BEFORE THE HEARINGS PANEL
FOR THE QUEENSTOWN LAKES PROPOSED DISTRICT PLAN

IN THE MATTER	of the Resource Management Act 1991
AND	
IN THE MATTER	of Stage 3 and 3b of the Proposed District Plan

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STATEMENT OF EVIDENCE OF JAMES DICEY
ON BEHALF OF QUEENSTOWN LAKES DISTRICT COUNCIL

GIBBSTON VALLEY REZONINGS - VITICULTURE

18 March 2020

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1. INTRODUCTION

1.1 My full name is James Dicey. I am the owner of Grape Vision Limited (**Grape Vision**), a vineyard development, management, brokerage and consultancy business based in Central Otago. I have been involved in the grape and wine industry since 2004.

1.2 I hold a Bachelor of Commerce (1992) and Bachelor of Law (1993) from Otago University and a Graduate Diploma in Oenology and Viticulture from Lincoln University (2005). A copy of my curriculum vitae is attached to this statement of evidence as **Appendix 1**.

1.3 Originally I qualified as a Chartered Accountant gaining experience with Deloitte in New Zealand, Amsterdam and London, prior to working as an independent contractor. My last contractor role was as a financial and IT risk manager with Diageo plc, a British multinational alcoholic beverages company that produces spirits, beer and wine.

1.4 I joined Grape Vision as an operations manager in 2004 upon moving back to New Zealand. After gaining a Graduate Diploma in Oenology and Viticulture, I continued to work for Grape Vision before purchasing the business in 2009.

1.5 Through my work with Grape Vision I have accumulated extensive experience and expertise in the production of grapes grown for both clients and myself. Since 2004, I have managed between 250 and 400 hectares of vineyard land in the Central Otago winegrowing region, which includes the Gibbston sub-region. This has included a number of vineyards in the Gibbston, including:

(a) the Van Asch Havoc and Winehouse Vineyards, which I currently manage;
(b) the Anthem Vineyard, which I managed from 2006 to 2010; and
(c) the Chard Farm Gibbston Vineyard which I managed in 2008.

1.6 In addition to the above management roles, I have also consulted to the following vineyards in the Gibbston:

(a) Wentworth Owners Group, who lease their properties to Peregrine Wines Limited;

(b) the Gibbston Highgate Vineyard in relation to vineyard operation and leases;

(c) the Lane Vineyard in relation to a lease to Gibbston Valley Wines Limited; and

(d) the Winery and Pagan Vineyards for Mount Edward Wines Limited.

1.7 I have also consulted in other New Zealand wine regions, as well as in South Africa and California. I have been retained by the Queenstown Lakes District Council (**QLDC** or **Council**) as a viticultural expert providing expert advice on land use and consent issues within the Gibbston Character Zone (**GCZ**).

1.8 Additionally, I have gained a detailed business and economic understanding of the Central Otago wine industry through owning my own brand (Ceres Wines Limited) and through my role as director of Mt Difficulty Wines Limited, a position I have held since 2004 until the sale of the company in 2019.

1.9 Other positions I have held in the wine industry include:

(a) committee member of the Central Otago Winegrowers Association for over 12 years, including acting as President for over five years;

(b) sitting on the New Zealand Winegrowers Research Committee for four years;

(c) being an elected Director of New Zealand Winegrowers Incorporated, the New Zealand wine industry member body, since 2016 (including deputy chair roles on the Finance and Sustainability committees); and

(d) being a nominated Director of New Zealand Winegrowers Research Centre (since its inception in 2017), a wholly owned subsidiary of New Zealand Winegrowers which instigates and oversees research.

1.10 I visited all of the submission sites in February and March 2020. I drove and walked within the sites. In addition to these visits, I have also observed the sites over the years that I have been growing grapes in the Gibbston and in the Central Otago winegrowing region (2006 to the present).

2. SCOPE

2.1 In December 2019 QLDC engaged me to provide viticultural evidence in relation to Queenstown Lakes District Proposed District Plan (**PDP**) Stage 3 and 3b, and specifically in relation to sites referred in the following submissions:

(a) Submission 3357 – Stage 3 - Requests that the submitter's land and 'surrounding properties' be included within the General Industrial Zone (**GIZ**). This land is identified as being located within the GCZ. The submitter also requests a range of other changes to the text of the proposed GIZ.

(b) Submission 3349 – Stage 3 - Requests that the submitter's land be included within the GIZ. The land is indicated as being partially within the GCZ and partially within the Rural Zone. The submitter has also requested a range of other changes to the text of the proposed GIZ.

(c) Submission 31039 – Stage 3b - Requests that the submitter's land be included within the Rural Visitor Zone. This land is identified as being located within the GCZ.

(d) Submission 31037 - Stage 3b - Requests that the submitter's land be included within the Rural Visitor Zone. The land is indicated as being partially within the GCZ and partially within the Rural Zone.

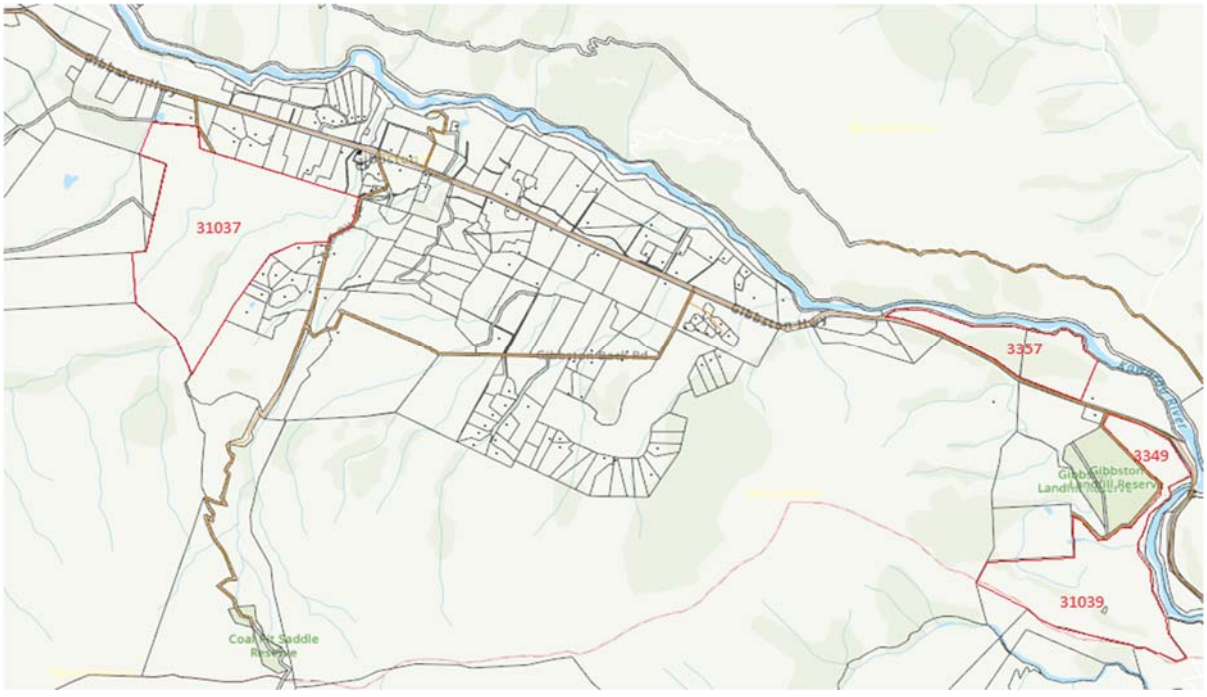

Figure 1 - *Map showing submission areas (outlined and numbered in red)*

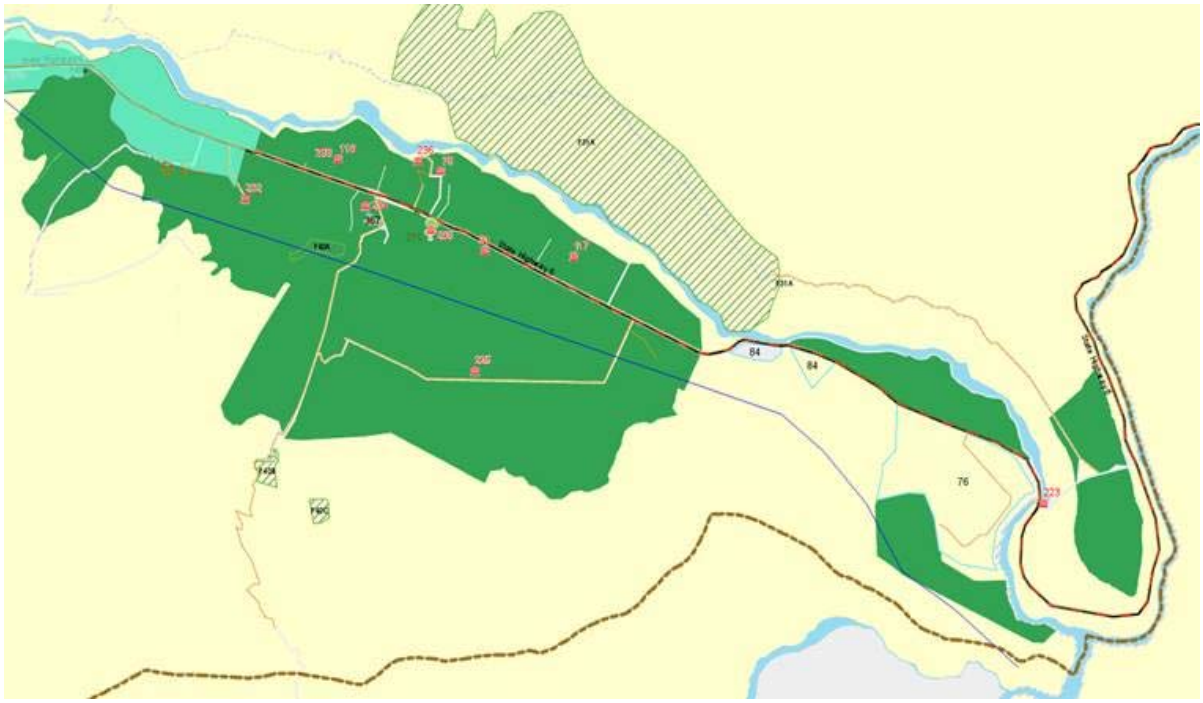

Figure 2 – *extent of GCZ shown in dark green. Surrounding rural zone shown in yellow.*

2.2 Generally, my evidence addresses:

(a) the viticultural attributes of the GCZ;
(b) the productive potential and viticultural viability of the sites;
(c) economic viability of the sites from a viticultural perspective; and
(d) the potential effects of the land use changes, on viticultural activities both on the sites itself and on nearby sites.

2.3 Since being engaged by the Council, I have visited the sites and the wider Gibbston Valley area, and have also considered various documents that I consider to be relevant to this matter. A full list of the documents I have reviewed and considered are set out at **Appendix 2** to my evidence.

2.4 My evidence is structured as follows:

(a) Part 4: Executive summary;
(b) Part 5: Viticultural attributes of the Gibbston;
(c) Part 6: The productive potential and viticultural viability of the sites;
(d) Part 7: Economic viability of the sites from a viticultural perspective;

(e) Part 8: Effects of the proposal from a viticultural perspective; and

(f) Part 9: Conclusion.

2.5 Although this is a Council Hearing, I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court of New Zealand Practice Note 2014 and that I have complied with it when preparing my evidence. Other than when I state I am relying on the advice of another person, this evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

3. EXECUTIVE SUMMARY

3.1 My evidence outlines that:

(a) Grapevines can be successfully cultivated in the GCZ. Although the sub-region is cooler than some (but not all) other sub-regions in the Central Otago winegrowing region, high quality grapes can be grown and ripened on a consistent basis. The wines that are produced from these grapes have a distinctive sense of place and command international acclaim.

(b) From a viticultural perspective, submission sites 3357, 3349 and 31039 are economically viable. They have the potential to grow high quality fully ripe grapes at sufficient yields and will be able to command a price commensurate with the yield/quality tier. When solely considered as a contract grape growing site the majority of yield and price scenarios result in a positive return. I consider that the location of the sites in the GCZ lends itself to capturing additional value using successful business models that progress further along the value chain, particularly in relation to the Direct to Consumer (**DTC**) and tourist business models.

(c) The 3357, 3349 and 31039 submission sites receive sufficient growing degree days (**GDD**) to ripen fruit and the rainfall levels are acceptable. The frost risk on these sites are able to be sufficiently mitigated in all but the heaviest frost due to lower altitude, the aspect and relief of the sites. The soils are suitable for viticulture and when combined with new clones that are grafted on to Phylloxera, tolerant rootstock have the potential to

yield at economic levels, achieve full ripeness and create distinctive and high quality wines.

(d) The 31037 submission site however, does not share all these characteristics as the majority of the land is too high, subject to increased frost risks and wind damage. The rainfall is also higher on the site and the area of land able to be developed to generate an economic return is too small as a vineyard by itself. However, if the full downstream returns are realised then the higher aspect and its negative impact on reliable yield may be mitigated.

(e) In my opinion, the conversion of the sites to Rural Visitor or GIZ will result in the loss of productive viticultural land. I consider that the rezoning's could result in reverse sensitivity effects in relation to noise, spray drift, tractor and staff activity (including at early hours), if viticultural activities are located next to residential activities in particular.

4. VITICULTURAL ATTRIBUTES OF THE GCZ

4.1 In this part of my evidence, I consider the following attributes of the GCZ: climate, soil, vines and vineyards and cultural practices. For the reasons set out below, it is my opinion that grapevines can be successfully cultivated in the GCZ. While the Gibbston sub-region is cooler than some, but not all, sub-regions in the Central Otago winegrowing region, high quality grapes can be grown and ripened on a consistent basis. The wines that are produced from these grapes have a distinctive sense of place and have commanded, and continue to command, international acclaim.

Climate

Meso-climate vs micro-climate

4.2 Although the PDP refers to the "micro-climate" of the GCZ,[1] the more technically correct term is "meso-climate." This describes the climate that the vineyard experiences, whereas a micro-climate is the climate that the leaves on the vine experience (scale in millimetres rather than in tens or hundreds of metres). The meso-climate is a key driver for the ability of a site to consistently and reliably grow economic yields and ripen the grapes to enable the production of commercially acceptable wine.

1 PDP, Chapter 23, 23.1 Zone Purpose.

4.3 The key climatic drivers in the GCZ are outlined below.

Accumulated heat

4.4 Accumulated heat is a measure of how much heat a grapevine receives during the growing season (above a baseline of 10°C). GDD is the calculation used to measure accumulated heat.

4.5 There is a GDD range which is optimal for economic yields, quality and ripeness to be achieved. For the varieties grown in the Central Otago winegrowing region, this spans from 750 – 1200 GDD. While the area nominated as being within the GCZ is at the lower end of the GDD range experienced in the Central Otago winegrowing region, it is still acceptably within the range.

4.6 The meso-climate of the GCZ is not homogenous and significant variation occurs. Analysis of data I was able to access from the HarvestNZ weather stations indicates that a variation of approximately 112.8 to 239.2 GDD exists within the GCZ. This data is set out in **Appendix 3** to my evidence.

4.7 The accumulated heat, or GDD, impacts the speed at which the grapes ripen. Accordingly, the lower GDD experienced in the GCZ does mean that grapes are slower to ripen and are therefore picked later than most of the Central Otago winegrowing region with the higher altitude grapes tending to be harvested last.

Rainfall

4.8 Rainfall data from the GrowOtago resource indicates that areas planted in vineyards in the GCZ receive between 551 and 700mm of rain per annum. This is a higher rainfall than in other areas of the Central Otago wine growing region except for Wanaka. I note that this rainfall is typically spread across the year, so is not all received during the growing season.

4.9 Increased rainfall can increase the costs of vineyard management, particularly the costs associated with the tasks of mowing, weed control and canopy trimming. However, in the overall context of a grape growing operation, these are low cost tasks and would likely see an additional single execution of these tasks compared to drier areas of the Central Otago winegrowing region. To offset this higher annual cost, it is worthwhile to note

that increased rainfall reduces the need to irrigate the vines, with a saving in electricity from less pumping.

4.10 High rainfall, coupled with warmer temperatures can increase the risk of bunch rot cause by Botrytis Cinerea. In my experience, the more open bunches of grapes and the cooler temperatures during rainfall events experienced in the Gibbston result in lower disease pressure from Botrytis Cinerea induced bunch rots when compared to other areas in the Central Otago winegrowing region.

Frost risk

4.11 It is widely accepted in the grape growing industry that a frost during the growing season can damage the cell tissue of leaves and fruit, and lead to crop loss. It can also compromise vine performance in the following season. All of the Central Otago winegrowing region is subject to frost risk of varying degrees. While this can be partially mitigated by methods such as site selection, wind machines, helicopters or water, none of these completely eliminate the risk from all frost events.

4.12 The frost risk in the Gibbston is higher than many other sub-regions and that this in turn increases the risk of crop loss and loss of grape quality. This is primarily due to increased altitude.

Soil

4.13 Soil provides the nutrients and holds the water that grapevines need to grow. Different soils have different physical, biota and chemical characteristics and this variation contributes to differences in the wines that are produced from grapes grown on them. Differences in soil characteristics contribute to different wine styles and these differences are a valued by growers and makers.

4.14 The soils in the GCZ are suitable for viticulture. There are a range of different soils in the sub-region which, in my opinion in combination with the other factors described in this section of my evidence, result in wines with a distinctive character and sense of place. It should be noted that these are not limited to soils which are considered in terms of the Land Use Capability Classification or in the Otago Regional Council Proposed Regional Policy Statement to be “high class”, “highly productive” or “versatile” (or similar) soils

as grape vines thrive and produce high quality grapes on a wide range of soil types.

Vines and vineyards

4.15 Different grape varieties require different environmental conditions to ripen economic yields. A range of varieties are suitable for growth in the GCZ. The predominant variety grown in the Central Otago winegrowing region and the GCZ is Pinot Noir, although Pinot Gris, Gewürztraminer, Chardonnay and Riesling also perform well.

4.16 Fruit grown in the Gibbston has achieved numerous national and international gold medals and trophies. Gibbston fruit and cooler climate sites in the Central Otago winegrowing region are becoming increasingly sought after due to their distinctive flavours and aromatic profile. As wine growers, a distinctive character and sense of place is one of the attributes we seek to see reflected in the wines produced from grapes. Nuances of the influence of a sub-region in wine is what drives high end discerning consumers who are prepared to pay significant premiums for particular wines. The profile of wine made from Gibbston fruit has been characterised by the following regionally distinctive descriptors:

(a) Aromatic: Floral, perfumed, lifted aromatics, savoury, dried herb; and;

(b) Mouthfeel: finer/softer tannins, higher acidity, vibrancy, energy.

Cultural practices

4.17 The phrase “cultural practices” refers to viticultural interventions used to grow the grapes. In recent years, as a result of better trained viticulturists with increased experience with growing grapes in cooler regions, clonal improvements and the advent of products used to advance grape maturity, it is my observation that the GCZ has cropped more reliably at higher yields and increased maturity.

5. THE PRODUCTIVE POTENTIAL AND VITICULTURAL VIABILITY OF THE SITES

5.1 For the reasons discussed below, I consider that the climate and soils make most of the area of the sites suitable for wine production.

5.2 In **Appendix 4**, based on my site visits and my general knowledge of the sites, I have noted a number of observations about the sites.

Accumulated Heat

5.3 As noted above, accumulated heat, as measured by GDD, is a key consideration when considering the viticultural viability of a site. No weather station data are available from the sites. However, data from the GrowOtago resource (which interpolates GDD based on climate modelling and mapping techniques) indicates that sites of submitters 3357, 3349 and 31039 all receive sufficient GDD. One submission site (31037), mostly due to altitude, receives less accumulated heat, according to the GrowOtago resource than the optimal range I have noted above. This can be modified by a significant northerly aspect but this is not present on the land suitable for grapes (being the top terrace). The land immediately above the Wentworth subdivision has a northerly aspect but it is too steep to be developed into a workable vineyard. The GrowOtago data referred to above is included as **Appendix 5** to my evidence.

5.4 The GrowOtago resource is a particularly useful and highly reliable resource but can generate exceptions based on the fact that the data is interpolated for various factors (e.g., altitude, aspect etc) that can result in meso-climate variations. To conclusively determine the suitability of a site temperature (and other climate components such as rainfall and winds) data should be collected using weather stations and analysed after a growing season.

Altitude

5.5 An additional consideration when considering accumulated heat is the altitude that the vineyard is located at. Within the Central Otago winegrowing region, it has been generally accepted (with some exceptions mostly due to unique topography) that 400masl is the upper limit to successfully ripen grapes and, all the sites except one (submission 31037) are below that altitude. The 31037 submission site ranges from approximately 381-526 masl with the majority of the usable land above 440masl.

Rainfall

5.6 According to the GrowOtago resource, sites 3357, 3349 and 31039 are likely to receive 550-600mm of rainfall per annum. The 31037 site receives between 600 and 700mm. The 3357, 3349 and 31039 sites will require less additional mowing, weed control or canopy trimming compared to the 31037 site. There will also be a reduced risk from loss of crop from bunch rot due to Botrytis Cinerea on 3357, 3349 and 31039 sites compared to 31037 (and other parts of the GCZ although, as previously noted, the risk of Botrytis Cinerea is dependent on both climate and rainfall). The GrowOtago data referred to above is included as **Appendix 6**.

Frost

5.7 Like all areas in the Central Otago winegrowing region, the submission sites are all subject to frost risk. However, the topography of the sites does aid frost drainage, which in turn will reduce the risk of frost damage. There is a section of the 3349/31039 site which is concave which will increase frost risk.

5.8 In my experience the frost can be mitigated sufficiently with the appropriate location of frost fans. In the most severe frosts (through the combination of the length of the event, the growth stage of the vines and the depth of the frost event) the efficacy of frost fans is reduced and severe frosts have occasionally been experienced in the GCZ. This can result in damage to the grapes and crops. None of the sites has a particularly elevated risk of frost due to the topography of the sites due to katabatic drifts. The channel on one site (submission 31037) is sufficiently incised and has an exit path sufficient to ensure any cold air brought onto the property will drain off. The concave area on submission sites 3349 and 31039 will result in frost risk that is slightly more elevated than the remainder of the site but this is not excessive and adequate protection should be afforded by wind machines.

5.9 The collection of additional temperature data from a growing season will aid this analysis for the reasons set out above in paragraph 5.4.

Soil

5.10 The soils on the sites are as described in the both the GrowOtago resource and the S-Map resource and a summary is included in **Appendix 3**. A copy of the GrowOtago data is attached as **Appendix 7** to my evidence and the S-Map in **Appendix 8**. The soils the sites are located on are suitable for the production of high quality grapes. Part of the sites for submissions 3349 and 31039 are on high class soil (the horseshoe area) as is a part of the site for submission 31037 but the balance is on Land Use Classification (LUC) 6 which is still useful for viticulture.

5.11 During the visit to the submission 3357 site I noted the presence of a large number of tors and surface rocks in amongst what appeared to be suitable soil. Too many floating rocks and surface/subsurface rocks can make developing the land into a vineyard uneconomic. Further soil sampling and analysis would be required to conclusively determine whether it would be viable to develop this land into a vineyard.

6. ECONOMIC VIABILITY OF THE USE OF THE SITES FOR VITICULTURE

6.1 For the reasons set out below, it is my opinion that, from a viticultural perspective, the submission sites, with the exception of the 31037 submission site, are economically viable. They have the potential to grow high quality fully ripe grapes at sufficient yields and will be able to command a price commensurate with the yield/quality tier. When solely considered as a contract grape growing site, the majority of yield and price scenarios result in a positive return. The location of the sites in the GCZ lends itself to capturing additional value using successful business models that progress further along the value chain. The exception to this is the 3349 and 31039 sites which are subject to Designation #76 – Landfill Buffer (in Chapter 37 of the PDP), which may prevent this from being realised. In my opinion, the sites also have the potential to generate a positive capital gain.

Vineyard Establishment Costs

6.2 Generally, in the Central Otago winegrowing region the cost to get a vineyard to achieve its first commercial crop is approximately $91,500 per hectare.

6.3 Investment calculations should be based on capital cost and land value. A full return on a new vineyard, with no establishment issues, is achieved by the

end of the fifth growing season and that this should be factored into calculations. It should also be noted that the economic life of a high quality vineyard is upwards of 60 years and can extend to over a century so there is a long opportunity for payback of the investment.

Vineyard Models

6.4 Commercial vineyards have been located in the GCZ since the early 1980s when Alan Brady planted his vineyard. Almost from the start of viticulture in the GCZ, different business models have been adopted to generate an economic return. To conclusively assess whether a site is economically viable from a viticultural perspective each model should be considered. Other considerations of economic value include understanding the Return on Investment (**ROI**) that can be generated from business models which travel further down the value chain, as this has can generate significantly better returns. This assumes an adequate route to market.

6.5 Broadly, business models in the GCZ have broadly included:

(a) Contract grape growing;
(b) Vineyard lease;
(c) Bulk wine;
(d) Wines sold direct or via a distributor to the trade;
(e) Wines sold direct to the consumer; and
(f) Tourism and other activities leveraged off the wine business (bike rental, cheese stores, restaurants, vineyard accommodation etc).

6.6 The vast majority of vineyards in the GCZ are winery owned (although I am not sure of the exact percentage). Across the whole of the Central Otago winegrowing region, and not just the GCZ, pursuit of additional value is key and the pure contract growing model should not be the only manner in which the economic value of viticulture should be assessed.

6.7 I note that there are many combinations of these business models in the GCZ but, for the purposes of my evidence, focus on each of the main models.

Contract Grape Growing

6.8 Contract grape growing is growing grapes for sale to generate a profit from the vineyard. The economics of this business model are driven by the

combination of vineyard productivity, price and the cost of production to calculate profitability.

6.9 In my opinion, the sites, except for submission 31037, have attributes that are at least equal to other Gibbston vineyards when solely considered as a contract growing vineyard. Specifically, these attributes include sufficient GDD, reasonable rainfall, equal or reduced frost risk, suitable soil, average annual maximum wind speed, the ability to be planted with modern clonal material and sufficient size when compared to most other Gibbston vineyards. As a result, the sites have the opportunity to generate a positive ROI as a contract growing vineyard.

6.10 The 31037 site does not share these attributes. Specifically, the difficulty of developing the land and the resulting small size of the vineyard, the higher altitude and commensurately lower GDD, the higher wind speed and increased frost risk make this site extremely marginal for the economic production of grapes when considered by itself as a contract grape growing operation. Part of the land may be suitable when value is achieved further down the economic value chain, which should be possible via the Gibbston Valley brand and sales outlet on the main highway.

Vineyard Productivity in the GCZ.

6.11 Based on my experience from growing grapes in the Gibbston on a range of sites, a key action used by viticulturists to ensure full fruit sugar and flavour ripeness is to reduce the vine yields. The level of yield reduction applied will depend on the quality tier that the fruit is designed for. From my experience, the following quality and yield tiers apply to the Gibbston:

Quality Tier	**Cromwell Basin Yield Range**	**Gibbston Range**
Value (RRP $25-$30/btl)	7-8t/ha (Avg 7.5)	5.6-6.4 (20%) –Avg 6
Premium (RRP $35-$45/btl)	5.5-6.5t/ha (Avg 6)	4.95-5.85 (10%) – Avg 5.4
Icon (RRP $65+/btl)	3.5-4.5t/ha (Avg 4)	3.5-4.5 (0%) – Avg 4

6.12 Conservatively, I would typically apply an average 20% yield reduction to the Gibbston at the Value yield range, 10% at the Premium and zero yield

reduction at the Icon tier compared to vineyards I manage in the Cromwell Basin.[2]

6.13 In my experience, full grape ripeness (being sugar and flavour ripeness) can be achieved in nearly all seasons when the above yield reductions are applied. In my experience as a grower of fruit in the Gibbston, that a yield of 5.5 to 7 tonnes per hectare (season dependant) will achieve sufficient sugar and flavour ripeness.

6.14 In my experience, a large amount of the fruit sourced from the Gibbston is made into Premium and Icon tier wines. There are some contract growers who successfully target the Value tier (where the risk of unripe or green flavours is increased), but in my experience these growers are the exception rather than the norm.

Pricing

6.15 There is a direct relationship between yield, quality and the prices the grapes command. Different quality grapes are priced at different levels that reflect their quality.

6.16 Demand for Central Otago grapes is currently strong, including grapes from the Gibbston. As part of my business I regularly field requests for grape purchases and currently a number of opportunities for purchase of Pinot noir that I am unable to fulfil from all sub-regions including the Gibbston.

6.17 Demand growth is also shown when the trend in average price for grapes is examined, including a rising premium for Central Otago compared to the NZ price for Pinot Noir. Supporting data is included in **Appendix 9**. In my opinion, given its attributes, it is reasonable to assume that the sites will be used to grow Premium quality fruit. Nonetheless, the following income matrix shows the full range of potential revenue per hectare using different fruit quality, taking into account a range of yields and pricing. This income range can then be compared to costs of production to gain an understanding of potential profit:

2 Note that actual yield reductions applied depend on the season the grapes are being grown in but are a representative average.

		Pricing		
		Value	Premium	Icon
Yield		3750	4050	4250
Lower	4.95	18563	20048	21038
Average	5.4	20250	21870	22950
Upper	5.85	21938	23693	24863

6.18 Data from New Zealand Winegrowers is available in $50 price increments (as set out in **Appendix 10** to my evidence) which reflects this tier based model.

6.19 This data shows the stretch around the median price and tiered pricing. Additionally, in my experience in recent years, spot priced fruit on the open market has been significantly higher than the average price with most recent pricing being in the ranges outlined below:

Quality Tier	Price Range
Value (RRP $25-30/btl)	$3,650 – $3,850 (Avg $3,750)
Premium (RRP $35-45/btl)	$3,850 – $4,250 (Avg $4050)
Icon (RRP $65+/btl)	$4250+

Profitability

6.20 The price per hectare to grow the grapes in the Gibbston ranges between $15,500 and $21,000 per planted hectare. The costs incurred depend on the tier the grapes are being grown for and the size of the vineyard. Typically, lower tier grapes cost less to grow as they have fewer viticultural interventions. Additionally, there is efficiency in operating larger land units and in my experience there are break points at 5 hectares, 30 hectares and 70 hectares. Applying a range of costs to reflect this to the income received, generates the following profits:

	COGS	Profitability		
Lower	15500	3063	4548	5538
		4750	6370	7450
		6438	8193	9363
Middle	16700	1863	3348	4338
		3550	5170	6250
		5238	6993	8163
Upper	21000	-2437	-953	38
		-750	870	1950
		938	2693	3863

6.21 In summary, the above analysis shows that a range of returns are possible and that it is possible to cover the costs of production and other off-vineyard costs. This will provide a positive return in approximately 89% of the scenarios considered and, in my opinion, is an acceptable ROI. Purely as a contract grower the likelihood is that the 31037 site is unlikely to generate sufficient reliable yields to operate solely as a contract growing vineyard.

Capital gain as a method of calculating return on investment

6.22 Another dimension of ROI to consider is the likely capital gain that will be achieved by developing the sites into vineyard. Developed and producing grafted vineyards are valued between $185,000 and $220,000 per hectare. At the more modest range this equates to a capital gain of between 31% and 146% based on the data and calculation contained in **Appendix 1**. All the sites except 31037 (due to lower yields and smaller developable area) will be able to achieve capital gain.

Vineyard lease

6.23 A vineyard lease is an alternate contract grape growing business model. It effectively transfers control and most of the risk to the lessee. In exchange, a lower return to the lessor is offered. Leases typically generate returns of between 2-4% of capital value and I am aware of a number of vineyard leases in the Gibbston which are generating this range of return. This is a relatively risk free option for generating returns and would still enable the

lessor to benefit from capital gain. All the sites except 31037 (due to lower yields and smaller developable area) will be able to achieve a lease return. Submission site 31037 will be highly unlikely to be able to be leased out.

Bulk wine

6.24 This model looks at making the grapes into bulk wine which is then sold. In my experience, there is currently strong demand for Central Otago bulk wine (including from the Gibbston). I have developed a scenario for a site to test the economic viability of bulk wine sales. This scenario is set out in **Appendix 12**. Analysis of the scenario shows selling grapes from the sites as bulk wine would be likely to achieve around an 8% return.

6.25 I also note that the pricing for wine making in the model is based on the assumption that a winery is on the sites being considered. However, if this does not occur, the wine making price would increase from $2.50 a litre to $3.20 a litre (which is the current commercial cost of wine making on contract). Running the scenario on this basis would drop the return to 0.6% which is an unacceptably low return and demonstrates the value of building a winery on the sites.

Wines sold direct using a sales manager or via a distributor to the trade

6.26 The majority of wineries in the Gibbston include a component of the business model where branded bottled wine is sold directly to the wine trade directly (direct sale) by an employed sales manager or via a distributor (distributor model).

6.27 I have developed two scenarios for the sites to test the economic viability of wine sold in this manner. The scenarios and my calculations are set out in **Appendices 13 and 14**. The scenarios presented show all the wine produced at a site in one year sold direct to trade customers either by an employed sales manager or via a distributor. The models that I have produced exclude indirect overhead costs (administration, tax, depreciation, debt servicing, rates, accountancy fees etc) but in my opinion do include all likely direct costs.

6.28 From the models that I have developed, I consider that the estimated returns for direct sales from the site could range significantly from 35% for distributor to 51% for a direct to trade model (or 32% for distributor to 48% for a direct to

trade model if no winery building is constructed on site, which I estimate to increase winemaking costs to $3.20 a litre). The returns in these models is commensurate with my direct experience with other wine businesses. Performing a break even analysis, yields would need to drop to below 2t/ha before this business model became uneconomic.

6.29 This model applies to all the sites. The 31037 site may be able to benefit from this but yields are likely to be just above the break-even point.

Wines sold direct to the consumer

6.30 The DTC model is viewed in the wine industry as the optimal business model due to its profitability, and is typically predicated on access to a large number of visitors via a cellar door. The importance of tourism in the GCZ continues to grow, specifically in relation to the importance of the DTC model and the importance of the Gibbston to wine tourism.

6.31 Data from the New Zealand Tourism Forecasts 2018 – 2024 indicates that tourist numbers to New Zealand are expected to increase 37.1% and spend is expected to increase by 39.7%. Using data, I have accessed from Tourism New Zealand I have calculated that the Gibbston will see an increase of over 73,000 wine tourists by 2024 which will in turn present an enhanced DTC opportunity.

6.32 I have developed the scenario at **Appendix 15**, which assumes 100% sales to consumers and 3.5 Full Time Equivalent staff to host and prepare platter food to enable an on premise license. Food is assumed to be zero margin so is excluded from calculations. This model shows a very healthy return on investment of 65% (or 64% if the wine is made on contract for $3.20 a litre and the building is only used as a cellar door). A breakeven analysis using this model indicates that yields would need to drop to below 1t/ha before becoming uneconomic. The model also excludes ongoing direct sales from customer data collected at the cellar door, website sales, merchandise sales, private cellar door tastings, wine clubs etc which can contribute significantly to profitability.

6.33 A number of the brands in the Central Otago winegrowing region have established cellar door operations in the GCZ specifically for the purpose of DTC sales. This includes some whose business did not start in the Gibbston

but have moved into the GCZ to access wine tourism and increase their level of vertical integration.

6.34 This model applies to most of the sites. The 31037 site may be able to benefit from this but yields are likely to be just above the break-even point. I note that Gibbston Valley Wines already has both distributor and DTC models in place. The 3349 and 31039 sites are apparently subject to a Designation, 'Landfill Buffer'. which may prevent the creation of a facility which will enable the gains modelled in **Appendix 15** from being realised.

Tourism and other activities leveraged off the wine business (functions, bike rental, local produce, restaurants, vineyard accommodation, etc)

6.35 Other activities can be vertically integrated from the winery/tasting room and this provides an opportunity to generate additional profit. For example, bike park (Gibbston Valley Wines), Restaurant (Gibbston Valley, Waitiri Creek), functions (Peregrine, Gibbston Valley, Waitiri Creek, Winehouse), brewery (Waitiri Creek), local produce (Gibbston Valley), vineyard accommodation (Peregrine, Kinross), wine cave (Gibbston Valley), pub (Rockburn).

SUMMARY

Loss of productive land

6.36 As demonstrated above all the sites except 31037 are productive land from a viticultural perspective. In my opinion, the proposed change in land use will alter the life supporting capacity of soil due to the development of buildings and associated infrastructure on top of the soil which compromises the capacity of the soil to be used for growing grapes through the physical presence of the buildings/infrastructure compromising soil biota.

Impact on economic viability

6.37 If a partial reallocation of land use occurs and only a part of the land is retained for viticulture there will be a material increase in per hectare cost when the retained vineyard size drops below the 30hectare size and again below the 5-hectare size and the economic viability deteriorates. This is a result of the cost of establishing and disestablishing machinery and staff on the site and the inefficiency of managing smaller vineyards.

REVERSE SENSITIVITY ISSUES

Effects on the proposed residential activities from the vineyard and nearby vineyards

6.38 In my experience, the placement of residential activity (some of the elements of the Rural Visitor Zone, specifically rules 46.4.2 and 46.4.3) in close proximity to an operational vineyard is likely to result in reverse sensitivity effects. Reverse sensitivity effects are also likely to arise where an industrial activity is developed next to vineyards.

6.39 This issue applies to submissions 3357 and 31037 if the rezoning was to go ahead, as the new General Industrial zones would border land still zoned GCZ. The 3349 application is for the whole area that is currently GCZ, and therefore reverse sensitivity effects on the GCZ is not as relevant, and may only affect the land on the other side of the road which will remain as part of the GCZ. 31039 only relates to the horseshoe area and is physically separate from the remainder of the land and as such reverse sensitivity effects are not anticipated if this land is rezoned.

Spray

6.40 Spray drift from sulphur, which is very commonly used to control powdery mildew is a mild irritant and, whilst not particularly dangerous to human health, is particularly odorous. Sprays can drift a considerable distance from crop sprayers. This is a particular issue in the spring in the Gibbston when wind is a constant feature. The Otago Regional Plan: Air for Otago in section 17.2.1.2 recognises the potential to cause adverse effects on health and non-target neighbouring areas. In Schedule 4(m) it considers that the QLDC should control these effects through land use planning by minimising drift hazard by creating a buffer zone of at least 100m between the vineyard and other types of activities.

Noise

6.41 Noise is a factor that must be considered when considering the appropriate proximity for residential activities to an operational vineyard.

6.42 As previously noted in my evidence, wind machines are one of the frost mitigation options. However, in my experience, these are very noisy,

particularly on a calm night typically associated with a frost event. Different blade configurations can lessen the impact by changing the harmonic but offset is recommended by the manufacturers (one of the main brands of machines, the US built Orchard-Rite, recommends an offset of at least 100 yards).

6.43 Wind machines at least are governed by resource consents and their noise managed under the RMA process. The same does not apply to helicopters which are governed by the Civil Aviation Authority and as I understand are not subject to resource consents when in the air. Their noise is much more significant when operating. I operate a very small (Robinson 22) frost fighting helicopter occasionally right next to my house for frost protection and sleep is nigh on impossible – from my experience I consider that a larger helicopter like a Robinson 44, Squirrel or Hughes 500 would be required on the sites which is even louder and would likely lead to complaints.

6.44 To address the need to get sprays on in the typically windy spring tractor drivers often start very early (2am starts are typical) and vineyard staff often start at day break to get the work done in the cooler morning hours during the peak of summer.

6.45 The sort of noise described above could impact the wellbeing of those living in any adjacent residential dwellings.

Effects on the vineyard from the proposed residential activities

6.46 In my experience, residential activities in close proximity to an operational vineyard can also result in adverse effects on the vineyard. In particular, unintentional damage can be caused to vines by broadleaf sprays used on lawns. These are typically available in supermarkets or applied by contractors. Grapes are particularly sensitive to these sprays and it is difficult to identify the causative location or police their use. The effects can be persistent and can travel considerable distance.

Effects on the vineyard from the proposed industrial activities

6.47 Industrial activities in close proximity to grapes can also have an effect on an operational vineyard. Specifically, this relates to odour or dust generated from industrial activities transferring to vineyards and being adsorbed into the waxy cuticle on the outside of a developing grape berry.

James Dicey
18 March 2020

Appendix 1

James Dicey Curriculum Vitae

PROFESSIONAL EXPERIENCE

Grape Vision Limited

Viticultural Development & Management Sep. 04 – present
Owner/Viticulturalist

Development and implementation of viticultural program for 35 vineyards spread over ~250ha. Recruitment, training and management of staff, including ~38 permanent New Zealanders in specialist roles and 40-110 seasonal Ni-Vanuatu via the RSE scheme. Client management. Budgeting and capital expenditure planning. Management of vineyard budgets with a combined value of >$4m. Materials procurement. Management of machinery operations. National and international viticultural and wine business consultancy. Fruit and wine brokerage. Vineyard development in all regions of Central Otago. Consultancy on reverse sensitivity issues in property development and expert witness

Ceres Wines Limited

Wine Brand 2005 – present
Owner

Development of wine brand. Creation of website and associated social media. Securing and managing NZ, UK, US and Australian distribution.

Diageo plc

Premium drinks, London, Feb. 03 – Jul 04
Manager, Business Risk

Deliver IS based risk activities globally. Recent work includes assessing the project risks within SAP implementations as well as the managing the post implementation audit work on the GB, Ireland and Project Sheriff (US) SAP implementations. Development and maintenance of network with senior IS community to identify key IS risks that drives work. Influence the IS agenda to embed appropriate risk culture.

- Work identification and planning – using an extensive network of IS contacts identify key IS risks and develop work programs to assess, mitigate and audit these risks.
- Risk Consulting – risk assessment and mitigation planning for key IS and market risks. Risk consulting on projects and markets to improve the quality of the control environment.
- Risk Auditing – performed financial and IS audits primarily focussed on SAP enabled back offices.

Quickstart Consulting Limited

Project management (self employed), London, Oct. 99 – Oct. 02

Contracts included:

Saudi Aramco (contracted to Deloitte & Touche)
Oil Producer: Dhahran (Saudi Arabia) Aug. 02 – Oct. 02, period 3 months

Contracted by Deloitte & Touche South Africa to project manage a post implementation SAP R/3 review for Saudi Aramco. Complex environment (FI, CO, MM, IS Oil, PS, IM, AM, HR, QA, BW and PM) with high number of users (20,000).

- Project Management - Identification of project requirements, project planning and delivery of report against plan and budget. Staff management (16 staff/10 nationalities), resource allocation, mentoring and assessment.
- Control Frameworks – Identification and documentation of business processes and the development of control frameworks.
- Reporting – Development of reporting standards. Regular status updates to senior management.

Shell Marine Products
Marine Fuel and Lubricants Supplier: London (United Kingdom) Jul. 01 – Feb. 02, period 7 months

Contracted by Shell Head Office to project manage the development and support of core business applications that are used internationally (in over 25 countries, by over 300 users), including changing software suppliers to reduce costs.

- Project Management: development/rollout of a core business application (Rapid Lubricants Analysis 2) internationally, management of pilot phase, development of support model and integration to SAP (focussing on international VAT issues).
- Management of RFP process: managed change of 3rd party software developer.
- Third Party Management: contract drafting, service level negotiation, process/procedure definition and implementation.
- Strategic: Contribution to IT strategy, IT steering committee (business case/project definitions), staff management including project manager mentoring.
- Business Continuity Planning (BCP): Creation and implementation of Shell Marine Products BCP. Shaping the Shell BCP strategy and approach.

WebPerform Group
Internet Performance Services: London (United Kingdom) Nov. 00 – Jul. 01, period 9 months

Assisted Internet start up company (focussed on online performance assessment and improvement) to obtain £7m funding. Reporting directly to the Product Development Director, working as a Programme Manager developing the development and implementation of core business applications (including £1m budgetary control). Promotion to Information Manager with sole responsibility for the development of the business intelligence layer, reporting directly to the WebPerform executive.

- Programme Management: co-ordination and implementation of multiple software and organisational projects. Project management of the following projects:
  - SAP Implementation (FI/CO, Logistics, CRM/SM, and HR). Responsibilities included solution assessment, training, configuration and change management.
  - Bespoke Application Development – specification, analysis and implementation of a core database driven business intelligence layer including an ASP based front end for configuration. Responsibilities included managing testing (including UAT), user training and documentation.
  - Operational Process Development – Creation of pan-organisational operational processes and structures.
- Business Intelligence Layer: scoping, designing and implementing the Business Intelligence Layer

IPC Electric (part of IPC Media)
Publisher: London (United Kingdom) Oct. 99 – Jul. 00, period 10 months

Reporting directly to the Director of Product Development, with sole responsibility for the development, implementation and operation of a B2C e-commerce solution to provide multiple websites with e-commerce functionality, based on a single catalogue.

- Programme Management – Co-ordination of multiple project e-commerce and infrastructure requirements. Management of resource (financial and human) allocation and prioritisation.
- Project Management – Simultaneous project management (up to 4 concurrent projects) from conceptualisation to implementation/project close-down (budgets exceeding £1.5m).
- Other responsibilities – Policy development, third party management (contract/service), E-Commerce strategy development, business process design, front/back end design integration, software requirements specification, testing, operational management of processes (including logistics and fulfillment), international fulfillment and VAT implication analysis, design of support processes, staff selection/training/management, development of project management methodology.

Deloitte & Touche

Professional Services: Feb. 94 – Sep. 00 (New Zealand, Netherlands, United Kingdom)

Senior manager with a professional career starting in financial audit, progressing to IT audit (including significant security training). Transfer to Europe to focus on SAP assurance and implementation (primarily security and business process controls).

- Project Management – Identification of business requirements, project planning and delivery of product against plan and to budget.
- Business Process Mapping – Identification and documentation of business processes and integration to SAP R/3.
- Business Control Identification – Identification and documentation of SAP R/3 functional controls and development of manual controls to mitigate business risk.
- Security Configuration – Identification of security settings. Design, implementation and rollout of security matrix
- Clients included – Philips Luminaires, ASM Lithography, Delphi Automotive, Philips Automotive, Telecom NZ.

PROFESSIONAL QUALIFICATIONS

- Grad. Dip Viticulture & Oenology – Lincoln University, 2005
- Chartered Accountant – Institute of Chartered Accountant of New Zealand, 1997
- Barrister and Solicitor – High Court of New Zealand, 1993
- Bachelor of Law (LLB) – Commercial Law Major (University of Otago, NZ), 1993
- Bachelor of Commerce (BCom) – Accounting Major (University of Otago, NZ), 1992

DIRECTORSHIPS

- Mt Difficulty Wines Limited: 2004 – 2019
- New Zealand Winegrowers: 2016 – Present
- New Zealand Winegrowers Research Centre Limited: 2017 – Present
- Seasonal Solutions Co-operative Limited: 2006 – 2016

INDUSTRY COMMITTEES

- 2016 – Present: NZ Winegrowers Finance Committee (Deputy Chair)
- 2016 – Present: NZ Winegrowers Sustainability Committee (Deputy Chair)
- 2006 – Present: Committee Central Otago Winegrowers Association, including 5 years as President (current role)
- 2010-2014: NZ Winegrowers Research Committee
- 2014: Lincoln University Bachelor of Viticulture and Oenology course review committee member
- 2014-2016: Alternate Director for NZ Grape Growers Council

MAJOR AWARDS/TROPHIES

- Ceres Black Rabbit Riesling (2017) – Royal Easter Show Wine Awards Champion Riesling trophy
- Ceres Composition Pinot Noir (2016) – Decanter World Wine Awards New World Pinot Noir Best in Show
- Ceres Composition Pinot Noir (2010) – International Wine and Spirit Competition Bouchard Finlayson Pinot Noir trophy
- Remarkable Wines Pinot Noir (2006) – Decanter World Wine Awards New World Trophy
- Gourmet Traveller Wine 2018 New Zealand Viticulturalist of the Year

TRAINING

- Institute of Directors – Introduction to Governance, Invercargill 2009
- Risk Management Concepts – Diageo, London 2003
- SAP R/3 – Security Review and Implementation, South Africa, 1999
- SAP R/3 – HR module courses, SAP Training Academy, Manchester, 1998
- Computer Assurance – Basic/Advanced IS technical and audit training, Malaysia/Sydney, 1996/1997

Appendix 2

List of documents reviewed in preparing this evidence

Application to the Council

(a) Submission 3357 – Stage 3;

(b) Submission 3349 – Stage 3;

(c) Submission 31039 – Stage 3b; and

(d) Submission 31037 – Stage 3b.

Planning documents

(e) Otago Regional Council Regional Plan: Air for Otago dated 1 January 2009;

(f) Otago Regional Council Regional Policy Statement for Otago 1998 (partially operative as of 14 January 2019); and

(g) Otago Regional Council Proposed Regional Policy Statement for Otago 2018 (Council Decisions Version Appeals Marked In dated 14 February 2017).

Other relevant material

(h) Land Use Capability Handbook – a New Zealand handbook for the classification of land 3rd Ed;

(i) VineFacts for Season 2017-2018 published by New Zealand Winegrowers;

(j) Harvest.com weather station data for Suncrest Orchard and Calvert Vineyard (Bannockburn);

(k) 2018 Interim Incremental Grape Price Data published by New Zealand Winegrowers;

(l) Wine Tourism Tourist Special Interest February 2014 published by Tourism New Zealand;

(m) Wine Tourism Tourist Activity September 2009 published by the Ministry of Tourism (now Ministry of Business, Innovation and Employment);

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(l) Wine Tourism Tourist Special Interest February 2014 published by Tourism New Zealand;

(m) Wine Tourism Tourist Activity September 2009 published by the Ministry of Tourism (now Ministry of Business, Innovation and Employment);

(n) New Zealand Wine Tourism Insights published by New Zealand Winegrowers;

(o) Wine Tourism: New Zealand Wine Tourism at a glance published by New Zealand Winegrowers;

(p) International Visitor Survey September 2017 published by Ministry of Business, Innovation and Employment;

(q) Wine industry benchmarks and insights 2017 published by Deloitte;

(r) Queenstown Airport Statistics published by Queenstown Airport October 2018;

(s) New Zealand Tourism Forecasts 2018 – 2024 (May 2018) published by the Ministry of Business, Innovation and Employment;

(t) The New Zealand Soil Classification published by LandCare Research (https://webcast.gigtv.com.au/Mediasite/Play/592c330cdb6045e596a54d5e2b6be5861d?catalog=cf98d83053764395b5e48ae171db49e621)

Appendix 3

Gibbston GDD data (source HarvestNZ Weather Stations)

Weather Station	2018 GDD Base 10°C	2017 GDD Base 10°C
Monterosa	1134.9	751.1
Wentworth (Peregine Gibbston)	1233.4	786.6
Gibbston Valley Wines	1078.6	N/A
Havoc (Three Paddocks)	1051.6	673.8
Chard Farm	1290.8	775.2
Vintner Holdings	1171.1	734.6
Weatherstation (Gibbston)	1161.0	730.0

- The data for 2018 was chosen as it was an unusually hot season in the Central Otago wine growing region
- The data for 2017 was chosen as it was an unusually cool season in the Central Otago wine growing region

Appendix 4 – Site Observations

Observations

Attribute	3357 (Waitiri)	3349 (Hend – Ind)	31039 (Hend – RVZ)	31037 (Gibbston V)
Altitude (meters above sea level)	300-317	301-337	301-337	381-526
Aspect	Neutral to North	Neutral to East	Neutral to East	Varied – predominately North
Land Use	Unfarmed but fenced	Mix – farmed and unfarmed. Fenced	Mix – farmed and unfarmed. Fenced	Mix – farmed and unfarmed. Fenced
Topography	Undulating	Flat – Undulating	Flat – Undulating	Rolling
Description	Close to edge of Kawarau Rover. Frost drain limited onto the site but expected to be along the river. Mountains to North and West. A number of significant Torrs noted throughout the property.	Limited drainage onto the site. "Roadside" block limited drainage off the site but "Horsehoe" block has drainage to the river. Mountains to the West.	Limited drainage onto the site. "Roadside" block limited drainage off the site but "Horsehoe" block has drainage to the river. Mountains to the West.	Hill country with limited flat land. Incised by drainage channel which will have frost drainage on to the property. Steep in places and specifically above the Wentworth subdivision.
LUC Classification (from S-Map resource)	6s 7	Flat – 6s 7 Horseshoe – 3s 6	Flat – 6s 7 Horseshoe – 3s 6	Mix of 3e 11, 4e 9

GrowOtago

Attribute	3357 (Waitiri)	3349 (Hend – Ind)	31039 (Hend – RVZ)	31037 (Gibbston V)
Soils	Gb3sU^B	Gd0sU, Sh1s/aU (Gladbrook, Deep, sandy loam, Undulating), (Shotover, moderately deep, sandly loam/	Gd0sU, Sh1s/aU (Gladbrook, Deep, sandy loam, Undulating), (Shotover, moderately deep, sandly loam/	9b, Gb2fU, Pg2fR (Shotover), (Gibbston shallow fine sandy loam undulating), (Pigburn shallow fine sandy loam rolling)
Drainage	Well drained	Well Drained	Well Drained	Moderately Drained

Fertility	Moderate	Moderate	Moderate	Low
Profile Available Water	Low	Low	Low	Moderate
Rocks	Younger Quaternary – Loess/Alluvial fans	Younger Quaternary – Loess/Alluvial fans	Younger Quaternary – Loess/Alluvial fans	Younger Quaternary – Loess/Alluvial fans (majority) Older Quaternary – Alluvial sand and gravel, loess (minority)
Rainfall (mm, Annual Median)	550-600	550-600	550-600	650-700
Growing Degree Days (10C)	851-900	851-900	851-900	500-700
Average Annual Wind Speed (km/hr)	8-12	8-10	8-10	10-12
October Frosts	2-3	2-3	2-3	3-4
November Frosts	0-1	0-1	0-1	1-2

S-Map Online

Attribute	**3357 (Waitiri)**	**3349 (Hend – Ind)**	**31039 (Hend – RVZ)**	**31037 (Gibbston V)**
Drainage	Well drained	Well drained/moderately well drained (minority)	Well drained/moderately well drained (minority)	Well drained
Soil Type	Gibbston (2)	Gibbston (2)/Barr (35) (minority)	Gibbston (2)/Barr (35) (minority)	Gibbston/Pigburn
Depth (to rock)	Shallow, presence of tors and surface rocks noted	Shallow- Very deep	Shallow- Very deep	Shallow
Soil Moisture	Moderate	Moderate-High	Moderate-High	Low-Moderate
Soil Order	Brown	Brown (flats), Pallic (Horseshoe)		Brown (upper), Recent (lower)

Brown - Soils with a brown or yellow-brown subsoil below a dark grey-brown topsoil caused by thin coatings of iron oxides weathered from the parent material. Brown Soils occur in places where summer drought is uncommon and which are not waterlogged in winter. They are the most extensive soils covering 43% of New Zealand.

Pallic - Soils with pale coloured subsoils, low amounts of iron oxides, weak structure and high density subsurface horizons, formed in predominantly in schist or greywacke loess. They are dry in summer, wet in winter, and occur primarily in the eastern North and South Islands covering 12% of New Zealand.

Recent - Weakly developed soils with distinct topsoil’s, but B horizons are either absent or only weakly expressed, variable texture and high special variability. They occur on young land surfaces, including alluvial floodplains, unstable steep slopes, and slopes mantled by young volcanic ash, are generally less than 1000 to 2000 years old, and cover 6% of New Zealand.

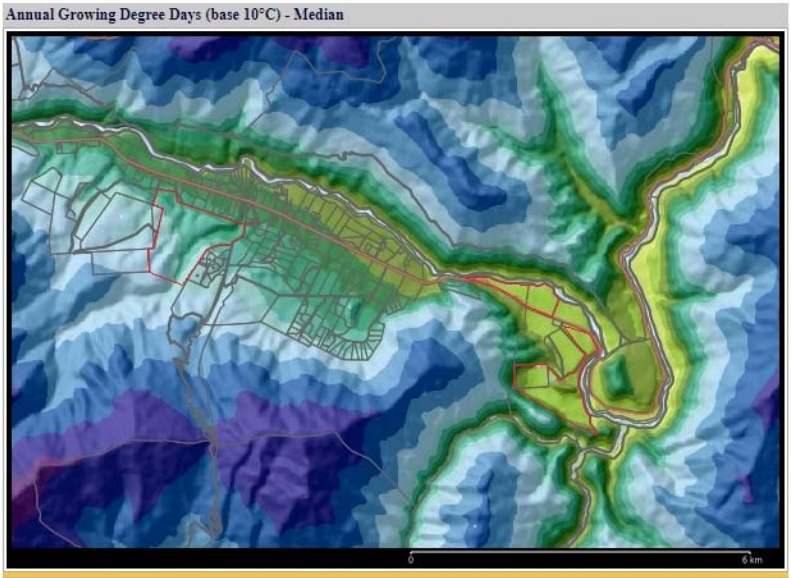
Appendix 5

GDD Base 10°C (source GrowOtago)

growOTAGO®

Soils ▾ Rocks ▾ Rain ▾ Temp ▾ Soil Temp ▾ Wind ▾ Evap ▾ Solar ▾ Frost ▾ Chilling ▾ Snow ▾ Topo ▾ Help ▾

Annual Growing Degree Days (base 10°C) - Median



Refresh Select Function: Zoom In Pan Zoom Out

Description

Median annual (January to December) growing degree day total (base 10 deg C) for the period 1970-2001. When all the annual growing degree day totals for this period are ranked from lowest to highest, the median is the middle value.

Growing degree days are calculated by subtracting the base temperature from the average daily temperature. In this case, 10 deg C is a useful base temperature for sub-tropical crops, e.g. grapes. If the average temperature is below the base temperature the growing degree day value for that day is zero. Daily growing degree day values are added together for the whole year, providing an indication of the energy available for plant growth.

Overview - click to navigate

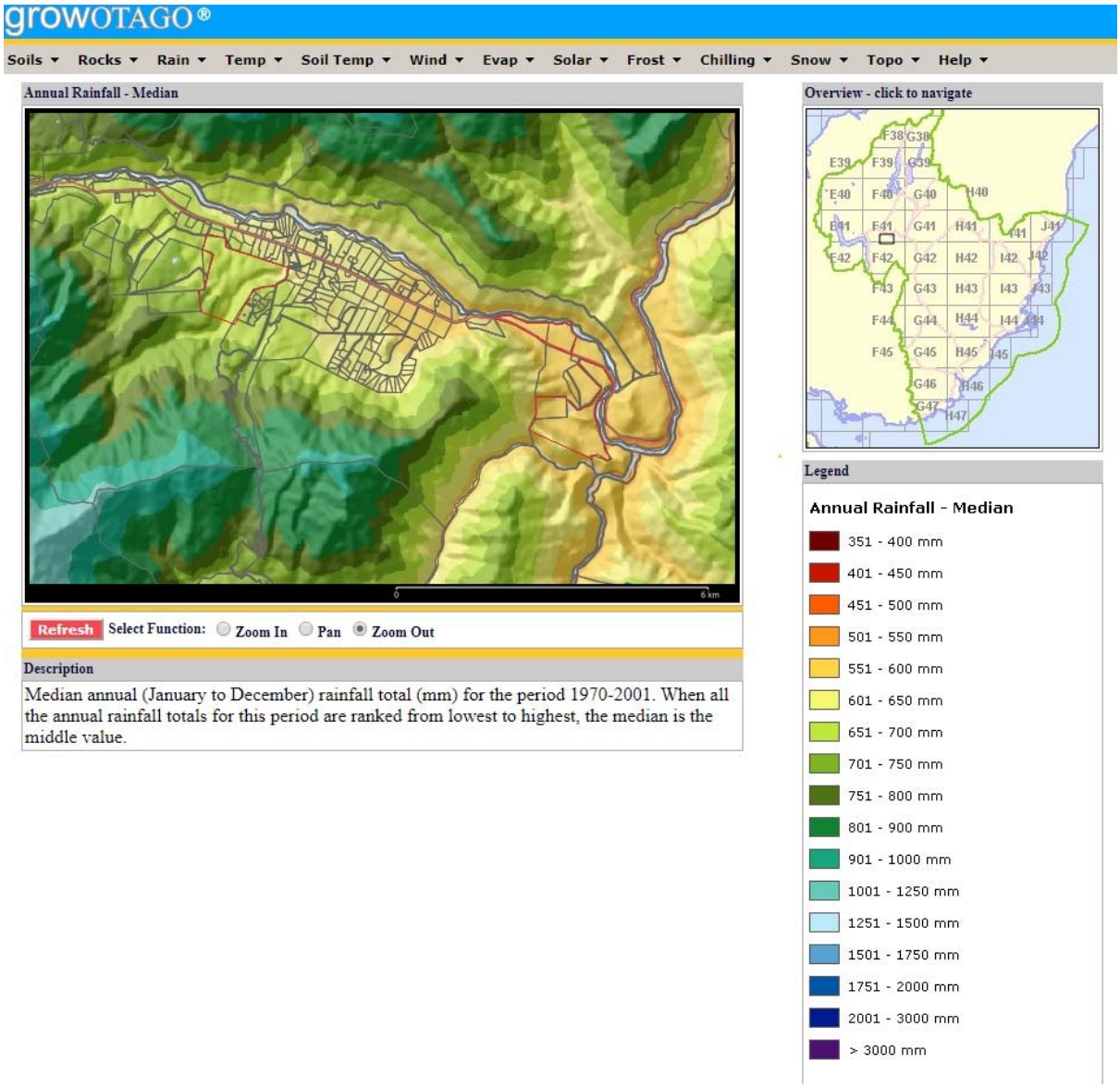
Legend

Annual Growing Degree Days (base 10°C) - Median

- < 201
- 201 - 300
- 301 - 400
- 401 - 500
- 501 - 600
- 601 - 650
- 651 - 700
- 701 - 750
- 751 - 800
- 801 - 850
- 851 - 900
- 901 - 950
- 951 - 1000
- 1001 - 1050
- 1051 - 1100
- 1101 - 1150
- 1151 - 1200
- 1201 - 1250

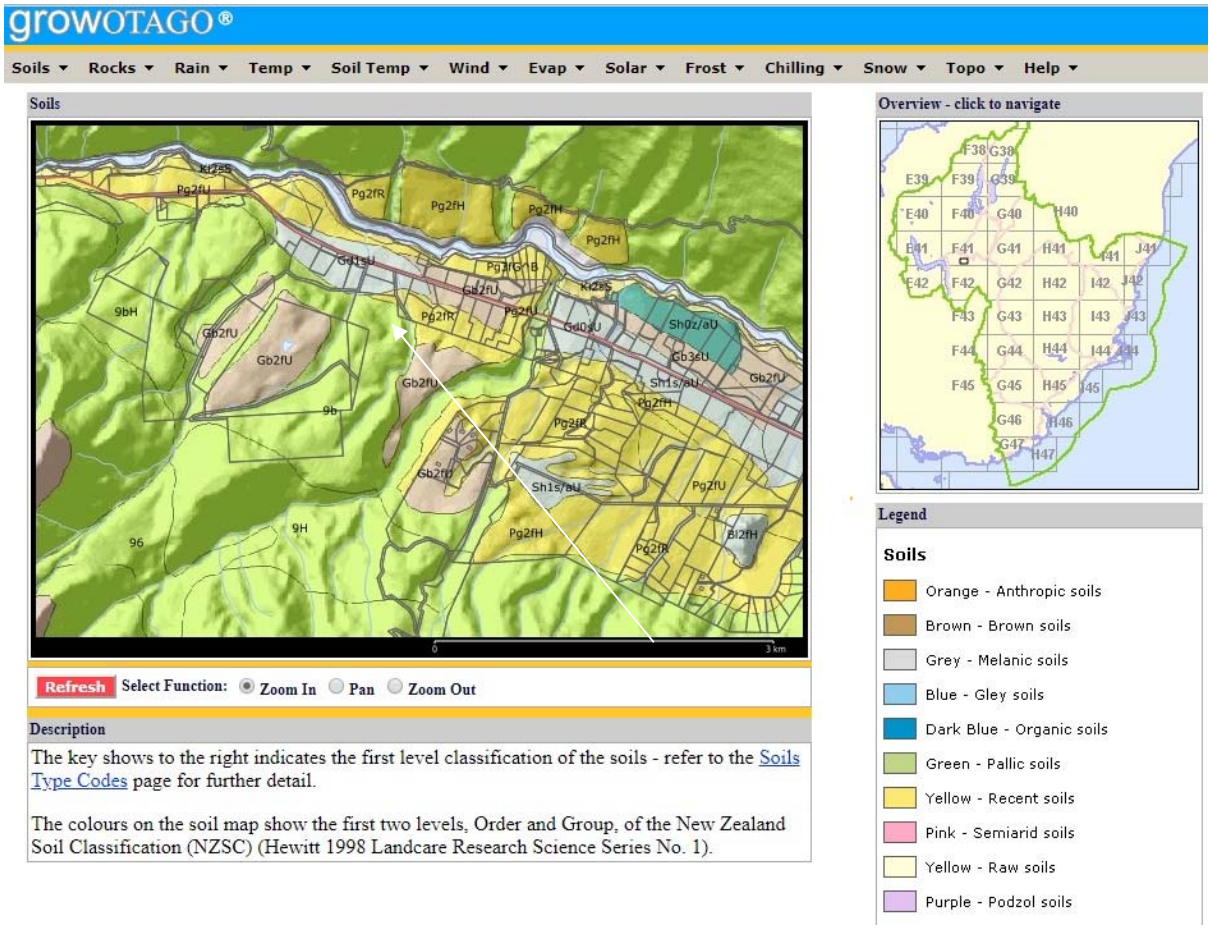
Appendix 6

Rainfall (source GrowOtago)



Appendix 7

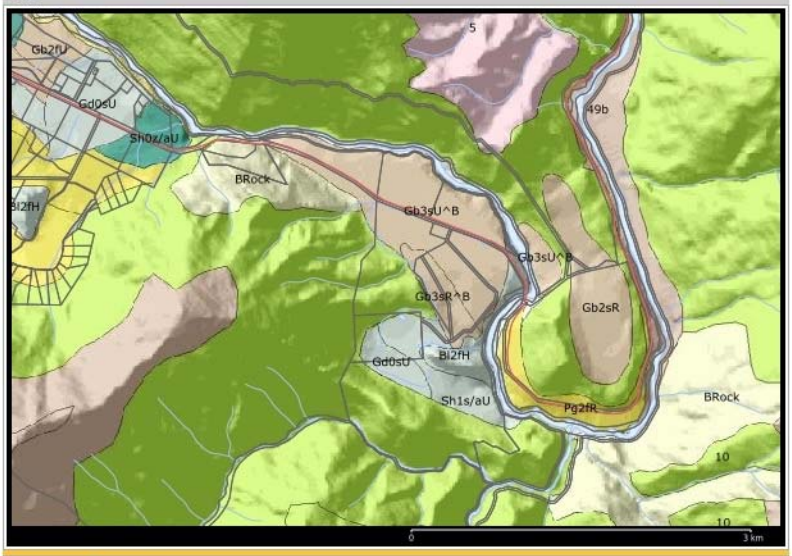
Soils (source GrowOtago)



growOTAGO®

Soils ▾ Rocks ▾ Rain ▾ Temp ▾ Soil Temp ▾ Wind ▾ Evap ▾ Solar ▾ Frost ▾ Chilling ▾ Snow ▾ Topo ▾ Help ▾

Soils



Refresh Select Function: Zoom In Pan Zoom Out

Description

The key shows to the right indicates the first level classification of the soils - refer to the Soils Type Codes page for further detail.

The colours on the soil map show the first two levels, Order and Group, of the New Zealand Soil Classification (NZSC) (Hewitt 1998 Landcare Research Science Series No. 1).

Overview - click to navigate

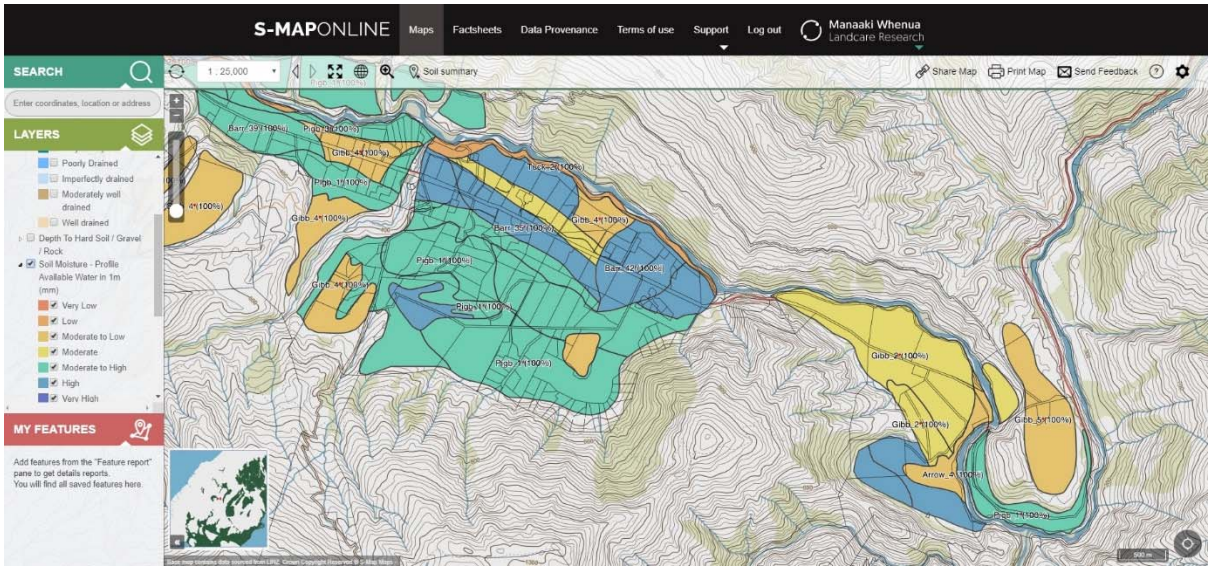
Legend

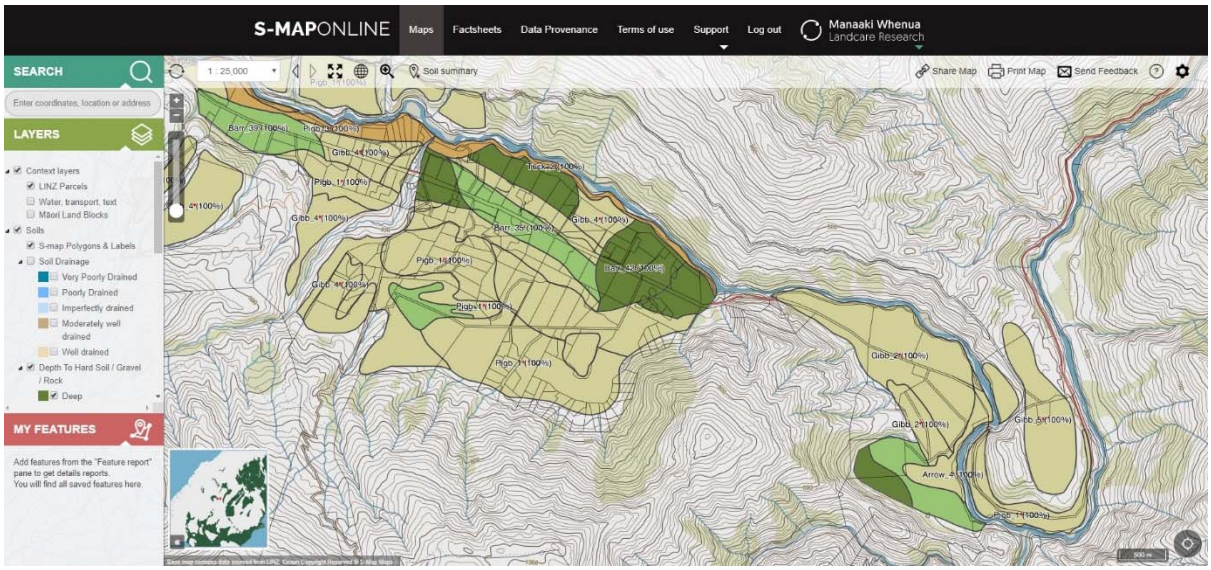
Soils

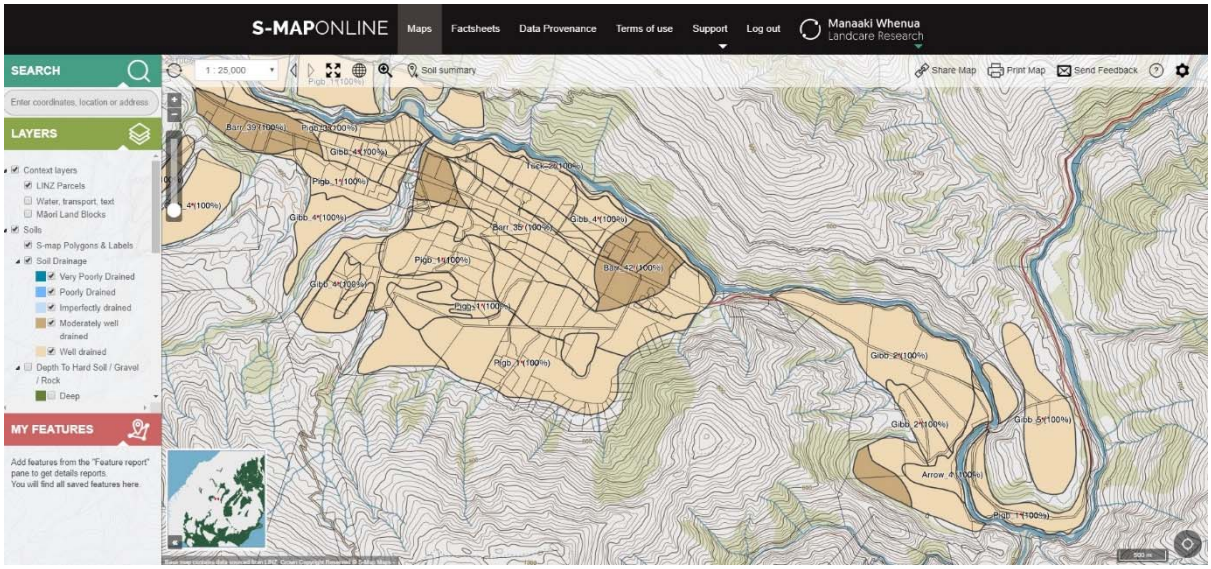
- Orange - Anthropic soils
- Brown - Brown soils
- Grey - Melanic soils
- Blue - Gley soils
- Dark Blue - Organic soils
- Green - Pallic soils
- Yellow - Recent soils
- Pink - Semiarid soils
- Yellow - Raw soils
- Purple - Podzol soils

Appendix 8

Soils (source SMaps)



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Very Poorly Drained
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Imperfectly drained
Moderately well drained
Well drained
Depth To Hard Soil / Gravel / Rock
Deep
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1 : 25,000
Soil summary
Share Map
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Barr_39 (100%)
Ingc_8 (100%)
Gibb_4 (100%)
Tuck_26 (100%)
Pgb_1 (100%)
Gibb_4 (100%)
Barr_35 (100%)
Gibb_4 (100%)
Pgb_1 (100%)
Barr_42 (100%)
Gibb_4 (100%)
Pgb_1 (100%)
Pgb_1 (100%)
Gibb_2 (100%)
Gibb_2 (100%)
Gibb_5 (100%)
Arrow_4 (100%)
Pgb_1 (100%)

Appendix 9

Average price per tonne (source NZ Winegrowers Average Grape Prices 2018 Interim)

New Zealand Winegrowers Average Grape Prices

Category Pinot Noir – Table Wine

Region Central Otago

Vintage	Central Otago	Inc cf p/yr	NZ Avg	Premium cf NZ Avg
2010	3128		2775	13%
2011	2917	-7%	2439	20%
2012	3070	5%	2842	8%
2013	3480	12%	2999	16%
2014	3338	-4%	2931	14%
2015	3344	0%	2992	12%
2016	3486	4%	2965	18%
2017	3643	4%	3042	20%
2018	3724	2%	3001	24%

Appendix 10

$50 Incremental pricing 2018 Interim (source NZ Winegrowers)

Inc/Range $50		# tonnes	Sales Value	Average Price
1801	1850	2.65	4876	1840
1851	1900			
1901	1950			
1951	2000			
2001	2050			
2051	2100			
2101	2150			
2151	2200			
2201	2250			
2251	2300			
2301	2350			
2351	2400	6.928	16412	2369
2401	2450			
2451	2500			
2501	2550			
2551	2600			
2601	2650			
2651	2700			
2701	2750			
2751	2800	2.65	7415	2798
2801	2850			
2851	2900			

Inc/Range $50		# tonnes	Sales Value	Average Price
2901	2950			
2951	3000	50.661	151983	3000
3001	3050			
3051	3100	28.736	89082	3100
3101	3150			
3151	3200	126.742	404211	3189
3201	3250			
3251	3300	98.968	326594	3300
3301	3350			
3351	3400	78.851	268093	3400
3401	3450	90.97	313847	3450
3451	3500	392.769	1374692	3500
3501	3550			
3551	3600	237.571	852183	3587
3601	3650	1087.75	3969259	3649
3651	3700	4.15	15355	3700
3701	3750	160.337	597790	3728
3751	3800	412.17	1566246	3800
3801	3850	253.31	975200	3850
3851	3900	118.681	462856	3900
3901	3950	11.723	46306	3950
3951	4000	331.525	1326100	4000
4001	4050	42.632	172660	4050
4051	4100	12.019	49278	4100
4101	4150	13.284	55129	4150

Inc/Range $50		# tonnes	Sales Value	Average Price
4151	4200	176.056	739435	4200
4201	4250	58.673	249360	4250
4251	4300			
4301	4350	2.2	9570	4350
4351	4400	58.788	258667	4400
4401	4450			
4451	4500	48.11	216495	4500
4501	4550			
4551	4600			
4601	4650			
4651	4700	18	84600	4700
4701	4750			
4751	4800			
4801	4850			
4851	4900			
4901	4950			
4951	5000			
5001	5050			
5051	5100			
5101	5150			
5151	5200			
5201	5250			
5251	5300			
5301	5350			
5351	5400			

Inc/Range $50		# tonnes	Sales Value	Average Price
5401	5450			
5451	5500			
5501	5550			
5551	5600			
5601	5650			
5651	5700	9.786	55312	5652
5701	5750			
5751	5800			
5801	5850			
5851	5900			
5901	5950			
5951	6000	1.128	6768	6000

Appendix 11

Rate of Return on Capital Investment Calculation

To calculate a rate of return the land value should be included into the calculation. In my opinion the site valued as undeveloped bare land (excluding any lifestyle value or value attributed to a residential house platform) would range from $25,000 to $50,000 a hectare.

	Low land value, re-use infrastructure	**Low land value, full development**	**High land value, re-use infrastructure**	**High land value, full redevelopment**
Land Value	25000	25000	50000	50000
Development Cost	64400	91500	64400	91500
Total Investment	**89400**	**116500**	**114400**	**141500**
3% Rate of Return	2682	3495	3432	4245

A 3% return on investment in an agricultural context is about average in my experience – the scenarios presented in my evidence at 6.13 show a return higher than this in 60% of the modelled scenarios.

Using the total investment to redevelop the vineyard it is further possible to calculate a capital gain on investment by calculating the capital gain on the development scenarios presented above. This is calculated by:

(Sale price – Total Investment) = Capital Gain (expressed as a percentage)
Total Investment

Sale Price	185000	185000	185000	185000
Capital Gain %	106% (185,000 – 89,400)/ 89,400	59%	62%	31%
Sale Price	220000	220000	220000	220000
Capital Gain %	146%	89%	92%	55%

Appendix 12

Bulk Wine Scenario Calculation

BULK MODEL					
	Planted Ha	T/ha	Litres/T (finished)		
Yield	28.60	6	630	108,108	Litres
Projected Revenue (Incl)			11.5	1,243,242	
Less GST				162,162	
Projected Revenue Gross (Excl)				1,081,080	
Excise/ALAC Levy (NA on bulk wine)		Litres			
Excise	0	108,108		-	
ALAC Levy	0	108,108		-	
				-	
Cost of Goods Sold					
Vineyard Costs - Growing		16700		477,620	
Vineyard Costs - Lease		0		-	
Vineyard Costs - Deprectaion		775		22,165	

Winery Costs	2.5	108,108		270,270	
Barrel Depreciation	1.6	108,108		172,973	
Direct Costs (Bottling, Labelling, Packaging)	0	12,012.00		-	
Total COGS				943,028	
				138,052	13%

Appendix 13

Direct Trade Scenario Calculation

TRADE MODEL					
	Planted Ha	T/ha	Litres/T (finished)		
Yield	28.60	6	630	108,108	Litres
Projected Bottles Produced				144,144	Bottles
Trade Price Per Bottle				28.30	Trade
Projected Revenue (Incl)				4,079,275	
Less GST				532,079	
Projected Revenue Gross				3,547,196	
Excise/ALAC Levy		Litres			
Excise	2.9432	108,108		318,183.47	
ALAC Levy	0.035385	108,108		3,825.40	
				322,009	
Cost of Goods Sold					
Vineyard Costs - Growing		16700		477,620	

Vineyard Costs - Lease		0		-	
Vineyard Costs - Deprectaion		775		22,165	
Winery Costs	2.5	108,108		270,270	
Barrel Depreciation	1.6	108,108		172,973	
Direct Costs (Bottling, Labelling, Packaging)	20	12,012.00		240,240	
Total COGS				1,183,268	
				2,041,919	58%
Distribution			$/bottle		
A&P/Market Activation			0.40	57,658	
Freight Out			0.32	46,126	
Relabelling/Packing			0.03	4,324	
Admin Overhead			0.60	86,486	
Sales Manager (Salary and expenses)				145,000	
				194,594	
GM After Direct Costs				1,847,325	52%

Per hectare				64,592	

Appendix 14

Distributor Trade Calculation Scenario

DISTRIBUTOR MODEL					
	Planted Ha	T/ha	Litres/T (finished)		
Yield	28.60	6	630	108,108	Litres
Projected Bottles Produced				144,144	Bottles
Distributor Price Per Bottle				21.50	Trade
Projected Revenue (Incl)				3,099,096	
Less GST				404,230	
Projected Revenue Gross				2,694,866	
Excise/ALAC Levy		Litres			
Excise	2.9432	108,108		318,183.47	
ALAC Levy	0.035385	108,108		3,825.40	
				322,009	
Cost of Goods Sold					
Vineyard Costs - Growing		16700		477,620	
Vineyard Costs - Lease		0		-	

Vineyard Costs - Deprectaion		775		22,165	
Winery Costs	2.5	108,108		270,270	
Barrel Depreciation	1.6	108,108		172,973	
Direct Costs (Bottling, Labelling, Packaging)	20	12,012.00		240,240	
Total COGS				1,183,268	
				1,189,589	44%
Distribution			$/bottle		
A&P/Market Activation			0.40	57,658	
Freight Out			0.32	46,126	
Relabelling/Packing			0.03	4,324	
Admin Overhead			0.60	86,486	
				194,594	
GM After Direct Costs				994,995	37%
Per hectare				34,790	

Appendix 15

Direct to Consumer Calculation Scenario

DIRECT TO CONSUMER						
	Planted Ha	T/ha	Litres/T (finished)			
Yield	28.60	6	630	108,108	Litres	
Projected Bottles Produced				144,144	Bottles	
Retail Price Per Bottle				47.50	Retail	
Projected Revenue (Incl)				6,846,840		
Less GST				893,066		
Projected Revenue Gross				5,953,774		
Excise/ALAC Levy		Litres				
Excise	2.9432	108,108		318,183.47		
ALAC Levy	0.035385	108,108		3,825.40		
				322,009		
Cost of Goods Sold						
Vineyard Costs - Growing		16700		477,620		

Vineyard Costs - Lease		0		-		
Vineyard Costs - Depreciation		775		22,165		
Winery Costs	2.5	108,108		270,270		
Barrel Depreciation	1.6	108,108		172,973		
Direct Costs (Bottling, Labelling, Packaging)	20	12,012.00		240,240		
Total COGS				1,183,268	8.21	per bottle
				4,448,497	75%	
Cellar Door Costs						
Staff		45,000	3.50	504,504		
Food				-		
				504,504		
GM After Direct Costs				3,943,993	66%	
Per hectare				137,902		