

New Planting Procedure - Summary of Assessments

RSPO

Roundtable on Sustainable Palm Oil



**New Britain
Palm Oil
Limited**

A Sime Darby Plantation Company



Global Gateway Certifications

NPP Reference Number: GGC-J4-NPP-HOP

Country of the NPP submission: Papua New Guinea

RSPO Membership Number: 1-0008-04-000-00

Section 1: General Information

The purpose of this NPP is to enable NBPOL to comply with RSPO requirements, which necessitates all new oil palm developments to undertake a suite of assessments prior to development. These assessments are done to ensure that:

- Development is done in harmony with the environment and in harmony with the communities that live within and around the assessment area.
- Any HCV area or HCS forest in the assessment area are identified and mapped prior to development, and management and monitoring recommendations are provided to ensure the HCV/HCS present are maintained or enhanced if the project proceeds.
- Development is planned to minimise carbon emissions and maximise carbon sequestration.

The assessment areas are located in Oro Province, PNG. Each of the assessment areas are spread out across the landscape. The name and coordinates of each assessment area are provided in Table 1, the assessment areas can be seen in Figure 1. The total area is 2256.54 ha.

Table 1. Study areas that are relevant to this assessment.

Proposal
1. Andogorari
2. Bafera
3. Bakito Extension
4. Beririta
5. Borari
6. Boruga Pusute Extension
7. Buro (Portion 911)
8. Dara Pema
9. Darau Extension
10. Ewasasaru
11. Gajarepa
12. H.Hombokapa
13. Hajojo
14. Haugapa
15. Hiroipa
16. Hofita
17. Hombare
18. Houembo Kosote

19. Houpa Extension
20. Hungoro
21. Isugahambo (Portion 951)
22. Jajama
23. Javunipa
24. Kajma Estate
25. Kesiha
26. Kofureta
27. Korofurukari
28. Kovenopa Sambura
29. Mende (Portion 914)
30. Owate
31. Papaki Extension
32. Perombata Ext. (Haintapa Clan)
33. Perombata Ext. (Sorupa Clan)
34. Portion 2
35. Pupu
36. Saura (Portion 919)
37. Serembe - Arehu Oga
38. Serembe - Ohogo
39. Sifia
40. Siko
41. Topiripa Extension
42. Wanipa Extension

NB: These will all be scheme Mini Estates if the development goes ahead.

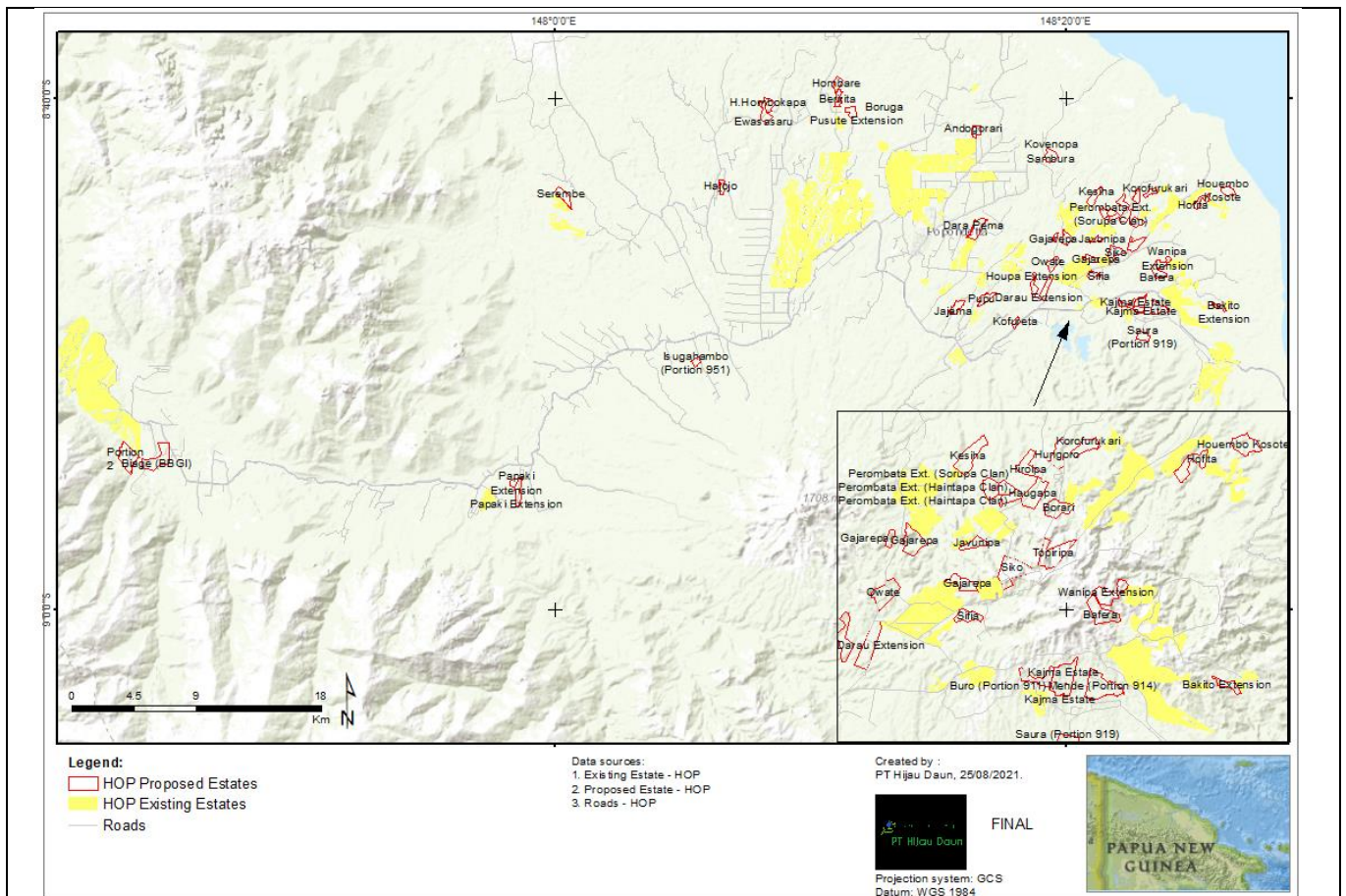


Figure 1. Spatial location of study areas (red) in the AOI.

Table 2. Permits by which use of the land will be allowed.

Site Ref.	Proposed Estate	Tenure ¹
ND01	Topiripa Extension	SUB- LEASED THROUGH AN ILG
ND02	Hougapa	SUB- LEASED THROUGH AN ILG
ND03	Perombata Extension	SUB- LEASED THROUGH AN ILG
ND04	Perombata Extension	SUB- LEASED THROUGH AN ILG
ND05	Kovenopa Sambura	SUB- LEASED THROUGH AN ILG
ND06	Owate	SUB- LEASED THROUGH AN ILG
ND07	Sefia	SUB- LEASED THROUGH AN ILG
ND08	Kofureta Handiria	SUB- LEASED THROUGH AN ILG
ND09	Pupu	SUB- LEASED THROUGH AN ILG
ND10	Houembo Kosote	SUB- LEASED THROUGH AN ILG
ND11	Jajama	SUB- LEASED THROUGH AN ILG
ND12	Portion 2	SL
ND13	Dara Pema	SUB- LEASED THROUGH AN ILG

ND14	Darau Extension	SUB- LEASED THROUGH AN ILG
ND15	Javunipa	SUB- LEASED THROUGH AN ILG
ND16	Bakito Extension	SUB- LEASED THROUGH AN ILG
ND17	Mende (Portion 914)	State Lease
ND18	Buro (Portion 911)	State Lease
ND19	Saura (Portion 919)	State Lease
ND20	Wanipa Extension	SUB- LEASED THROUGH AN ILG
ND21	Bafera	SUB- LEASED THROUGH AN ILG
ND22	Korofurukari	SUB- LEASED THROUGH AN ILG
ND23	Hungoro	SUB- LEASED THROUGH AN ILG
ND24	Borari	SUB- LEASED THROUGH AN ILG
ND25	Siko	SUB- LEASED THROUGH AN ILG
ND26	Hiroipa	SUB- LEASED THROUGH AN ILG
ND27	Hofita	SUB- LEASED THROUGH AN ILG
ND28	Kesiha	SUB- LEASED THROUGH AN ILG
ND29	Gajarepa	SUB- LEASED THROUGH AN ILG
ND30	Houpa Extension	SUB- LEASED THROUGH AN ILG
ND31	Boruga Pusute Extension	SUB- LEASED THROUGH AN ILG
ND32	Beririta	SUB- LEASED THROUGH AN ILG
ND33	Hombare	SUB- LEASED THROUGH AN ILG
ND34	Handari Hombukapa	SUB- LEASED THROUGH AN ILG
ND35	Ewasasaru	SUB- LEASED THROUGH AN ILG
ND36	Hajojoo	SUB- LEASED THROUGH AN ILG
ND37	Andogorari	SUB- LEASED THROUGH AN ILG
ND38	Serembe	SUB- LEASED THROUGH AN ILG
ND39	Isugahambo (Por 951 LTC)	Private lease with an owner with a Freehold title (LTC)
ND40	Papaki Extension	SUB- LEASED THROUGH AN ILG
ND41	Papaki Extension	SUB- LEASED THROUGH AN ILG
ND42	Kajma Estate	State Lease

¹ CL = Customary Land, SL = State Lease, LTC = Land Tenure Conversion (customary land but with clear title usually registered to a single clan member rather than communal or clan name (ILG))

The assessments conducted over these areas were:

- HCV / HCS assessment
- SEIA
- GHG
- LUCA
- Soil and Topography

Landforms

A landform refers to a ‘recurring pattern of topography within the landscape’ (Bryan and Shearman, 2008), with specific landforms often associated with specific vegetation associations and/or communities.

Landform extent across the AOI can be seen in Figure 2 and Figure 3 and the descriptions have been taken from the PNGRIS handbook (Bryan and Shearman, 2008).

Table 3. Landforms present in the assessment AOI, as per PNGRIS (2008).

Landform Number	Landform group	Landform name	Description
3	Depositional landforms	Beach Ridge complexes and beach plains	Beach ridge complexes consist of long parallel ridges and swales often extending for several tens of kilometres along the coast. The relief is mostly 2-3 m and gradually decreases inland. If there is no discernible relief the complex is called a beach plain. Beach ridge complexes are formed by sand transported by lung-shore drift and are most common where there is strong wave transport. Beach ridge complexes often occur at the mouths of estuaries along the south coast and are the most favoured areas of human settlement. They are, however, also common along the north coast where their material is generally coarser, reflecting the greater sediment supply from the inland rivers due to the continuous uplift of the area.
13	Depositional landforms (recent plains)	Composite alluvial plains	Complex alluvial plains or basins consisting of a central flat to gently undulating meander floodplain with meandering channels, low discontinuous levees, meander scrolls and oxbows, which merge into poorly drained flanking back plains and back swamps and/or higher well drained terraces.
21	Depositional landforms	Back plains	Fossil beach ridges are those which are some distance inland and separated from the present beach ridge complexes. In the strict sense, of course, only the very first beach ridge of a complex is active and all the successively older beach ridges behind it are inactive. However, because of the very limited extent of these land forms it was not possible to map this kind of detail. Relict beach ridges are clear indicators for seaward extension of the land.
22	Depositional landforms (Fluvial - recent plains)	Back swamps	Extensive marshy semi-permanently to permanently inundated depressed areas of floodplains with drainage impounded or impeded by a central levee or meander plain. These freshwater swamps are maintained wherever land gradients and drainage outlets are inadequate to disperse the rain and run-on water. The depth of standing water and

			duration and depth of flooding is highly variable throughout PNG and depends entirely on local conditions.
25	Depositional landforms (Fluvial - recent plains)	Braided Flood-plains or Bar Plains.-	Braided flood-plains are distinctly different from the plains mentioned above. They are characterized by numerous braiding shallow channels, sand bars, and mud bars which are constantly shifting. The channels are very shallow and unnavigable by even small craft. The gradients are high (0.5-3 %) even for larger rivers and large quantities of sediment are moved rapidly during flood.
30	Depositional landforms (Fluvial - recent plains)	Relict fans	Relict fans are basically similar to relict plains but form a segment of a cone with its apex at the point where the stream leaves the mountains. They consist of irregularly bedded sediments of silt, clay, and gravel unconformably overlying planed surfaces of older beds. Fans are typical features of tectonically active areas. The relief gives an approximate indication of the degree of dissection. Undissected fans have a relief of 0-10 m, while the dissected fans have a relief of 10-30 m or 30 - 100 m.
31			
32	Volcanic landforms (Fans and footslopes)	Little dissected volcanic footslopes and volcano-alluvial fans	A variety of undissected to little dissected landforms generally surrounding young or recently active volcanoes and including partially dissected extensive coalescing volcano-alluvial fans of slightly concave profile. Fans are dissected by shallow, frequently steep sided radiating valleys separated by either long low ridges with accordant crests or by undulation plains at lower altitudes and slopes.
33	Volcanic landforms (Fans and footslopes)	Dissected volcanic footslopes and volcano-alluvial fans	Dissected volcanic footslopes and former volcano-alluvial fans of slightly concave profile, formed of intercalated fluvial, lahric (mudflow) and nuee (avalanche) deposits with superficial ash. On the flanks of major volcanoes, they are dissected by numerous radiating streams to form a pattern of long, radiating or sub-parallel ridges and narrow, steep sided valleys.
35	Volcanic landforms (Fans and footslopes)	Volcano-alluvial plains	Actively forming very low angle volcanic plains which may take various forms.
51	Erosional landforms (mountains and hills)	Mountains or hills with weak or no structural control	<p>Mountains and hills of high to very high relief (greater than 100m) with weak or no structural control, steep escarpments and narrow sharp crested ridges separated by V-shaped valleys with steep river gradients.</p> <p>Mountains and hills with weak or no structural control on soft fine -grained sedimentary rocks such as marl, mudstone and siltstone. They are characterized by a very dense dissection pattern and highly irregular slopes with great variability in slope steepness because of frequent slumping and intense gullying. Slopes can vary from 50° at slump headwalls to a few degrees at slump toes. Weathering is mostly shallow and immature.</p>

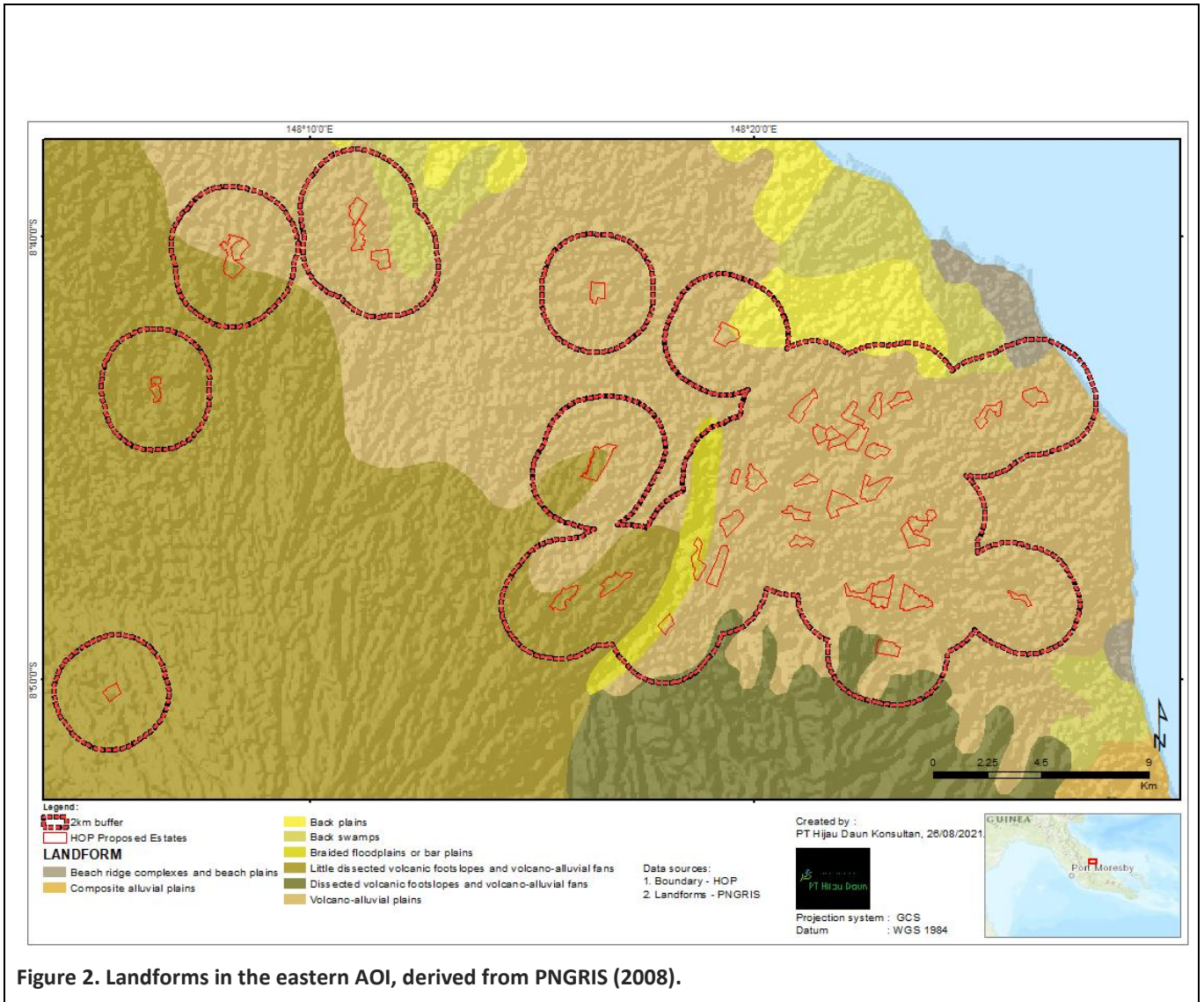


Figure 2. Landforms in the eastern AOI, derived from PNGRIS (2008).

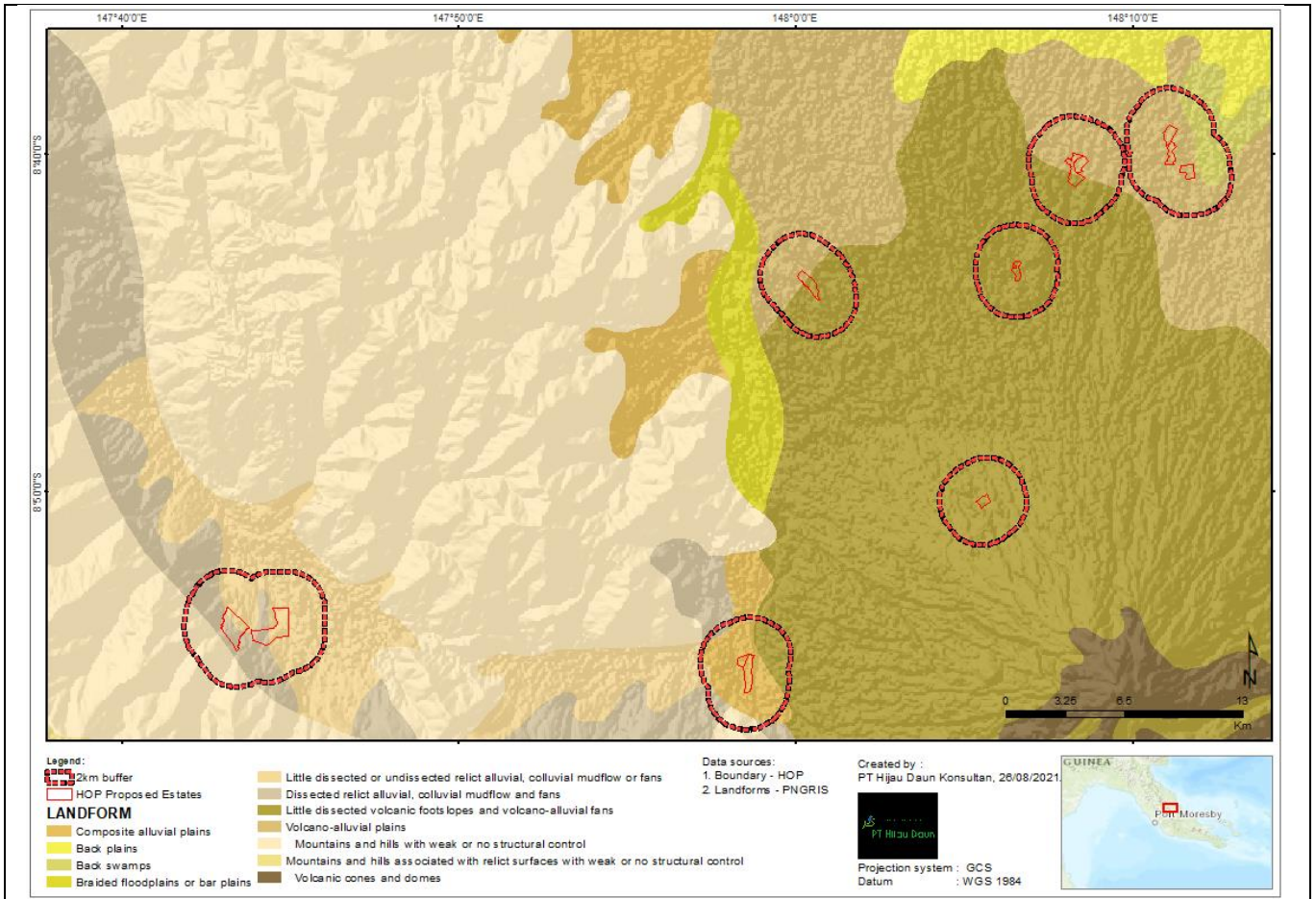


Figure 3. Landforms in the western AOI, derived from PNGRIS (2008).

Elevations and Slopes

All the blocks are of low elevations (<300 m) and flat.

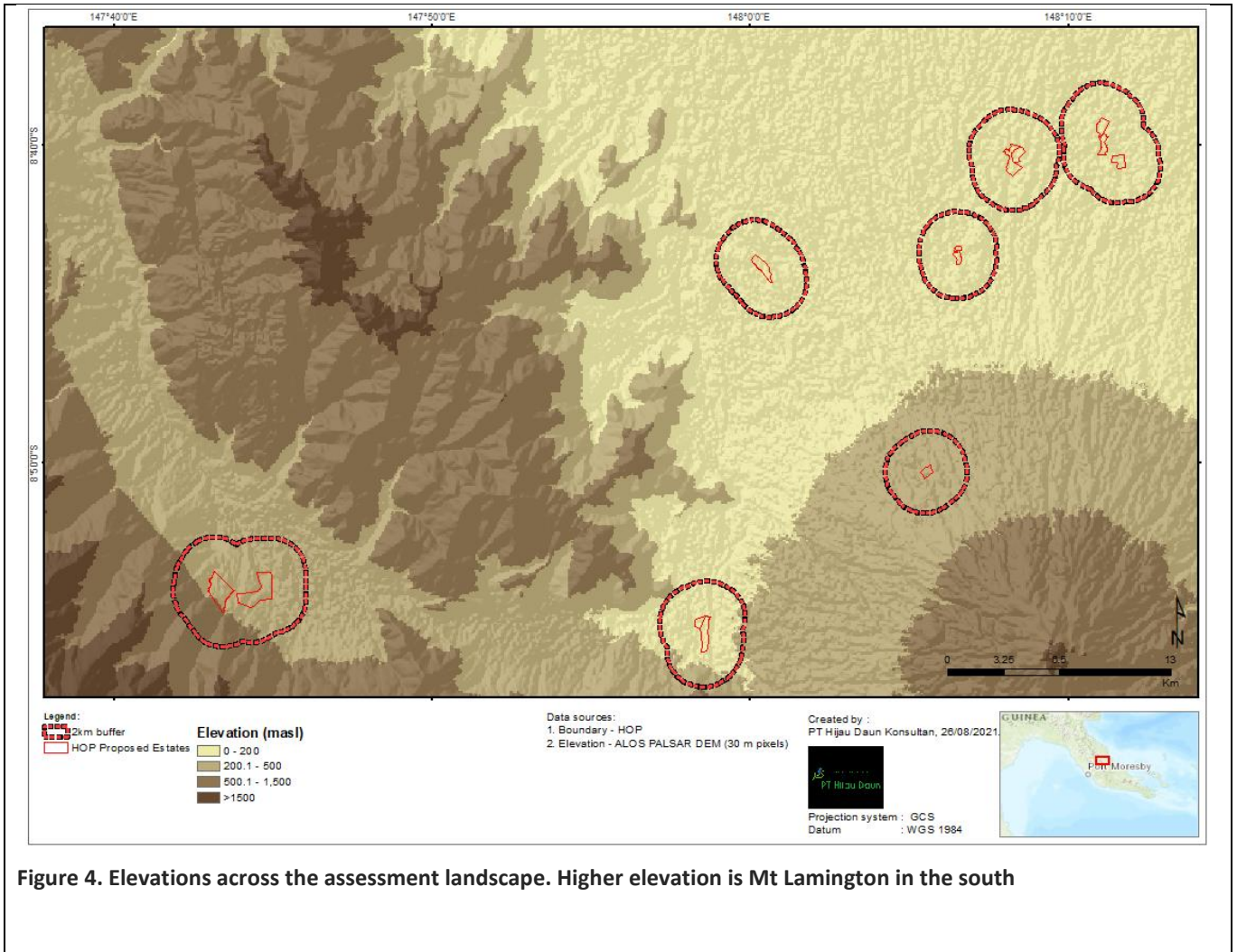


Figure 4. Elevations across the assessment landscape. Higher elevation is Mt Lamington in the south

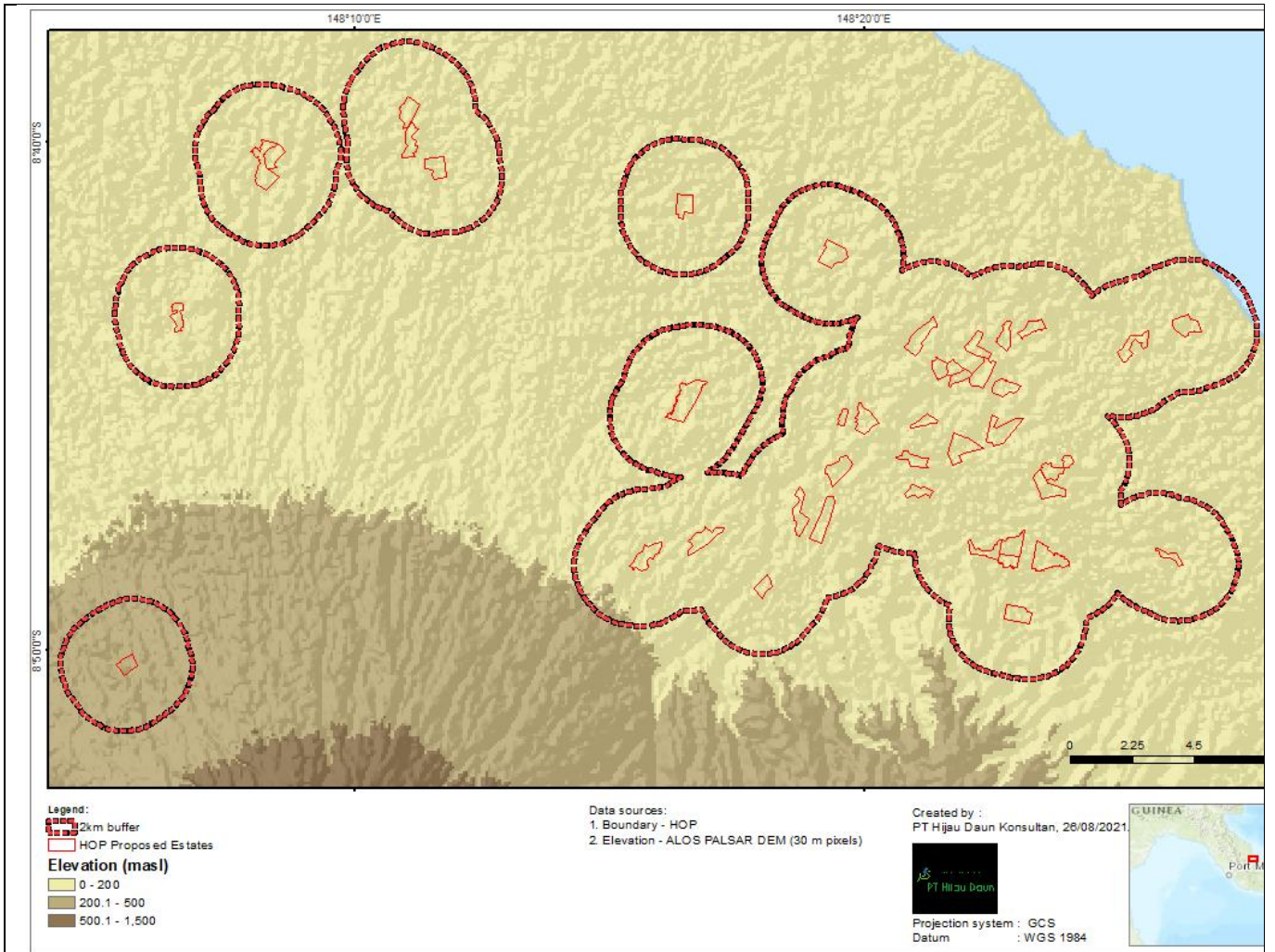


Figure 5. Elevations across the assessment landscape. Higher elevation is Mt Lamington in the south.

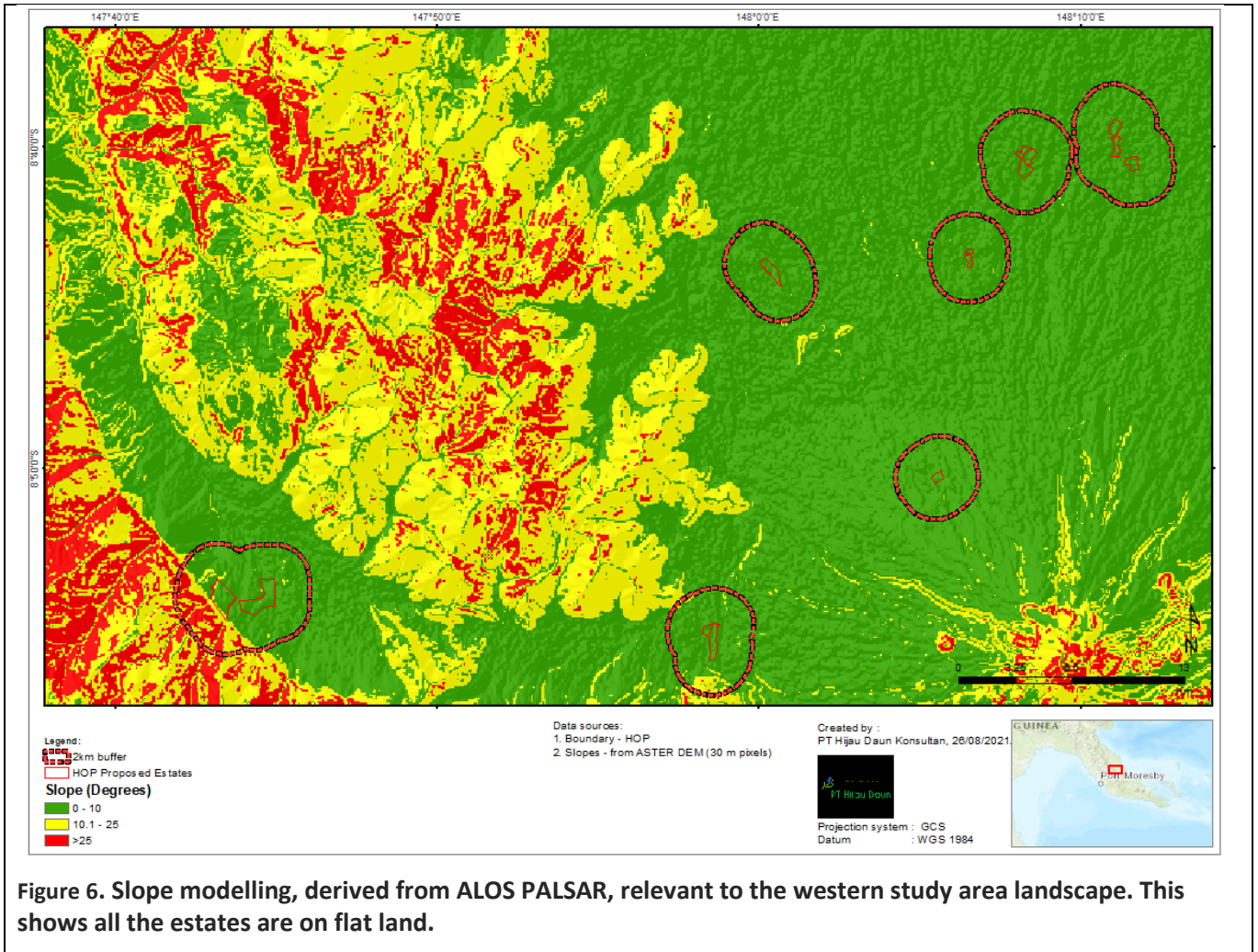


Figure 6. Slope modelling, derived from ALOS PALSAR, relevant to the western study area landscape. This shows all the estates are on flat land.

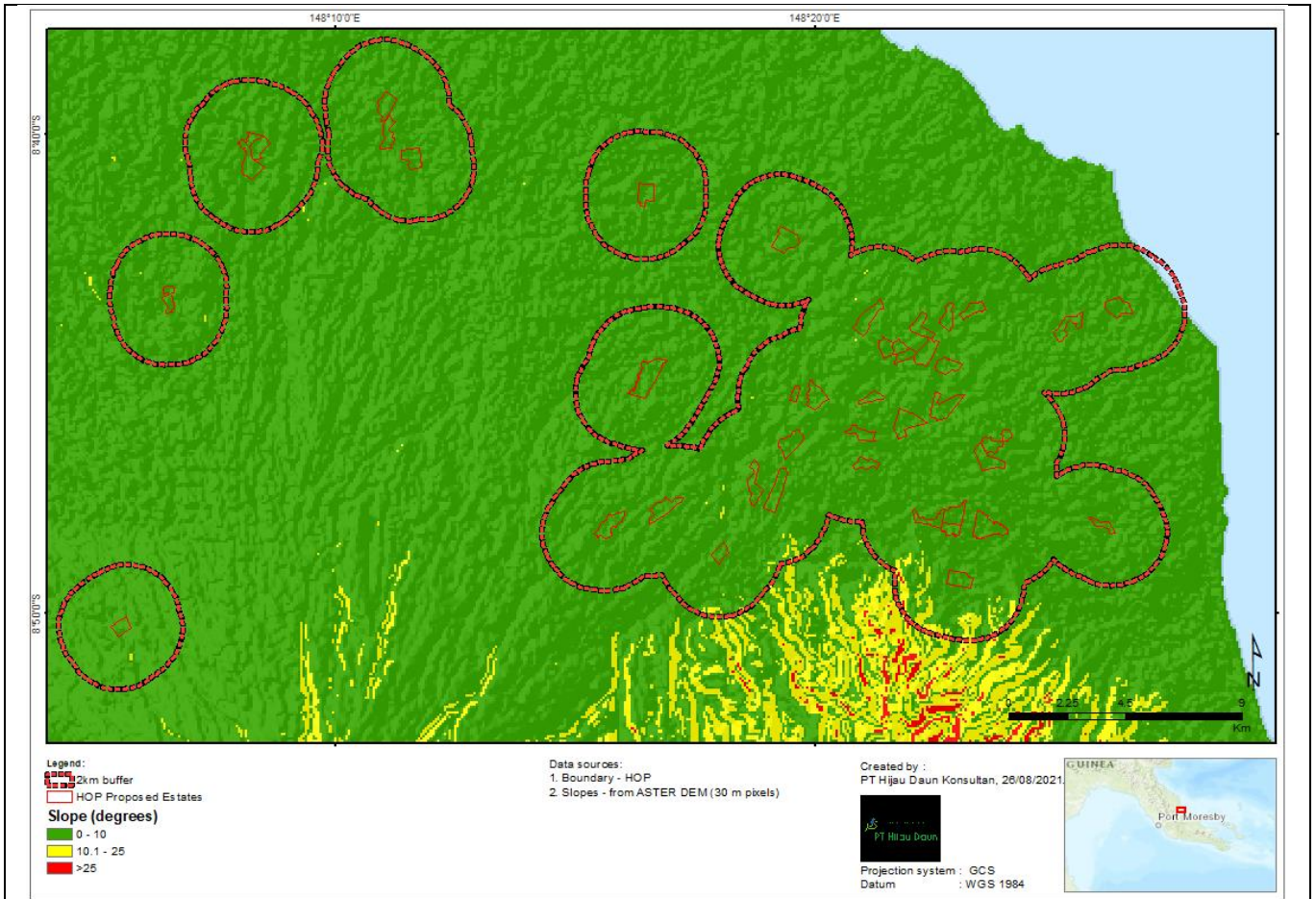


Figure 7. Slope modelling, derived from ALOS PALSAR, relevant to the eastern study area landscape. This shows all the estates are on flat land.

Hydrology

The area has a very wet tropical climate with rainfalls in excess of 100 mm in almost every month.

All rivers either originate on Mt Lamington or in the Owen Stanley Ranges within the assessment AOI are generally north east flowing.

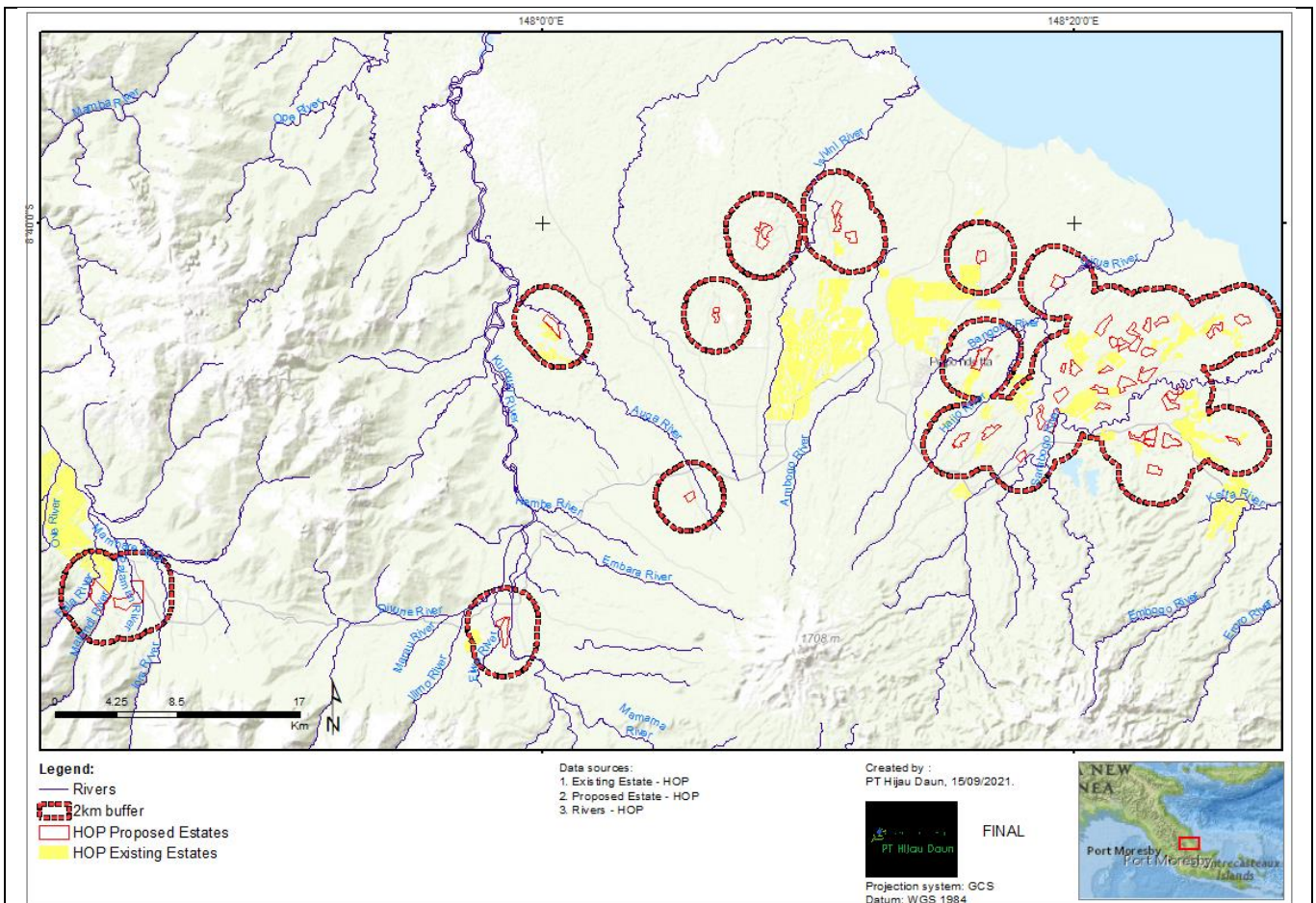


Figure 8. Major rivers in the AOI. The main rivers in the landscape are the Kumusi River and the Mamba River (starting at Kokoda).

Formally protected and informal conservation areas

Intact Forest Landscapes

There are Intact Forest Landscapes near the proposed estates (1 km from Portion 2, 2 km from Saura and 2.7 km from Papaki Extension). These areas can be seen below on Figure 9.

Endemic Bird Areas (EBA) and Important Bird Areas (IBA)

There are no IBAs nearby the AOI. However, there is the Central Papuan Mountains EBA which includes all the mountain ranges that run unbroken from the isthmus of the Vogelkop in Indonesian Papua through to Milne Bay in PNG. The lower limit of this EBA is defined as 1000 m (as such it does not overlap with the AOI). This EBA has the second most restricted range species of all EBAs in the south east Asian island region, as well as distinct avifauna, including nine endemic genera (which includes four genera of the Birds of Paradise). In the South-eastern Highlands – which is the area of the EBA which is closest to the AOI there are 31 restricted range species. (Keast, 2000)

Key Biodiversity Areas (KBA)

There is one KBA in this landscape, the Popondetta Plains KBA. Sites qualify as global KBAs if they meet one or more of 11 criteria, clustered into five categories: threatened biodiversity; geographically restricted biodiversity; ecological integrity; biological processes; and, irreplaceability.

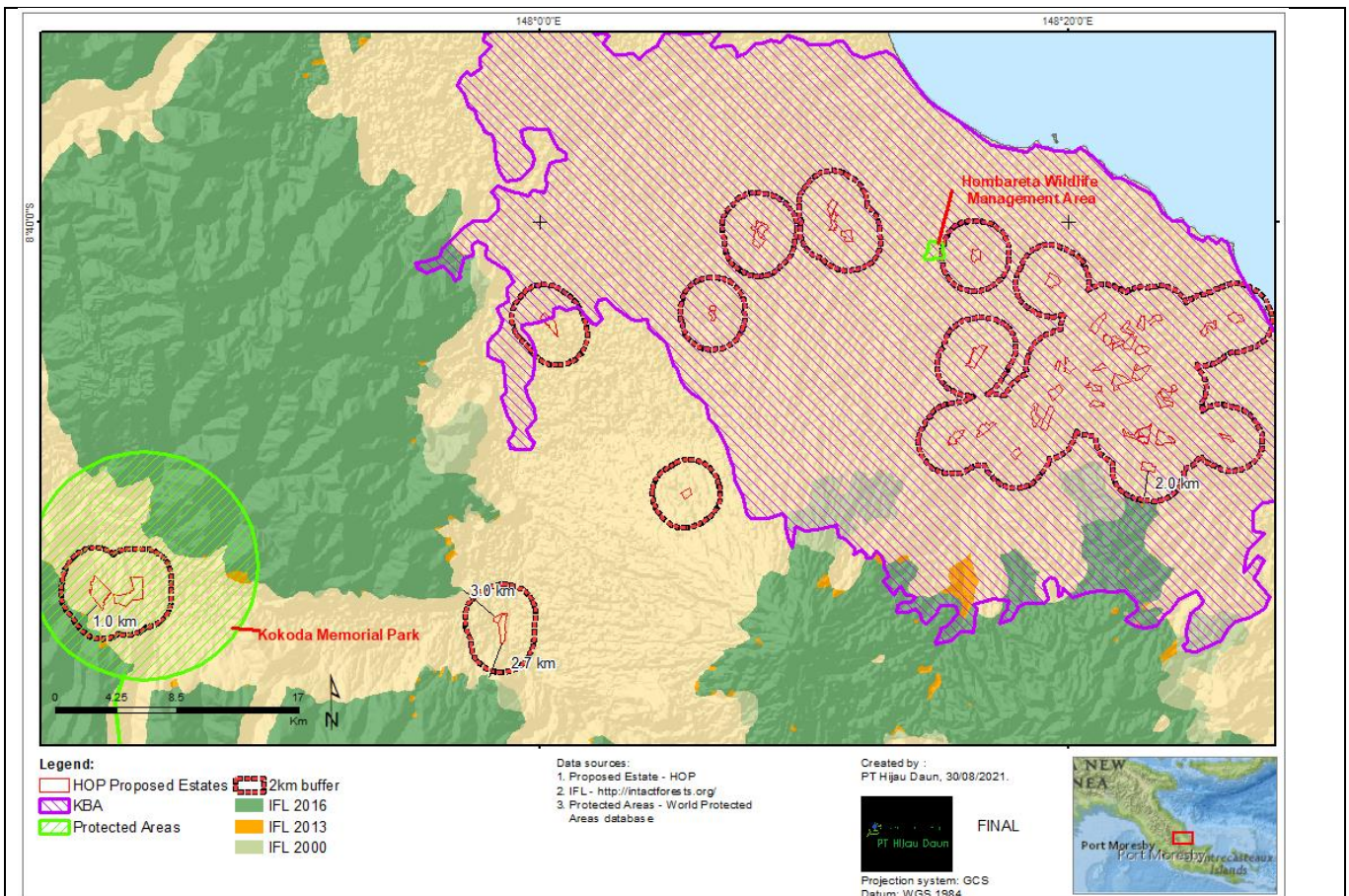


Figure 9. Shows the formally Protected Areas (green hatching), KBAs (purple hatching) and IFLs in the AOI. The closest IFL is 1.0 km from Portion 2. Endemic Bird Areas are mapped over the whole of PNG.

Social, cultural and economic characteristics

Ownership

Customary Land

Approximately customary owned land is about 97% of the total land area of PNG as opposed to 3% which alienated/state land, however, percentages of state/alienated land is more than likely to have increased over the years. Customary land is also known as unregistered land. The PNG legal system recognizes both customary and common (English) law land rights. Customary land ownership and land boundaries are determined through traditional mediation processes used by customary land owners. Customary land can be utilized to benefit traditional land owners. One of the common mechanisms used in PNG to utilize traditional land is to register the land as an Incorporated Land Group. This makes the land available for leasing to businesses, developers, etc. to conduct operations on the land and the customary land owners are paid royalties in return.

Customary land within PNG is owned by Clans, not individuals. In general, the clans live in a village. Although there may be several clans in a village. The “Study Areas” are an arbitrary boundary drawn up between NBPOL and the clan which describes the area the clan(s) wants to be considered for oil palm development. In order to lease the land to NBPOL, the clans must form an ILG and get the land registered. NBPOL has assisted the landowners with this process. Although the landowners could get their complete land registered as an ILG, most have just got the ILG registered over the land they want to lease. Many are fearful of the process and are worried about losing their land.

Freehold Land

All freehold titles have “Restrictions” detailed on the back of the Certificate of Title at the time of registration. These restrictions have been specified under Section 26 of the Land (Tenure Conversion) Act prohibiting the title holder from:

- Transferring or leasing the land for a period longer than 25 years only with the consent of the Land Board.
- Using the land as security as a consequence of bankruptcy, insolvency etc.

Freehold titles indicate that the name of the person or business group on the Certificate of Title (COT) owns both the property and the land upon which it stands. Land which can be converted to freehold is originally customary land and cannot be State Land. The Land Title’s Commission “is responsible for the carrying out of investigations into applications to ensure that all interests in the land are addressed to prevent future disputes. However, if a dispute arises, the Land Title’s Commission has a mechanism in place to hear and settle disputes.”

This is something of an anomaly in PNG. Isugahambo has a land title certificate (freehold title), and is owned by an individual, which is very uncommon.

State Lease

State Leases contain one particular restriction, which is the approved purpose specified in the lease of that land. This is land owned by the state and leased to individuals or groups. The term is generally a 99-year lease. Most of NBPOL’s existing estates are state lease land. Leasehold titles are that once it has been registered and certified, the validity of the ownership cannot be challenged or defeated. This feature was adopted when PNG adopted the Torrens Title System of Registration from Australia. As mentioned earlier a lease may be applied for a period not exceeding 99 years and at its expiration the State is allowed, but not obliged to renew the lease. Once a state lease is granted, the application of the lease will be published in the National Gazette under the heading “Successful Applicant”.

This is land owned by the state and leased to individuals or groups. The term is generally a 99-year lease. Most of NBPOL’s existing estates are state lease land.

Table 4. Study areas covered by this integrated HCV-HCSA assessment

Site Ref.	Proposed Estate	Ownership	Development Plan ²
ND01	Topiripa Extension	Customary	Mini Estate
ND02	Hougapa	Customary	Mini Estate
ND03	Perombata Extension	Customary	Mini Estate
ND04	Perombata Extension	Customary	Mini Estate
ND05	Kovenopa Sambura	Customary	Mini Estate
ND06	Owate	Customary	Mini Estate
ND07	Sefia	Customary	Mini Estate
ND08	Kofureta Handiria	Customary	Mini Estate
ND09	Pupu	Customary	Mini Estate
ND10	Houembo Kosote	Customary	Mini Estate
ND11	Jajama	Customary	Mini Estate
ND12	Portion 2	State Lease	Mini Estate
ND13	Dara Pema	Customary	Mini Estate

ND14	Darau Extension	Customary	Mini Estate
ND15	Javunipa	Customary	Mini Estate
ND16	Bakito Extension	Customary	Mini Estate
ND17	Mende (Portion 914)	State Lease	Mini Estate
ND18	Buro (Portion 911)	State Lease	Mini Estate
ND19	Saura (Portion 919)	State Lease	Mini Estate
ND20	Wanipa Extension	Customary	Mini Estate
ND21	Bafera	Customary	Mini Estate
ND22	Korofurukari	Customary	Mini Estate
ND23	Hungoro	Customary	Mini Estate
ND24	Borari	Customary	Mini Estate
ND25	Siko	Customary	Mini Estate
ND26	Hiroipa	Customary	Mini Estate
ND27	Hofita	Customary	Mini Estate
ND28	Kesiha	Customary	Mini Estate
ND29	Gajarepa	Customary	Mini Estate
ND30	Houpa Extension	Customary	Mini Estate
ND31	Boruga Pusute Extension	Customary	Mini Estate
ND32	Beririta	Customary	Mini Estate
ND33	Hombare	Customary	Mini Estate
ND34	Handari Hombukapa	Customary	Mini Estate
ND35	Ewasasaru	Customary	Mini Estate
ND36	Hajojoo	Customary	Mini Estate
ND37	Andogorari	Customary	Mini Estate
ND38	Serembe	Customary	Mini Estate
ND39	Isugahambo (Por 951 LTC)	Land Title Certificate	Mini Estate
ND40	Papaki Extension	Customary	Mini Estate
ND41	Papaki Extension	Customary	Mini Estate
ND42	Kajma Estate	State Lease	Mini Estate

Demographic and socio-economic context

The assessment area lies within the Oro Bay Rural, Kokoda Rural, Popondetta Urban and Higaturu Rural LLGs.

² Mini Estate, where NBPOL pays a lease and a royalty on the FFB

Table 5. Populations in the wider landscape based on the previous census.

Wards	Households	People	Male	Female
Kararata	321	1792	958	834
Dobuduru	207	1039	543	496
Siremi	212	1256	656	600
Other Oro Bay Rural	4,586	25,973	13,775	12,198
Oro Bay Rural Total	5,326	30,060	15,932	14,128
Gewoto	406	2279	1158	1121
Sewa	517	3186	1632	1554
Isuga	792	4424	2286	2138
Sorovi	360	2137	1138	999
Other Popondetta Urban	2,857	17,428	9,102	8,326
Popondetta Urban Total	4,932	29,454	15,316	14,138
Kovelo	150	953	485	468
Ilimo	224	1427	727	700
Kokoda Rural Other	3,175	18,545	9,669	8,876
Kokoda Rural	3,549	20,925	10,881	10,044
New Warisota	63	460	233	227
Handarituru	479	2879	1465	1414
Sirembi	238	1572	828	744
Papoga	586	3681	1931	1750
Ehu	162	1046	534	512
Other Higaturu Rural	6,476	39,064	20,334	18,730
Higaturu Rural Total	8,004	48,702	25,325	23,377
Grand Total	21,811	129,141	67,454	61,687

(Papua New Guinea National Statistical Office, 2011)

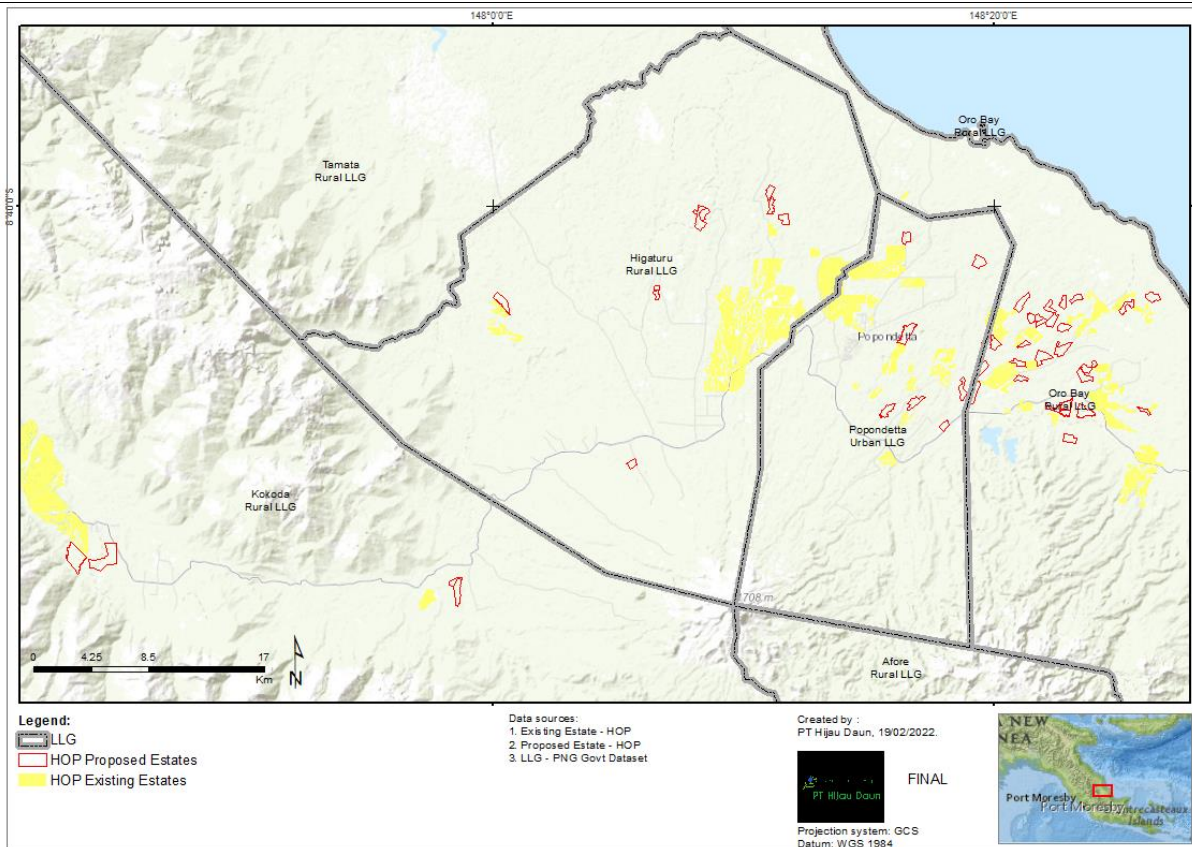


Figure 10. Local Level Government (LLG) Boundaries

Table 6. Demographic data related to the landowning communities.

Estate / Community	Name of Clan(s)	Tribe and Lineage	Population (est.)	# of Household (est.)	Main Religion
Andogorari Andogorari Village	Sambatuhu	Huhurundi Tribe, Patrilineal	66	12	Anglican Church
Jajama Hohota	Ifane	Sauga	100 (+)	60(+)	Anglican Church
Dara Pema New Soputa	Humotapa	Sauga	500(+)	250(+)	Anglican Church
Pupu Tombata Village	Andeiripa	Isuga Patrilineal	50+	10	Anglican Church
Houpa Extension Ovuro Village	Houpa	Isuga	182	28	New Apostolic (Church is located)

					within the village)
1. Hombare 2. Beririta <i>Kipore Village</i>	1. Hombare – Aukapa 2. Beririta - Eregapa	Hurundi	300	50	Anglican Church, Christian Revival Church (CRC)
Sifia Urio Village	Jangoropa	Sauga	300(+)	20 to 50	New Apostolic
Kesiha Kendata Hamlet (Part of Perombata Village)	Haintapa	Sauga	15	3	New Apostolic Anglican
Boruga Pasute (Extension) <i>New Warisota Village</i>	1)Barunapa (Boruga is the sub-clan) 2)Erepa 3)Haraha 4)Haguma-Senane 5)Atupa 6)Perohari	Hingogopa	200+	100+	New Apostolic Anglican
Ewasasaru Sehero Village	1)Uhepa (Clan proposing new ME) 2) Akutepa 3)Oisopa 4) Undari-Hombukapa	Hurindi	200+	100+	New Apostolic Anglican
1. Owate 2. Javunepa <i>Purata</i>	The two clans are as follows; 1. Owate – Kambaripe 2. Javunepa - Javunepa	Sauga	32	8	New Apostolic
Perombata Extention (Haintapa Clan) Perombata Extention (Sorupa Clan)	1. Haintapa 2. Sorupa	Sauga	300+	50+	Anglican New Apostolic

Perombata Village					
Kovenopa-Samburua <i>Soputa Village</i>	1.Kovenopa-Samburua 2.Paratapa 3.Isuga-Sarungahane	Isuga-Pereho	1000+	200+	Anglican New Apostolic
1. Haugapa Pusi 2. Hiroipa 3. Hungoro 4. Korofurukari <i>Ango Village</i>	The clans are as follows; 1. Haugapa Pusi – Haugapa 2. Hungoro – Uhepa 3. Hiroipa – Javiripa 4. Korofurukari - Hungorapa	Sauga	1. Haugapa Pusi – 343 2. Hungoro – 200 3. Hiroipa – 90 4. Korofurukari - 73	170	Anglican Church, New Apostolic Church
Kofureta <i>Girua</i>	Jorembaembo	Andiriha	100+	20	Anglican New Apostolic Church and SDA
1. Darau Extension 2. Siko 3. Bafera 4. Topiripa <i>Dobuduru Village</i>	The clans are as follows; 1. Darau Extension – Hogapa 2. Siko – Hogapa 3. Bafera – Kaire 4. Topiripa - Topiripa	Sauga	1. Darau Extension and Siko - 27 2. Bafera – 200 3. Topiripa - 35	The clans are in two separate villages; they are; 1. Dobuduru: 20 to 50 2. Urio: 100(+)	Anglican Church, New Apostolic Church
Hofita Houembo-Kosote <i>Siremi Village</i>	1. Joveipa Clan (Houembo Kosote) 2. Vuritepe Clan (Hofita) 3. Uhipe Clan (Hofita)	Peuha	1. Hofita 1000+ 2. Houembo Kosote 300+	1.Hofita 500+ 2.Houembo Kosote 50+	Anglican Church New Apostolic Church
Gagerepa <i>Parahe Village</i>	1.Gagerepa 2.Hurundi (Sub-Clan) 3. Sangara (Sub-Clan)	Sauga	1000+	300+	Jehhova Witness, Anglican, New Apostolic,
Wanipa Extension	Gajarepa	Sauga	200 (+)	50	Anglican Church, New

Dobuduru Village					Apostolic Church
Buro (Portion 911) MB Estate (Urio Hamlet)	Free-hold land	Free-hold land	100+	20+	Anglican Church
Saura (Portion 919) Sori Village (Urio Hamlet)	Free-hold land	Free-hold land	100+	30+	Anglican Church
Bakito Extension Kararata Village	Jaumo	Sauga	200(+)	67	Anglican Church, New Apostolic Church
Mende (Portion 914) Mende Estate	The land is a 99 years state lease and is held by Mr. Joseph Aripa from Mende Clan	The Mende clan hail from the Yega Tribe in Gona.	28	13	Anglican Church, New Apostolic Church
Serembe Serembe Village	The proposed 'ME' is under two clans, they are; 1. Oga 2. Ohogo	Arehu	900(+)	500(+)	Anglican Church, CRC, Four Square Church and SDA Church
Hajojo Jajau Village	Hokaipa	Asigi	367+	60+	Anglican Church
H/Hombukapa Oere Village	1. Hombukapa 2. Haterepa 3. Baria 4. Pome	Asigi Patrilineal	100+	34	Anglican Church
Isugahambo (Portion 951) Isugahambo Estate	Customary land converted to Freehold land through Land Tenure Conversion (LTC)	Land does not come under any tribe	7	3	Anglican Church, New Apostolic Church
Kajma Estate (Portion 912)	99 Years State Lease	Land does not come under any tribe	9	3	Anglican

Embi Estate					
Papaki Extension (Erofafa Clan)	1. Erofafa	Hunjara	800+	400+	Anglican
Papaki Extension (Afurafu Clan)	2. Afurafu				
Papaki Village					
Portion 2 Koiasi Village	99 Years State Lease	Land does not come under any tribe - however currently the original land owners are settling on the land	85	15	Anglican Chritain Missionary Church
Borari	1) Inonadari 2) Ingonpa	Sauga	23	3	Anglican Church, New Apostolic Church

The latest census (2011) shows that between 2000 – 2011 the population was growing at 3.1%. Annual population growth reaching 3.1% is considered very high by world standards. This is putting huge strains on both the environment and government services.

Migrants

Other areas of PNG have constant issues with settlers from other areas coming in seeking economic opportunity or just fleeing fighting in their own communities. Typically, they take up residence on the fringes of urban centres, on plantation compounds, in rural ‘squatter’ camps, or on the land settlement schemes. This doesn’t seem to be such a problem in this area, probably because it is difficult to access. None of the clans complained of third parties encroaching upon their land.

Education

The education levels in PNG make somewhat depressing reading. No studies could be found in Popondetta but Ryan et al (2017) makes the following finding based on data sourced in the Kimbe area :

“The current state of education in PNG is characterised by low levels of educational attainment and literacy, poor school attendance and retention rates, and high levels of gender inequality. The average years of schooling received by people aged 25 years and older is just 3.9 years. PNG also has national literacy rates that are far below the regional averages with just 62.4% of adults being literate compared with 94.4% for the region, and 70.8% of youths compared with the regional average of 98.8%.”

Another finding of the study was that though these mini estate landowners were comparatively wealthier people in PNG. However, this wealth doesn’t appear to have flowed through into an investment in education.

Food and Land Tenure

Land in the AOI is mostly owned by clans not individuals. Typically, boundaries are based on physical features such as rivers or ridges, in other places marked out by particular species of plants (a variety of cordyline is a common marker).

The dominant tenure system governing both terrestrial and marine resources is patrilineal, with men inheriting rights from their fathers. Land tenure is more spatially differentiated than marine tenure, partly because the planting of economic crops gives tenure rights to the cultivator. Marine tenure rights are also overlapping, so that people from major clans residing outside the village sometimes have access to the village's marine resources.

Efforts to translate this traditional understanding of land tenure in a western style titling system, with surveyed boundaries, has resulted in many disputes. Resolution of these disputes is required before the land can be leased to a third party (e.g. NBPOL). These disputes typically take years to resolve.

Within PNG 83% of the population lives in rural areas and their main economic and social activity is subsistence agriculture. 83% of food energy and 76% of protein consumed in PNG continues to come from locally grown foods, derived largely from village gardens. This description, although based on PNG-wide data, probably reflects that of the assessment landscape.

Many people have moved from areas within PNG from areas of disadvantage to places with employment and better services. There was little evidence of migration to Popondetta area from elsewhere in PNG.

Social environment impact assessment

Lovai, (2022) has undertaken a Social Environmental Impact Assessment (SEIA) on the same potential mini-estates in the area. Particularly recommendations surrounding improving the well-being and stability of the communities.

An important part of this is the NBPOL Social Management Plan and Social Impacts Register. These documents rely on interviews to identify particular projects to improve the well-being of the workers. From there, projects are implemented. Another valuable source of economic data are Bilum Index surveys, which use prices from the shops at the workers camp to calculate the field workers' cost of living. In this respect NBPOL is able to ensure workers are paid a sufficient amount to cover the cost of living.

Associated with this study, a SEIA was undertaken. A major part of this is establishing a "baseline" just prior to development.

Free Prior and Informed Consent.

Most of the FPIC procedures are contained in an NBPOL document, "MG 21 Land Acquisition Practices." This describes the process that NBPOL goes through to develop mini-estates. These mini-estates rely on "leasing" land not actually acquiring it. Primarily it involves assisting clans to form an ILG, which gives the clan a legal entity to be able to lease land to NBPOL. The process of formation of an ILG mirrors the FPIC process, ensuring that all the members of the ILG are informed and agree to the scheme. An ILG can only lease land, it cannot sell the land. Therefore, the community maintains their land rights and cannot result in landlessness.

Land use and development trends

Land use planning

PNG does not have a formal land use planning system which gazettes particular areas for example, for forestry, urban development or agriculture. Any applications for land use change are handled through CEPA (Conservation and Environment Protection Authority). (Pers Comm staff of WNBPA Division of Lands). As such there are no future land use plans for the area.

Land use history

Establishment of the Oil Palm Industry

In the late 1950s, approximately 10,450 ha of land at Sangara, between Popondetta and Saiho was purchased from village people for the Popondetta European Land Settlement Scheme. Under this scheme, land and loans were made available to Australian and Papua New Guinean ex-servicemen for the development of plantations. These areas were planted mainly in cocoa, with some small areas of coffee and rubber. The plantations were attacked by army worm and weevils, and the cocoa industry was beset by low prices. By the 1970s, many estates had been abandoned. During the 1980s, the leases were taken back by the government and 6000 ha of nucleus estate oil palm were planted by Higaturu Oil Palm Pty Ltd at Sangara. This company also established an oil palm processing factory at Sangara. A further 6000 ha of oil palm has been planted by smallholder settlers on estates from the original Land Settlement Scheme, or on their own village land. Village oil palm planting is continuing in the Kokoda area, towards the Kumusi River around Siai village. (Bourke et al., 1998)

Agricultural Land

The lower slopes of Mt Lamington are considered to be 'some of the best land' in Papua New Guinea.

The most common agricultural system is described as:

“Short woody regrowth fallows, 5-15 years old, are cleared and burnt. Sweet potato is the most important crop; taro and Chinese taro are important crops; other crops are cassava, yam (*D. esculenta* and *D. alata*), banana and sago. Taro and sweet potato are planted in separate gardens. Yam may also be planted in a separate garden or in a section of a garden, separate from taro and sweet potato. Two plantings are made before a long fallow, with either sweet potato or taro in the first year. Only sweet potato is planted in the second year. Sweet potato is planted on small mounds.” (Bourke et al., 1998)

The fallow is described as:

“Short woody regrowth, dominated by *Piper aduncum*, is the dominant fallow vegetation. *Piper aduncum* is a recent introduction and is known locally as 'poroporo'. It is considered to be a useful introduction. It is said to be spread mainly by a small bat. Clearing of gardens takes place throughout the year, particularly when dry spells offer an opportunity. However slightly more gardens are made at the end of the dry season, between August and October, than at other times. Undergrowth is slashed and trees are cut off about shoulder height and the branches used for fences, estate markers or firewood.” (Bourke et al., 1998)

Describing the gardens in the area Bourke et al., (1998b) wrote “that most households had three or four gardens in forest fallows for everyone in the grasslands. Gardens are made throughout the year. Aibika, sugarcane, corn, watermelon and green vegetables are planted with taro. When all the taro is planted, sweet potato is planted in separate sections of the one garden. Corn, lowland pitpit and sugarcane are interplanted with sweet potato. Cassava is planted in a single line along the boundaries of the garden sections. Yams are either planted in small sections, separated from other crops, or are interplanted with taro at very low densities. They are grown on stakes and are planted in July-September.

Two plantings are made before a long fallow. Sweet potato is replanted after the first planting of sweet potato has been harvested. Sweet potato is also planted following the first planting of taro. Banana is planted once only throughout the garden, but more is planted in the taro parts of the garden after the taro harvest, than in the sweet potato parts of the garden. Some people say they plant sweet potato three times before a long fallow.” Although this reference is dated the description of the gardens still appears to be relevant.

Background to the Land Settlement Scheme

An important part of the land use history of the area is the Land Settlement Scheme.

In the 1960s PNG adopted land settlement programmes to promote agricultural and economic development. The administration envisaged that by taking people out of the context of village life and settling them on individualised land holdings on various settlement schemes, the perceived problems of traditional communal land tenure in constraining agricultural development would be overcome. It was thought that Papua New

Guineans would quickly recognise the benefits of an individualised land tenure system, a recognition that would hasten the replacement of customary land tenure based on group ownership with individual land titles. Furthermore, it was envisaged that as settlers became increasingly integrated into cash crop production, they would gradually reduce their dependence on subsistence production to become more market-oriented and market-driven producers and consumers. However, after forty years this sort of progress has not eventuated. Many people spend more time in food production than tending their oil palm. (Koczberski, Curry and Bue, 2012)

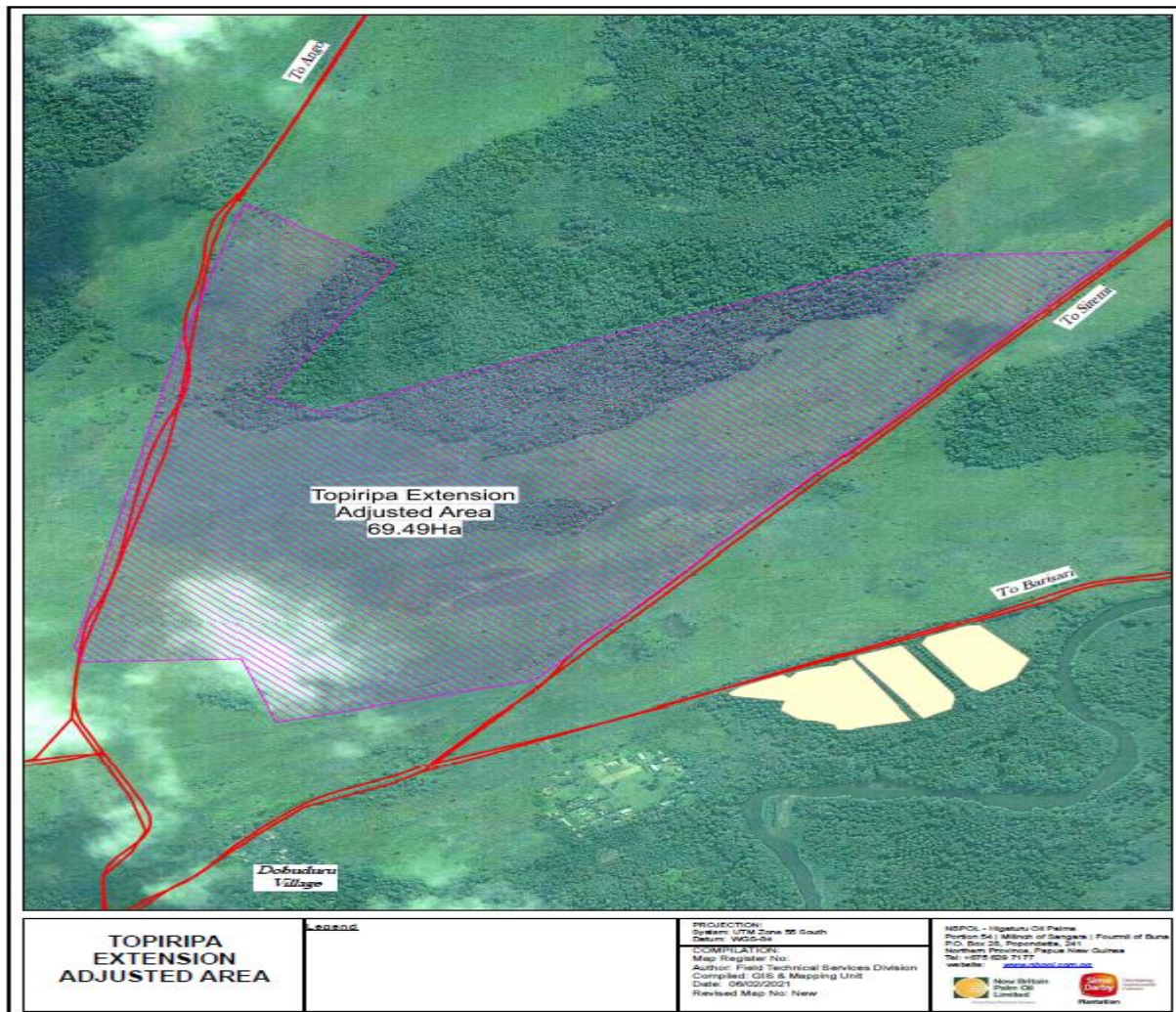
Forestry

Much of the Popondetta Plains have been cleared by industrial forestry. Much of this wood was processed at a local plywood mill. This mill is now closed.

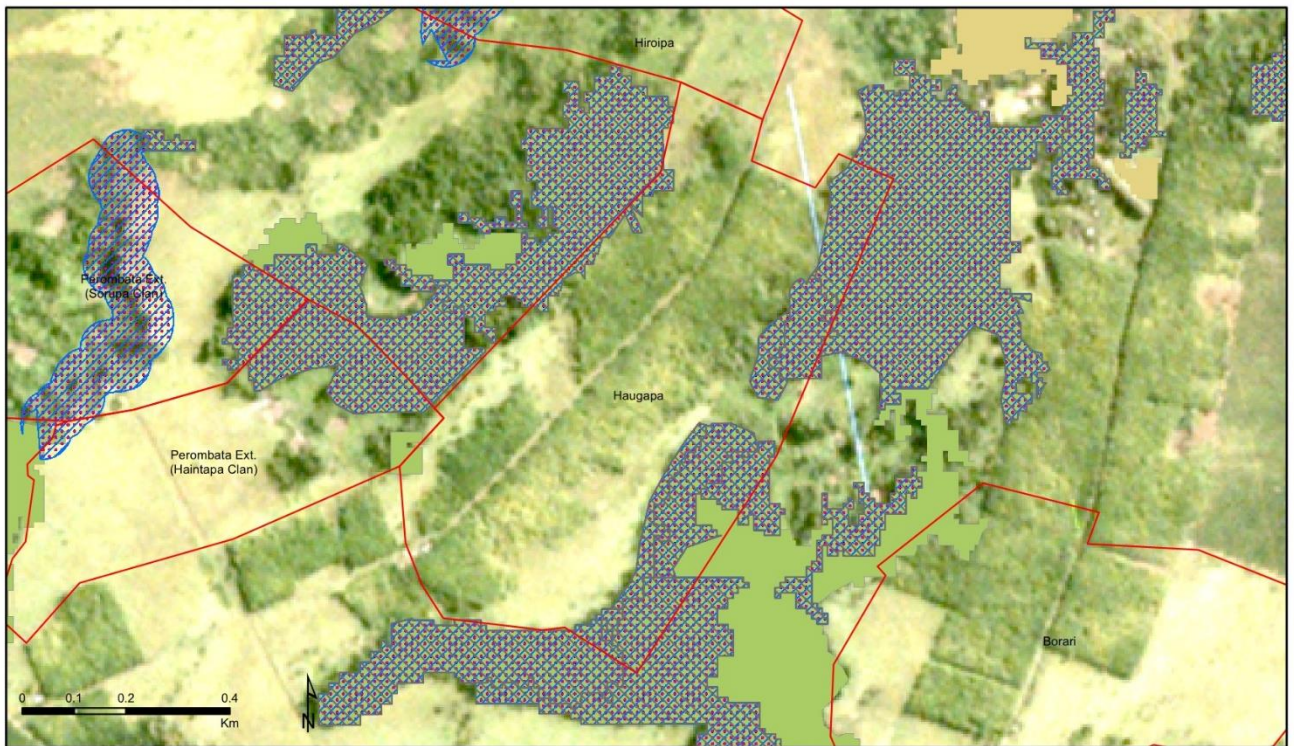
Local landowners are able to turn the forests on their land into cash. However, the rate of deforestation has slowed, probably this is linked to a diminished resource base to exploit. However, the logging industry has left the forests in the area in a depauperate condition.

Section 2: Maps

Boundary Maps owned by the company and Proposed NPP area Maps with overly with HCV and HCS areas



ND01: Topiripa Extension



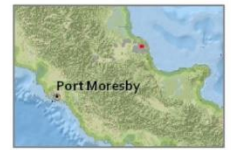
- Legend:**
- HOP Proposed Estates
 - HCS Forest
 - HCS Community Use
 - HCV1
 - HCV2
 - HCV3 Swamp Forests
 - HCV4
 - HCV5
 - HCV6
 - 2km buffer

Data sources:
 1. Existing Estate - HOP
 2. Proposed Estate - HOP
 3. Landcover - 2021 Sentinel

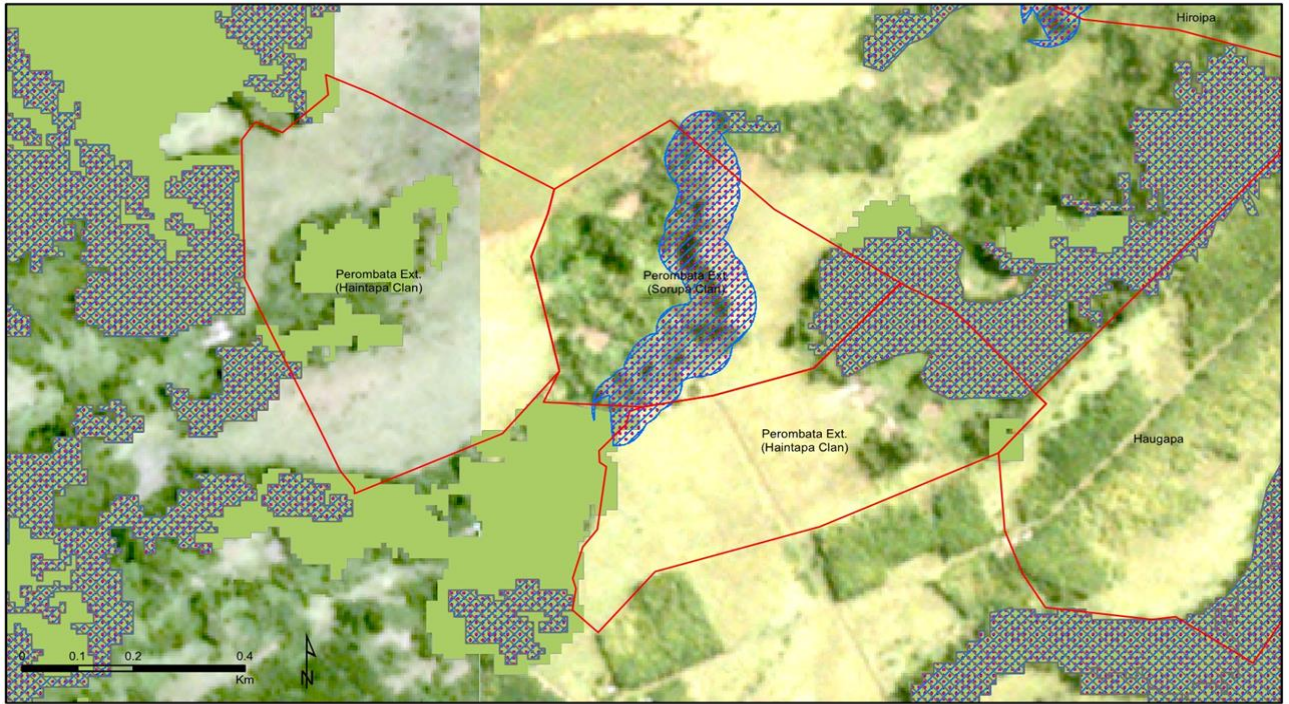
Created by :
 PT Hijau Daun, 7/06/2022.



Projection system: GCS
 Datum: WGS 1984



ND02: Hougapa



- Legend:**
- HOP Proposed Estates
 - HCV1
 - HCV2
 - HCV3 Swamp Forests
 - HCV4
 - HCV5
 - HCV6
 - HCS Forest
 - HCS Community Use
 - 2km buffer

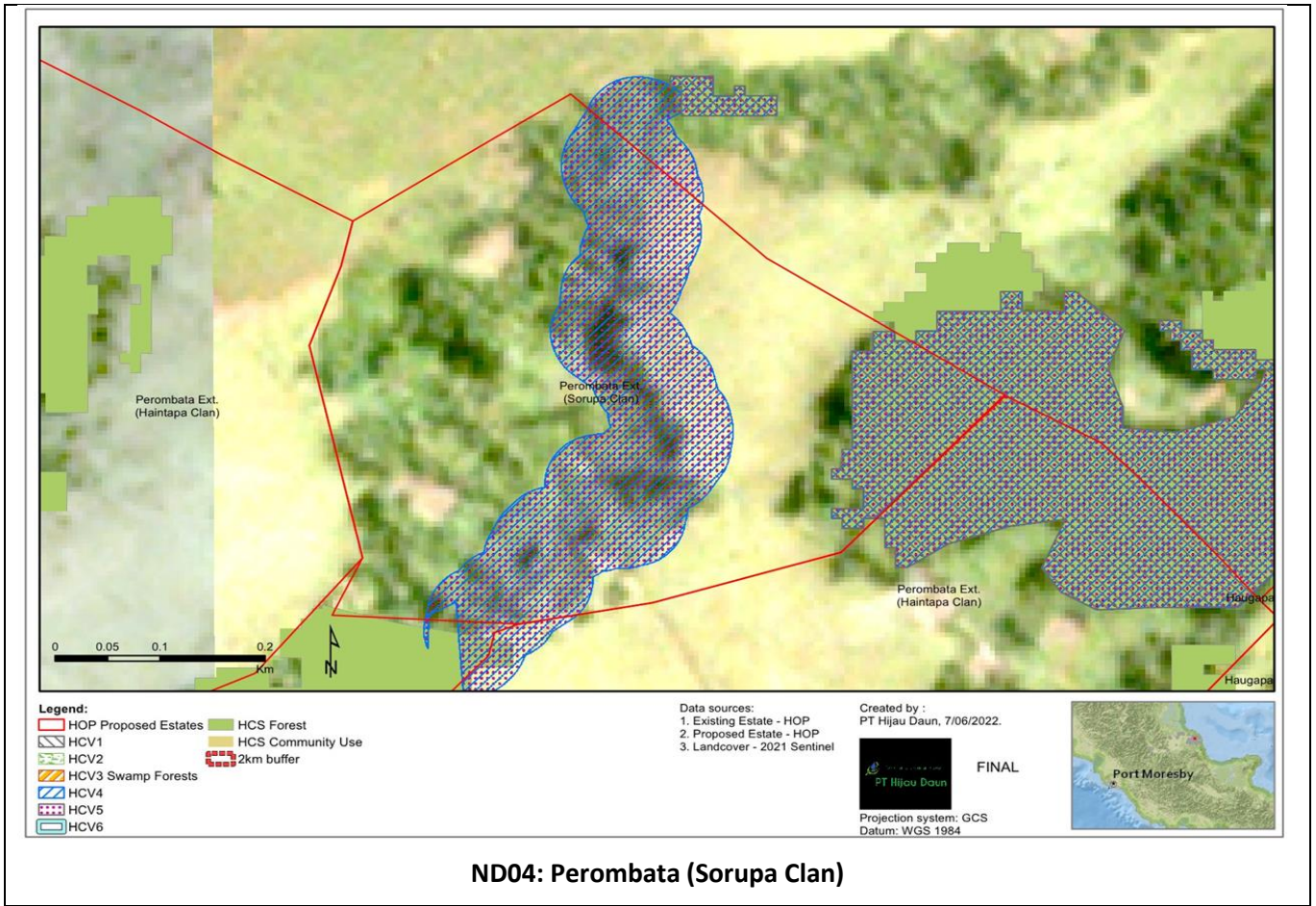
Data sources:
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 2. Proposed Estate - HOP
 3. Landcover - 2021 Sentinel

Created by :
 PT Hijau Daun, 7/06/2022.

FINAL
 Projection system: GCS
 Datum: WGS 1984



ND03: Perombata (Haintapa Clan)





Legend:

- | | |
|----------------------|-------------------|
| HOP Proposed Estates | HCS Forest |
| HCV1 | HCS Community Use |
| HCV2 | 2km buffer |
| HCV3 Swamp Forests | |
| HCV4 | |
| HCV5 | |
| HCV6 | |

Data sources:
 1. Existing Estate - HOP
 2. Proposed Estate - HOP
 3. Landcover - 2021 Sentinel

Created by :
 PT Hijau Daun, 7/06/2022.

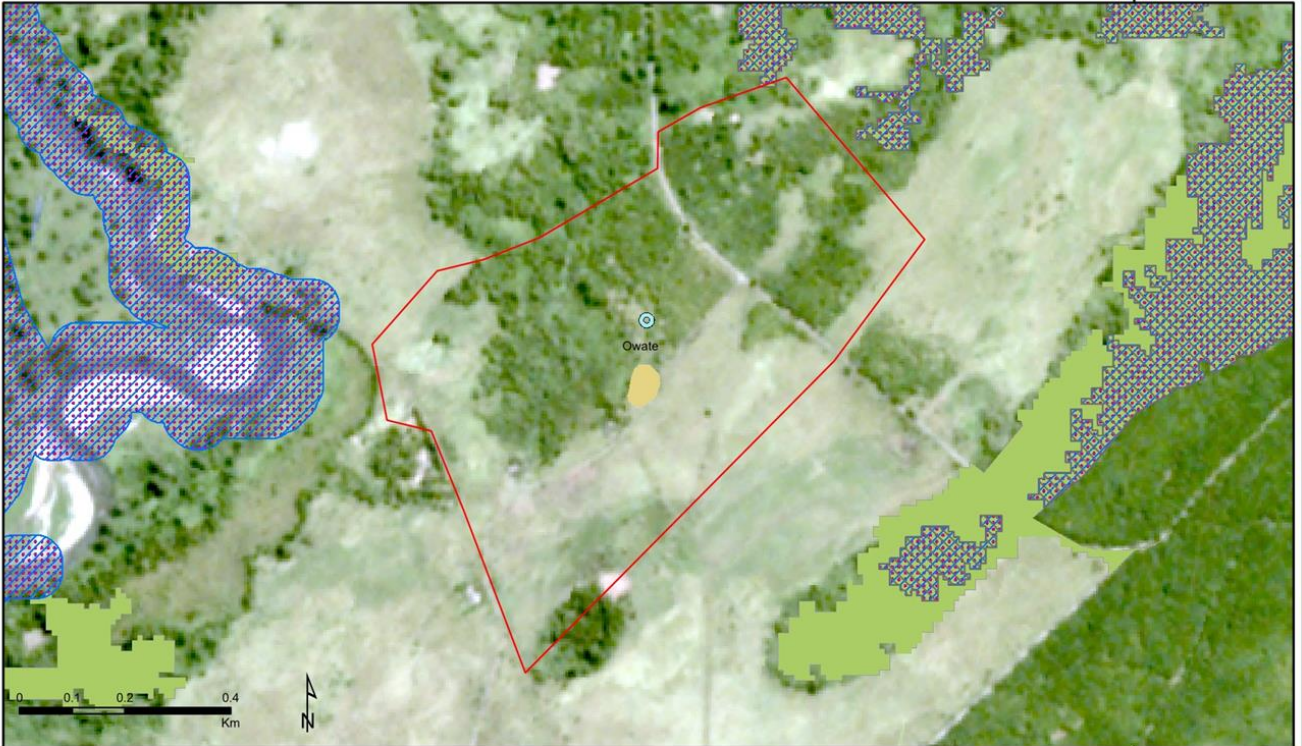


FINAL

Projection system: GCS
 Datum: WGS 1984



ND05: Kovenopa Sambura



- Legend:**
- HOP Proposed Estates
 - HCS Forest
 - HCV1
 - HCS Community Use
 - HCV2
 - HCV3 Swamp Forests
 - 2km buffer
 - HCV4
 - HCV5
 - HCV6

Data sources:
 1. Existing Estate - HOP
 2. Proposed Estate - HOP
 3. Landcover - 2021 Sentinel

Created by :
 PT Hijau Daun, 7/06/2022.

 **FINAL**
 Projection system: GCS
 Datum: WGS 1984



ND06: Owate



- Legend:**
- HOP Proposed Estates
 - HCV1
 - HCV2
 - HCV3 Swamp Forests
 - HCV4
 - HCV5
 - HCV6
 - HCS Forest
 - HCS Community Use
 - 2km buffer

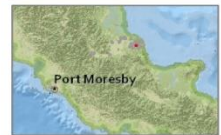
Data sources:
 1. Existing Estate - HOP
 2. Proposed Estate - HOP
 3. Landcover - 2021 Sentinel

Created by :
 PT Hijau Daun, 7/06/2022.



FINAL

Projection system: GCS
 Datum: WGS 1984

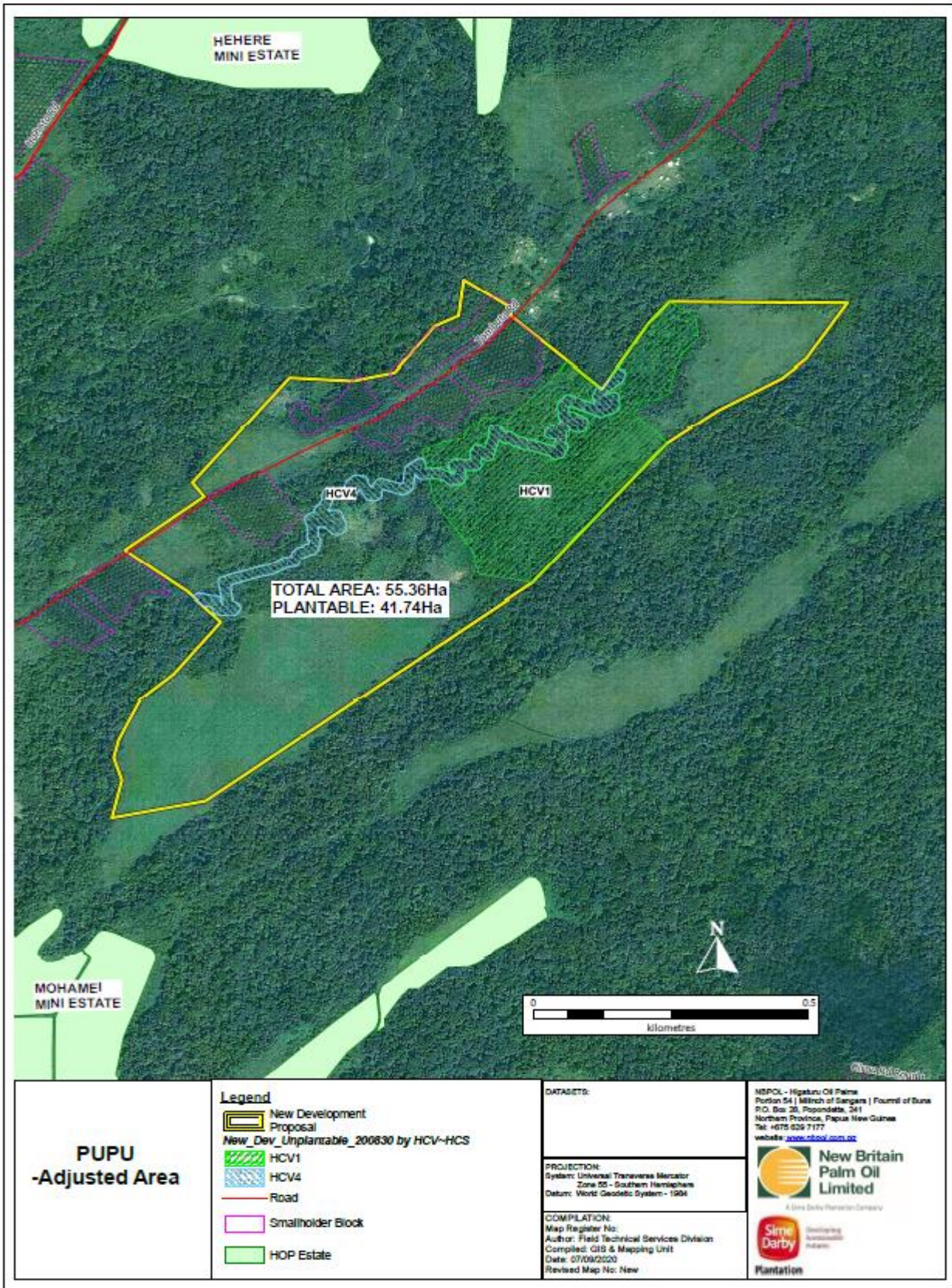


ND07: Sefia

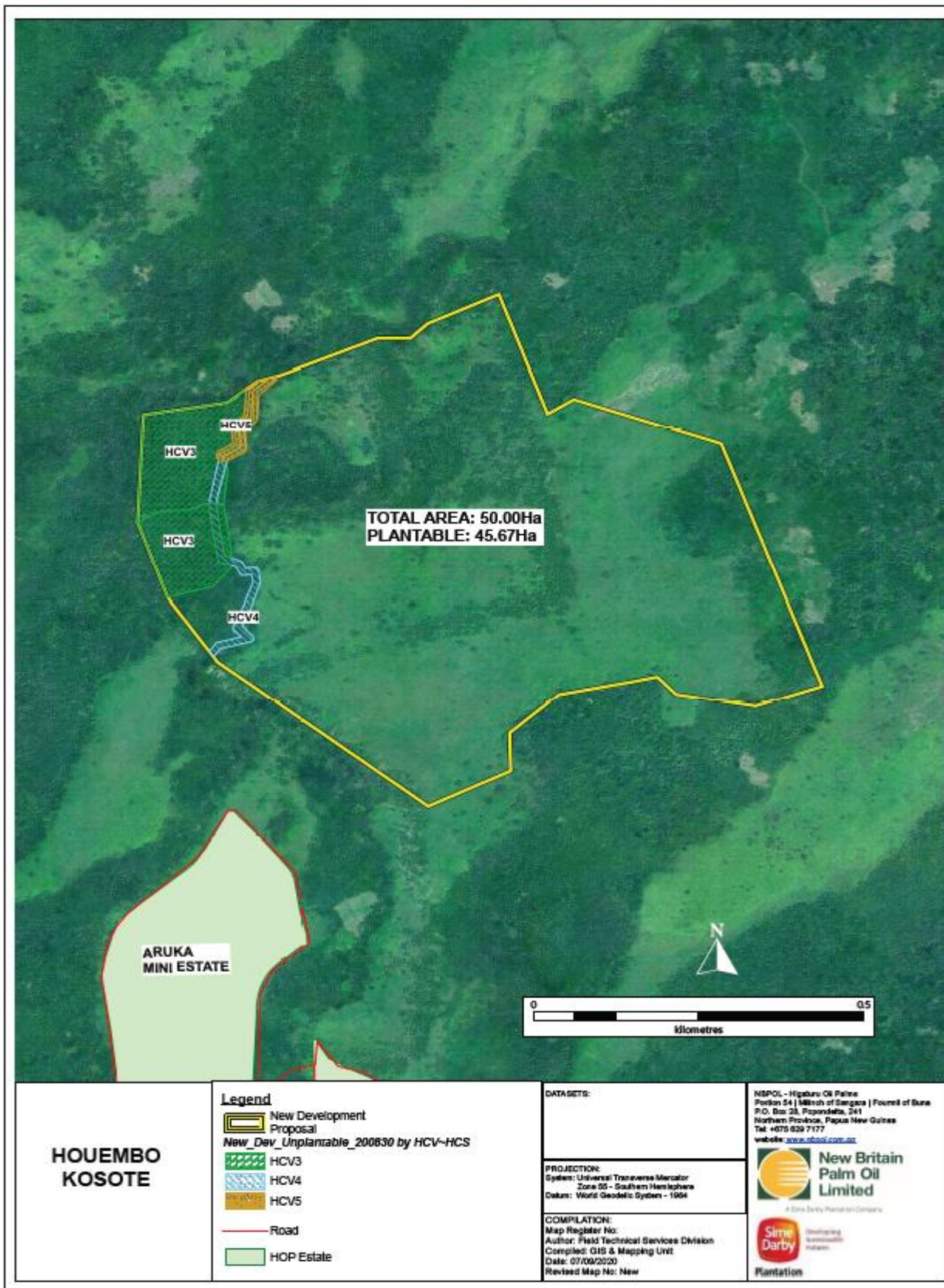


<h2>KOFURETA HANDIRIA</h2>	Legend New Development Proposal <i>New_Dev_Unplantable_200830 by HCV-HCS</i> HCV4 Road Smallholder Block	DATASETS: PROJECTION: System: Universal Transverse Mercator Zone 55 - Southern Hemisphere Datum: World Geodetic System - 1994	MBPOL - Higaturu Oil Palms Portion 54 Milinch of Sangam Fournal of Buns P.O. Box 28, Ropondata, 241 Northern Province, Papua New Guinea Tel: +675 629 7177 website: www.mbpol.com.pg
		COMPILATION: Map Register No: Author: Field Technical Services Division Compiled: GIS & Mapping Unit Date: 07/09/2020 Revised Map No: New	 A Bore Batty Partnership Company

ND08: Kofureta Handiria



ND09: Pupu

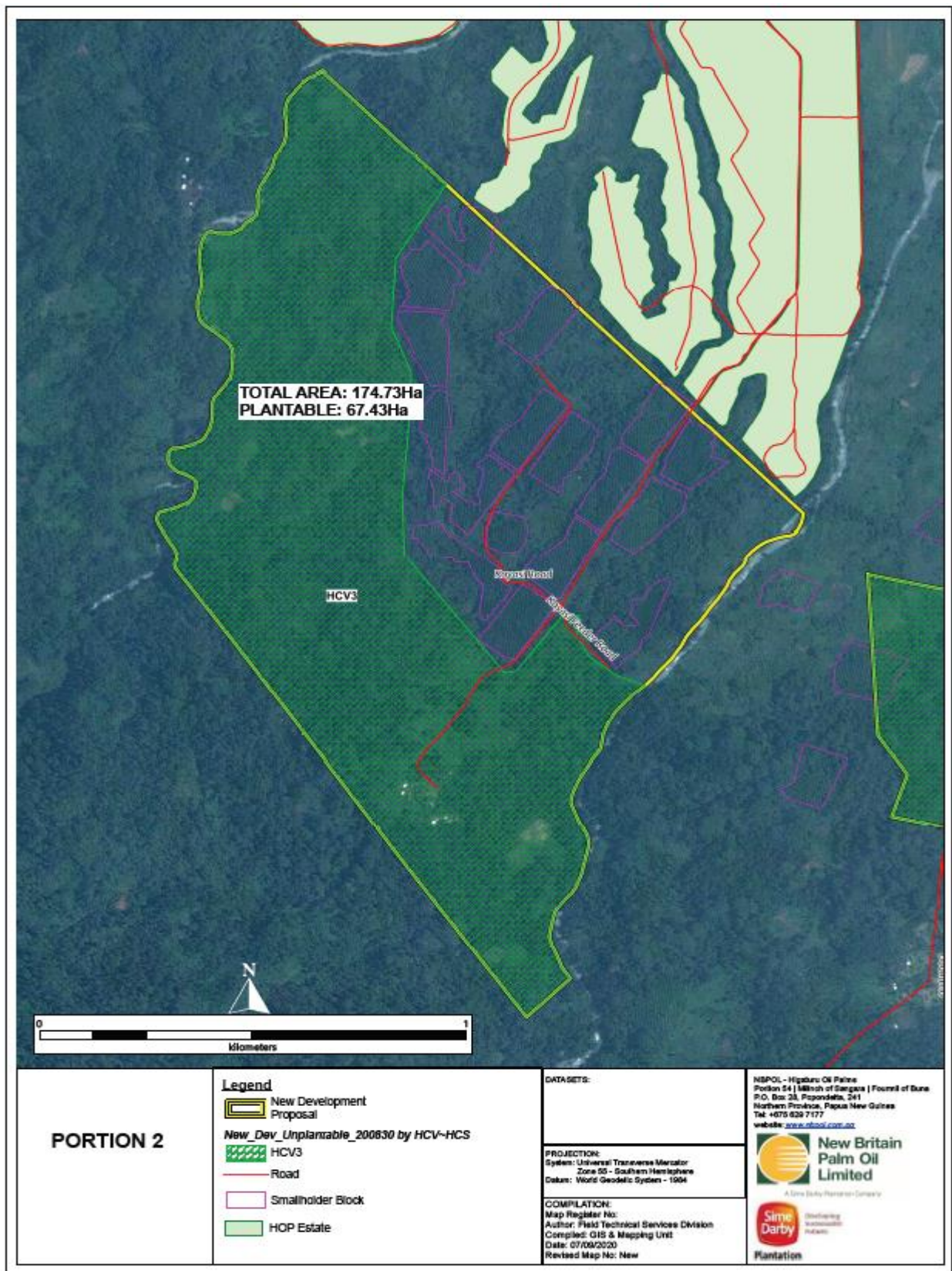


ND10: Houembo Kosote

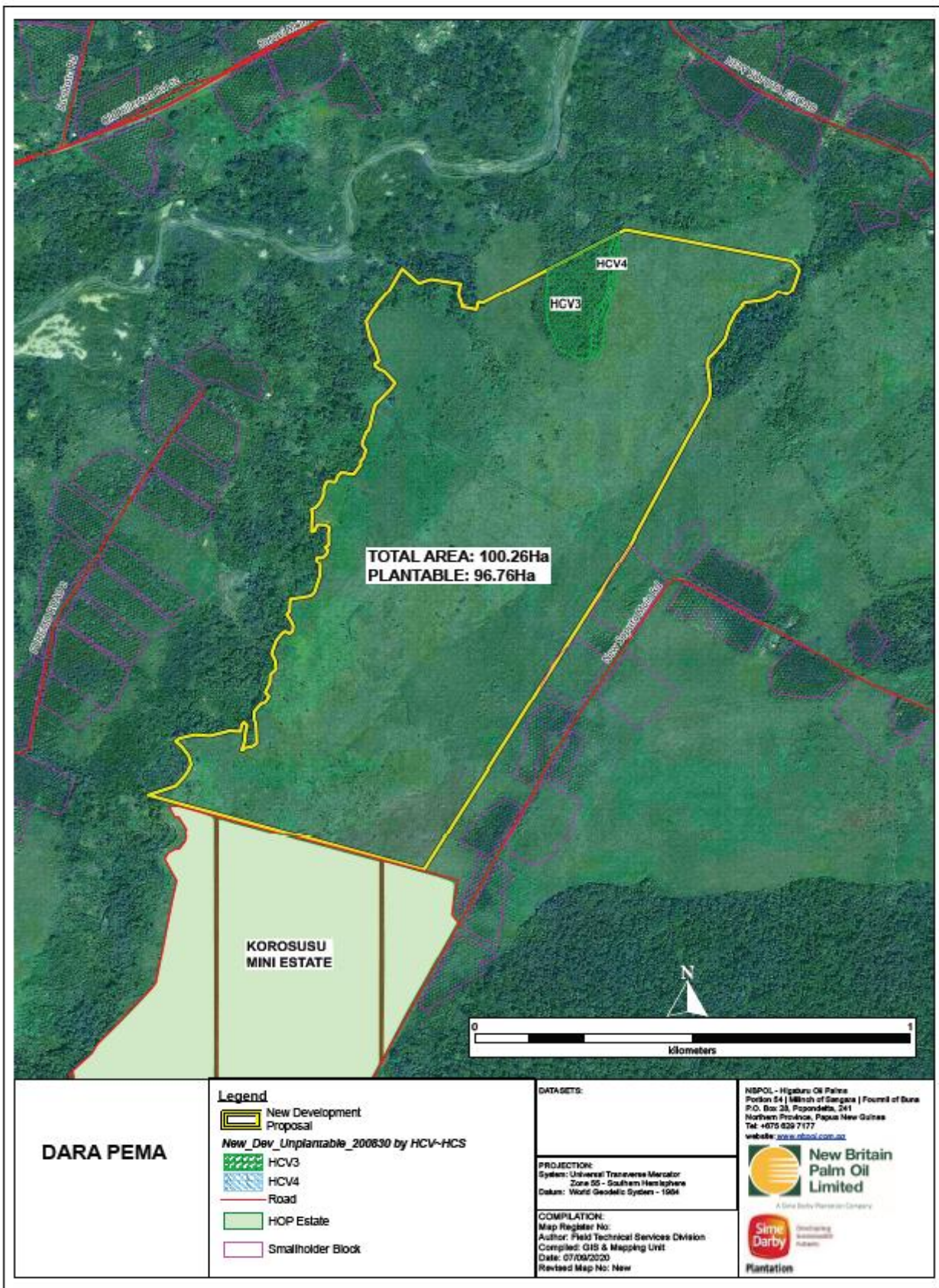


<p>NAJAMA</p>	<p>Legend</p> <ul style="list-style-type: none"> New Development Proposal New Dev Unplantable_200830 by HCV-HCS HCV3 	<p>DATA SETS:</p> <p>PROJECTION: System: Universal Transverse Mercator Zone 52 - Southern Hemisphere Datum: World Geodetic System - 1984</p> <p>COMPLIATION: Map Register No: Author: Field Technical Services Division Compiled: GIS & Mapping Unit Date: 07/04/2020 Revised Map No: New</p>	<p>NSPOL - Higabaru Oil Palm Poston 54 Milneba of Bengara Fomil of Bura P.O. Box 38, Pongonia, 241 Northern Province, Papua New Guinea Tel: +675 629 7177 website: www.nspol.com.pg</p> <p> New Britain Palm Oil Limited A Sime Darby Plantation Company</p> <p> Sime Darby Plantation</p>
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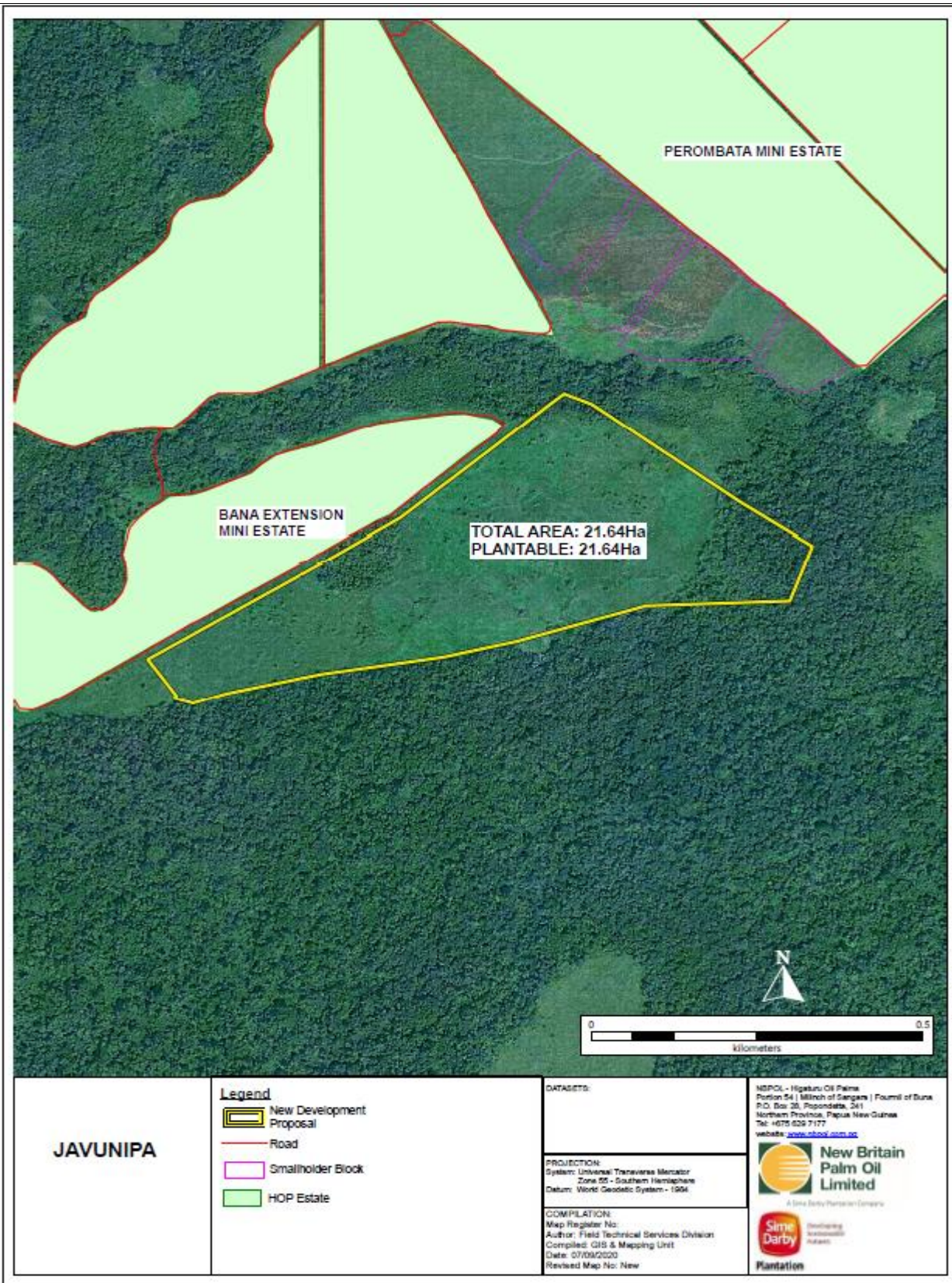
ND11: Jajama



ND12: Portion 2



ND13: Dara Pema



ND15: Javunipa



**BAKITO
EXTENSION**

Legend	
	New Development Proposal
	Road
	HOP Estate

DATASETS:
PROJECTION: System: Universal Transverse Mercator Zone 55 - Southern Hemisphere Datum: World Geodetic System - 1994
COMPILATION: Map Register No: Author: Field Technical Services Division Compiled: GIS & Mapping Unit Date: 07/09/2020 Revised Map No: New

NBPOL - Higasuru Oil Palms
 Portion 54 | Milinch of Sangara | Fomuil of Duna
 P.O. Box 28, Popondeta, 241
 Northern Province, Papua New Guinea
 Tel: +675 625 7177
 website: www.nbpol.com.pg



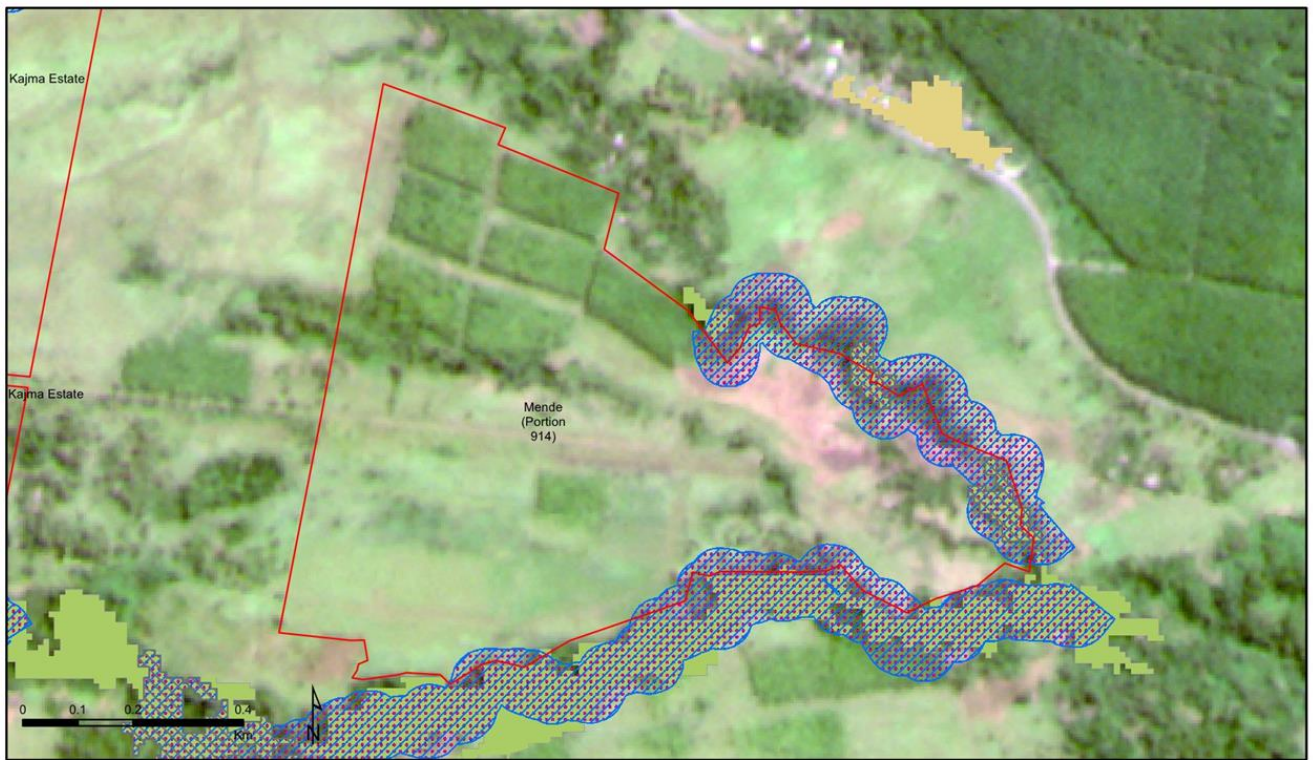
New Britain Palm Oil Limited

A Fine Darby Partnership Company



Sime Darby Plantation

ND16: Bakito Extension



Legend:

- HOP Proposed Estates
- HCS Forest
- HCS Community Use
- HCV1
- HCV2
- HCV3 Swamp Forests
- HCV4
- HCV5
- HCV6
- 2km buffer

Data sources:
 1. Existing Estate - HOP
 2. Proposed Estate - HOP
 3. Landcover - 2021 Sentinel

Created by :
 PT Hijau Daun, 7/06/2022.

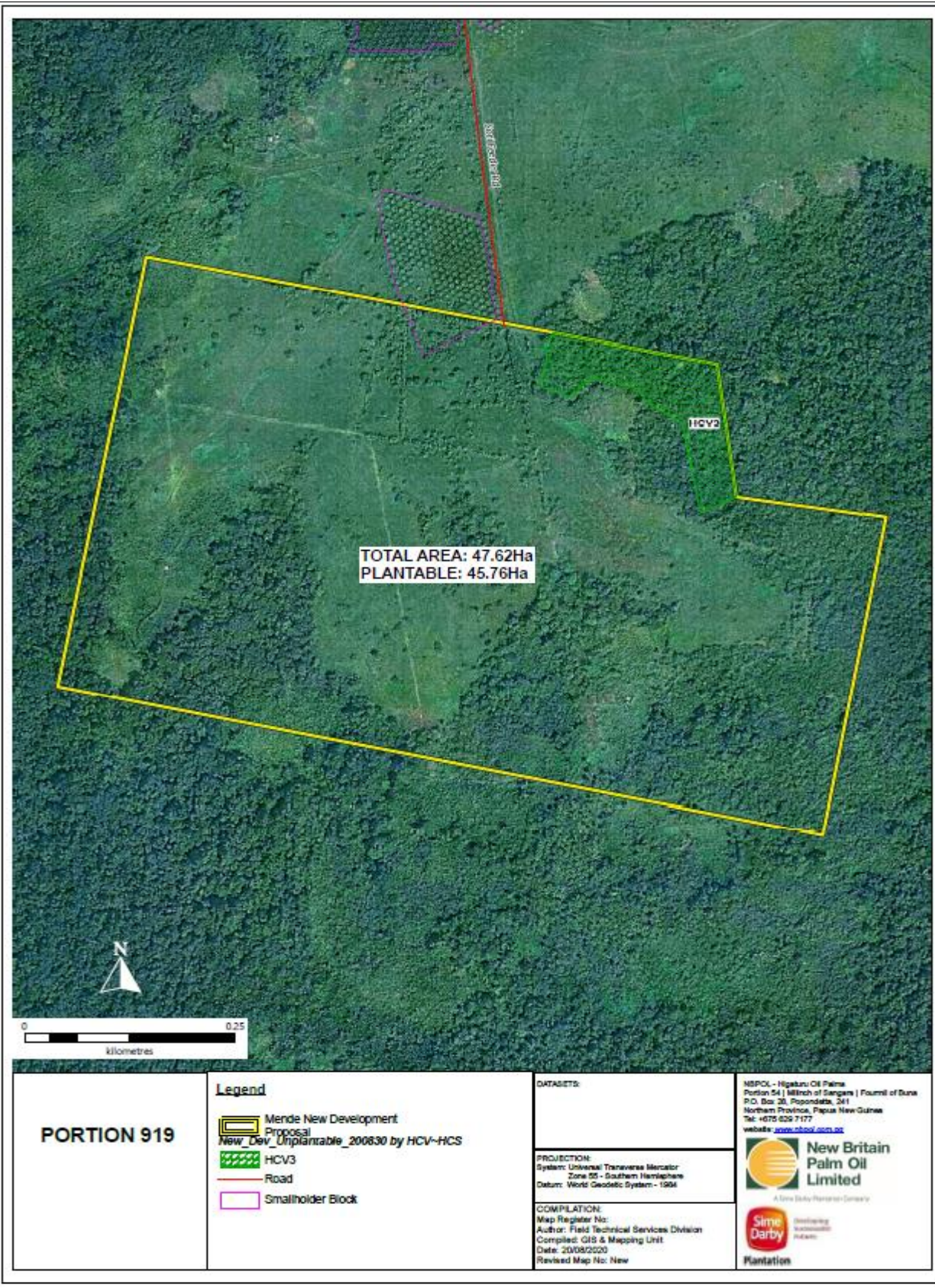


FINAL

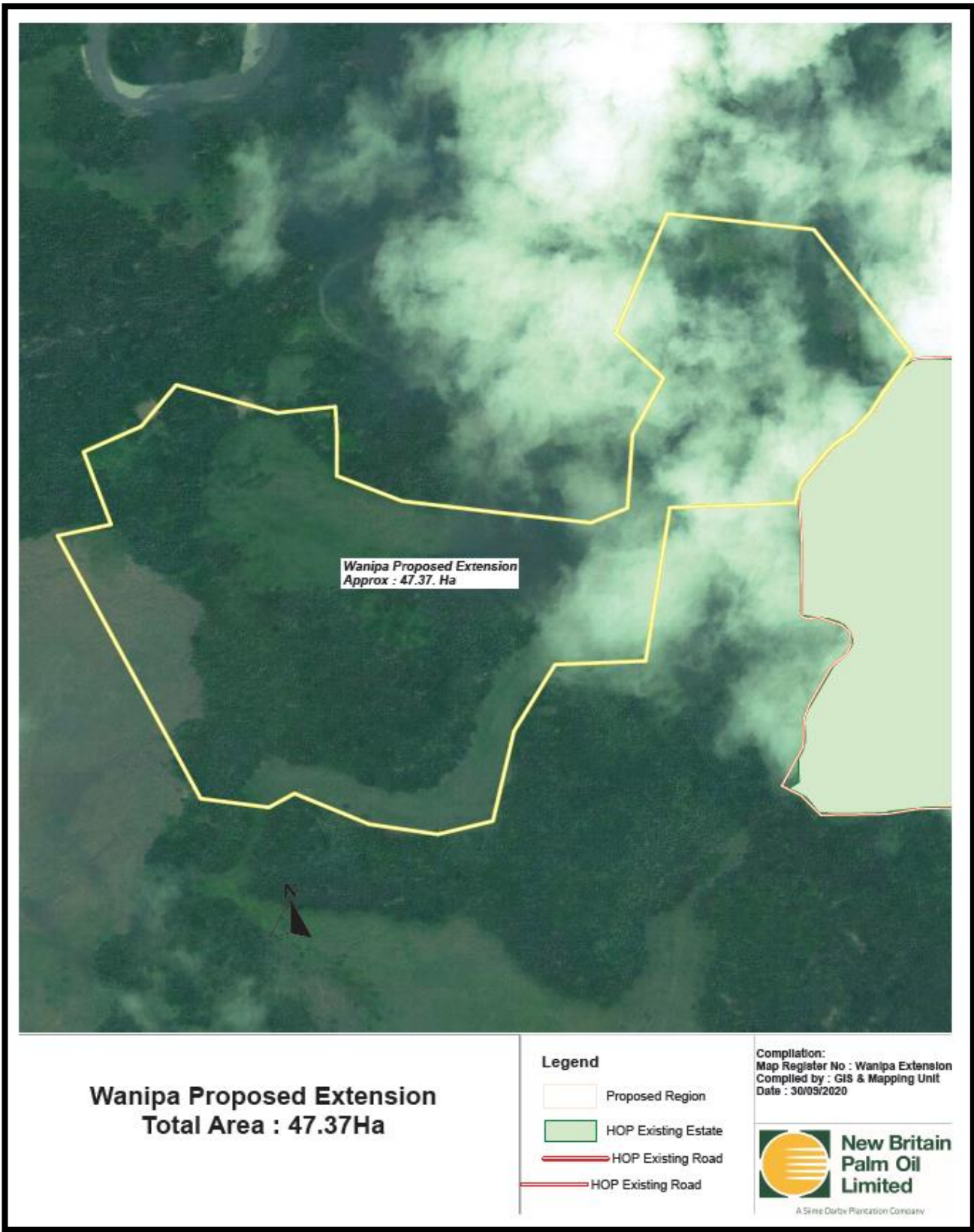
Projection system: GCS
 Datum: WGS 1984



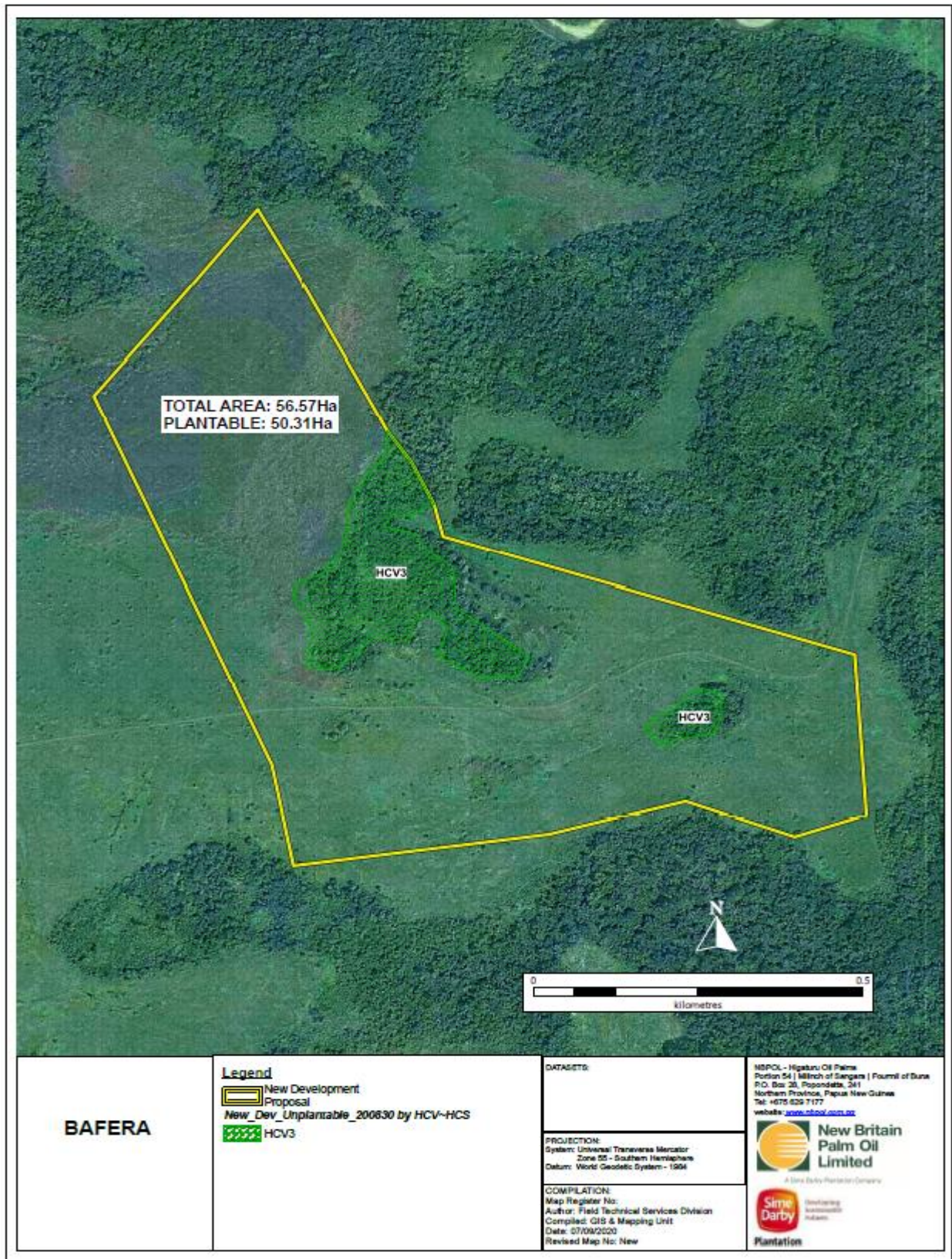
ND17: Mende (Portion 914)



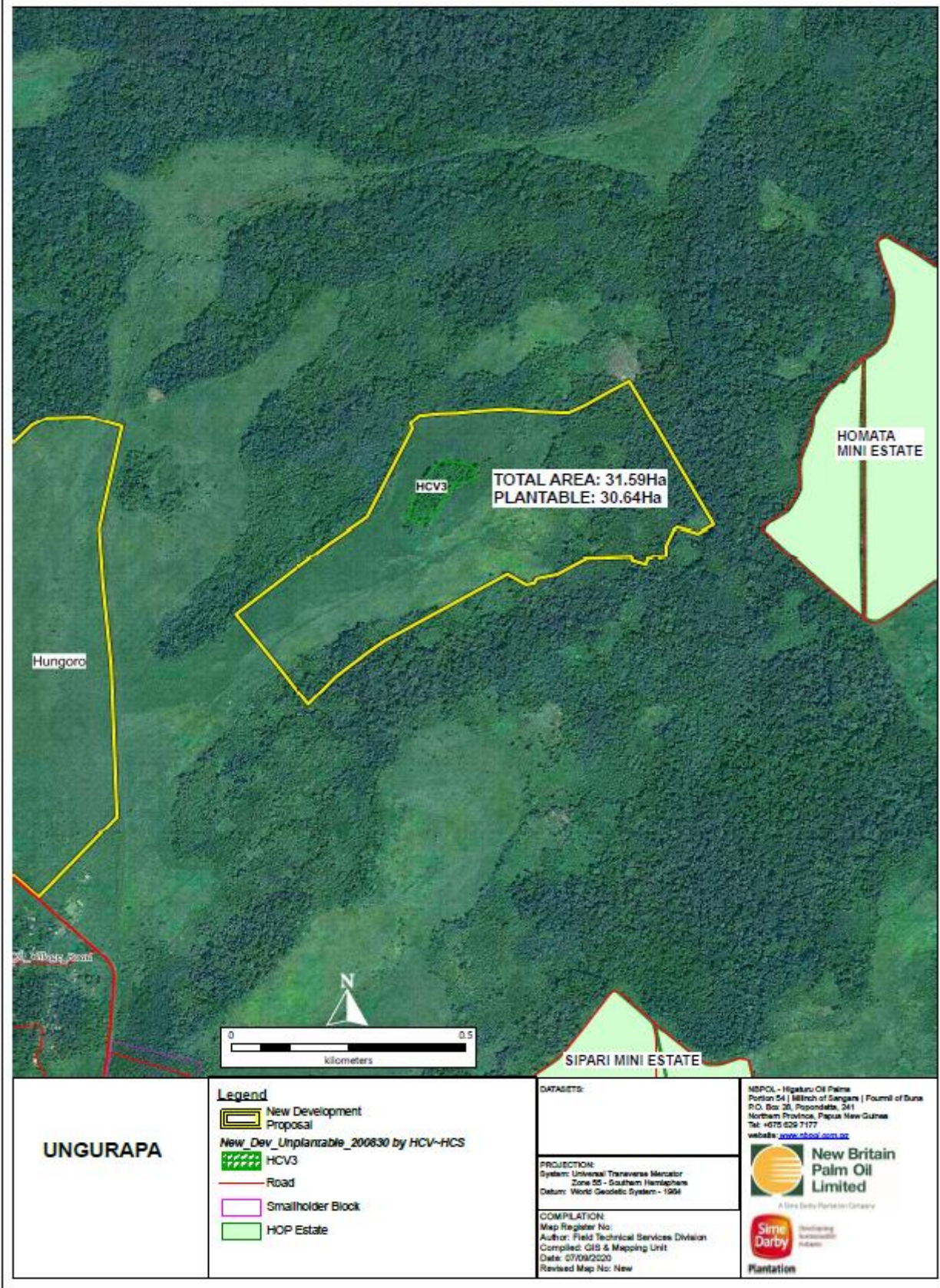
ND19: Saura (Portion 919)



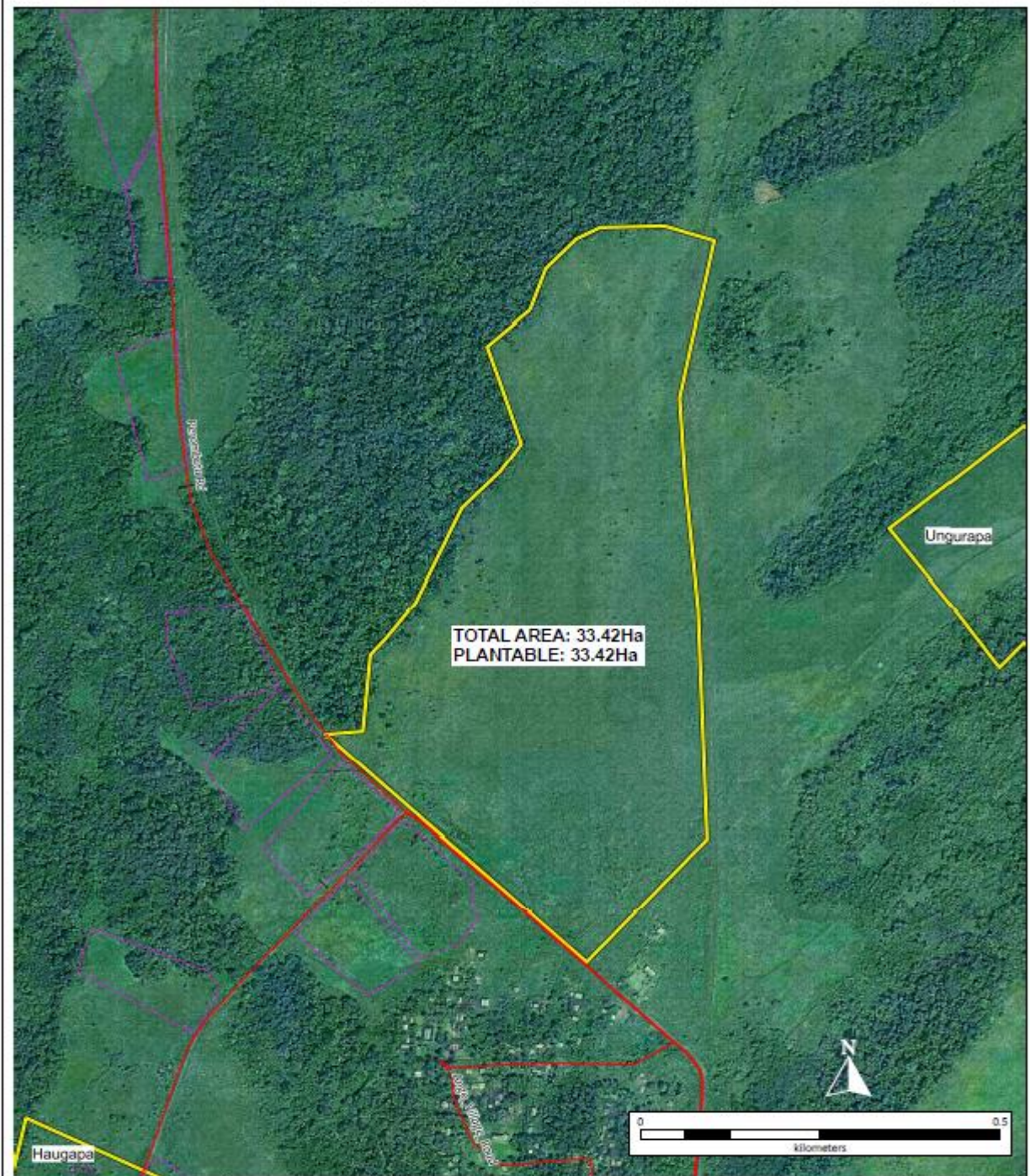
ND20: Wanipa Extension



ND21: Bafera



ND22: Korofurukari



HUNGORO

Legend	
	New Development Proposal
	Road
	Smallholder Block

DATASETS:
PROJECTION: System: Universal Transverse Mercator Zone: 65 - Southern Hemisphere Datum: World Geodetic System - 1984
COMPILATION: Map Register No: Author: Field Technical Services Division Compiled: GIS & Mapping Unit Date: 07/09/2023 Revised Map No: New

NSPOL - Higturu Oil Palms
 Portion 54 | Millinch of Saigama | Faunil of Buna
 P.O. Box 33, Popondeta, 241
 Northern Province, Papua New Guinea
 Tel: +675 529 7177
 website: www.nbspol.com.pg

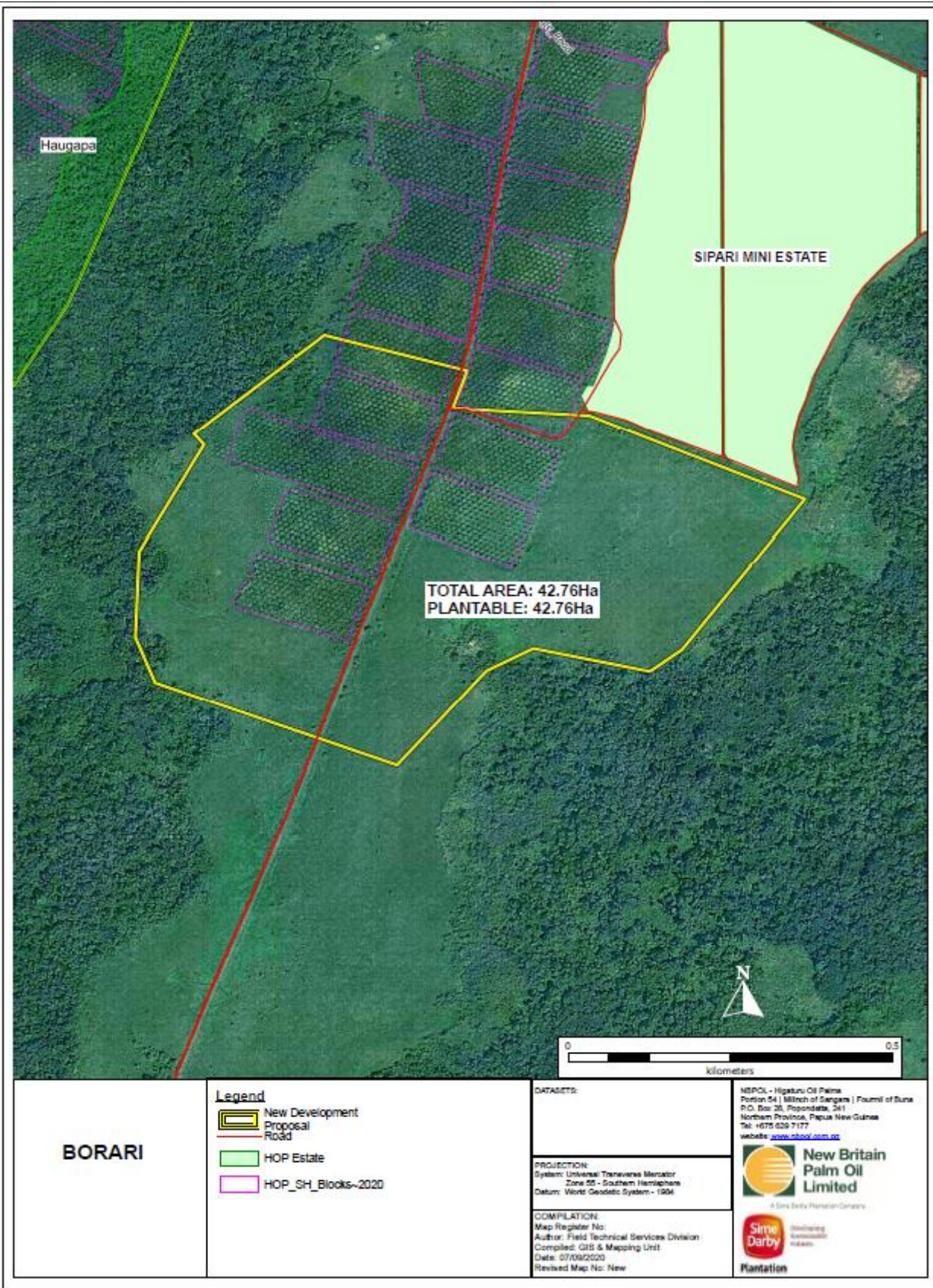


New Britain Palm Oil Limited

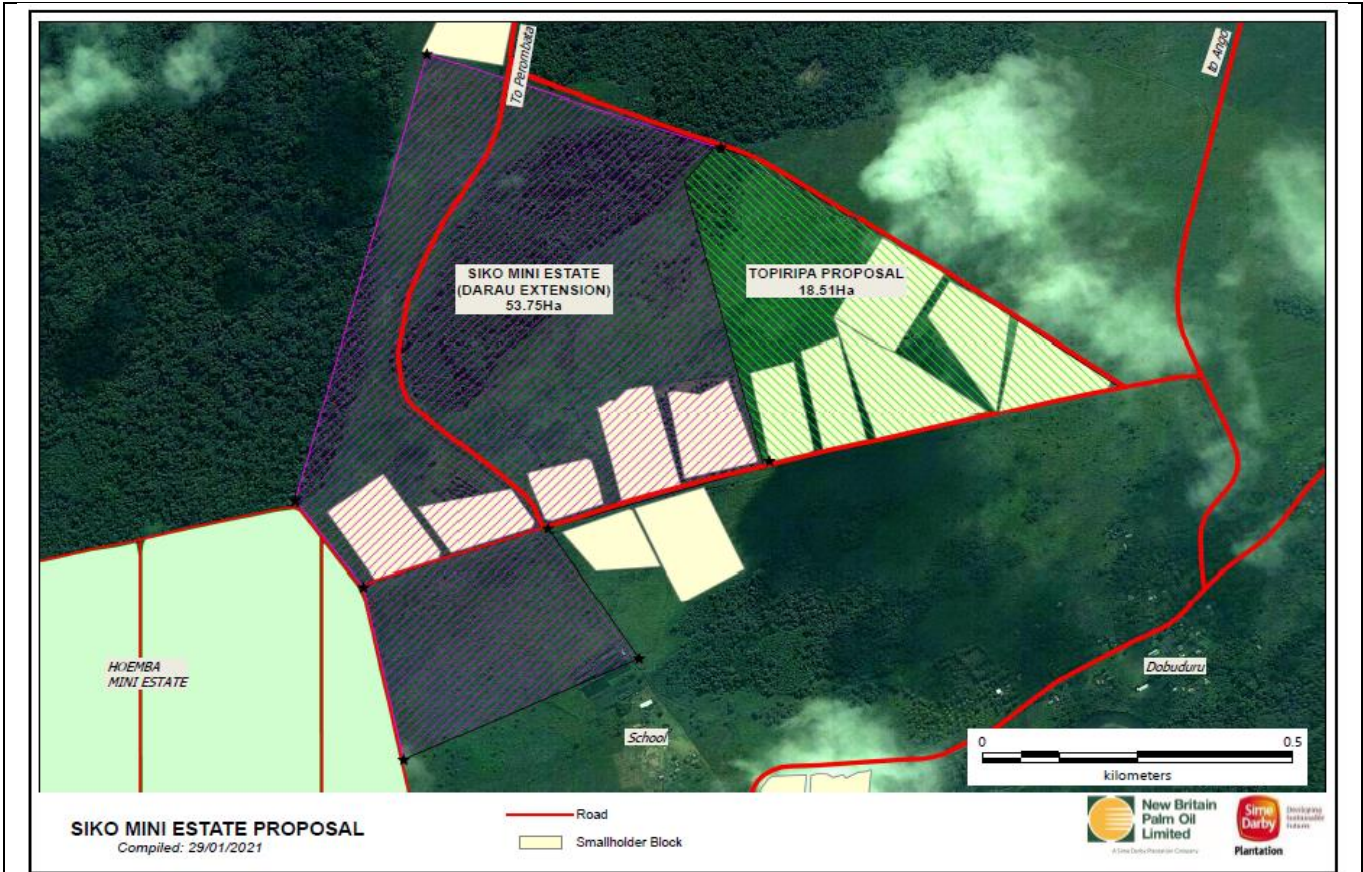
A Sime Darby Plantation Company



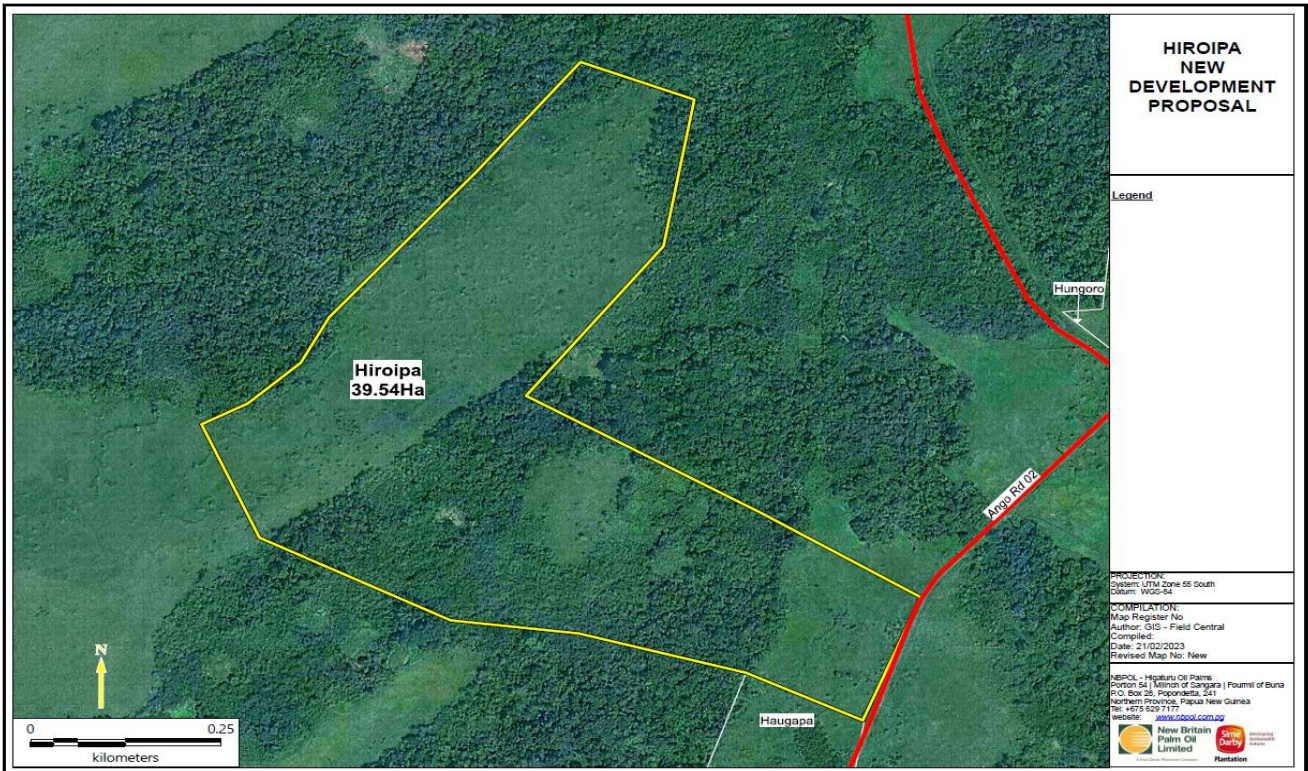
ND23: Hungoro



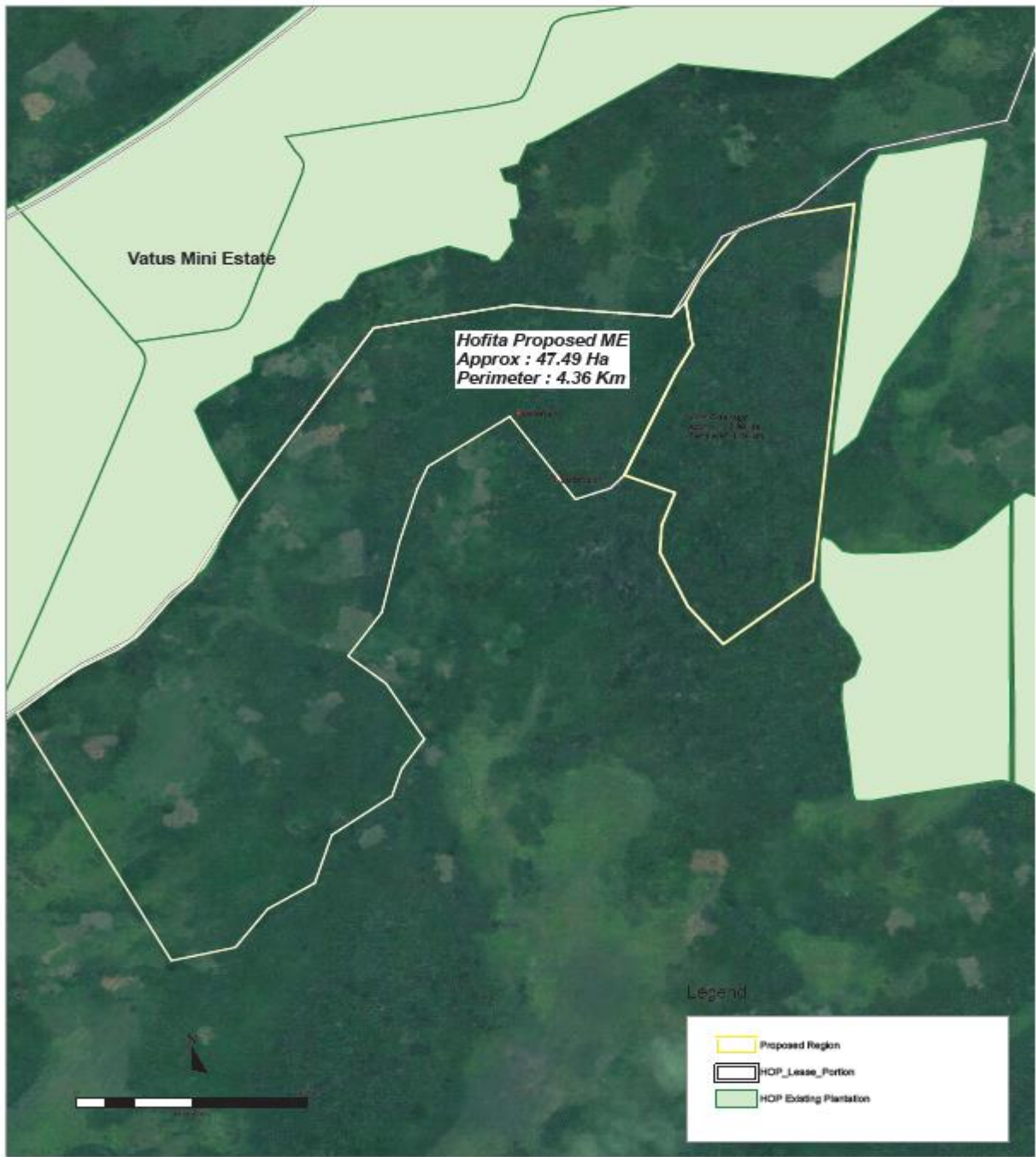
ND24: Borari



ND25: Siko



ND26: Hiroipa

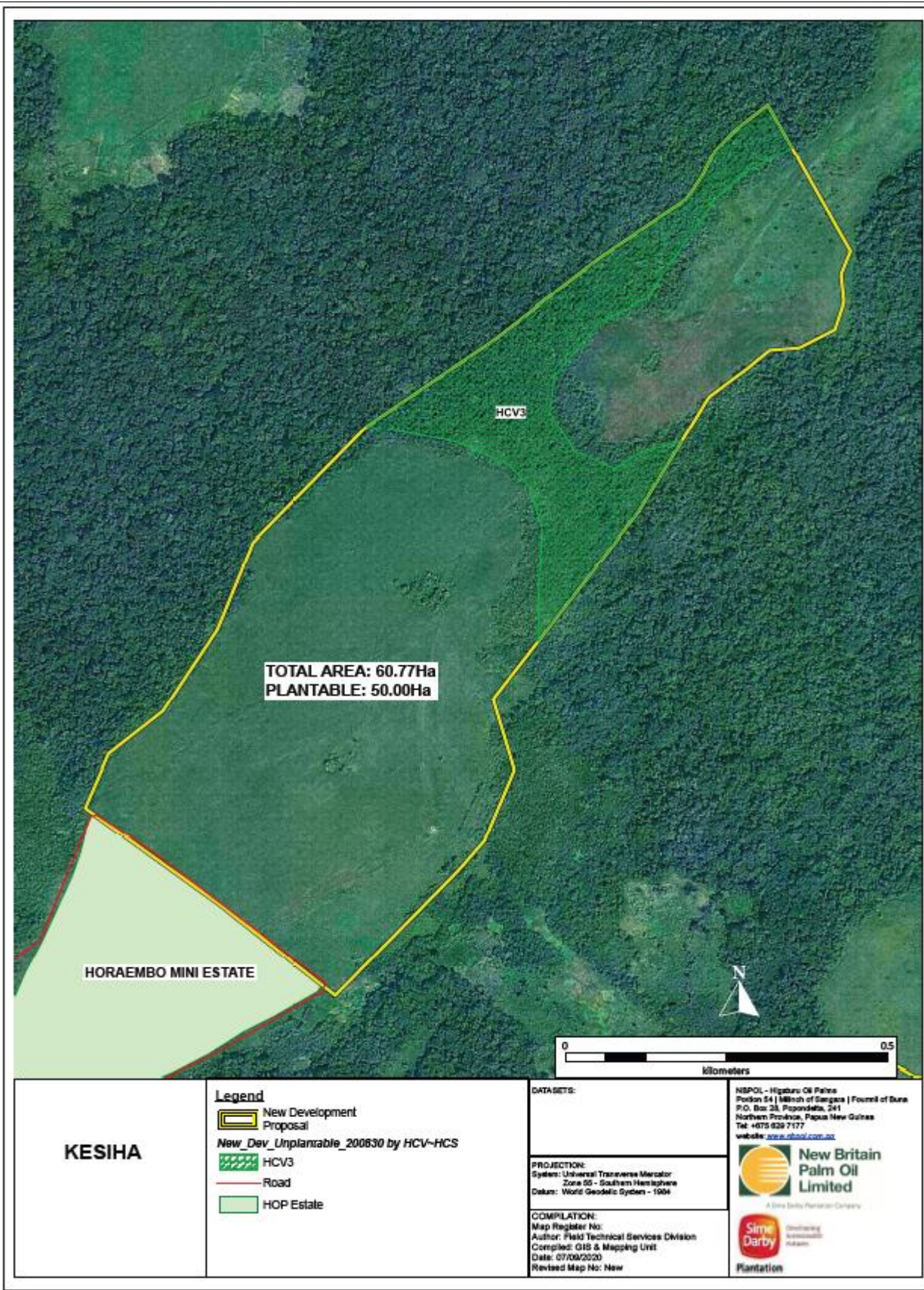


Hofita Proposed Mini Estate
Total Area : 47.49 Ha



Compiled Date : 29/09/2020

ND27: Hofita



ND28: Kesiha

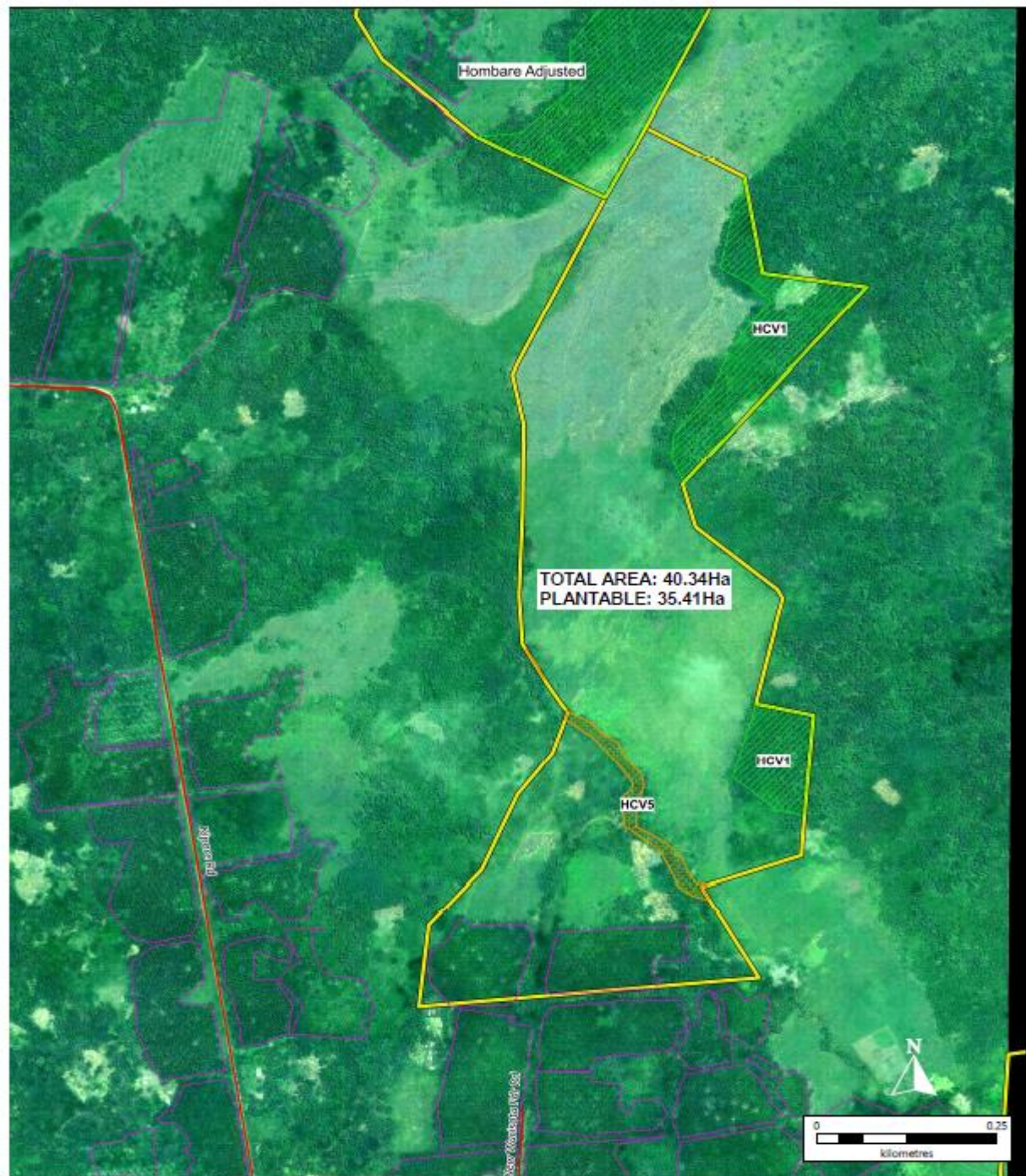


<h2>HOUPA EXTENSION</h2>	Legend New Development Proposal Road Smallholder Block HOP Estate	DATASETS: 	MBPOL - Higaturu Oil Palms Portion 54 Milinch of Sangara Founil of Buna P.O. Box 26, Popondetta, 241 Northern Province, Papua New Guinea Tel: +675 629 7177 website: www.nbpol.com.pg
		PROJECTION: System: Universal Transverse Mercator Zone 55 - Southern Hemisphere Datum: World Geodetic System - 1994	 A New Britain Palm Oil Company
		COMPILED: Map Register No: Author: Field Technical Services Division Compiled: GIS & Mapping Unit Date: 07/09/2020 Revised Map No: New	 A Sirine Darby Partnership Company

ND30: Houpa Extension









ND31: Boruga Pusute Extension



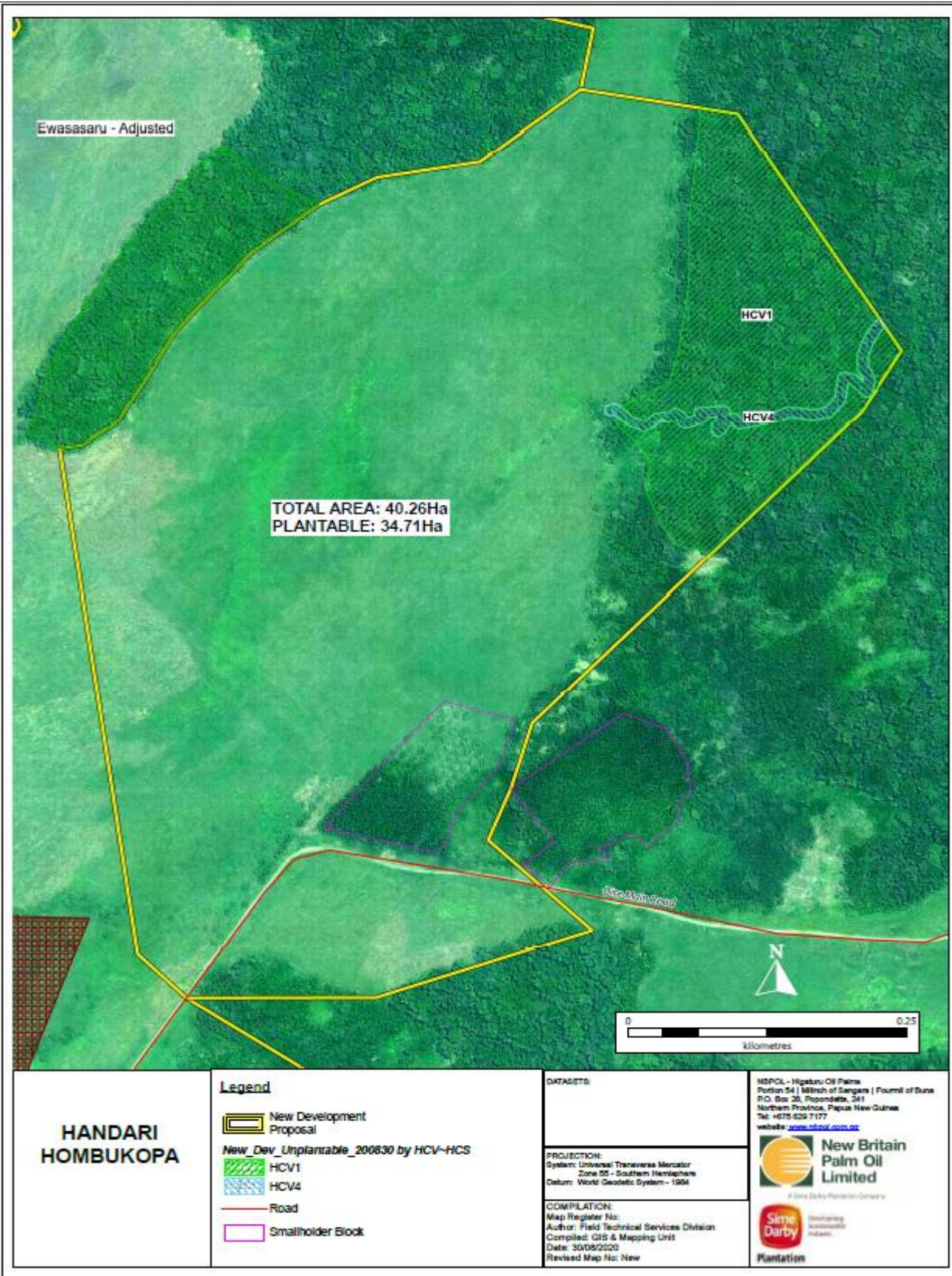
<h3>BERIRITA -Adjusted Area</h3>	Legend New Development Proposal New_Dev_Unplantable_200630 by HCV-HCS HCV1 HCV5 Road Smallholder Block	DATASETS: PROJECTION: System: Universal Transverse Mercator Zone 55 - Southern Hemisphere Datum: World Geodetic System - 1994	MSPOL - Higaturu Oil Palm Portion 54 Millinch of Sangera Fournal of Buna P.O. Box 28, Popondeta, 341 Northern Province, Papua New Guinea Tel: +675 622 7177 website: www.cbsof.com.pg
	COMPLIATION: Map Register No: Author: Field Technical Services Division Compiled: GIS & Mapping Unit Date: 30/08/2020 Revised Map No: New	 New Britain Palm Oil Limited <small>A Sime Darby Plantation Company</small> Sime Darby Plantation	

ND32: Beririta



<h3>HOMBARE -Adjusted Area</h3>	Legend  New Development Proposal <i>New_Dev_Unplantable_200830 by HCV-HCS</i>  HCV1  Road  Smallholder Block	DATASETS: PROJECTION: System: Universal Transverse Mercator Zone 55 - Southern Hemisphere Datum: World Geodetic System - 1984	MBPOL - Higituru Oil Palms Portion 54 Milinch of Sangara Fomuil of Buna P.O. Box 38, Popondeta, 341 Northern Province, Papua New Guinea Tel: +675 825 7177 website: www.nbpol.com.au
	COMPILATION: Map Register No: Author: Field Technical Services Division Compiled: GIS & Mapping Unit Date: 07/09/2020 Revised Map No: New	 A Sime Darby Plantation Company 	

ND33: Hombare



<h2>HANDARI HOMBUKOPA</h2>	Legend New Development Proposal <i>New Dev_Unplantable_200830 by HCV-HCS</i> HCV1 HCV4 Road Smallholder Block	DATASETS: PROJECTION: System: Universal Transverse Mercator Zone: 95 - Southern Hemisphere Datum: World Geodetic System - 1994	MBPOL - Higturu Oil Palms Portion 54 Milinch of Sangera Fomuil of Buni P.O. Box 20, Popondetta, PNG Northern Province, Papua New Guinea Tel: +675 629 7177 website: www.nbpol.com.au
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ND34: Handari Hombukapa



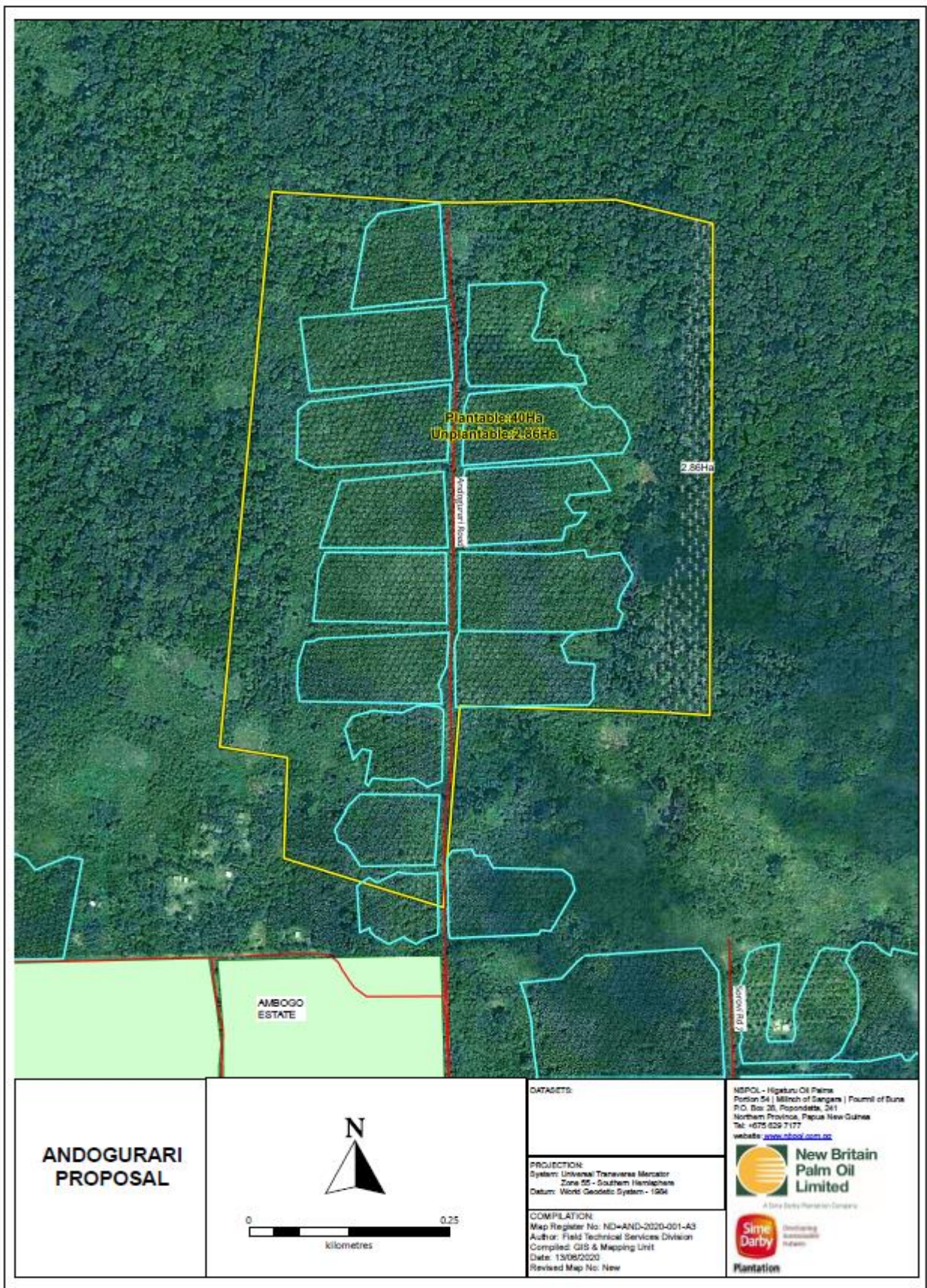
EWASASARU -Adjusted Area	Legend New Development Proposal <i>New Dev_Unplantable_200630 by HCV-HCS</i> HCV3 HCV5 Road Smallholder Block	DATASET: PROJECTION: System: Universal Transverse Mercator Zone 55 - Southern Hemisphere Datum: World Geodetic System - 1994	NBPOK - Higaturo Oil Palm Portion 54 Millinch of Sangara Founil of Duna P.O. Box 28, Popondetta, 261 Northern Province, Papua New Guinea Tel: +675 829 7177 website: www.nbpo.com.pg A Day Darby Plantation Company
	COMPILATION: Map Register No: Author: Field Technical Services Division Compiled: GIS & Mapping Unit Date: 30/08/2020 Revised Map No: New		

ND35: Ewasasaru

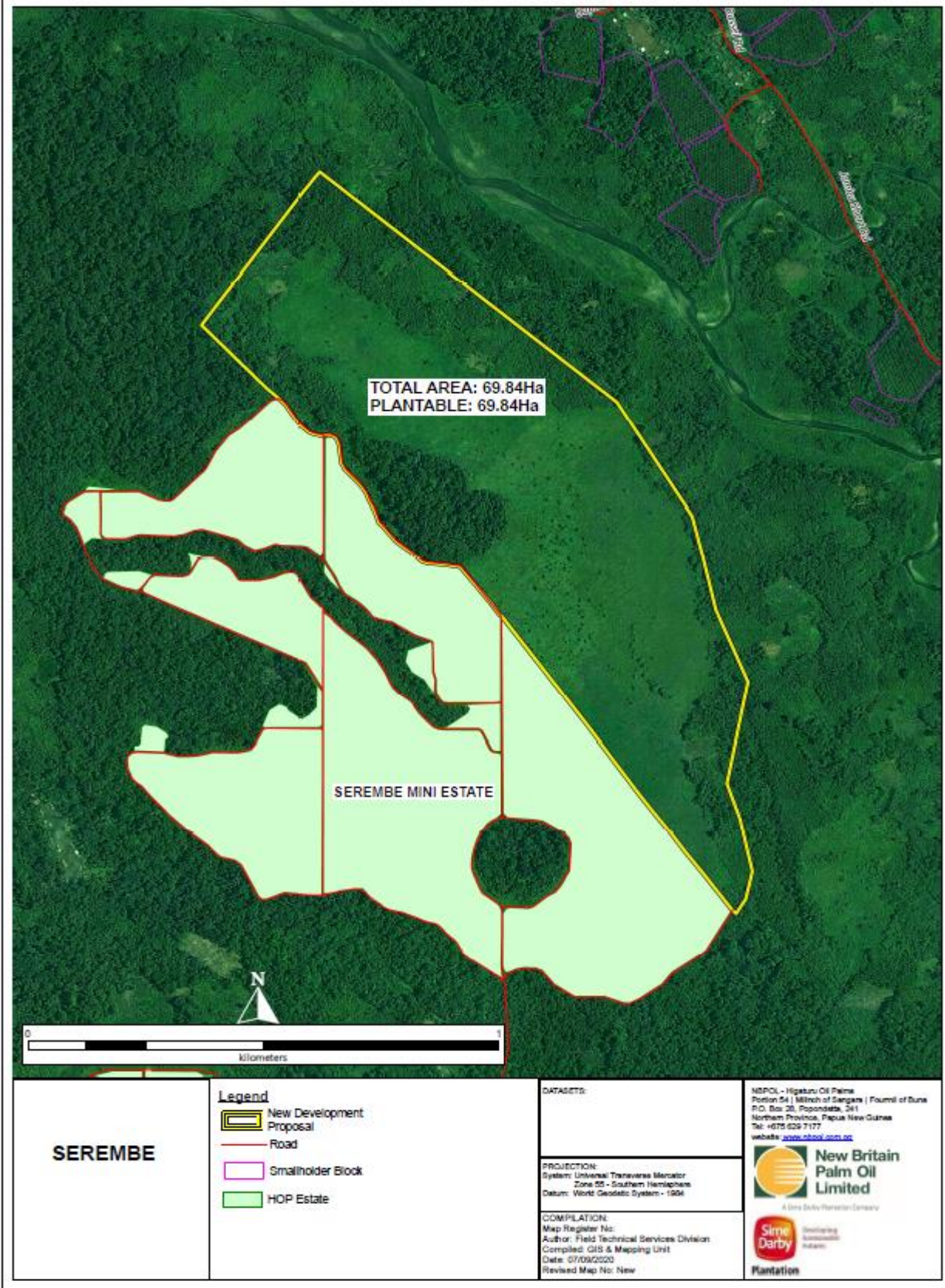


HANJOJO	Legend New Development Proposal <i>New_Dev_Unplantable_200830 by HCV-HCS</i> HCV3 HCV4 Road Smallholder Block	DATASETS: PROJECTION: System: Universal Transverse Mercator Zone 55 - Southern Hemisphere Datum: World Geodetic System - 1984	NSPOL - Higikuru Oil Palms Portion 54 Millinch of Sangara Fournal of Duna P.O. Box 28, Popondeta, 341 Northern Province, Papua New Guinea Tel: +675 525 7177 website: www.nspol.com.pg
	COMPILATION: Map Register No: Author: Field Technical Services Division Compiled: GIS & Mapping Unit Date: 07/09/2020 Revised Map No: New	 A Sime Darby Plantation Company 	

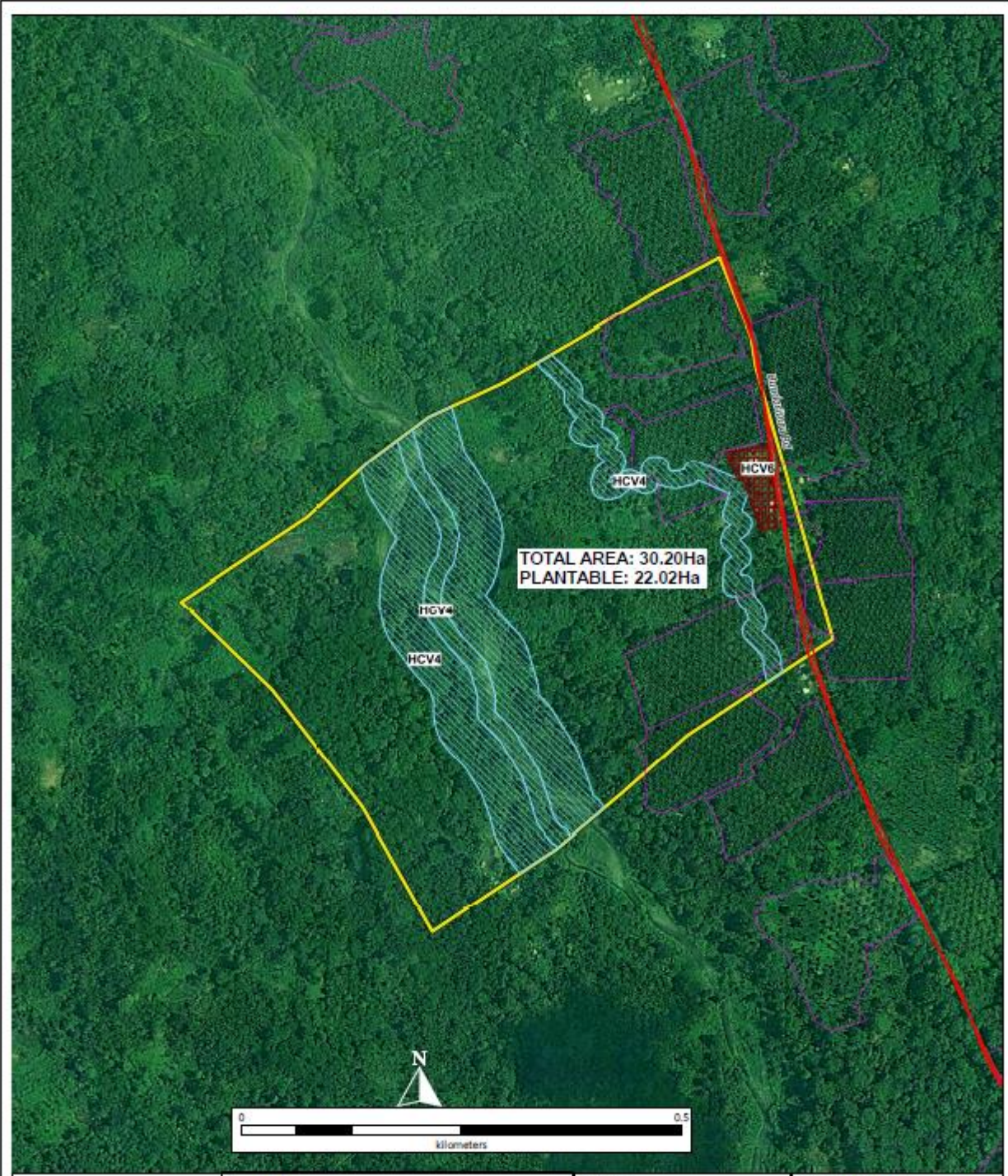
ND36: Hajojoo



ND37: Andogurari



ND38: Serembe



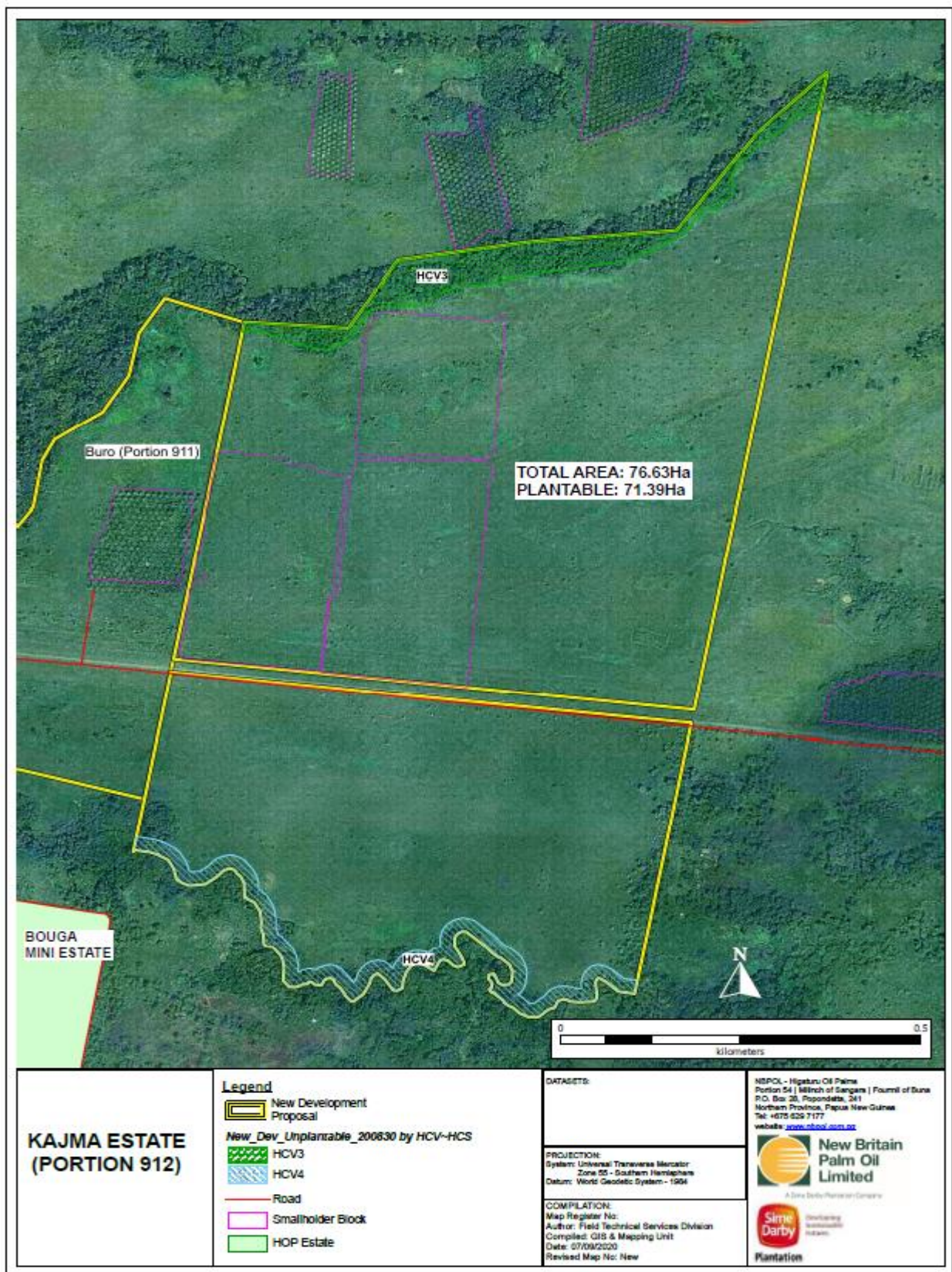
<p>ISUGAHAMBO (Portion 951)</p>	<p>Legend</p> <ul style="list-style-type: none"> New Development Proposal <i>New Dev Unplantable_200830 by HCV-HCS</i> HCV4 HCV6 Road Smallholder Block 	<p>DATASETS:</p>	<p>MBPOL - Higatuni Oil Palms Portion 541 Milinch of Sangara Fournal of Buna P.O. Box 38, Popondeta, 241 Northern Province, Papua New Guinea Tel: +675 829 7177 website: www.nbpol.com.pg</p> <p> New Britain Palm Oil Limited A One Darby Plantation Company</p> <p> Sirine Darby Plantation</p>
		<p>PROJECTION: System: Universal Transverse Mercator Zone 55 - Southern Hemisphere Datum: World Geodetic System - 1994</p> <p>COMPLIATION: Map Register No: Author: Field Technical Services Division Compiled: GIS & Mapping Unit Date: 07/09/2020 Revised Map No: New</p>	

ND39: Isugahambo (Por 951 LTC)



PAPAKI EXTENSION	Legend New Development Proposal <i>New_Dev_Unplantable_200830 by HCV-HCS</i> HCV1 Road Smallholder Block	DATASETS: PROJECTION: System: Universal Transverse Mercator Zone 55 - Southern Hemisphere Datum: World Geodetic System - 1994	MSPOC - Higatuni Oil Palm Portion 54 Millinch of Sangara Founil of Buna P.O. Box 20, Popondata, 341 Northern Province, Papua New Guinea Tel: +675 629 7177 website: www.nbpoc.com.pg A Greiner Group Company
	COMPILED: Map Register No: Author: Field Technical Services Division Compiled: GIS & Mapping Unit Date: 07/09/2020 Revised Map No: New		

ND40 & 41: Papaki Extension



ND42: Kajma Estate

Section 3: SEIA

Date of assessment:

Activity	Timing
Full Assessment field work	9th August - 24th September 2021

Name of Assessor: Narua Lovai

Assessor Designation and Company: Freelance Environment Management Consultant.

Methods

Primary data for the environmental and social impact assessment on the proposed MEs was gathered from general observations, sample ILG household interviews as well as meetings with ILGs, provincial government officials and focus groups comprising representatives of nearby communities. In addition, important secondary data was sourced via literature searches on the biophysical and socio-economic aspects of the location as well as latest RSPO information on new plantings and oil palm agriculture.

Two sets of semi-structured questionnaires were used to obtain environmental and socio-economic information from ILGs and sample ILG households respectively. The questionnaires were designed to complement the information from other sources and contribute toward assembling an outline of the predevelopment situation which both HOP and the respective ME landowners should consider in the development agreement and progressively manage for the benefit of both parties and other stakeholders.

In preparation for the fieldtrip the Sustainability and Quality Management (SQM) Department and Lands Unit delivered notification on the SEIA to the interim ILG committees, relevant OPG and other officials. After the fieldtrip, the data acquired was processed with relevant information from literature searches and other sources as well as the knowledge and experience of the consultant on MEs in the oil palm industry to compile the SEIA report.

Findings and Recommendations

Pre-planting site evaluation and land use agreement negotiation

Ensuring FPIC

Under the RSPO and the revised ILG Act, all members of a landowning clan must agree to pursue a development activity before they lodge their intention and begin discussions with a potential developer. This has taken place for all the proposed MEs and the interim ILG committees are serving as the official clan representatives pending the formal registration of the ILGs. HOP has started well with maintaining FPIC and it should continue to do so during ILG registration and ME agreement negotiation.

Notification to CEPA

Under the Environment Act 2000, a proponent of any major commercial or natural resource development activity must register its intention with CEPA. This notification must include the location, nature and scope of the activity, name of the developer and extent of involvement of the local people. HOP has in this case already advised CEPA about the proposed MEs and has been formally cleared to proceed to land evaluation and lease.

Notification to Local Level Government and Provincial Government

Since the MEs collectively represent large land uses, HOP should inform the relevant ILGs and Oro Provincial administration about the proposed new developments. The district and provincial administration officials may evaluate how the MEs fit into the local development plans and if necessary, discuss potential alterations in consultation with the landowners.

Assessment of HCV and HCS

In accordance with RSPO and its NPP, HCV and HCS assessments for the sites have to be conducted. The assessors will recommend whether and where the MEs should be established with respect to the prevailing biophysical, ecological, social and cultural characteristics. In the proposed MEs where development is deemed appropriate, unplantable portions including buffer zones will be demarcated. HOP can then determine whether the amount of net plantable area is sufficient to support a feasible ME.

Registration of ILG

A genealogy study is necessary to determine eligible ILG membership as per the amended ILG legislation. These studies have been conducted by HOP with each land-owning clan. The respective interim ILG committees played a major role in facilitating the successful completion of these studies by familiarizing and organizing their members.

Baseline socio-economic survey of land group

This study will form the benchmark from which changes can be gauged at regular intervals into the future. Corrective actions can then be taken to remedy adverse trends and foster positive impacts. HOP may consider conducting this study during the ILG genealogy study to maximise use of time and supporting resources.

Negotiation of ME agreement

ME agreement negotiation discussions may commence after the completion of the activities outlined above. At the outset, HOP should explain how the ME will be run, the estimated cost of setting it up and the terms and conditions HOP is prepared to offer the ILG. The ILG committee should consider the offer, discuss it with ILG members and return for further negotiations with HOP. This process should be repeated until a decision is reached to either sign the agreement or terminate negotiations. This should prevent any ILG member from accusing HOP and the ILG Committee of lack of transparency and consultation.

Site preparation and planting

Employment opportunities

Priority for employment of unskilled workers for the ME should be given to the ILG community and nearby villages. Workers from other areas may be hired if necessary. HOP may provide training on proper budgeting and arrange for a financial facility in Popondetta where new employees can open savings accounts and obtain small loans to improve their housing, acquire water tanks and build better toilets. Increased income may lead to greater promiscuity among the sexually active and HOP may organise regular awareness on STDs and HIV-AIDS.

Allowance for buffer zones, natural drainage and nature conservation

HCV sites, buffer zones, unplantable areas, access roads and drainage should be delineated before site preparation begins. Roads and drains should be aligned and constructed so that natural flow is maintained. Similarly bridges and culverts should be installed so that the local hydrology is not altered.

Clearing of vegetation should be done only on the plantable area and the removed material used to form windrows and silt traps. Where practicable, natural vegetation interconnectivity should be preserved across the entire area to ensure the safe movement of local fauna. The plantable area should be marked and seedlings planted. Groundcover should also be planted to reduce erosion, maintain soil structure and improve fertility. Species diversity in the buffer zones may be enlarged with the planting of other local species including QABB vines.

Management of dust, waste and noise

In the event that an excessive amount of dust is generated, water should be applied from spray trucks to contain the dispersion and impact of dust on nearby residences. Any waste material generated on site

including sewage should be properly disposed of. Site preparation work involving heavy machinery should be carried out during the daytime to prevent disturbance of nearby residents.

Financial management by ILG Committee

The initial payment of the land lease rental will provide an opportunity to evaluate how the ILG Committee will use the revenue. The ILG Committee and the ILG landowners should prepare an annual budget and use the ME revenue accordingly. Financial reports should be prepared and presented to ILG members at six monthly meetings.

Maintenance and harvesting

Application of agrochemicals

This is the post-planting to mature palm removal phase when each palm needs to be supported in its growth with periodic dosage of fertiliser and protected by herbicides and pesticides. With proper maintenance and management, the palm should be able to deliver the expected FFB crop during its economic lifetime.

Fertilisers, herbicides and pesticides should be applied by trained personnel who are equipped with the correct PPE and able to follow standard operating procedures on the handling of these substances. The respective application programmes should be based on agronomic advice and not carried out during rainy days.

HOP should set up a six-monthly water quality monitoring program covering sites along potentially affected rivers and streams. The program should include analysis for pH, conductivity, turbidity, dissolved oxygen, nitrates, phosphates, potassium, faecal coliforms as well as herbicide and pesticide residues.

Harvesting of FFBs and delivery to the mill

Improper harvesting programs can lead to delays in FFB collection and loss of crop. If the quality of any batch of crop has deteriorated below the pre-milling standard, it should be correctly disposed of as it will generate offensive odour and encourage breeding of flies if left to biodegrade in the open.

Management of buffer zones and nature conservation

The vegetation in the buffer zones must be left intact and enriched with more local species. The planting of QABB vines should be encouraged to assist in the revival of the butterfly on the Popondetta Plains.

Employment opportunities

In the operational phase of the ME, priority for employment should be given to the ILG members and then to residents in the surrounding communities. If there is a shortfall of locally available labour, workers from other parts of Oro Province may be recruited. If the long-term intention for the ILG community is to run the mini-estate on its own, HOP may assist with a training programme so they are able to properly run the estate as scheduled.

Management support to ILG Committees

When the palms start producing fruit, the revenue of the LLG will increase with the receipt of FFB royalties. It would be advisable that the ILG committee manages these funds in a transparent manner and for the benefit of the entire ILG community. HOP may consider providing training in financial management to the ILG Committee and community members.

It is suggested that HOP to hold meetings biannually with each ILG Committee to discuss emerging issues and ensure the smooth running of the mini-estate. This will ensure that potentially serious issues are sorted at an early stage before they become unmanageable and expensive to resolve. Both parties should still meet whenever dictated by other critical circumstances.

Monitoring of socio-economic indicators

The baseline household socio-economic survey should be repeated every three years to identify positive and negative trends and take appropriate management actions.

Removal of matured palms and replacement with new plantings

Depending on the nature of the ME agreement, both parties can decide to stagger the removal of mature palms and replace them with new plantings so that revenue flow is maintained.

Management of potential environmental and socio-economic impacts

The monitoring and management actions are aimed at mitigating negative environmental and socio-economic impacts and maximising positive outcomes. The successful implementation of these actions requires the support and close oversight of HOP management. The main actions have therefore been reiterated below as critical management measures for consideration and execution by HOP management.

Management of potential environmental impacts

- Carry out water quality monitoring before site preparation and six monthly thereafter.
- Conduct a freshwater fish survey before site preparation within the oil palm footprint area and devise a management plan for the fishery in general, and if feasible, for the Popondetta Blue-eye and Kokoda Glass Perchlet in particular.
- Make sure all buffer zones are clearly marked and left intact for the duration of each ME.
- Enrich species diversity in the buffer zones and ensure their interconnectivity.
- Include the cultivation of QABB vines in the buffer zones and collaborate with the Provincial Environment Office, local village communities as well as other stakeholders to revive the QABB population on the Popondetta Plains.
- Use machinery that is in good working order so that noise level and hydrocarbon spillages are minimized.
- Ensure removal of vegetation only where required and provide adequate erosion and sedimentation control mechanisms.
- Ensure proper design, construction and maintenance of roads, drains, bridges, and culverts.
- Ensure proper application of agrochemicals by appropriately trained and equipped personnel.
- Ensure appropriate disposal of all waste generated on each ME.

Management of potential socio-economic aspects

- Conduct RSPO awareness in each prospective ILG community.
- Carry out a full genealogy study of members of the landowning clan.
- Conduct a baseline household socio-economic survey of each ILG.
- Verify that all the clan members are kept informed of agreement negotiations.
- Evaluate increases in land rental and FFB royalty rates that would lead to improved socio-economic welfare in each ILG community.
- Ascertain that FPIC is maintained and all members understand the ME Agreement before signing it.
- Ensure priority for employment and contracts is given to each ILG community.
- Investigate ways and means of improving living conditions and social services in each ILG community particularly with water supply and sanitation as well as access to health and education.
- Arrange project planning and financial management training for each ILG Committee.

- Organise training and awareness on budgeting and saving income for ILG community members and new ME workers.
- Organise regular education and awareness on alcohol and substance abuse, domestic violence, nutrition as well as STDs and HIV-AIDs for each ILG and nearby communities.

Section 4: HCV-HCSA Assessment; OR
ALS HCV and Standalone HCSA assessment

Date of RSPO approval as satisfactory: Jan 2023

Name of Assessor: Jules Crawshaw

Assessor Designation and Company: Jules Crawshaw - Consultant – PT Hijau Daun

- Fully Licensed Assessor (ALS14006JC)

Table 7. Independent consultants engaged to undertake the integrated HCV-HCSA assessment

Name	Assessment role	Qualifications	Experience with HCV and HCS / Languages
Jules Crawshaw	Lead Assessor and Social Team Leader	<ul style="list-style-type: none"> • B.For.Sc., M.Bus.Sys • ALS Fully Licensed Assessor (ALS14006JC) • HCS Register Practitioner. 	<ul style="list-style-type: none"> • PNG, Indonesia, Solomon Is, Myanmar, Malaysia • English, Indonesian
Rahmat	GIS Expert ³	<ul style="list-style-type: none"> • B.For.Sc • GIS Expert for HCV assessments throughout Indonesia • LUCA Assessments 	<ul style="list-style-type: none"> • Indonesia • English, Indonesian
Jeffery Lawrence	Vegetation Expert Forest Inventory	<ul style="list-style-type: none"> • BSc Degree in Forestry • Expert in tree identification • FSC experience • HCV and HCS experience 	<ul style="list-style-type: none"> • PNG • English, Tok Pisin
Juliana Mohe	Social Expert ⁴	<ul style="list-style-type: none"> • BSc Degree in Geography and Environmental Science • Experience with social research and social surveys 	<ul style="list-style-type: none"> • PNG • English, Tok Pisin
Lewi Kari	Social Expert	<ul style="list-style-type: none"> • MSST. (2010) in Spatial Information Science Technology from the University of Southern Queensland , Toowoomba, Australia • Feasibility Studies • Training 	<ul style="list-style-type: none"> • PNG • English, Tok Pisin
Pita Amick	Mammals Expert	<ul style="list-style-type: none"> • Masters Degree in Science • rapid assessments on mammals • SEIAs 	<ul style="list-style-type: none"> • PNG • English, Tok Pisin
Bradley Gewa	Birds Expert	<ul style="list-style-type: none"> • B Sc. • Biodiversity surveys using focal insect, mammal, birds and plant groups. • Ecological research involving insects, mammals, birds and plant taxonomy 	<ul style="list-style-type: none"> • PNG • English, Tok Pisin

Table 8. Field team of NBPOL staff, who assisted with the fieldwork component of the assessment

Name	Department	Team
<ul style="list-style-type: none"> • Benjamin Osa 	SQM- Sustainability Quality Management	Process Management

³ The GIS Expert did the land cover classification. All the other GIS work was done by the lead assessor who is an HCS Registered Practitioner.

⁴ The lead assessor, who is an HCS Registered Practitioner, joined the social team.

• Simi Sakalia	Lands	Process Management
• Carl Gales (Lands Officer)	Lands	Birds and Mammals
• Archie Dasiga (GIS Officer)	Technical Service (TSD)	Birds and Mammals
• Nathaniel Jiregari (Landfield Attendent)	SQM- Sustainability Quality Management	Birds and Mammals
• Danziel Aumopa (Admin Driver)	SQM- Sustainability Quality Management	Birds and Mammals
• Benedict Pane	SQM- Sustainability Quality Management	Birds and Mammals
• Albert Gela (Lands Officer)	Lands	Vegetation
• Samuel Kadeu (SCRA Officer)	SQM- Sustainability Quality Management	Vegetation
• Fabien Tureha (Technical Officer)	SQM- Sustainability Quality Management	Vegetation
• Jason Yadup (SCRA Officer)	SQM- Sustainability Quality Management	Vegetation
• Whitey Masavin	SQM- Sustainability Quality Management	Vegetation
• Max Gairi	SQM- Sustainability Quality Management	Vegetation
• Jimmy Salowan (TSD Driver)	TSD	Vegetation
• Genesisus Abbah (Mamba Safety Rep)	Field Mamba Estate	Vegetation
• Nolen Sipolo (Lands Admin Driver)	Lands	Vegetation
• Nelu Lukas (Lands Officer)	Lands	Social
• Derrick Askopo- (GIS Officer)	TSD	Social
• Jonah Aiyowa (SCRA Officer)	SQM- Sustainability Quality Management	Social
• Sylvester Dira (Projects & Documentation Officer)	SQM- Sustainability Quality Management	Social
• Stephanie Pokowas (Community Engagement Officer)	SQM- Sustainability Quality Management	Social
• Lopita Philips (Sambogo Safety Officer)	Field- Sambogo Estate	Social
• Clody Kerahupa (Section Leader)	Field- Sambogo Estate	Social

Table 9. Timelines associated with this integrated assessment

Step	Step description	Dates undertaken/scheduled
1	Developing a proposal and contracting	June – July 2021
2	Compilation of secondary and available primary data, including preliminary stakeholder consultation during a short, initial visit to the license areas (Scoping Study)	July - August 2021
3	Scoping Study fieldwork	8 – 22 August 2021
5	Planning for fieldwork and agreement on field methods for primary data collection	August September 2021
6	Fieldwork and primary data collection, including direct stakeholder consultation	22 January – 13 February 2022
7	Data analysis and interpretation	February - April 2022
8	Writing a Social and Environmental Impact Assessment, - which included a land tenure and social baseline study.	Completed 1 February 2022
9	Final consultation to report interim HCV findings and refine threat assessment Consultation with NGOs	7 – 14 February 2022
10	Preparation of a Draft Report, including HCVA maps and management and monitoring recommendations (phase 1)	February - April 2022
11	Amend the draft report based on the feedback from NBPOL	May – June 2022
13	Submission of the HCV/S Report to HCVRN	July 2022

Social methods

Literature review and use of secondary data

There was a wealth of secondary data available in this area from various sources including:

- Old HCV and HCS reports
- Satellite images (ranging in dates from 2005 in to 2021)
- Academic papers (e.g. research from Curtin University, Australian National University) – these ranged in dates from 2002 – 2017. The individual references are included in this section
- Census (Papua New Guinea National Statistical Office, 2011) – this is the latest census
- Data from government departments (e.g. Education, Health, Police) – these were ad hoc data sets that they kept and were ongoing data from the last couple of years (e.g. no. of schools).

The fact that some of the datasets (especially the census) are now quite dated can be seen as a limitation of the study.

Secondary data for the assessment of HCV 5 and 6 were available from an SEIA and HCV and HCS Assessment reports provided by the company from other areas in the assessment landscape where NBPOL has its operations. These described a range of social and economic classes, livelihoods, and village infrastructure. There was no secondary data relevant to the particular estates.

At the same time as the HCV / HCS assessment was being done, data was being collected for the SEIA – which included a land tenure and social baseline study.

Day	Date	Sites Covered	Village (Affected Communities)
Monday	24/01/2022	Andogorari	Andogorari
Tuesday	25/01/2022	Jajama	Hohota
Tuesday	25/01/2022	Dara Pema	New Soputa
Wednesday	26/01/2022	Houpa Extension	Ovuro
Wednesday	26/01/2022	Pupu	Tombata
Thursday	27/01/2022	Owate	Pururuta
Thursday	27/01/2022	Javunipa	Pururuta
Thursday	27/01/2022	Kesiha	Pururuta
Thursday	27/01/2022	Boruga Pusute	New Warisota
Thursday	27/01/2022	Hombare	Kipore
Thursday	27/01/2022	Baririta	Kipore
Thursday	27/01/2022	Ewasasaru	Sehoro
Thursday	27/01/2022	Sifia	Urio
Friday	28/01/2022	Haugapa	Ango
Friday	28/01/2022	Hiroipa	Ango
Friday	28/01/2022	Hungoro	Ango
Friday	28/01/2022	Korofurukari	Ango
Friday	28/01/2022	Haintapa	Perombata
Friday	28/01/2022	Sorupa	Perombata
Friday	28/01/2022	Kovenopa Sambura	Soputa
Saturday	29/01/2022	Darau Extension	Dobuduru
Saturday	29/01/2022	Bafera	Dobuduru
Saturday	29/01/2022	Siko	Dobuduru
Saturday	29/01/2022	Topiripa	Dobuduru
Saturday	29/01/2022	Kofureta	Topohambo
Monday	31/01/2022	Wanipa Extension	Dobuduru
Monday	31/01/2022	Gajarepa	Parehe
Monday	31/01/2022	Hofita	Siremi
Monday	31/01/2022	Houembo Kosote	Siremi
Tuesday	1/02/2022	Bakito Extension	Kararata
Tuesday	1/02/2022	Mende (Portion 914)	Urio
Tuesday	1/02/2022	Buro (Portion 911)	Urio
Tuesday	1/02/2022	Saura (Portion 919)	Sori
Wednesday	2/02/2022	Serembe	Serembe
Wednesday	2/02/2022	Hajojo	Jajau
Wednesday	2/02/2022	Isugaembo	Handarituru

Wednesday	2/02/2022	H Hombukapa	Oera
Thursday	3/02/2022	Erofafa (Papaki)	Papaki
Thursday	3/02/2022	Afurafu (Papaki)	Papaki
Thursday	3/02/2022	Kajma	Urrio
Friday	4/02/2022	Portion 2- Kokoda Station	Koasi
Monday	7/02/2022	Borari	Ango

Social methodology

FPIC

This study is one step in the FPIC process. There have been a number of FPIC activities that have spanned many years for each of the projects that are being considered. While each group differs; the main activities are (1) an initial request for development from the community, (2) socialisation with the community, (3) a land investigation report and (4) NBPOL support with establishing an ILG (this is not necessary for State land or freehold titles).

Social Fieldwork

The social methods are based on the Common Guidance. However, the assessor does use a method from the PNG Toolkit to add extra detail on resource usage, this is a level of dependency table.

Using the CG as a reference, questions were prepared for meetings at the village level to evaluate the dependency of community members on natural ecosystems to fulfil basic needs (HCV 5) and identify any important cultural sites (HCV 6).

The data capture method was similar across the proposed development areas involved participatory mapping and Focus Group Discussions. This involved all the affected communities. Village interviews being undertaken in the villages directly affected by the development. Generally, the interviews were done at the village-wide level. During the interviews, maps of both the development area and the wider landscape were used as the basis for participatory mapping. At each interview with all the affected communities during the full assessment the assessor asked the communities whether there was anyone that objected to the survey. No one objected in any of the interviews to the survey taking place. The assessor noted this. This information was augmented by permission being given by all the communities at NBPOL meetings. The assessor wrote this in his notebook that there was no objection to the survey. The assessor considers no objection to be consent. Note that consent is not defined in the HCVRN documentation.

A letter was to be sent to each group (the assessor asked that the staff state that the team did not just want to meet leaders but woman and other groups also – this was confirmed by a good turn-out of the whole community at each meeting). As well as this an NBPOL staff member followed-up with the villages, organising a daily schedule. Hijau Daun encouraged as many people to join as possible, but ultimately couldn't force anyone to come. The sampling method did not aim for a percentage attendance; the method was just to get input from as many people as possible. Note that some people were understandably reluctant to attend as there was a wave of Covid 19 sweeping the communities at the time. The assessors caught Covid while they were there too.

Especially given that the clans had contacted NBPOL and requested plantation development, there was a good turn-out at every meeting (Figure 11). Meetings were attended by the clan leader and many other interested parties (e.g. women, younger people, farmers). In each interview a general introduction to the purpose and context of HCV was made. The assessor did not go into complex explanations but introduced the purpose in terms of the company's "no deforestation commitment" and reviewing the community's reliance on natural resources to ensure that the development doesn't interfere with this. The biodiversity team worked in the area at the same time as the social team. An explanation was made of the biodiversity team's activities and several members of the community joined the biodiversity team to act as guides and help with the measurements.

This was followed by a Focus Group Discussion (FGD) in order to collect data on social and cultural aspects. The FGD approach is an effective way to collect information on social and cultural dimensions of village life in an informal setting that permits discussion and exchange of ideas between group members. As part of the social survey questions were asked to identify groups within the community (though there did not appear to be much variation within the village e.g. in terms of income disparity or religion). The main disparity was in ages with the elders having most of the decision-making power in these communities. Similarly, these are patrilineal societies so most of the decision-making power sits with the men. Nevertheless, it was recognised that it was important to ensure representatives from all groups were present.

At the clan level meeting, typically it was the leaders that answered most of the questions. For this reason, the social experts made special efforts to involve other groups like mothers and younger people in the interviews. Often the experts asked to go for a walk to see the gardens or springs where they would talk informally with the mothers about resource use.



Figure 11. Focus Group Discussion taking place at Handari Hombukopa

The interviews all took place in Tok Pisin (the PNG lingua franca), which is widely spoken in the area. Occasionally questions and important points were translated into a local dialect. This was generally done by one of the more educated members of the community such as a schoolteacher.

Additionally, clan members joined the HCV / HCS survey team when the team surveying the estates. During this time informal discussions took place about a range of topics (e.g., land ownership, disputes, resource use, population expansion and cultural identification with natural areas). This was very useful supporting information for the survey. While surveying the estates, clan members were asked to take the team to cultural sites and places of interest. GPS points were taken where appropriate (e.g. graveyards) or, where a creek was used for taking water, this was marked on the survey map. Similarly, the clan leaders were asked to mark-up on maps the complete extent of their lands. This was used to confirm there would be sufficient land after oil palm development for gardens. Also areas where other resources were located was also marked on the maps.

At the end of each meeting next steps were discussed. These were (1) writing a draft report which will map out the GO / NO GO areas and (2) returning to the village to socialise the results of the mapping and seek feedback / approval from the communities (Final Consultation).

Limitations of these methods may have been that the assessment team missed some key point because someone didn't speak up or that someone was in town and missed the meeting. However, the team visited each village at least twice and in most cases, three times and gave everyone the opportunity to raise questions or concerns. So, it was felt that the assessor had undertaken "best endeavours" to collect and fairly represent the information.



Figure 12. Marking up the extent of the clan's lands at Kipore Village. The community were asked to mark up the complete extent of their clan's land on maps. The maps had the proposed development area and satellite images of the surrounding area on them.

Table 10. How consent from other affected communities were obtained, verified and documented.

Site name	Affected communities	Initial FPIC to the continuation of the process ⁵	The specification of mechanisms for subsequent interactions between communities and the company
All Sites – both Customary Land and State Land	The villages associated with the customary land	Initial FPIC was done by the company. Where the company explained many things to the community about the development process, including the HCV assessment. Which would involve a social and biodiversity assessment. By signing this document, the landowners	The communities either have set up or are in the process setting up an ILG. Letters should be

⁵ The incredibly vague statement was interpreted by a third party social expert as meaning "informed consent from the communities is needed before the assessor starts working on their lands and engaging with them."

		<p>agreed for the process to go ahead and allow people to come onto their land and undertake social work in their villages. All the landowners had signed these documents.</p> <p>An interview during the full assessment was held with the affected communities. The assessor asked about the information that had been provided about the survey by NBPOL. The assessor noted that the community had an adequate understanding of the assessment process and understood that the area may be converted to OP. The assessor asked these parties whether the assessment team had the community's consent to start working on their lands and engaging with them. To which the community replied "Yes". The assessor took this as being consent and noted it..</p>	<p>addressed to the chairman.</p> <p>The assessor asked if village meetings with the company representatives was acceptable also. The communities unanimously stated that this was OK. The assessor noted this.</p>
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Participatory mapping

At each village interview the communities were asked to mark up the complete area of their land to ensure (1) that the oil palm development did not impact on their gardening area, (2) if it did overlap with their gardening area that this would not force them to go and open up areas of forest elsewhere and (3) if there were any resources that were likely to be affected by oil palm development (e.g. hunting areas). Additionally, any areas of community set asides, within the assessment area, were asked to be mapped out.

Regarding community set asides, this was usually where the village was located within the area to be developed (e.g. Owate). Also, in Portion 2 the community stated that they did not want the whole lease area to be developed, only the area which used to be VOP. Their reason was that there was a lot of wildlife in the area surrounding the village and they wanted to ensure that the birds and snakes etc had a place to live near their village. This area would be set aside and classified as community lands, which the community could manage it how they wished.

Following this the assessors went to have a look at the areas of interest within the area. Examples of areas of interest would be:

- Springs
- Sak-sak areas
- Cultural sites

Having studied these maps, the assessor found some inconsistencies and some of the data was incomplete. During the final consultation the assessor asked the communities more questions and asked further clarifications.



Figure 13. Reconfirming some of the results of the Participatory Mapping (Portion 2).

Environmental methods

Literature review and use of secondary data

Vegetation survey

Much of this phase of the assessment sought to understand if any species likely to be found within the study areas are listed under various international agreements or are protected under any national legislation. Any potential species found during this phase of the assessment were cross referenced against the digital herbarium records at the Forest Research Institute (FRI) at Lae (Papua New Guinea) for records of listed species occurring in Oro Province. From this search, a potential candidate species list was formed, which was further refined by general habitat and elevation (where possible). Resources utilised during the desktop review are listed in Table 11. The results of the IUCN red list search are provided in Table 12.

Table 11. Major information sources used to perform desktop review.

Resource	Comment
National herbarium – Lae (digital)	This resource was used to understand the potential presence or absence of RTEs identified by the PNG HCV National Interpretation, or individuals found from the area-based search of the CITES or IUCN databases. Record data (if present) was interrogated to understand potential location, habitat and growth form of the species. The online herbarium is not complete, but provides an excellent starting point for understanding the potential distribution and ecology of RTE's.

Relevant field guides	Once the indicative list was compiled, the following references were interrogated to understand any information about the identified species (full bibliographic entry in the reference list); <ul style="list-style-type: none"> • Peekel, P. G (1984). Flora of the Bismarck Archipelago⁶ • Verdcourt, B. (1979). A manual of New Guinea legumes • Baker, W. J and Dransfield, J. (2006). A field guide to the palms of New Guinea. • Lewis, B. A and Cribb, P. J.(1991). Orchids of the Solomon Islands and Bougainville.⁷ • Handbooks of the flora of Papua New Guinea Vols 1, 2 and 3
IUCN Red list	An area-based search using the IUCN online database was performed before the commencement of field work in January, 2022. A list of all flora species with an IUCN rating of vulnerable or greater (i.e. inclusive of endangered or critically endangered), was collated. The area of focus was the Papua New Guinea in general, with further investigation determining the relevance of each listed species to the Oro Province context
CITES prohibited	An area-based search using the CITES online database was performed before the commencement of field work January, 2022. The area of focus was the Papua New Guinea in general, with further investigation determining the relevance of each listed species Oro Province.,
Nationally protected species	Little guidance is provided by the Papua New Guinea government as to the formal protection of particular plant species, but the HCV toolkit for Papua New Guinea (PNG FSC, 2005) provides a range of species that a considered rare, threatened or endangered by IUCN or prohibited for trade under the CITES convention.

It should be acknowledged that the understanding about the ecology or distributions of much of the PNG rainforest flora is imperfectly known, with many species descriptions being known only from original type specimens that are housed in various herbaria in Australia and Papua New Guinea.

This component of the field assessment was integrated with the requirements of the HCS approach field assessment, with each field team being equipped with the list of target species and searches being carried out in the vicinity of each HCS plot and on the traverse between.

Of the species identified broadly identified for consideration, a short list of 2 species were identified as high priority for targeted species searching. Of this list, both are Data Deficient (DD)

All CITES Appendix 1 species were orchids and their habitats were confined to rocky or montane areas (which are not present in the assessment area). It is of interest to note that listed species are climax community species mostly present in large expanses of relatively undisturbed forests.

The broad, initial species selection is shown in Table 12, with the high priority target species shown in red.

Table 12. RTE tree species identified for targeted species searching across the assessment areas.(PNG FSC, 2005)

Family	Binomial	Red List status	Location
Guttiferae	Calophyllum laticostatum	DD	A large tree found in well-drained lowland or lower montane rainforest.
Guttiferae	Mammea novoguineensis	DD	A tree that occurs in primary well-drained forest between 60

⁶ Note that the Flora of the Bismarck Archipelago is of the islands such as New Britain Island which is adjacent to Oro province. The flora of Oro Province was considered is sufficiently similar (by the assessor) to have value in this study.

⁷ Note that the Orchids of the Solomon Islands and Bougainville is of a separate area to Oro province. The flora of Oro Province was considered is sufficiently similar to have value in this study and there were no specific orchid references to Oro Province.

and 420m. It is known from a few scattered localities in an area that is poorly known.

Bird Survey

The bird expert is a Popondetta local, so had an informal species checklist from sightings made in the area. This was augmented from information on species that were potentially present within the areas of interest were collated from field guides ((Coates and Peckover, 2001) and (Beehler, Pratt and Zimmerman, 1986)). This resulted in a list of potentially present bird species.

Of the total of 43 sites that constituted the assessment area, 10 sites were selected for bird surveys (Table 13). Most of the sites are lowland areas with grassland, scrub, fragmented forests, secondary regrowth and bush that had been altered by human settlement and agricultural activities. Some of the sites had existing or old Palm Oil plantations. The ten selected sites were selected over a wide geographic spread

For data-gathering for this survey, bird habitats were categorized into 6 main types, which are Forest (F), Grassland (G), Bush (B), Garden and Village (Ga&V), Wetlands (W) and Palm Oil plantation (P), following the Daemeter High Conservation Bird Report study (2015, unpublished).

Table 13. The 10 selected sites where the bird and mammal survey was conducted.

Higaturu NBPOL Site Reference	Site Name	Village
ND12	Portion 2	Koasi
ND23	Hungoro	Ango
ND31	Boruga Pusute	New Warisota
ND37	Andogorari	Ambogo
ND34	H. Hombokapa	Oere
ND39	Isugahambo (Portion 951)	Handarituru
ND41	Papaki Extension	Papaki
ND03	Perombata Extension (Haintapa Clan)	Perombata
ND05	Kovenopa Sambura	Soputa
ND01	Topiripa Extension	Dobuduru

Mammal Survey

A list was developed of 83 terrestrial mammals which are expected to occur in the lowland forests and grasslands, including the proposed development areas. This list was developed based on a literature survey and the mammal expert's professional experience. This became the initial species list.

Sampling areas

There were two main habitat types that were surveyed for mammals: (1) disturbed forest, and (2) anthropogenic grassland with scattered trees (Figure 14).

Anthropogenic grassland (Figure 14A)

More than half of the land areas proposed for development are stretches of grasslands and scattered trees. Although the exact history of the formation of the grasslands in the Sauga areas of Oro Province has not been documented, we believe that the grassland plains here may have been formed mainly due to bushfire and gardening activities, similar to what happened in the central highlands of PNG in the Mid-Late Holocene period (Haberle, 2007). This view is also supported by Parsons (1992), who studied the Queen Alexandra butterfly (*Ornithoptera alexandrae*) in the Sauga area.

Disturbed forests (Figure 14B)

All the land portions proposed for development that come under this generic category are composed of fragments and patches of secondary forests that are highly disturbed, and secondary re-growths in fallowed food gardens and logged areas. This also includes buffer zones along the water ways.



Figure 14 The entire proposed project area is characterized generally by two habitat types - A: Anthropogenic grassland habitat; B: disturbed forests.

Field methods

The surveyors used mist nets, bat detectors, and snap traps to systematically record mammals across all sites sampled. The surveyors also did night-time spot lighting and collected and identified mammals based on hunt trophies. Both of the aforementioned methods are supportive only and were not used consistently throughout the sites sampled. All species expected and those recorded were individually enquired of their updated conservation statuses at IUCN's website (<https://www.iucn.org>). Updated list of CITES Listed species were provided by Conservation and Environment Protection Authority of PNG (CEPA).

Slope Analysis

Excessive slope (i.e. that greater than 25o) is an operational constraint (prescribed by RSPO) needing to be factored into decision making, although the paucity of topographic data available for this study made this process difficult within the GIS environment. Slope analysis was performed using the Synthetic Aperture Radar (SAR) derived ALOS PALSAR as an input, then using the 'slope' (spatial analyst) tool within ArcGIS to convert elevation values to slope values. While the ALOS PALSAR dataset is useful to understand relative elevation differences, its use in higher resolution, operational planning is limited.

Rivers

There was secondary river course data available from NBPOL. However, this lacked some of the small creeks that ran through the estates. Data on the river courses of small creeks was augmented by walking the course of the rivers and taking GPS waypoints down the river courses. These way points were used to accurately map the river courses inside the estates only. Furthermore, it should be noted that a lot of the rivers change their course considerably in short periods, so the value in mapping their current location extremely accurately is rather limited, if after 5 years they have moved 100 m to the left or right.

Environmental field work

Based on the information gleaned from the secondary data as well as the assessment team's experience with similar surveys in other parts of PNG it was decided that the focus of the environmental survey should be on forest areas. The environmental survey therefore focussed on forest areas, however the assessment team still passed through areas of cultivation, grassland, bareland and village areas in the process of accessing the forest and was constantly vigilant regarding sighting of species of interest in these land cover types. The birds and mammals surveyor

frequently walked along forest edges where birds were more easily able to be seen. Similarly, the vegetation team walked through all land cover types and was vigilant for any species of interest in all land covers. Though, as predicted, the vegetation of interest for HCV was located in the forest areas.

HCSA forest assessment and vegetation survey

The in-field vegetation survey was combined with the HCS plot data collection. The survey focussed on forested areas. Grasslands were not considered a priority, given that it is dominated by kunai grass (*Imperata cylindrica*), which is incredibly aggressive at suppressing any other growth. This is not to say these areas were ignored, these areas were still surveyed but from the surveyors' experience they were less likely to harbour HCV vegetation species and for surveying efficiency focused on other areas. HCS plot measurement involved assessing fixed area plots (described in more detail below) and searching for Rare, Threatened or Endangered (RTE) vegetation in the vicinity of and whilst walking between plots. By actually identifying every tree in the plots – it ensures no trees were missed.

The field inventory performed for this project was primarily used to;

- Collect HCSA plot data
- Ground truth the output of the initial image classification and to quantify the above-ground woody biomass (i.e. that within trees) found within each of the strata, across the study areas
- Actively search for RTE species listed under national or international acts or conventions within the study areas and adjacent landscape.
- Verify the ecosystems that were described as present based on the secondary data review. Where possible, refine the boundaries and better describe these ecosystems.
- Develop a vegetation species list.
- Develop a description of the forest associations in the area, along with information on levels and type of disturbance and threats.

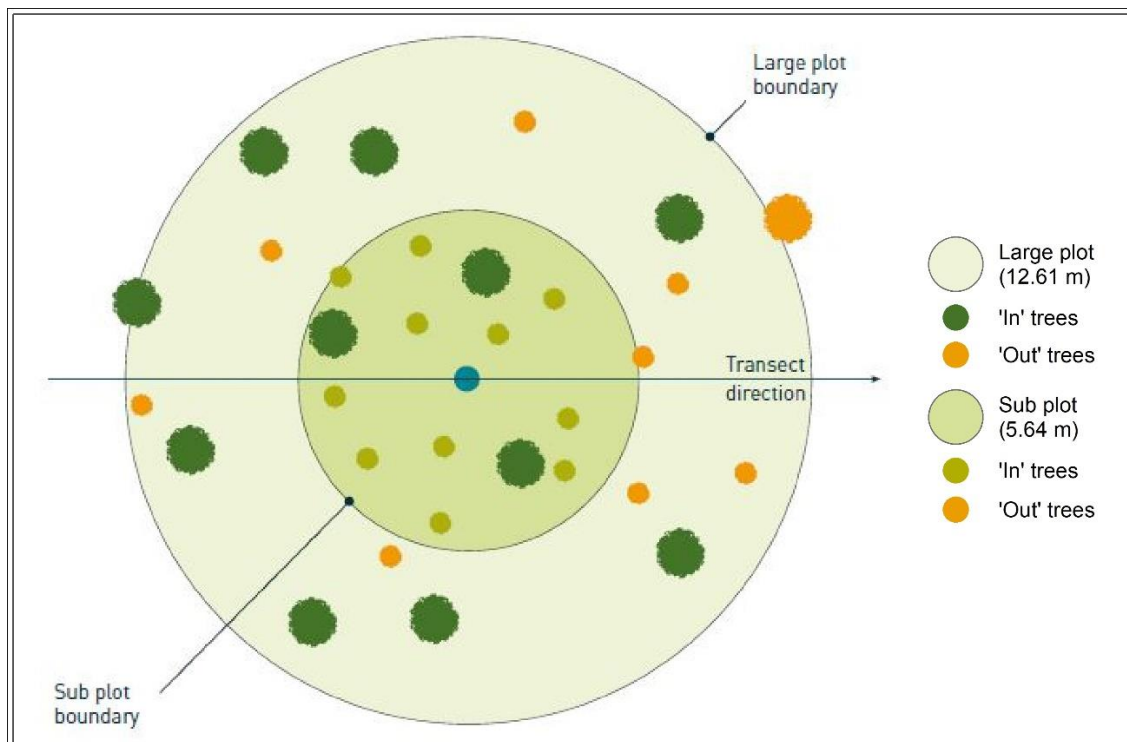


Figure 15. Stylised representation of HCSA plot used during this assessment.

HCSA plot sampling design

Plot sample design was conducted in accordance with the HCSA Toolkit Version 2, Module 4, and sought to develop statistically separate mean biomass values that are ascribed to the HCSA strata defined during image classification, to a 90% confidence interval.

Mean biomass and standard deviation values from previous field assessments in other parts of Papua New Guinea and the Solomon Islands were used as inputs into this process, with both the equation from pp 27 (see below) in HCSA Toolkit Version 2, Module 4 and the ‘winrock sample plot calculator spreadsheet tool’8 were tested to compare the sample sized needed for this assessment (Table 14).

$$N = t^2 s^2 / E^2$$

Where:

t = t-value from Student’s t-test table for 90% confidence interval

s = standard deviation based on existing datasets from similar forest types

E = probable error, expressed as a percentage of the estimated mean value (from existing datasets)

Table 14. HCSA plot sample size derived from various methods.

Strata	Mean biomass (t/ha)	Standard deviation (t/ha)	N (HCSA equation)	N (winrock sample plot calculator)
HCS forest	160	47	22	12
Young regenerating forest	54	5	3	3
Scrub	25	2.5	3	3
Total			27	17

Given the large geographic spread and the likely edge effects even the HCSA equation was thought to give far too few plots to get reliable data. A sample of 112 HCSA plots was planned, a large survey effort given assessment time constraints, weather related downtime and logistical complications, such as distance between study areas and safety issues. There was a heavy focus on “over-plotting” the scrub and YRF class in order to ensure statistical separation of the two classes. Stratified random sampling (using ‘create random point’ in ArcGIS) was used. Table 15 shows the breakdown of plots by strata measured during the field assessment, with Figure 16 and Figure 17 showing the plot locations. Note that all plots that were planned were measured, except for 13 plots in BBGI (which dropped out during the assessment due to an internal dispute).

Minimal biomass sampling was undertaken in Non-HCS vegetation, as in the context of this assessment, such vegetation was generally treeless or non-woody vegetation such as active gardens or grassland areas or areas dominated by palms, such as Coconut or Sago. Non-HCS vegetation is usually encountered for one of the following reasons; a) a change in landcover has occurred since the mapping was conducted (e.g. a new garden has been established) or b) because of poor or incorrect classification (sometime plots fall right on the boundary of forest / nonforest).

This approach is consistent with pp 27 in Module 4 of the HCSA toolkit (Rosoman, et al., 2017), which states; ‘Although Scrub (S) and Open Land (OL) are likely to contain very low levels of carbon, the HCS assessment process does seek to sample a limited number of field plots to confirm this assumption. Other classes, such as existing plantation areas (e.g. oil palm and food crops), and areas not to be developed including community areas, peatlands, and HCV areas, are generally not assessed as it is expected that these areas are separately demarcated unless required for carbon accounting’.

The strata “LDF+” mentioned in Table 15 refers to an aggregation of LDF, MDF and HDF classes. It was decided to aggregate these landcovers into a single class as all require conservation and are considered HCS Forest. There were no HDF plots and the species mix in MDF and LDF are very similar. It is really just years since disturbance and the level of disturbance that differentiates the two categories. Furthermore, there were few areas that were considered MDF, most were LDF.

Table 15. Planned and measured HCS plots for this assessment. Note that BBGI dropped out during the survey (which had 13 plots planned). Note that the plots were done at the planned locations, the difference in the strata is due to a plot being planned in LDF (based on image interpretation) and in reality it is YRF on the ground.

Strata	Plots planned	Plots measured
LDF+	18	25
Young regenerating forest	50	24
Scrub	44	45
Non-HCS vegetation	0	3
Other	0	2
Total	112	99

⁸ <https://www.winrock.org/document/winrock-sample-plot-calculator-spreadsheet-tool/>

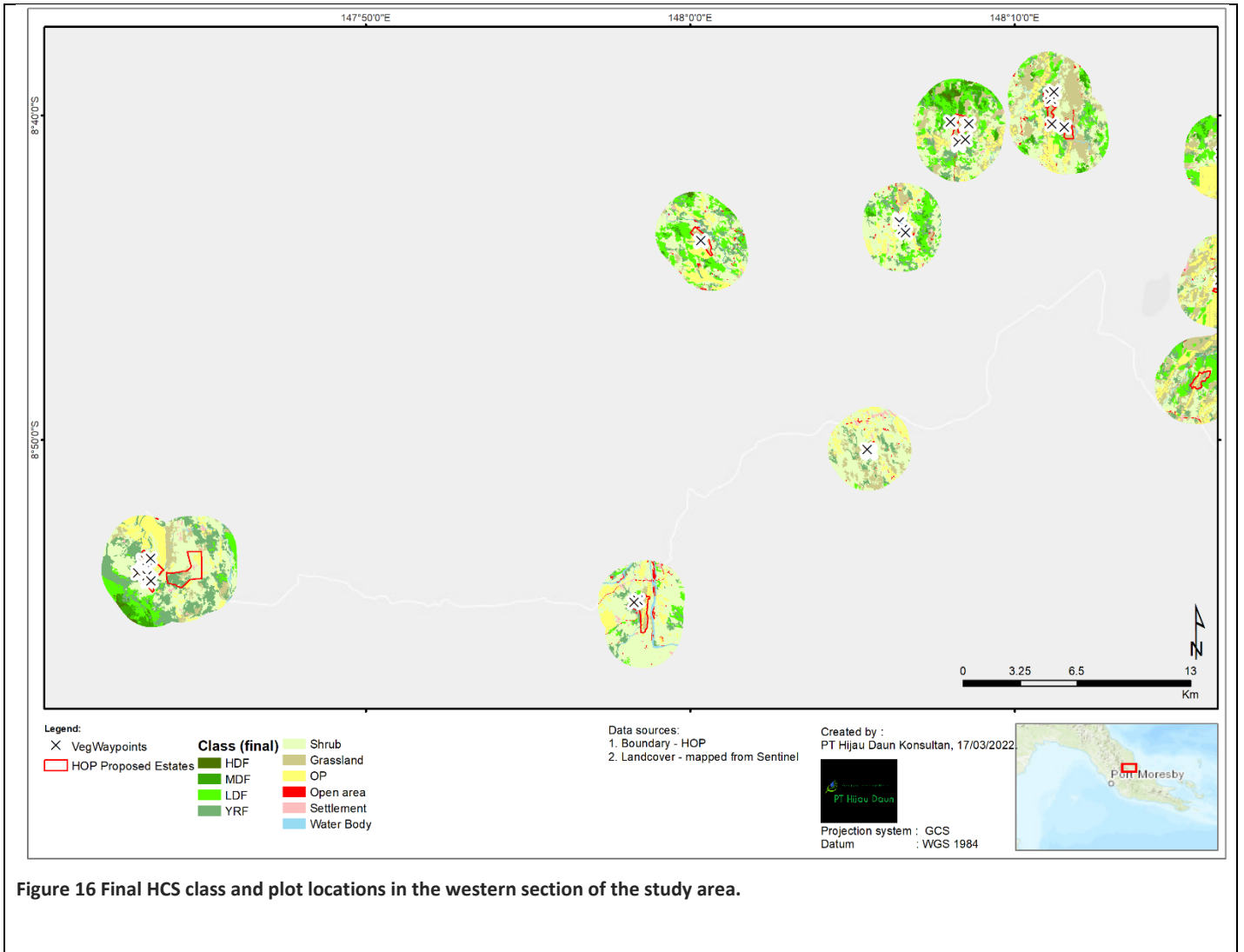


Figure 16 Final HCS class and plot locations in the western section of the study area.

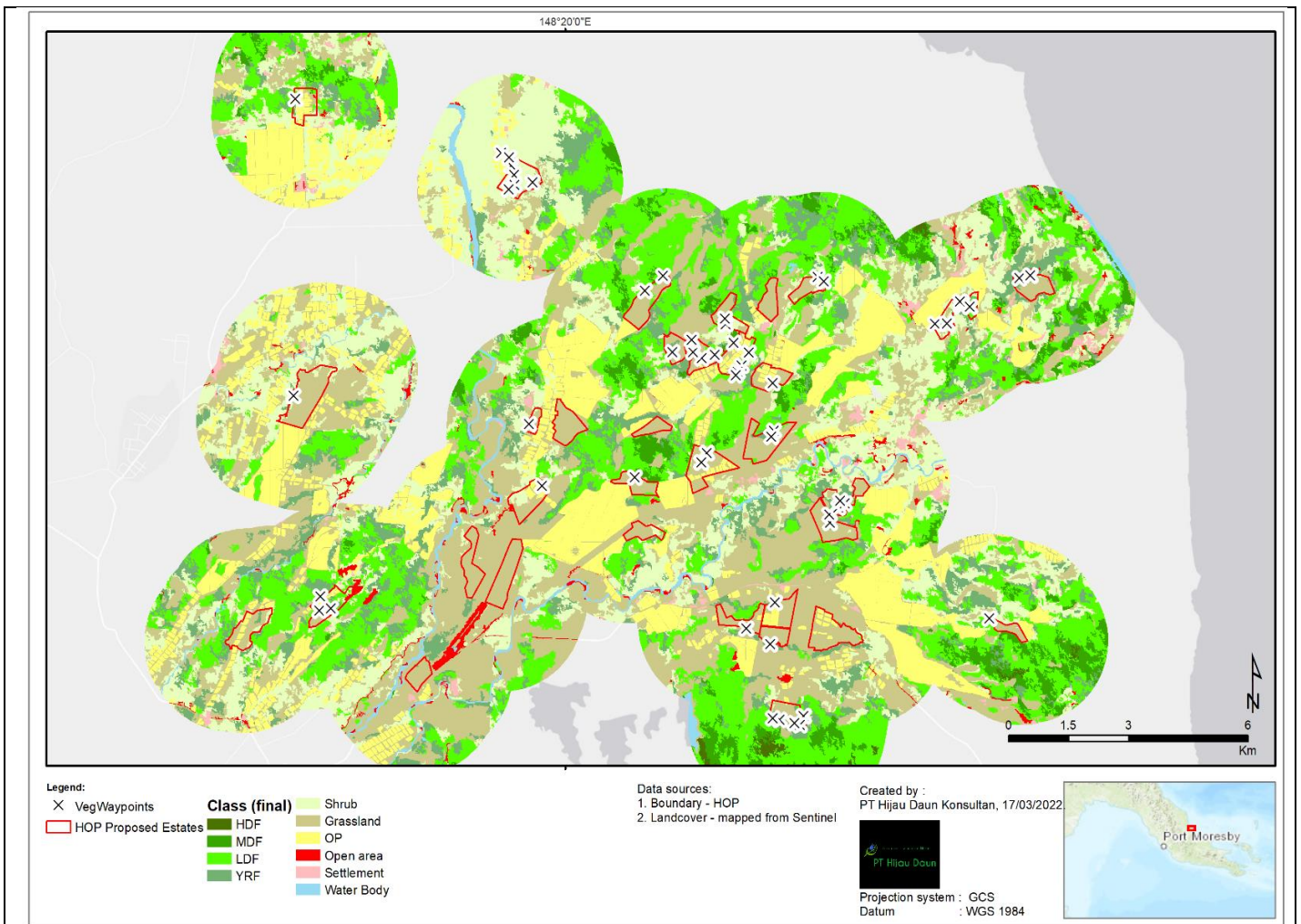


Figure 17. Final HCS class and plot locations in the western section of the study area

Inventory method

All field inventory was performed in January – February 2022, and was done as per the methodology set out in Module 4, HCSA (2017). This inventory method consists of two nested circular plots with plot radii of 5.64m and 12.61m, equating to 100m² and 500m² respectively. Trees between 5 -14.9 cm are measured within the 5.64m plot and all trees >15.0 cm are measured within the 12.61m plot. Further detail can be found in HCSA (2017).

While HCSA plot data generally has a focus relating to determining above ground woody biomass, a range of other data is collected at each plot, such as species information, vegetation type, vegetation condition, stand structure and disturbance history, all of which proved to be a useful aid in determining the vegetation likely to be encountered during this assessment.

Carbon calculation and data analysis

All plot data was analysed with the excel statistical software package. Main outputs were summary statistics and the Scheffe post-hoc ANOVA. A summary of this analysis can be seen below.

All biomass calculations were performed according to the method outlined in Chave et al., (2014).

The Chave equation that was used is :

$$\text{AboveGroundBiomass} = 0.0673 * ([\text{Density}] * ([\text{Diameter}]^2) * [\text{HeightCalc}])^{0.976}.$$

CarbonStock = 0.47 x AboveGroundBiomass

Density = Wood Density taken from Global Wood Density Database (ICRAF Database - Wood Density, no date) in t/m³

Diameter = tree dbh in cm)

HeightCalc = 0.3937[Diameter] +6.5609

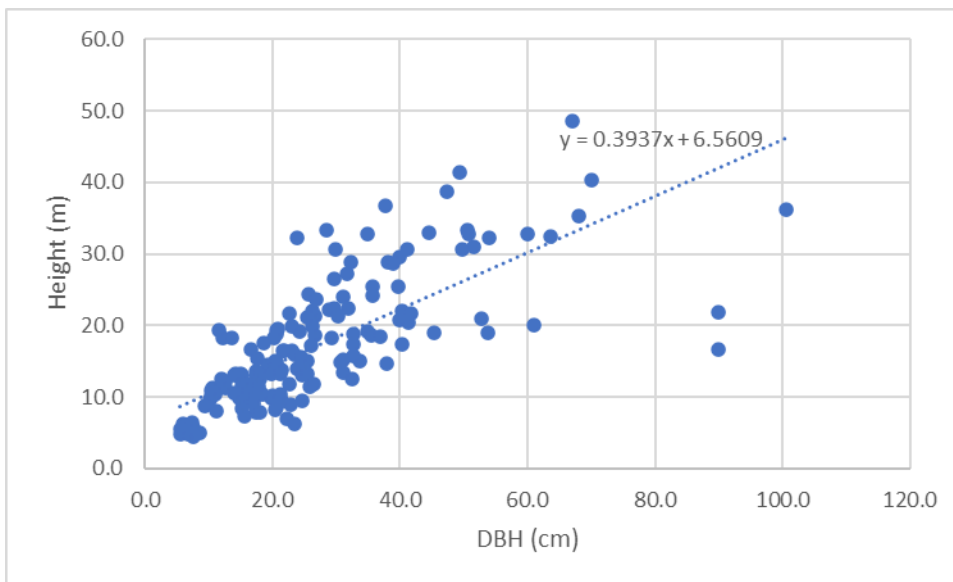


Figure 18. Height diameter relationship. Height (m) versus dbh (cm)

The heights are derived by regressing dbh to height in excel and selecting the best equation. In every plot two trees were selected and the height / diameter relationship was derived which is shown in Figure 18.

Environmental HCV and HCS forest results

Flora

Of the approximately 149 tree species identified during this assessment, and despite thorough searching of the area around each HCS plot and on the traverse between each HCS plot, only three RTE species were positively identified (Table 16). Note that kwila has been included because it has recently changed from VU to NT – it is hard to imagine that vast stands of kwila have been found so it is more likely a result of commercial pressure on IUCN that its threat level has been downgraded.

Table 16. RTE plant species identified during this assessment

RTE species identified	IUCN listing	Relevant study areas
Kwila (Intsia bijuga)	Near Threatened (NT)	Ewasasaru, Beririta
New Guinea rosewood (Pterocarpus indicus)	Endangered (EN)	Papaki Extension Wanipa Extension Haugapa Hiroipa

		Korofurukari Hajojo
Anisoptera thurifera	Vulnerable (VU)	Saura (Portion 919) Pupu Bafera Wanipa Extension Topiripa Perombata Ext. (Haintapa Clan) Houembo Kosote Hombare Haugapa

Birds

Ten sampling days were spent surveying birds for roughly one to two hours per day at 10 locations during peak bird activity times, mostly in the mornings. A total of 80 species of birds were recorded, both by direct observation and through analyzing their recorded calls. Some species records were obtained through interviewing local hunters and villagers. The highest number of species recorded in this survey was at the Perombata (ND03) site, with 45 species, and an average of 34 bird species were recorded per site.

The particularly important species in this list are the Dwarf Cassowary (*Casuarius bennetti*)⁹, Birds of Paradise (*Cicinnurus regius* and *Paradisaea raggiana*). Additionally, the Blyth's Hornbill (*Aceros plicatus*) and the Palm cockatoo (*Probosciger aterrimus*) are amongst several nationally protected species.

All sites had many endemic or protected species.

The endemic species (which is defined as endemic to New Guinea Island) are all forest birds (Buchanan and Pilgrim, 2008).

Mammals

Fourteen different species were recorded. There were only four mammals sighted during the survey that were IUCN vulnerable or above or CITES listed (Table 17). None were endemic to the island of Papua. All of these are forest dwelling species.

Table 17 Mammal species identified during the survey. This is a refined list of species that are IUCN VU or above or CITES . No species were endemic.

Names	IUCN	CITES	Alt. (m)	Location	Source
Phalangeridae					
Common spotted cuscus <i>Spilocuscus maculatus</i>	Least concern	II	0-1200	2,3	Leary et al. 2016
Pteropodidae					
Spectacled flying fox <i>Pteropus conspicillatus</i>	Endangered	II	0-200	2	Roberts et al. 2020
Variable flying fox <i>Pteropus hypomelanus</i>	Near threatened	II	0-400	5	Tsang 2020

⁹ This was recorded in the hills above Portion 2.

Giant flying fox Pteropus neohibernicus	Least concern	II	0-1400	2,5	Leary and Helgen 2020
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HCSA forest classification and carbon assessment

Table 18. Summary of statistical analysis of carbon stocks per vegetation class

Land cover class	Area (ha)	Plot # (n)	Mean Carbon stock (tC/ha)	Carbon stock standard error (tC/ha)	Confidence limits (90%) (tC/ha) ¹⁰	
					Lower	Upper
LDF+	98.88	25	113.8	58.66	94.16	133.44
YRF	252.01	24	33.59	15.47	28.30	38.88
Scrub	463.03	45	11.44	13.78	8.03	14.85

The statistical analysis that was carried is firstly an ANOVA. This was to test whether all the three land cover categories are equal or not. The second analysis was the Scheffe test which was used to test for each combination of two land covers whether there was a significant difference between the two. The results are shown in Table 19 and Table 20, along with a discussion of the outcomes.

Table 19. Results of ANOVA test

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	172,109.221	2.000	86,054.611	78.068	0.000	3.097
Within Groups	100,309.679	91.000	1,102.304	-	-	-
Total	272,418.901	93.000				

Conclusion: if $F > F_{crit}$, we reject the null hypothesis. This is the case, $8.76 > 3.09$. Therefore, we reject the null hypothesis. The means of the three populations are not all equal. At least one of the means is different.

Table 20. Scheffe post hoc analysis results

		Diff Means ²	$\frac{1}{n_1} + \frac{1}{n_2}$	MSw	F _s	F _s > Scheffe	Significant Difference
LDF+	YRF	6,434.62	0.08	1,102.30	71.48	6.19	Y
LDF+	SCR	10,478.05	0.06	1,102.30	152.77	6.19	Y
YRF	SCR	490.46	0.06	1,102.30	6.96	6.19	Y

Scheffe Critical Value = $F_{crit} \times df = 3.097 \times 2 = 6.19$

In all cases $F_s > \text{Scheffe Critical Value}$, this means that there is a significant difference between each of the classes

¹⁰ Uses the formula $\text{mean} \pm (t\text{value}) \times ((\text{std error}) / (\text{sqrt}(n)))$

Note that 99 plots were measured all up. There are 94 plots analysed in table 60. Two plots were in grassland with no trees in them. One plot was full of *Spathodea campanulata*, an invasive species¹¹. This has therefore been removed from the analysis. Two other plots were ex-garden sites and full of Piper (a common scrub species) but had a couple of massive fig trees in them which had been left by the community as shade trees for the garden. HCS provides no guidance on exception handling so these plots were removed from the analysis.

	Presence	Justification
HCV 1	Present	<p>Given the presence of a KBA and habitat for the QABB within the AOI, this element of HCV1 is deemed to be present.</p> <p>There were:</p> <p>2 RTE species of trees sighted that were IUCN:VU or above.</p> <p>4 species of mammals that were IUCN:VU or above or CITES listed.</p> <p>30 Species of birds that were endemic, nationally protected or CITES listed.</p> <p>As a proxy for HCV1, forest which is LDF or better is used. These forests contain IUCN RTE flora and is of high habitat value for RTE fauna Blyth's Hornbill (<i>Aceros plicatus</i>) and Palm cockatoo (<i>Probosciger aterrimus</i>). Additionally, fauna such as Common spotted cuscus (<i>Spiloglossus maculatus</i>) and flying foxes. All of these species require forest that is mid-secondary forest or better (i.e LDF).</p> <p>Similarly, forests LDF or better are used as a proxy for QABB habitat based on where the <i>Paraistolochia</i> vine grows.</p>
HCV 2	Present in the landscape but not in the estates	There is an intersection between the AOI with intact forested landscapes. Furthermore cassowaries (an important indicator species) are seen in the area of this IFL.
HCV 3	Present in the landscape but not in the estates	The endangered ecosystems that overlap with the AOI are swamp forests. These are present in the landscape but not the assessment areas.
HCV 4	Present	There are many rivers in the assessment area. All these require buffers that are considered HCV 4. Additionally, forests that are LDF or better can be considered to provide critical barriers to destructive fire. Forests that are YRF would likely burn as they are drier and more open.
HCV 5	Present	<p>Given the high level of reliance on building materials, hunted meat, fruits and vegetables which at least one or more communities source from the forests. The forests are considered HCV5.</p> <p>There is a high level of reliance on fish and water which are sourced from the rivers. The rivers and river buffers are considered HCV5.</p> <p>Most of these resources are currently sourced throughout the whole landscape at a very low extraction density. Additionally, HCV 5 is mapped within the assessment area over the forests, swamps, springs and rivers. However, within the assessment areas the management and monitoring recommendations are different because the company insists that there is no resource extraction from within the HCV areas that are located within the lease areas.</p>
HCV 6	Present	Most of the sites were nearby the development areas, nevertheless there are several within the development areas.
HCS Forest	Present	In most estates there are forested patches that are considered HCS forest.

¹¹ Advice Note 3 states “Forest inventory plots with introduced or invasive species comprising 50% or more of the basal area can be categorized as ‘Other’ or ‘SH’ under the non-HCS land cover categories.”

Environmental and social values to be conserved	Area (ha) where the value is found(inside MU only)
HCS forest areas (Value includes forests YRF or better)	226.57
HCV 1	103.06
HCV 2	-
HCV 3	-
HCV 4	204.69
HCV 5.	204.69
HCV 6	2.38
Total HCV area (all overlaps removed)	206.77
Community Only	88.38
HCV Only	97.96
HCS Only	117.76
HCV or HCV or Community	108.81
Area enclaved for community usage	114.39
Totals (ha). Conservation (HCV + HCS + enclave areas with all overlaps removed)	412.79
Total Area	2,256.54
Total Developable Area	1,843.75

Section 5: FPIC

Most of the FPIC procedures are contained in an NBPOL document, “MG 21 Land Acquisition Practices.” This describes the process that NBPOL goes through to develop mini-estates. These mini-estates rely on “leasing” land not actually acquiring it. Primarily it involves assisting clans to form an ILG, which gives the clan a legal entity to be able to lease land to NBPOL. The process of formation of an ILG mirrors the FPIC process, ensuring that all the members of the ILG are informed and agree to the scheme. An ILG can only lease land, it cannot sell the land. Therefore, the community maintains their land rights and cannot result in landlessness.

The HCV HCS study is one step in the FPIC process. There have been a number of FPIC activities that have spanned many years for each of the projects that are being considered. While each group differs; the main activities are (1) an initial request for development from the community, (2) socialisation with the community, (3) a land investigation report and (4) NBPOL support with establishing an ILG (this is not necessary for State land or freehold titles).

FPIC was well advanced in all these communities. There had been a multiple year “ramp up” to this survey. The villages had been visited a number of times by NBPOL staff. NBPOL had assisted the villages to form an ILG, which was either complete or in the final steps. It was clear that these communities needed NBPOL’s assistance to establish the ILGs.

Within the company, all the staff had a working knowledge of HCV and HCS and NBPOL’s sustainability commitments. This was from the Managing Director to the junior office staff and verified through casual conversations with these staff. Furthermore, the area had done a very similar assessment 7 years ago and it was clear that the staff had taken a lot of the lessons learned in the previous assessment on board. Particularly the communication with the communities (FPIC) and the associated documentation can only be described as “excellent” – all the communities were extremely well informed about the development and the company’s record keeping was very complete.

Table 21. Verification of FPIC in-field based on research done at the Due Diligence step

Indicator	Description
Moratorium on any land clearing or land preparation until the ICLUP is completed.	Based on in-field observations, no land clearing had taken place and NBPOL staff stated that nothing would take place until the ICLUP was finalised.
Demonstrated legal right over or permission to explore the AOI.	ILGs, Lease agreements), copies of titles and explanation of the genealogy study over the area was provided by NBPOL. Similarly meeting notes where communities gave permission to explore the area were provided
FPIC gate FPIC process has been initiated with full disclosure of the proposed project with all potentially affected communities and stakeholders, and the process for negotiation and consent going forward has been agreed with representatives appointed through fair process	Chronologies of past engagement were provided. Additionally, the communities were clearly well briefed on HCV and HCS when the assessors visited them.

Status of FPIC by the end of the assessment

The company’s plans (no conversion had taken place at the time of the assessment) to convert, after sub-lease agreements had been signed. The communities’ agreement with this plan had been noted along with a number of issues of concern (which would be entered into the management and monitoring recommendations). An example was re-establishment of the riparian buffers and setting aside areas for birds in Portion 2.

How the assessor verified the FPIC-related information gathered during the due diligence step

NBPOL showed the assessor a dossier of information that they had been given to the community as well as letters of consent that the community had provided. The assessor checked that these were not forged.

Verification of a two-way communication involving active participation and joint decision-making processes.

In all meetings the Chairman / Village Elders actively encouraged the community members to speak to the assessors. Typically, the ladies were quiet during the discussions (which is common in these societies). The interviewer deliberately engaged the women in order to elicit a response.

Subgroups should be consulted.

In all communities, the assessor made a particular point to invite women and young people to speak up.

Decide with each community the procedure by which overall consent for the proposed development and conservation plan will be sought.

This procedure had been decided with each of the communities. There were minor variants, but in each community the decision would be made communally with the main community leaders.

By the end of the assessment, **ALL** the affected communities had taken part in the study and had decided upon a development plan and agreed to it. Agreement was documented by asking people did they agree to the proposed development / conservation plan. When they said “Yes” this was documented. Additionally, people were asked to hold up their lands maps with the areas marked for development and conservation on them and have their photo taken as evidence (Figure 19 is an example). So FPIC was well advanced.



Figure 19. Mothers at Andogorari hold up their map which shows the areas delineated for development / conservation.

Final Consultation

The procedure for the communities was for a member of the NBPOL Sustainability Department to visit each of the communities one week prior to the assessor visiting them and give them a written request for a meeting for the final consultation. It was asked that the Chairman and leaders of the ILGs be present but the invitation was extended to the whole community (women, young people, disabled etc).

The details of each consultation were provided. The procedure was that the assessor delivered a presentation which detailed the purpose, methodology and the general results of the assessment to the community. Following this people were asked for comments or questions). The interim results of the assessments for the estates that were relevant to the communities were then presented). The assessor used this opportunity to check the outputs of the Participatory Mapping.

At the end of the presentation the assessor asked:

1. Did the community understand the presentation? All communities stated that it was clear.

2. Did the community agree with the interim results relevant to their estates? All communities stated that they agreed with the results.

All clans had the next steps explained. The assessor pointed out this involved getting the report reviewed by HCVRN. This took a long time and suggested the community start negotiating with NBPOL regarding the terms and condition of their agreements. After this a RSPO NPP had to be completed – after that the seedlings would arrive.

Table 22. Final Consultation Results (these were group meetings)

Date & Name of Community/ILG	Number Attending	Comments and Remarks of final consultation	Name of person making comment/remark/question & comment/remark/question asked	Response Given
Monday 7th February, 2022 Venue: Dobuduru Village Proposed ME sites; 1. Bafera 2. Siko 3. Topiripa Extension 4. Darau Extension 5. Sifia	20	<p>Final Consultation was successfully completed. Maps were presented to the communities.</p> <p>The communities were happy that the assessment took place, as it has made them understand the proposed project development much better than they did before.</p> <p>The Topiripi and Sifia Land Groups raised issues concerning their proposed 'ME' boundaries respectively. Ms. Stephanie Pokowas (HOP – SQM Officer) was requested to raise this matter with the HOP Lands and GIS office.</p>	<ul style="list-style-type: none"> Mr Harold Tikambari (Topiripa Land Group Chairman) – Mr. Tikambari wanted to know what will become of the HCV/HCS areas within the proposed 'MEs', does it belong to the company during the duration of the lease or is still owned by the Landowners? Mr Harold Tikambari (Topiripa Land Group Chairman) – asked two more questions; Q1. What will become of the land that has old gardens on it, is it possible to make gardens again in the same area and Q2. Water wells must be installed in villages and maintained every 3 months, he mentioned that 50 m buffer zones cannot effectively stop contaminants from fertilizers leaching into the natural water 	<p>Mr. Jules Crawshaw (HCV/HCS - Team Lead) replied that the land still belongs to the Landowners (LOs), however after signing the contractual agreement with HOP, the land will be under the custodianship of HOP until the lease expires. It is important to read and understand the contract with the assistance from a lawyer before moving forward with signing the contract. Mr. Tikambari acknowledged the response.</p> <p>Mr. Jules Crawshaw (HCV/HCS - Team Lead) replied to Q1. saying any land that is not considered HCV within the proposed site will be used for oil palm planting. Lewi Kari (PT Hijau – Consultant) clarified that the community can use land outside of the 'ME'</p>

			<p>system.</p>	<p>boundary for gardening, etc. Ms. Stephanie Pokowas (HOP – SQM Officer) replied to Q2. stating that the water projects are ongoing, meaning, the company has plans to bring in skilled technicians to train the community in assessing, maintaining and fixing the water-pumps. She also added that buffer zones are there to at least minimize the adverse impact of fertilizers leaching into the water system. Mr. Tikambari acknowledged the response to both Q1. & Q2.</p>
			<ul style="list-style-type: none"> • Mr. Oliver Tikambari (Topiripa Land Group) – asked once the lease expires will the land revert back to the land owners? 	<p>Mr. Jules Crawshaw reiterated that it is important to read the agreement with the aid of a lawyer before signing, because information such as the terms of leasing will be in the contract documents. Mr. Tikambari acknowledged the response</p>
			<ul style="list-style-type: none"> • Mr. Charlie Garoja (Siko – Land Group) – asked after the lease expires and the land is reverted back to the LO's, will the land in which the oil palm was grown on be infertile for gardening? 	<p>Mr. Jules Crawshaw, responded saying that it will not be the case, on the contrary the land may be more fertile</p>

				than it was before the planting.
			<ul style="list-style-type: none"> • Mr. Steven Nakesa (Bafera – Land Group Secretary) Queried what would happen if people were planting gardens within the proposed ‘ME’ boundary, will they be penalised, etc? 	<p>Mr. Jules Crawshaw, stated it is better not to make gardens within the ME. Ms. Stephanie Pokowas interjected saying that the company will not penalise them, however, it will result in the HOP carrying out further awareness with the responsible community.</p> <p>Both Messrs Garoja and Nakesa acknowledged and appreciated the responses given.</p>
<p>Monday 7th February, 2022</p> <p>Meeting Venue: Ango Village Proposed ME sites;</p> <ol style="list-style-type: none"> 1. Hungoro 2. Korofurukari 3. Hiroipa 4. Haugapa 	17	<p>Final Consultation was successfully completed. Maps were presented to the communities.</p> <p>The communities were happy that the assessment took place, as it has made them understand the proposed project development much better than they did before.</p> <p>Mr. Osborne Jifure (Hungoro – Land Group Chairman) enquired about another map</p>	<ul style="list-style-type: none"> • Mr. Mathew Ajase (Korofurukari Land Group) – asked why is it important to have HCV/HCS areas delineated within the proposed ‘ME’ boundary, when they have verbally agreed to have the company plant oil palm on their land? 	<p>Ms. Stephanie Pokowas (HOP – SQM Officer) – replied that FPIC conducted for the community explained that before any oil palm is planted, under RSPO criteria or regulations an HCV/HCS assessment must first be carried out, and NBPOL is a member of RSPO, hence, must adhere to those guidelines. Mr. Mathew Ajase acknowledged the response.</p>

		<p>that's supposed to show an extension to their current proposed boundary. Ms. Ms. Stephanie Pokowas (HOP – SQM Officer) was requested to raise this matter with the HOP Lands and GIS office.</p> <p>Mr. Maxwell Opita (Haugapa Land Group Chairman) said that there was no sacred site located within the Haugapa proposed ME boundary, Mr. Jules Crawshaw made revisions and amendments to to the Haugapa Map accordingly.</p>	<ul style="list-style-type: none"> • Mr. Elias Auri (Korofurukari – Land Group Secretary) queried why areas that are assigned HCV/HCS status are paid less per/ha and can it be changed? • Mr. Maxwell Opita (Haugapa Land Group Chairman) commented that he is very happy with the HCV/HCS assessments, it has made him understand a lot of advantages and disadvantages that comes with oil palm development and the effects it has on the environment and its people. Apart from that he also asked how long would the contract lease be? 	<p>Mr. Jules Crawshaw, stated it is important to review the contract with a lawyer to understand it better before signing. He also mentioned, in addition to the monies paid per/ha the Land Groups are paid royalties on the oil palm fruit harvested by the company. Mr. Auri, acknowledged that the question asked should be directed towards the HOP management.</p> <p>Mr. Jules Crawshaw, acknowledge his comments and replied to his question stating that it would be in the agreement given by the company, and that once again it is important to have a lawyer go through the contract with all the growers first before moving forward with signing the contract.</p>
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<p>Monday 7th February 2022</p> <p>Meeting Venue: Siremi Village</p>	<p>24</p>	<p>Final Consultation was successfully completed. Maps were presented to the communities.</p> <p>The communities were happy that the assessment took place, as it has made them understand the proposed project development much better than they did before.</p>	<p>Mr Ivan Boruga (Hofita Member) - Concerned about his coconut trees (more than 50 trees) on the estate, will he be compensated if the trees are removed during clearance?</p>	<p>Ms Nelu Lukas responded to Mr Boruga, stating that the area for development they have willingly given for development, therefore they cannot request for compensation, if there is any dispute or misunderstanding than they should seek further clarification form the lands office (HOP). Mr Boruga acknowledged response and said he was OK with his coconut trees being removed, as he wanted to develop OP.</p>
			<p>* Mr Rex Ahkaimbo (Observer from Hariko Village) - As a citizen of Hariko villlage he is concern why he is no part of Houembo-Kosote</p>	<p>Ms Juliana Mohe responded to Mr Rex Ahkaimbo and advised him that he should address this concern to members of Houembo Kosote directly. Mr Ahkaimbo and members of Houembo Kosote who were present acknowledged response and said they will sit together and discuss with Rex.</p>
			<p>* Mr Bruce Ahkaimbo (Houembo Kosote Member) - has concerns about the buffer area marked on the map during the final consultation presentation.</p>	<p>Ms Nelu Lukas responded to Mr Bruce Ahkaimbo and Mr Paulsalte Kosote that the buffer area, once confirmed will be</p>

			<p>* Mr Paulsalte Kosote (Houembo-Kosote Member) - has concerned about the buffer area which has been set aside for conservation, this might affect their area size. Will they be compensated for this?</p>	<p>identified under 'not planted' area within the ME, there is payment for this which LO's will be entitled to annually depending in the size (area) of the buffer - in other words they will be compensated for it.</p>
			<p>* Mr Rodney Hambere (Hofita Member) - Made remark that he is happy with the assessment and that the consultation with the community is clear.</p>	<p>Noted</p>
<p>Tuesday 8th February, 2022</p> <p>Meeting Venue: Perombata Village Proposed ME sites;</p> <p>1. Perombata Extn -Sorupa</p> <p>2. Perombata Extn - Haintapa</p> <p>3. Kesiha</p>	<p>18</p>	<p>Final Consultation was successfully completed. Maps were presented to the communities.</p> <p>The communities understood that HCV/HCS areas will not be developed for oil palm if they are within the proposed ME boundary.</p>	<ul style="list-style-type: none"> • Mr. Livingstone Haembo (Kesiha Land Group) – commented that due to the FPIC, the land he has committed for the 'ME' does not have areas that fall under the HCV/HCS category. • Mr. Lindsey Taire (Haintapa Land Group) and Mr. Livingstone Haembo questioned why is the company not maintaining the water well(s) it has installed in the villages, the well(s) have not been operational for quite a long time due to faulty pumps. 	<p>Mr. Jules Crawshaw acknowledged Livingstone's comment and commended him for taking heed of the awareness carried out by the HOP team.</p> <p>Ms. Stephanie Pokowas (HOP – SQM Officer) replied stating that the water projects are ongoing, meaning, the company has plans to bring in skilled technicians to train the community in assessing, maintaining and fixing the water-pumps sometime this year. Messrs Taire and Haembo acknowledged the response.</p>

			<ul style="list-style-type: none"> Elisha (Sorupa Observer) asked two questions, Q1. Are there any measures in place to improve HCS in areas that have been disturbed (e.g. forest cleared for gardening, logging, etc)? Q2. Wouldn't the chemicals used for the oil palm plantation leach into the HCS/HCV areas and damage the soil and the vegetation growth? 	<p>Mr. Jules Crawshaw responded to Q1. by simply stating 'do not touch the disturbed areas, let them regenerate naturally, thus increasing the volume of HCS. Jules also responded to Q2. stating that the fertilizers and herbicides will not affect the soil or vegetation in HCV/HCS areas, the concern however, would be if it leached into the water system, then it would harm aquatic and human lives that live and depend in/on the water. Elisha acknowledged the responses.</p>
			<ul style="list-style-type: none"> Mr. Stanfield Haembo (Kesiha Land Group Chairman) asked two questions, Q1. If there are old gardens within the proposed ME boundary will they still be able to make garden in the same place after some time have elapsed? Q2. He asked to clarify what is the buffer distance for rivers, streams, etc. inside the proposed ME and/or near the boundary of the proposed ME? 	<p>Mr. Jules Crawshaw responded to Q1. stating that areas that have old gardens within the proposed boundary will be developed for oil palm. People are not allowed to make gardens in the ME as per NBPOL and RSPO regulations and criterias. He also answered Q2 stating buffers for streams, rivers, swampland, etc. in/or near the ME will be 50 m. Mr. Stanfield duly</p>

				acknowledged the response.	
				<ul style="list-style-type: none"> • Mr. Edrick Evata (former Land Group Chairman for Perombata Ext) stated adamantly that areas under HCV/HCS status will not be disturbed and that the community will accept the findings of the HCV/HCS assessment as final. 	Mr. Jules Crawshaw acknowledged Edrick's comment.
Tuesday 08th February 2022 Meeting Venue: New Soputa Village Proposed ME: Dara Pema	9	<p>Final Consultation was successfully completed. The Map was presented to the community.</p> <p>The community understood that HCV/HCS areas will not be developed for oil palm if they are within the proposed ME boundary.</p> <p>During the time of the consultation the Dara Pema Land Group were in mourning due to the death of their Chairman/Elder a week prior to the meeting.</p>	<ul style="list-style-type: none"> • No questions were asked – community agreed on the project development. 	N/A	

<p>Tuesday 8th February 2022</p> <p>Meeting Venue: Soputa Village</p> <p>Proposed ME sites:</p> <p>Kovenopa Samburua</p>	<p>26</p>	<p>Final Consultation was successfully completed. Maps were presented to the communities.</p> <p>The communities were happy that the assessment took place, as it has made them understand the proposed project development much better than they did before.</p>	<ul style="list-style-type: none"> • Mr Moses Tingasimpa - Requested for HOP to advise them on how they calculate the rate of buffer conservation and how the payment is made? Asked for the company to advise them on the total running costs that the company will invest on their land under ME agreement and when they can be eligible to run the ME on their own if there is an option for that. 	<p>Explained that this was not really an HCV / HCS issue and this should be addressed directly to company operatives and reflected in the contract.</p>
<p>Tuesday 8th February 2022</p> <p>Meeting Venue: Parahe Village</p> <p>Proposed ME sites:</p> <p>Gajerepa</p> <p>Javunipa</p> <p>Wanipa Extention 1/2</p>	<p>6</p>	<p>Final Consultation was successfully completed. Maps were presented to the communities.</p> <p>The communities were happy that the assessment took place, as it has made them understand the proposed project development much better than they did before.</p>	<ul style="list-style-type: none"> • Mr Fosol Endeki - concerned about the buffer and forest area near the proposed ME as identified and presented during final consultation mapping. • Mr Richard Apere concerned about his cocoa and coconut trees which are near the boundary area of the proposed ME. Will the development of the ME affect his cocoa estate and coconuts? 	<p>Ms Juliana Mohe explained the purpose of why there needs to be a buffer and that the area set aside for buffer will have payment arrangement in which the company will pay annually to local landowners. Mr Endeki acknowledged response.</p> <p>Ms Juliana Mohe responded to Mr Apere and went through maps for him to identify where his cocoa farms and coconut trees where. It was identified that his cocoa and coconut estate were not in close vicinity to the proposed new development area for ME. Mr Apere acknowledged the response.</p>

			<ul style="list-style-type: none"> • Mr Theophilus Ajarimbo from Wanipa Extension 1/2 concerned about water supply (well/tank) commitment by company which has not been fulfilled. Will this be the same case for the new development? They are not happy that the company has not fulfilled this commitment. He is also concerned about the water quality for Hunguro River and fertilizer run-off into water catchment from current existing plantations. This needs to be rectified for the new development. They also requested for more training and capacity building in their communities. 	Ms Juliana Mohe responded to Mr Ajarimbo about the grievance process to the company and advised HOP officers present in meeting to take note about community concern. Under training and capacity building - HOP can assist community with financial literacy and literacy training and basic training in life skills based on a community needs assessment.
Wednesday 09th February 2022 Meeting Venue: Hohota Village Proposed Sites: Pupu Jajama	11	<p>Final Consultation was successfully completed. The Map was presented to the community.</p> <p>The community understood that HCV/HCS areas will not be developed for oil</p>	No questions asked - community were happy with results and presentation of final consultation and agreed on the project development	Noted

		palm if they are within the proposed ME boundary.		
Wednesday 09th February 2022 Meeting Venue: Kararata Village Proposed ME: 1. Mende (Portion 914) 2. Saura (Portion 919) 3. Bakito Extension	20	<p>Final Consultation was successfully completed. The Maps were presented to the communities.</p> <p>The community understood that HCV/HCS areas will not be developed for oil palm if they are within the proposed ME boundary.</p>	<ul style="list-style-type: none"> Rowley Kokoi Saura (Saura Land Group Deputy Chairman – Por 919) asked what will happen to the buffer zones, will the company use it for other purposes? 	<p>Mr. Jules Crawshaw replied saying the buffer zones will not be used by the company for whatever purpose. Mr. Simi Sakalia (HOP – Lands Manager) stated that under RSPO regulations buffer zones are not to be used or disturbed by the company or even the LOs. Mr. Rowley acknowledged the response.</p>
			<ul style="list-style-type: none"> Jaumo Land Group Chairman Mr. Champion Sorari (Bakito Extension) commented that this sort of assessments or information should have been provided to them 20 or 30 years ago before their land was used for oil palm development. It would have helped them to preserve land that was under HCV/HCS status, thus minimising the adverse effect it has on their land today. He further stressed that LO's should be given priority by the company in terms of service delivery (water, health, etc.). 	<p>Mr. Simi Sakalia responded saying that 20 to 30 years ago there was no RSPO, hence this types of assessments were not done. He also responded to the comment saying that the company always prioritises the LOs as a key stakeholder and listens to their grievances. Mr. Champion accepted the response given.</p>
			<ul style="list-style-type: none"> Mr. G. Kingsley Saura (Saura Land Group Chairman – Por 919) Asked three questions as followed, Q1. Will the company install a water supply system in their area? Q2. Will the 	<p>Mr. Simi Sakalia replied that these are questions left for the HOP management to discuss with the</p>

			<p>company sponsor their children to schools? Q3. What is the company's view on providing business spin-offs to the Los?</p>	<p>LO's. The questions asked are not pertinent to the HCV/HCS assessment being conducted.</p>
			<ul style="list-style-type: none"> Messrs. Onesmus Konja and Victor Sorari expressed their satisfaction with the HCV/HCS assessment, it has made them realize that not everything is about money, it is also important to preserve the environment for their future generations. They both agree that it is important that HCV/HCS assessments must be done prior to any oil palm being planted on their traditional land. 	<p>Mr. Simi Sakalia acknowledge their comments on behalf of the HCV/HCS team.</p>
			<ul style="list-style-type: none"> Mr. Joel Sorari (Bakito Ext. Secretary) – asked if there would be any penalties if the LOs used the buffer zones? 	<p>Mr. Simi Sakalia said that it would not be good if that were to happen, the RSPO carries out audits and monitors what the NBPOL does, if the buffer zones were disturbed and the RSPO finds out, it might lead to NBPOL losing their RSPO license. This in turn would lead to the company not doing business with the LOs who have breached that agreement.</p>
			<ul style="list-style-type: none"> Sandra (Bakito Extension) asked whether HOP will improve the water supply in the villages once oil palm development is well underway? 	<p>Mr. Simi Sakalia stated that it is a valid concern, once they receive the HCV/HCS report the NBPOL management will review it and provide assistance where possible.</p>

			<ul style="list-style-type: none"> • Mark Mende (Mende – Por 914) asked what will happen to the WW2 relics that are found in the ME boundaries? 	Mr. Simi Sakalia said they will be buffered and the oil palms will be planted around them.
Wednesday 09th February 2022 Meeting Venue: Andogorari Village Proposed ME: Andogorari	17	<p>Final Consultation was successfully completed. The Map was presented to the community.</p> <p>The community understood that HCV/HCS areas will not be developed for oil palm if they are within the proposed ME boundary.</p>	<ul style="list-style-type: none"> • Mr. Tony Amburari (Andogorari Land Group Chairman) - Queried whether the proposed ME once in operation, would it have an adverse effect on the stream that they use for drinking and cooking? 	Mr. Jules Crawshaw replied saying that the proposed ME site is far from the underground stream, hence, it will not affect the water source that use to drink and cook. The natural vegetation between the ME and the water source will act as a buffer to keep contaminants out of the stream.
Thursday 10th February 2022 Meeting Venue: Handarituru Proposed ME sites: Isugahambo (Portion 952)	6	<p>Final Consultation was successfully completed. The Map was presented to the community.</p> <p>The community understood that HCV/HCS areas will not be developed for oil palm if they are within the proposed ME boundary.</p>	No questions asked - Family rep was happy with results and presentation of final consultation and agreed on the project development.	
Thursday 10th February 2022 Meeting Venue: Ehu Proposed ME sites: Beririta	5	<p>Final Consultation was successfully completed. The Map was presented to the community.</p> <p>The community understood that HCV/HCS areas</p>	No questions asked - community were happy with results and presentation of final consultation and agreed on the project development.	

Hombare		will not be developed for oil palm if they are within the proposed ME boundary.		
Thursday 10th February 2022 Meeting Venue: New Warisota Proposed ME: Boruga Pusute Extension.	10	Final Consultation was successfully completed. The Map was presented to the community. The community understood that HCV/HCS areas will not be developed for oil palm if they are within the proposed ME boundary.	<ul style="list-style-type: none"> • No questions were asked – community agreed on the project development. 	N/A
Thursday 10th February 2022 Meeting Venue: Sehor Village Proposed ME: 1. Ewasasaru 2. Handari Hombukopa	12	The Handari Hombukopa Land Group were not present during the Final consultation, their Map and the HCV/HCS Final Consultation Booklet was given to the Chairman of the Ewasasaru Land Group to be passed onto them. Final Consultation was successfully completed with the Ewasasaru Land Group. The map was presented to the community. The community understood that HCV/HCS areas will not be developed for oil	<ul style="list-style-type: none"> • Mr. Grayson Jaro (Chief – Ewasasaru) asked four questions as follows; Q1. Will the buffer zones be used for other purposes? Q2. What if someone outside of the clan uses the buffer zones and s/he is caught? Q3. What will happen to any cultural sites located within the proposed ME? Q4. Will the buffer zones be fenced off? 	Mr. Jules Crawshaw replied to Q1. saying that no one is allowed to use the buffer zones for whatever purpose. Mr. Carl (HOP – Lands Officer) responded to Q2. stating if a person is caught using the buffer zone, it must be reported to the company asap and they will deal with it. Mr. Lewi Kari answered Q3. saying all HCV6 sites within the ME will be buffered and oil palm planted around it. Ms. Stephanie Pokowas replied to Q4. stating buffer zones are not fenced off, rather there will be

		<p>palm if they are within the proposed ME boundary.</p>		<p>signboards put up to indicate that the area is a buffer zone.</p>
			<ul style="list-style-type: none"> • Mrs. Nancy H (Ewasasaro member) – asked two questions as follows; Q1. If there is an existing garden within the buffer zone what will happen to it when it comes time to planting oil palm? Q2. Will the land group get any benefit from the buffer zones? 	<p>Mr. Mr. Jules Crawshaw responded to Q1. stating that gardens within the proposed ME boundary must be harvested asap before oil palm development begins. Jules also responded to Q2. saying that buffer zones are paid K25 per/ha, which means the Land Group will still benefit from the buffer zone.</p>
			<ul style="list-style-type: none"> • Mr. Etropmas (Observer) stated that the water source that he’s people use is downstream from the proposed ME, will the chemicals used to help grow oil palm leach into the river upstream and spoil the water downstream? 	<p>Mr. Lewi Kari responded saying that under RSPO guidelines all rivers, streams, swampland, etc. will have a buffer zone of 50 m. This essentially means whatever chemicals used will be contained within the buffer zone. Etropmas acknowledged the response.</p>

<p>Friday 11th February 2022</p> <p>Meeting Venue: Papaki Village Proposed ME: 1. Papaki Extension (Erofafa & Afurafu Clan)</p>	<p>30</p>	<p>Final Consultation was successfully completed. The Map was presented to the community.</p> <p>The community understood that HCV/HCS areas will not be developed for oil palm if they are within the proposed ME boundary.</p>	<ul style="list-style-type: none"> • Mr. Augustine Koropa (Chairman -Afurafu Clan) commented that the land they have proposed for the ME is all grassland. • Mr. Gary Akoro raised a question on HCV 4, he asked what if oil palm is planted on slopes within the ME and it rains, wouldn't the chemicals used to fertile and protect the oil palms leach into the river due to run-off? • Ms. Natalie Jeva (Erofafa Clan member) stated that will the chemicals used in the oil palm leach into the underground spring that they use for drinking and cooking? 	<p>Mr. Jules Crawshaw acknowledged Augustine's comment.</p> <p>Mr. Jules Crawshaw replied to Gary stating that all rivers, creeks, etc. within the ME or next to the ME boundary are set as 50 m buffer zones. This means that the buffer zone acts as a barrier against chemicals or contaminants leaching into the river systems. Mr. Jules Crawshaw replied saying that the proposed ME site is about 200 m from the underground stream, so it will not be affected. The natural vegetation between the ME and the water source will act as a buffer to keep contaminants out of the drinking/cooking water source.</p>
<p>Friday 11th February 2022</p> <p>Meeting Venue: Koasi Village Proposed ME: Portion 2</p>	<p>19</p>	<p>Final Consultation was successfully completed. The Map was presented to the community.</p> <p>The community understood that HCV/HCS areas will not be developed for oil palm if they are</p>	<ul style="list-style-type: none"> • Messrs Sam Ovi, Paul Aguma, Sebastian Aguma and Beni Roberts (Koasi Committee members) commented or rather asked the same question, they asked that the land used for their VOP be converted to ME and not areas that are HCV/HCS, because they depend entirely on the forest for their livelihood and do not want it developed for oil palm. 	<p>Mr. Jules Crawshaw responded saying, if they wish to convert the existing VOP to an ME they would have to talk to the HOP – Lands office. He also reiterated that any land that is designated as HCV/HCS will not be developed for oil palm. Mr. Genesis</p>

		within the proposed ME boundary.		(SQM Officer – Mamba Division) clarified the matter stating that the proposed ME is actually the VOP area.
Friday 11th February 2022 Meeting Venue: Jajau Proposed ME: Hajojo	30	Final Consultation was successfully completed. The Map was presented to the community. The community understood that HCV/HCS areas will not be developed for oil palm if they are within the proposed ME boundary.	No questions were asked – community agreed on the project development.	Noted
Friday 11th February 2022 Meeting Venue: Serembe Proposed ME: Serembe Extention	10	Final Consultation was successfully completed. The Map was presented to the community. The community understood that HCV/HCS areas will not be developed for oil palm if they are within the proposed ME boundary.	No questions were asked – community agreed on the project development.	Noted
Saturday 12th February 2022 Meeting Venue: Ango Proposed ME: Borari	17	Final Consultation was successfully completed. The Map was presented to the community. The community understood that HCV/HCS areas will not be developed for oil palm if they are	No questions were asked – community agreed on the project development.	Noted

within the proposed ME boundary.

CEPA – (PNG Conservation and Environment Protection Authority)

Agency	Date	No. Attending	Discussion	Assessor Response
CEPA	15.2.2022	7	The Lead assessor presented the Final Consultation presentation Explained also that it is an RSPO requirement to do this assessment.	
			Fabian : Do we do historical analysis to see if areas have been recently deforested.	We assess the land based on the landcover at the date of assessment. If someone were to be really sneaky, they could clearfell a forested area and then get it assessed as being suitable for OP based on a no deforestation commitment. However, this has not happened in any of the estates that were assessed.
			Fabian : Mention of rivers – this would be very useful baseline data.	Agreed. We only have river data for the larger rivers. However there are small streams and creeks running through these estates which require buffers. We will GPS the course of these streams.
			Fabian – mentioned on the Popondetta plains there was very fast population growth.	Yes people mentioned that animals and fish were harder to come by and this they thought was the result of population growth. It was expected these resources will become more scarce but it hadn't reached a tipping point yet.
			Fabian – Do they want anything from CEPA.	No – at this stage we are just keeping CEPA informed. However, the environmental permit will have to be amended with the additional areas.

Section 6: Soil and topography

Date of Assessment: January and February 2022 over a period of 3 weeks

Name of Assessor: Jules Crawshaw

Assessor Designation and Company: Consultant / PT Hijau Daun

Methods

Secondary Data

Secondary data was either downloaded from the internet or sourced from PT Hijau Daun's library of spatial data.

Data Type	Source
Digital Elevation Model (which was used to derive slope)	ALOS PALSAR (30 m pixels)
Soil Type	PNGRIS
Landforms and general soil information	PNGRIS

Primary Data

The secondary data was verified by travelling around the study area to certain points and observing the situation in that area. For example, verifying, at that point, if the area was mapped as being less than 10 degrees slope, was this in fact correct. Similarly looking at the soil and the landforms in the area to determine whether it matched the description.

Additionally, village level interviews were undertaken within and around the assessment area. One of the questions was relating to the soils in the area. In every interview the community was asked about soil fertility and whether there were any soils in the area that were avoided as a result of low yields.

The assessment took place in January and February 2022 over a period of 3 weeks.

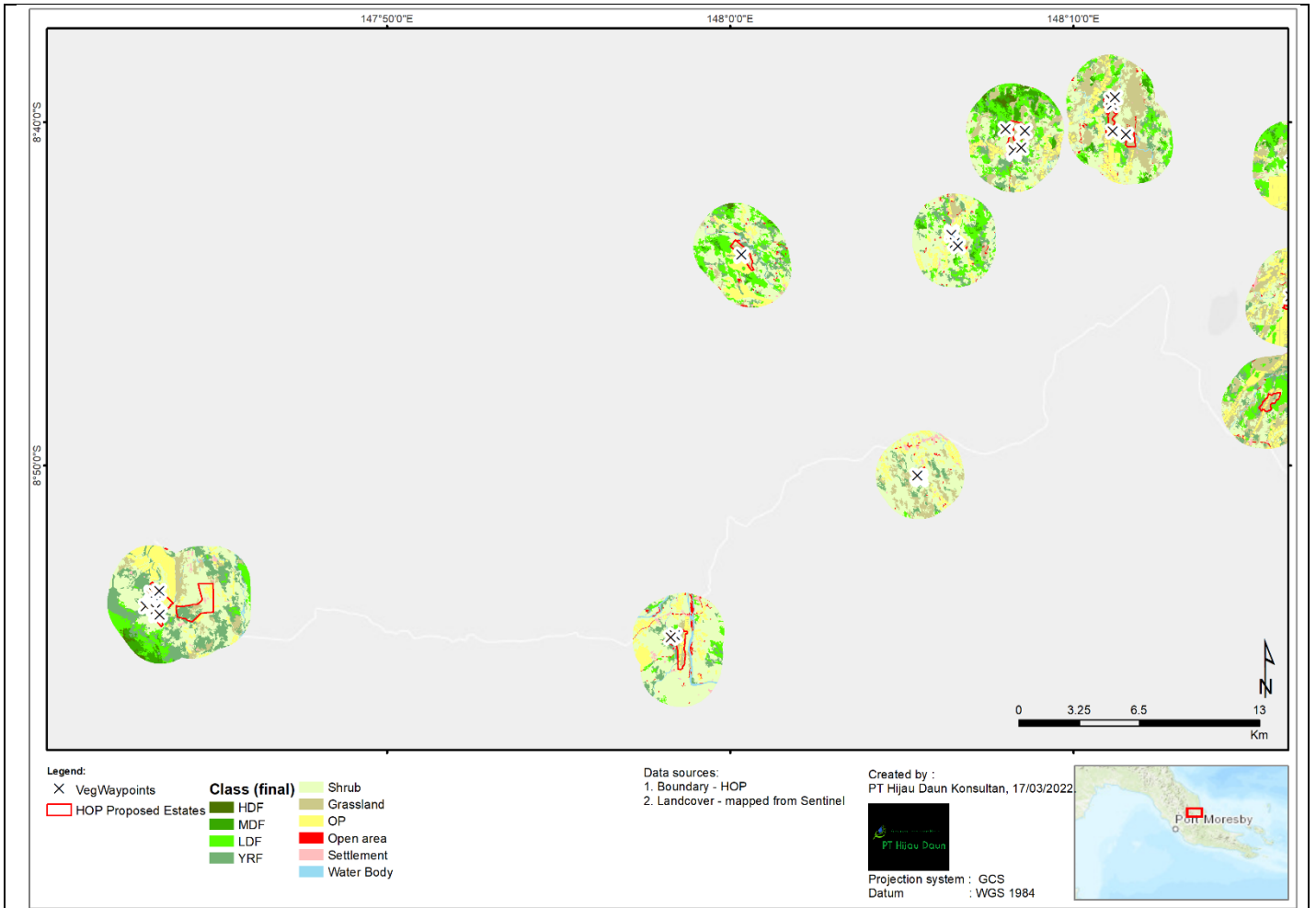


Figure 20 Locations of soil and topography observation points

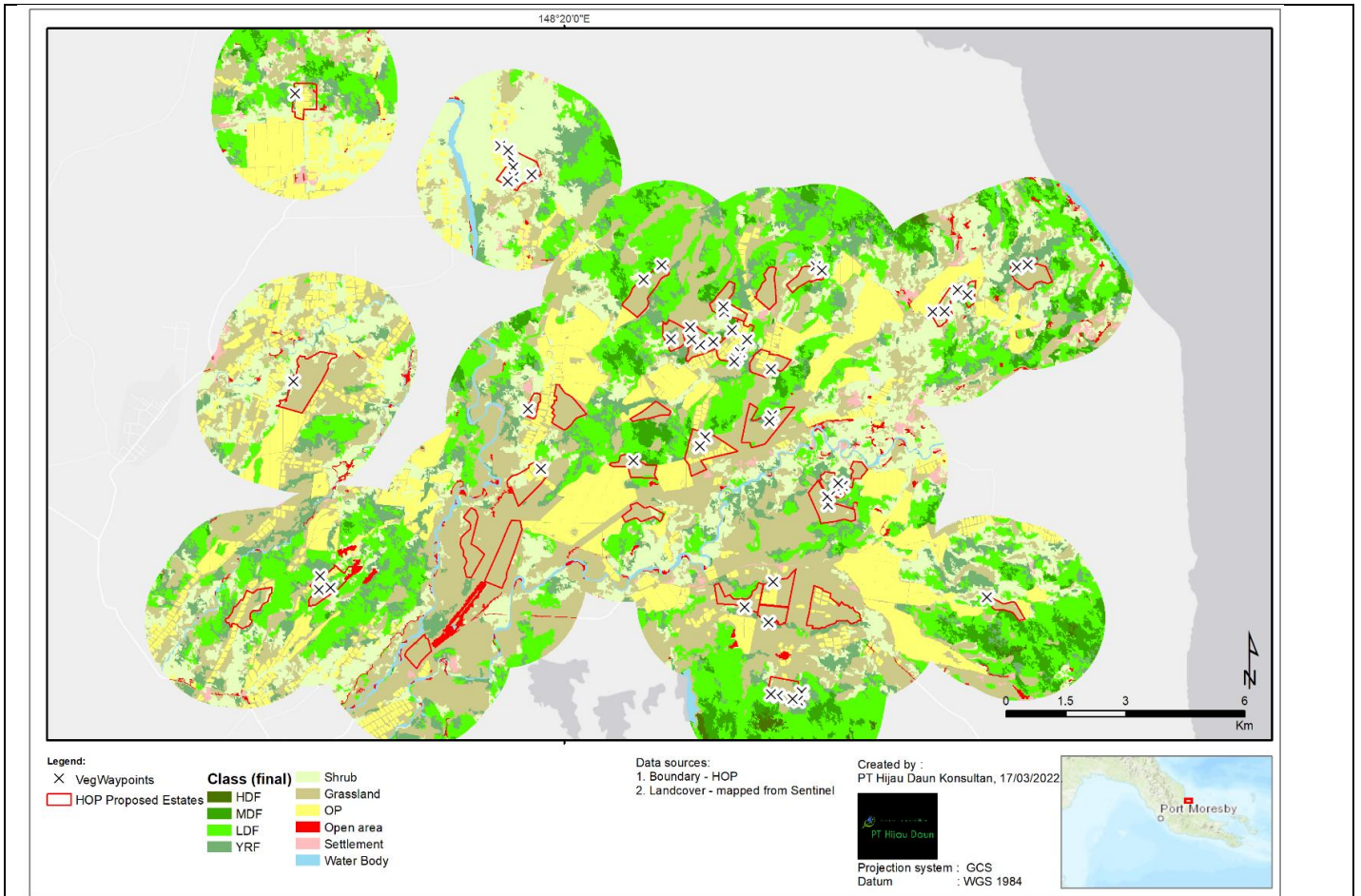


Figure 21. Locations of soil and topography observation points

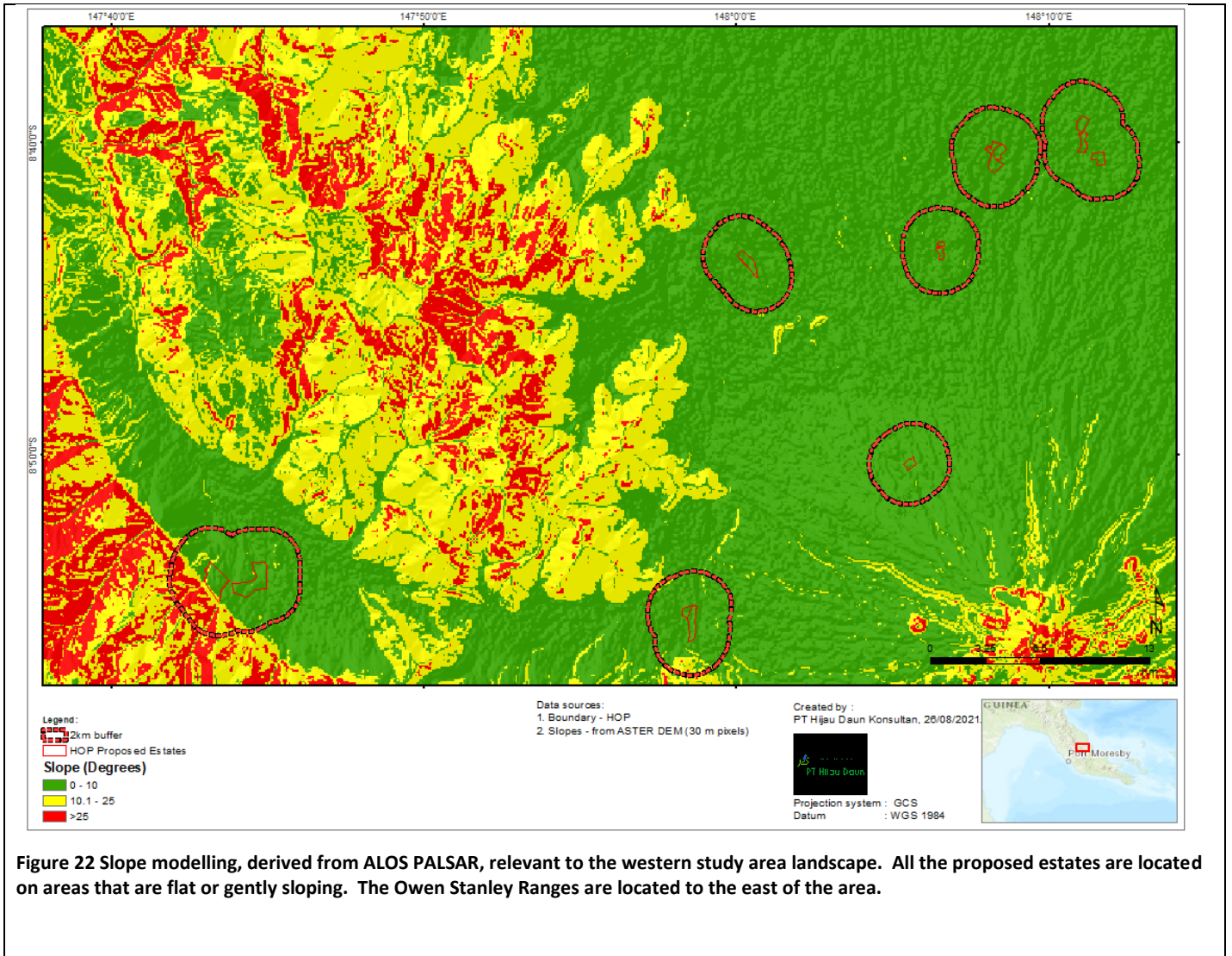
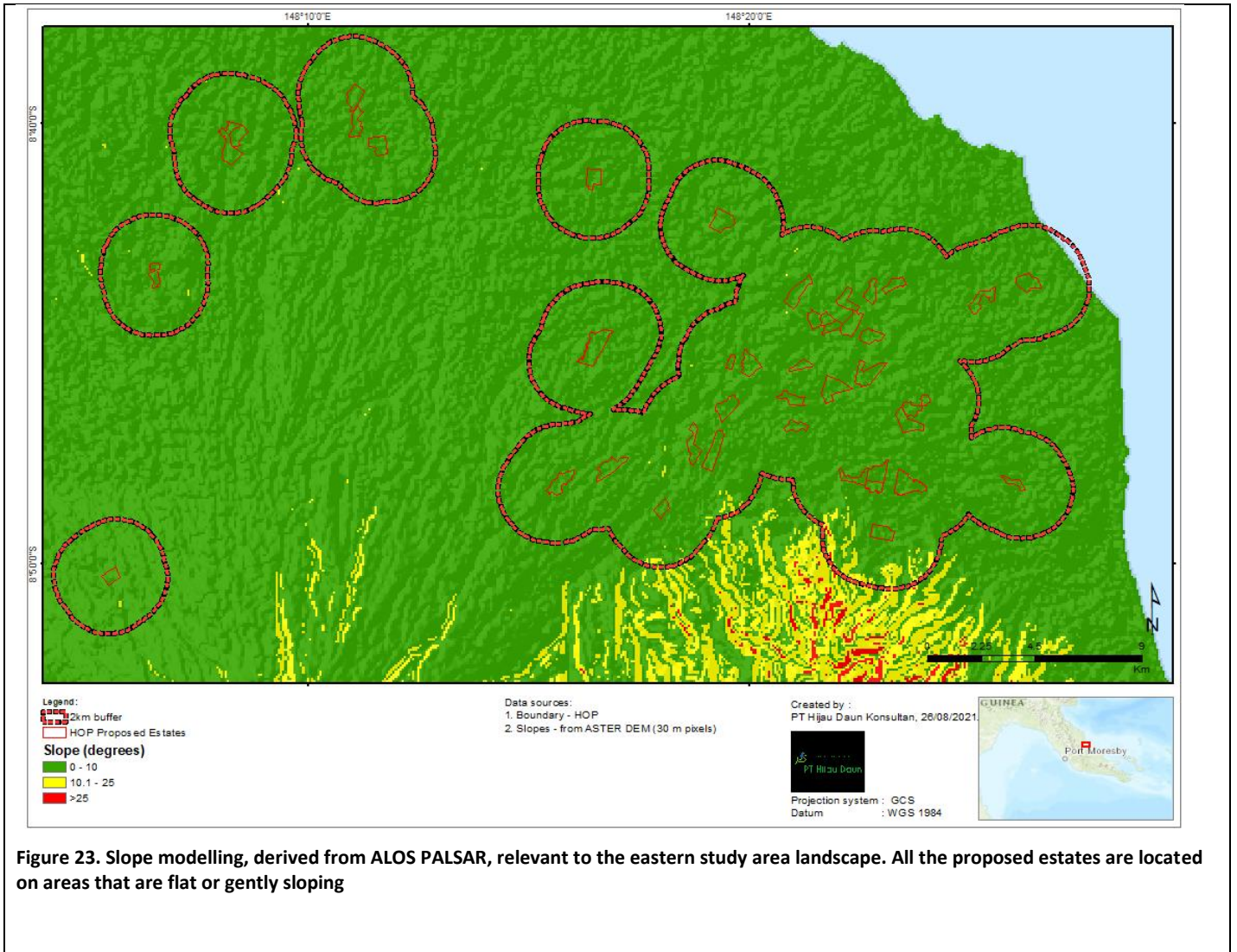


Figure 22 Slope modelling, derived from ALOS PALSAR, relevant to the western study area landscape. All the proposed estates are located on areas that are flat or gently sloping. The Owen Stanley Ranges are located to the east of the area.



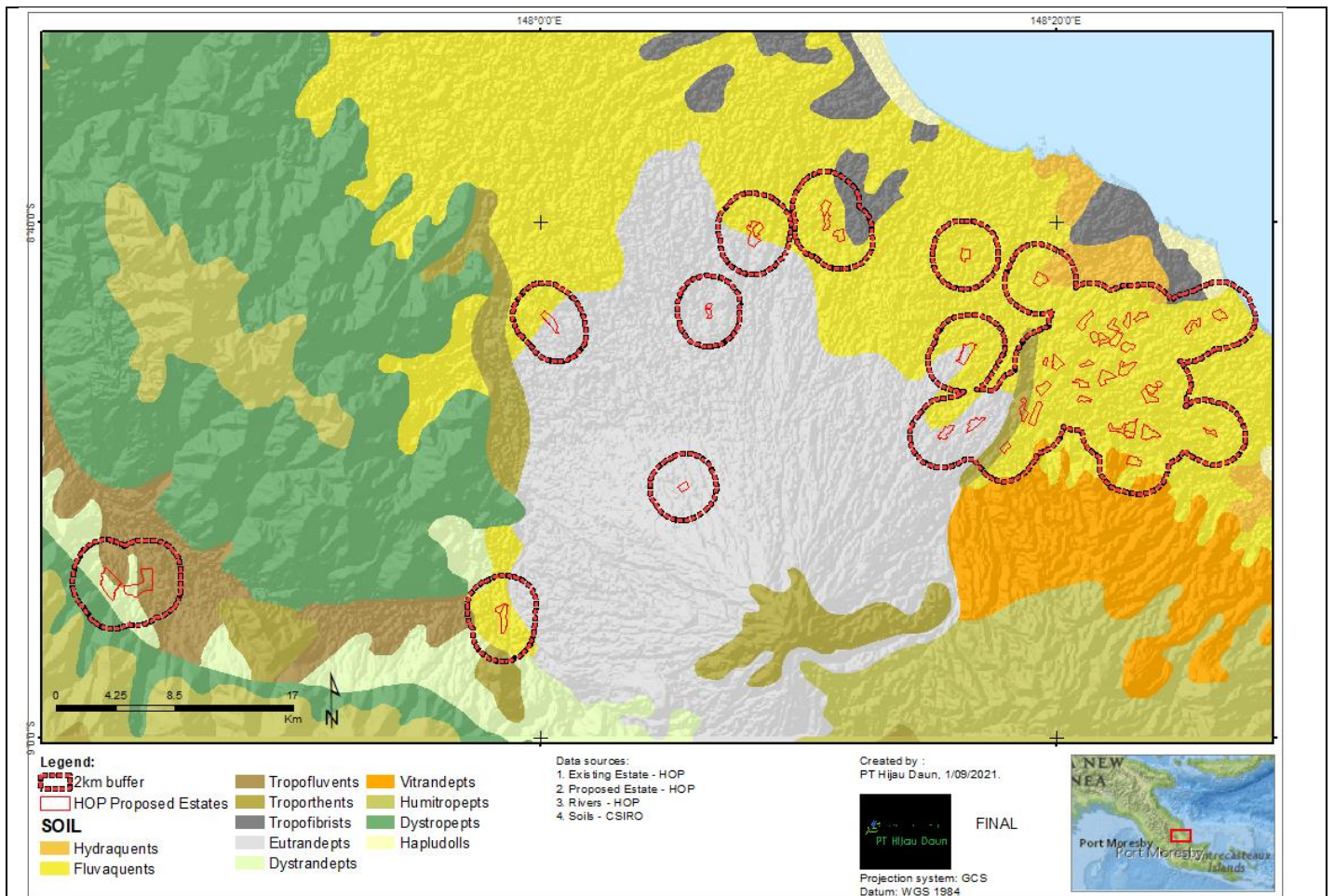


Figure 24. Soils from Bryan and Shearman, (2008)

Table 23. Indicative soils (great soil groups) found within the study areas, derived from PNGRIS (2008).

Order	Suborder	Great soil group	Brief description	Erosion risk (PNGRIS 2008)
Inceptisols	Andepts	Dystrandeps	Moderately weathered, well drained soils that are formed on volcanic ash.	Very low
Inceptisols	Tropepts	Dystropepts	Relatively young, moderately well-drained soils with moderately high bulk densities. Low in amorphous clay minerals.	Moderate
Inceptisols	Andepts	Eutrandepts	Moderately weathered, well drained soils that are formed on volcanic ash.	Very low
Entisols	Aquents	Fluvaquents	Poorly to very poorly drained soils found on the flood plains of major rivers. Organic carbon content relatively high.	Moderate
Mollisols	Ustolls	Hapludolls	Moderately well drained soils from humid climates. Profile unlikely to dry out for more than 90 days (cumulative) per year.	Low
Inceptisols	Tropepts	Humitropepts	Have >12 kg/m ² organic carbon in the soil to a depth of 1 m and less than 50% base saturation.	Moderate
Entisols	Aquents	Hydraquents	Dominated by fine textured alluvial soil	Moderate
Histosols	Fibrists	Tropofibrists	Little decomposed organic soils (peats). Saturated with water for at	Very low

			least 6 months, black and organic matter cannot easily be destroyed by rubbing.	
Entisols	Fluvents	Tropofluvents	Moderately well drained, stratified alluvial soils with textures of loamy fine sand or finer.	Moderate
Entisols	Orthents	Troporthents	Soils without any diagnostic horizons that are formed on recent erosional surfaces. Often shallow.	Moderate
Inceptisols	Andepts	Vitrandepts	Little or un-weathered Andepts. Gravelly or sandy textures.	Very low

Table 24. Criteria and Observations

Criteria	Description	Observation
Fragile Soils	A soil that is susceptible to degradation (reduction in fertility) when disturbed. A soil is particularly fragile if the degradation rapidly leads to an unacceptably low level of fertility or if it is irreversible using economically feasible management inputs.	Based on interviews with the community, there was no mention of soils that met these criteria. Indeed agricultural studies have labelled these soils as some of the best in PNG>
Marginal Soils	A soil that is unlikely to produce acceptable economic returns for the proposed crop at reasonable projections of crop value and costs of amelioration. Degraded soils are not marginal soils if their amelioration and resulting productivity is cost effective.	In all the community interviews, it was mentioned that the area could be comprehensively cropped and there was no mention of areas or soil types that were routinely avoided because of low yields for Oil Palm . Note that the grassland areas have been routinely burnt which has led to very low levels of soil carbon. This means that large amounts of particularly nitrogen fertiliser will be needed. These can be seen as degraded soils not marginal soils.
Peat	A soil with cumulative organic layer(s) comprising more than half of the upper 80 cm or 100 cm of the soil surface containing 35% or more of organic matter (35% or more Loss on Ignition) or 18% or more organic carbon.	There was no peat observed in the area nor was it mapped in any of the soil data sets.
Steep soils	Soils over 25 degrees	No areas over 25 degrees were noted.

Section 7: Greenhouse Gas (GHG)

Date of Assessment: 22 January – 13 February 2022

Name of Assessor: J Crawshaw

Assessor Designation and Company: Consultant PT Hijau Daun

Table 25. Carbon /GHG assessment team members and qualifications

Name	Organisation	Qualifications	Role
Jules Crawshaw	PT Hijau Daun	Bachelor of Forestry Science and Master of Business Systems	GHG Lead. Forest Inventory and GIS manager
Jeffery Lawrence	Independent consultant	Tree identification expert	Field team member

The steps involved

1. Developing the land cover map based on Sentinel Images (already described above).
2. Reclassifying the landcover map categories to fit with the landcover categories in the RSPO GHG Calculator.
3. Identifying 3 development scenarios.
4. Inputting the data for the 3 development scenarios into the Calculator
5. Summarising the results.

Table 26. Translation table between assessment land cover classes and RSPO Classes

Land cover	RSPO land cover	Area (ha)
Grassland	Grassland	1,398.66
LDF +	Disturbed forest	98.88
MDF	Disturbed forest	4.67
Oil Palm	Grassland ¹²	222.06
Open Area	Grassland	7.75
Settlement	Not to be developed	5.26
Shrub	Shrub land	463.05
Water Body	Other	3.06
YRF	Shrub land	1,398.66
Total		2,455.39

Table 27. Land conversion scenarios. HCVMA = ‘High Conservation Value Management Area’, HCSF = ‘High Carbon Stock Forest’

Scenario	Description	Area Developed for oil palm (ha)
Scenario 1	No development of Community Use / HCV or HCS areas. No BBGI. No Community Use.	1915.86
Scenario 2	Development of everything. No BBGI. No Community Use.	2141.09
Scenario 3	Development of everything except riparian buffers. No BBGI. No Community Use.	2126.54

¹² This is classified as grassland because usually the crop has failed and is overgrown oil palm.

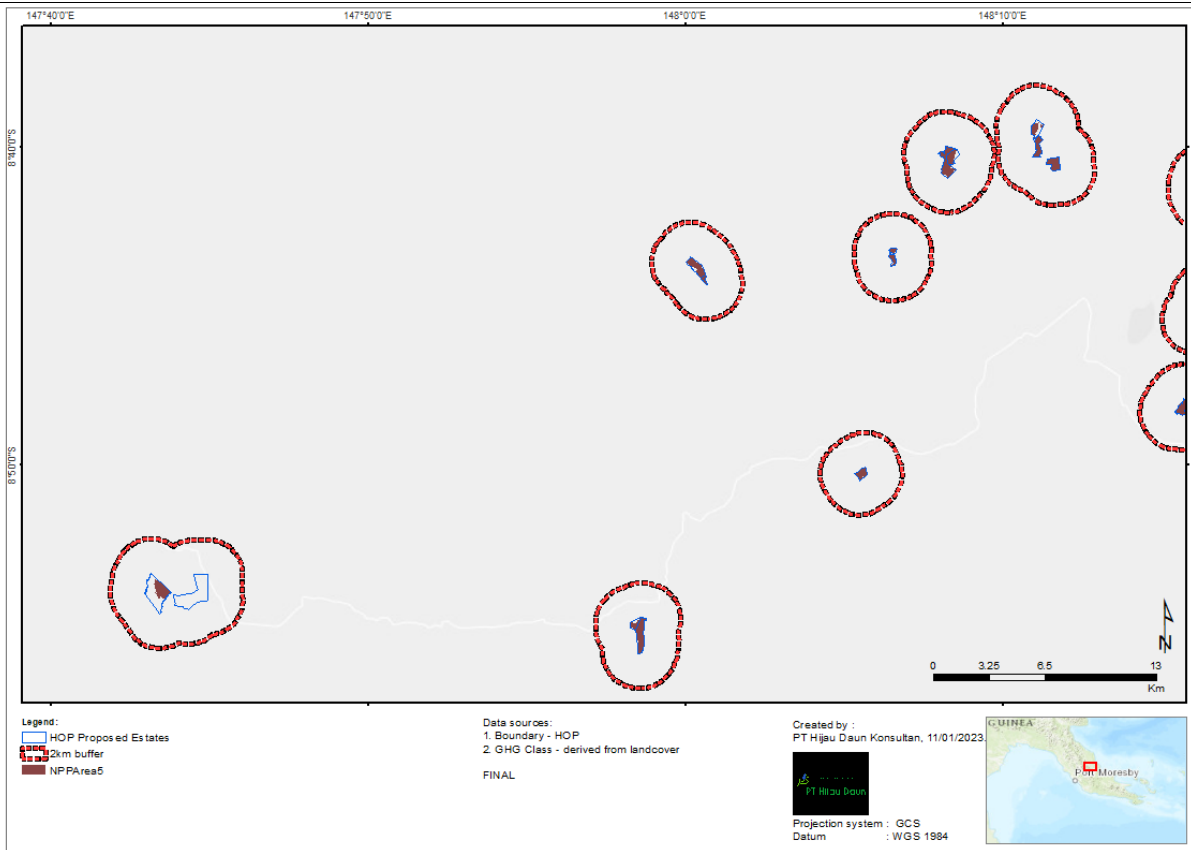


Figure 25. Scenario 1 (West) – No BBGI. Brown areas are those to be developed.

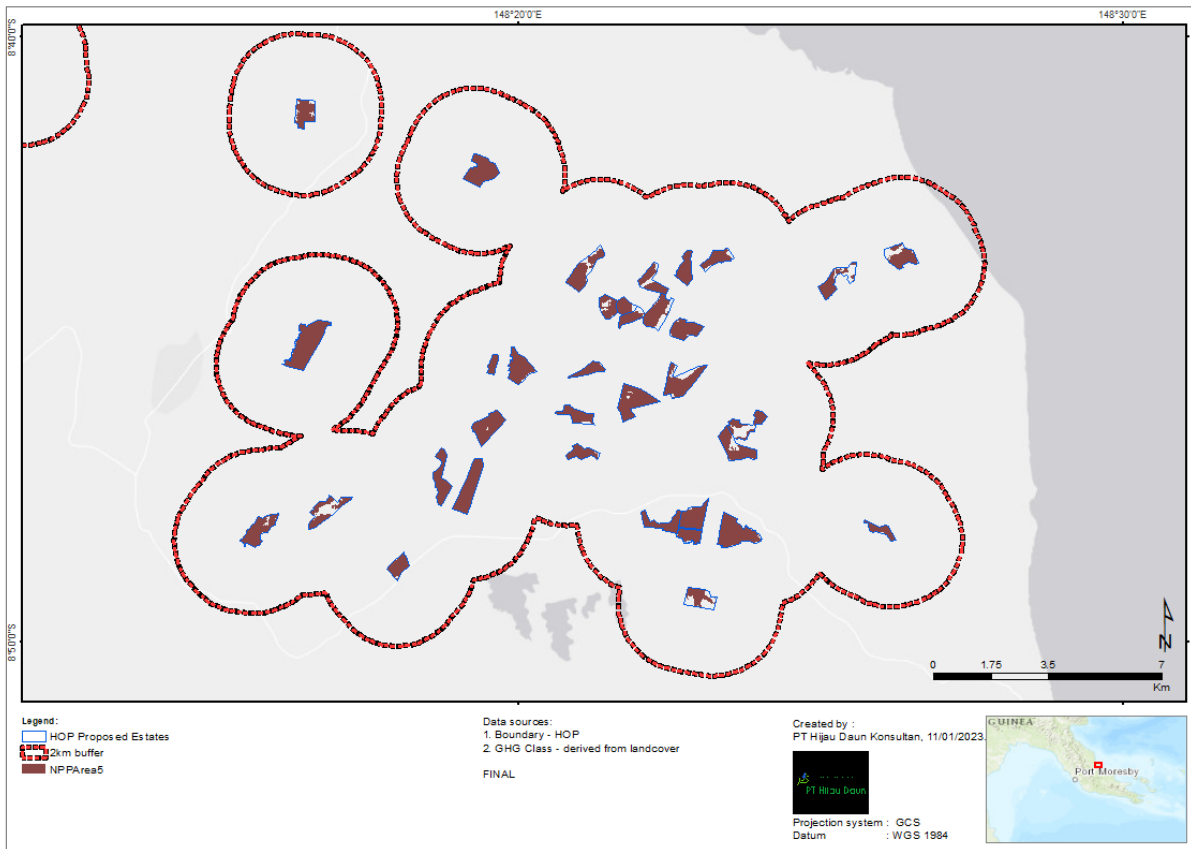


Figure 26. . Scenario 1 (East). Brown areas are those to be developed.

Table 28. Summary of conversion scenarios (ha). Preferred scenario is Scenario 1.

Classification	Scenario 1			Scenario 2			Scenario 3		
	Current LC	Conserv e	Develop	Current LC	Conserv e	Develop	Current LC	Conserv e	Develop
Disturbed Forest	103.55	103.55	-0.00	103.55	3.08	100.47	103.55	3.83	99.71
Grassland	1,591.43	37.61	1,553.82	1,591.43	0.01	1,591.42	1,591.43	2.50	1,588.92
Shrub land	554.21	264.28	289.93	554.21	107.01	447.20	554.21	116.31	437.90
Other	3.06	3.06	0.00	3.06	1.05	2.00	3.06	3.06	-
Not to be developed	4.30	4.30	0.00	4.30	4.30	-	4.30	4.30	-
Grand Total	2,256.54	412.79	1,843.75	2,256.54	115.45	2,141.10	2,256.54	130.00	2,126.54

From Table 29 it can be seen that large emissions come from land clearing. Especially in scenarios 2 and 3, where forest is cleared. Subsequently, growth of the palms sequesters a lot of carbon. The project is carbon negative because it is planting mainly on scrub and grassland, which have low natural carbon stocks.

At the mill the major source of emission is the rotting of the EFBs.

Table 29. Results of the greenhouse gas emissions scenario modelling, orange box indicating preferred Development Scenario. Field emissions and sinks assume average growth for oil palm, used by large scale operations. Data derived from RSPO GHG Calculator (RSPO-PRO-T04-003 V2.0 ENG).

Field emissions & sinks	Scenario 1			Scenario 2			Scenario 3		
	tCO2e	t CO2e/ha	tCO2e/tFFB	t CO2e	t CO2e/ha	t CO2e/t FFB	t CO2e	t CO2e/ha	t CO2e/t FFB
Land clearing	844.24	0.46	0.03	1,655.85	0.77	0.05	1,634.06	0.77	0.05
Crop sequestration	-17,260.70	-9.36	-0.59	-20,042.44	-9.36	-0.59	- 18,490.57	-8.70	-0.54
Fertilisers	581.48	0.32	0.02	675.20	0.32	0.02	670.67	0.32	0.02
N2O	1,960.81	1.06	0.07	2,276.82	1.06	0.07	2,261.56	1.06	0.07
Field fuel	540.74	0.29	0.02	627.88	0.29	0.02	623.67	0.29	0.02
Peat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Conservation credit	-258.88	-0.14	-0.01	-7.70	0.00	0.00	-7.70	0.00	0.00
Total	-13,592.30	-7.37	-0.46	-14,814.40	-6.92	-0.43	- 13,308.30	-6.26	-0.39
Mill emissions & credit	tCO2e	tCO2e/ha	tCO2e/tFFB	tCO2e	tCO2e/ha	tCO2e/tFFB	tCO2e	tCO2e/ha	tCO2e/tFFB
POME	5,782.50	3.14	0.20	6,714.41	3.14	0.20	6,669.41	3.14	0.20
Mill fuel	460.20	0.25	0.02	534.37	0.25	0.02	530.78	0.25	0.02
Purchased electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Credit (excess electricity exported)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Credit (sale of biomass for power)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	6,242.70	3.39	0.21	7,248.78	3.39	0.21	7,200.20	3.39	0.21
Total emissions, tCO2e (field and mill)	-7,349.60	-	-	-7,565.62	-	-	-7,525.66	-	-
t CO2e/t CPO	-0.84	-	-	-0.74	-	-	-0.74	-	-
t CO2e/t PK	-0.84	-	-	-0.74	-	-	-0.74	-	-

Section 8: Land Use Change Analysis (LUCA)

Date of RSPO approval as satisfactory: Not assessed by RSPO as there has been no non-compliant land clearing

Name of Assessor: Jules Crawshaw

Assessor Designation and Company: Jules Crawshaw, Consultant – PT Hijau Daun.

Methodology

Landsat Satellite images were downloaded to get as cloud free images as possible as specified in Table 30

Table 30. Date ranges for cloud free images

Period	Date of acquisition	Cloud cover (%)
Before November 1, 2005 (baseline)	2006/06/06 (L5)	0
November 1, 2005-November 31, 2007	2008/07/13 (L5)	0
December 1, 2007-September 2008	2009/04/11 (L5) 2010/12/10 (L5)	0
September, 2008-December 31, 2009	2015/07/01 (L8)	0
1 Jan 2010-May 9, 2014	2021/06/15 (L8)	0
2014-2018	2006/06/06 (L5)	0
Latest satellite image used for ground truthing	Planet High Resolution satellite imagery December 2021	0

The images were classified based in the land covers in Table 31.

Table 31. Land covers / coefficients and descriptions

Land Cover Class	Land cover classification	Vegetation Coefficient
Medium Density Forest	Forest	0.7
Low Density Forest		0.7
Young Regenerating Forest		0.7
Scrub	Scrub	0
Open Land	Open Land	0
Settlement	Settlement	0
Oil Palm	Oil Palm	0
Grassland	Grassland	0

In order to verify that the images have been classify the images a number of samples were chosen from each landcover. The number of samples per land cover are specified in Table 32. An example of the locations of the samples are provided in Figure 27.

	2005	2007	2009	2014	2021
Forest	402.17	392.60	377.69	367.34	344.25
Grassland	1,371.09	1,370.98	1,386.67	1,209.34	1,381.34
Mix Agriculture	146.83	146.83	146.83	145.64	142.91
OP	201.77	201.77	204.34	202.64	221.43
Open area	36.99	39.16	17.50	194.74	16.56
Settlement	6.20	6.20	6.20	6.20	6.20
Shrub	287.77	295.29	313.58	326.92	340.14
Water Body	2.57	2.57	2.57	2.57	2.57
Grand Total	2,455.39	2,455.39	2,455.39	2,455.39	2,455.39

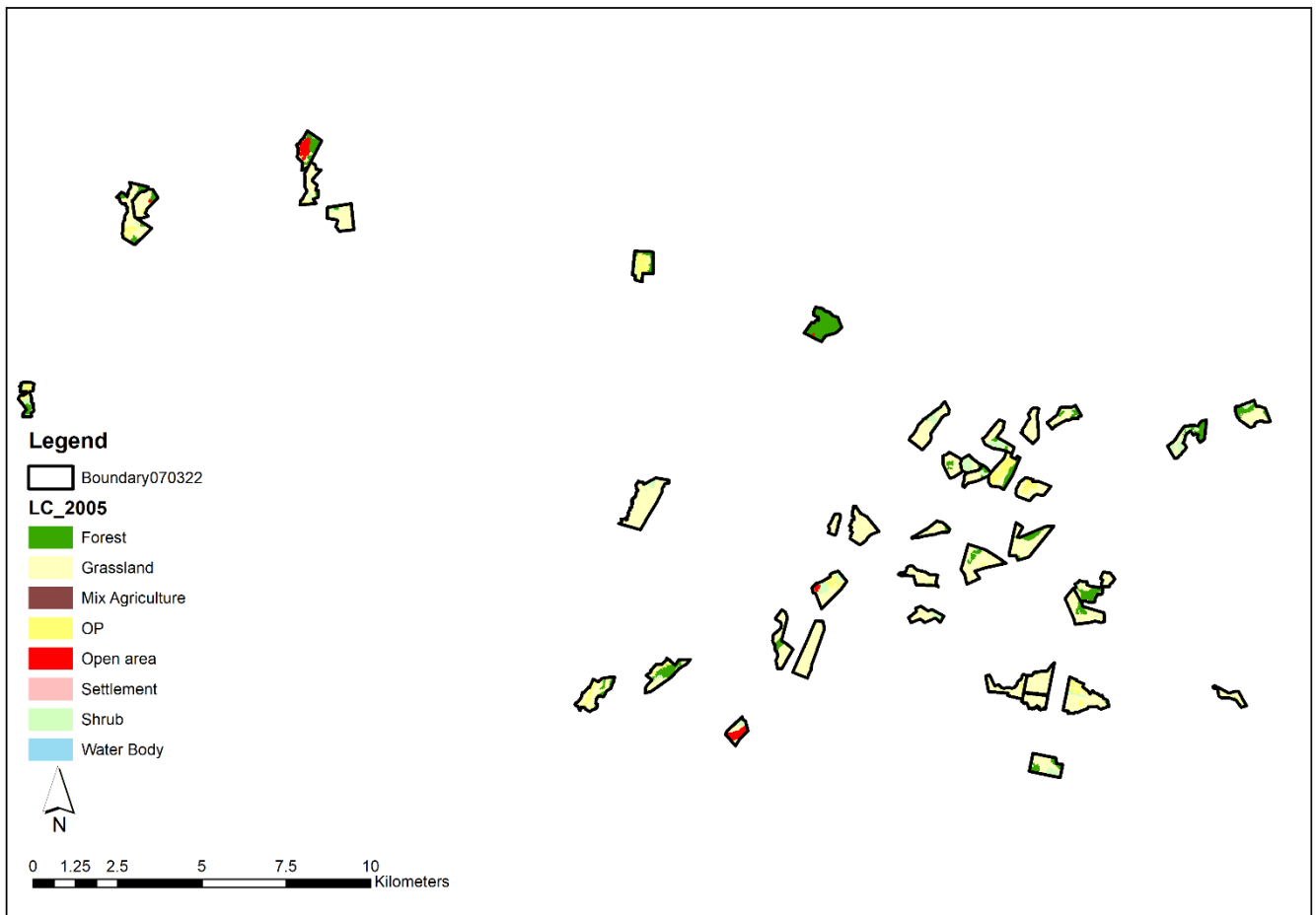


Figure 28. Nov 2005 East land cover



Figure 29. Nov 2005 West land cover

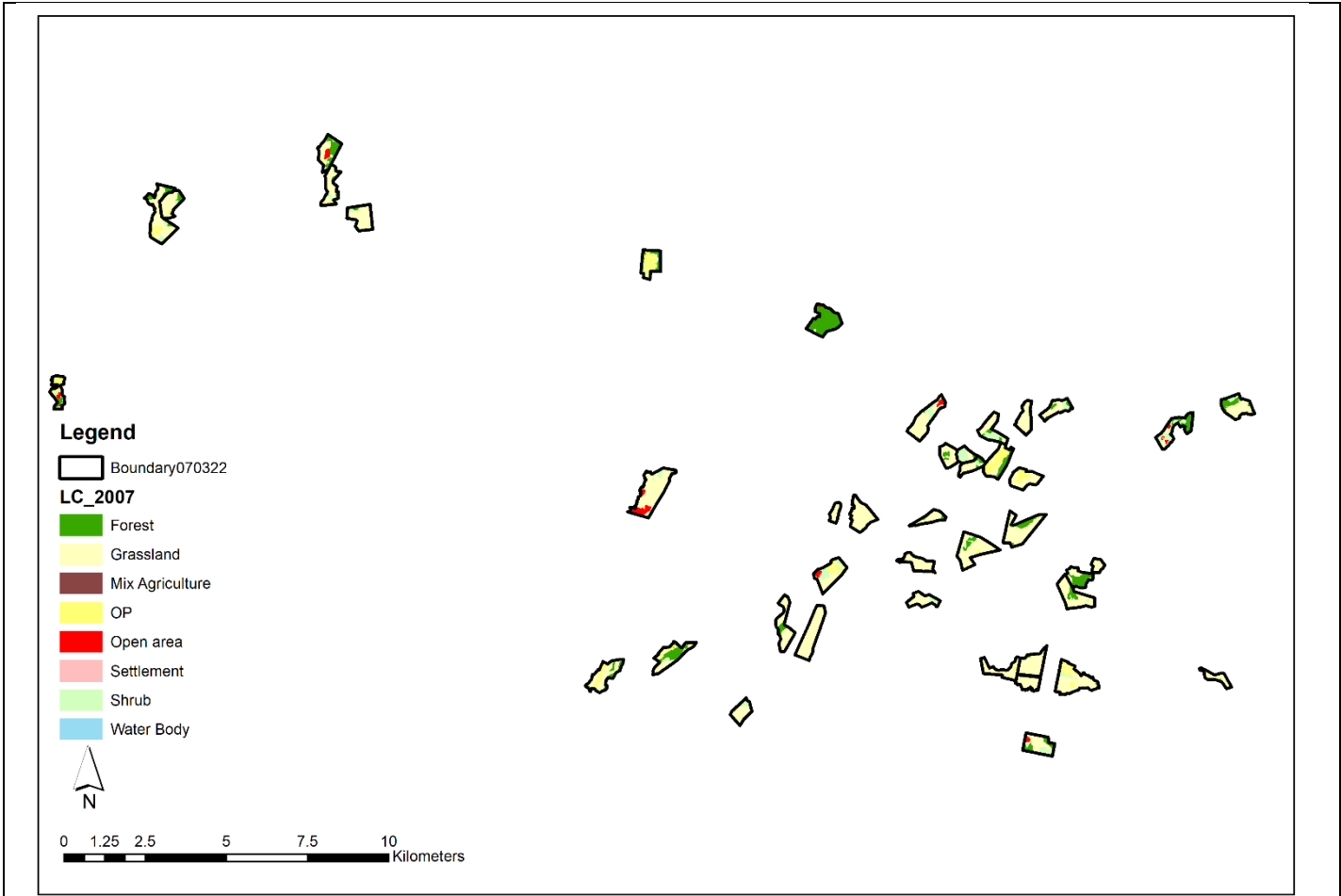


Figure 30. Dec 2007 East land cover



Figure 31. Dec 2007 West land cover

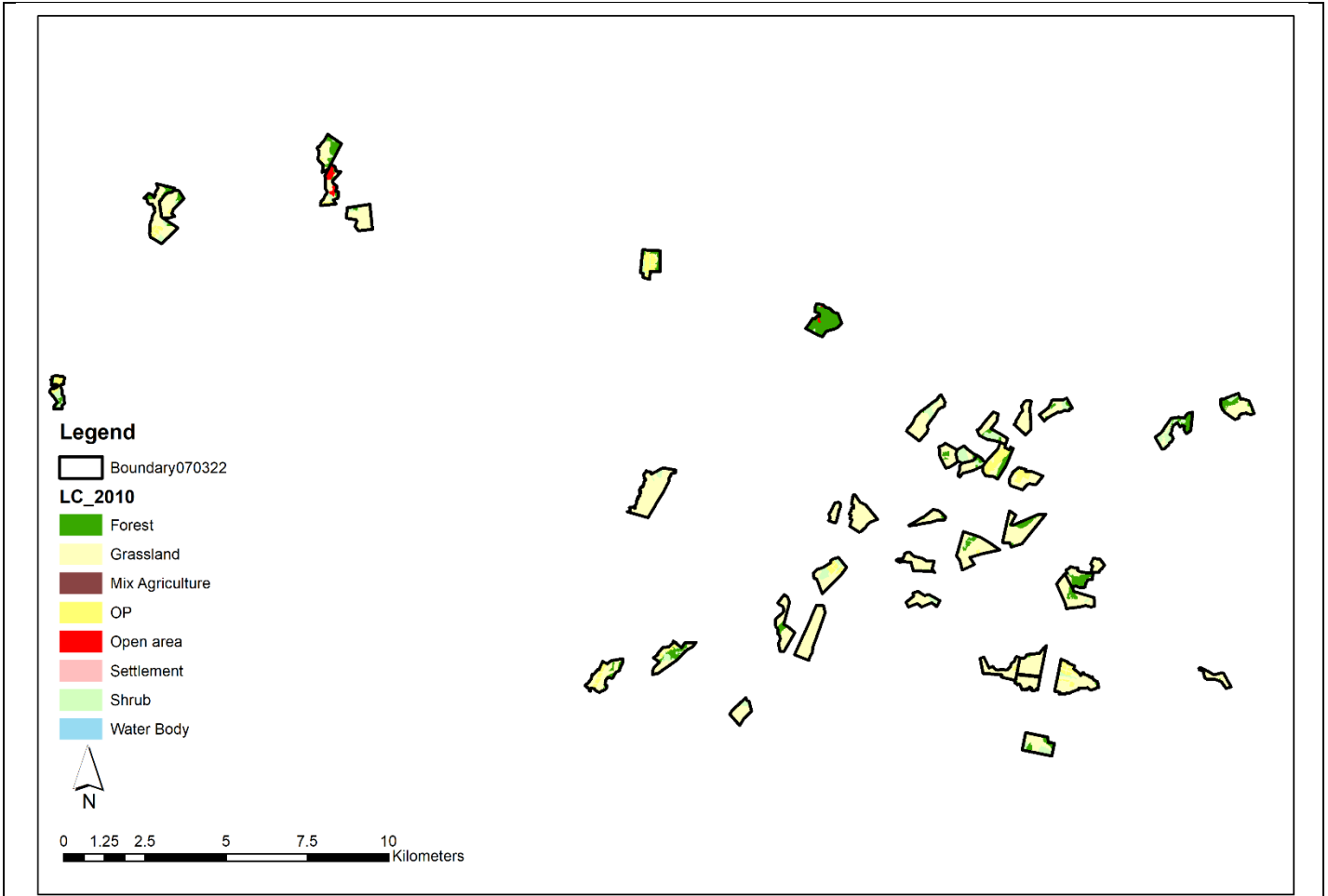


Figure 32. Dec 2010 East land cover

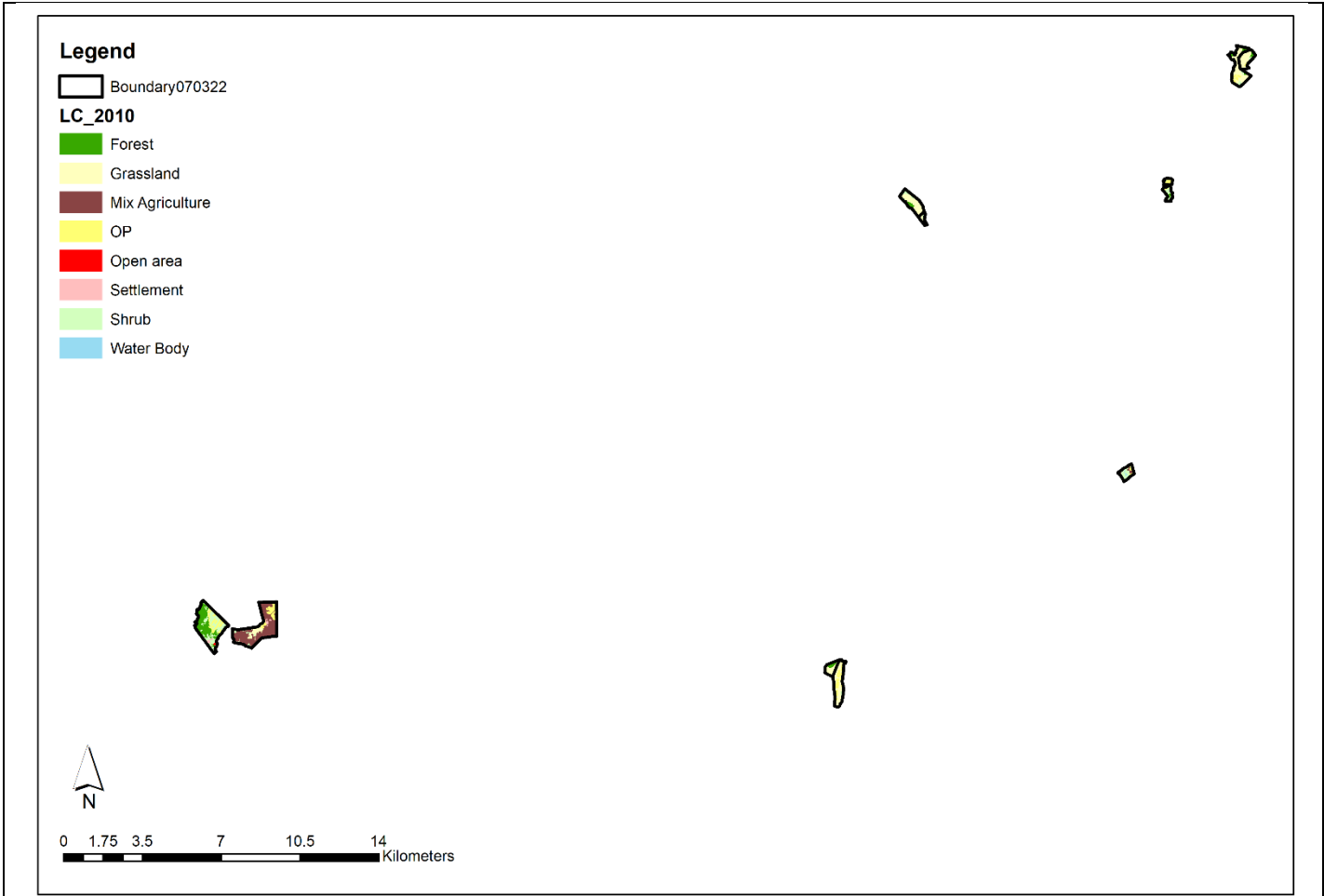


Figure 33. Dec 2010 West land cover

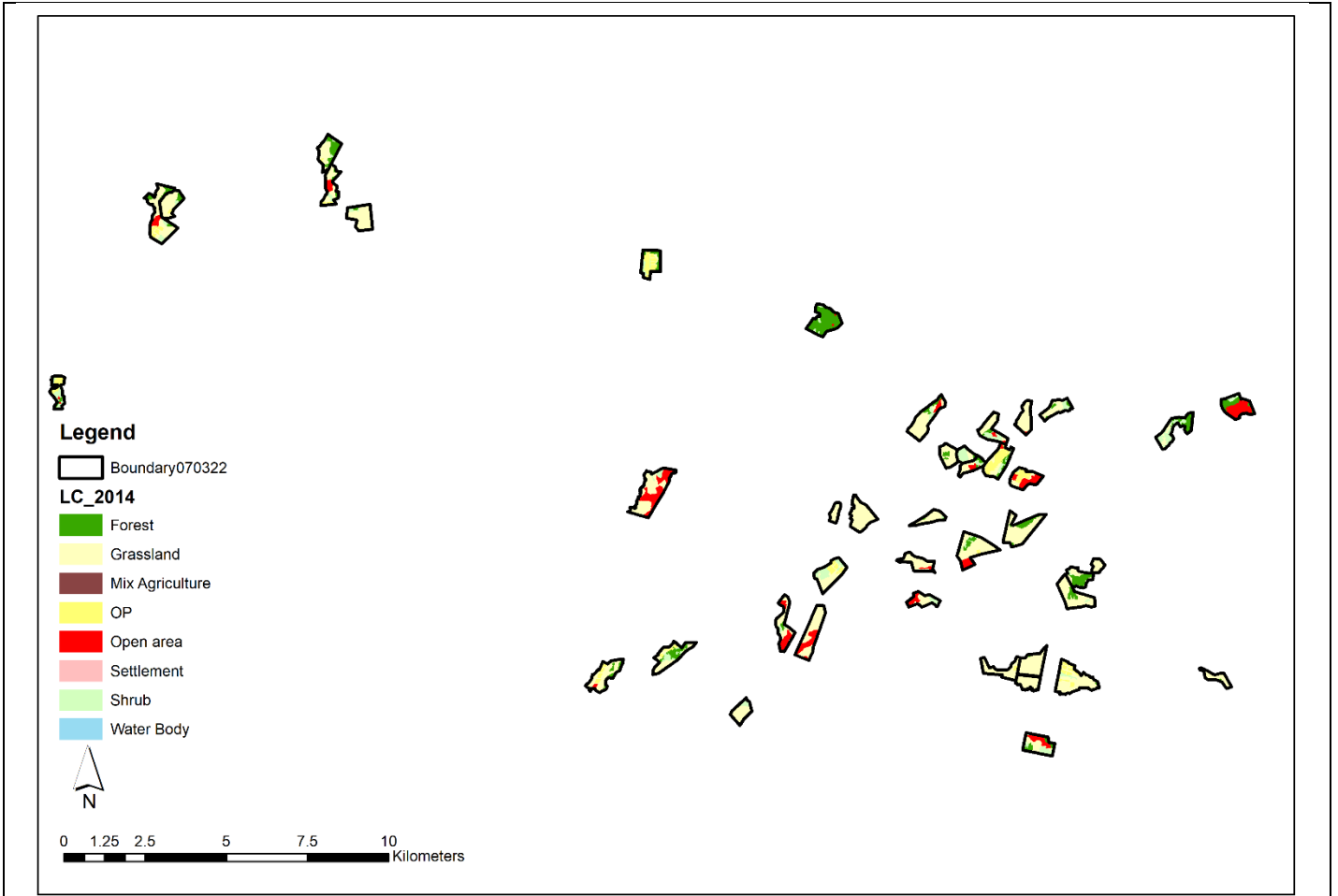


Figure 34. May 2014 East land cover



Figure 35. May 2014 West land cover

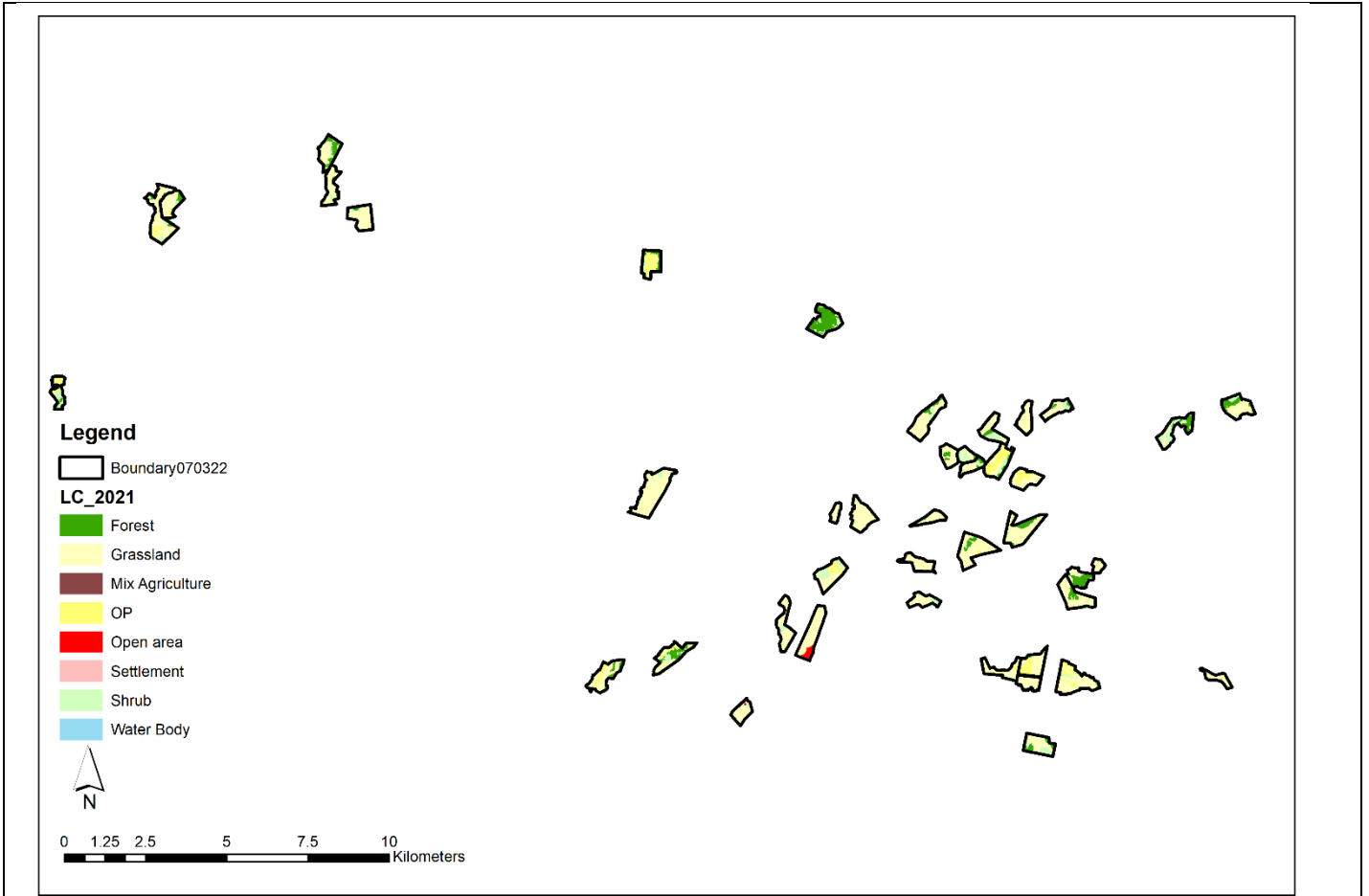


Figure 36. August 2021 East land cover



Figure 37. August 2021 West land cover

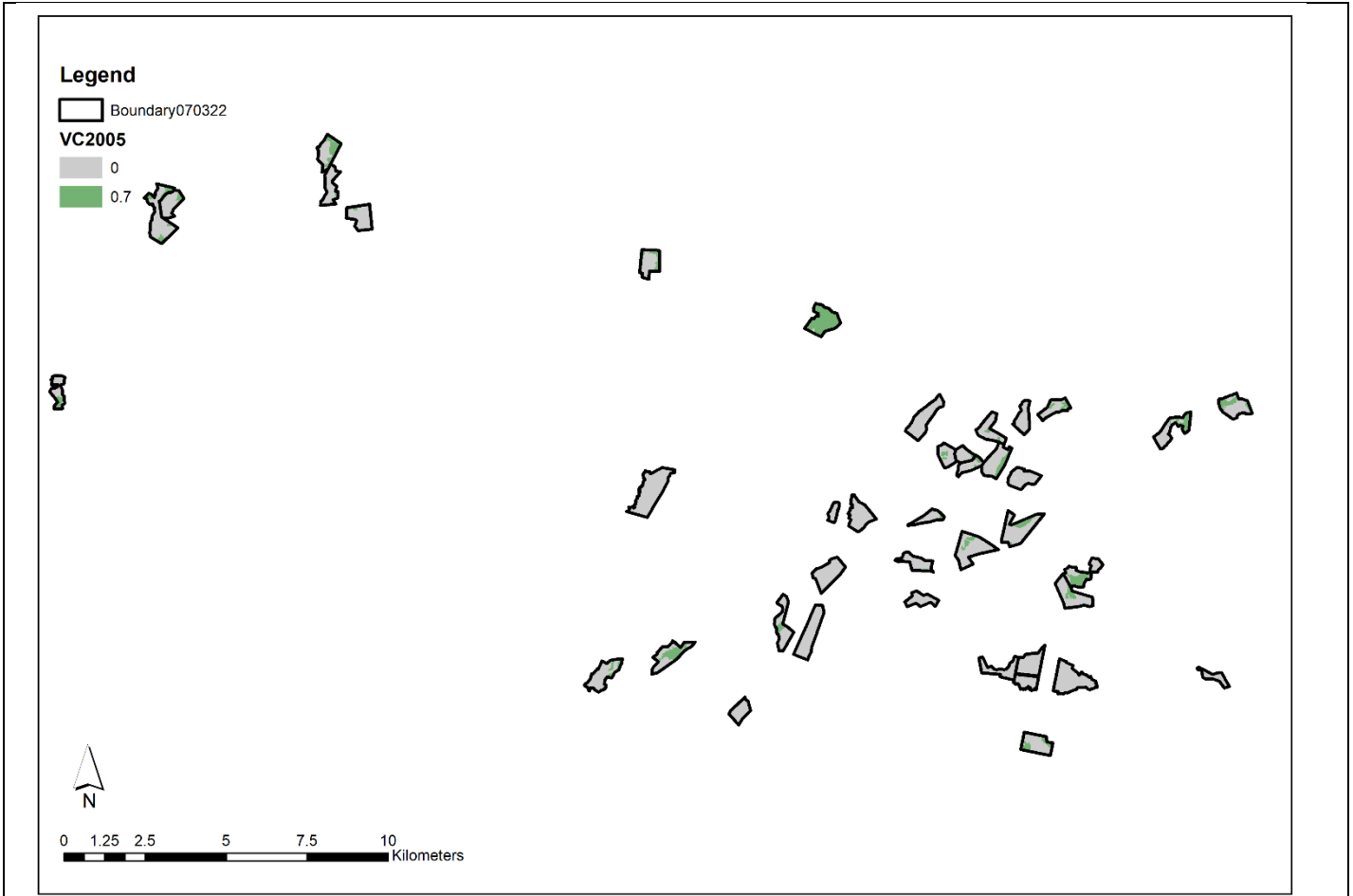


Figure 38. August 2005 East Vegetation Coefficients.



Figure 39. August 2005 West Vegetation Coefficients.

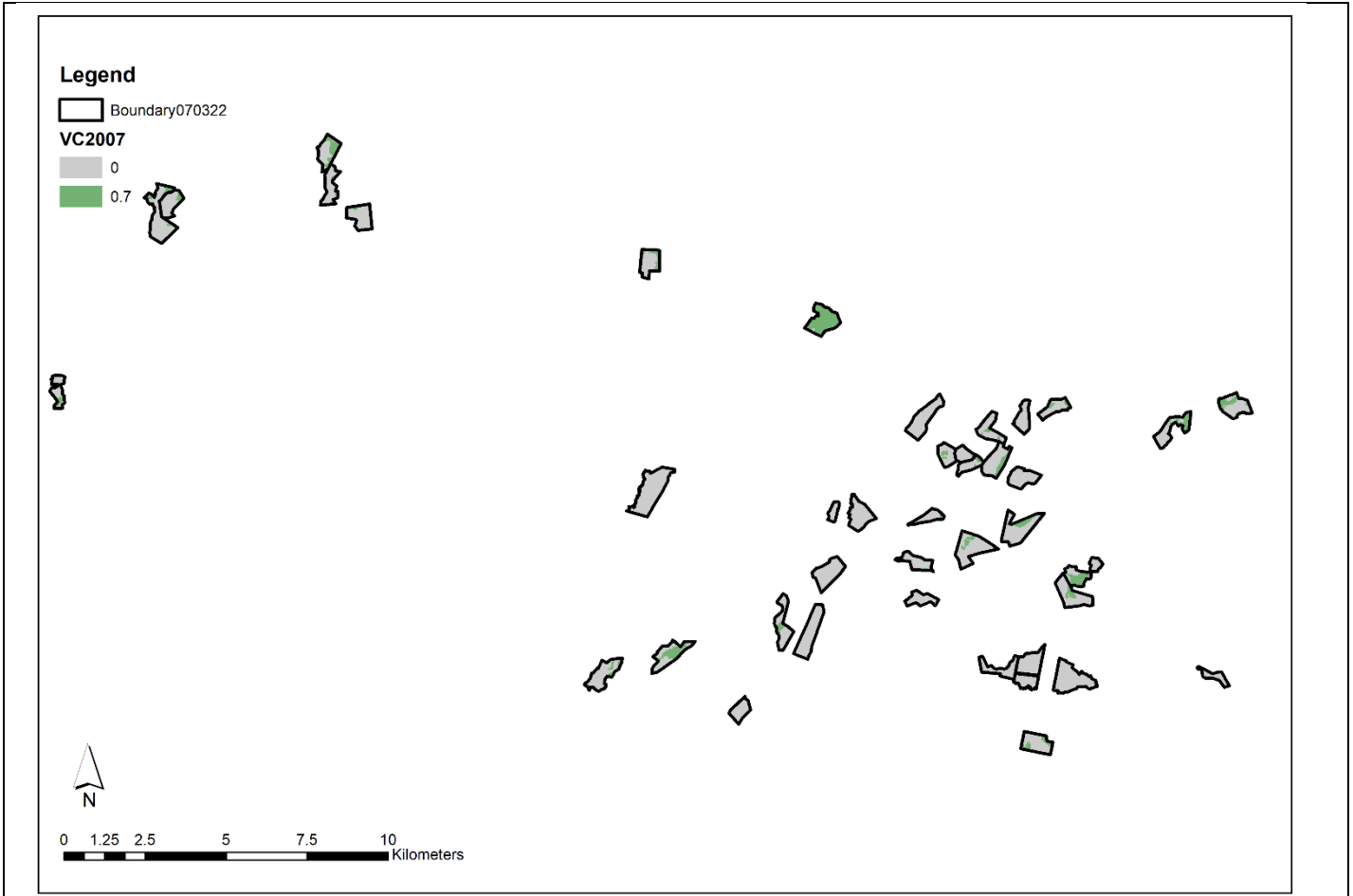


Figure 40. Dec 2007 East Vegetation Coefficients.



Figure 41. Dec 2007 West Vegetation Coefficients.

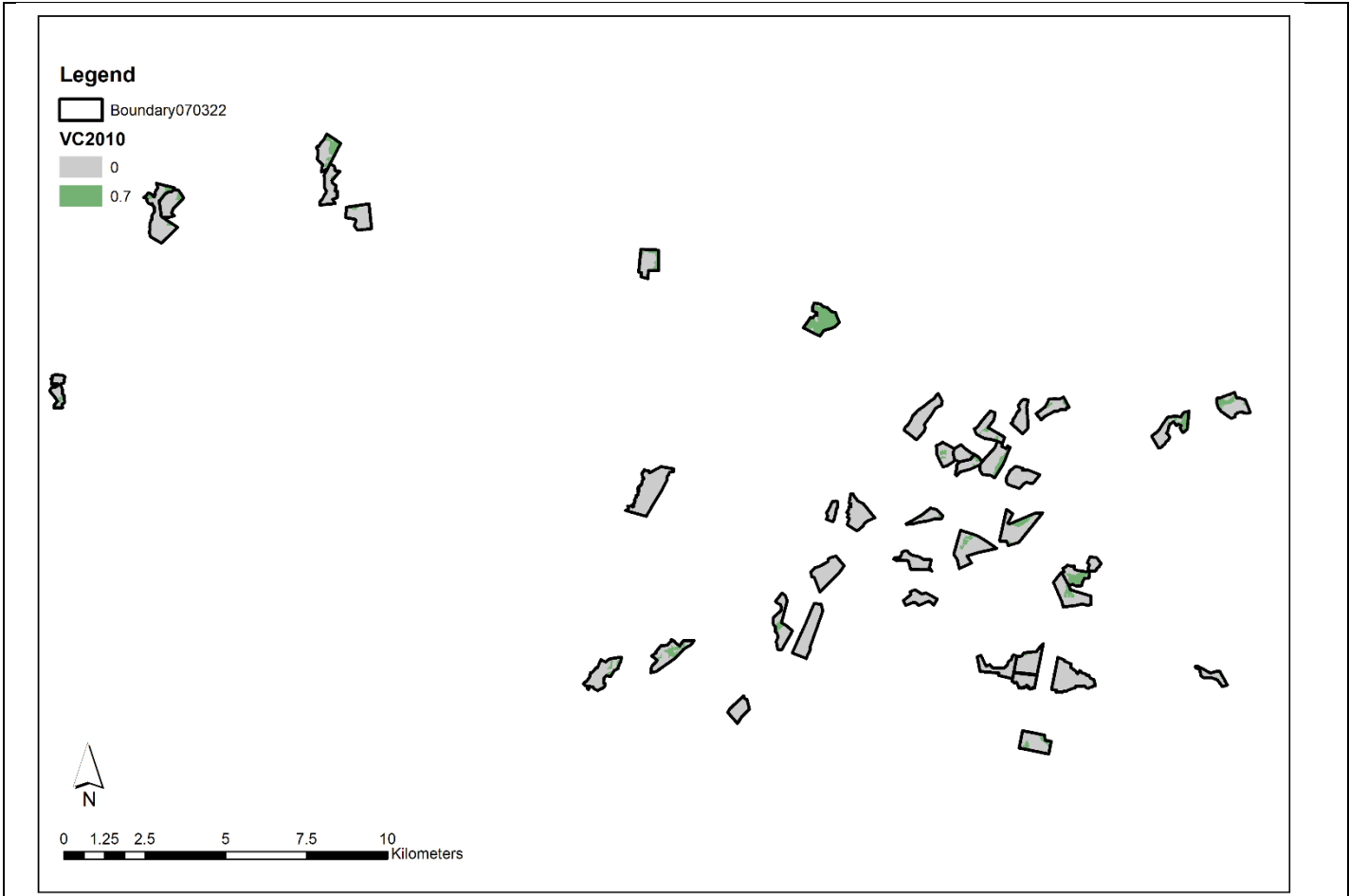


Figure 42. Nov 2010 East Vegetation Coefficients.



Figure 43. Nov 2010 West Vegetation Coefficients.

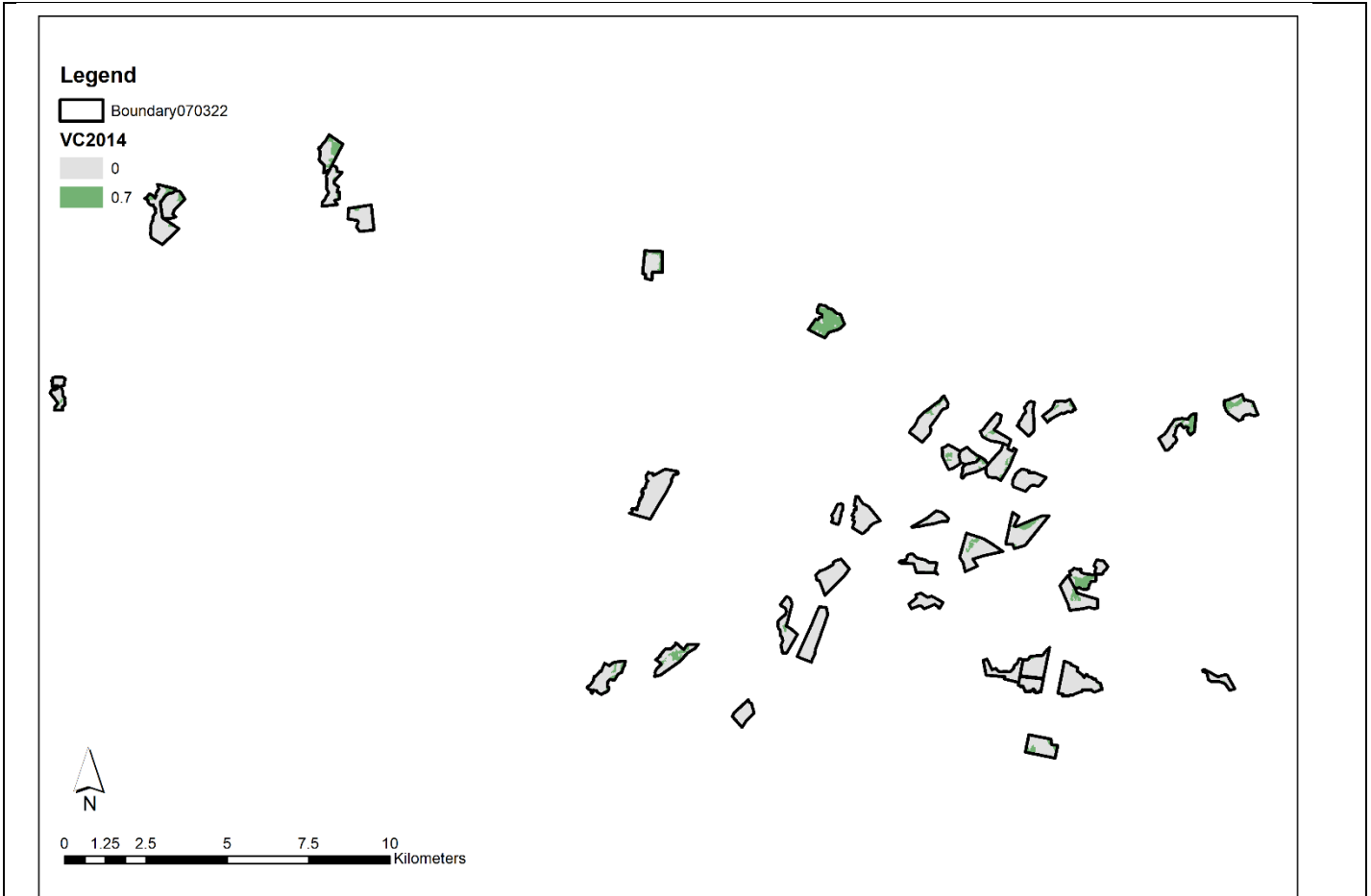


Figure 44. Aug 2014 East Vegetation Coefficients.



Figure 45. Aug 2014 West Vegetation Coefficients.

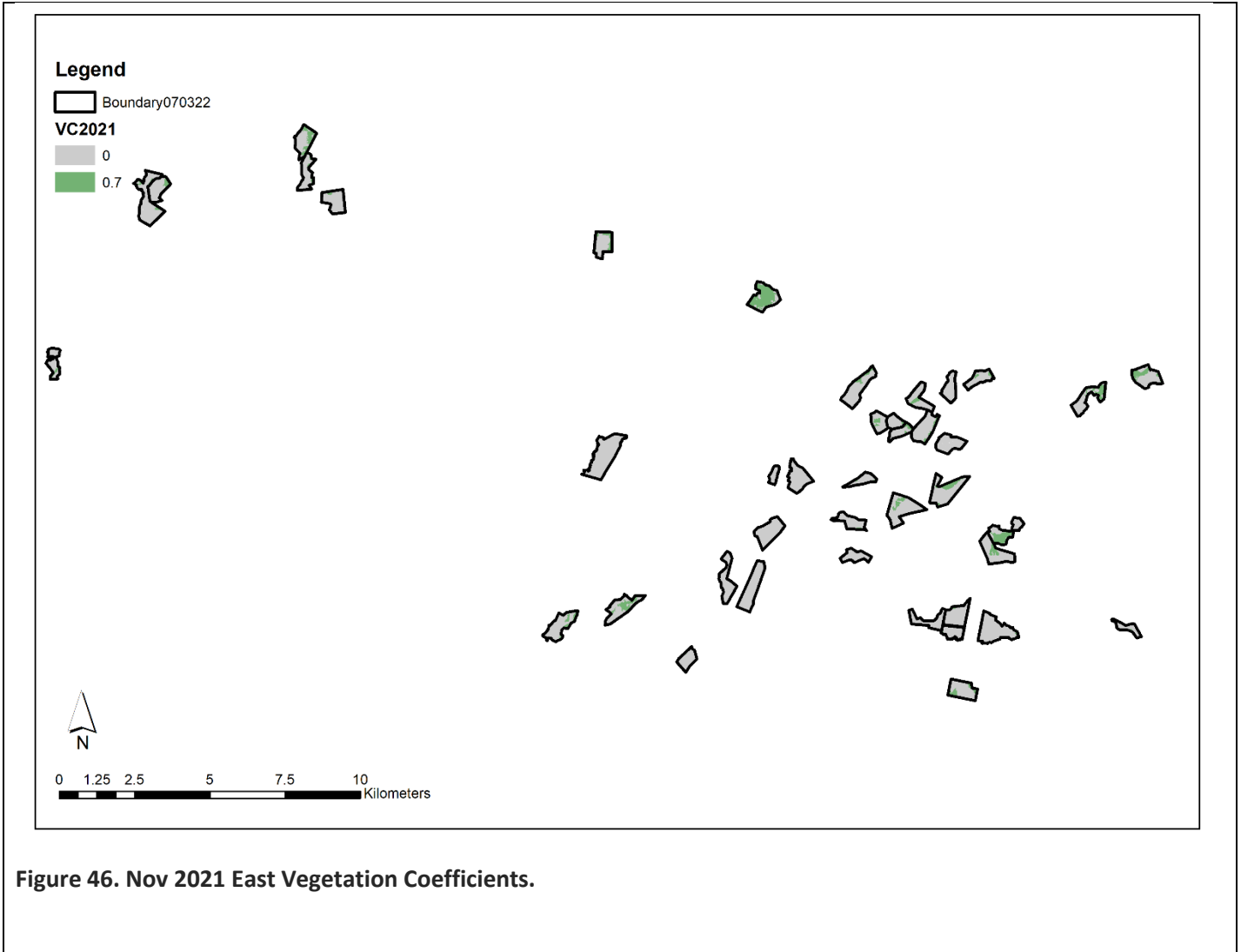


Figure 46. Nov 2021 East Vegetation Coefficients.



Figure 47. Nov 2021 West Vegetation Coefficients.

Environmental remediation, Raw liability and Final compensation

Because there has been no clearing for oil palm the environmental remediation, raw liability and final compensation liability are all 0 ha.

Section 9: Conclusions

RSPO Note: Please conclude all the findings of the assessment and how this will be translated into a management plan. If there is any known significant issue, the RSPO member needs to acknowledge its existence and ensure it is a priority for the management to address those issues.

Table 33. Threats to biodiversity and social values.

Value identified	Threat	Management	Monitoring
HCV 1	<ul style="list-style-type: none"> • Hunting • Fire • Invasive species 	<ul style="list-style-type: none"> • Agreements with the community about no hunting of birds / mammals in the HCV areas nor logging. 	<ul style="list-style-type: none"> • Undertake bird / mammals surveys to measure changes in bird mammal abundance / presence. • Map out areas of burns.

	<ul style="list-style-type: none"> • Logging • Agricultural clearance • Roding development 	<ul style="list-style-type: none"> • Awareness raising in villages to discourage random fire lighting. Enforcement of the “No Burn Policy” • Very little can be done about invasive species. • Agreements with the community about no clearance / logging within the HCV areas. Roding through the HCV areas to access oil palm must be avoided 	<ul style="list-style-type: none"> • Recording the presence of invasive species. • Monitoring using a combination of monitoring from satellite images as well as on the ground patrols and being informed by staff working in the village about encroachment or logging.
HCV 2	<ul style="list-style-type: none"> • These follow HCV1 and are not repeated. 		
HCV 3	<ul style="list-style-type: none"> • These follow HCV1 and are not repeated. 		
HCV 4	<ul style="list-style-type: none"> • Burning to assist agricultural development within the riparian buffer strip. • Lack of awareness by company employees and contractors about HCV 4, particularly small river riparian buffers and mismanagement of high risk activities within buffer areas (e.g building roads through riparian areas). • People constructing huts and living (permanently or temporarily) 	<ul style="list-style-type: none"> • Ensure that the communities realise that the riparian buffers are not empty land available for agriculture. This should be specifically stated in agreements and socialized to the community. • A survey and demarcating areas that are within 50 m of rivers and planting native trees in these areas (where the landcover is grassland). 	<ul style="list-style-type: none"> • Monitoring using a combination of monitoring from satellite images as well as on the ground patrols and being informed by staff working in the village about encroachment or logging. • Monitoring of land clearing to ensure buffers are not cleared. • Water quality monitoring. • Monitor the survival of trees on newly planted areas.

	<p>and making gardens in riparian areas.</p> <ul style="list-style-type: none"> • River changing course and destroying riparian areas • Fire – this will stop tree lined riparian strips being established. 		
5 (internal)	<ul style="list-style-type: none"> • Agricultural chemicals in the ground water • Claims and disputes on land. 	<ul style="list-style-type: none"> • Maintaining SOPs which are that no agricultural chemicals can be used within 60 m of rivers. • Ensuring adequate areas are available for the community to garden and collect natural materials (outside the lease area). • Mapping of clans’ lands (not just those areas to be leased) and assisting to have the land included in the ILGs. This is to ensure security of the land and right to use the land in the future. • Ensuring all claims and disputes are registered under the company’s grievance process. 	<ul style="list-style-type: none"> • Monitor against HCS metrics of 0.5 ha of garden land per person available. • Monitoring recommendations for HCV 1 & 4 will overlap with HCV 5 and are not repeated. • Keeping abreast of disputes and providing assistance to the communities where possible or necessary.
5 (external)	<ul style="list-style-type: none"> • Overfishing. • Continued agricultural expansion putting increased pressure on natural areas. Most likely this will be caused by oil palm companies that are not RSPO members nor have a “no 	<ul style="list-style-type: none"> • Currently people have stated that the level of fishing is not degrading marine resources. With the development of OP, hopefully this will reduce the pressure on marine resources. • Really this is in the hands of the community as it is their land. It is hard to say whether it is inevitable as the community are desperate for development. • Agreements within the community 	<ul style="list-style-type: none"> • Monitoring the prevalence of fish indicator species also the size of catches. • Recording problems with settlers or disputes between clans. • Mapping of the number and size of fires.

	<p>deforestation commitment”</p> <ul style="list-style-type: none"> • Fires in el nino years. • Settlers (or other parties) buying land in undocumented / illegal deals. 		
6	<ul style="list-style-type: none"> • Accidental clearing of cultural sites by NBPOL staff. • Fires that may burn these sites. • Communities simply forgetting about their history and / or cultural sites. 	<ul style="list-style-type: none"> • Demarcation in the field prior to land clearing and planting. Including an appropriate buffer to make sure these areas are not disturbed by operations. • Demarcation on operational maps • Documentation of cultural and historical values • Awareness raising with the communities to try to discourage them lighting fires. • On-going fire-fighting to put out fires before they get large and uncontrollable. • Get an anthropologist to document these sites and the stories of the clans so that this element of people’s culture is not lost. Additionally, the anthropologist should document the significance of each site and how it should be preserved. . 	<ul style="list-style-type: none"> • Checks to make sure enclaved areas are still clearly delineated. • Mapping of the number and size of fires.
Local people’s lands and future livelihood security	<ul style="list-style-type: none"> • Some of the clans may have limited gardening area following development (based on the HCSA metric). 	<ul style="list-style-type: none"> • Clans who believe their land may be limited after oil palm expansion should ensure they get user rights for additional gardening areas. 	<ul style="list-style-type: none"> • Surveys of food security – especially during difficult times (e.g. droughts or when FFB prices are low). • Monitor the location where gardening takes place (e.g. are clans being forced to garden in places where gardening would not normally be done.)
Peat	<ul style="list-style-type: none"> • Not present in the assessment areas 		
HCS forest	<ul style="list-style-type: none"> • These follow HCV1 and are not repeated here 		

Section 10: Confirmation of Report

The outcomes of all assessment reports have been accepted by the Management of NBPOL – Higaturu Oil Palm and will be applied in developing and managing as outlined in the management and monitoring plans presented in this report.

Date of Completion 21st May 2024

Signature



Name Benjamin Osa

Position Sustainability Manager