

Memorandum

To: Haidee McCabe Of: Irrigation Resource Solutions
 From: James Dommissie Date: 18/8/2009
 Subject: **Irricalc irrigation demand modelling**

At the request of Irrigation Resource Solutions, Aqualinc Research Ltd has carried out irrigation demand modelling to calculate an annual volume for Bellfield Land Company, Glentanner Station, Otamatapaio Station, and Twin Peaks Station. Irrigation demand modelling was carried out using the Aqualinc irrigation demand model called Irricalc. A summary of calculated and notified volumes for each property are provided in Table 1:

Table 1: Summary of the irrigation demand modelling.

Property	Resource Consent (s)	Irrigation Method (s)	Total Irrigation Area (ha)	Annual Irrigation Volume (m ³ /yr)	Notified Volume (m ³ /yr)
Bellfield Land Company	CRC011987 CRC071649	Spray	242	1,936,212	2,866,720
Glentanner Station	CRC071362 CRC083609 CRC092721	Spray	200	1,282,910	1,200,000
Otamatapaio Station	CRC012047	Spray	200	1,617,400	1,496,840
Twin Peaks Station	CRC063564 CRC063565	Spray	72	557,840	432,000

The irrigation demand modelling was undertaken in a manner that ensures consistency with the Waitaki Catchment Water Allocation Regional Plan (WCWARP) and the proposed Natural Resources Regional Plan (NRRP) is achieved. This includes:

- Meeting the requirements of Policy 16 of the WCWARP.
- Annual volumes based on soil moisture measurements, or local rainfall and evapotranspiration modelling.
- Eight-in-10 year reliability.
- Irrigation application efficiency of at least 80 %.
- Within NRRP system capacity limits (a maximum of 0.8 l/s/ha (or 6.9 mm/day)).

A summary of the important Irricalc input parameters are provided in Appendix A and a summary of the important output parameters are provided in Appendix B.

Appendix A

Property	Resource Consent	Irrigation Method	Soil PAW mid (mm)	Proportion Area of Irrigation Area (ha)	Application Depth (mm)	Return Interval (days)	Christiansen Uniformity (%)	Trigger for Starting Irrigation	Rooting Depth (mm)	Landuse	
Bellfield Land Company	CRC011987	Spray	30	5	13.8	2	85	50% of PAW	500	Pasture	
			45	17	20.7	3	85	50% of PAW	500	Pasture	
			65	55	27.6	4	85	50% of PAW	500	Pasture	
			75	46	34.5	5	85	50% of PAW	500	Pasture	
			90	45	41.4	6	85	50% of PAW	500	Pasture	
			110	21	48.3	7	85	50% of PAW	500	Pasture	
			130	2	62.1	9	85	50% of PAW	500	Pasture	
	CRC071649	Spray	45	15	20.7	3	85	50% of PAW	500	Pasture	
			80	2	34.5	5	85	50% of PAW	500	Pasture	
			110	15	48.3	7	85	50% of PAW	500	Pasture	
			130	5	62.1	9	85	50% of PAW	500	Pasture	
			140	12	69	10	85	50% of PAW	500	Pasture	
	Glentanner Station	CRC071362 CRC083609 CRC092721	Spray	25	63	6.9	1	85	50% of PAW	500	Pasture
				80	1	34.5	5	85	50% of PAW	500	Pasture
85				137	41.4	6	85	50% of PAW	500	Pasture	
Otamatapaio Station	CRC012047	Spray	60	100	27.6	4	85	50% of PAW	500	Pasture	
			70	16	34.5	5	85	50% of PAW	500	Pasture	
			100	84	48.3	7	85	50% of PAW	500	Pasture	
Twin Peaks Station	CRC063564 CRC063565	Spray	30	32	13.8	2	85	50% of PAW	500	Pasture	
			100	40	48.3	7	85	50% of PAW	500	Pasture	

Appendix B

Property	Resource Consent	Soil PAW mid (mm)	Proportion Area of Irrigation Area (ha)	Application Efficiency (%)	Irrigation Water Use (mm/yr)	Annual Volume (m ³ /yr)
Bellfield Land Company	CRC011987	30	5	80	867	42,898
		45	17	80	843	141,817
		65	55	80	834	462,175
		75	46	80	830	377,823
		90	45	80	802	357,141
		110	21	80	770	160,016
	130	2	80	804	15,913	
	CRC071649	45	15	80	818	122,700
		80	2	80	755	15,100
		110	15	80	769	115,350
130		5	80	744	37,200	
140		12	80	734	88,080	
Glentanner Station	CRC071362 CRC083609 CRC092721	25	63	80	675	425,250
		80	1	80	634	3,170
		85	137	80	626	854,490
Otamatapaio Station	CRC012047	60	100	80	823	823,000
		70	16	80	807	129,120
		100	84	80	792	665,280
Twin Peaks Station	CRC063564 CRC063565	30	32	80	807	258,240
		100	40	80	749	299,600