

DRAFT

Kwamtili Forest Management Plan

Prepared for:

Kwamtili Estate Limited

Kwamtili, Mkinga District, Tanga Region

1,150 Total Parcel Hectares

___ Total Certified Hectares

Plan Duration: 20 Years (2030)

Prepared by:

JPFIRST Limited

Plan prepared: February 2010

Field work:

LANDOWNER MANAGEMENT GOALS AND OBJECTIVES

The main goal of management is to convert a major part of Kwamtili estate into a natural forest habitat for indigenous flora and fauna, preferably joined to other forest fragments in the Eastern Usambara.

The objectives of the company are:

- To facilitate re-growth and enrichment of the natural forest trees indigenous to the area (particularly *Melitia excelsa*).
- To increase the population of wild fruit species for the sustenance of wildlife in the area in order to create conditions for the stable co-existence of man and animals
- To develop eco-stable, economically attractive, forest-based land utilisation types that can be adopted by surrounding communities
- To develop eco-tourism in the area
- Economic development of the surrounding population

GENERAL PROPERTY DESCRIPTION

Kwamtili Estate is a cocoa farm situated in Mkinga District, Tanga Region in north-eastern Tanzania, about 50 km from the coast of the Indian Ocean. The farm has an area of 1,150 ha, which includes 770 ha of forest. Most of this forest covers the Kwachawa Mountain, which itself is approximately 680 ha.

At its peak as a commercial farm, the estate had a planted about 300.000 cocoa plants. Available production statistics show that around 19.. the farm was producing ... tons of dried cocoa from ... ha. The major market was in Europe.

In 19... the founder/first owner of the estate died and was laid to rest within the farm. Management of the estate was left to his wife. During the second management term, the company was run from a town office in Tanga, some 60 km away. From about that time the estate was plagued by a management problem. The shareholders began to neglect the enterprise, some died and others came into the company as part of loan deals. The company began to run into debt, the farm became neglected, production fell and the company made huge losses. The accounts of 200.. show a loss of ... with ... in creditors. The Managing Director was getting on in age and died in 2002.

The present (third-term) management took over in 2003. The Managing Director is a retired business man and took on the responsibility of running the farm initially as a pass-time activity. The estate is still run from a home office in Tanga town. The present Managing Director has been pumping money into the estate to keep the enterprise from liquidation. Most of this money has gone into loan servicing and government penalties.

Though not making profit, the Kwamtili cocoa plantation remains about the only one of kind in Tanzania todate. Planted under a canopy of old natural forest, it is home for a number of bird and animal species. The estate has turned from a commercial enterprise that can sustain itself more to a nature spot with its scenic view.

The area surrounding the farm is highly impoverished. Accessibility from the nearest local market centres is by poor gravel roads, which can become difficult during periods of heavy rain. Although we do not have statistics at this time, the population around the farm has a low literacy level among adults and children, and is characterised by erratic food security.

Timber and Other Vegetation

An inventory of flora and fauna in this area has not been done. By casual observation, the forest comprises a large percentage of indigenous trees. This section is a habitat for small animals, birds and insects

The estate has a substantial population of *Gliricidia sepium* and kapok, which were planted mainly as shade trees for the cocoa.

Mronge trees have also been planted on a small section of the estate.

A few stands of mature and, in places, ageing, *Melitia exelsa* exist in the area.

Non-timber forest products

A small part of the farm has been planted with cardamom, a climber spice crop which does fairly well

Exotic/Invasive species

There are four plots of about half a hectare each on which *Tectona grandis* (teak) was planted some 15 years ago.

Water resources

The farm is bounded by the Muzi River to the west. This river is perennial, although the flow decreases in the dry season. Several seasonal streams flow from the Kwachawa Mountain into the central part of the farm. A dam has been dug in the centre of the estate and is used for rearing fish.

Soils

The soil conditions at the Estate vary considerably over short distances. Most soils of the area are ferruginous deep, sandy clays and clays, moderately acid, but fairly well provided with nutrients. Many soils however are gravelly and/or shallow which are crucial factors for root development and moisture storage. Five different soil series have been recognized, each with a number of phases for slope, effective depth and presence of gravel occurring in a complex pattern over short distances.

About 35% or 170 ha of the estate have a high gravel content, resulting in only marginal potential for cultivation.

Deep and very deep soils cover 80 ha and 100 ha of the Estate respectively, of these lands however, 84 ha have soils with drainage problems or are subject to regular flooding.

The overall results of the land evaluation in terms of the physical suitability indicate that the Kwamtili Estate lands in general have a limited potential for cultivation (of cocoa and coconut). Highly to moderately suitable land for cocoa covers only approximately 30% of the estate and approximately 50% for coconut. However the strong variability of the soil conditions over short distances and the consequent complexity of the physical suitability of the estate lands within each block strongly affect the management of the lands.

Special management zones and high conservation value forests or habitats

The presence of the Kwachawa Mountain in the estate leaves about 470 ha (about 40% of the estate) for possible development for agriculture. A soil study undertaken in 1986 on the estate (excluding the mountain) showed that of this 470 ha, only less than 7% is suitable, while about half has severe limitations for commercial farming.

In the 1960s an area of about 85 ha was planted with cocoa. Today, about 35,000 cocoa trees that were planted on this area are still surviving. In 2002, an additional 19 ha were planted with cocoa, 5 ha in 2004 and 2 ha were planted in 2007.

Apart from cocoa, the estate invested in 100 acres of coconut plantation which unfortunately failed. This was financed and overseen by the Nederland Finance Group in conjunction with the Dutch Government. Following the failure of the venture, the loan was written off.

The farm infrastructure includes 3 residential houses, 6 cocoa driers, a store and some staff houses

Accessibility issues and transportation considerations

The estate is accessible from Tanga City by an earth road which connects Maramba sub-town to Tanga, some 60 km away. There are regular commuter mini-buses from nearby the estate to both Tanga and Muheza.

From within the estate, there are tracks that connect it to Amani Nature Reserve. These tracks are currently not motorable, but potentially they can be upgraded to rural road status.

Goods and crops are transported from surrounding villages by trucks. In the wet season, when the rural roads are particularly bad, the trucks must be assisted by the tractor owned by Kwamtili Estate.

LANDSCAPE LEVEL INFORMATION

Physiography

Kwamtili Estate is situated at the foot of the Usambara Mountains Complex. Due to secondary faulting (probably in connection with the uplifting of the Usambaras) a dense drainage system has been formed giving the landscape a “hummocky” character of small rounded hills. Particularly from the air or on aerial photographs this “hummocky” landform is very striking.

Three landscape units may be distinguished in the area as follows:

Hills and ridges:

the higher “hummocks” within the Estate, having their base at altitudes between 160-200 m above sea level. Mostly these hills are 30-80 m elevated above their surrounding, with a maximum altitude of 250 m.a.s.l. The almost flat summits are usually small and narrow, the upper slopes are mostly sloping to moderately steep (8-30%), whereas the middle and lower slopes usually have gradients between 15 and 50%.

Small valley bottoms:

the small valleys separate the individual hills and ridges. The small streams in this convex and U-shaped valleys carry water most of the time as the sections higher up-stream run dry during the dry season.

Alluvial flats of the Muzi river:

Built up from recent alluvial deposits of the Muzi River, these flats are the lowest part of the estate at altitudes between 140-160 m.a.s.l. In most places the flats are narrow, between 30 and 50 m, but locally, where the river has formed big looping meanders, they are as wide as 200-300 m. Flooding of the flats occurs annually.

Geology

In the geological sense the rocks occurring at the Estate belong to the Usagaran system and they are of metamorphic origin. In general the rocks belong structurally to the big north-south Mozambique belt, and probably are of Archaen (Pre-Cambrium) age. The rocks are extensively migmatized. The main rock types are pyroxene, hornblende, acid granulites and banded gneisses, in which quartz and feldspars are the dominant minerals, although garnet and biotite commonly are major constituents.

Faulting is responsible for the uplifting of the Usambara Mountains in general as well as for the formation of a number of valleys in particular, of which the Muzi river valley is one. The NNE is crisscrossed by a number of small secondary faults at an angle with the main fault.

Climate

The climate in the Kwamtili area is predominantly governed by the atmospheric circulation of the inter-tropical convergence zone, a low pressure zone with adjacent high pressure zones oscillate north and south annually resulting in a monsoon climate with a bi-modal rainfall regime.

According to Koppën the climate can be classified as a tropical bi-modal savannah climate with a difference of less than 5°C between the mean monthly temperature of the warmest and the coldest month

	Temperature (°c)			Rainfall (mm)			ETo (mm)
	Max.	Min.	Mean	Mean	Standard Deviation	80% probability	
Jan	32.4	21.7	27.1	79	70	20	173
Feb	33.3	21.7	27.5	47	35	18	168
Mar	32.8	21.9	27.4	147	99	64	166
Apr	30.6	21.8	26.2	202	117	104	139
May	28.6	20.9	24.8	190	115	93	123
Jun	28.2	19.5	23.9	73	44	36	117
Jul	27.7	18.7	23.2	78	41	44	115
Aug	27.9	18.4	23.2	74	46	35	123
Sep	28.5	18.7	23.6	111	94	32	138
Oct	29.5	19.6	24.6	178	137	63	153
Nov	30.5	20.7	25.8	216	139	99	152
Dec	31.5	21.7	26.8	162	87	88	164
Year	30.1	20.4	25.3	1556	450	1178	1,731

• Hydrology

• Present Vegetation and Land Use

The present vegetation in the area can be described generally as mixed forest> On the Kwachawa Mountain the vegetation is predominantly of indigenous species. In the lower areas, there are patches of planted forest species, which were introduced as shade trees for cocoa.

Parts of the estate are planted with cocoa, cashew and small-scale garden crops. On the periphery of the estate and surrounding areas, regular cultivation for annual subsistence crops such as maize and beans is the main land use.

In 2004, 25 hectares of *Mronge* trees were planted under a contract with one foreign investor. Before the contract could be executed, the investor company sold its interest in Tanzania, leaving Kwamtili Estate and other growers no viable market for the seeds.

The main route that connects the villages of ... and ... to Maramba, Muheza and tanga towns passes through the estate. Along this road, in the estate, some bamboo grows.

• Natural Disturbance & Local Conservation Concerns

Historically, the major disturbance to the natural eco-system was the introduction of plantation cocoa, which was apparently preceded by almost exhaustive harvesting of timber trees, particularly *Melitia exelsa*. Equal or even more denudation of natural tree species was carried out on surrounding areas.

These disturbances have led to a near total abandonment of large mammals and birds, apart from monkeys, which still exist in noticeable numbers. Due to their nuisance factor on cereal crops such as maize and fruit crops like mango, cocoa and pineapple, these animals are commonly killed indiscriminately. This non-sustainable interaction between man and monkey is probably due to the diminished forest resources in the area, a fact which forces the animals onto human territory.

• Legal & Regulatory Issues

According to the Forest Office in Tanga and minutes of the company's Board Meeting (Board Paper 1/90), the government has begun the process of taking over this forest area for conservation. In principle the company has agreed to this move and the government has put the arrangement into its conservation extension plans.

INTERACTION WITH NEARBY PROPERTIES

This section of the management plan involves a description of:

- Adjacent land uses and conditions
- Ownership and land use history
- Other ecological and socio-economic factors interacting with the forest management opportunities

IDENTIFICATION AND PROTECTION OF CULTURAL, HISTORICAL AND ARCHEOLOGICAL RESOURCES AND RARE, THREATENED AND ENDANGERED (RTE) SPECIES

In order to be able to monitor any changes that may occur in terms of species appearance (or otherwise), the baseline situation needs to be known with accuracy. There is no appropriate information available at present. This section will be therefore be completed when a biological inventory of fauna species has been conducted. This activity is outlined in brief in Appendix 2.

STAND LEVEL INFORMATION

This plan envisages significant improvements in the stand levels. Stand level information is expected to be an important indicator in the monitoring activities for this plan. However, an accurate monitoring plan requires accurate baseline information. This information is currently not available. So, like the previous one, this section will be completed when a forest resources inventory and mapping has been carried out. This activity is outlined in brief in Appendix 2.

MONITORING AND ENVIRONMENTAL ASSESSMENTS

The monitoring plan is summarized in the following logical framework.

ACTIVITY / OUTPUT	OBJECTIVELY VERIFIABLE INDICATOR	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
Forest enrichment	An increase in the proportion of indigenous trees	A vegetation inventory study after each 5 years	
Improved natural ecology	<ol style="list-style-type: none"> 1. An increase in number and variety of fauna 2. Emergence of exogenous species 	A biological study at the end of each five years	
Improved hydrological conditions	An increase in number of perennial streams and height of the dam	A hydrological survey	
Sustainable economic forest land uses	Extent of economic activities in the forest area	Farm records	
Positive impact on the surrounding communities	Number of households benefitting directly from the forest reserve	Farm records	
A stable and acceptable co-existence between man and animal		A simple survey every two years, including the baseline year	

APPENDIX 1: EXHIBITS

This section includes copies of the following documents to support legal ownership and decision-making authority:

- a) Title deed
- b) Farm boundary map (photograph)
- c) Topographic map
- d) Soils map (photograph)
- e) Stand boundary map (to be appended later; needs additional study – see Appendix 2)

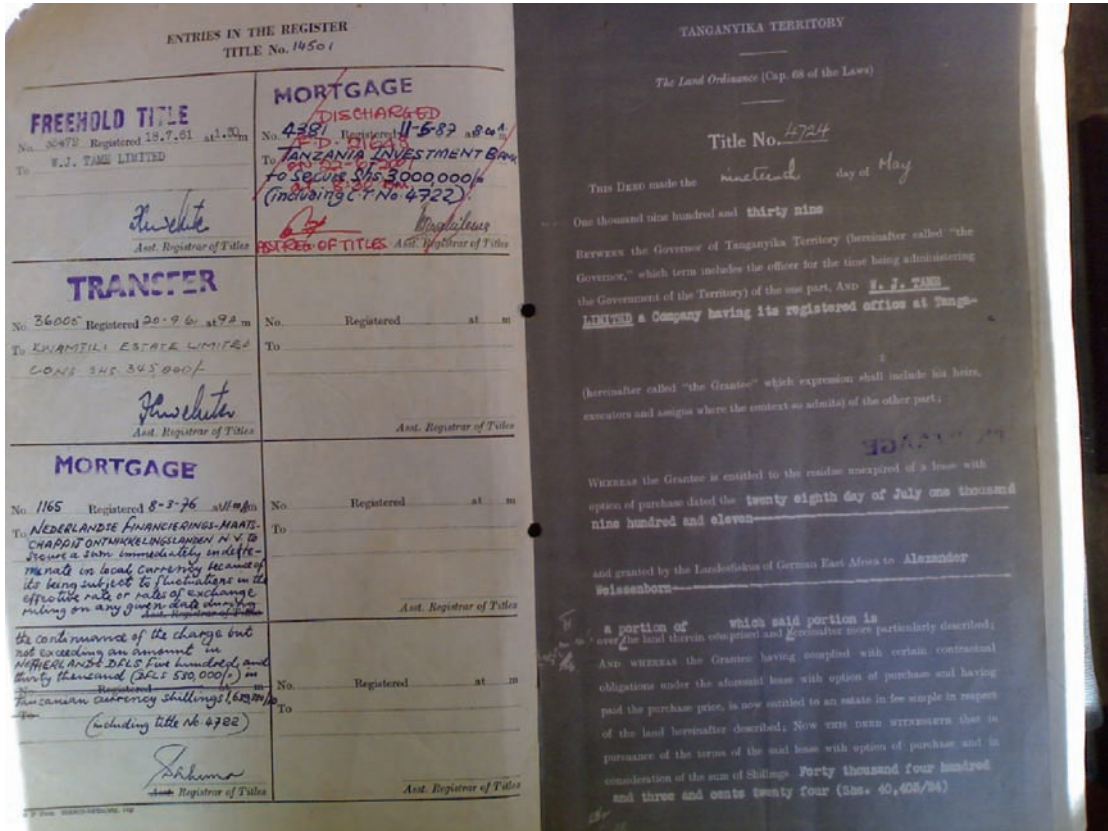


Figure 1 : Title deed no 4724 of 19 May 1939

Ref. No. of this document	Date of Registration	Nature of entry	Instr. Refers
		<p>LAND REGISTRY, MUSHA MORTGAGE</p> <p>Filed Document No. 1165</p> <p>Date of registration 8-3-76 time 11:00 A.M.</p> <p>T. NEDERLANDSE FINANCIERINGS-MAATSCHAPPIJ ONTWIKKELINGSLANDEN N.V. issued a loan corresponding to the amount in local currency because of its being subject to fluctuations in the effective rate of exchange ruling on any given date during the continuance of its doing but not exceeding an amount in Netherlands Guilders Five hundred and thirty thousand (530,000) in Tanzanian currency shillings (1976/70) (including title No. 4722)</p> <p>Sikuma Registrar of Titles</p>	
		<p>LAND REGISTRY, MUSHI MORTGAGE</p> <p>Filed Document No. 4381</p> <p>Date of registration 11-5-87 time 8:00 A.M.</p> <p>T. TANZANIA INVESTMENT BANK TO SECURE SHS 3000000 (including title No. 4722)</p> <p>Sikuma Registrar of Titles</p>	
		<p>LAND REGISTRY, MUSHI NOTICE OF REVISION OF RENT</p> <p>Filed Document No. 26376</p> <p>Date of registration 1-7-58 time 3:59 P.M.</p> <p>To Shs. 58/- from 1-7-58</p> <p>Sikuma Registrar of Titles</p>	
		<p>LAND REGISTRY, MUSHI TRANSFER</p> <p>Filed Document No. 794</p> <p>Date of registration 7-4-58 time 11:30 A.M.</p> <p>To KIAMILLI ESTATE LIMITED c/o P.O. Box 118 Tanga (inc. 2, 500/)</p>	
		<p>LEASEHOLD TITLE RIGHT OF OCCUPANCY (16-7-57) at 3:30 P.M.</p> <p>W. J. TAME LIMITED</p> <p>Sikuma Registrar of Titles</p>	
		<p>CHANGE</p> <p>Filed Document No. 3550</p> <p>Date of registration 1-7-58 time 10:00 A.M.</p> <p>T. THE STANDARD BANK OF SOUTH AFRICA LIMITED (inc. 1, 1950/)</p> <p>Sikuma Registrar of Titles</p>	

The Land Ordinances (Cap. 68 of the Laws)

CERTIFICATE OF OCCUPANCY

The eighth day of March

Nineteen hundred and thirty nine

Title No. 4722

THIS IS TO CERTIFY that **W. J. TAME LIMITED**, a Company registered in the Tanganyika Territory under the provisions of the Companies Ordinance 1951

(hereinafter called the occupier) is entitled to a right of occupancy in and over the agricultural land described in the Schedule hereto and more particularly delineated in the plan annexed thereto for a term of ninety nine years from the twentieth day of June Nineteen hundred and thirty eight according to the true intent and meaning of the said Ordinance and subject to the provisions thereof and to any regulations made thereunder and to the following special terms and conditions, viz. :-

1. The occupier shall pay yearly during the said term the rent of Shillings Twenty nine (Shs. 29/-) to be paid yearly in advance without any deduction the first of such payments for the year ending on the twentieth day of June Nineteen hundred and thirty nine having been made on or before the execution of these presents and the subsequent payments to be made in advance for each year on the twentieth day of June in each year during the said term. Provided always that the said rent shall be subject to revision by the Governor at intervals of twenty years from the commencement of the term.
2. The land shall be used solely for agricultural purposes and purposes ancillary thereto.
3. The Right of Occupancy hereby granted shall not confer any water rights.

Figure 2 : Certificate of Occupancy No. 4722, of 18 March 1939

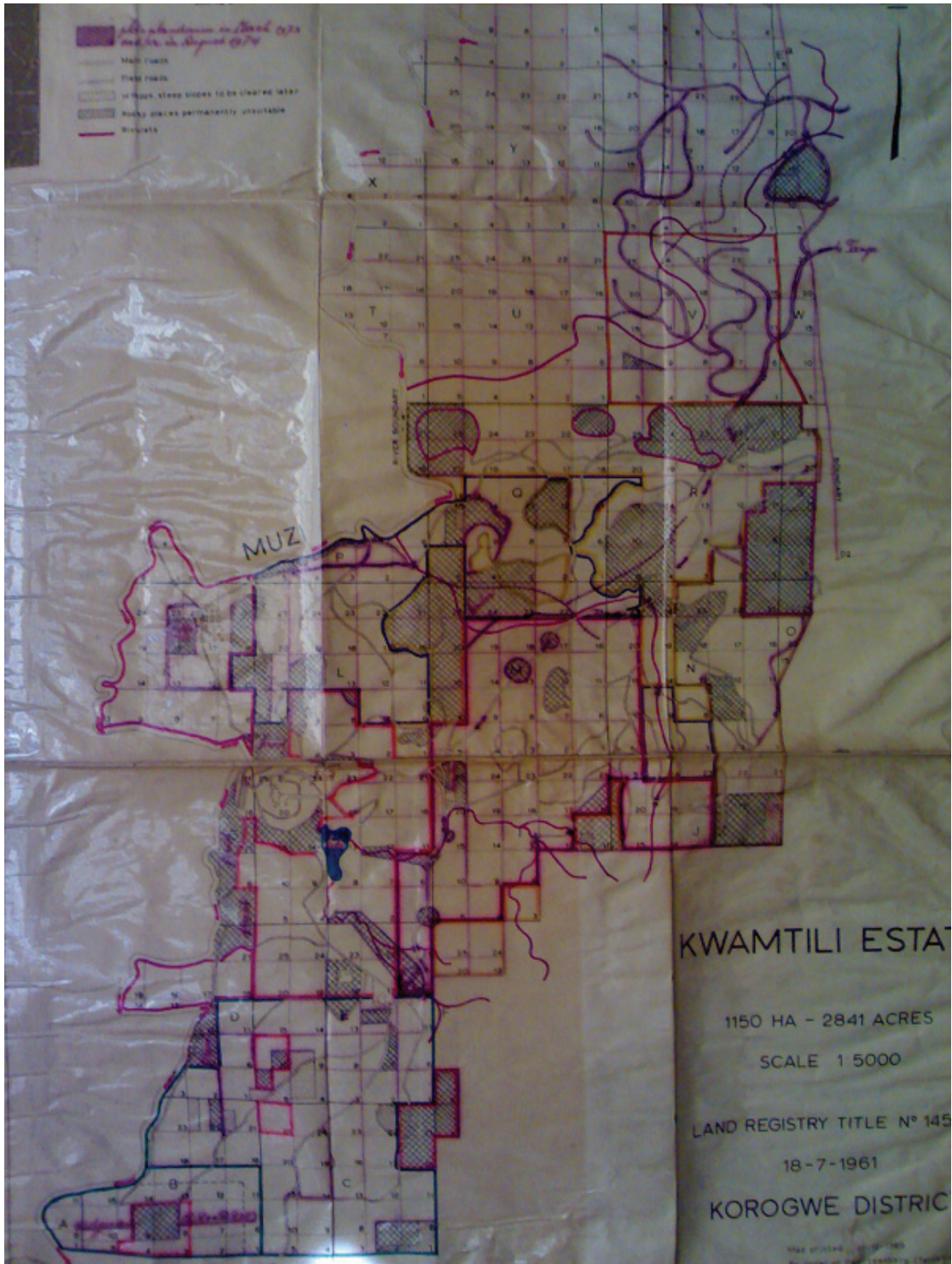


Figure 3: Farm boundary map of Kwamtli Estate

APPENDIX 2: ACTIVITIES NEEDED TO COMPLETE THE FOREST MANAGEMENT PLAN

Kwamtili Estate Limited is in the process of preparing a forest management plan as part of its preparations to convert the estate into a private forest reserve. Some of the information required for a comprehensive and long-term forest management plan is not readily available. The company does not have in-house the expertise for collecting the required information. This means that the estate must set aside a budget for completing its forest management plan.

In this text, an attempt is made to present an outline of activities which must be completed before the final forest management plan can be written. For each forest management plan objective a summary description of the objective, a list of activities to be undertaken and a tentative budget are given.

Management Plan Objective: Identification and Protection of Cultural, Historical and Archeological Resources and Rare, Threatened and Endangered (RTE) Species

Summary Description:

Activities under this objective will provide a description of the presence, or potential for, cultural and historical resources or RTE species or communities on the site. This description will reference national agency data or other credible sources, and conditions observed on the property. If resources are identified, management guidance specific to the protection or management of the identified resource shall be provided.

Activities:

- a. Contact the wildlife office for the list of RTE species known or expected to occur in the area.
- b. Conduct a walk-through of the property during the growing season to identify any RTE species, and report the results in this forest management plan. If any RTE species are found, to make note of their location (preferably on a map) and explain how we will protect them and their habitat, especially during forest management activities.

Budget:Tshs

Management Plan Objective: Stand Level Data

Summary Description:

A study to provide a general description of current stand conditions and inventory information in terms of stand number or other identifier, habitat type, natural community, or other type of ecosystem-based classification for the stand, size of the stand (acres). The inventory data reports the current

condition and stocking of the overstory tree species, the species and relative abundance of understory plants and shrubs, any exotic species concerns, and the species and relative abundance of existing tree regeneration. From this study it will be possible to clearly define in the management plan:

- Stand level management objective
- Desired future condition of the stand in a 50 to 100 year time frame
- Management recommendation and silvicultural system to be used
- Treatment design details with rationale for harvest rates
- Rotation age description and explanation
- Activity schedules and plans for monitoring growth and yield and other information

The Treatment Design Details include specific volume or basal area targets and species composition goals for the residual stand and address criteria such as regeneration strategies, structural and species diversity, ecological processes, landscape context and the protection of RTE species and ecosystems.

Activities:

- a. Hire a forestry expert with experience in forest resources inventory
- b. Conduct a forest resource inventory (with map?)

Budget: Tshs