Water Use Efficiency Assessment for Criffel Irrigation Company.

To determine if the water applied for by Criffel Irrigation is both efficent based on Aqualinc[1] and in line with their historic water use the following assesment has been completed.

Figure 1 below shows the current irrigation command area (1400 Ha), the area that is currrently irrgated using spray irrgation (619 Ha) and the area that has historically been irrigated or could be irrigated (400 ha).

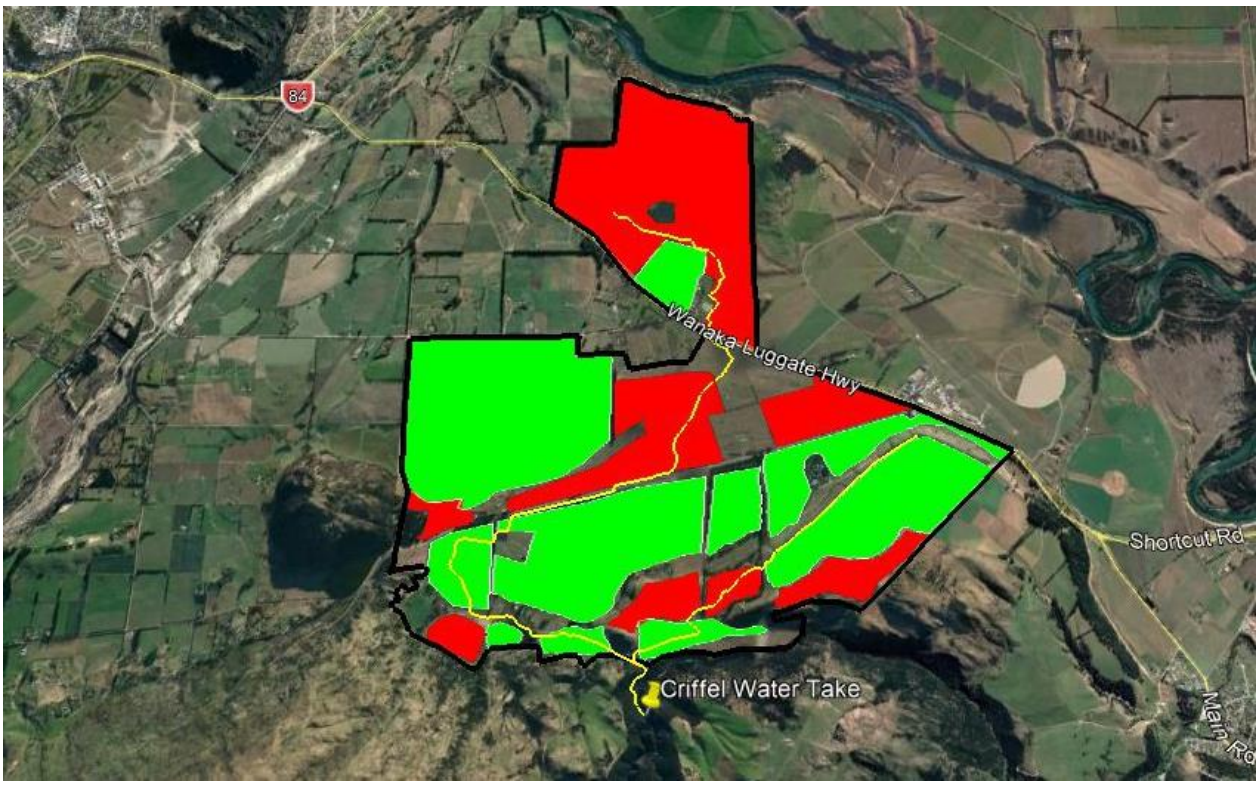

Figure 1. Criffel existing irrigation command area of ~1400 Ha (black outline), existing spray irrigation area (shown in green) and historically/potentially irrigated area (shown in red). Also shown is the existing take from Luggate Creek and the two main races (yellow lines).

Table 1 below breaks down the existing Criffel Irrigation Companies irrigation areas based on soil type and rainfall in accordance with Aqualinc producing both the efficient monthly and annual volumes for the area shown in Figure 1.

[1] McIndoe I, Brown P, Rajanayaka C, KC. B, 2017. Guidelines for Reasonable Irrigation Water Requirements in the Otago Region. Otago Regional Council, 2. Aqualinc Research Limited.

Table 1. Assessment of efficient irrigation requirements for Criffel Irrigations existing spray irrigation area of 619 Ha based on Aqualinc 2015[2].

Land use	MAR Rainfall Central Lakes District (Aqualinc 2017)	PAW (Aqualinc 2017)	Area (Hectares)	Aqualinc Monthly Volume (m^3/hectare)	Max Monthly Need for area (m^3)	Aqualinc Annual Volume (m^3/hectare)	Annual Need for area (m^3)
Pasture	650	90	265.5	1460	387630	7710	2,047,005
Pasture	650	120	353.5	1300	459550	7140	2,523,990
Total			619		847,180		4,570,995

Table 2. Assessment of efficient irrigation requirements for Criffel Irrigations Supplementary Take irrigation area of 400 Ha based on Aqualinc 2015[2].

Land use	MAR Rainfall Central Lakes District (Aqualinc 2017)	PAW (Aqualinc 2017)	Area (Hectares)	Aqualinc Monthly Volume (m^3/hectare)	Max Monthly Need for area (m^3)	Aqualinc Annual Volume (m^3/hectare)	Annual Need for area (m^3)
Pasture	650	90	77	1460	112420	7710	593,670
Pasture	650	120	323	1300	419900	7140	2,306,220
Total			400		532,320		2,899,890

Table 2 below provides both the maximum monthly and Annual volumes taken based on water take records for Criffel Irrigation between February 2016 and June 2018. The data shows up to 1,478,364 m^3 has been taken over a month (December 2017) with up to 8,358,376m^3 taken in an irrigation season (1st October to 30th April).

Table 3. Summary of Actual Use based on Criffel Irrigation take data from February 2016 to June 2018.

Irrigation Season (1st Oct – 30th April)	Max Monthly Take (m^3)	Seasonal Volume (m^3)
2015/16#	649,721	1,681,682
2016/17	1,439,005	8,102,027
2017/18	1,478,364	8,358,376

data only available from February 2016.

[2] McIndoe I, Brown P, Rajanayaka C, KC. B, 2017. Guidelines for Reasonable Irrigation Water Requirements in the Otago Region. Otago Regional Council, 2. Aqualinc Research Limited.

Table 4. Maximum Consented and Seasonal (1st October to 30th April) volumes for the Criffel Irrigation take.

Max Consented Monthly Take (m^3)	Maximum Consented Seasonal Volume (m^3) (1st Oct – 30th April)
1,581,000	10,812,000

The history of use shows that up to 1,478,364 m^3 has been taken in a month which is more than the volume identified as efficient under Aqualinc of 1,379,500m^3 for peak monthly demand for the 1019 Ha of irrigable area. Also, the maximum seasonal volume (1st Oct – 30th April) taken of 8,358,376 m^3 is more than recommended by applying Aqualinc[2] of 7,470,885m^3 for the 1019 Ha of irrigable area.

Actual use for the Criffel Irrigation take is also slightly less than what is currently consented (Table 3 and Table 4).