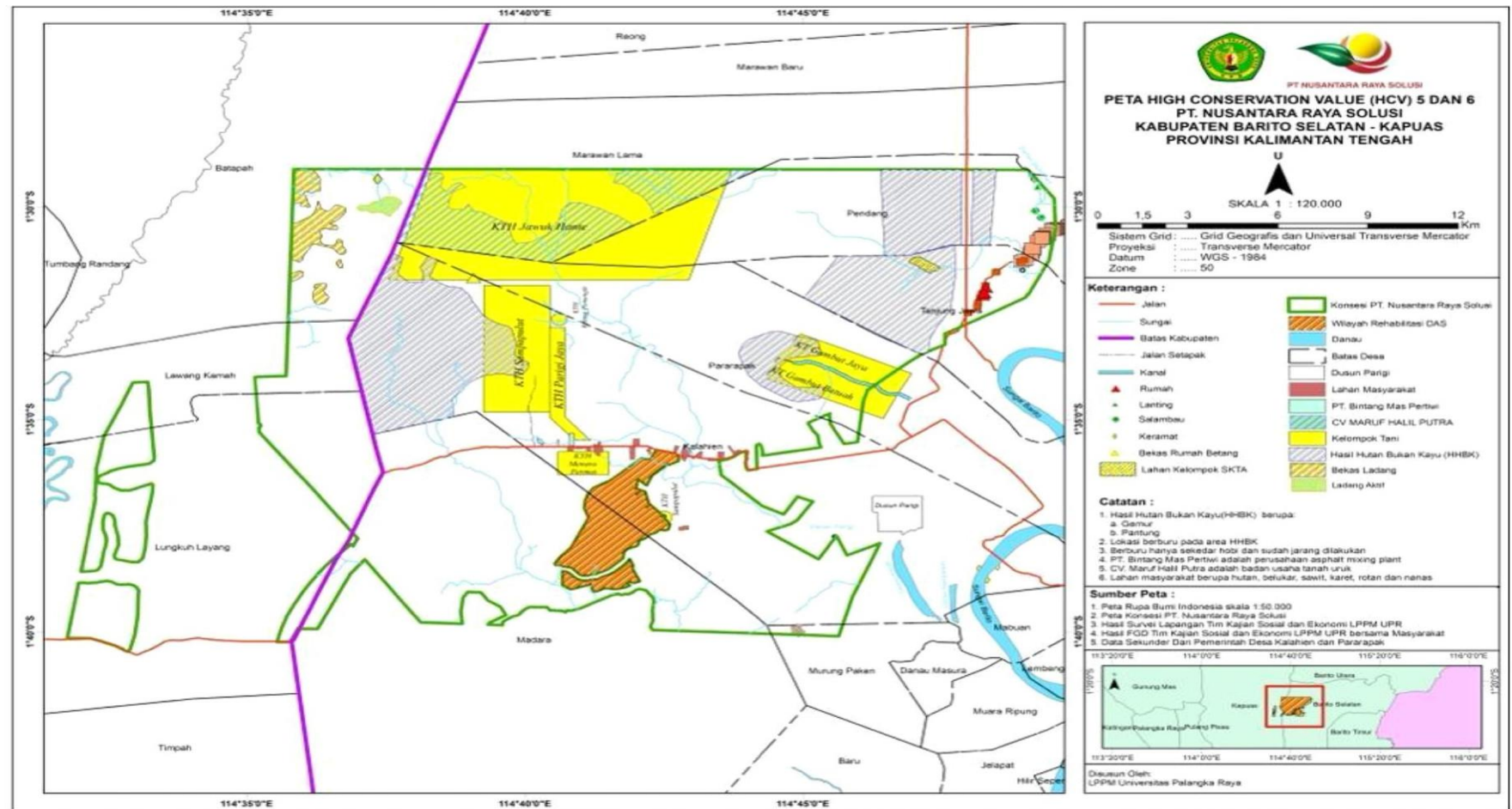
District	Village	Sub-ethnic	Religion	Livelihood
South Barito	Kalahien	Dayak Dusun (80%), Ma'anyan, Bakumpai, Banjar, Jawa, Flores	Protestan (40%), Hindu, Kaharingan (35%), Catholic, Islam	Community activities in overlapping areas: Fishing, Looking for medicinal plants, Hunting (Minor), Agroforestry rattan and rubber, Pineapples Cultivation. Outside overlap area: Rattan and fruit agroforest cultivation, fishermen, Farming using a rainfed rice system, Government officer, trader, mechanic, builder
	Murung Paken	Dayak Bakumpai	Islam, Christian, Protestant	Community activities in overlap area: Cultivation of rattan and rubber agroforest. Outside overlap area: Rubber cultivation agroforest, rattan and fruit cultivation

				agroforest, a rainfed rice field system, fishing, Toman Fish Cultivation, Honey
	Parapak	Dayak Dusun Barito (70%), Jawa, Batak, Banjar, Sunda, Bugis	Kristen (60%), Islam (30%), Kaharingan (10%)	Community activities in overlapping area: Medicinal plants, fishermen, Looking for wood, Others: Rattan, Rubber and fruit agroforest, a Rainfed rice Paddy fields, pineapple cultivation, government officer, trader, mechanics, builder
	Tanjung Jawa	Dayak Ma'anyan, Bakumpai, Tamboyan, Jawa, Banjar	Islam 50%, Hindu 25%, Kristen 15%, Katolik 10%	Community Activities in overlapping area: Non-Timber Forest Product (Resin, Honey, Rattan, Rubber), Fishermen, Looking for wood, Hunting, swift nest, fishermen, Other: Paddy, Chicken farming, labor
	Madara	Dayak Ma'anyan (95%), Dayak Ngaju, Madura, Batak, fFores, Jawa	Kristen (95%), Islam, Katolik, Kaharingan	Rubber, Farming, Government Officer, Trader, Mechanics, Builder

	Pendang	Bakumpay (90%), Dayak Ma'anyan, Jawa	Islam (98%), Kristen protestan, Katolik, Hindu, Kaharingan	Overlapping area: Rubber, Swift Nest, Rattan, Fishermen, Looking for Wood, hunting (minor), Other: Paddy field, Fishermen, Government Officer, Trader, Mechanics, Builder.
	Merawan Lama	Dayak Dusun, Bakumpai, Dayak Ma'anyan, Banjar, Jawa	Islam (Majority), Hindu, Kaharingan, Kristen Protestan, Katolik	Community activities in overlap area: Non-timber forest product, Medicinal Plants, Hunting (minor) Other: Rubber agroforest cultivation, Rattan and fruit cultivation agroforest, Rainfed Rice system, Fishing.
Kapuas	Batapah	Dayak Ma'anyaan (95%), Dayak Ngaju, Banjar, Jawa	Kristen (90%) Islam, Katolik, Kaharingan	Community activities in overlap area: Fishing, Looking for wood, Medicinal plants, Hunting, Farming, Rubber and rattan cultivation agroforest. Outside overlap area: Fishing, Hunting, Honey, Rattan, Rubber and

				fruit or vegetables, Agroforest rattan and fruit, gold mining, worker in a company, government officer, Trader, Mechanics, Builder
	Lawang Kamah	Islam 95% Dayak Ngajuk, Jawa 5%	Hindu Kaharingan, Islam, Kristen	90% Gold Mining, Fishermen, Rattan, Swift Nest.

APPENDIX 5: HCV 5 AND 6 MAP



Gambar 2.42 Peta HCV 5 & 6 Hasil Assessment di 7 Desa

APPENDIX 6: MOU Consent

Copies of the MoUs between the Project Proponents and villages adjacent to the Project Area are set out below.

SURAT PERNYATAAN PERSETUJUAN
PEMULIHAN EKOSISTEM, PENGELOLAAN HUTAN LESTARI DAN PEMBERDAYAAN
MASYARAKAT DESA DALAM RANGKA MITIGASI PERUBAHAN IKLIM
PT. NUSANTARA RAYA SOLUSI

Pada hari ini, kami, Tenggus Dwa Kusala, Bambang Olesker, dan Ratu Dhu Dhu Pulu, telah berdiskusi kemudian dan Pengobatan terhadap Program Perencanaan Keluarga. Kami sudah melihat Pengobatan terhadap Degradasi Lahan dan Pengobatan terhadap Cederam Kamban Lahan dan Konservasi Kasejahteraan Hayati Dahu. P. Nautera Raya Sakti (PT. NRS) di Provinsi Kalimantan Tengah. Dengan ini kami segerakan masyarakat Desa Batok, Kecamatan Tengah, Kabupaten Kutai, Provinsi Kalimantan Tengah yang dwali oleh yang merencanakan suatu pelayanan ini, menyatakan **Pengobatan Seseorang** terhadap rencana Program dan Kegiatan Pemeliharaan Ekosistem, Pengobatan Lahan Lutan dan Pembordyaran Masyarakat dan rencana Miligil dan Pembordyaran film yang akan dilaksanakan oleh P. Nautera Raya Sakti (PT. NRS) dengan melibatkan peran aktif masyarakat. Desa Batok di awal tahun 2024.75 Ha yang berada di dalam wilayah desa kami sebagai rencana desa terpencil

[illegible]

Untuk diketahui bahwa, terdapat dua tempat makam diantaranya Makam "Tuyee Muwar" Lahir 15-7-1901, Meninggal pada tanggal 27 Juli 1970. Sekitar Tahun 2015 berhalangan keturunan (anak-cucu) dari pemiri makam tersebut sudah menganut agama Kristen maka makam diganti dengan kuburan (makam) beserta selip (yang saat ini selipnya sudah rapuh/hancur).

11 Page

Adapun terhadap kegiatan masyarakat yang kurang sosial dengan upaya Kegiatan Pemufatan Ekosistem, Pengelolaan Hutan Lebar dan Pemberdayaan Masyarakat dalam rangka Mngasi Perubahan iklim akan didukung solusinya melalui mekanisme pengawasan tahunan, ampan baik dan ganti rugi sebagaimana disepakati oleh masyarakat yang bersangkutan dengan PT. Nusantara Raya Solusi (PT. NRS).

Dibawah ini program dan kegiatan yang akan dilaksanakan oleh PT. Nusantara Raya Solusi (PT. NRS) mencakup, namun tidak terbatas, hal-hal sebagai berikut:

Program	Kegiatan
1. Pemulihan Ekosistem	• Perindukan Hutan yang mampu meningkatkan nilai daerah; • Perencanaan dan Penanaman tanaman kehutanan dan tanaman yang bernilai ekonomi tinggi; dan • Seleksi dan penanaman jenis/layur dan kawasan berkapas karang tinggi
2. Pengkajian Secara Berkelanjutan	• Pengkajian kualitas dan kondisi pemukiman penduduk Hutan rakyat (HTRK) seperti : sanitasi, pelayanan kesehatan, hasil pertanian tanaman obat; • Pengkajian sarana produksi hasil hutan, pertanian dan peternakan; • Pemantauan hutan (untuk pencegahan kebakaran hutan)
3. Pemberdayaan Masyarakat	• Pengkajian kapasitas dan kualitas Masyarakat; • Penguatan kelembagaan produksi hasil hutan, pertanian dan peternakan; • Penguatan usaha.

21Page

Kami yang bertanda tangan dibawah ini,

Kepala Desa Batapahi
YUDHA PRAMANTO

Ketua Badan Permusyawaratan Desa
LAZARUS P. LALU

Muhammad Dipo Batasari,
Wakil Ketua Masyarakat

Wakil Kelompok Tani,

HADI WIJAYA, S.T
Wakil Perempuan,
[Signature]

Eka W. Riana
Mika Dwiandika

Sekretaris Desa (Rabiraa)
 Wakil Tenaga Pendidik,

Wakil Menteri Pendidikan dan Kebudayaan
R. Nuriyati

Ketua RT. 2
1

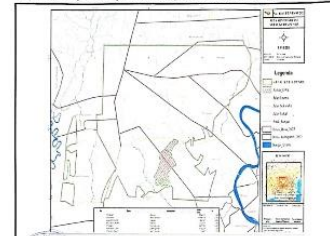
Patung

Wakil Pemilik Kuburan/Lahan

MARIA

3 | Page

Lampiran 1. Foto wilayah Desa Batupah di dalam area kerja PT. Nusantara Raya Sulfur (NRS)



Kepala Desa Batangpang,
Karya Batin Perencanaan Desa,

Wakil Mayor Asal Desa Batapoh

Wahyuni YUTHA NGABAN

Wakil Kelompok Tani,
Hadi Wijaya, ST

Wakil Tokoh Agama,
Yandri S

10

4 | Page

**SURAT PERNYATAAN
PERSETUJUAN**
PROGRAM PENURUNAN EMISI GAS RUMAH KACA
MELALUI PENCEGAHAN DEFORESTASI DAN DEGRADASI HUTAN SERTA
PENINGKATAN CADANGAN KARBON HUTAN DAN KONSERVASI
KEANEKARAGAMAN HAYATI
DI PT. NUSANTARA RAYA SOLUSI

Pada hari ini, desman tanggal desman bulan Oktober, tahun Dua Ribu Dua Puluh Tiga, desman berdasarkan kesadaran dan pengetahuan tentang Progres Penurunan Emisi Gas Rumah Kaca melalui Pencegahan Deforestasi dan Degradasi Hutan serta Peningkatan Cadangan Karbon Hutan dan Konservasi desman Kelembagaan Hayati oleh PT. Nusantara Raya Solusi (PT NRS) di Provinsi Kalimantan Tengah. Kami segenap masyarakat Desa Kalahen Kecamatan Dusun Selatan Kabupaten Barito Selatan, Provinsi Kalimantan Tengah, yang diwakili oleh yang menandatangani surat pernyataan ini, menyatakan desman desman terhadap rencana Program dan Kegiatan yang akan dilaksanakan oleh PT. NRS di area seluas 11.044,75 Ha yang berada di dalam wilayah desa kami sebagaimana peta terlampir.

Berdasarkan kegiatan pertemuan partisipatif yang telah dilaksanakan dengan difasilitasi prosesi oleh Tim LPPM Universitas Palangka Raya, diketahui wilayah tersebut memiliki nilai tinggi secara sosial, ekonomi dan budaya Masyarakat dalam bentuk hutan sekunder, semak belukar dan perkebunan agroforestry rotan dan karet. Oleh karenanya di area tersebut terdapat aktivitas masyarakat dalam kegiatan perkebunan, perikanan, perburuan dan memelihara hasil hutan (sarawati belian) yang dapat diintegrasikan dengan program dan rencana kegiatan PT. NRS. Adapun terhadap kegiatan masyarakat yang kurang sesuai dengan upaya penurunan emisi akan didiskusikan solusinya melalui mekanisme penanganan keluhan, umpan balik dan ganti rugi sebagaimana disampaikan oleh perwakilan masyarakat dan PT. NRS

Dibawah ini program dan kegiatan yang akan dilaksanakan oleh PT. NRS mencakup, namun tidak terbatas, hal-hal sebagai berikut:

Program	Kegiatan
1. Pemulihan Ekosistem	• Perindihan Hutan, • Penanaman Tanaman Kehutanan dan Tanaman Yang Bermilai Ekonomi Tinggi, dan • Konservasi Kearifanngisan Hayati dan Kawasan Bermilai Karbon Tinggi
2. Pengelolaan Secara Berkelanjutan	• Peningkatan kualitas dan akses pasar (rantai pasok hijau) produk HHEK (dih. rotan, madu, perikanan, tanaman obat) • Peningkatan sarana produksi hasil hutan, pertanian dan perkebunan • Pemertan hutan
3. Pemberdayaan Masyarakat	• Peningkatan kapasitas Masyarakat, • Penguatan kelembagaan • Penguatan usaha

Demikian Surat Pernyataan Persetujuan ini dibuat dengan penuh kesadaran dan tanggung jawab tanpa ada unsur pemaksaan, untuk dipergunakan sebagai mana mestinya.

Kami yang bertanda tangan dibawah ini,

Kepala Desa

ES/KAR/AGL.S.Pi
Wakil Kelompok Tari Hutan

WALAN

Ketua Badan Perwakilan Desa

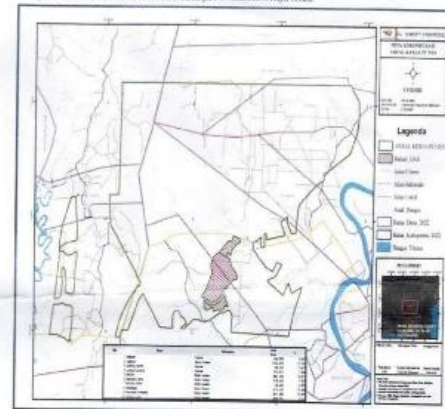
GETOT WIRAWAN

Martir Adat,
JUMADI

Tokoh Masyarakat
IluK
Wakil Pemuda/Pemudi
Feby Harastina, ST
Kepala Dusun Parigi
Nico Aprianto

Wakil Kelompok Perempuan,
Roxana
Perwakilan Kelompok Tani,
BRITO NATHAN KTOY, S.M

Lampiran 1. Foto workshop dan di dolok siswa kerja PE Sumatera Utara Selatan



Kepala Desa
[Signature]
Wakil Ketua Tim Penggerak

Batas Berakhlak Dengan

Masrizal Adnan
JUMADI

SURAT PERNYATAAN PERSETUJUAN
PEMILIHAN EKOSISTEM, PENGELOMAN HUTAN LESTARI, KONSERVASI
KEANEKARAGAMAN HAYATI DAN PEMBUDIDAYAAN MASYARAKAT DESA
DALAM RANGKA MITIGASI PERUBAHAN IKLIM
PT. NUSANTARA RAYA SOLUSI

Pada hari ini, Minggu tanggal Dua Puluh Dua, bulan Oktober, tahun Dua Ribu Dua Puluh Tiga, kami masyarakat Desa Marawan Lama Kecamatan Dusun Utara Kabupaten Barito Selatan, Provinsi Kalimantan Tengah, yang diwakili oleh yang memandatangani surat pernyataan ini, menyatakan Persetujuan terhadap rencana Program dan Kegiatan Perhutanan Ekosistem, Pengelolaan Hutan Lestari, Konservasi Keanekaragaman Hayati dan Pembudidayaan Masyarakat dalam rangka Mitigasi Perubahan Iklim yang akan dilaksanakan oleh PT. NRS dengan melibatkan peran aktif masyarakat Desa Marawan Lama di area seluas 3.117,87 Ha yang berada di dalam wilayah desa sebagaimana peta terlampir.

Berdasarkan kegiatan pemilihan partisipatif yang telah dilaksanakan dengan difasilitasi prosesnya oleh Tim LPPM Universitas Palangkaraya, diketahui wilayah tersebut memiliki nilai tinggi secara sosial, ekonomi dan budaya Masyarakat dalam bentuk sengkang, hutan sekunder, semak bukar dan agroforestry karet. Oleh karenanya di area tersebut terdapat aktifitas masyarakat dalam bentuk kegiatan HREK, pertanian dan memelihara hasil hutan (santanen obat) yang dapat dilaksanakan dengan program dan rencana kegiatan PT. NRS. Adapun terhadap kegiatan masyarakat yang kurang sesuai dengan upaya Kegiatan Pemilihan Ekosistem, Pengelolaan Hutan Lestari, Konservasi Keanekaragaman Hayati dan Pembudidayaan Masyarakat dalam rangka Mitigasi Perubahan Iklim akan didiskusikan selanjutnya melalui mekanisme penanganan keluhan, uraian baik dan ganti rugi sebagaimana ditetapkan oleh masyarakat yang bersangkutan dan PT. NRS.

Dibawah ini program dan kegiatan yang akan dilaksanakan oleh PT. NRS mencakup, namun tidak terbatas, hal-hal sebagai berikut:

Program	Kegiatan
1. Pemilihan Ekosistem	• Perindangan Hutan, • Penanaman Tanaman Kakutanah dan Tanaman Yang Bernilai Ekonomi Tinggi dan • Pelestarian Keanekaragaman Hayati dan Kawasan Bernilai Karbon Tinggi

1 | Page

2. Pengelolaan Secara Berkelanjutan	• Peningkatan kualitas dan akses pasar produk HREK (teh, karet, rotan, madu, perikanan, tanaman obat) • Peningkatan sarana produksi hasil hutan pertanian dan perkebunan • Pemertanian hutan
3. Pemberdayaan Masyarakat	• Peningkatan kapasitas Masyarakat, • Penguatan kelembagaan • Penguatan usaha

Demikian Surat Pernyataan Persetujuan ini dibuat dengan penuh kesadaran dan tanggung jawab tanpa ada unsur pemaksaan, untuk dipergunakan sebagai mana mestinya. Kami yang bertanda tangan dibawah ini,

Kepala Desa Marawan Lama,

MARIADI

Menteri Adat/Penghulu Adat


MARIADI

Perwakilan Pemuda,


MARIADI

Kepala Desa Marawan Lama,

MARIADI

Perwakilan Masyarakat,


MARIADI

Wakil Kelompok Perempuan,


MARIADI

2 | Page

Dipindai dengan CamScanner

Dipindai dengan CamScanner

Lampiran 1. Peta Wilayah Desa Marawan Lama di dalam area kerja PT. Nusantara Raya Solusi



Kepala Desa Marawan Lama,

MARIADI

Menteri Adat/Penghulu Adat


MARIADI

Perwakilan Pemuda,


MARIADI

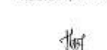
Kepala Desa Marawan Lama,

MARIADI

Perwakilan Masyarakat,


MARIADI

Wakil Kelompok Perempuan,


MARIADI

**SURAT PERNYATAAN
PERSETUJUAN**

PROGRAM PENURUNAN EMISI GAS RUMAH KACA
MELALUI PENCEGAHAN DEFORESTASI DAN DEGRADASI HUTAN SERTA
PENINGKATAN CADANGAN KARBON HUTAN DAN KONSERVASI
KEANEKARAGAMAN HAYATI
DI PT. NUSANTARA RAYA SOLUSI

Pada hari ini, Minggu tanggal Delapan, bulan Oktober, tahun Dua Ribu Dua Puluh Tiga, bahwa berdasarkan kasedaran dan pengetahuan tentang Program Penurunan Emisi Gas Rumah Kaca melalui Pencegahan Deforestasi dan Degradasi Hutan serta Peningkatan Cadangan Karbon Hutan dan Konservasi Keenakanragaman Hayati oleh PT. Nusantara Raya Souisi (PT. NRS) di Provinsi Kalimantan Tengah. Kami segenap masyarakat Desa Murung Pakan Kecamatan Dusun Selatan Kabupaten Barito Selatan, Provinsi Kalimantan Tengah, yang diwakili oleh yang menandatangani surat pernyataan ini, menyatakan Persetujuan sepenuhnya terhadap rencana Program dan Kegiatan yang akan dilaksanakan oleh PT. NRS di area seluas 105.425 Ha yang berada di dalam wilayah desa kami sebagaimana pada terlampir.

Berdasarkan kegiatan pertemuan partisipatif yang telah dilaksanakan dengan difasilitasi prosesnya oleh Tim LPPM Universitas Palangkaraya, diketahui wilayah tersebut memiliki nilai tinggi secara sosial, ekonomi dan budaya Masyarakat dalam bentuk hutan sekunder, semak belukar dan perkebunan agroforestry rotan dan karet. Oleh karenanya di area tersebut terdapat aktivitas masyarakat dalam kegiatan perkebunan, perikanan, perburuan dan memenu hasil hutan (tanaman obat) yang dapat diselaraskan dengan program dan rencana kegiatan PT. NRS. Adapun terhadap kegiatan masyarakat yang kurang sesuai dengan upaya penurunan emisi akan didiskusikan solusinya melalui mekanisme penanganannya keulahan, umpan balik dan ganti rugi sebagaimana disepakati oleh perwakilan masyarakat dan PT. NRS

Dibawah ini program dan kegiatan yang akan dilaksanakan oleh PT. NRS mencakup, namun tidak terbatas, hal-hal sebagai berikut:

Program	Kegiatan
1. Pemulihan Ekosistem	• Perlindungan Hutan, • Penanaman Tanaman Kehutanan dan Tanaman Yang Bernilai Ekonomi Tinggi; dan • Konservasi Keanekaragaman Hayati dan Kawasan Bernilai Karbon Tinggi
2. Pengelolaan Secara Berkelanjutan	• Peningkatan kualitas dan akses pasar (rantai pasok hijau) produk HIBIK (cth. rotan, madu, perikanan, tanaman obat) • Peningkatan sarana produksi hasil hutan, pertanian dan perkebunan • Pemantauan hutan
3. Pemberdayaan Masyarakat	• Peningkatan kapasitas Masyarakat • Penguatan kelembagaan • Penguatan usaha

Demikian Surat Pernyataan Persetujuan ini dibuat dengan penuh kesadaran dan tanggung jawab tanpa ada unsur pemaksaan, untuk dipergunakan sebagai mana mestinya.

Kami yang bertanda tangan dibawah ini,

Kami yang
Kecamatan Desa
Bardusir
Wakil Kelompok Tani

Ketua Badan
Pengawasatan Des

Maria Adit

AMILIN

Page 10

2 | Page

Takah Masyarakat

ANWAR.

Wakil Pemuda/Pemudi

RAMADAN

Ketua RT I

muhammad

PIPA
HERIADI

Wakil Kelompok Perempuan

Map
Mudman

Perwakilan Kelompok Tani,

[Signature]
SAMSUDIN

Ketua RT II

FIRIADI

Lampiran 3. Peta wilayah studi di kawasan area kerja PT. Nenasari Raya Sdn



Kepala Desa
DESA
WURUNG
Santiaza
Wakil Kepala Desa Tani Hutun
Aspirant


 Menteri Perdagangan dan Industri Republik Indonesia
 (.....)
 Wakil Menteri Perdagangan dan Industri
 (.....)
 (.....)

Mawla Ali
.....
Wakil Pemuda/Pemudi
.....
RAMADAN

SURAT PERNYATAAN PERSETUJUAN

PROGRAM PENURUNAN EMISI GAS RUMAH KACA
MELALUI PENCEGAHAN DEFORESTASI DAN DEGRADASI HUTAN SERTA
PENINGKATAN CADANGAN KARBON HUTAN DAN KONSERVASI
KEANEKARAGAMAN HAYATI
DI PT. NUSANTARA RAYA SOLUSI

Pada hari ini, Sabtu tanggal Tujuh bulan Oktober, tahun Dua Ribu Dua Puluh Tiga, bahwa berdasarkan kesadaran dan pengetahuan tentang Program Penurunan Emisi Gas Rumah Kaca melalui Pencegahan Deforestasi dan Degradasi Hutan serta Peningkatan Cadangan Karbon Hutan dan Konservasi Keanekaragaman Hayati oleh PT. Nusantara Raya Solusi (PT. NRS) di Provinsi Kalimantan Tengah. Kami segenap masyarakat Desa Pararapak Kecamatan Dusun Selatan Kabupaten Barito Selatan, Provinsi Kalimantan Tengah, yang diwakili oleh yang menandatangani surat pernyataan ini, menyatakan Peretujuan sepenuhnya terhadap rencana Program dan Kegiatan yang akan dilaksanakan oleh PT. NRS di area seluas 5170,47 Ha yang berada di dalam wilayah desa kami sebagaimana peta terlampir.

Berdasarkan kegiatan pemetaan partisipatif yang telah dilaksanakan dengan difasilitasi prosesnya oleh Tim LPPM Universitas Palangkaraya, diketahui wilayah tersebut memiliki nilai tinggi secara sosial, ekonomi dan budaya Masyarakat dalam bentuk hutan sekunder dan semak belukar. Oleh karenanya di area tersebut terdapat aktifitas masyarakat dalam bentuk kegiatan perkebunan, perikanan, pertanian dan meramu hasil hutan (tanaman obat) yang dapat diselaraskan dengan program dan rencana kegiatan PT. NRS. Adapun terhadap kegiatan masyarakat yang kurang sesuai dengan upaya penurunan emisi akan didiskusikan solusinya melalui mekanisme penengangan keluhan, umpan balik dan ganti rugi sebagaimana disepakati oleh perwakilan masyarakat dan PT. NRS.

Dibawah ini program dan kegiatan yang akan dilaksanakan oleh PT. NRS mencakup, namun tidak terbatas, hal-hal sebagai berikut.

Program	Kegiatan
1. Pemulihan Ekosistem	• Perlindungan Hutan, • Penanaman Tanaman Kehutanan dan Tanaman Yang Bernilai Ekonomi Tinggi; dan • Konservasi Keanekaragaman Hayati dan Kawasan Bernilai Karbon Tinggi
2. Pengelolaan Secara Berkelanjutan	• Peningkatan kualitas dan akses pasar (rantai pasok hijau) produk HHBK (oth, rotan, madu, perikanan, tanaman obat) • Peningkatan sarana produksi hasil hutan, pertanian dan perkebunan • Pemantauan hutan
3. Pemberdayaan Masyarakat	• Peningkatan kapasitas Masyarakat, • Penguatan kelembagaan • Penguatan usaha

Damikian Surat Pernyataan Persetujuan ini dibuat dengan penuh kesadaran dan tanggung jawab tanpa ada unsur pemaksaan, untuk dipergunakan sebagai mana mestinya.

Kami yang bertanda tangan dibawah ini,

Kepala Desa
Desa Pararapak
Barito Selatan
Kalimantan Tengah
Wakil Kelompok Tani Hutan
PT. NRS

Ketua Badan Perwakilan Desa
Desa Pararapak
Barito Selatan
Kalimantan Tengah
Mantir Adat
PT. NRS

Tokoh Masyarakat

Handrianto
Yanto Sabutran

Wakil Kelompok Perempuan,

ERMI
TIKNO

Wakil GAPOKTAN,

Lampiran 1. Peta wilayah desa di dalam area kerja PT. Nusantara Raya Solusi



Kepala Desa
Desa Pararapak
Barito Selatan
Kalimantan Tengah
Wakil Kelompok Tani Hutan
PT. NRS

Ketua Badan Perwakilan Desa
Desa Pararapak
Barito Selatan
Kalimantan Tengah
Mantir Adat
PT. NRS

SURAT PERNYATAAN PERSETUJUAN

PEMULIHAN EKOSISTEM, PENGELOLAAN HUTAN LESTARI, KONSERVASI KEANEKARAGAMAN HAYATI DAN PEMBEDAYAAN MASYARAKAT DESA DALAM RANGKA WITIGASI PERUBAHAN IKLIM PT. NUSANTARA RAYA SOLUSI

Pada hari ini, Kamis tanggal Dua Belas, bulan Oktober, Tahun Dua Ribu Dua Puluh Tiga, kami masyarakat Kelurahan Pendang Kecamatan Dusun Utara Kabupaten Barito Selatan, Provinsi Kalimantan Tengah, yang diwakili oleh yang menandatangani surat pernyataan ini, menyatakan **Peretujuan** terhadap rencana Program dan Kegiatan Pemulihan Ekosistem, Pengelolaan Hutan Lestari, Konservasi Keanekaragaman Hayati dan Pemberdayaan Masyarakat dalam rangka Mitigasi Perubahan Iklim yang akan dilaksanakan oleh PT. NRS dengan melibatkan peran aktif masyarakat Kelurahan Pendang di area seluas 4.968,59 Ha yang berada di dalam wilayah kelurahan kami sebagaimana peta terlampir.

Berdasarkan kegiatan pemetaan partisipatif yang telah dilaksanakan dengan difasilitasi prosesnya oleh Tim LPPM Universitas Palangkaraya, diketahui wilayah tersebut memiliki nilai tinggi secara sosial, ekonomi dan budaya Masyarakat dalam bentuk demak, sungai dan juga sebagai area tangkapan ikan, hutan sekunder, semak bukar, rumah adat dan perkebunan agroforestry rotan dan karet. Oleh karenanya di area tersebut terdapat identitas masyarakat dalam bentuk kegiatan perkebunan, perikanan, perburuan dan marasma hasil hutan (larangan obat) yang dapat diselaraskan dengan program dan rencana kegiatan PT. NRS. Adapun terhadap kegiatan masyarakat yang kurang sesuai dengan upaya Kegiatan Pemulihan Ekosistem, Pengelolaan Hutan Lestari, Konservasi Keanekaragaman Hayati dan Pemberdayaan Masyarakat dalam rangka Mitigasi Perubahan Iklim akan dilakukan solusinya melalui mekanisme penanganan keluhan, umpan balik dan ganti rugi sebagaimana diupayakan oleh masyarakat yang bersangkutan dan PT. NRS.

Dibawah ini program dan kegiatan yang akan dilaksanakan oleh PT. NRS mencakup, namun tidak terbatas, hal-hal sebagai berikut:

Program	Kegiatan
1. Pemulihan Ekosistem	• Perlindungan Hutan, • Penanaman Tanaman Kehutanan dan Tanaman Yang Bernilai Ekonomi Tinggi, dan • Pelestarian Keanekaragaman Hayati dan Kawasan Bernilai Keban Tinggi

2. Pengelolaan Secara Berkelanjutan	• Peningkatan kualitas dan akses pasar produk H-EK (tdh. karet, rotan, madu, perikanan, tanaman obat) • Peningkatan sarana produksi hasil hutan, pertanian dan perkebunan • Pemertanian hutan
3. Pemberdayaan Masyarakat	• Peningkatan kapasitas Masyarakat, • Penguatan kelembagaan • Penguatan usaha

Demikian Surat Pernyataan Peretujuan ini dibuat dengan penuh kesadaran dan tanggung jawab tanpa ada unsur pemaksaan, untuk dipergunakan sebagai mana mestinya.

Kami yang bertanda tangan dibawah ini


A. Md. Kep
NIP. 19660517 198802 1 005
PPK Pendang


HAIRUL SUJADI
NIPPPK. 19750909 202121 1 001

Sekretaris Dusun Utara,


SUELISNG SSI

Perwakilan Pemuda (i)


HARISMAN


Edmilson SP
NIP. 19680330 199303 1 010
Perwakilan Kelompok Tani Nelayan


SYAHBUDIN

Wakil Kelompok Perempuan,


ERMA WATI

Ketua MPA


NOOR JAMILAH

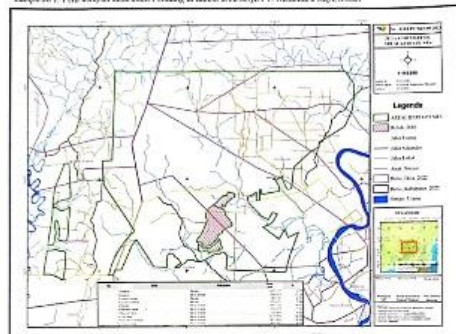
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Lampiran 1. Peta wilayah Kelurahan Pendang di dalam area kerja PT. Nusantara Raya Solusi




A. Md. Kep
NIP. 19660517 198802 1 005
PPK Pendang


HAIRUL SUJADI
NIPPPK. 19750909 202121 1 001

Sekretaris Dusun Utara,


Edmilson SP
NIP. 19680330 199303 1 010
Perwakilan Kelompok Tani Nelayan


SYAHBUDIN

Wakil Kelompok Perempuan,


ERMA WATI

SURAT PERNYATAAN PERSETUJUAN

PEMULIHAN EKOSISTEM, PENGELOAAN HUTAN LESTARI, KONSERVASI KEANEKARAGAMAN HAYATI DAN PEMBERDAYAAN MASYARAKAT DESA DALAM RANGKA MITIGASI PERUBAHAN IKLIM PT. NUSANTARA RAYA SOLUSI

Pada hari ini, Sabtu tanggal Empat Belas, bulan Oktober, tahun Dua Ribu Dua Puluh Tiga, kami masyarakat Desa Tanjung Jawa Kecamatan Dusun Selatan Kabupaten Barito Selatan, Provinsi Kalimantan Tengah, yang diwakili oleh yang merandatangani surat pernyataan ini menyatakan Persetujuan terhadap rencana Program dan Kegiatan Pemulihan Ekosistem, Pengelolaan Hutan Lestari, Konservasi Keanekaragaman Hayati dan Pemberdayaan Masyarakat dalam rangka Mitigasi Perubahan Iklim yang akan dilaksanakan oleh PT. NRS dengan melibatkan peran aktif masyarakat Desa Tanjung Jawa di area seluas 2.635,71 Ha yang berada di dalam wilayah desa sebagaimana peta terlampir.

Berdasarkan kegiatan pemetaan partisipatif yang telah dilaksanakan dengan difasilitasi prosesnya oleh Tim LPPM Universitas Pafanglanya, diketahui wilayah tersebut memiliki nilai tinggi secara sosial, ekonomi dan budaya Masyarakat dalam bentuk sungai dan baya sebagai area tangkapan ikan, hutan sekunder, semak belukar, rumah walet dan perkebunan agroforestry rotan dan karet. Oleh karenanya di area tersebut terdapat aktifitas masyarakat dalam bentuk kegiatan perkebunan, perikanan, perburuan dan meramu hasil hutan (caranam obat) yang dapat diselaraskan dengan program dan rencana kegiatan PT. NRS. Adapun terhadap kegiatan masyarakat yang kurang sesuai dengan upaya Kegiatan Pemulihan Ekosistem, Pengelolaan Hutan Lestari, Konservasi Keanekaragaman Hayati dan Pemberdayaan Masyarakat dalam rangka Mitigasi Perubahan Iklim akan dilakukan solusinya melalui mekanisme penangan keuhun, umpan balik dan ganti rugi sebagaimana disepakati oleh masyarakat yang bersangkutan dan PT. NRS.

Dibawah ini program dan kegiatan yang akan dilaksanakan oleh PT. NRS mencakup, namun tidak terbatas, hal-hal sebagai berikut:

Program	Kegiatan
1. Pemulihan Ekosistem	• Perindugunan Hutan, • Penanaman Tanaman Kehutanan dan Tanaman Yang Bermilai Ekonomi Tinggi; dan • Pelestarian Keanekaragaman Hayati dan Kawasan Bermilai Karben Tinggi

2. Pengelolaan Secara Berkelanjutan	• Peningkatan kualitas dan akses pasar produk HHRK (cay, karet, rotan, madu, perikanan, tanaman obat) • Peningkatan sarana produksi hasil hutan, pertanian dan perkebunan • Pemantauan hutan
3. Pemberdayaan Masyarakat	• Peningkatan kapasitas Masyarakat, • Penguatan kelembagaan • Penguatan usaha

Demikian Surat Pernyataan Persetujuan ini dibuat dengan penuh kesadaran dan tanggung jawab tanpa ada unsur pemaksaan, untuk dipergunakan sebagai mana mestinya. Kami yang bertanda tangan dibawah ini,

Kepala Desa Tanjung Jawa,

 SUPRATNO

Penghulu Adat,

 SANJOTO

Perwakilan Masyarakat,

 SUDIRMAN

Perwakilan Pemuda (P),

 JENI

BPD Tanjung Jawa,

 HAHARHARNO

Martir Adat,

 TRISADI

Wakil Kelompok Perempuan,

 SUDAMA

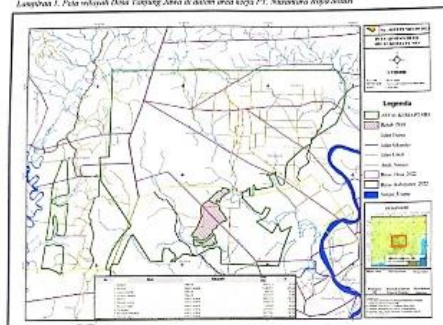
Ketua MPA,

 MPA

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Dipindai dengan CamScanner

Lampiran 1: Peta wilayah Desa Tanjung Jawa di dalam area kerja PT. Nusantara Raya Solusi



Kepala Desa Tanjung Jawa,

 SUPRATNO

Penghulu Adat,

 SANJOTO

Perwakilan Masyarakat,

 SUDIRMAN

Perwakilan Pemuda (P),

 JENI

BPD Tanjung Jawa,

 HAHARHARNO

Martir Adat,

 TRISADI

Wakil Kelompok Perempuan,

 SUDAMA

Ketua MPA,

 MPA

APPENDIX 7: STANDARD OPERATION PROCEDURE- GRIEVANCE MECHANISM

Each complaint will be reviewed based on the object of the complaint, verified, and then the results will be formulated through the following procedure:

1. Receive and register the grievance.

Stakeholders can submit complaints in several ways:

- Telephone number: 082125346944
 - WhatsApp number: 082125346944
 - Email: manager@nusantararayasolusi.com
 - Letter or direct report to NRS office at Palangka Raya Office, Kalahien Office, or Jakarta Office.
 - Address of NRS Palangka Raya Office: Jl. Sultan Badaruddin No. 27C, Kelurahan Menteng, Kecamatan Jekan Raya, Kota Palangka Raya, 73111
 - Address of NRS Kalahien Office: Jl. Padat Karya No. 33 RT009/RW002, Desa Kalahien, Kecamatan Dusun Selatan, Kabupaten Barito Selatan, 73751
 - Address of NRS Jakarta Office: Gedung TCC – Batavia Tower One. Lantai 06 Unit 01. Jl. KH. Mas Mansyur Kav. 126, Kota Jakarta Pusat, 10220
 - Or other electronic Facilities such as email or NRS web page: www.nusantararayasolusi.com
 - Complainants directly coming to Kalahien office in South Barito, Central Kalimantan will be received by the HSE Officer.
 - Complainants directly coming to Jakarta Office will be received by the Communication Relations Officer.
 - Complainants directly coming to Palangka Raya Office will be transferred to Community Relation Staff.
 - Initial acknowledgement will be given within 3-5 days of receipt and can be in the form of a standard letter or email, with a clearly identified point of contact in the NRS, a brief description of the process that will be followed, and a reference name or number to get update on the treatment progress of the complaint.
- ### 2. Act to resolve complaints by HSE or Communication Officer
- The designated HSE or Communication staff will take initial steps in responding to the complaint. The staff understands frequently asked questions of NRS.

- The grievance resolved and closed. Many complaints may resolve on the spot or in the office. The resolved complaint will be recorded and archived.
- If the HSE or Communication Officer cannot resolve the grievance, then the staff will provide a complaint form and transfer the complaint to community relation officer in Central Kalimantan.

3. Review and analysis

- Community Relations Officer reviews and analyses the complaint form against related SOPs and discusses with HSE or communication officer regarding the complaint received.
- Community Relations Officer prepares staff review paper with recommendations to respond the concerned complaint and submitted to General Manager cc related managers.
- General Manager discusses together with community relation and related manager to drafting correction/prevention action plan.
- General Manager report to director concerning the complaint received with correction/prevention action plan proposal.

4. 1st stage response

- Based on the direction of director, General Manager issued order letter to community relation and related manager to perform the approved correction/prevention action plan.
- Community Relations Team proposes corrective action plan to complainant and seeks agreement on the response.
- Community Relations Team together with related manager report the progress of performed actions to General manager. The General Manager updated the director on the progress of complaint treatment.
- If the complainant refuses the corrective action plan. General Manager reports to director with proposal for in depth evaluation and investigation. If necessary, external, or independent party involvement.

5. Evaluate and investigate.

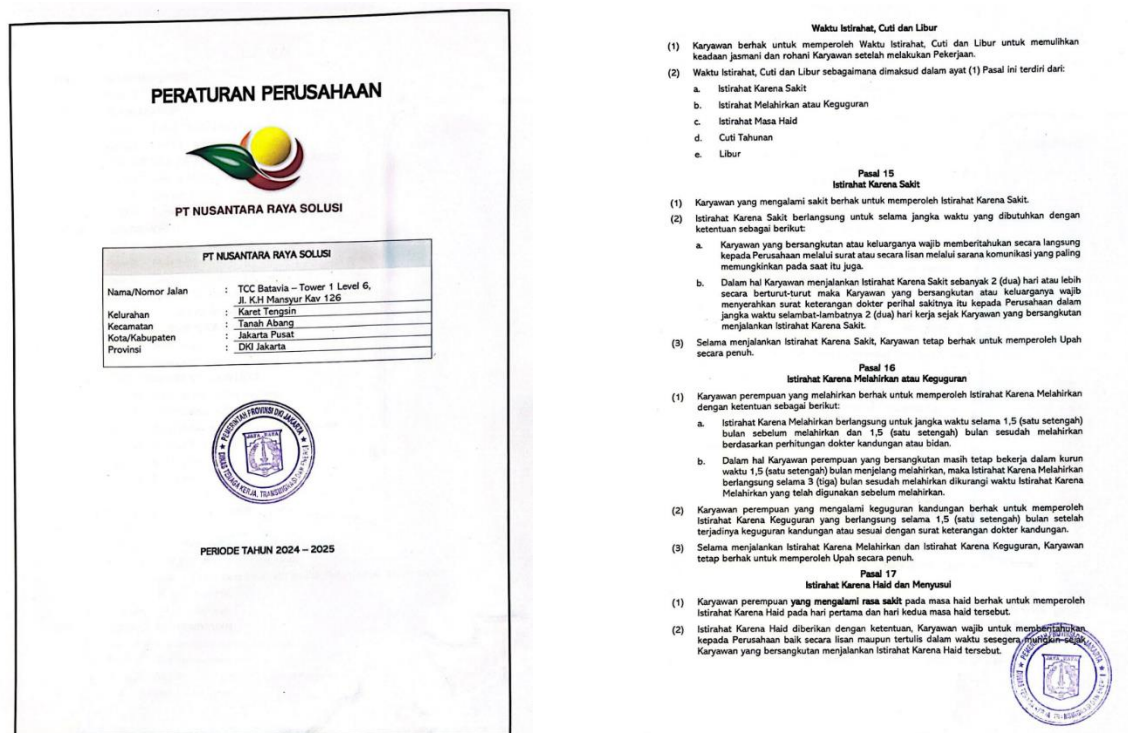
- General Manager under direction of director develop evaluation and investigation team. Team led by Community Relation
 - The community relation officer will complete the verification process and follow up by conducting field verification, sampling, photos, and/or videos of field findings.
 - The community relation will discuss with The General Manager and determine whether the handling of the grievance requires additional assessment and involvement of the complainant or other stakeholders to determine the best way to respond.
6. Act to resolve by community relation or team. The community relation will propose a response to the complainant and seek agreement on the response.
 7. Implement agreed response. If the complainant agrees with the response or solution of the complaint, the community relation staff will directly facilitate the agreed solution work, overseeing the implementation and involves the stakeholders to jointly monitor the work.

8. Grievance resolved and closed. If the agreed solution had been implemented and the complainant satisfied, then the grievance was resolved and closed. The community relation will make the report and document it in archives.
9. No Agreement on response. If an agreement is not reached. The Community Relations Team will review the cases and consider other ways of approach or other alternatives that may be available, including judicial. This will be communicated to the complainant and the complainant informed of the choice among alternatives.
10. Grievance referral or closed out.

If the grievance has not been resolved, the Community Relations Team will document all steps taken and communication. The final decision will be made by the organization whether the grievance will recourse to other alternatives including legal alternatives.

APPENDIX 8: Policy And SOP Relevant to Gender Equity in Labor and Work

The Project Proponent Company Regulation (Employee Handbook) is attached, which contains policies concerning gender equity in labor and work.



APPENDIX 9: POLICY AND SOP RELEVANT TO HUMAN TRAFFICKING, FORCED LABOR, AND CHILD LABOR

The Project Proponent Company Regulation (Employee Handbook) is attached, which prohibits human trafficking, forced labor and child labor, including in its supply chain.

As represent in the Article 7.b. that *fulfil the job requirements criteria determined by the company with reference to article 68 of Law No. 13 of 2003, where entrepreneurs or companies are strictly prohibited from employing children under 18 years old.*

PERATURAN PERUSAHAAN



PT NUSANTARA RAYA SOLUSI

PT NUSANTARA RAYA SOLUSI	
Nama/Nomor Jalan	: TCC Batavia – Tower 1 Level 6, Jl. K.H. Mansyur Kay 126
Kelurahan	: Karet Tengsin
Kecamatan	: Tanah Abang
Kota/Kabupaten	: Jakarta Pusat
Provinsi	: DKI Jakarta



PERIODE TAHUN 2024 – 2025

- g. Dengan ceroboh atau sengaja merusak atau membiarkan dalam keadaan bahaya barang milik Perusahaan yang dapat menimbulkan kerugian bagi Perusahaan.
- h. Dengan ceroboh atau sengaja membiarkan Karyawan lain atau Perusahaan dalam keadaan bahaya.
- i. Membongkar atau membocorkan rahasia Perusahaan yang seharusnya dirahasiakan kecuali untuk kepentingan hukum.
- j. Melakukan perbuatan lainnya yang diancam dengan pidana penjara 5 (lima) tahun atau lebih.

BAB IV HUBUNGAN KERJA

Pasal 7

Penerimaan Karyawan

- (1) Penerimaan Karyawan dilakukan oleh Perusahaan terhadap Calon Karyawan yang memenuhi syarat sebagai berikut:
 - a. Warga Negara Indonesia atau Warga Negara Asing yang memenuhi persyaratan sesuai peraturan perundang-undangan yang berlaku, sehat jasmani dan rohani, termasuk tidak menderita penyakit menular dan semestinya, dibuktikan dengan surat dokter
 - b. Karyawan yang diterima bekerja harus memenuhi kriteria dan persyaratan yang ditentukan Perusahaan, antara lain:
 1. Lulus ujian atau tes yang dilakukan oleh Perusahaan.
 2. Bersedia dan berijazah sehat berdasarkan pemeriksaan kesehatan oleh dokter dan/atau sarana kesehatan yang ditunjuk oleh Perusahaan.
 3. Memenuhi kriteria persyaratan jabatan yang ditentukan oleh Perusahaan.
 4. Berkelakuan baik yang dibuktikan dengan surat keterangan yang dikeluarkan oleh pihak yang berwenang.
 5. Bersedia menaati Peraturan Perusahaan dan Tata Tertib Perusahaan.
 6. Menyerahkan dokumen-dokumen yang dipersyaratkan oleh Perusahaan.
- (2) Prosedur dan tata cara Penerimaan Karyawan lebih lanjut ditentukan oleh Perusahaan berdasarkan Keputusan Perusahaan.

Pasal 8

Masa Percobaan

- (1) Setiap Karyawan status Perjanjian Kerja Waktu Tidak Tertentu (PKWTT) wajib untuk menjalani Masa Percobaan paling lama selama 3 (tiga) bulan sejak tanggal ditandatanganinya perjanjian kerja.
- (2) Masa Percobaan 3 (tiga) bulan ini tidak berlaku untuk Karyawan dengan status Perjanjian Kerja Waktu Tertentu (PKWT).
- (3) Selama Masa Percobaan, baik Perusahaan maupun Karyawan berhak untuk melakukan Penutusan Hubungan Kerja secara sepihak pada setiap saat dan tanpa syarat apapun.
- (4) Selama Masa Percobaan, Perusahaan berhak untuk melakukan pengawasan dan penilaian terhadap Karyawan yang pelaksanaannya dilakukan oleh atasan langsung dari Karyawan.
- (5) Berdasarkan hasil pengawasan dan penilaian terhadap Karyawan sebagaimana dimaksud dalam ayat (3) Pasal ini, Perusahaan berhak untuk melakukan Evaluasi Masa Percobaan dengan ketentuan sebagai berikut:
 - a. Karyawan Masa Percobaan yang lulus Evaluasi Masa Percobaan akan diangkat menjadi Karyawan Tetap oleh Perusahaan berdasarkan Keputusan Perusahaan.

APPENDIX 10: BENEFIT SHARING

The Project benefit sharing mechanism is set out in the below table

:

