

Full Assessment of Environmental Effects

In support of the South Dairy Application to:

- Expand Dairy Farm – increase in land area and cow numbers
- Construct Effluent Pond
- Renew Groundwater Take
- Renew Discharge Effluent to Land



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1. Executive Summary

The overall proposal is to x, which ensures that the adverse effects from adding 50ha to the dairy platform are mitigated.

The mitigations include wintering off, investment in a stand-off pad, and increasing effluent storage volume.

In addition the proposed activity will have nutrient losses less than the permitted baseline activity (and current land use).

Consultation with Y & Z have been undertaken, and the agreed restrictions are included in this AEE.

The process that has been followed to produce this AEE report, including checklists, good management practices, mitigation measures and common risks have been included for review.

In summary we believe the proposal fully remedies, avoids and mitigates any adverse effects as a result of the change in activity. In our view, this report represents a fair record of an acceptable process to assess and address the environmental effects as part of this application.

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2. Proposal of changes in activity

The discharge renewal applied for is for 750 cows increased from 599 with an increased land area from 199.6 to 250.6ha. The stocking rate on the existing farm will remain the same at 3.0 cows/ha. Additional effluent storage will be constructed, bringing the total pumpable storage volume up to 5060m³.

The discharge area will be increased to cover the whole farm except buffer distances.

There are four key changes in land use that are being proposed in this consent. These are depicted in Figure 1 that follows and are outlined below.

1. The previous consent permitted FDE from up to 599 cows to be disposed on the farm over an area of 43ha with an aerial load of between 62 and 73 kg N /ha/year. This area is shaded in purple below. The same area also had a stocking rate of 3.0 cows per hectare. This proposal will lower the aerial load over this part of the farm to between 16 and 20 kg N /ha/year. There will be no change to the stocking rate.
2. The previously consented farm area shaded in yellow below is currently used for dairy, with up to 599 cows as per the permit. It will continue to be used for the same activity, at the same stocking rate of 3.0 cows per hectare. The proposal also requests the permit allows for FDE to be discharged to land, with an aerial load between 16 and 20kg N /ha/year.
3. 599 cows were previously wintered on the farming block. As part of this proposal, these cows will be wintered off the farm. This effect of this mitigation is quantified below.
4. The area shaded in white below has been used in the past six years as a run-off block, winter grazing, raising young stock and cows at various times. The area is 49 hectares and it is being leased. The intensity of land use prior to this proposal has been:
 - a. 170 calves.
 - b. 140 heifers that are going to calve.
 - c. 8.7 ha or 17.8% winter crop (average from last five years).
 - d. 200 cows grazed on the winter on fodder crop (68 days).

This application proposes the land is used for the same purpose as the rest of the farm at the same stocking rate of 3.0 cows, and same low aerial loading of FDE between 16 and 20 kg N/ha/year. The average area used for winter crop will drop to 20ha over the total farm area, which is 8% or 3.9ha for this block.

Further information provided previously on the details of the current land use include:

The existing system has all young stock on the farm all year round. There are 170 calves, and 140 heifers that are going to calve. Another 200 cows also winter on fodder crops on the farm including the lease block. The heifers will winter on crop until they calve. The cows come back to calve on crop for up to 1 month.

With the expansion all calves will be sent off the whole farm in December and brought back as heifers ready to calve. All adult cows will also winter off. Both the heifers and cows will return and feed on grass with balage and on the calving pad if there are wet ground conditions. Up to 20ha of crop will be grown in the pasture renewal programme and up to 50% of this can be harvested in autumn to provide low protein feed or fed to springers in late spring. This will vary season to season.

This is 510 animals with the balance of the milking mob coming back onto crop in spring to calve.

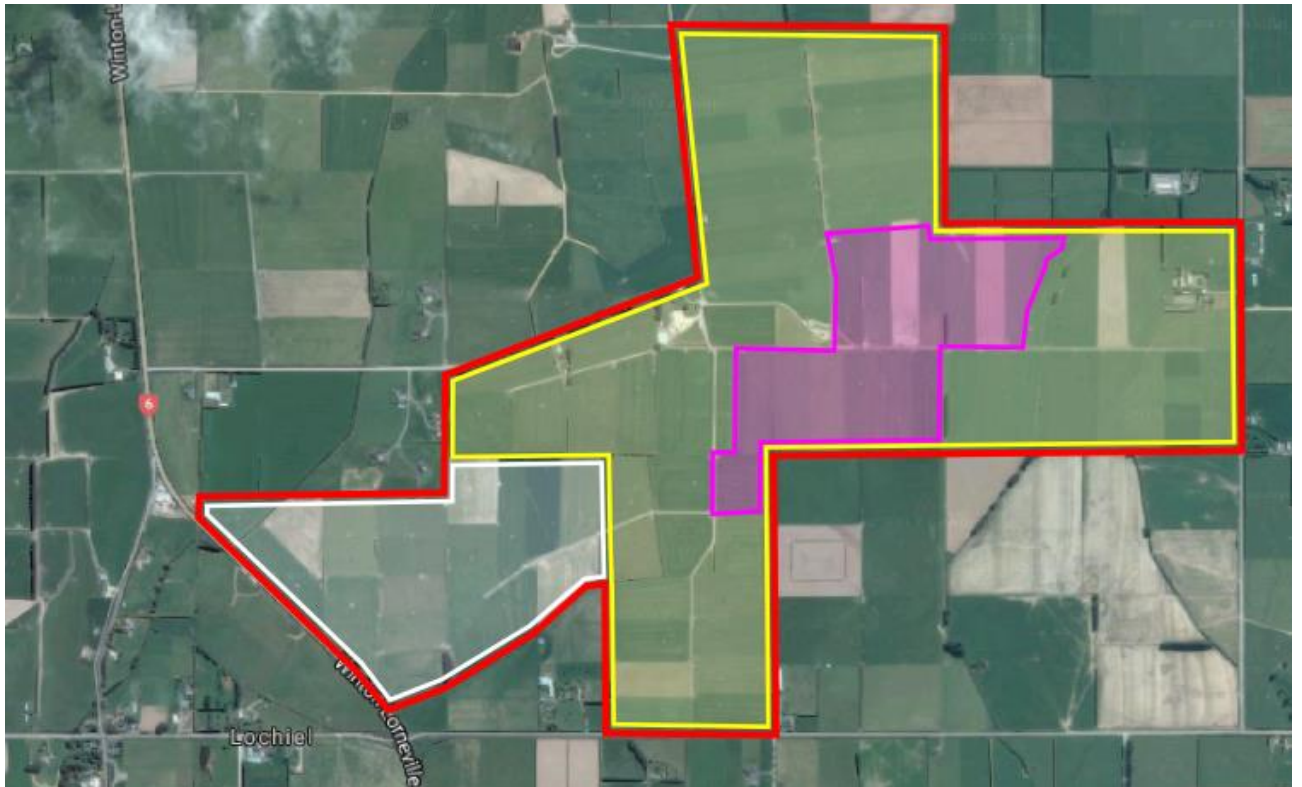
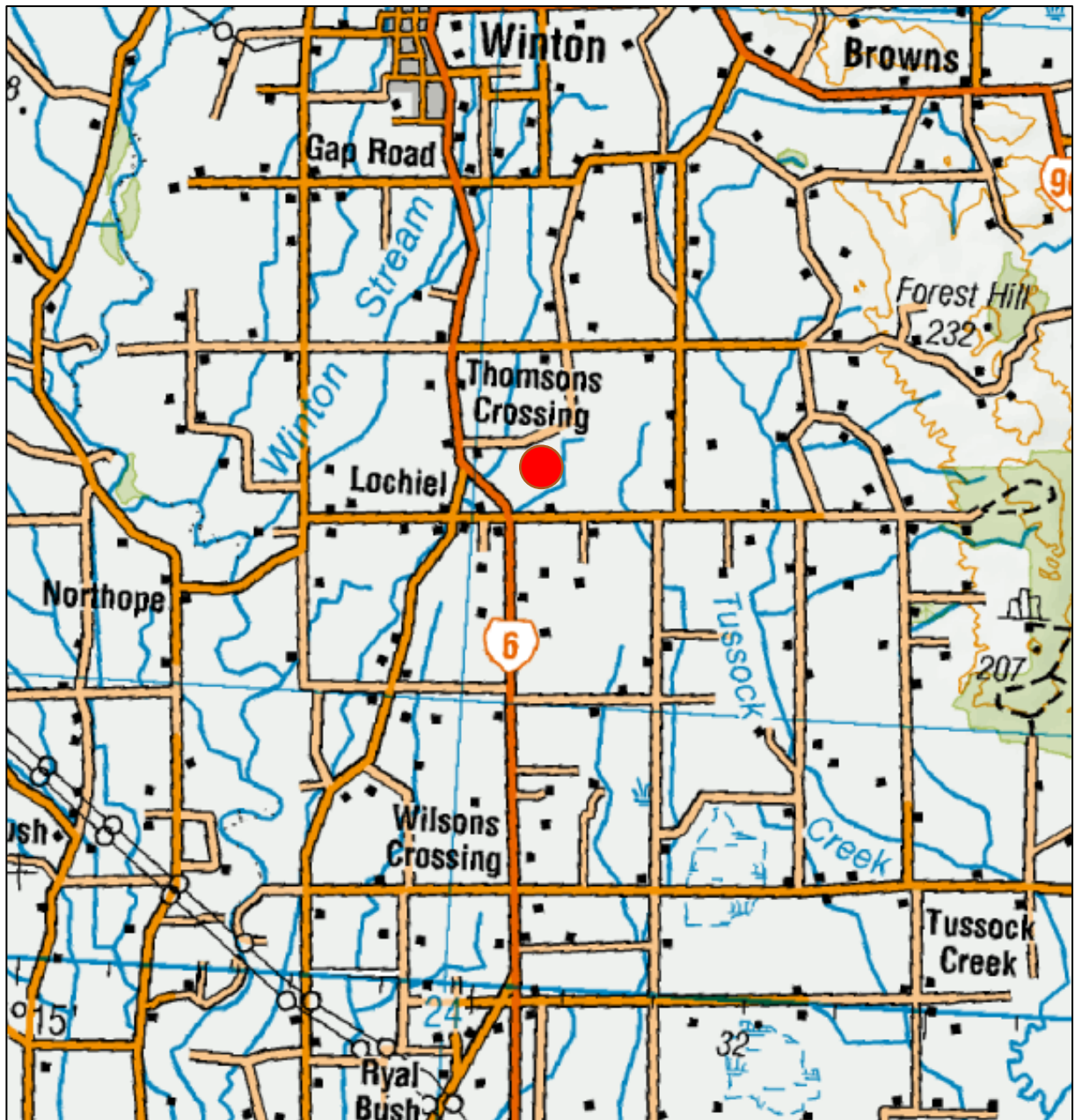


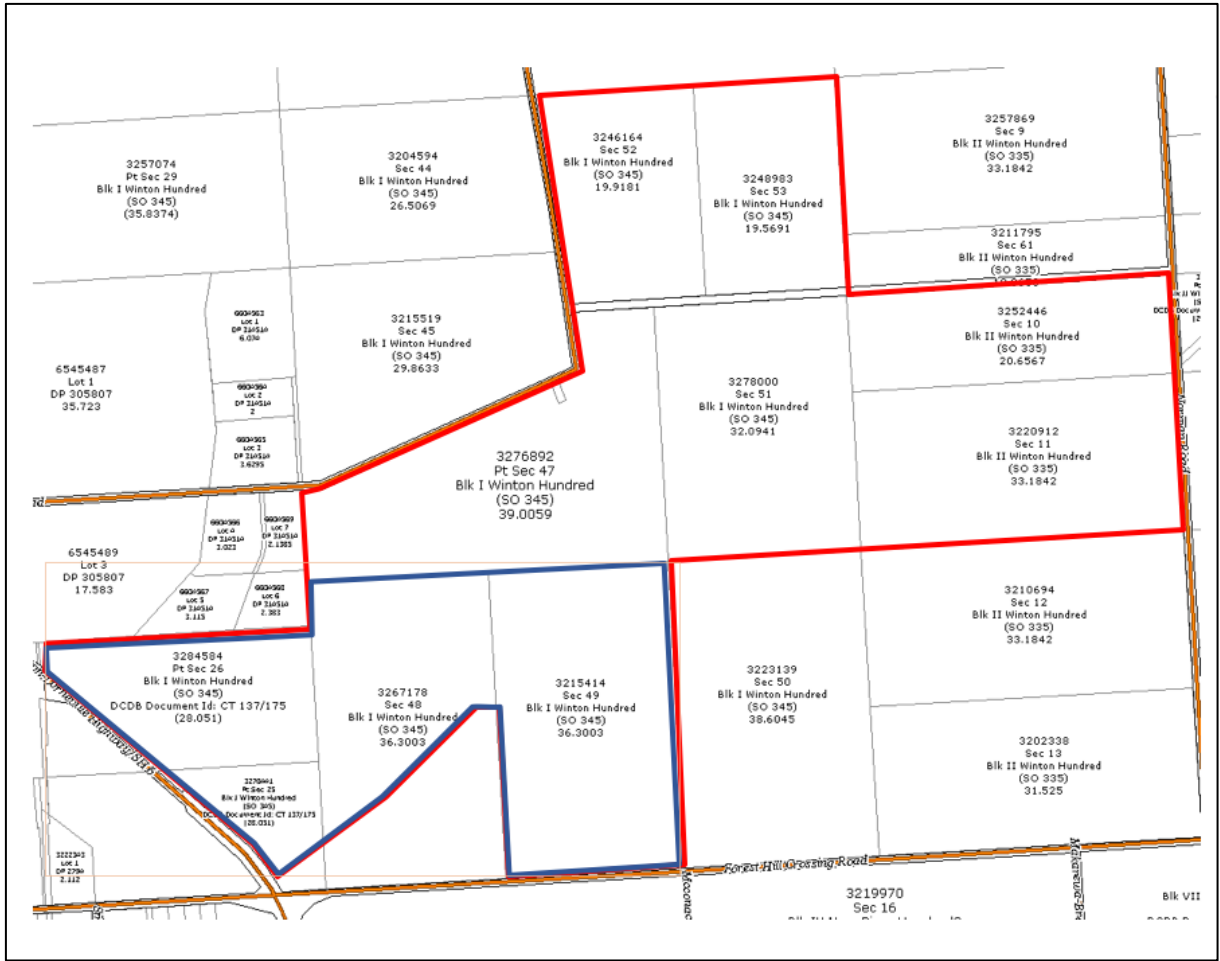
Figure 1 Diagram outlining proposed land-use changes at South Dairy Farm

3. Site and locality

The assessment of environment effects has been undertaken at the South Dairy farm sited near Lochiel, as indicated below.



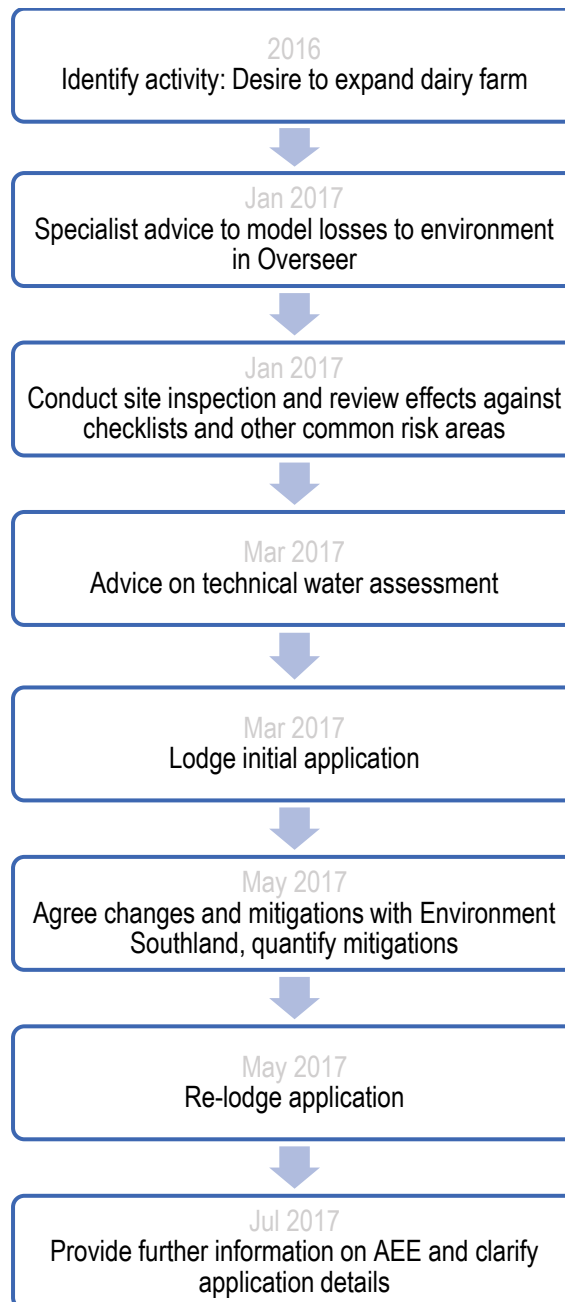
The specific titles for the land in this proposal are outlined below, with full details in the application that has been submitted to Environment Southland.



- overall farm boundary
- blocks with long term lease arrangement

4. Process to identify and resolve environmental effects

Outlined below are the the steps that have been followed to assess and address the potential and anticipated adverse environmental effects.



We have not had direct discussions with Department of Conservation, Fish and Game, Te Ao Marama or Ngai Tahu for this application but have had discussions with them over new conversions and more sensitive situations and they have provided written approvals with similar losses. They are waiting for the nutrient setting process to be completed which may provide a level playing field for all land uses.

5. Effects checklist, ranking and discussion

The initial discussion and site visit was undertaken with Mr Alexander on 16 January 2017. This initial discussion identified that some minor issues may require care with the new pond construction, but generally good practices were in place. The issue of expansion would require further assessment for mitigation of adverse effects from this change.

Category	Status quo	Proposed changes	Scale of effect	Duration of effect
Water abstraction point and availability	Water is taken from the existing bore which is located 260m east of the tanker track loop. Existing water permit ~84m ³	Increase to 90m ³ per day. Take is 3.6% of recharge.	None	Permanent
Slope and run-off	The farm is flat and undulating and all less than 7 degrees.		None	
Wintering	599 cows have been wintered on the current dairy farm. About 9ha of the lease block has been used for winter crop, with 200 cows grazed on the fodder	To be discussed	None	
Bridges and culverts	One bridge and two culverts. At the end of these are riparian areas	No change	None	
Stocking rates	Existing rates are 3.0 cows per hectare	No change	None	
Stock access to water	The stream is fenced and there is no access to this water for stock. All paddocks have troughs connected to the	No change	None	
Riparian management	The streams are fenced and well vegetated. The shed, yards and effluent storage pond are well away from any open drain. The vegetation within the open drains will tend to trap any	No change	None	
Silage management		No change	None	
Offal disposal		No change	None	
Sludge management	All effluent flows directly to the stone trap where some sludge is held and cleaned out into a concrete bunker with a weeping wall. The feed pads will have nib walls and solids will be pushed up the slope when generally dry and stored there. The liquid that weeps from the heap will flow back down the feed pad	No change	None	
Sediment management	The waterways are fenced and have vegetation cover. The feed pads and storage pond that are to be built are well away from any drain with sufficient buffer for any silt. The material to be used does	No change	None	
Soil disturbance, earthworks	There is currently an effluent storage pond	The feed pads and storage pond that are to be built will be well away from any drain with sufficient buffer for any silt to settle out.	Minor	Temporary
Open drain clearing	Any open drain clearing will be done at appropriate times.		None	
Drainage, tiles, tile ends	The farm has a large number of tiles and some are located	The owners are currently developing a tile map for their Management	None	
Cultivation	About x ha of crop grown as part of the pasture renewal system.	Up to 20ha of crop will be grown in the pasture renewal programme and up to 50% of this can be harvested in autumn to provide low protein feed or fed to springers in late spring		
Shelter belts	There are several north south running shelter belts	These will be retained	None	
Dairy lane locations	There are no lanes adjacent to any drains with only one culvert crossing	No change	None	

The farm management practices were reviewed against good management practices to check for any risks or issues with current farming approach that may have adverse environmental effects.

Category	Status quo	Proposed changes	Scale of effect	Duration of effect
Nutrient management plan	Discharge area is 43 ha giving an annual aerial load of between 62 and 73 kg N / ha	To be discussed, increase discharge area where possible	Significant	Permanent
Optimum soil test P			None	
Stock exclusion from streams and wetlands			None	
Tracks and lane site away from water			None	
Limited N fertiliser use			None	
Grass buffers			None	
Restricted grazing of cropland, some still planted for pasture renewal			None	
Pugged soil resown			None	

The current practice of discharging effluent over a small area had a high risk of concentrated effluent resulting in high potassium ... as well as increased risk of losses of valuable N and P to surface and groundwater.

Following discussions about planned farm expansion, the proposed activity to add the 50ha lease block with cows at a similar stocking rate raised the potential need to expand the size of effluent storage, as well as high risk of adverse environmental effects that would need to be quantified and mitigation measures explored. It is important that these effects were considered against the current permitted baseline.

Overseer modelling outlined a decrease in losses from collected dairy effluent with the proposed changes, however modelling that included losses from direct discharge to land outlined a significant increase in N to the receiving environment. This meant that further mitigations would be required.

An interim set of adverse effects (prior to mitigations being agreed) is outlined below for the additional lease block being proposed to add to the dairy platform.

Activity: Add 50ha lease block with 150 cows to dairy farm platform			
<i>Identify possible permanent effects: visual effects, loss of trees and vegetation, shading neighbouring property, soil stability, privacy, stormwater/sewer capacity, traffic generation, landscape changes, effects on water quality/quantity, cultural/spiritual values on iwi, effects on heritage sites/buildings/structures/objects, pollution, loss of recreational values of land etc.</i>			
Environmental effect	Ranking of effect	Avoid/remedy/mitigate effect	AEE action
Losses of N and P to environment are likely to increase, reducing water quality	Significant	Mitigate effect - investigate necessary measures	Mention in AEE, discuss with affected parties including Environment Southland.
<i>Identify possible cumulative effects: change in character, loss of urban vegetation, effects on waterways, landscape, effects on infrastructure etc.</i>			
Environmental effect	Ranking of effect	Avoid/remedy/mitigate effect	AEE action
Losses of N and P to environment are likely to increase, reducing water quality	Significant	Mitigate effect - investigate necessary measures to ensure negative effects do not interact at a catchment level.	Mention in AEE, discuss with affected parties including Environment Southland.

And further temporary effects were anticipated for the temporary construction of the feed-pad and effluent pond.

Activity: Construct new effluent pond			
<i>Identify possible temporary effects: noise/dust/vibrations/emissions/hazardous substances/odour/land contamination from construction</i>			
Environmental effect	Ranking of effect	Avoid/remedy/mitigate effect	AEE action
Visual effects	Minor	??	Mention in AEE
Sediment loss	Minor	The feed pads and storage pond that are to be built are well away from any drain with sufficient buffer for any silt to settle out.	Mention in AEE
Noise from construction	Minor	Noise from construction will be minor due to the distance of the construction site from neighbouring properties	Mention in AEE
Activity: Construct new feed pad			
<i>Identify possible temporary effects: noise/dust/vibrations/emissions/hazardous substances/odour/land contamination from construction</i>			
Environmental effect	Ranking of effect	Avoid/remedy/mitigate effect	AEE action
Visual effects	Minor	??	Mention in AEE
Sediment loss	Minor	??	Mention in AEE
Noise from construction	Minor	??	Mention in AEE
<i>Identify possible permanent effects: visual effects, loss of trees and vegetation, shading neighbouring property, soil stability, privacy, stormwater/sewer capacity, traffic generation, landscape changes, effects on water quality/quantity, cultural/spiritual values on iwi, effects on heritage sites/buildings/structures/objects, pollution, loss of recreational values of land etc.</i>			
Environmental effect	Ranking of effect	Avoid/remedy/mitigate effect	AEE action
Water diversion and collected effluent	None	This will be mitigated by connecting the run-off to the effluent storage system	Mention in AEE, discuss with affected parties including Environment Southland.

6. Remedies to adverse effects, mitigations to adverse effects, and effects to be avoided

As more detailed modelling has been undertaken through the process, the required measures to fully mitigate the adverse effects have become clearer and agreed with Environment Southland.

7. Consultation undertaken

We have not had direct discussions with Department of Conservation, Fish and Game, Te Ao Marama or Ngai Tahu for this application but have had discussions with them over new conversions and more sensitive situations and they have provided written approvals with similar losses. They are waiting for the nutrient setting process to be completed which may provide a level playing field for all land uses.

8. Proposed or agreed restrictions on consent

Key restrictions that have been agreed at this point include:

1. A new effluent pond will be constructed that can hold effluent for a maximum of 750 cows, a total pumpable storage volume of 5060m³
2. A stand-off feedpad will be constructed with an area of 2730m².
3. 599 cows will be wintered off the farm.

9. Alternatives considered and accepted or rejected

The alternatives that were considered for the expansion were as follows:

1. Status quo: Continue using the dairy farm as per previous permits of 599 cows on 200ha of land with minimal discharge area, and continue using the 50ha south west block as a run-off and winter-grazing block. These are baseline permitted activities and the effects as part of these activities are allowed.
2. Increase effluent disposal area, but do not expand farm: Continue using the dairy farm as per previous permits of 599 cows on 200ha of land, with an increased discharge area. Continue using the 50ha south west block as a run-off and winter grazing block. Continue to keep 599 cows wintered on the farm.
3. Expand farm to 750 cows and 250ha of land, with an increased discharge area. Heifers and calves removed from 49 ha block. Take 599 cows off the main farm over winter.

We are proposing scenario 3. The other options are sub-optimal for environmental, economic or efficiency reasons.

10. Proposal for monitoring potential and actual effects

1. The groundwater bore water quality will continue to be monitored by Environment Southland, as well as the river water quality, macro invertebrate, algae and nutrient levels. The existing arrangement with Environment Southland is that they will undertake a bore water quality test bi-annually and on-charge to South Dairy, however no records of water quality measurement at E46/0942 have been supplied on request for this application.
2. The activities to monitor the effects on the farm include
 - a. daily recording of effluent discharge to land, including the paddock, volume and moisture.
 - b. soil testing of each paddock each year to check nutrient levels especially Olsen P test and trace elements to ensure optimum use.
3. Recording the mitigation measures for the required winter crop and cultivation plans is required as part of the Management Plan and detailed in Appendix N.