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Rural Productivity Appraisal Agfirst



Independent Agriculture & Horticulture Consultant Network

Sarah de Bruin

Rural Productivity Appraisal of 996 State Highway 2, Whirinaki

Prepared for Evans Family Trust

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1.0 EXECUTIVE SUMMARY

AgFirst was asked to provide a rural productivity appraisal for the currently rurally zoned land at 992 State Highway 2, Whirinaki. AgFirst has assessed:

- The nature and quality of the soil resource at this property
- Current Utilisations
- Horticultural Productivity Potential

The landowner wants to develop this area of rural land as they believe it is not productive and can be better utilised through its development into housing. They believe factors limiting production to be the nature and fertility status of the soil, the inputs required for economically sustainable yields, and reverse sensitivity issues as the result of further development on the subdivision to the east.

AgFirst has found there to be limitations to production in Area A of the subject property, however Area B has fewer limitations to its productive nature and is suitable for continued production.

2.0 PROPERTY LOCATION

The subject property is located at 992 State Highway 2, Whirinaki, Napier.

The total area under investigation is 15ha, with a drain dividing it into two triangles. For the purpose of this report Area A (approximately 10ha) is the area to the eastern side of the drain, and Area B (approximately 5ha) is to the western side of the drain.



Figure 1 Investigation area of 15ha, divided into two sub areas by the drain running diagonally through



Figure 2 Open drain which runs diagonally through the subject location, dividing the two areas



Figure 4 "Area A" to the eastern side of the drain, approximately 10ha



Figure 3 "Area B" to the western side of the drain, approximately 5 ha

Area A is currently out of production and is planted in an annual grass and clover mix. Area B is currently planted in a crop of oats.



Figure 5 Area A looking towards the East. Currently planted in pasture- a mixture of annual grasses and clover



Figure 7 Pasture species mix in Area A



Figure 6 Area B looking towards the East. Currently planted in Oats

If the subject property was to be developed, it is enclosed by roads around the north, eastern and western boundaries by North Shore Rd, Pohutakawa Drive and State Highway 2 respectively. Because of these road edges on three sides of the property, there would be minimal change to the urban developed boundary with rural land if development was to occur.

3.0 SHAPE AND TOPOGRAPHY

The subject property is broken into two triangular areas, by a diagonal drain running from the north to south corners. The topography is flat, with little to no undulation. The land is 7m above sea level in the north corner closest to State Highway 2, sloping down to 2m above sea level along the eastern edge.

4.0 LAND USE CAPABILITY

This property in divided into two different LUC class sections. Area A has 11.2 ha classified as Land Use Capability (LUC) 2 which is classified as having multiple land use suitability. Along the eastern edge of Area A, 3.92ha is classified as LUC 7, which has a decreased versatility of use, with a generally low to unsuitable land use for arable cropping, pastoral of production forestry suitability.

Area B has all 5ha classified as LUC 2.



Figure 8 LUC map showing both LUC 2 and LUC 7 over the subject location. Sourced from HBRC LUC Tool

5.0 SOILS

A physical inspection of the property was undertaken on 22nd July 2022 to determine the nature and quality of the soil resource at this property. Within this inspection, the soil types were verified against the Manaaki Whenua S-Maps database. This inspection was also made to determine any additional factors which may be associated with the site that could have a practical implication on the productivity of the land.

As soil testing has not been recently carried out, the current soil fertility is unknown. However, the landowner advised that topsoil from the development neighbouring the property and drain cleanings, had been spread over the subject location to try and improve the fertility levels.

The predominant soil type listed on S-Maps for the investigation area is Hinds_25a.1. Across the investigation area, S-Maps shows the soil drainage status to be imperfectly drained, and the soil moisture profile available water in 1m (mm) to be moderate to high.

Attribute	Hinds_25a.1
Soil order	Recent
Soil origin and texture	It is formed in alluvial sand silt or gravel deposited by running water, from hard sandstone parent material. The topsoil typically has loam texture and is stoneless. The subsoil has dominantly loam textures, with gravel content of more than 3% but below 35% for most part of the soil.
Potential rooting depth	Unlimited rooting depth. Deep soil class (>1.0 m). No significant barriers within 1.0 m.
Drainage class	Imperfectly drained with moderately limited aeration and moderate over rapid permeability profile (4-72 mm/h).
Profile available water	Moderate to high (130mm) within the 0-100cm rooting profile.
Soil Management Factors	High structural vulnerability, medium N Leaching vulnerability, moderate water logging vulnerability, low drought vulnerability.
Drawbacks	Imperfectly drained, high structural vulnerability due to being weakly developed recent soils.

Source: Landcare Research New Zealand Limited 2021.



Figure 9 S-Map image showing the Soil Moisture Profile Available water in 1m (mm) to be Moderate to high across the investigation area (left) and the Soil drainage status to be imperfectly drained across the investigation area (right)



Figure 10 Diagram showing location of soil profile holes

A sandy silt textured soil was present in all three holes, however hole 2 had the most sandy texture of the three. Hole 1 showed a browner soil colour, whereas holes 2 and 3 showed a more grey soil colour.

Upon inspection, it seemed that the soil in each location was more free draining than the Smaps categorisation has listed, due to texture found. Consequently, this can be indicative of some susceptibility to drought, structural vulnerability, and nutrient leaching vulnerability, of a more significant nature than is identified by the S-Maps attribute. This would indicate a slightly improved water holding capacity and less propensity of nutrient leaching.

There were no rocks present in any of the soil profiles dug. The horizons down the profiles seemed consistent, in soil texture and colour, with virtually indistinguishable horizon boundaries.



Figure 11 Soil Profile of Hole 1



Figure 12 Soil sample from Hole 1



Figure 13 Soil Profile Hole 2



Figure 15 Soil Profile hole 3



Figure 14 Soil sample Hole 2



Figure 16 Soil sample hole 3

Anecdotally, back when the subject location was planted in squash, the landowner had to regularly irrigate due to low water holding capacity of the soil. Regular base and planting applications of Crop15 and Urea fertilisers were also applied as nitrogen source. Applications were made throughout the year, totalling an estimated 110kg/ha of Nitrogen applied annually.

One of the reasons that Area A was put into pasture, was because the landowners felt that with the N leaching susceptibility of the soil, and the significant N inputs for little productive gain, the land would be better off as pasture. The substantial inputs of irrigation and nutrient fertiliser still resulted in low yields in this area of the subject property.

6.0 CURRENT UTILISATIONS

The current land use of Area A is annual grasses, in a ryegrass/clover mix. Five years ago it carried a crop of Maize, and prior to this was planted in squash. Area B is currently planted in Oats, and has a history of market garden production.

The westerly prevailing wind and sandy/silt nature of the soils means there have previously been issues with erosion of the topsoil following cultivation. As well as the topsoil becoming eroded, the dust was an issue to the residential sites along the eastern border of the property, and thus the landowners decided to retire this section from cropping and instead have it in long term pasture.

Other reverse sensitivity effects have been experienced by the landowners, in relation to production practices and spraying in particular. These effects, caused by fragmentation of development, occurred when the 30m buffer between the land and the exiting development on Pohutakawa Drive was developed into an additional row of residential property.

7.0 HORTICULTURAL PRODUCTIVITY POTENTIAL

Productive land is said to have very few to no limitations in regard to climate, erosion, wetness or soil. It is highly fertile, with the potential to produce significant yields.

It would seem there are some limitations to the productive nature of Area A. This site has not been utilised for productive purposes in five years, and prior to this, production was not economically sustainable. Limiting factors in Area A include the propensity for topsoil erosion caused by the westerly prevailing wind when cultivated as well as potential nutrient leaching, some water holding capacity weaknesses and anecdotal evidence of poor yields despite high inputs. This can mostly be attributed to the sandy silt texture of the soil.

Additionally, the reverse sensitivity situation which has been created with the development encroaching within the previous 30m buffer has been inhibiting horticultural activity such as spraying and cultivation on Area A.

Area B however, seems to suffer less from these limitations, and it is likely due to having a soil texture that is slightly less sandy. Therefore, while it may be slightly susceptible to leaching and water loss, it is less so than Area A. It is currently planted in oats, and previously had been market gardens, and maize plantings. With regular and attentive management, any of the limitations on Area B could be worked through, and thus this area could continue to be productive.

Contact

Sarah de Bruin Horticultural Consultant

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> 201B Warren Street North PO Box 1261, Hastings 4156, New Zealand 06 872 7080 hawkesbay@agfirst.co.nz www.agfirst.co.nz

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