Appendix 11: Agribusiness Productivity Assessment

Productive Capacity Assessment for: 805, 815, and 819 North Road



Date: 9/10/2024

Prepared for: Tulloch Limited

Prepared By: Agribusiness Consultants Ltd – Mark Aitken

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1. Introduction

Agribusiness Consultants Limited has been tasked with assessing what impacts on productive potential the re-zoning of the subject property into "Industrial 1 Zone Land" would have on the 9.7124ha titles known as the subject property located in in the Lornville township area. The report is being prepared for Tulloch Limited as per Bonisch Consulting's request.

This report relates to the National Policy Statement, Highly Productive Land 2022 (NPS-HPL). The NPS-HPL defines productive capacity as "the ability of the land to support land based primary production over the long term". Land-based primary production includes production from agricultural pastural, horticultural, and forestry activities.

This report's purpose is to be used as an agricultural economists/farm consultant's assessment for a submission on re-zoning the area of the subject property.

The subject property in this report is a 9.7124ha located at 805 North Roald, Lorneville, Invercargill 9876 and is used as a large scale commercial building and lifestyle blocks. The subject property is in the Lorneville township area and boundaries small and large commercial buildings, lifestyle blocks, and a state highway road that links Invercargill to the rest of the Southland Province.

This report shows calculations of what production is lost and discusses limitations to properties such as the subject properties.

This report references reports written by other professionals and references guidelines published by councils and government agencies. The survey proposal has been prepared by Bonisch Consultants. Ms Pearson of Land and Water science has completed a soils assessment on the property that is referred to in the report,

2. Methodology

This process of the report undertakes the following methodology to draw conclusions on the impacts of the re-zoning proposal.

- Property details are listed to provide information to align and support the submission proposal including climate data.
- Land Use Classification (LUC) of the property is compared to the physical features and this ties into the systems able to be run on the property, this also sets what systems are used to calculate productive capacity.
- Constraints and limitations of the property are discussed and potential remedies for these are assessed.
- The current land use and farm system being run on the property is assessed and what improvements can be made to maximize productive output for a 30 year period (if any).
- The changes to the productive output of the property are assessed based on the re-zoning proposal.
- Benefits and costs to society are mentioned and discussed briefly in this report, this may also be discussed by the surveyor at Bonisch.
- A Conclusion on the property and the re-zoning proposal is given.

3. Subject Property Details

3.1. Address

Property is located at 805, 815, 819 North Road, Lorneville

3.2. Zoning

Property is zoned Rural as per Invercargill City Council.

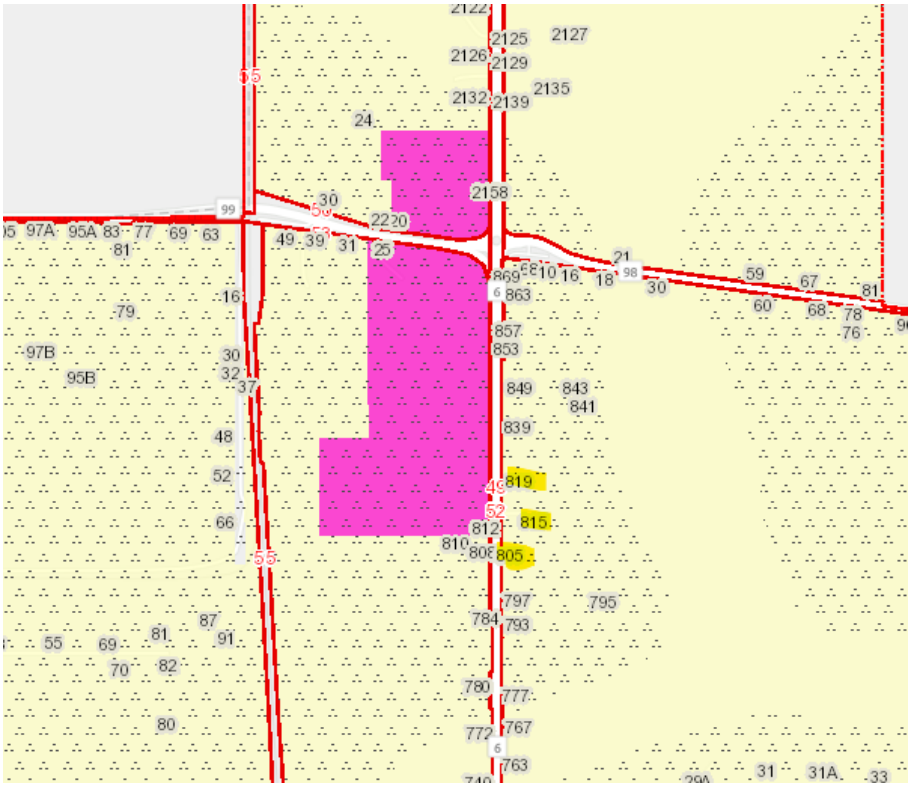


Image sourced from Invercargill City Council, Yellow is Rural and purple is Business in Lorneville township. Highlighted address are the subject titles.

3.3. Area

The below titles and areas are what is referred to as the subject property throughout this report.

CT#	Area (ha)	Description
SLB4/1444	4.8562	North title 819 North Road
SL10A/519	4.5349	South Larger title 815 North Road
SL10A/518	0.3213	West smaller title 805 North Road
Total	**9.7124ha**	

Effective pasture areas Maped on Google EarthPro = 5.47Ha

Balance of the area being ineffective areas, buildings and houses.

3.4. Legal Owners

Tulloch Limited owns all titles of the subject property.

3.5. Current Land Use

The current farmland appears to be used for very low intensity grass sales or cut and carry. This activity looks to be done to keep the property tidy. Based on the pastures on the property, (see appendix) there appears to be very little to no fertilizer used, this is also supported by the soil assessment completed by Ms Pearson showing Olsen P tests of 18 which is below the recommended optimum of 20-30, this can be fixed with fertilizer applications.

The subject properties pastures are very old and poor quality, there looks to be no re-grassing done for some time, this is typical of lifestyle type farming.

3.6. Soil types & Fertility

Soil types as mentioned in Ms Pearson's report are Mokotua, Dacre, and Woodlands types. These soils are usually used for pastural farming. The soils on the current property are limiting for arable and vegetable crop use. This is discussed in more detail in Ms Pearson's report further in this report and in section 3.11.

3.7. Climate of Lorneville Area

The Invercargill climate (5 minutes' drive from Lorneville) is a temperate climate with consistent rainfall throughout the year, this climate is considered summer safe where a larger amount of rain generally falls throughout the summer. These climates tend to be less suitable for arable crops as it is difficult to get crops sown, have them ripen, and harvesting. Below places like Gore and Winton and Northern Southland tend to be more suited for arable crops than where the subject property is located. This climate suits pasture farming (Dairy, sheep & beef, or cut and carry systems) very well as pasture maintains growth and quality throughout the year.

Table 6. Monthly and annual rainfall normals (a; mm), and monthly distribution of annual rainfall (b; %) at selected Southland stations, for the period 1981-2010.

Location		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Gore AWS	a	98	85	81	74	88	77	58	60	63	77	84	100	945
	b	10	9	9	8	9	8	6	6	7	8	9	11	
Invercargill Aero	a	115	87	97	96	114	104	85	76	84	95	90	105	1149
	b	10	8	8	8	10	9	7	7	7	8	8	9	
Kingston	a	88	61	74	75	84	85	70	79	79	87	67	96	944
	b	9	7	8	8	9	9	7	8	8	9	7	10	
Manapouri Aero AWS	a	79	85	81	91	102	105	83	99	106	106	96	105	1136
	b	7	7	7	8	9	9	7	9	9	9	8	9	
Milford Sound	a	722	455	595	533	597	487	424	464	551	640	548	700	6716
	b	11	7	9	8	9	7	6	7	8	10	8	10	
Monowai	a	119	95	105	99	117	118	92	108	108	123	98	120	1301
	b	9	7	8	8	9	9	7	8	8	9	8	9	

Table 6 continued.

Location		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Puysegur Point AWS	a	241	179	212	215	228	211	192	193	196	186	203	207	2463
	b	10	7	9	9	9	9	8	8	8	8	8	8	
South West Cape AWS	a	108	93	115	104	120	125	107	108	111	106	109	107	1313
	b	8	7	9	8	9	9	8	8	8	8	8	8	
Te Anau, Doc	a	165	92	105	80	91	112	83	85	73	134	75	108	1203
	b	14	8	9	7	8	9	7	7	6	11	6	9	
Tuatapere	a	163	123	100	103	120	92	98	91	64	105	75	104	1238
	b	13	10	8	8	10	7	8	7	5	8	6	8	
Waikaia	a	107	89	110	64	83	54	70	58	57	77	63	87	918
	b	12	10	12	7	9	6	8	6	6	8	7	9	
Winton 2	a	101	79	85	77	94	83	63	65	70	75	76	91	959
	b	11	8	9	8	10	9	7	7	7	8	8	10	

Southland rainfall data sourced from NIWA – Site in appendix.

Table 10. Average monthly rain days (a; days where at least 0.1 mm rainfall is measured) and wet days (b; days where at least 1 mm rainfall recorded is measured) at selected Southland stations.

Location		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Gore AWS	a	16	13	15	16	19	20	17	16	16	19	18	17	202
	b	12	10	11	11	12	14	10	10	11	13	13	13	141
Invercargill Aero	a	17	15	17	18	20	20	19	17	17	18	18	18	213
	b	13	11	13	13	15	15	14	12	13	13	13	13	157

Rainfall days comparing Gore to Invercargill.

The table below adds to the rainfall data table, Invercargill is generally wetter than Gore and Northern Southland areas.

Table 15. Highest and lowest recorded air temperatures, average number of days per year where maximum air temperature exceeds 25°C, and average number of days per year where the minimum air temperature is less than 0°C, for selected Southland stations from all available data.

Location	Highest recorded (°C)	Annual days max temp > 25°C	Lowest recorded (°C)	Annual days min temp < 0°C
Gore AWS	32.9	9	-6.5	34
Invercargill Aero	32.2	5	-9.0	41
Lumsden AWS	31.0	11	-9.0	62
Manapouri Aero AWS	32.0	11	-10.2	79
Milford Sound	28.3	2	-6.1	29

Highest and lowest temperatures.

The Invercargill and Southland province as shown in the above table, have temperatures during winter months that get below zero degrees. These colder temperatures make growing some crop types in Invercargill and Southland not suitable. Crops such as Maize/corn can be ruined by frosts. Many horticultural crops cannot be grown in the winter months that can be grown in the upper North Island.

3.8. Drainage Status

The drainage on the property is very poor, there is evidence of prolonged waterlogging. There is a large council drain running through the property, there is another open drain that looks to be recently piped.

The drainage will be affecting the productive output of the property, this can be upgraded and would improve pasture production. The property would also need to be cultivated and fertilizer improved to get better pasture growth.

3.9. Infrastructure

805 North Road	Lifestyle Dwelling and small sheds
815 North Road	Large commercial building
819 North Road	Lifestyle Dwelling and small sheds

3.10. Fragmentation of Locality

The Lorneville area is highly fragmented, it boundaries lifestyle blocks ranging from 2ha to 13ha, the locality also consists of many commercial type buildings and industrial complexes.

The property also boundaries a larger creek to the east that makes access or re-amalgamation with these titles unlikely and very expensive on a per hectare basis.

The subject property is very limited to what farm system activities and options for agricultural use given location, scale and physical features. The state-highway makes shifting livestock and large machinery dangerous and un-appealing.

The fragmented area makes the property only suitable for lifestyle of commercial use.



GRIP image showing title boundaries in the area.

3.11. Land Use Capability (LUC)

3.11.1. Subject Property LUC

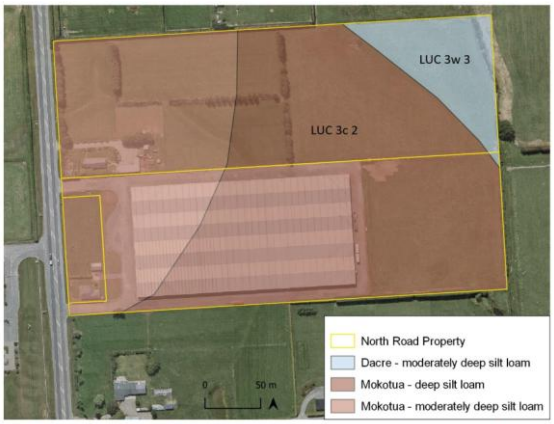


Figure 4. Revised soil map for the North road property. The soils on this property fit the LUC description for Class 3 land.

Map sourced directly from Ms Pearson's report

LUC capability as mentioned in Ms Pearson's soil assessment:

- *The LUC classification for the Mokotua soil is Class 3 (3c 2). This means the mapped LUC class of Class 2 on the upper terrace is unlikely at the location given the prevalence of fine textured, slowly permeable, imperfectly drained soils. The slope class is also mixed A + B across the Mototua deep silt loam on the upper terrace (Figure 4). The Mokotua soils will have limited versatility for arable and horticulture due to inadequate aeration during wet periods. Mokotua soils have moderate versatility for intensive pasture due to inadequate aeration during wet periods with a risk of short-term water logging after heavy rain. Soil fertility would also need to be increased at the site to support intensive pasture.*
- *The lower terrace LUC class of Class 3 (3w 3) is consistent with the properties of the Dacre soil. Dacre soils have limited versatility for arable, horticulture and forestry and moderate versatility for intensive pasture due to inadequate aeration during wet periods and the risk of short-term water logging after heavy rain.*
- ***It is noted that the identification of the Mokotua soil series changes the assigned LUC class at the site to Class 3 across the entire property.***

3.11.2. Interpretation of LUC

The LUC system analyses different areas of land to describe their physical characteristics and limitations into a basic code. The subject property's land use classifications based on Ms Pearson's report are **3c2** and **3w3.**

3c2 – Class 3 – Climate – Soil

- **Class 3** – has moderate limitations for arable use,
- **C** - has a climate limitation – this is excessive rainfall and frequent frost,
- **2** – has specific management needs relating to soil – this is likely avoiding compaction and pasture damage.

3w3 - Class 3 – wetness – Slope angle

- **Class 3** – has moderate limitations for arable use,
- **W** – Wetness, these soils are lower lying and slow to drain. (See appendix),

- **3** – Slope angle, as mentioned in Ms Pearsons report there is a 7% slope, this means erosion risk is increased which doesn't suit vegetable crops.

Based on Ms Pearsons assessment, the property is most suited to pastural farming, commercial vegetable crops are not suited, arable crops are not suited given the wetter climate (also discussed in section 3.7).

4. Submission Proposal

The submission proposal in this case is for the subject property to be re-zoned as "Industrial 1 Zone land". (Survey plan in section 7.2).

The key point to the proposal relating to the productive output is that all of the effective areas will be developed and no longer able to produce food & fiber. The subject property will however be productive in the sense that it provides support services to Agriculture discussed in section 5.4.

The property does increase its productivity in the sense that it is no longer farmed as a lifestyle block and is operated as a support business for agricultural industries such as the current wool store building located on the property.

5. Productive Capability

5.1. Current Farm System

The existing farm system involves the pastures across all the effective areas being harvested with baling equipment, this harvested grass is then removed from the subject property and sold.

In this type of system, a set amount of fertilizer is required to be applied following each cut/harvest of grass to replace the nutrients removed. These fertilizer applications do not look to have been applied, the effects of this lack of fertilizer are a gradual reduction in pasture growth and a reduced persistence in the target pasture species – in most cases this target species is ryegrass and white clover. When low (or no) fertilizer is used for long periods of time weeds generally replace ryegrass and white clover as the conditions are more optimal for the weed species.

The above lack of management does not cause any major long-term damage to the soil as per say, fertilizer can be applied to increase nutrient levels to optimum levels and pastures can be renewed through the cultivation process.

5.2. Constraints and Limitations

All properties in some ways have limitations, some of these can be mitigated or offset, some limitations significant enough that people do not use the land for various farm systems.

Limitation	Comments
Scale	The size of the property and its very low productive output is not enough to support a farm owner or farming family at the 5.47ha. This small scale makes it very unlikely to be operated alongside other farming titles.
Location	The location (along with scale) makes this property very difficult to be farmed or leased along with bigger properties. There are many properties in the area that are farmed as lifestyle and are not farmed in unison with bigger properties as it is not practical or economic. The subject property sits on a busy main road that makes it not practical to walk livestock on.

Soil types	As discussed in section 3.11, soils are limited for arable and vegetable crops.
Fragmented location	As per section 3.10, the area is very fragmented with other lifestyle and commercial lots. The issue with this is it is highly unlikely to be re-amalgamated with neighbouring properties to then be farmed.

The subject property and most properties of this scale are almost impossible to farm in a profitable or practical manner. There are other systems that cannot legally be farmed on this title such as dairy or dairy grazing or based on Ms Pearson's assessment and my experience the property is only suitable for low intensity sheep and beef or cut and carry systems.

To make use of these titles or market them is usually lifestyle use or commercial use, there are very few (or none) that are farmed or re-amalgamated with larger properties.

5.3. Productive Assessment

5.3.1. Farm systems for productive land use

There are many farm systems run in Southland that are chosen to suit the land of which they are run on for factors such as soil type, climate, topography, distance to markets, and desires of property owners. Some farm systems, although can work on a given property, are not always practical or economical and for the purposes of this report these types of systems are not assessed if deemed unsuitable. Below is a table showing various farm systems and why or why they are not suitable and justifications.

System Type	Suitability	Comments
Dairy	Not Suitable	Dairy farming requires consent for land use which would not be granted. Also, the subject property scale to small, dairy farms typically are at minimum 80ha in size.
Dairy Grazing/Support	Not Suitable	Dairy grazing requires land use consent when the property has no history of dairy stock which is the case with the subject property. The property would not be suitable for young stock given pasture performance, if this was fixed up at 10,000KgDm harvested could run 20 heifers for 12 months.
Sheep and Beef	Suitable	Permitted activity – low environmental footprint. Carrying capacity very low – discussed in section 5.3.2
Carrots and Potatoes	Not Suitable	This is not suitable for properties this small, typically 10ha paddocks or bigger are required given the large machinery required and buffer zones around housing and buildings. The LUC class 3 soil also makes it unsuitable.
Other Vegetables	Not Suitable	As per above, minimum 10ha is usually required. Also small market gardens are considered niche in Southland. Class 3 land not suitable for most crops.
Other Arable (Cereal Grains).	Not Suitable	The climate at Lorneville is not suitable, there is very little (if any) grains grown down this part of Southland. Also, the property size is very small for this system.
Grass harvest/Cut & Carry	Suitable	This is the current system; it is workable for properties this size, but the subject property is of very small scall and outputs are very small

Other systems not contained in the above are considered very niche or not present in the Southland area. It is difficult to consider niche farm systems when completing productive

capacity assessments and is not likely to be an option for property owners of this scale over a 30 year period.

5.3.2. Current System Calculations

Cut and Carry

3.92ha (effective) (on 819 title)

1.37ha (effective) (on 815 title)

0.18ha (effective) (on 805 title)

5.47ha Total	*	**5000KgDm Harvest Per year**	**27,350KgDm**
The value of the above feed working on a low value due to poor quality			$0.10
Total financial value per year			$2,735

The cut and carry system run on the subject property is depleting the soil of nutrients and the KgDm harvested each year progressively drops. This system is of low productive output and is of very low intensity in this case, the above income does not include the cost of fertilizer which is usually $0.10-$0.12 per kgDm harvested.

Sheep

The below calculations are based on district averages and considered appropriate on an average efficient management basis.

Area	*5.47*	*ha*		
SR	*8*	*SU/Ha*		
Total SU	*43.76*	*SU*		
	Numbers		*MAF SR*	
MA Ewes	*36*		*1*	*36*
Hoggests	*9*		*0.7*	*6.3*
Rams	*1*		*0.9*	*0.9*
Total				*43.2*
Productive Capacity				
Meat				
Laming % survival to sale	*140%*			
Less replacements	*25%*			
Numbers Sold	*41.4*			
Weight Slaughtered	*32.4*			
Total Lamb Produced	*18*			
	583	*KgCw*		
Cull Ewes at 20%	*7.2*			
Ewe Carcass Weight	*26*			
Total Weight Sold	*187.2*	*KgCw*		
Total Meat Production	*770.40*	*KgCw*		
Meat Production Per hectare	*140.84*	*KgCw/ha*		
Wool				
Ewe Wool Harvested Per year	*3.5*		*126*	
Hoggets wool harvested Per year	*2*		*18*	
Total Wool			***144***	***Kgs***
Total Product off Property			***914.40***	
Total Product per hectare			***167.17***	***Kgs of sheep product per hectare***

Note the above calculations are not the system run on the property, this system would be the most likely system to replace the cut and carry system. All workings based on district averages and typical assumptions for the area.

The above calculations show the meat and wool output of the property. Total meat production from the property is 914.4Kgs of Carcass weight and wool product of 144kgs. Total product sold from the property is 914.4kgs. This assumes that new ewes are purchase. Total product produced per ha is 167.17Kg per year.

The output of the property is very low given its very small scale. Often properties this size are not run efficiently and do not make the owners any profit.

Based on the proposal, the subject property loses a small 914.4kgs of product but is replaced with a building complex that will add much more value to the ag sector

5.4. Changes to Productive Capacity

Based on the concept layout shown in section 7.2, all of the subject property's productive areas will be taken up by buildings and curtilage. The property will lose the 914.4kgs of product produced on the property each year. This productive output is very low and the loss is very low, the property even with developments such as, increased fertilizer use, drainage improvements, and newer pastures, would still see the subject property's outputs very low.

6. Conclusion

The property in its current form has a very low productive output of food, fibre, grass cut and carry. Even if the property's productive output could be increased to its maximum, this would be very small and insignificant, it would also be very difficult (if not impossible) to be run in a productive way as a stand alone farm or run in unison with other properties given the location and fragmentation.

The subject property is not suitable for arable or vegetable crops, evidence of this is provided in Ms Pearson's report where all the subject property is classified as 'class 3 land' with limitations of climate and wetness.

The subject property from a farm operations perspective is highly fragmented and there is no obvious way the property could be re-amalgamated with larger titles

The subject property while does lose a small amount food and fiber production of 914Kgs per year total, but more importantly gains a large utility with the commercial development proposed which provides employment for the area.

If you wish to discuss the contents of this report, please contact me mark@agribusiness.co.nz or 021 718 956

Yours Sincerely



Mark Aitken

7. Appendix

7.1. References

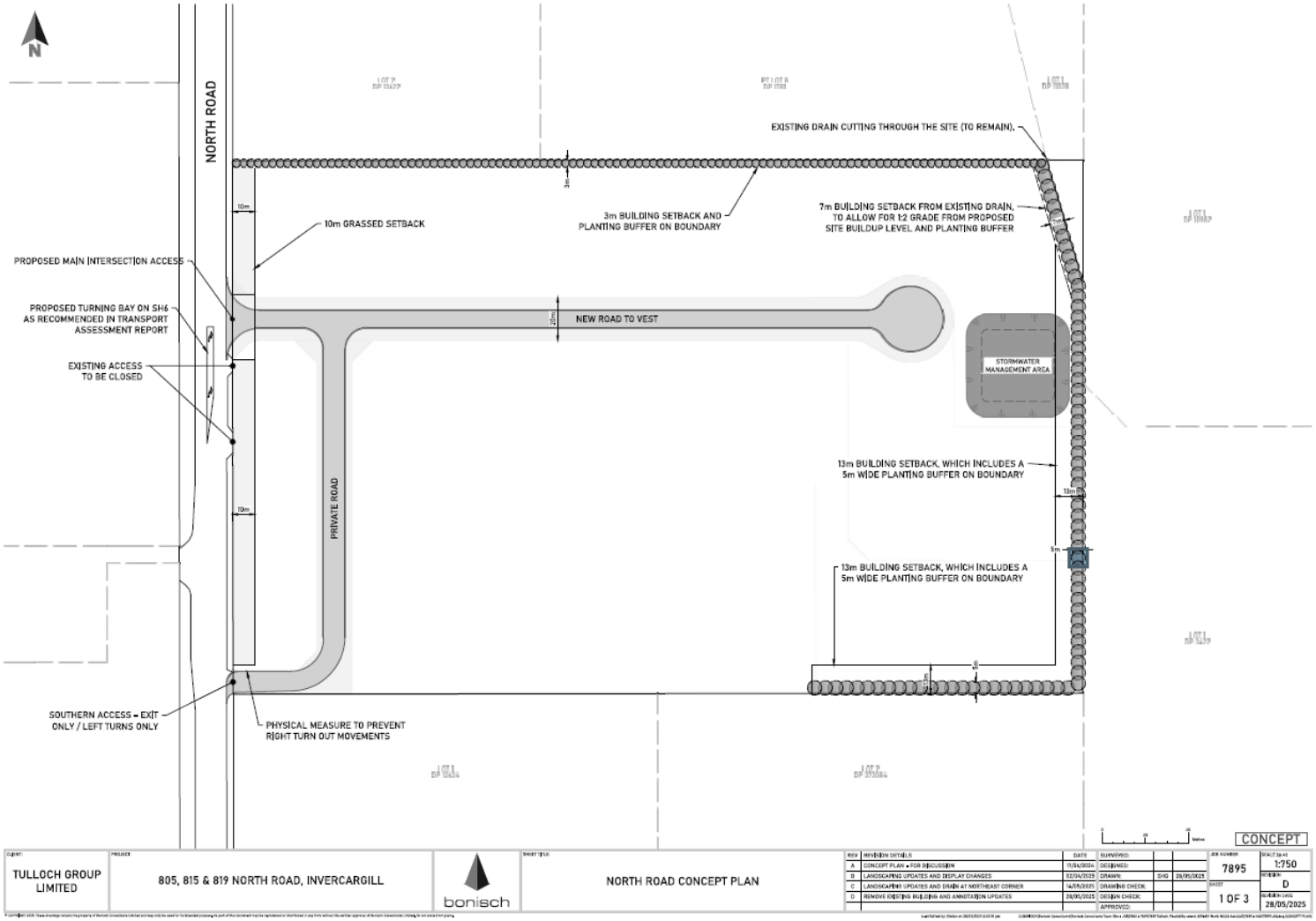
https://gis.icc.govt.nz/ICCViewer/?map=9a025e64bf4c43459033b476901c4a12 – Southland district council zoning information.

NPS-HPL guidance document https://environment.govt.nz/assets/publications/National-Policy-Statement-Highly-Productive-Land-Guide-to-implementation-March-2023.pdf

Land use capability handbook https://www.tupu.nz/media/jzbjrpy4/land-use-capability-luc-survey-handbook-3rd-edition.pdf

Climate information sourced from:
https://niwa.co.nz/sites/default/files/Southland_Climate_WEB.pdf

7.2. Survey Plan



Concept layout sourced from Bonisch.

7.3. GRIP Image with Labels



Image sourced from Bonisch

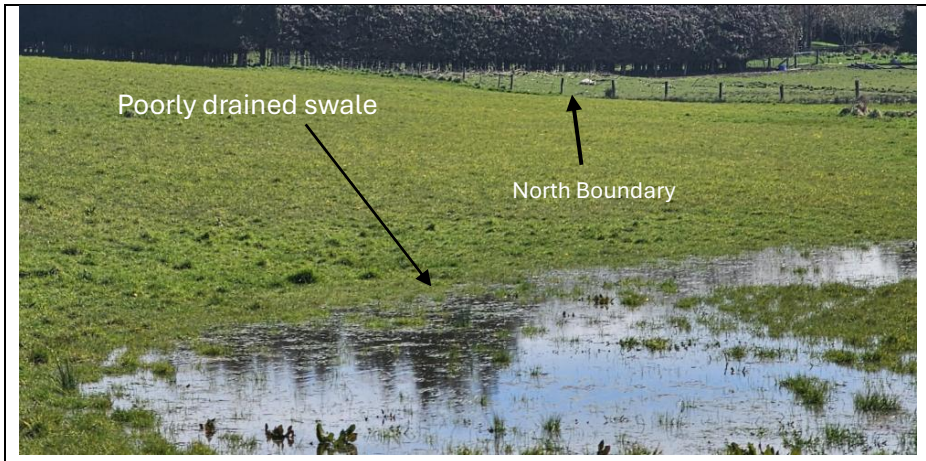
7.4. Site Photographs










Poorly drained swale
North Boundary


Open Drain
South Property Boundary
Evidence of poor drainage

Large Council Drain	