Pencarrow Estate

Proposed Private Plan Change

Land Resource and Land Use Capability Survey

State Highway Two

Pongakawa

April 2024

LandVision Ltd

55 Golf Road

Mount Maunganui

1 SUMMARY

A detailed soil and land use capability survey at the paddock scale (1:7,000) was undertaken for the proposed private plan change site for Pencarrow Estate at 1491 State Highway Two, Pongakawa.

The total area of the subject area is 17.1 ha of which approximately 43% is flat to gently undulating terraces, with the remaining 53% as rolling hills.

The vegetative cover currently comprises of approximately 15.5 ha of effective pasture and 0.3 ha in maize. The remaining 1.3 ha are in utilities and other non-effective areas.

The predominant rock type for the higher terraces and rolling hills is patchy Kaharoa tephra over ancient tephra. The lower terraces are formed from peat and pumiceous alluvium.

Five different soil types were identified on the property each with different characteristics. There was no erosion recorded on the property.

Five different LUC (Land Use Capability) units and four LUC classes (II, III, IV & VIII) were recorded as part of this survey.

2 TABLE OF CONTENTS

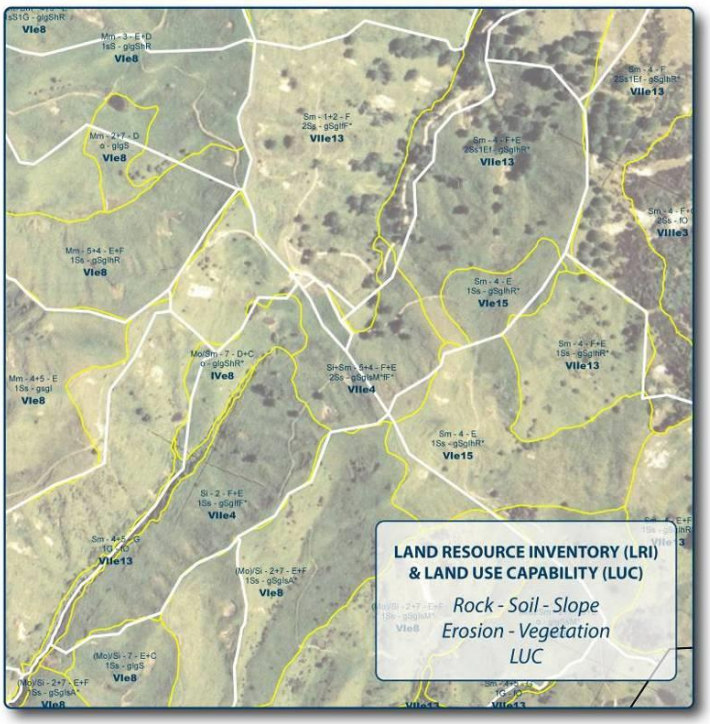
3 PURPOSE

The purpose of this report was to provide a Land Resource and Land Use Capability survey for the proposed plan change site of Pencarrow Estate at 1491 State Highway Two, Pongakawa (see Location Map in Appendix 1).

4 RESOURCE AND ENVIRONMENTAL ASSESSMENT

4.1 Land Resources

The land resource has been described and evaluated according to the Land Resource Inventory (LRI) and Land Use Capability classification system (LUC). The land resources survey was undertaken at a 1:7,000 scale.



The LRI system involves mapping landscape units according to five inventory factors (rock type, soil unit, slope class, erosion type and severity, and vegetation).

From the LRI assessment, the area was then classified as LUC, which further groups similar units according to their capacity for sustainable production under arable, pastoral, forestry or conservation uses across the region. The LUC code is broken down into three components, which show the general capability (I-VIII classes), the major limitations (four subclass limitations of wetness, erosion, soil and climate), and the capability unit to link with regional classifications and known best management practices. The LUC unit is shown in bold in Figure 1, (e.g., VIIe4) and the LRI is shown by a series of symbols laid out in a set pattern as shown in the bottom right corner.

4.2 Summary of the Land Resource Inventory Assessment

The total area of the proposed site is 17.1 ha of which approximately 85% is flat to gently undulating terraces, with the remaining 15% as rolling hills.

The vegetative cover currently comprises of approximately 15.5 ha of effective pasture and 0.3 ha in maize. The remaining 1.3 ha are in utilities and other non-effective areas.

The predominant rock type for the higher terraces and rolling hills is patchy Kaharoa tephra over ancient tephra. The lower terraces are formed from peat and pumiceous alluvium.

Five different soil types were identified on the property each with different characteristics. There was no erosion recorded on the property.

N.B. the results of the Land Resource Assessment are depicted in the Land Resource Inventory Map in Section 4.3 and summarised in the Land Resource Legends in Section 5.

4.3 Land Resource Inventory Map

4.4 Land Use Capability Assessment

Five different land use capability units were identified as part of the land resource survey and the extent of these are summarised in the following table. Detailed descriptions and a map of the units are shown in Sections 4.5 & 4.6 respectively.

Table 1. Distribution of LUC units on the site.

LUC Class	Area (ha)	%	LUC Unit	Area (ha)	%
Class II	12.8	75	IIw1	7.2	42
			IIs1	5.6	33
Class III	1.5	9	IIIw1	1.5	9
Class IV	2.5	15	IVe2	2.5	15
Class VIII	0.3	2	VIIIw1	0.3	2
Total	**17.1 ha**	**100 %**		**17.1 ha**	**100 %**

As Table 1 shows the site contains 12.8 ha of LUC class II land, 1.5 ha of LUC class III land, 2.5 ha of LUC class IV land and 0.3 ha of LUC class VIII land.

4.5 LUC Descriptions

Table 2. Descriptions of each of the LUC units on the site.

Description	Area (ha)	Parent material	Dominant soil	Slope	Vegetation and area (ha)	Erosion degree and severity		Strengths	Weaknesses	Land use suitability	Conditions of use
						Actual	Potential				
IIw1 Flat river terraces near sea level with recent, gley recent and organic soils. Occasional surface flooding and moderately high winter water table levels limit versatility. 	7.2	Pumiceous alluvium and peat (Tp+Pt).	Pow.	0-3	Pasture (7.1 ha) Utilities (0.1 ha)	Nil.	Nil.	Contour. Access.	Often easily pugged. Fluctuating water table. Occasional surface flooding.	Intensive pastoral farming with drainage.	Care with stock during wet periods to minimise risk of pugging damage. Drainage required to optimise production potential. Stopbanks may be required to protect from surface flooding.
IIs1 Gently undulating to undulating terraces near sea level with coarsely textured soils. 	5.6	Patchy Kaharoa tephra over ancient tephra (pKt/Mo).	Pgls.	0-3	Pasture (4.7 ha) Maize (0.1 ha) Utilities (0.8 ha)	Nil.	Slight wind erosion when cultivated.	Contour. Access. Good natural drainage.	Drought prone. Low natural fertility.	Intensive pastoral farming. Horticulture.	Maintain soil fertility.
IIIw1 Flat narrow valley floors and poorly drained flats with a moderately high water table, subject to runoff from adjacent higher areas.	1.5	Pumiceous alluvium and peat (Tp+Pt).	Rpzl. Rppl.	0-3	Pasture (1.4 ha) Maize (0.1 ha)	Nil.	Slight streambank erosion.	Contour. Access. Holds on longer under drought conditions. Good soil physical properties. Good natural fertility. Potential for cropping following drainage. Sheltered.	Wetness limitation even after drainage due to high water table. Often easily pugged with heavy cattle following prolonged wet periods.	Intensive pastoral farming with drainage.	Care with heavy cattle during wet periods to prevent treading and pugging damage. When undertaking cultivation ensure that the moisture levels are sufficient to prevent compaction or creating a plough pan. Drainage is required to maximise production however it maybe ineffective.

Description	Area (ha)	Parent material	Dominant soil	Slope	Vegetation and area (ha)	Erosion degree and severity		Strengths	Weaknesses	Land use suitability	Conditions of use
						Actual	Potential				
									Cropping versatility is restricted by wetness that can delay planting. Low lying areas may flood. Potential for slight streambank erosion.		Adjacent stream banks may require erosion protection. Rushes can be controlled with grazing management, fertiliser, lime or herbicide.
IVe2 Rolling to strongly rolling slopes near sea level with coarsely textured soils formed from a thin mantle of Kaharoa ash over more weathered ashes. Soils are less fertile and more drought-prone than those of 1Ve1. There is a potential for moderate to severe sheet, wind and rill erosion when cultivated. 	2.5	Patchy Kaharoa tephra over ancient tephra (pKt/Mo).	PglsR.	7-20	Pasture (2.2 ha) Maize (0.2 ha) Utilities (0.1 ha)	Nil.	Nil to slight sheet. Moderate to severe sheet, rill and wind when cultivated.	Good soil physical properties. Contour. Access.	Potential for severe sheet and rill erosion under cultivation.	Intensive pastoral production. Forestry.	Use minimum tillage techniques when cultivating.
VIIIw1 Low lying lake, river and seaside areas that are difficult to drain and have a permanent severe wetness limitation.	0.3	Drain/Ponds	Drain/Ponds	0-3	Drains/Pond (0.3 ha)	Nil.	Nil.	Biodiversity values.	Not suited to any kind of pastoral farming. Recreational activities.	Retirement.	Enhancement planting with riparian species Animal pest control

Description	Area (ha)	Parent material	Dominant soil	Slope	Vegetation and area (ha)	Erosion degree and severity		Strengths	Weaknesses	Land use suitability	Conditions of use
						Actual	Potential				
											

4.6 Land Use Capability Map

5 LAND RESOURCES

5.1 Parent Material

The following table describes the rock types present on the property. Note: Sample pictures are provided.

	**Ashes older than Taupo ash (Mo);** is found on the flat to easy hill country slopes. It is described as compact to very compact, moderately to completely weathered clay-rich, surface or near surface, bedded or massive, ash and some lapilli. Grassed and forested slopes formed on tephra are generally stable where less than 20 degrees. Slopes steeper than 20 degrees are subject to sheet erosion while soil slip or slump erosion may occur with slip planes on weathered layers or tephra interfaces. The soils formed from this ash are typically yellow-brown loams.
	**Pumiceous alluvium (Tp**) is a very loose to compact, fresh to moderately weathered pumiceous block lapilli and ash, which is typically poorly sorted, frequently containing charcoal material, and is found as a surface or near surface deposit. This was deposited from the Taupo volcanic centre, and locally in the Okataina area, approximately 1800 years ago, along with pumice alluvium derived from these deposits. Typically this tephra would be mapped on its own or in association with Kaharoa and Taupo ashes overlying ashes older than Taupo ash. Since this tephra is loose and the pumice can float, it is prone to fluvial erosion processes such as gully, tunnel gully, stream bank and sheet erosion.
	**Kaharoa and Taupo ashes (Kt)** is found on the flat to easy hill country slopes. It is described as loose to compact, fresh to moderately weathered rhyolitic ash with some lapilli. A surface or near surface deposit approximately 40 cm or more deep. Deposited as a result of eruptions from the Okataina (Kaharoa ashes) area 900 years ago, and from the Taupo areas approximately 1800 years ago. Typically this tephra would be mapped as a stratigraphic sequence overlaying older, weathered ashes (Mo). This rock type is subject to sheet, wind and rill erosion and only occurs when exposed.
	**Peat (Pt):** Extremely weak, dark brown or black organic residue mixed with various amounts of mineral matter. Surface or near surface deposits thicker than 50 cm. A widespread Quaternary deposit produced by the partial decomposition and disintegration of vegetation.

5.2 Soil types

The proposed Lot contains two different soil types and these are described in the table below. The Soil Resources Map for the property is shown in Section 6.3.

Soils of the terraces	
	**Name: Pukehina silt loam. peaty subsoil phase.** **Map symbol**: Pow **Soil profile coordinates:** -37.818889, 176.475645. **LUC Unit:** IIw1 **Parent material**: Pumiceous alluvium and peat. **Drainage status**: Poorly drained. **Topsoil consistence**: Friable. **Degree of topsoil development**: Well developed. **Profile description:** 25 cm of well developed, friable, medium block breaking to medium nut structure, very dark brown (10YR 2/2) silt loam.: On:10 cm of moderately developed, friable, fine nut and crumb structure, black (10YR 2/1) peaty silt loam. On: 10 cm of loose, structureless dark yellowish brown (10YR ¾) sand with medium pumiceous fragments and orange staining. On: 5 cm of loose, structureless, coarse white (7.5YR 8/1) sand. On: reddish brown (5YR 4/3) fibrous peat. **Comments:** Found on the lower terraces in the northern section of the site. **Management considerations:** Consider drainage on these soils.
	**Name: Paengaroa loamy sand on shallow sand.** **Map symbol**: Pgls **Soil profile coordinates:** -37.820355, 176.475164. **LUC Unit:** IIs1 **Parent material**: Kaharoa tephra over ancient tephra. **Drainage status:**:Well drained. **Topsoil consistence:** Very friable. **Degree of topsoil development:** Moderately developed. **Profile description:** 20 cm of moderately developed, very friable, medium block breaking to nut and crumb structure, dark brown (10YR 3/3) loamy sand. On: 20 cm of loose, structureless, light grey (2.5Y 6/1) sand. On: 25 cm of very friable, fine nut and crumb structure, dark yellowish brown (10YR 3/6) sandy loam to loamy sand. On: loose, structureless, white (7.5YR 8/1) sand. **Comments:** Found on the higher terraces. **Management considerations:** Maintain soil fertility.

	**Name: Raparapahoe silt loam** **Map symbol**: Rpzl **Soil profile coordinates:** -37.820589, 176.473648. **LUC Unit:** IIIw1 **Parent material**: Pumiceous alluvium and peat. **Drainage status**: Poorly drained. **Topsoil consistence:** Friable. **Degree of topsoil development:** Moderately developed. **Profile description**: 15 cm of friable, fine nut and crumb structure, reddish brown (5YR 4/3) sandy loam. On: 5 cm of friable, fine to medium nut structure, dark brown (7.5YR 3/2), silt loam. On: 20 cm of friable, medium nut structure, light olive brown (2.5YR 4/3) silt loam. On: 10 cm of friable, fine nut and crumb structure, dark brown (7.5YR 3/2), peaty silt loam. On: 10 cm of loose, structureless, white (10YR 8/1) pumiceous sand. On: sedge peat. **Comments:** Found in the low narrow valleys of the property where drainage in influenced from runoff from the surrounding hills. **Management considerations:** Care with heavy stock and machinery during extended wet periods to avoid pugging and compaction damage.
	**Name: Paengaroa loamy sand, rolling phase.** **Map symbol**: PglsR **Soil profile coordinates:** -37.821787, 176.472987. **LUC Unit:** IIIe2 **Parent material:** Kaharoa tephra over ancient tephra. **Drainage status**: Well drained. **Topsoil consistence**: Very friable. **Degree of topsoil development**: Moderately developed. **Profile description**: 20cm of moderately developed, very friable, medium nut and fine crumb structure dark brown (10YR 3/3) loamy sand. On: 10 cm loose, structureless, light grey (7.5YR 7/1) loamy sand. On: friable, fine crumb structure, dark yellowish brown (10YR 3/6) sandy loam. **Comments:** Found on the rolling valley sides where there is less coverage of Kaharoa tephra. **Management considerations:** Keep pasture coverage to avoid sheet and wind erosion.

Name: Raparapahoe sandy peat loam.

Map symbol: Rpspl

Soil profile coordinates: -37.822006, 176.472861.

LUC Unit: IIIw1

Parent material: Peat over tephra alluvium.

Drainage status: Poorly drained.

Topsoil consistence: Friable.

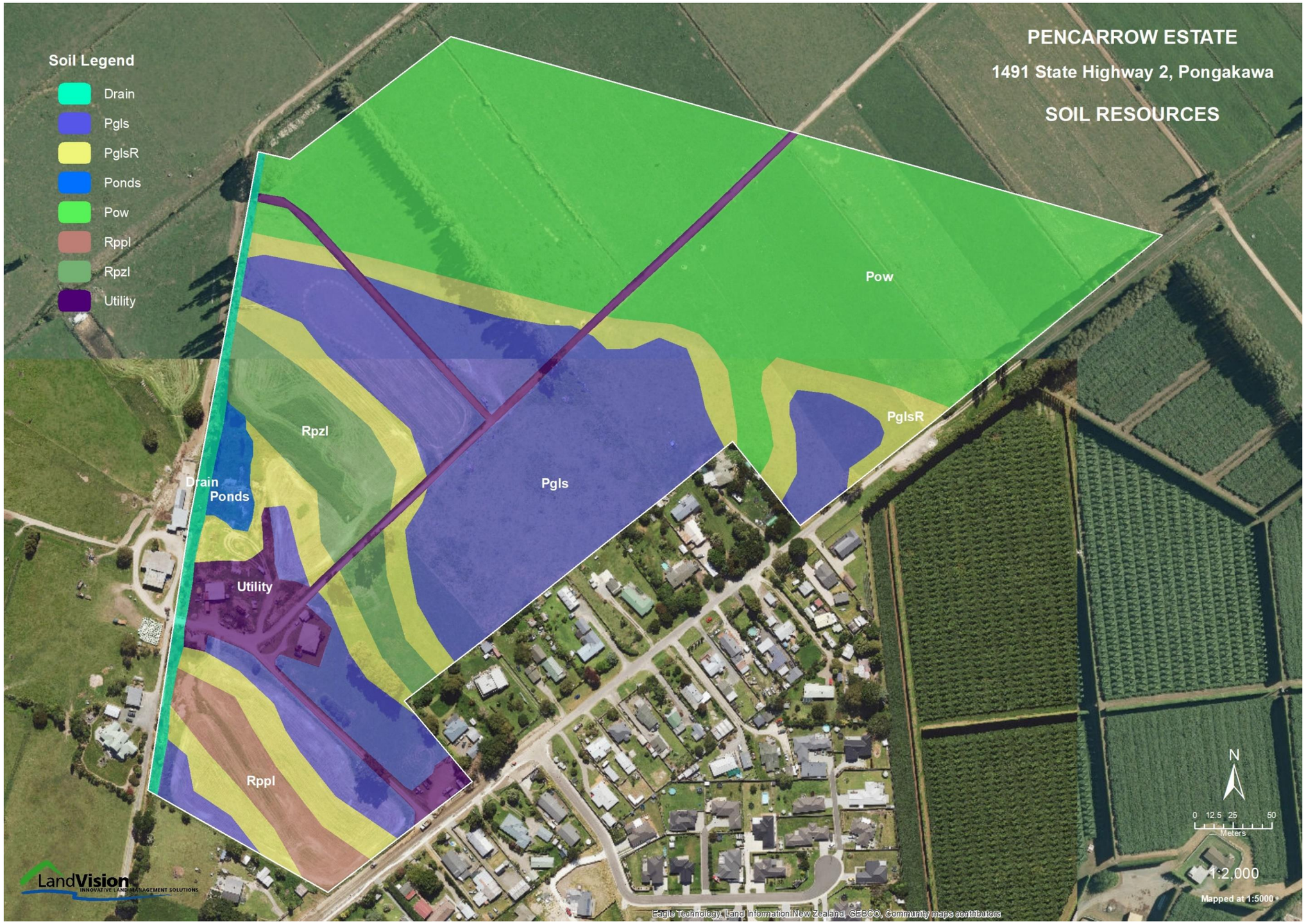
Degree of topsoil development: Moderately developed.

Profile description: 25 cm of moderately developed, friable, medium nut and block structure, reddish brown (5YR 5/3) sandy peat loam: On:15 cm of friable, medium nut and fine crumb structure, reddish brown (5YR 5/3) peaty loam. On: loose, structureless, white (10YR 8/1) sand.

Comments: Similar to Rpzl – found on the lower river valley terraces where drainage is influence by runoff from the surrounding hills.

Management considerations: Care with heavy stock and machinery during extended wet periods to avoid pugging and compaction damage.

5.3 Soil Resources Map



5.4 Slope Legend

The definitions of the slope classes mapped on the Land Resources Map are shown in the tables below, along with a summary of the various slope classes found on the property.

Slope class	Degrees	Slope description	Access suitability
A	0-3°	Flat to gentle undulating	Tractor
B	4-7°	Undulating	Tractor
C	8-15°	Rolling	Tractor
D	16-20°	Strongly rolling	Some tractor, four-wheel bike
E	21-25°	Moderately steep	Two-wheel bike
F	26-35°	Steep	Walking and some two-wheel bike
G	>35	Very steep	Walking
+	*Indicates a compound slope*		
/	*Indicates average slope is borderline between two slope classes*		
‘	*Indicates a dissected slope*		

Slope class	Area (ha)	Percentage (%)
A+B	14.6	85
C+B	2.5	15
Total	**17.1 ha**	**100 %**

5.5 Erosion Legend and Severity Ranking

No erosion was recorded on the property.

5.6 Vegetation Cover

The following table summarises the vegetation cover on the property.

Erosion severity	LRI symbol	Area affected (ha)	Percentage (%)
Improved pasture	gI	15.5	91
Maize	cM	0.3	1
Utilities/Non-effective areas	Utility, Ponds, Drains	1.3	8
Total		**17.1 ha**	**100%**

6 APPENDICES

6.1 Appendix 1: Location Map