



OVERSEER Nutrient Budget review

For: Environment Southland – Cashmere Dairy  
Effluent

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### Review of Modelled Effluent Areas

1. Regarding the consent application for Cashmere Dairy, I have reviewed the following OVERSEER @ Nutrient Budget (OVERSEER) files:
  - a) Cashmere Bay – 1516 Dairy + Runoff
  - b) Cashmere Bay – 1617 Dairy + Runoff
  - c) Cashmere Bay – 1718 Dairy + Runoff + Sheep Blocks
  - d) Cashmere Bay-Pro-posed scenario

### Modelled Areas of Effluent

2. Table 1 below shows the areas of effluent modelled as effluent area irrigated and not irrigated

Table 1: Effluent Areas Modelled

	2015/2016	2016/2017	2017/2018	Proposed
Non-Irrigated Effluent Area	19.8	19.8	0	0
Irrigated Effluent Area	121.1	121	100.4	186.4
<b>Total Area</b>	<b>158.6</b>	<b>158.6</b>	<b>100.4</b>	<b>186.4</b>

### Blocking of Effluent and Irrigated Areas

3. Table 2 below shows the blocks that are effluent and irrigated, and effluent only (dryland)

Table 2: Effluent Blocked Areas Modelled

	2015/2016	2016/2017	2017/2018	Proposed
Large RR & Cobra Effl Morv 7a.1 -I	34.4	34.4	16.4	34.4
Large RR & Cobra Effl Selw 50a.1 -I	85.6	85.6	17.6	85.6
Large RR & Cobra Effl Eure 23a.1 -I	1.1	1.1	0	0
Main Pasture Flat Cobra Effl Balm 21a.1 -D	19.8	19.8	0	0
Main Pasture Flat Cobra Effl Sewl 50a.1 -D	17.7	17.7	0	0
Pivot Water & Effluent Eure 23a.1 -I	0	0	24.8	24.8
Pivot Water & Effluent Morv 7a.1 -I	0	0	3	3
Pivot Water & Cobra Effluent Eure 23a.1	0	0	1.1	1.1
Small RR & Cobra Effl Selw 50a.1 -I	0	0	17.7	17.7
Small RR & Cobra Effl Balm 21a.1 -I	0	0	19.8	19.8
<b>Total</b>	<b>158.6</b>	<b>158.6</b>	<b>100.4</b>	<b>186.4</b>

D = Dryland

I = Irrigated

### Application Depth of Effluent (including irrigation)

4. Table 3 below shows the application depth of effluent plus irrigation. Has been noted from the FEP that the effluent application rate with the Cobra Rain Gun applies effluent at a rate of between 4.9 mm and 6.4 mm in the shoulders when not irrigating. The rest of the season the effluent is either injected into the pivot and applied with irrigation water or applied 100% effluent applying 2mm/application. All irrigation is applied November, December and January for all models. Irrigation for rotorainers is set to Soil Water Budget and Default 2 shifts for small rotorainer and Default 1 Shift for Large rotorainer for all models. Pivot blocks are set to Soil water budget, depth applied to achieve target; fixed return period for 2017 2018 and proposed (except Pivot Water & Effluent Morv 7a.1 for months December and January which has 'Trigger point and depth applied to achieve target' ; % PAW 66% Trigger Point and 95 % Target). Application depths of rotorainers seems low?

Table 3: Irrigation and Effluent Application depth (mm) for each block

	2015/2016	2016/2017	2017/2018	Proposed
Large RR & Cobra Effl Morv 7a.1 -I	10 mm/6 days*	10 mm/6 days*	10 mm/6 days*	10 mm/6 days*
Large RR & Cobra Effl Selw 50a.1 - I	10mm/12 days*	10mm/12 days*	10mm/12 days*	10mm/12 days*
Large RR & Cobra Effl Eure 23a.1 - I	10mm/12 days*	10mm/12 days*		
Main Past Flat Cobra Effl Balm 21a.1 - D	6.4mm effl	6.4mm effl		
Main Pasture Flat Cobra Effl Sewl 50a.1 -D	6.4mm effl	6.4mm effl		
Pivot Water & Effluent Eure 23a.1 - I			5mm/5 days**	5mm/5 days**
Pivot Water & Effluent Morv 7a.1 - I			5mm/5 days**	5mm/5 days**
Pivot Water & Cobra Effluent Eure 23a.1			5mm/4 days**	5mm/5 days**
Small RR & Cobra Effl Selw 50a.1 - I			10 mm/6 days*	10 mm/6 days*
Small RR & Cobra Effl Balm 21a.1 - I			10 mm/3 days*	10 mm/3 days*
<b>Total</b>	<b>158.6</b>	<b>158.6</b>	<b>100.4</b>	<b>186.4</b>

\*FEP indicates an application depth of 30 mm/10 days for rotorainer irrigation

\*\*FEP indicates 3 mm/24 hours for pivot irrigation

### Model 2017 2018 Area cropped that is normally effluent Area

5. The area in the model that was modelled as effluent area in the 2015 2016 and the 2016 2017 years and was put into crop in the 2017 2018 season has not been identified in the blocking of the crops (does not say what area was effluent and what area was non effluent). There was no effluent applied to these crops in this season and none of the crops were not irrigated.