PyroNam

Submitted to: D U Kaiser – Kaiser Farming
Attention: Mr Dirk Ulrich Kaiser
Farm Waltershagen 135
Otjozondjupa Region
Namibia

REPORT:

FARM MANAGEMENT PLAN FOR THE BUSH THINNING ACTIVITIES AND BIOCHAR PRODUCTION ON FARM WALTERSHAGEN 135

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ABBREVIATIONS

ABBREVIATION	DESCRIPTION
%	Percent
˚C	degree Celcius
cm	centimetre
CO^2	carbon dioxide
DEA	Directorate of Environmental Affairs
DoF	Department of Forestry
EAP	Environmental assessment practitioner
ECC	Environmental Compliance Consultancy
ECC	environmental clearance certificate
EIA	environmental impact assessment
EMA	Environmental Management Act
EMP	environmental management plan
ENE	East north-east
FSC	Forest Stewardship Council
GEMP	generic environmental management plan
ha	hectre
I&APs	Interested and affected parties
IGI	International Generic Indicators
km	kilometre
km/h	kilometre per hour
m	metre
MEFT	Ministry of Environment, Forestry and Tourism
mm	millimetre
MoHSS	Ministry of Health and Social Services
N	North
NCA	Namibia Charcoal Association
NE	North-east
NNE	North north-east
No.	number
RH	relative humidity
RoD	Record of Decision
Subsp.	subspecies
spp.	species
TE	Tree Equivalent

1 INTRODUCTION

1.1 BACKGROUND

Bush encroachment refers to the proliferation of native and non-native woody plants in grasslands and savannas, leading to a reduction in biodiversity and productivity. Namibia is particularly affected by this phenomenon, with an estimated 45 million hectares of land affected (SAIEA, 2015). This is due to a combination of factors, including overgrazing, climate change, and fire suppression. The impacts of bush encroachment are significant, including reduced water availability, increased carbon emissions, and reduced economic opportunities. Various efforts are underway to address the issue, including the use of prescribed burning, mechanical removal, and the promotion of sustainable land management practices.

Invasive bush is currently present on Farm Waltershagen 135, and urgent measures are needed to restore the rangeland productivity on its property. Mr Dirk Ulrich Kaiser, the owner of the farm, proposes bush control activities, using manual or semi-automatic mechanical harvesting techniques.

Consistent with the Environmental Management Act, No. 7 of 2007 and its associated 2012 regulations, an environmental clearance certificate application will be submitted to the competent authority the Ministry of Environment, Forestry and Tourism (MEFT) to make a Record of Decision (RoD) with regards to the proposed Project.

1.2 NEED AND MOTIVATION FOR THE PROJECT

Covering an estimated 45 million hectares of the entire surface area of Namibia, bush encroachment is a major reason for the lowering productivity of rangelands in the country. Opportunistic indigenous bush and shrub species multiplied in abundance on farmland over the last six decades and suppressed the growth of grass and other palatable species markedly, initiating thickets and impenetrable stands, causing an overall reduction in biodiversity, a decreasing carrying capacity and a noticeable change in the water cycle.

If extensive thinning of invasive shrubs is implemented, the agricultural sector can increase economic output. When encroacher bush has become so dense that grazing resources are seriously reduced, then the bush Without active intervention, there is no way to reverse the problem. Active intervention is needed to reverse the problem of encroaching bush where it becomes so dense that grazing resources are seriously reduced. This will reinstate the rangeland's natural carrying capacity, improve biodiversity and restore the groundwater's natural recharging potential. The usual way for farmers to control the bush on their land is by thinning or defoliating it. However, to avoid a worse problem in the future it is necessary to carry out this practice with an effective veld management approach.

Implementing post-thinning management plans will be also needed in order to keep the area open, and to avoid potential regrowth complications. Moreover, it is essential that such activities are not deemed more important than environmental considerations when considering the harvesting of wood.

1.3 INTRODUCTION ON THE ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS

Environmental Impact Assessment (EIA) is a process that is used to identify, predict, evaluate and communicate the potential environmental impacts of a proposed development project. In Namibia, EIA is governed by the Environmental Management Act (No. 7 of 2007) and the Environmental Impact Assessment Regulations (2012).

The EIA process in Namibia is a systematic and transparent process that involves a number of steps. These steps include:

- **Scoping**: This is the process of identifying the potential environmental impacts of a proposed project and determining the scope of the EIA study.
- **Baseline studies:** This involves collecting information about the existing environmental conditions in the project area, including information about the air, water, soil, flora and fauna.
- **Impact Assessment**: This involves identifying and assessing the potential environmental impacts of the proposed project, including both positive and negative impacts.
- **Mitigation Measures**: This involves identifying measures that can be taken to reduce or avoid the negative impacts of the proposed project.
- **Public Participation:** This involves giving members of the public an opportunity to comment on the proposed project and the EIA report.
- **Decision-Making:** This involves reviewing the EIA report and making a decision about whether or not to approve the proposed project. The decision is based on the potential environmental impacts of the project, the effectiveness of the proposed mitigation measures, and the comments received from the public.
- **Compliance Monitoring:** This involves monitoring the implementation of the proposed mitigation measures to ensure that the potential environmental impacts are minimised or avoided.

In Namibia, EIA is mandatory for certain types of projects, including mining, agriculture, forestry, fisheries, energy, transportation, and water resource development. The EIA process is designed to ensure that development projects are carried out in an environmentally sustainable manner, with due consideration given to the potential environmental impacts of the project.

1.4 EIA FRAMEWORK

In 2017 MEFT released a publication to streamline and simplify the legal process authorising people to combat bush encroachment in Namibia. This is based on the *Strategic environmental assessment of large-scale bush thinning and value-addition activities in Namibia* (SAIEA, 2015)

which distinguishes three categories of thresholds for the environmental impact assessment (EIA) process on bush control activities.

Accordingly:

- No Environmental Clearance is required for areas smaller than 150 hectares where bush control activities are being conducted;
- A Generic Environmental Management Plan (GEMP) is required for an area larger than 150 hectares, but smaller than 5000 hectares where bush control activities are being conducted; and
- A full EIA and Environmental Management Plan (EMP) are required for an area larger than 5,000 hectares where bush control activities are being conducted.

Farm Waltershagen 135 covers an area of 5303.60 ha, and bush control activities are expected to stay within a total area below 3800 ha due to the nature of harvesting. Only manual and semi-mechanised harvesting practices will be used and harvesting is expected to be of low intensity. According to this, the farm will then be classified as a medium-sized bush harvesting operation (150 – 5000 hectares), which thus requires a GEMP in order to be granted an environmental clearance certificate.

An EMP aims to meet the requirements as legislated in Section 8 (j) of the regulations of the Environmental Management Act, No. 7 of 2007 and includes information about the identified environmental impacts, the management, mitigation, protection or remedial measures to be undertaken to address the impacts associated with the proposed operations. The GEMP may be amended as new information is made available.

Public Participation Process (PPP) allows interested parties and the public to be involved in the impact assessment since it constitutes an important source of information for decision-making.

1.5 TERMS OF REFERENCE

The assessment will focus on the environmental receptors that could be affected by the proposed Project. ECC will also engage neighbouring farmers and the Proponents to seek input into the assessment. The baseline studies chapter is broken into three sections, the baseline context, environmental (physical and biological), and social (including economic).

Desktop studies as well as all available field surveys from the Project area will be used to help define the baseline. These studies also give a further indication of whether any local or regional future developments could impact the project or vice versa.

Lastly, the socio-economic section of the baseline studies helps to gain information on the governance, demographic profile, social stratification (employment, education, infectious disease), occupation and livelihood (economic activities, employment rates) and access to

services. Below, Figure 1 provides the EIA process applied to bush thinning activities on a portion of land.

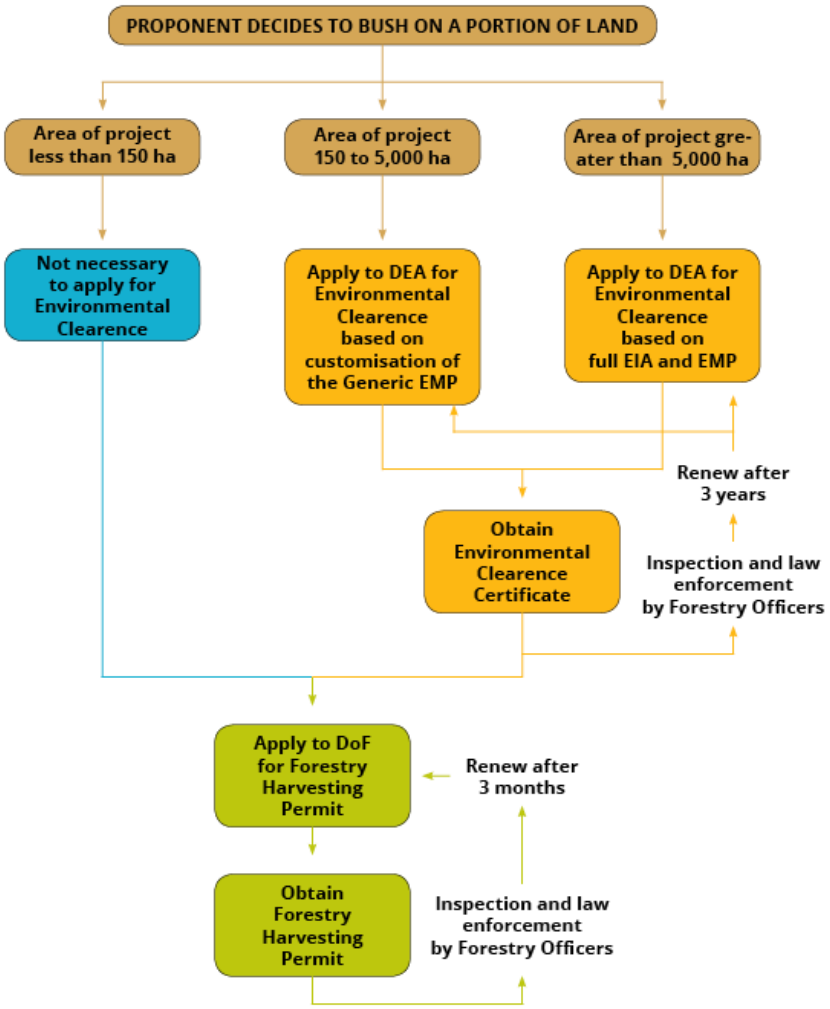

Figure 1 - Flowchart of the bush thinning activities EIA process (GIZ, 2017)

2 PROJECT INFORMATION

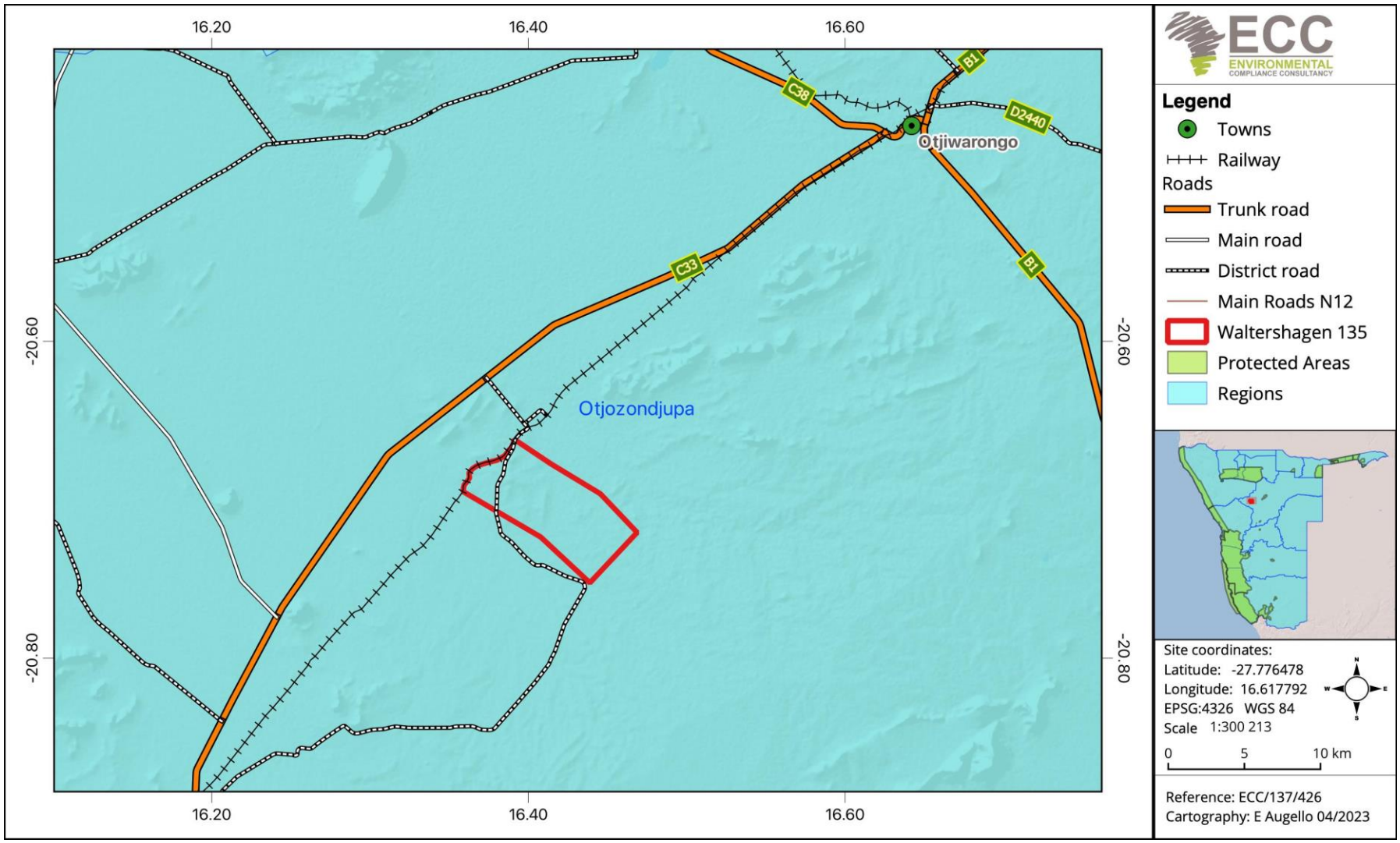

Figure 2 – Location of farm Waltershagen 135 in Otjozondjupa Region, Namibia

2.1 THE FARM

As shown in Figure 2, Farm Waltershagen 135, which is 5303.60 ha large, is situated in Otjozondjupa Region, about 40 km from Otjiwarongo along the C33 in a south-westerly direction. Mr Dirk Ulrich Kaiser is the owner who is managing the farm as a cattle farm, with cattle fences, and charcoal production. The owners of neighbouring farms, namely Erundu, Okaturwa, Excelsior, Helenenhof, Kuhwarder, Ykandonga and Ohiwa, have been informed about the intention of bush-thinning activities for farm Waltershagen 135 (Figure 3).

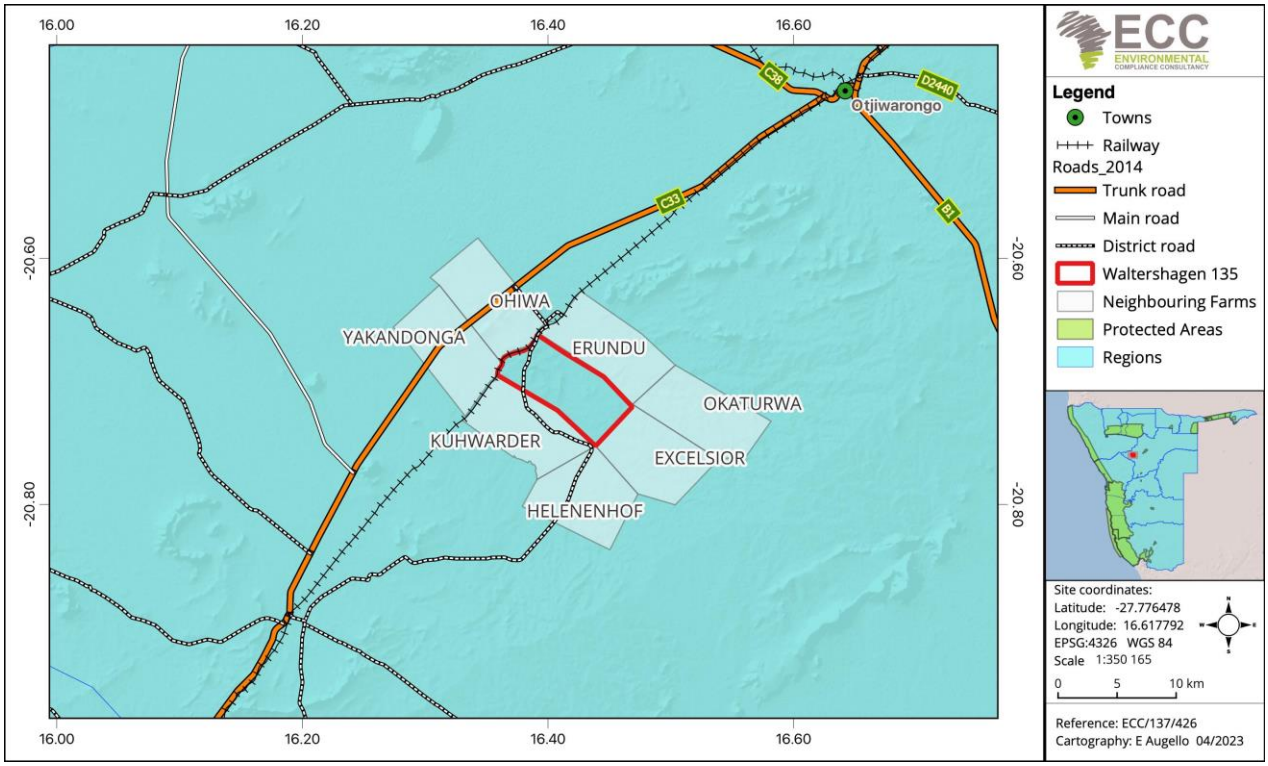

Figure 3 – Farm Waltershagen 135 neighbouring farms

Within Farm Waltershagen 135, a total of 115.5 ha, from a river with 66.6 ha and a district road (D2493) that crosses the farm with 48.9 ha, has been identified as excluded areas from bush-thinning activities. These areas are excluded from the total hectares of the farm that will be committed to harvesting (subject to amendments in respect of new developments). Therefore, the total area dedicated to bush thinning will cover 3 800 ha, which is subdivided into 19 smaller plots, that are managed using rotational plans for better sustainable use.

As shown in Figure 4, the area where farm Waltershagen 135 is located has a climate that is characterised by warm to hot summers and cold winters, with mean maximum temperatures ranging between 24˚C and 33˚C and mean minimum temperatures ranging between 5˚C to 19˚C. The hottest months of the year are between September and January and the coolest months are in June, July and August (Atlas of Namibia, 2002).

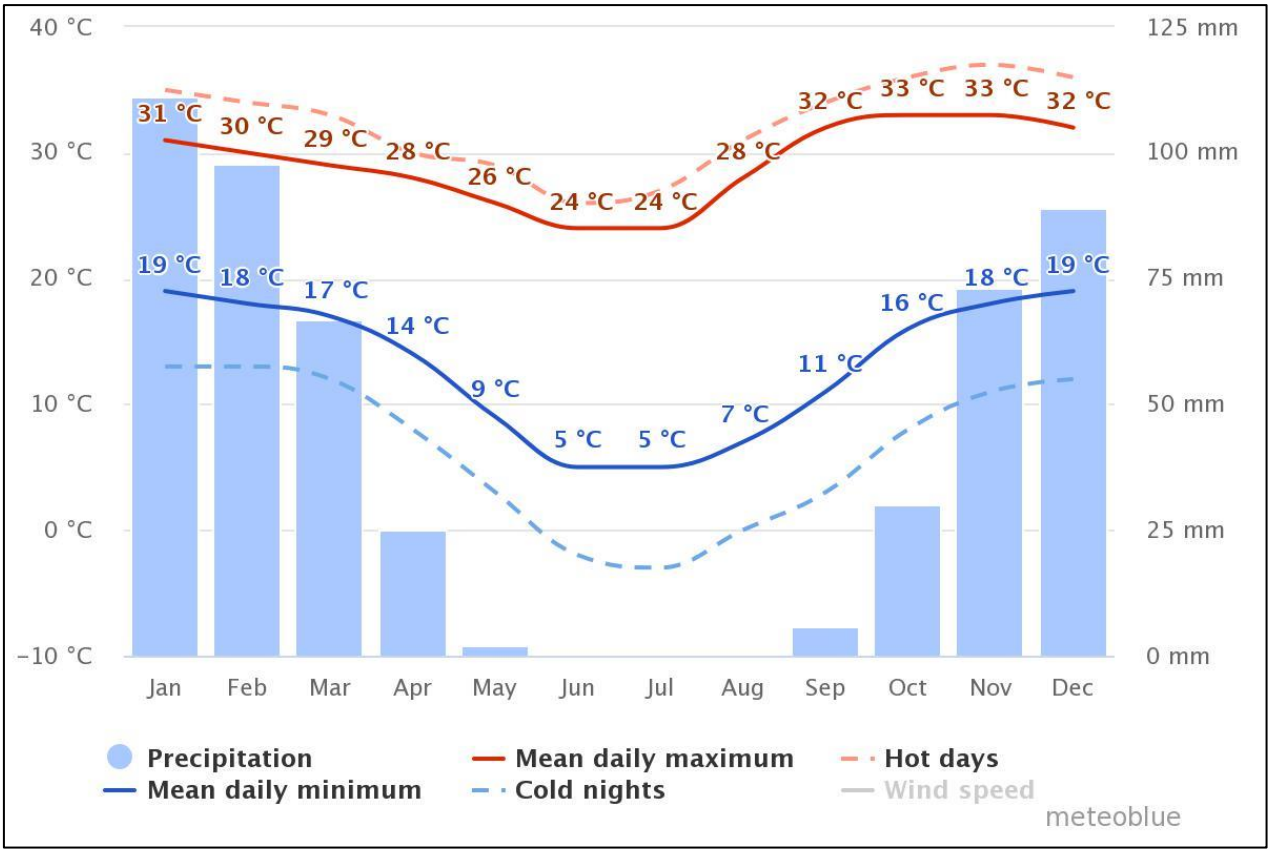

Figure 4 – Farm Waltershagen 135 average rainfall and temperatures (meteoblue, 2023)

The most humid months have a relative humidity (RH), of approximately 70% RH, and the driest month of approximately 10% RH. The average rainfall in this area during the year is between 400 to 450 mm and rainfall events are limited to the summer months, mainly between November and March. Potential evaporation is between 1,600 and 1,800 mm per year.

The plant diversity for this area is medium to high (300 to 400 species) and the dominant vegetation structure on Farm Waltershagen 135 is a thornbush shrubland and falls within the Savanna biome (Atlas of Namibia, 2002). The productivity of the farm is compromised by infestations of encroacher bush such as red-bark acacia (*Vachellia reficiens*), sickle bush (*Dichrostachys cinerea*), blackthorn (*Senegalia mellifera* Subsp. *dentinens)* and blue-thorn (*Senigallia erubescens*), Kalahari-sand acacia (*Vachellia luederitzii*), silver cluster leaves (Terminalia *sericea*), purple-pod cluster leaves (*Terminalia pruinoides*), mopane (*Colophospermum mopane*).

This area has wind speeds between 0 and 38 km/h, where the months of August to October are known to have the strongest winds. Wind can occur any time of the day and the most predominant wind directions for this area are N, NNE, NE and ENE (Figure 5) (meteoblue, 2023).

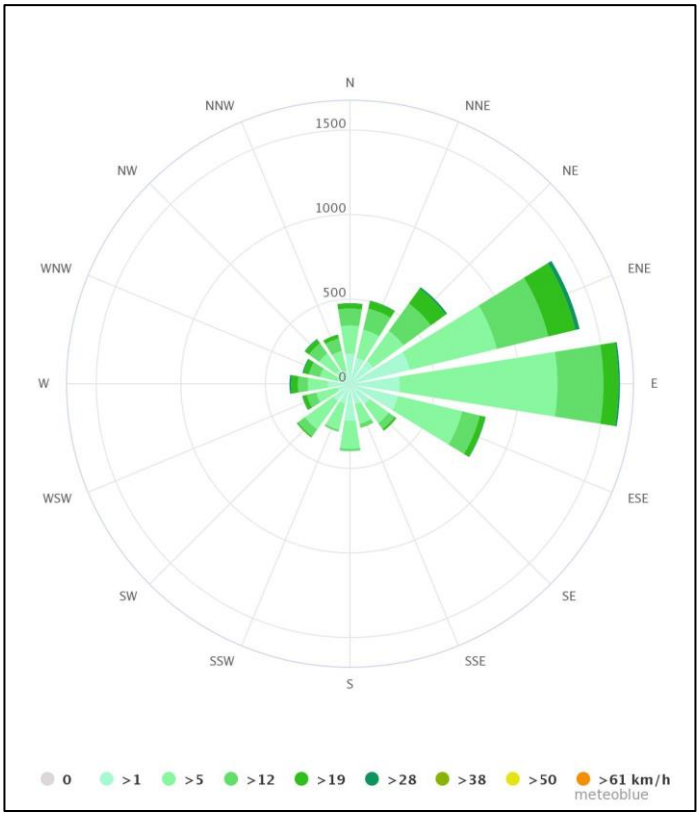

Figure 5 – Farm Waltershagen 135, average wind speed and direction (meteoblue, 2023)

Since 2022, de-bushing activities have been practiced on the farm after obtaining an environmental clearance certificate (ECC), in respect of application No. APP-3683. Moreover, Farm Waltershagen 135 is operating under harvesting (No. 06530) and marketing permits (No. 03525). Due to the intense encroachment, the owner proposes bush control activities as inevitable to restore the rangeland productivity on his property. Suggested operations include manual harvesting techniques that will clear land that eventually will develop into rangeland. The resulting use of forest products is meant to be used for Biochar production.

Biochar is a product of wood combustion under specific thermal conditions that result in an extremely porous material which is suitable to be mixed with the soil, potentially increasing its productivity and enhancing carbon sequestration, as well as a food supplement for livestock, augmenting its agricultural production (Bolan et al., 2022).

A very labour-intensive method of eradicating bush is manual cutting with axes and chainsaws as an early approach to eradication, which can be considered more commonly used by farmers than aftercare measures. This will not only improve agricultural productivity but also have a social benefit in terms of combating crime, raising income and solving food security problems. In addition, biochar production represents a significant potential for promoting diversified sources of income for farmers. The possibility of developing state-of-the-art bush harvesting and biochar processing services is also available.

2.2 DESCRIPTION OF THE PROPOSED BUSH-THINNING PROJECT

At present the project is planned for a duration of 10 years with chances to be prolonged in respect of new developments.

On the 22nd of February 2023, a site visit at Farm Waltershagen 135 was undertaken by ECC staff and four Tree Equivalent (TE) counts on targeted species, have been performed, three of which in a pre-harvest area and the last one in a post-harvest area. A TE is a unit of measurement, conventionally recognised as a 1.5 m tall tree, used in forestry to estimate the amount of timber volume or biomass per unit area. According to this definition, if in the field a 3 m tall tree is found, it will correspond to 2 TEs, while a 0.75 m bush will be 0.5 TEs. Trees with a diameter at the base greater than 18 cm should not be harvested (GIZ, 2017). The three pre-harvest counts have been chosen as representative of the overall bush encroachment problem and have been performed along 2.5 m x 50 m linear transects (125 m^2), North facing. Post-harvest TE counts will be performed in the same pre-harvest sites to inspect the correctness of the bush thinning procedures and evaluate the regrowth of coppice and saplings for aftercare activities.

Proposed bush control activities on Farm Walershagen 135 entail manual and semi-mechanised harvesting methods. Subject to feasibility, the harvested wood will be used for biochar production. The following components will form part of the proposed project:

Manual Bush Control: The use of heavy machinery to remove vegetation is a relatively quick and effective way for combating bush expansion, but it will result in soil erosion and land degradation. Manual and semi-automatic harvesting methods are preferred for small-scale operations, where cost and time are less important. It is labour-intensive and time-consuming but, if well-supervised, a highly effective method of control. Hand tools such as axes, bush picks, handsaws, pangas as well as chainsaws are used to take out individual bushes. The method is highly selective, making it ecologically sustainable. However, if not well supervised and if harvesters are not well trained, there is a risk that non-target plants may be removed.

Training of Workers: Workers need to be sufficiently trained in order to ensure that the removal of plants is in line with forestry regulations and health and safety guidelines. In order to reduce the incidence of re-growth, stumps should either be chemically treated or should be felled below the soil. Some species are likely to coppice if felled, hence aftercare is required.

Products of harvested wood: Income-generating activities such as the production of woodchips, firewood, droppers, charcoal and, more recently, biochar, turn the negative consequences of combating bush encroachment into economically viable results and create additional employment, while at the same time rehabilitating degraded ecosystems.

Biochar is a relatively new product in Namibia and it can be used to improve carbon sequestration, soil nutrient retainer as well as animal fodder (Bolan et al., 2022). Local, regional and international markets are not yet fully established, making its production one of the main potential developing markets in the medium term. It is of utmost importance that stakeholders at all levels, establish and develop a network to access such markets, aiming to be environmentally, socially and economically sustainable.

Detailed information about the ongoing proposed bush thinning project can be retrieved in Appendix A.

2.3 BIOMASS QUANTIFICATION

The total area considered for the biomass quantification corresponds to 5303.60 ha. Within the perimeter of the Farm Management Unit (FMU), some areas where a District Road is passing through, covering 48.9 ha, have been identified and excluded from the biomass production area. Moreover, an area of 535.30 ha has been earmarked for Wildlife Protection (WPA), which corresponds to about 10% of the total size. What remains (4719.40 ha) consists of rangeland covered by encroaching species, such as *S. mellifera*, *D. cinereal* and *V. reficiens*.

To calculate the biomass availability, 70% of standing biomass for targeted species was used to represent the dry mass (DM) biomass and then applied a biomass-to-biochar conversion rate of 30% to determine the allowable use of biochar.

Recommended sustainable use for the FMU (t/y of biochar): 2923

Table 1 below shows harvest periods and associated biomass/biochar availability in tons per year. We (ECC) recommend a sustainable use of 65% of the allowable use, which acts as a safety margin to avoid overharvesting/excessive harvesting. However, this figure is subject to change once harvesting begins.

Table 1 - Harvest years and associated biomass and biochar availability

Years of harvest	Biomass available (t/yr)	Biochar available (t/yr)
5	13 918.05	2 922.79
10	6 959.02	1 461.40
15	4 639.35	974.26
20	3 479.51	730.70

2.4 BIOMASS PROCESSING

Since 2018, MEFT is engaged in creating a dedicated legislature on Biochar, therefore, producers do still comply with regulations for normal charcoal production. Guidance for charcoal production is provided through the Namibia Charcoal Association (NCA) as well as widely available publications (e.g. *Good Practices for Namibian Charcoal* by the NCA and *Financing Bush Control* and the *Bush Control Manual* by the De-bushing Advisory Services Namibia), and charcoal producers need to comply with specific legislation contained in the Forestry Act, No. 12 of 2001 as amended by the Forest Amendment Act, No. 13 of 2005 and its regulations.

In the past, harvested wood by the Proponent was used for charcoal production. Charcoal is produced by heating organic biomass in the absence of oxygen, similarly to biochar. The Proponent proposes harvested biomass to be used for biochar production.

3 LEGAL FRAMEWORK

The Environmental Management Act shall apply to all wood harvesting activities in an area of more than 150 hectares per annum. This act is administered by the Environmental Commissioner in the Department of Environmental Affairs (DEA) in the Ministry of Environment, Forestry and Tourism (MEFT).

3.1 RELEVANT LEGISLATION APPLICABLE

The Directorate of Environmental Affairs (DEA) shall pursue the principles of Environmental Management as an entity responsible for managing and protecting its natural resources. The holder of an ECC shall support sound environmental management as defined in the Constitution, through the implementation of mitigation measures provided for in this Scoping Report and its accompanying environmental management plan (EMP).

Sustainable use of grassland, as well as the fight against bush invasion in order to restore and revive livestock productivity are key issues within the policy framework of Namibia. Integrated approaches to development activities are encouraged by sustainable development.

Table 2 indicates the relevant requirements to obtain a permit as per MEFT ordinance.

Table 2 - Legal requirements to obtain a permit as per MEFT

National regulatory regime	Applicability to the project
The Environmental Management Act, No 7 of 2007	This farm is classified as a medium-sized bush harvesting operation (150 – 5000 hectares), which thus requires a GEMP in order to be granted an environmental clearance certificate (section 4, Forestry Activities).
The Forestry Act, No. 12 of 2001 as amended by the Forest Amendment Act, No. 13 of 2005 - Harvesting permit	The proposed project will require a harvesting permit DoF for the cutting (harvesting) of encroacher tree species.
Transport permit	The proposed project may require a transport permit DoF for the transportation of biomass, produced by encroacher tree species.
Export permit	The proposed project may require an export permit DoF for the export of biomass, produced by encroacher tree species.
Marketing permit	The proposed project may require a marketing permit DoF for the marketing of biomass, produced by encroacher tree species.

4 IMPACT ASSESSMENT (POTENTIAL IMPACTS AND MITIGATION MEASURES)

Bush encroachment may generate some potential benefits, such as increased carbon sequestration and improved wildlife habitat, there are also negative impacts that can result from this phenomenon. Some of the latter are significant, including reduced water availability, increased carbon emissions, and reduced economic opportunities (Shikangalah & Mapani, 2020).

4.1 NEGATIVE IMPACTS OF BUSH ENCROACHMENT

Bush encroachment can alter the water cycle by increasing water consumption by trees and shrubs, reducing water infiltration into the soil, and changing the timing and amount of water that flows into streams and rivers. This can have negative impacts on downstream ecosystems and human water supplies.

Moreover, it can reduce the productivity of grasslands and savannas by shading out the grasses that livestock and wildlife depend on for food. This can negatively impact the livelihoods of farmers and pastoralists who rely on these resources for their animals.

One of the most environmental impacts of bush encroachment consists in the reduction in biodiversity by changing the composition and structure of plant communities. This can lead to a decline in the number and variety of plant and animal species that can thrive in the area.

The denser vegetation created by bush encroachment can increase the risk of wildfires, which can have devastating impacts on both natural ecosystems and human communities, as well as increase erosion by reducing soil stability and water infiltration, leading to increased runoff and sedimentation in streams and rivers.

4.2 POSITIVE IMPACTS OF BUSH THINNING

The best practice to reduce bush encroachment is bush thinning, which is recognised as one of the core priorities of Namibia's forest development policies. Clear advantages of bush-thinning can be summarised as follows:

- Employment and greater opportunities for income generation in rural areas
- Improvement of rangeland productivity
- Improvement of groundwater resources, reduction of vulnerability to climate change
- Improvement of biodiversity and ecological integrity of savannas
- Training and skills improvement
- Potential boost to the power sector, both in off-grid areas as well as in improving generation capacity over the whole grid
- Power generation from renewables – less demand on non-renewable sources, and less net CO^2 emission (NPC, 2009).

4.3 NEGATIVE IMPACTS OF BUSH THINNING

Notes on the particular activities causing severe negative impacts or habitats that may have a higher probability of being affected are taken into account in any potential impact (Appendix B)

5 GENERIC ENVIRONMENTAL MANAGEMENT PLAN (GEMP)

For the purpose of carrying out bush clearance and a commercial value addition project, an environmental certificate is required according to the Environmental Management Act and the Forestry Act.

Normally, an Environmental Impact Assessment (EIA) has to be completed, together with an Environmental Management Plan (EMP), through which the negative impacts identified in the EIA will be addressed. In order to ensure that the adverse effects are minimised, the EIA report and EMP will be considered by the environmental commissioner in the MEFT. If requirements are met, an Environmental Clearance Certificate is issued.

Farm Waltershagen 135 is part of the Pyronam biochar scheme, which is committed to following the Forest Stewardship Council (FSC) principles and criteria for the sustainable use of forest products (FSC, 2023). These Principles and Criteria are valid worldwide and filter down into national or regional forest management standards, or International Generic Indicators (IGIs), helping stakeholders and certification bodies to interpret the Principles and Criteria for a specific region or country and to bring global consistency to forest management standards (Appendix C).

The Clearance Certificate usually requires the implementation of the EMP by the project proponent in a timely manner. It is not advised to reduce the process of EIA for major projects which may have wide, complicated and or protracted environmental impacts. Differently, for smaller projects such as bush-thinning operations in an area between 125 ha and 5000 ha, only a General EMP needs to be prepared to be submitted to the DEA with the application for an ECC.

6 MONITORING

Monitoring after bush thinning is an important aspect of improving the ecological integrity of rangelands. It involves regular observation and data collection to assess the effectiveness of the thinning operation and to determine whether any further management actions are needed. The specific monitoring activities that are needed will depend on the objectives of the thinning operation and the characteristics of the forest stand. Some common monitoring activities after bush thinning include:

Vegetation cover and diversity: Monitoring changes in vegetation cover and diversity can provide valuable information about the impact of bush thinning on plant communities in rangelands. An increase in vegetation cover and diversity can indicate that bush thinning has improved habitat conditions for native plants and animals.

Soil health: Monitoring soil health can provide valuable information about the impact of bush thinning on soil quality and nutrient cycling. An improvement in soil health can indicate that bush thinning has reduced erosion and improved nutrient availability for plant growth.

Water availability: Monitoring changes in water availability can provide valuable information about the impact of bush thinning on hydrological processes in rangelands. An improvement in water availability can indicate that bush thinning has reduced water loss due to evaporation and improved infiltration and water storage in the soil.

Wildlife populations: Monitoring changes in wildlife populations can provide valuable information about the impact of bush thinning on wildlife habitat in rangelands. An increase in wildlife populations can indicate that bush thinning has improved habitat conditions for native wildlife species.

Carbon sequestration: Monitoring changes in carbon sequestration can provide valuable information about the impact of bush thinning on the carbon balance of rangelands. An increase in carbon sequestration can indicate that bush thinning has reduced greenhouse gas emissions and contributed to mitigating climate change.

By monitoring these indicators, rangeland managers can assess the effectiveness of bush thinning in improving the ecological integrity of rangelands and adjust management practices as needed to achieve their ecological goals.

7 PUBLIC PARTICIPATION PROCESS (PPP)

The public participation process refers to the process by which members of the public are given the opportunity to provide input, feedback, and opinions on decisions or actions that may affect them or their communities. This process is often used to gather input from stakeholders before making decisions that may have an impact on the community.

The public participation process typically involves a series of steps, including:

- Notification: The public is informed about the proposed decision or action, and how they can participate in the process.
- Input gathering: The public is given the opportunity to provide feedback, comments, and suggestions on the proposed decision or action. This can be done through public meetings, surveys, online forums, or other means.
- Analysis: The input gathered from the public is analyzed and considered as part of the decision-making process.
- Feedback: The public is provided with feedback on how their input was considered and how it influenced the decision.
- Implementation: The decision or action is implemented, taking into account the input and feedback received from the public.

The goal of the public participation process is to ensure that decisions and actions are informed by the input of the people who will be affected by them and to promote transparency and accountability in decision-making.

Farm Waltershagen's neighbours have been notified about the bush thinning operations and an acknowledgement letter for Farm Waltershagen 135 bush-thinning operations was signed by each owner and/or lessee (Appendix E). Details of Farm Waltershagen 135 neighbouring farms are shown in Table 3 below.

Table 3 – Farm Walterhagen's neighbours

No.	Farm Name	Contact person	Contact details
1	Farm Erundu 136	Andre Pretorius	0812966627
2	Farm Excelsion 134	Andreas Opholtzer	0811293391
3	Ohiwa 129	Frikkie Visagie	0811241370
4	Farm Kuhwarder	Dirk Ulrich Kaiser	0818024321

MEFT's decision on whether to issue the Environmental Clearance Certificate will be communicated to all registered I&APs, so as to comply with EMA 2007 and EIA 2012 regulations.

8 CONCLUSION AND RECOMMENDATIONS

8.1 CONCLUSION

Based on the strategic environmental assessment conducted by SAIEA, a project of magnitude 150 ha - 5000 ha, under which Farm Waltershagen 135 project is classified, yields low impacts, however the endorsed generic environmental management plan (GEMP) should be implemented.

8.2 RECOMMENDATIONS

Before starting bush control and biochar production, the owner of the farm must apply for a number of permits from the Forestry Directorate. In principle, to avoid deforestation, MEFT is required to carry out regular inspections of commercial farms producing charcoal and biochar. Such regular checks could therefore be hampered by the lack of personnel and resources in the Ministry. Therefore, it is recommended that the owner of the farm take a proactive role in maintaining an ongoing monitoring system.

These mitigation measures identified could significantly reduce negative impacts and improve the positive impact of this project if they are implemented.

Where relevant, in the event of a project being approved by MEFT, mitigation measures and other such provisions may be subject to enforcement as conditions for approval under the ECC.

Moreover, it is recommended that bush control activities are conducted in accordance with the FSC Standards, including the monitoring as per Annexure F: Monitoring Requirements in Appendix D of this report.

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APPENDIX A – GENERAL INFORMATION ABOUT THE PROJECT

Description	Specifications
Species to be thinned	Red-bark acacia (*Vachellia reficiens*), sickle bush (*Dichrostachys cinerea*), blackthorn (*Senegalia mellifera* Subsp. *dentinens)* and blue-thorn (*Senigallia erubescens*), Kalahari-sand acacia (*Vachellia luederitzii*), silver cluster leaves (Terminalia *sericea*), purple-pod cluster leaves (*Terminalia pruinoides*), mopane (*Colophospermum mopane*).
Density estimates of the problem area	3,307 trees/ha
Past efforts to manage bush encroachment on the land	Charcoal production.
Expected duration of the project (years)	10 years with chances to be prolonged in respect of new developments.
Rough density of trees to remain after thinning	1653 trees/ha
Size of area to be thinned (hectares)	The total area dedicated to bush tinning will cover 3800 ha, which will be subdivided into smaller plots, that will be managed using rotational plans for better sustainable use.
Methods of bush thinning to be used	Manual (axe) and semi-mechanised methods will be used.
Equipment / machinery / chemicals to be used	Axe and panga
Number of staff to be employed	50
How staff will be recruited	Already present on the farm
Where staff will live	Corrugated houses within Farm Waltershagen 135
What contractual arrangements will be made with staff	Will be paid per ton of biomass, on a contract basis.
Description of the bush value-adding project	Combat bush encroachment, restore rangeland, increase biodiversity, improve agricultural productivity, combat crime, raise employment, raise income, solve the food security problem, promote diversified sources of income and create new market opportunities

Description	Specifications
Products to be produced (description, quantity, etc.)	Biochar production. From the data collected it has been calculated that for a period of 10 years, the total biochar production available is 1,176 t/yr. Such results have been already calculated at 65% of the allowable use, which acts as a safety margin to avoid overharvesting/excessive harvesting and thus promote sustainable use. However, this figure is subject to amendments, subject to harvesting performance during operations.
Methods of production to be used	Manual harvesting
How will the product be taken to market?	Tractor with trailer
Who and where is the market?	PyroNam plant on Farm Waltershagen 135
What possible air emission will be generated?	No air emissions will be generated during harvesting.
How will the possible air emissions be supervised?	N/A
Where will water be obtained from?	Boreholes
How much water would be needed?	Water will only be used for hygienic purposes
If from a borehole, are there any abstraction permits in place?	Yes
What waste (liquid and solid will be produced?	Household waste
How and where will waste be disposed of?	Appropriate dump sites at the nearest town, Otjiwarongo.

APPENDIX B – IMPACTS OF BUSH THINNING AND MITIGATION MEASURES TO BE APPLIED

Negative Impacts of bush thinning	Mitigation measures
Felling of the wrong trees	• All bush cutters and machine operators must be trained on which trees to target. • In all bush harvesting operations, there should be supervision of cutters to prevent cutting or felling of non-target trees. • There should be more frequent inspection of harvesting operations, and stronger monitoring of the permits issued by Forestry officials. This should be complemented with inspections by Environment officials, to ensure that the conditions of the EMP, as stated in the Environmental Clearance, are being met. Monitoring should include assessing the vegetation community of targeted areas before harvesting begins, and then repeating the assessment a few months later. It will become evident over time if there is a decline in the proportion of non-target species.
Excess harvesting of trees	• Harvesting operations should be monitored at all times • The guideline harvesting levels for every bush-harvesting operation should be specified in the EMP
Disturbance to Wildlife	• The Environmental Management Plan should identify and define sensitive areas in the harvesting area and exclude them from the harvesting plan. Localised areas with relatively dense concentrations of birds' nests – such as along an ephemeral river with larger trees containing nests of vultures – should be excluded from harvesting activities. An attentive farmer should be aware of these things on his or her land and take care to cause as little disturbance as possible. • Vigilance by the farmer and/or the person in charge of the harvesting teams is necessary to prevent contraventions of the law. Teams that are left on their own for extended periods are likely to get away with poaching and felling of the wrong trees, while those that are visited and checked frequently will be more readily apprehended and the wrong activities penalised and

Negative Impacts of bush thinning	Mitigation measures
	stopped. It all depends on active, involved management.
Smoke and emissions from kilns	• Kilns should be operated efficiently, so that there is very little smoke. Kiln operators should be trained in correct packing of the kilns. • Retort kilns are known to be more efficient in that they produce less smoke. This alternative charcoal-making apparatus should be considered for charcoaling operations. • Scrubbers should be installed in factory chimneys to minimise air emissions.
Loss of Soil Fertility	• Avoid heavy machinery bush clearing practices
Increased encroachment after bush thinning	• Better aftercare strategies should be put in place considering the specifications of the regrowth that occurred. Depending on the severity of the encroachment, remedy strategies may include intensive grazing by goats, use of fire to kill young seedlings, shorter rotation time for bush harvesting, or controlled use of chemicals
Non-targeted tree harvesting	• Proper calibration of any application equipment, so that dosages are accurately applied. • Must have strict monitoring and management during application, so that the chemicals are not just 'thrown down an aardvark hole' or sold. • Further research is necessary to calculate minimum dosages that achieve the desired effect.
Safety and health hazards for workers	• Apply standard occupational safety measures and practices (training, protective clothing, availability of first aid facilities
Pollution of soil and water from bush-utilising factories	• The design of any bush processing plant must minimise the risk of causing pollution

APPENDIX C – GENERIC ENVIRONMENTAL MANAGEMENT PLAN (GEMP)

HEALTH AND SAFETY				
Impact description	**Generic mitigation measure**	**Project specific additional measures**	**Responsibility**	**Indicators**
HIV/AIDS infection due to risky sexual behaviour	• Provide awareness information to workers • Do not allow visitors to the project area • Provide free condoms • Provide recreation facilities (games/TV etc.)	None obvious, but the proponent must consider modifications to the generic mitigation measures	The person/company that has the permit from DoF is responsible for implementing. S/he must ensure that all sub-contractors implement the EMP. **VERY IMPORTANT** – the proponent must provide the names and contact numbers of the persons responsible	• Evidence of a training event, • Written instructions regarding visitors • facilities visible
Bites / stings from snakes, scorpions and insects	• Staff may not to catch or kill snakes or scorpions – back away. • Staff must wear protective glasses, gloves, closed shoes, hard hats and overalls while working. • A first aid kit, which includes an aspivenin pump, must be accessible for all staff. • Accommodation/eating areas are kept clean at all times, and garbage placed in	As above	The person/company that has the permit from DoF is responsible for implementing. S/he must ensure that all sub-contractors implement the EMP	• Evidence of a first aid training event, • Written instructions regarding non-handling of wildlife, • First aid kits accessible • Facilities clean • protective gear being

HEALTH AND SAFETY				
	closed containers to avoid attracting vermin, insects. • All staff must be informed in writing about the consequences of breaking these rules, and it must be clear that the rules are understood			worn
Harm to face, eyes, skin and other parts of the body from thorns, dust, etc	• Staff must wear protective glasses, gloves, closed shoes, hard hat and overalls while working.	As above	The person/company that has the permit from DoF is responsible for implementing. S/he must ensure that all sub-contractors implement the EMP	• Protective gear being worn
Loss of life/injury from traffic accidents	• Vehicles roadworthy and properly maintained • Drivers comply with all Roads Ordinances, including avoiding overloading, speeding, safety belts, yellow line driving. • Vehicles travel with lights on whether using tar or gravel roads. • No driving at night • No conveying of hitchhikers or non-project staff • Instruction in road safety must be given and repeated periodically amongst all	As above	The person/company that has the permit from DoF is responsible for implementing. S/he must ensure that all sub-contractors implement the EMP	• Vehicles roadworthy • Zero traffic fines or accidents • Evidence of drivers receiving instruction/ training in road safety. • All drivers licensed

HEALTH AND SAFETY				
	drivers. • All Staff must be informed about the consequences of breaking these rules, and it must be clear that the rules are understood			
Loss of life/injury from machinery accidents	• Machines properly maintained • Operators know and comply with machine instruction manuals. • Instruction in machine operating safety must be given periodically to operators.	As above	The person/company that has the permit from DoF is responsible for implementing. S/he must ensure that all sub-contractors implement the EMP	• Machines well maintained • Zero machine-related accidents • Evidence of operators receiving instruction/ training in operating safety
Loss of life/injury from fire accidents	• Fire-fighting equipment (rubber beaters and/or backpack spray) must be accessible at key points during controlled burning. • Deploy beaters/backpack spray immediately when a fire starts. • A fire cart must be available at each workstation with water supply and pumps to deal with fire. • Regular training for site staff on fire prevention and control, especially in the dry season.	As above	The person/company that has the permit from DoF is responsible for implementing. S/he must ensure that all sub-contractors implement the EMP	• No fire incidents • Evidence of a fire-fighting training event, • Written instructions regarding fire prevention, • Fire-fighting equipment available at base camp, on vehicles and at charcoal kilns.

HEALTH AND SAFETY				
	• If a fire starts, notify the farm owner/ manager immediately. • Open fires only permitted in a designated facility at the site camp. Campfire must be extinguished when staff go to bed or leave the camp. • No cigarette butts, matches or any other burning object may be thrown into the veld. • An area of at least 3 metres must be cleared of grass around active charcoal kilns. • Combustible refuse must be burnt in a drum. An area of 3 metres must be cleared of grass around such a drum. The drum may not be left unattended until the fire is extinguished, and a lid has been placed on the drum			• Suitable drum available for combustible refuse and located in cleared area. • Suitable cleared area designated for campfire at base camp

Disturbance of Wildlife and Livestock				
Impact description	**Generic mitigation measure**	**Area specific additional/ alternative measures**	**Responsibility**	**Indicators**
Loss of wildlife	• The killing of wildlife and setting of snares	As above	The person/company	• No snares present in

Disturbance of Wildlife and Livestock				
and livestock from poaching	is prohibited. Anyone caught involved in such activities will be fired immediately. • Possession of a firearm or snare is prohibited. Such items will be confiscated if detected, and the offender issued a warning. • All staff must be informed in writing about the consequences of breaking these rules, and it must be clear that the rules are understood		that has the permit from DoF is responsible for implementing. S/he must ensure that all sub-contractors implement the EMP.	the camp or veld • No firearms on site • No incidences of poaching
Escape of wildlife and livestock due to fences damages/ gates left open	• Fences may not be damaged and gates may not be left open. • All staff must be informed in writing about the consequences of breaking these rules, and it must be clear that the rules are understood	As above	The person/company that has the permit from DoF is responsible for implementing. S/he must ensure that all sub-contractors implement the EMP.	No wildlife or livestock escape from the property due to fences damages/ gates left open by project staff.
Loss of wildlife/ livestock because of fires	• See section on fires in “Health and Safety”	As above	The person/company that has the permit from DoF is responsible for implementing. S/he must ensure that all sub-contractors implement the EMP	See section on fires in “Health and Safety”
Disturbance of	• Permanent nests of large raptors such as	As above		

Disturbance of Wildlife and Livestock				
sensitive animal species	eagles or vultures, must be avoided by at least 100 m. • Some reptiles such as tortoises and pythons move very slowly when cold. Site staff, drivers, and the machine guide in particular, shall look out for any slow-moving animals and avoid causing any harm to such animals			

Damage to Plants and Rangelands (Other than those being legally harvested)				
Impact description	**Generic mitigation measure**	**Area specific additional/ alternative measures**	**Responsibility**	**Indicators**
Loss of protected tree species	• Avoid cutting protected trees, whether large or small ones. Many of the protected species are frequently found amongst dense encroacher bush, so they are at risk of being destroyed by bush management practices e.g. harvesting machines, arboricides, and even hand labour, if not adequately supervised. • Protected trees must be marked (e.g. with hazard tape) and all staff must know that	As above	The person/company that has the permit from DoF is responsible for implementing. S/he must ensure that all sub-contractors implement the EMP.	• No protected trees are cut

Damage to Plants and Rangelands (Other than those being legally harvested)				
	marked trees are out of bounds. • Trees protected under the Forest Act are listed in **Annex 1**. • All staff must be informed in writing about the consequences of breaking this rule, and it must be clear that the rule is understood.			
Disturbance of sensitive plant habitats	With the exception of prosopis and black wattle, there must be no bush/tree cutting in broadleaved woodlands and other sensitive habitats including: • *Kirkia acuminata – Danthoniopsis dinteri* woodlands in the Otavi Mountains. • *Spirostachys africana - Terminalia prunioides* thickets/woodlands occurring often on footslopes or plains. • *Olea europea* subsp. *africana – Euclea undulata* thickets. • *Terminalia sericea – Acacia fleckii* thickets occurring on remnants of sand dunes within the karstveld. • All plant communities within 100m of a fountain or spring. These habitats often include uncommon wetland trees.	As above	The person/company that has the permit from DoF is responsible for implementing. S/he must ensure that all sub-contractors implement the EMP	No bush/tree cutting in such areas, with the exception of black wattle and prosopis

Damage to Plants and Rangelands (Other than those being legally harvested)				
	• *Acacia erioloba – Tylosema esculentum* habitats, and all stands of *Acacia erioloba* trees. • Palmveld (*Hyphaene petersiana*)			
Ecological imbalance due to over-harvesting	• In order to maintain soil fertility and provide habitat and browse for wildlife and birds, the following measures shall be carried out within each and every target area: o Leave bush clumps (or 'islands') totalling at least **10%** of the target area. o If any slopes with gradients of 5 – 12.5% are included in the target area, then the islands must be increased to **20%** on those slopes. • Within areas that are cut, all large trees (over 4m tall), including dead trees, shall be retained. The only exception is if the vegetation consists entirely of encroachers that are all over 4m. In that case, leave 300 - 500 per hectare in any case. • The TE – rainfall formula includes all sizes and species, including Protected species.	Modify this component of the EMP considerably for the specific habitat in the project area	The person/company that has the permit from DoF is responsible for implementing. S/he must ensure that all sub-contractors implement the EMP	Correct level of harvesting, adequate numbers of trees, and islands, remain. Area has a "park-land" appearance after bush thinning.

Damage to Plants and Rangelands (Other than those being legally harvested)				
	The result a year after cutting should be grasslands with many large trees providing shade in a park-like landscape, with some islands of bush as mentioned above. • In addition to small bush islands, also leave at least one large area exceeding **1 ha** as a representative sample of the original habitat. • All 'islands' envisaged above should include browser species of bush, Protected species of trees, and even encroacher species as they also have benefits for soil fertility. Browser species are listed in **Annex 3**. • Seek to create an environment with a matrix of grass, large trees and bush			

Soil Erosion				
Impact description	**Generic mitigation measure**	**Area specific additional/ alternative measures**	**Responsibility**	**Indicators**
Loss of topsoil as a result of bush	• No bush cutting permitted on slopes steeper than 12.5% gradient (i.e. 1 in 8).	Modify this component of the	The person/company that has the permit from	• No bush thinning in steep areas

Soil Erosion				
thinning.	• _Bush cutting is also not recommended on slopes of 5 - 12.5% (i.e. between 1 in 20 and 1 in 8). • On all slopes of 5 – 12.5%, machinery should move approximately along the contours (not up and down slopes). • If such slopes are significantly bush encroached it is recommended that they be set aside as part of the 50% of bush encroached areas per farm that will not be cut even in the medium to long term. • Sandy and silty soils are prone to erosion and loss of soil fertility following bush cutting. Where *Terminalia sericea* is dominant it is an indicator of deep sand. All sites where this species is dominant should be harvested at the TE – rainfall formula for woodland i.e. TE per hectare = 3 x rainfall	EMP for the specific conditions on the site.	DoF is responsible for implementing. S/he must ensure that all sub-contractors implement the EMP.	• Bush cutting by machines must be done along the contour
Erosion or destabilisation of river banks as a result of bush thinning	• No bush cutting permitted within 100 metres of a watercourse (see Forest Act). This includes small watercourses and 'blind valleys' found in karst areas, and also springs. • Two exceptions only are permissible	Modify this component of the EMP considerably if the project envisages removing Prosopis or black wattle.	As above	Apart from the exceptions of black wattle and Prosopis, no tree cutting in riverbeds, riverbanks or within 100 metres thereof

Soil Erosion				
	○ where bush has encroached into ephemeral (seasonal) pans – it is acceptable to clear the bush within the floor of the pan but not around the outside margins. ○ Prosopis and black wattle may be removed from within a watercourse and from the riverbank	Also modify the EMP if the land has no watercourses, or if they are significantly different to those described in column 2		

Pollution of Groundwater				
Impact description	**Generic mitigation measure**	**Area specific additional/ alternative measures**	**Responsibility**	**Indicators**
Pollution of soil and water from waste products (e.g. tars, ash, brine) generated in bush-to-energy plants or factories for wood products	• Where appropriate, the waste should be reused. E.g. i) ash should be redistributed in the harvested areas so that nutrients are returned to the soil. ii) Some of the tars produced in a wood gasifier, might be re-useable as fuel in the plant. • Where re-use is not feasible, appropriate disposal must be considered e.g. in a site equipped for hazardous waste disposal, with measures to prevent seepage into	Modify this component of the EMP for the specific conditions and wastes generated on site.	The person/company that has the Environmental Clearance is responsible for implementing. Composition of effluents should be specified by the proponent, and measures for safe disposal put in place.	• A sporadic sampling of local soil and water, to test for contaminants

Pollution of Groundwater				
	soil and groundwater. • Brine and contaminated water should be collected and stored in sealed evaporation ponds. The residue should be regularly scraped up and disposed of in an appropriate site		Water quality inspectors from MAWF and/or MoHSS need to exercise control over disposal of effluents	
Small-scale, local pollution patches caused by spillages and servicing of machinery used in bush harvesting operations. (e.g. fuels, oils, greases)	Regular maintenance and servicing of vehicles and machinery, to prevent breakdowns and the need for on-site repairs	Modify this component of the EMP for the specific conditions and wastes generated on site	The person/company that has the Environmental Clearance is responsible for implementing	• A sporadic sampling of local soil and water, to test for contaminants

Pollution of Air				
Impact description	**Generic mitigation measure**	**Area specific additional/ alternative measures**	**Responsibility**	**Indicators**
Smoke given off	Training and supervision of charcoal producers	Modify / adapt where	Charcoal producer	Complaints from

Pollution of Air				
from charcoal kilns can, under certain conditions, accumulate to harmful levels.	can improve the efficiency of the process, so less smoke is produced. Retort kilns, operated efficiently, produce almost no smoke	appropriate		neighbours / local people
Wood utilisation factories may generate air pollution e.g. smoke, soot.	Air emission control measures e.g. scrubbers installed in chimneys	Modify / adapt where appropriate	Proponent is responsible for minimising air emissions	Complaints from neighbours / local people

Prevention of Regrowth through Aftercare				
Impact description	**Generic mitigation measure**	**Area specific additional/ alternative measures**	**Responsibility**	**Indicators**
The original encroacher species, or more aggressive colonisers, will quickly establish themselves in the thinned-out areas	Preventing bush regrowth following harvesting can be achieved through: • Hand application of arboricides • Mechanical removal of problematic single plants • Stem burning • Judicious use of fire • Intensive browsing by goats or antelope, especially when regrown	There are no formulas or recipes for ideal aftercare – trial and error learning from neighbours, is essential, as is regular and meticulous monitoring	Farmer/landowner/land custodian	Thinned areas remain at the required tree density, or within defined limits of acceptable change

Prevention of Regrowth through Aftercare				
	plants are still small			
Burning and/or stem burning generates air pollution e.g. smoke, soot, and fires may "get away", threatening other rangeland and neighbours	• No burning when the day temperature exceeds 25˚C or wind exceeds 20 kph or in combination thereof during the months of April to July. • Notify neighbours a day or two before the controlled burning. • Remove livestock from the area prior to burning. • Ensure there are escape routes for larger forms of wildlife so that they do not succumb to the fire. • Avoid burning in areas where there are active nests of endangered bird species (e.g. vultures, eagles) – wait until chicks have fledged. • Fire-fighting equipment (fire-cart, rubber beaters and/or backpack spray) must be accessible and in working condition. • Prepare firebreaks that are at least 3 metres wide, around the area on 3 sides, prior to the controlled burn, or define an area bordered by roads which are wide enough to prevent a	Fires need careful planning. Each burn must take into account the weather, available fuel, the purpose of the fire (hot or cool fire?), neighbour rights and needs	Farmer/landowner/land custodian	Fire is fit for purpose and it is contained as planned

Prevention of Regrowth through Aftercare				
	fire "jumping". • Monitor the area after the burn is over, in case a smouldering coal or dung is blown into an unburnt area			
Illness to workers through exposure to chemicals	• Staff must wear the necessary protective gear while working with chemicals. • Staff must know and comply with instruction manuals for the particular chemical. • Instruction in chemical application must be given periodically to staff	None obvious	Farmer/landowner/land custodian	No injury to workers

APPENDIX D – FSC MONITORING REQUIREMENTS

FSC is an independent, not for profit, non-governmental organisation dedicated to the promotion of responsible forest management worldwide. Founded in 1993, its mission is to promote environmentally appropriate, socially beneficial and economically viable management of the world's forests. FSC operates on the ground through a network of Regional and National Offices and focal points in more than 40 countries.

FSC sets forest management standards based on 10 Principles and Criteria for responsible forest management. These Principles and Criteria are valid worldwide which filter down into national or regional forest management standards, or International Generic Indicators (IGIs), helping stakeholders and certification bodies to interpret the Principles and Criteria for a specific region or country and to bring global consistency to forest management standards.

In 2019 the first Namibian FSC standard was approved. The National Forest Management Standard (NFSS) for the Republic of Namibia is based on Version 5 of the Forest Stewardship Council (FSC) Principles and Criteria (P&C) and have been in effect since April 2020 (FSC, 2019).

The FSC Principles & Criteria describe the essential elements or rules of environmentally appropriate, socially, beneficial and economically viable forest management. These are listed as follows (FSC, 2020):

- **Compliance with laws** - Forest management shall respect all applicable laws of the country in which they occur, and international treaties and agreements to which the country is a signatory and comply with all FSC Principles and Criteria.
- **Workers' rights and employment conditions** - Long-term tenure and use rights to the land and forest resources shall be clearly defined, documented and legally established.
- **Indigenous peoples' rights** - The legal and customary rights of indigenous peoples to own, use and manage their lands, territories and resources shall be recognised and respected.
- **Community relations** - Forest management operations shall maintain or enhance the long-term social and economic well-being of forest workers and local communities.
- **Benefits from the forest** - Forest management operations shall encourage the efficient use of the forest's multiple products and services to ensure economic viability and a wide range of environmental and social benefits.
- **Environmental values and impacts** - Forest management shall maintain, conserve and restore ecosystem services and environmental values of the forest and shall avoid, repair or mitigate negative environmental impacts.
- **Management planning** - Forest manager shall have a management plan consistent with its policies and objectives and proportionate to scale, intensity and risks of its management activities. The management plan shall be implemented and kept up to date based on monitoring information to promote adaptive management. The associated planning and

procedural documentation shall be sufficient to guide staff, inform affected stakeholders and interested stakeholders and justify management decisions.

- **Monitoring and assessment** - The forest managers shall demonstrate that progress towards achieving the management objectives, the impacts of management activities and the condition of the forest, are monitored and evaluated proportionate to the scale, intensity and risk of management activities, to implement adaptive management.
- **High conservation values** - The forest manager shall maintain and/or enhance the High Conservation Values of the forest through applying the precautionary approach.

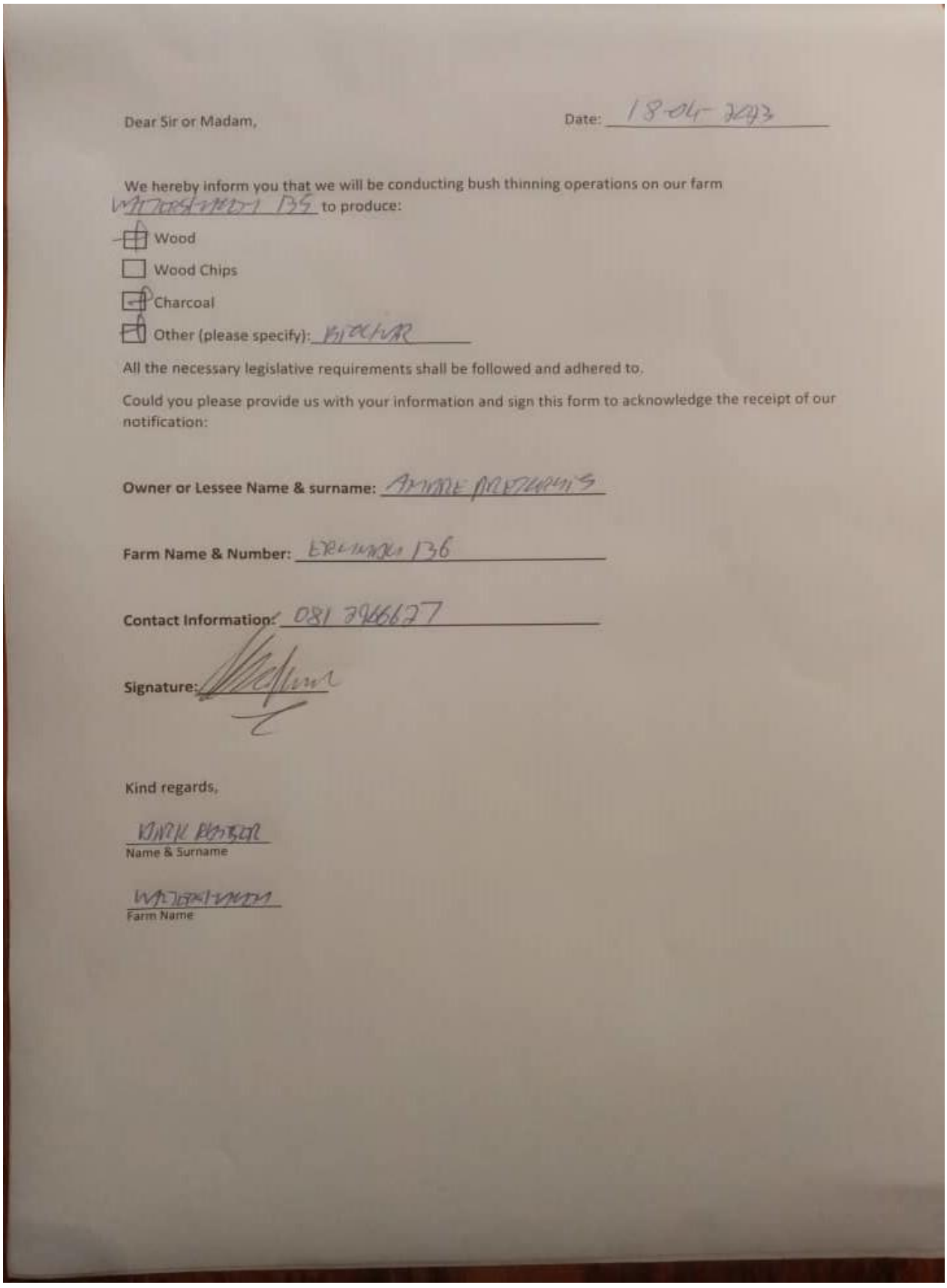
Implementation of management activities – Management activities conducted shall be selected and implemented with the manager's economic, environmental and social policies and objectives and in compliance with the FSC Principles and Criteria collectively.

FSC's criteria must be complied in order to obtain its certification, moreover, it is fundamental to maintain high standards of sustainability to be able to withhold it. Following the indications of FSC's Annexure F on monitoring requirements, is the practice to follow to retain the certificate.

FSC Annexure F: Monitoring Requirements *Aspects in italic should be made publicly available*	
No.	**Aspect**
1	*Density Data Model* calculations*
2	*Plan versus Actual volume of products produced*
3	The use of local processing and local services
4	Evidence of illegal harvesting (protected trees and oversized trees)
5	Resolution of disputes* and grievances with all stakeholders, inclusive of sexual and gender discrimination
6	Training carried out in accordance with Annexure B, Effectiveness of training
7	*Fair employment conditions*
8	*Housing, in accordance with Annexure D*
9	*Periodic potable water testing*
10	Programs and activities regarding occupational health and safety
11	Safe working conditions, accident rates
12	Timeous payment of wages
13	Deductions as per the Labour Act
14	*Identification and Engagement of Stakeholders, Indigenous Peoples Groups and Local Com- munities**
15	Full implementation of the terms in binding agreements*
16	Identification and eradication of Invasive alien species (e.g. *Prosopis spp.*and *Optunia spp.*)
17	*Silvicultural practices* are implemented that are ecologically appropriate, in relation to the management objectives*

18	Use of fertilisers (demonstrating that their use is more ecologically beneficial than non-use)
19	*Integrated Pest Management Plan – inclusive of chemical use, monitoring of after-care*
20	Impacts from Natural Hazards (i.e. Fire and Drought)
21	*Impacts from Fires resulting from Management Activities*
22	The impacts of site disturbing activities on soil structure – erosion and compaction
23	*The impacts of harvesting and extraction of timber on environmental values*
24	Environmentally appropriate disposal of waste materials
25	*Protection* of sites of special cultural, ecological, economic, religious or spiritual significance*
26	*Identification and Management of High Conservation Values**
27	*Changes in Environmental values* and ecosystem functions* after Management Activities*
28	*Protection of Rare and threatened species**
29	*Poaching Activities*
30	*Conservation of Sensitive Ecosystems**
31	Ecological restoration* of the MU
32	Conversion of natural forest* to non-forest*

APPENDIX E – ACKNOWLEDGEMENT LETTERS



Dear Sir or Madam,

Date: 18-04-2023

We hereby inform you that we will be conducting bush thinning operations on our farm Waltershagen 135 to produce:

- [x] Wood
- [ ] Wood Chips
- [x] Charcoal
- [x] Other (please specify): Biochar

All the necessary legislative requirements shall be followed and adhered to.

Could you please provide us with your information and sign this form to acknowledge the receipt of our notification:

Owner or Lessee Name & surname: Annie Andreas

Farm Name & Number: Erlangen 136

Contact Information: 081 2966627

Signature:

Kind regards,

Name & Surname

Farm Name

Dear Sir or Madam, Date: 18-04-2023

We hereby inform you that we will be conducting bush thinning operations on our farm WALTERSHAGEN 135 to produce:

- [x] Wood
- [ ] Wood Chips
- [x] Charcoal
- [x] Other (please specify): BIOCHAR

All the necessary legislative requirements shall be followed and adhered to.

Could you please provide us with your information and sign this form to acknowledge the receipt of our notification:

Owner or Lessee Name & surname: FRIKKIE VISAGIE

Farm Name & Number: OKAMA 139

Contact Information: 081 124 1370

Signature: [signature]

Kind regards,

MARK KAISER
Name & Surname

WALTERSHAGEN
Farm Name

Dear Sir or Madam, Date: 18-04-2023

We hereby inform you that we will be conducting bush thinning operations on our farm WALTERSHAGEN 135 to produce:

- [x] Wood
- [ ] Wood Chips
- [x] Charcoal
- [x] Other (please specify): BIOCHAR

All the necessary legislative requirements shall be followed and adhered to.

Could you please provide us with your information and sign this form to acknowledge the receipt of our notification:

Owner or Lessee Name & surname: ANDREAS GRETTNER

Farm Name & Number: EXCELSIOR 134

Contact Information: 081 129 3391

Signature: [signature]

Kind regards,

DIRK KAISER
Name & Surname

WALTERSHAGEN
Farm Name