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5 February 2019

The Consents Manager
Environment Southland
Private Bag 90116
Invercargill 9840



Pyper's to pay
via Internet
\$1500
GAA

Dear Sir,

***Pyper's Produce Limited, Branxholme
Application to renew water and discharge permits for a vegetable washing operation.***

Please find attached to this letter an application by Pyper's Produce Ltd for a water permit and discharge permit for an existing vegetable washing operation located at Branxholme. The operation is a long-standing one at this site.

The consents sought in this application are:

- Discharge of 380m³ of horticulture wash water daily onto and into land in circumstances where it may enter water under Rule 39 of the Proposed Southland Water and Land Plan.
- Abstraction and use of 380,000 litres of groundwater per day under Rule 54 of the proposed Southland Water and Land Plan and Rule 23 of the Regional Water Plan

Consent is not being sought for the use of the existing storage ponds. The ponds are existing therefore not covered by Rule 32C of the proposed Southland Water and Land Plan (pSWLP) as this rule is specific to the construction of new non-agricultural effluent storage facilities. The wastewater is not an agricultural effluent therefore Rule 32D does not apply either.

The storage ponds were constructed many years ago and are designed to allow wastewater to be discharged through infiltration/soakage. Discharge from the storage ponds requires consent under Rule 39 of the pSWLP.

The application is prepared on the basis that the activity is appropriate for the area in which it occurs, meets the requirement to use best practice, particularly in regard to the discharge to land, and will only have effects that are no more than minor but, for the most part, will be less than minor. The information provided is therefore considered to be in such detail as corresponds with the scale and significance of the effects that the activity may have on the environment.

We request the opportunity to view and comment on the proposed conditions for this activity before the granting of the application.

Attached to this application are the following:

1. Statutory application (Part A) form;
2. Part B forms for the abstraction of groundwater;
3. Part B forms for discharge to land;
4. site map;
5. maps showing soil types, FDE soil classification and physiographic zones;
6. soil data sheets and physiographic zone factsheets;
7. groundwater technical report prepared by Land and Water Science and;
8. wash water sample results.

The following are the addresses for service of applicant:

For matters relating to the processing of the application:

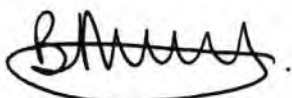
Bridgett Aitken
Bonisch Environmental
P O Box 1262
Invercargill 9840

For invoicing of costs associated with processing the application:

Pyper's Produce Ltd
C/- Brendan Hamilton
1035 Lochiel Branxholme Road
RD4
Invercargill

Thank you for your consideration.

Yours faithfully,



Bridgett Aitken
Planner, Bonisch Environmental

Pyper's Produce Limited, Branxholme

Application to renew water and discharge permits for a vegetable washing operation.

1. Introduction

Pyper's Produce is applying for the renewal of its existing discharge permit to allow the discharge of up to 380m³ of vegetable wash water to land per day and water permit to abstract 380,000 litres of groundwater per day for a vegetable washing operation located at Branxholme.

The discharge is a discretionary activity under Rule 39 of the pSWLP with the relevant rule being operative. The abstraction of groundwater is a discretionary activity under Rule 54 of the pSWLP and Rule 23 of the Regional Water Plan

There are no changes proposed to the current volumes of water abstracted or discharge.

A consent term of 20 years is requested for this application.

The 20 year term applied for is appropriate because of the minor scale and nature of the take and discharge, and the extent of the mitigation that is provided, that ensures the overall impact is no more than minor. Pyper's Produce vegetable washing plant has been in operation for many years and will continue to be required for the foreseeable future.

Having impeccable health and hygiene practices are important when dealing with a food product such as vegetables. There are stringent procedures that have to be followed, so suitable washing facilities are necessary. Because the disposal of the wash water meets the best practice requirements, a 20-year term is considered to be reasonable and appropriate. Further discussion on this matter can be found in the policy consideration.

None of the ponds are lined to prevent leakage as they are designed to allow waste water to infiltrate through the soil profile and discharge back to groundwater. When required, wastewater will be discharged to land via irrigation to allow for accumulated sediments to be removed from the ponds.

The total area available to spread wash water on over all properties included in the application is 85ha. The discharge will only occur when ground conditions are suitable. There will be no discharge of wash water directly to surface water through ponding, runoff or through subsurface drainage.

2. Background

Pyper's Produce is a large vegetable growing and processing operation located at Branxholme specialising in the production of root vegetables, such as potatoes and carrots, and has been in operation for 40 years. The washing plant used for the washing of vegetables prior to packing operates throughout the year.

The property where the washing plant is located is approximately 20ha. This land is used for cropping but is also leased out for grazing as part of crop rotation cycles. Cropping is also undertaken on leased areas located adjacent to the wash plant. Some of these lease properties have also been included as discharge areas for wash water to allow greater flexibility around wash water disposal. A location plan is attached as Appendix 1.

The block where the wash plant is located is located on the following land title:

- Lot 1 DP 3692 (Location of abstraction bore and monitoring bore)
- Lot 1 DP 517446
- Lot 2 DP 517466
- Lot 1 DP 7335
- Pt Sec 13 Blk II New River HUN
- Pt Sec 14 Blk II New River HUN
- Sec 4 SO 11880
- Pt Sec 15 Blk III New River HUN

Compliance History

This operation has had a generally good compliance record over the time it has been operating. All aspects relating to the discharge permit have been recorded as fully compliant, which also includes groundwater monitoring results. The water permit compliance history has two recorded instances of non-compliance for failing to provide abstraction records, however this has been addressed recently with the installation of the telemetry monitoring system that constantly records data. Access to the telemetry records can be provided to Environment Southland upon request.

3. Site Description

The property is situated approximately 16 kilometres north of Invercargill with the Oreti River located 1.6km to the west. The Tomoporakau Creek flows through the property and has been fenced for stock exclusion.

The groundwater management zone where this property is located is identified as Lower Oreti. It also lies within the Lower Oreti surface water management zone and Oreti freshwater management unit.

The wash water will be discharged onto Waikiwi, Edendale and Dacre soils. Based on information from the Southland Topoclimate survey information sheets, all these soils have a deep rooting depth and high plant-available water. Waikiwi and Edendale soils are well drained but have a compact subsoil that may cause short-term waterlogging after heavy rainfall. Dacre soils are moderately prone to compaction, slightly prone to leaching and have a severe vulnerability to waterlogging due to poor drainage and slow subsoil permeability

The regional nitrate levels range from 0.01 - 0.4 mg/L (pristine, pre-European) to 1.0 - 3.5 mg/L (minor to moderate land use impacts). On the section of land located north of the washing plant, nitrate levels are higher ranging from 3.5 - 8.5 mg/L (moderate to high land use impacts) to 8.5 - 11.3 mg/L (drinking water limits) as shown on the Beacon website. This aspect is discussed in more detail in the assessment of effects.

4. Description of Wash Water and Disposal System

The processing of these crops involves the removal of soil from the vegetables through washing. Sediment is removed from vegetables using various water jets and tumblers. Wash water is recycled as much as possible throughout the process, however once it is laden with sediment, it does not wash the produce efficiently and must be removed from the process. During times of peak production, approximately 200 tonnes of vegetables are processed through the washing plant per day.

Upon completion of the wash process, wash water is fed by gravity to the initial settling pond. This pond is where the bulk of the sediment is dropped out of suspension. Water then passes through a small screen, similar to a weeping wall for filtering dairy effluent. The next pond acts as a sump where the wash water is transferred to the larger settling/infiltration ponds.

Soil and sediments are cleaned out of the initial settling pond on an as required basis. During the peak of the season this is usually monthly. All soil and sediment removed, from all ponds, is stockpiled onsite.

Previously the larger settling/infiltration ponds consisted of approximately 6 smaller ponds, giving a total volume of approximately 17,550m³. Wash water would be pumped into the pond at the start of the series, which would then progressively flow into the next pond and so forth.

Currently this system still exists, however, to address any potential overflows from the ponds, large banks were created around the existing ponds, using accumulated sediment, to create three large ponds. A plan showing the location of the larger settling ponds is shown in appendix 1. For the majority of the time, the third pond is used as contingency, however it is used for settling purposes when sediment is being removed from one of the other ponds.

The irrigation of wash water from the large settling ponds to land occurs approximately once every 2 years and is undertaken during the summer months from December to February. The purpose of emptying the ponds using irrigation is to completely remove all water so the excavation of any further sediments that have accumulated can be undertaken. All sediment removed is placed in stockpiles next to the ponds.

These larger ponds allow for the further settling of sediments and allow water to infiltrate back into the aquifer. A small portion of water will be lost through evaporation.

The irrigation of the wash water is undertaken via a low rate pod system, similar to that that would be used to discharge dairy effluent to land. As mentioned above, the irrigation of the wash water is usually undertaken every two years in the summer months when ground conditions are suitable for disposal.

Additional areas have been included for the disposal of the wash water to give greater flexibility and the ability to spread the wash water onto established vegetable crops that may benefit from increased soil moisture during drier summer months.

The locations where crops are grown are rotated on a regular basis and only when there is a crop located near the ponds, at a time when irrigation will be occurring for the purposes of sediment removal, will wash water be potentially used as irrigation. The land that surrounds the ponds that is currently consented for the discharge of wash water will remain, therefore if there are no crops close to the ponds, there will always be a pasture area available to receive the wash water discharge.

The proposed addition of a block located on Collinson Road is some distance from the settling ponds. Wash water can be transported to this site using a tanker and set up with a transportable pump to allow the wash water to be irrigated to land in the same way it is done adjacent the settling ponds.

The irrigation of wash water onto crops will only occur during times of dry weather conditions when there is a clear soil moisture deficit and no risk of rainfall immediately afterwards.

There will be no discharge of wash water directly to surface water through ponding, runoff or through subsurface drainage.

4.1 Content of discharge

The content of the wash water includes soil particles and sediment; however, sanitisers are used as part of the washing process to prevent the produce becoming contaminated by any microbes present in the water. The sanitisers do not directly clean the produce. The applicant has advised that sanitisers such as hypochlorous acid cannot be detected in the wash water due to it being very reactive and quickly oxidises in the presence of organic matter. All sanitisers used in the washing process are HSNO approved.

The applicant has provided a recent sample of the wash water. The results of this sample are appended – see Section 4.3 below for some comment on the result.

Where wash water is discharged to land through soil infiltration, the discharged points are fixed to the locations of the settling/infiltration ponds. Where wash water is discharged to land using low rate irrigation there is an element of flexibility as the applicant has the ability to move the irrigation pods within a defined area adjacent to the settling ponds.

The disposal areas are outlined on the site plan appended. The land classifications for the disposal area have been identified as artificial drainage or coarse soil structure and well drained flat land. Copies of the relevant maps are appended. The wash water will be applied to land using a low rate pod system at an application depth of no more than 25mm per application at a rate of no more than 10mm an hour.

4.2 Frequency of Discharge

The washing of produce will occur for approximately 10 hours per day, 5 days per week for approximately 50 weeks a year when the washing plant is in operation. The volume of the discharge will be 380m³ daily, the same volume as the water abstracted to be used in the washing plant, however this is variable depending on the volume of produce that is being washed/processed at the time. Volumes for both the take and discharge are based on seasonal maximums daily averages are much lower due to recycling.

Wash water will be transferred into the settling/soakage ponds daily and is recycled as much as possible throughout the process. Water used for cooling purposes is later used through washdown hoses. Water used in the wash plant is also recirculated for as long as possible before becoming saturated with sediment and no longer washing effectively.

The irrigation of wash water to land from the secondary ponds occurs approximately every 2 years and is undertaken during the drier summer months from December to February. Generally, this time of year is more suited for irrigation as there is a greater soil moisture deficit therefore reducing potential effects relating to overland flow and runoff.

4.3 Monitoring

Groundwater monitoring is currently required as a condition of consent. A monitoring bore was specifically constructed in the vicinity of the ponds with the intention of detecting any potential effects of the discharge.

While the groundwater monitoring has detected elevated levels of nitrates in the vicinity of the ponds, this effect was linked to the planting and subsequent winter grazing of a brassica crop at the location of the monitoring bore.

Based on the information from Environment Southland outlining the content of the wash water discharge, a direct correlation between the discharge and groundwater monitoring results cannot be made. A summary of this sampling is shown in the table below.

Table 1: Wastewater Discharge and Groundwater Sampling Results undertaken by Environment Southland.

	Discharge 13/01/17	Bore E45/1007 21/11/17	Bore E45/1007 13/04/18	Discharge 14/11/18
Nitrogen (Nitrate) g/m ³	0.049	9.3	8.8	0.22
Nitrogen (Nitrate +Nitrite) g/m ³	0.095	9.3	8.8	-
Nitrogen (Nitrite) g/m ³	0.046	-	-	-
Phosphorus (Dissolved Reactive) g/m ³	0.004	-	-	-
Nitrogen (Total) g/m ³	4.03	-	-	32.6
E Coli MPN/100ml	-	<1	<1	-

Comparing the sample results between the groundwater and the contents of the wash water, the nitrogen content in the wash water is considerably lower than that of the groundwater, which would indicate that the discharge of wash water is not having an adverse effect on groundwater.

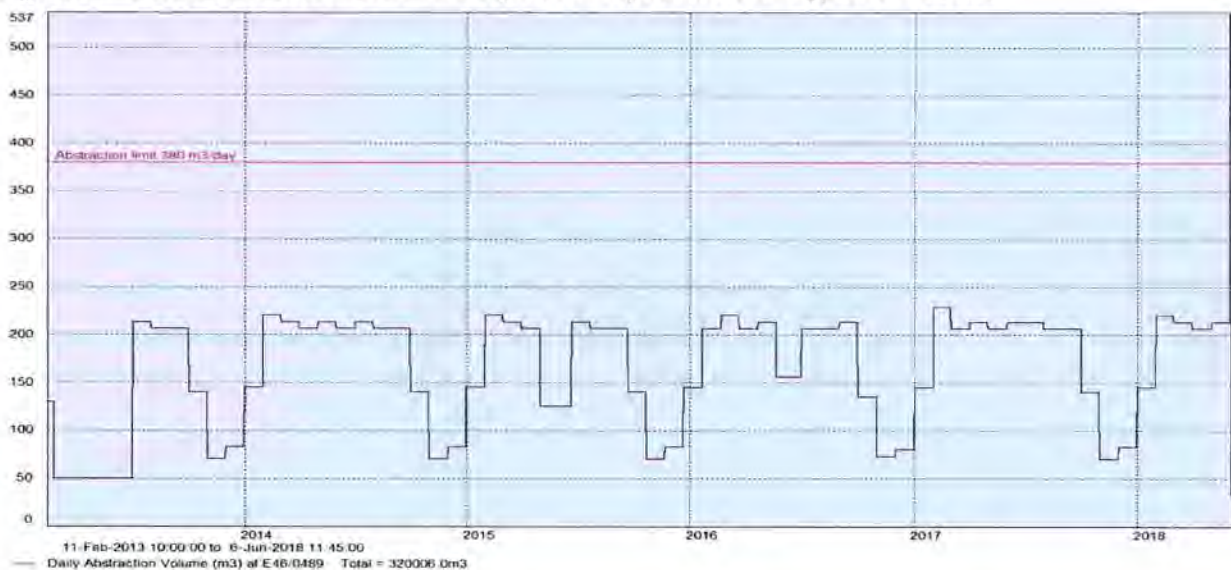
The applicant has undertaken a more recent sample of the wash water that shows 32.6 g/m³ for total nitrogen and 0.94 g/m³ for total phosphorous which are well above the earlier sample values outlined above. The timing around when these samples were taken needs to be taken into account. In November, when the most recent sample was taken, the plant was operating at full capacity processing carrots and the ground conditions were saturated at the time. The sample undertaken in January, would have been undertaken at a time when the plant had been shut down for two weeks during the Christmas period, therefore did not have the same volume of wash water being discharged to the pond with a higher likelihood of drier ground conditions also.

However, assuming the proportion of nitrate-nitrogen to total nitrogen is similar, the nitrate nitrogen content will still be less than 1 g/m³.

5. Groundwater Abstraction

This application is to take up to 380,000 litres of water per day to be used for vegetable washing purposes. This application is not unreasonable as it is very minor in scale, especially when compared to other water takes in the area. Groundwater is abstracted at a rate of 11 l/sec from the Lower Oreti Groundwater zone. There is no increase in volume to what is currently consented.

Figure 2 – Abstraction Data Provided by ES Hilltop Database- Pyper’s Produce



The volume applied for is also a daily maximum. Information provided by Environment Southland Compliance Division (figure 2 above), shows that water use is generally below the daily abstraction limit, however data shows was a spike in water use in mid-2018 which could be attributed to the installation of the telemetry monitoring system.

6. Assessment of Effects

The overall assessment is that the potential adverse effects of this application are minor. It is an existing activity on this property and there are no changes proposed that will increase the potential adverse effects. There are no other factors at this location that are considered to be especially sensitive to this existing operation, and best practices will be used to minimise losses and mitigate adverse effects.

6.1 Wash Water Discharge

There will be no direct discharge of the wash water to surface water. The ponds where the wash water is stored are unlined, thus allowing them to act as a soil-aquifer treatment system and let the water infiltrate back into the aquifer after filtering through the soil. Due to the ponds being for the purposes of infiltration, no pond drop test is required.

The storage and disposal of the wash water is based on the fact that is only water with some sediment content. It does not have any biological content and the only chemical exposure is from the use of a sanitiser that is rendered neutral after exposure to the wash water. It should also be noted that the wash water is groundwater that already has a moderate to high nitrate-nitrogen content. The effects assessment should be considered on that basis.

The regional nitrate levels range from 0.01 - 0.4 mg/L (pristine, pre-European) to 1.0 - 3.5 mg/L (minor to moderate land use impacts). On the section of land located north of the washing plant nitrate levels are higher ranging from 3.5 - 8.5 mg/L (moderate to high land use impacts) to 8.5 - 11.3 mg/L (drinking water limits) as shown on the Beacon website. The cause of this increase could be due to a number of factors that are beyond the scope of this application, particularly as the groundwater is likely to be moving in a south to south westerly direction.

The nitrate source will generally be from land use and may be historic in some cases but the hydrogeology in the catchment will also be an influence on where the higher concentrations are displayed. The area slightly to the south of the Collinson Road block that is identified as exceeding drinking water limits, is the location of the Ryal Bush Township.

The use of septic tanks in this township, on smaller landholdings, could be a significant contributor to the limits being exceeded.

The farm dairy effluent classifications for this property have been identified as 'Artificial drainage or coarse soil structure' and 'Well drained flat land'.

The soils on the property are moderately drained soils. The use of a low rate irrigation system will ensure that ensure water and nutrients are not lost through means such as overland flow, is an essential part of the management of these soils.

The physiographic zones that have been identified for this property include Gleyed and Oxidising. The main contaminant pathways for each of these zones include artificial drainage, overland flow/run off. The risks in these zones are managed by protecting soil structure and controlling nutrient applications to the soils. Good management practices include the low rate application of wash water to ensure that nutrients are taken up by plants, deferred irrigation, and avoiding irrigation when conditions are adverse.

Discharging up to 380 cubic metres of wash water yearly would apply a depth of 2.9 mm of washwater in total over the 12.72 ha located adjacent the ponds annually. If this volume was spread over the entire 85ha requested for washwater disposal, the depth would be further reduced to 0.4mm. Evaporation or infiltration of the washwater have not been taken into account and as a result the actual volume of the discharge is likely to be substantially less.

There is one open waterway located approximately 70 meters from the large settling ponds and in the same vicinity where the wash water is discharged to land. The buffers imposed on the current consent of not allowing the discharge to occur within 20m of a waterway will be maintained.

The wash water will be applied to land using a low rate pod system at an application depth of no more than 25mm per application at a rate of no more than 10mm an hour. For this type of discharge, at the application depth proposed, and including the mitigation measures described, the potential adverse effects are assessed as less than minor.

In terms of mitigation, the current system consists of a series of settling/infiltration ponds. The applicant has advised that the levels of these ponds remain static year round. The applicant has also reported that it is rare that the ponds have risen to a level where there

is the potential for overflow. As discussed above, work has been constructed around the ponds to create a large bund or bank to contain wash water in the rare event there is ever an overflow. Contingency ponds are located adjacent to contain and to direct overflow into if required.

The total amount of storage available within the larger storage/infiltration ponds is approximately 12,500m³. In addition, there are two contingency or overflow ponds as well as the additional bank/bund that has been created around the perimeter of the ponds to contain any overflow.

Wash water is only discharged onto land via irrigation for the purposes of sediment removal from the ponds.

Aside from the removal of sediments from the wash water, there is no other forms of treatment prior to the wash water being discharged. There are no chemical additives to assist with sediment removal.

There is no conspicuous odour associated with the wash water.

6.2 Groundwater Abstraction

This application is to take up to 380,000 litres of water per day to be used for vegetable washing purposes. The actual amount of water taken each day varies and depends on the type of vegetables being prepared and the quantity. It is difficult to assess what is a "reasonable" amount for this type of activity but the combination of "new" water and recycled water does help to reduce overall water consumption.

The amount applied for is not considered to be unreasonable as it is very minor in scale, especially when compared to other water takes in the area. Groundwater is abstracted at a rate of 11 l/sec from the Lower Oreti Groundwater zone. There is no increase in volume to what is currently consented.

The allocation status of the Lower Oreti Groundwater Zone according to the spreadsheets provided monthly from Environment Southland, for the RWP is 20% of the discretionary allocation. The discretionary allocation for the pSWLP is lower at 8.8% which could be attributed to the changes in the groundwater zone boundaries between the different plans.

Water is stored in a series of concrete water tanks located adjacent to the processing shed. There is a total of approximately 140,000 litres of water storage available in these tanks. The water level is controlled by a float switch located within the tanks, so pumping commences when the water level reaches a predetermined level.

An assessment of the groundwater abstraction has been undertaken by Land and Water Science, which is appended.

There is a waterway within the vicinity of the abstraction bore (E46/0489), Tomoporakau Creek, which is at a distance of approximately 90 meters to the east. In accordance with Appendix L of the pSWLP, Environment Southland require a stream depletion analysis to be undertaken to establish the hydraulic connectivity of the bore (E46/0489) to the nearby streams and waterways, as well as an assessment of the interference effects on the neighbouring wells.

According to Environment Southland, there are only 3 other registered groundwater bores located within a 1 km radius from the abstraction bore. These include a residential water supply bore at a distance of 40 m, a groundwater quality monitoring bore at a distance of 475 m, and a stock supply bore at a distance of 1 km. These bores are likely to draw from the same unconfined aquifer based on available well construction details.

Results indicate drawdown is 'acceptable' (<1.5 m) for the bores located within (and beyond) a 1 km radius of the abstraction bore at the proposed 146 days of constant pumping at 11 L/s. Even if pumping was carried out all year round, the effect on drawdown on neighbouring bores is minimal and therefore 'acceptable'. It is concluded that the groundwater abstraction is likely to have a less than minor impact on any neighbouring groundwater bores and takes. The results are supported by a statement from adjacent landowners that have a bore located approximately 40m from the abstraction bore. They have stated that they have never had never any issues with drawdown in their bore during abstraction from the applicant's bore over the last 20 years.

The outcome of the stream depletion assessment suggests the bore is likely to be hydraulically connected to the Tomoporakau Creek, however the stream depletion rate is sensitive to the rate of return to groundwater from the soakage pits. The assessment determines that the hydraulic connection between the abstraction bore and the Tomoporakau Creek is low, as stream depletion is less than 30% of the assessed rate. At

low hydraulic connection, the take can be managed solely as a groundwater take according to Appendix L.2 of the pSWLP.

Based on information provided in the report from Land and Water Science, it is likely that the abstraction will have no more than minor adverse effects on other groundwater users and surface waterways. The interference assessment indicated that there will be negligible drawdown of groundwater level in neighbouring bores, and the stream depletion analysis suggests that connection of the bore to Tomoporakau Creek is low with an estimated 80% of abstracted groundwater being returned to the aquifer via the soakage pits.

It is not anticipated that there will be any effects on groundwater quality or surface water flows as a result of this activity. There is no increase in the scale of the activity, and the volume of water sought will remain the same. The consent holder has advised that the bore where the abstraction occurs is monitored using a telemetry system and can provide access to this data upon request.

The groundwater abstraction will have no adverse environmental effect on the wider community, visual and landscape values or ecosystems.

7. Alternatives

The activity is well established on its current site and there are no other realistic alternatives to land disposal, the effects of which are assessed as no more than minor, and probably less than minor under most circumstances.

The disposal system is considered to comply with what is regarded as best practice for this type of horticultural activity. The disposal area available for irrigation to land is through agreements with landowners and lease agreements. Land areas available close to the pond site are well suited to effluent irrigation. As the amount of area available is significantly more than is actually required, and the timing of irrigation can be chosen to suit the conditions, there is flexibility to work around other farming activity and to avoid adverse conditions.

Alternative locations and methods of disposal are therefore not considered further.

8. Consultation

Written approval has been obtained from the landowners where the discharge of wash water will be occurring. A copy of these approvals are appended.

The applicant is in the process of obtaining written approvals from the landowners of the various lease blocks where irrigation of wash water may occur. These approvals will be forwarded to council in due course.

Since this is the renewal of an existing activity and there is no proposed change in the scale or intensity of the operation, approvals from neighbouring landowner's adjacent to irrigation areas have not been sought at this time.

9. Term of Consent

The 20 year term applied for is appropriate because of the minor scale and nature of the discharge, and the extent of the mitigation that is provided, that ensures the overall impact is no more than minor. There is also a history of good compliance and no adverse effects being observed. The growing and processing of vegetables is an integral part of the southland economy and will continue for the foreseeable future.

Because the disposal of the wash water meets the best practice requirements and industry guidelines, and the effects are no more than minor, a 20 year term is considered to be reasonable and appropriate. Further discussion on this matter can be found in the policy consideration.

10. Consideration of Statutory Documents

The relevant regional planning documents for this application are the Regional Policy Statement (RPS), Regional Water Plan (RWP), and Proposed Southland Water & Land Plan (PSWLP).

It is also noted that the National Policy Statement for Freshwater Management 2011 (referred to as 'the NPS') and the National Environmental Standards for Sources of Drinking Water (referred to as "the NES") and Resource Management (Measurement and Reporting of Water Takes) Regulations 2010 are relevant. The requirements of the former are addressed through the regional planning documents.

In regard to the NES, there is one registered drinking water site located within the Oreti River Catchment, downstream from the location of the properties where the wash water discharge will occur. This site is the Invercargill City Councils site at Branxholme to supply water to the city of Invercargill. For the purposes of this application it is assumed that any potential impact of this proposed discharge, even in the event of an incident on site, is considered less than minor because of the dilute nature of the discharge.

The provisions of the NPS and NES have therefore not been analysed further.

No detailed review of the RPS is provided. Typically, the objectives and policies are given effect through the provisions and requirements of the Plan, which cannot be inconsistent with the RPS. The adverse effects of these activities have been assessed as minor and they are occurring in a rural environment where such activities are common, so a detailed analysis of the higher-level documents is not considered to be necessary.

It is also noted that the Iwi management plan, Te Tangi a Tauira, is a relevant document to be considered. No analysis of it is provided with this application as it is had regard to in the formulation of the RPS and the plan. However, the activities as applied for are not inconsistent with that plan and will not impact on cultural values.

Regional Water Plan

The provisions of the Regional Water Plan that are most relevant are as follows:

Objectives

Objective 2 To manage water quality so that there is no reduction in the quality of the water in any surface water body, beyond the zone of reasonable mixing for discharges, below that of the date this Plan became operative (January 2010).

Objective 3 To maintain and enhance the quality of surface water bodies so that the following values are protected where water quality is already suitable for them, and where water quality is currently not suitable, measurable progress is achieved towards making it suitable for them.

In surface water bodies classified as mountain, hill, lake-fed, spring-fed, lowland (hard bed), lowland (soft bed) and Maitai 1, Maitai 2 and Maitai 3:

- (a) bathing, in those sites where bathing is popular;
- (b) trout where present, otherwise native fish;
- (c) stock drinking water;
- (d) Ngāi Tahu cultural values, including mahinga kai;
- (e) natural character including aesthetics.

...

Objective 4 To manage the discharge of contaminants and encourage best environmental practice to improve the water quality in surface water bodies classified as hill, lowland (hard bed), lowland (soft bed) and spring fed, and in particular to achieve

a minimum of 10 percent improvement in levels of the following water quality parameters over 10 years from the date this Plan became operative (January 2010):

- (a) microbiological contaminants
- (b) nitrate
- (c) phosphorus
- (d) clarity.

Objective 5 To have sufficient water to support the reasonably foreseeable needs of current and future generations and enable people and communities to provide for their social, economic and cultural wellbeing while protecting aquatic ecosystem health, life supporting capacity, natural character and historic heritage values of surface water bodies.

Objective 7 To maximise the efficiency of water use.

- Objective 8
- (a) To maintain groundwater quality in aquifers that already meet the Drinking-Water Standards for New Zealand 2000; and
 - (b) To enhance groundwater quality in aquifers degraded by land use and discharge activities (with the exception of those aquifers where ambient water quality is naturally less than the Drinking-Water Standards for New Zealand 2000) to ensure general compliance with the Drinking-Water Standards for New Zealand 2000 by the year 2010.

Objective 9 To ensure that the total volume and rate of groundwater abstraction is sustainable

Objective 9A To manage discharges onto or into land so that the quality and structure of soil resources are maintained.

Objective 9B To manage discharges onto or into land so that adverse effects on human health are avoided.

Objective 9C To manage discharges onto or into land so that any adverse effects on:

- (a) the diversity and integrity of habitats and ecosystems; and
- (b) amenity and historic heritage values;

are avoided, remedied or mitigated to ensure that these values are maintained or enhanced.

Policies

Policy 1A Any assessment of an activity covered by this plan must take into account any relevant Iwi Management Plan.

Policy A4

1. When considering any application for a discharge the consent authority must have regard to the following matters:
 - (a) the extent to which the discharge would avoid contamination that will have an adverse effect on the life-supporting capacity of fresh water including on any ecosystem associated with fresh water; and
 - (b) the extent to which it is feasible and dependable that any more than minor adverse effect on fresh water, and on any ecosystem associated with fresh water, resulting from the discharge would be avoided.
2. This policy applies to the following discharges (including a diffuse discharge by any person or animal):
 - (a) a new discharge; or
 - (b) a change or increase in any discharge –

of any contaminant into fresh water, or onto or into land in circumstances that may result in that contaminant (or, as a result of any natural process from the discharge of that contaminant, any other contaminant) entering fresh water.
3. This policy does not apply to any application for consent first lodged before the National Policy Statement for Freshwater Management takes effect on 1 July 2011.

...

Policy 3 Notwithstanding any other policy or objective in this plan, allow no discharges to surface water bodies that will result in a reduction of water quality beyond the zone of reasonable mixing, unless it is consistent with the promotion of the

sustainable management of natural and physical resources, as set out in Part 2 of the Resource Management Act 1991, to do so.

Policy 4 For surface water bodies outside Natural State Waters, manage point source and non-point source discharges to meet or exceed the water quality standards referred to in Rule 1 and specified in Appendix G “Water Quality Standards”, unless it is consistent with the promotion of the sustainable management of natural and physical resources, as set out in Part 2 of the Resource Management Act 1991, to do so and so avoid levels of contaminants in water and sediments that could harm the health of humans, domestic animals including stock and/or aquatic life.

Policy 7 Prefer discharges to land over discharges to water where this is practicable and the effects are less adverse.

Policy B7

1. When considering any application, the consent authority must have regard to the following matters:
 - (a) the extent to which the change would adversely affect safeguarding the life-supporting capacity of fresh water and of any associated ecosystem; and
 - (b) the extent to which it is feasible and dependable that any adverse effect on the life-supporting capacity of fresh water and of any associated ecosystem resulting from the change would be avoided.

2. This policy applies to:

- (a) any new activity; and
- (b) any change in the character, intensity or scale of any established activity –

that involves any taking, using, damming or diverting of fresh water or draining of any wetland which is likely to result in any more than minor adverse change in the natural variability of flows or level of any fresh water, compared to that which immediately preceded the commencement of the new activity or the change in the established activity (or in the case of a change in an intermittent or seasonal activity, compared to that on the last occasion on which the activity was carried out).

3. This policy does not apply to any application for consent first lodged before the National Policy Statement for Freshwater Management takes effect on 1 July

Policy 14A To determine the term of a water permit consideration will be given, but not limited, to:

- (a) the degree of certainty regarding the nature, scale, duration and frequency of adverse effects from the activity;
- (b) the level of knowledge of the resource;
- (c) relevant tangata whenua values
- (d) the allocation sought, particularly the proportion of the resource sought;
- (e) the duration sought by the applicant, plus material to support the duration sought;
- (f) the permanence and economic life of the activity;
- (g) capital investment in the activity;
- (h) monitoring and review requirement in permit conditions;
- (i) the desirability of applying a common expiry date for water permits that allocate water from the same resource; and
- (j) the applicant's compliance with the conditions of the previous permit (where a new water permit is sought for a previously authorised activity).

Policy 14B In addition to the matters specified in section 104 of the Act, when considering a water permit application for a previously authorised activity where:

- (a) the status of the activity has altered solely as a consequence of subsequent permits being granted to increase allocation from that resource;
- (b) the activity and knowledge of its adverse effects are the same or similar in character, intensity, and scale to that which existed previously; and
- (c) the adverse environmental effects of the activity are not significant.

regard will be given to:

- (i) the status of the activity at the time the original water permit was granted; and
- (ii) the conditions that applied to that permit.

Policy 21 To ensure that the rate of abstraction and abstraction volumes specified on water permits to take and use water are no more than reasonable for the intended end use.

- Policy 22 Require, where appropriate, the installation of water measuring devices on all new permits to take and use water.
- Policy 25 To avoid, remedy or mitigate the adverse effects arising from point source and non-point source discharges so that there is no deterioration in groundwater quality after reasonable mixing, unless it is consistent with the promotion of the sustainable management of natural and physical resources, as set out in Part 2 of the Resource Management Act 1991, to do so.
- Policy 28 To manage groundwater abstraction to avoid significant adverse effects on:
- long-term aquifer storage volumes
 - existing water users
 - surface water flows and aquatic ecosystems and habitats
 - groundwater quality
- Policy 29 (a) Manage the stream depletion effect of any groundwater abstraction with a rate of take exceeding 2 litres per second as follows:
- (i) where there is a direct hydraulic connection between the groundwater source and an adjacent surface water body, the stream depletion effect will be determined as the maximum instantaneous rate of take and will be managed in the same manner as a surface water abstraction for flow and allocation purposes. The abstraction will therefore be subject to any relevant minimum flow regime;
 - (ii) where there is a high degree of hydraulic connection between the groundwater source and an adjacent surface water body, the stream depletion effect will be determined as the greater of:
 1. the effect of 150 days pumping at the continuous pump rate required to deliver the seasonal volume;
 2. the effect of continuous pumping at the maximum permitted pump rate over the period required to deliver the seasonal volume.

The calculated rate of stream depletion will be managed in the same manner as a surface water abstraction for allocation purposes with the remainder of the abstraction included in the allocation volume for the relevant groundwater zone. Where the calculated rate of stream depletion exceeds 2 litres per second, the abstraction will be subject to any relevant minimum flow regime;

- (iii) where there is a moderate degree of hydraulic connection between the groundwater source and an adjacent surface water body, the stream depletion effect will be determined as the effect of 150 days of pumping at the continuous pump rate required to deliver the seasonal volume. The calculated rate of stream depletion will be managed in the same manner as a surface water abstraction for allocation purposes with the remainder of the abstraction included in the allocation volume for the relevant groundwater zone;
- (iv) where there is a low degree of hydraulic connection between the groundwater source and an adjacent surface water body, the stream flow effect is considered to be minor and the individual abstraction will not be taken into account in determining surface water allocation but will be included in the allocation volume for the relevant groundwater zone.

For the purposes of this policy, the degree of hydraulic connection is classified as follows:

Direct: Where the stream depletion effect of seven days continuous abstraction at the maximum permitted rate on an adjacent surface water body is greater than or equal to 80 percent of the maximum pump rate.

High: Where the stream depletion effect of seven days continuous abstraction at the maximum permitted rate on an adjacent surface water body is less than 80 percent of the maximum pump rate and the stream depletion effect of 150 days of pumping at the average continuous rate required to deliver the seasonal volume is greater than or equal to 60 percent of the average continuous pump rate.

Moderate: Where the stream depletion effect of seven days continuous abstraction at the maximum permitted rate on an adjacent surface water

body is less than 80 percent of the maximum pump rate and the stream depletion effect of 150 days of pumping at the average continuous rate required to deliver the seasonal volume is either:

(a) less than 60 percent but greater than or equal to 30 percent of the average continuous pump rate; or

(b) has an overall magnitude greater than 5 litres per second.

Low: *Where the abstraction is not classified as having a direct, high or moderate degree of hydraulic connection.*

(b) Minimise the cumulative stream depletion effect of groundwater abstraction by:

(i) imposing minimum flows on resource consents for groundwater abstraction where there is a direct or high degree of hydraulic connection and the stream depletion effect exceeds two litres per second in accordance with any relevant surface water minimum flow regime (including those established under any Water Conservation Order);

(ii) managing the total stream depletion effect of groundwater abstractions greater than two litres per second with a direct, high or moderate degree of hydraulic connection in accordance with any relevant surface water allocation regime (including those established under any Water Conservation Order);

(iii) ensuring the total stream depletion effect of groundwater abstractions greater than two litres per second with a direct, high or moderate degree of hydraulic connection does not result in surface water flows less than prescribed minimum flows or surface water allocation regimes being exceeded

Policy 30 (a) Use a staged management approach to allocate groundwater for abstraction in Southland to allow the knowledge gained by the progressive development of the region's groundwater resources to be built into its future management.

(b) Recognise the different characteristics of the following aquifer types when managing groundwater abstraction:

(i) riparian aquifers;

- (ii) terrace aquifers;
 - (iii) lowland aquifers;
 - (iv) confined aquifers;
 - (v) fractured rock aquifers.
- (c) Use an assessment of available hydrogeological information from resource consent applications supplemented by investigations and monitoring undertaken by the Council, on a case-by-case basis, to determine if an aquifer is confined. Where an aquifer is determined to be sufficiently confined to warrant management as a separate groundwater resource a preliminary allocation volume shall be determined on the basis of aquifer throughflow.
- (d) Provide for:
- (i) a level of permitted groundwater abstraction where there is a minimal risk of adverse effects;
 - (ii) a primary allocation for consented water abstraction and use; and
 - (iii) a supplementary allocation for consented water abstraction and use.
- (e) Require resource consent applications for groundwater abstractions to be supported by a level of information that corresponds to the level of risk of adverse environmental effects. Information to be supported by a conceptual hydrogeological model that corresponds to the level of allocation from the aquifer.
- (f) Where appropriate, impose minimum level and/or flow cut-offs and seasonal recovery triggers on resource consents for groundwater abstraction.
- (g) Impose monitoring on resource consents for groundwater abstractions that corresponds to the level of risk of adverse environmental effects.
- (h) Where monitoring shows adverse environmental effects are occurring in a specific groundwater zone, remedy or mitigate those effects using one or more of the following methods:

(i) reviewing the conditions of existing groundwater abstraction consents for that groundwater zone in accordance with Section 128 of the Resource Management Act 1991;

(ii) ceasing any further allocation of groundwater from that groundwater zone; and

(iii) temporarily restricting the abstraction of water from that groundwater zone by issuing a water shortage direction under Section 329 of the Resource Management Act 1991.

(i) Ensure that groundwater abstractions that have a high risk of adverse environmental effects will not result in:

(i) a long-term decline in groundwater levels;

(ii) surface water allocation regimes being exceeded³⁵

- Policy 31
- (a) Limit the cumulative interference effect of any new groundwater abstraction (in conjunction with other lawfully established groundwater takes) to no more than 20 percent of the available drawdown in any unconfined aquifer or up to 50 percent of the potentiometric head in any confined aquifer. The effects on any neighbouring bore will be considered where that bore is lawfully established and an assumption will be made that the bore fully penetrates the aquifer. An increased volume or increased pumping rate for any lawfully established groundwater abstraction will be considered a new groundwater abstraction under this policy.
 - (b) Limit the cumulative interference effect of any new groundwater abstraction on any bore that is notified to the Council and utilised for long-term monitoring of water levels to no more than 10 percent of the available drawdown in a unconfined aquifer, or no more than 20 percent of the available potentiometric head in a confined aquifer that exists 50 percent of the time during natural conditions when no pumping is occurring. An increased volume or increased pumping rate for any lawfully established groundwater abstraction will be considered a new groundwater abstraction under this policy.
 - (c) An exception to clause (a) and (b) above may be appropriate for aquifer testing and necessary infrastructure works, and in certain circumstances for mining activities where dewatering occurs for a short duration

Policy 31A Match the level of management that is required for discharges of contaminants onto or into land to the level of environmental risk posed by the following risk factors:

- (a) Nature and quantity of contaminants in the discharge
- (b) Sloping land
- (c) Soils with artificial drainage or coarse structures
- (d) Soils with impeded drainage or low infiltration rates
- (e) Well drained soils
- (f) Climate
- (g) Proximity to groundwater
- (h) Proximity to surface water
- (i) Soil's current physical, chemical and biological characteristics and its potential to leach nutrients
- (j) Natural hazards (for example, flooding and erosion).

Policy 31C Manage discharges of contaminants onto or into land to avoid, remedy or mitigate adverse effects, including on:

- (a) soil quality;
- (b) amenity values;
- (c) habitats, ecosystems and indigenous biological diversity;
- (d) historic heritage, cultural and traditional values;
- (e) natural character;
- (f) outstanding natural features

Policy 31D Encourage the beneficial reuse of materials where this is appropriate and promote discharges of these materials onto or into land to maximise the potential reuse of the nutrients and water contained in the discharge.

Rules

Rule 23 (c) Except as provided for in Rules 23(a) and 23(b) and the takes authorised by Section 14(3) of the Act, the abstraction and use of groundwater from any of the following sources is a restricted discretionary activity, provided the rate of take is less than or equal to 2 litres per second:

- (i) a riparian or terrace aquifer where the total volume of water allocated from the relevant groundwater zone is less than 25 percent of mean annual land surface recharge;

- (ii) a confined aquifer where the total volume of water allocated from the relevant groundwater zone is less than 25 percent of aquifer throughflow; or
- (iii) a source outside of the groundwater zones identified on Groundwater Map 1 of Appendix D, or a fractured rock aquifer, where the total volume of water applied for is less than 25 percent of the rainfall recharge over the relevant land area where the water is to be used.

The Council will restrict its discretion to the following matters:

- (i) any effects on aquifer storage volumes, existing bore or well yields, river and stream flows and wetland and lake water levels (stream depletion effects), and groundwater quality;
 - (ii) the efficiency of water use;
 - (iii) the need for the installation of a water measuring device;
 - (iv) the need for pump tests;
- (v) monitoring requirements

Discussion

The proposed groundwater abstraction and discharge to land is considered to have adverse effects that are no more than minor. As described above, the wash water will only contain sediments, with the majority of the sediment removed prior to discharge. The wash water will be irrigated to land when ground conditions are suitable using low rate irrigation that is currently consented. Due to the ponds only being emptied on a biannual basis, there is no great urgency to irrigate the wash water if ground conditions are not suitable. The applicant has contingency measures in place in the form of an additional storage pond and bunds around the existing ponds to prevent any potential overflow events.

There will be no increase in the volume of the groundwater abstraction. The abstraction has been undertaken from the same location for several years without any reported adverse environmental effects. The scale of the take is not unreasonable, and the recent installation of the telemetry data recording system is consistent with policies 21 and 22 of the Plan and the flow measurement regulations.

The report undertaken by Land and Water Science states that stream depletion has been assessed as having a low hydraulic connection. This is consistent with policies 29 and 31.

The activity is consistent with the objectives and policies of the Regional Water Plan, in particular, those relating to avoiding impacts on water quality. Land disposal is the best practicable option and consistent with Policy 4.

The assessment is that the proposed development is not contrary to, nor inconsistent with, the objectives and policies of the Regional Water Plan. It has been designed using best practice, and with consideration of the management practices that need to be put in place to ensure the plans objectives are met and any consents granted will be complied with.

Proposed Southland Water and Land Plan (decisions version)

The provisions of the Proposed Southland Water & Land Plan that are most relevant are as follows:

Objectives

- Objective 1 Land and water and associated ecosystems are managed as integrated natural resources, recognising the connectivity between surface water and groundwater, and between freshwater, land and the coast.
- Objective 2 Water and land is recognised as an enabler of primary production and the economic, social and cultural wellbeing of the region.
- Objective 4 Tangata whenua values and interests are identified and reflected in the management of freshwater and associated ecosystems.
- Objective 8
- (a) The quality of groundwater that meet both the Drinking-Water Standards for New Zealand 2005 (revised 2008) and any freshwater objectives, including for connected surface waterbodies, established under Freshwater Management Unit processes is maintained; and
 - (b) The quality of groundwater that does not meet Objective 8(a) because of the effects of land use or discharge activities is progressively improved so that:
 - (1) groundwater (excluding aquifers where the ambient water quality is naturally less than the Drinking Water Standards for New Zealand 2005 (revised 2008)) meets the Drinking Water Standards for New Zealand 2005 (revised 2008); and

- (2) groundwater meets any freshwater objectives and freshwater quality limits established under Freshwater Management Unit processes.

- Objective 11 The amount of water abstracted is shown to be reasonable for its intended use and water is allocated and used efficiently.
- Objective 12 Groundwater quantity is sustainably managed, including safeguarding the life-supporting capacity, ecosystem processes and indigenous species of surface water bodies where their flow is, at least in part, derived from groundwater.
- Objective 13 Enable the use and development of land and soils to support the economic, social, and cultural wellbeing of the region.
- Objective 13A The quantity, quality and structure of soil resources are not irreversibly degraded through land use activities or discharges to land.
- Objective 13B The discharges of contaminants to land or water that have significant or cumulative adverse effects on human health are avoided.
- Objective 14 The range and diversity of indigenous ecosystem types and habitats within dryland environments, rivers, estuaries, wetlands and lakes, including their margins, and their life-supporting capacity are maintained or enhanced.
- Objective 18 All activities operate in accordance with “good management practice” or better to optimise efficient resource use, safeguard the life supporting capacity of the region’s land and soils, and maintain or improve the quality and quantity of the region’s water resources.

Policies

- Policy 1 Enable papatipu rūnanga to participate Enable papatipu rūnanga⁴ to effectively undertake their kaitiaki (guardian/steward) responsibilities in freshwater and land management through the Southland Regional Council:
1. providing copies of all applications that may affect a Statutory Acknowledgement area, tōpuni (landscape features of special importance or value), nohoanga, mātaítai or taiāpure to Te Rūnanga o Ngāi Tahu and the relevant papatipu rūnanga;

2. identifying Ngāi Tahu interests in freshwater and associated ecosystems in Murihiku (includes the Southland Region);
3. reflect Ngāi Tahu values and interests in the management of and decision-making on freshwater and freshwater ecosystems in Murihiku (includes the Southland Region), consistent with the Charter of Understanding.

- Policy 2 Take into account iwi management plans Any assessment of an activity covered by this Plan must:
1. take into account any relevant iwi management plan; and
 2. assess water quality and quantity, taking into account Ngāi Tahu indicators of health.

Physiographic Zone Policies

- Policy 6 Gleyed, Bedrock/Hill Country and Lignite-Marine Terraces

In the Gleyed, Bedrock/Hill Country and Lignite-Marine Terraces physiographic zone, avoid, remedy, or mitigate adverse effects on water quality from contaminants, by:

1. requiring implementation of good management practices to manage adverse effects on water quality from contaminants transported via artificial drainage, and overland flow where relevant; and
2. having particular regard to adverse effects on water quality from contaminants transported via artificial drainage, and overland flow where relevant when assessing resource consent applications and preparing or considering Farm Environmental Management Plans.

- Policy 10 Oxidising

In the Oxidising physiographic zone, avoid, remedy, or mitigate adverse effects on water quality from contaminants, by:

1. requiring implementation of good management practices to manage adverse effects on water quality from contaminants transported via deep drainage, and overland flow and artificial drainage where relevant;
2. having particular regard to adverse effects on water quality from contaminants transported via deep drainage, and overland flow and artificial

drainage where relevant when assessing resource consent applications and preparing or considering management plans; and

3. decision makers generally not granting resource consents for additional dairy farming of cows or additional intensive winter grazing where contaminant losses will increase as a result of the proposed activity

Policy A4 Same as for RWP above.

Policy 13 Management of land use activities and discharges

1. Recognise that the use and development of Southland's land and water resources, including for primary production, enables people and communities to provide for their social, economic and cultural wellbeing.
2. Manage land use activities and discharges (point source and non-point source) to enable the achievement of Policies 15A, 15B and 15C.

Policy 14 Prefer discharges of contaminants to land over discharges of contaminants to water, unless adverse effects associated with a discharge to land are greater than a discharge to water. Particular regard shall be given to any adverse effects on cultural values associated with a discharge to water.

Policy 15A Where existing water quality meets the Appendix E Water Quality Standards or bed sediments meet the Appendix C ANZECC sediment guidelines, maintain water quality including by:

1. avoiding, remedying or mitigating the adverse effects of new discharges, so that beyond the zone of reasonable mixing, those standards or sediment guidelines will continue to be met; and
2. requiring any application for replacement of an expiring discharge permit to demonstrate how the adverse effects of the discharge are avoided, remedied or mitigated, so that beyond the zone of reasonable mixing those standards or sediment guidelines will continue to be met.

Policy B7 1. When considering any application, the consent authority must have regard to the following matters:

- (a) the extent to which the change would adversely affect safeguarding the life-supporting capacity of freshwater and of any associated ecosystem; and
 - (b) the extent to which it is feasible and dependable that any adverse effect on the life-supporting capacity of freshwater and of any associated ecosystem resulting from the change would be avoided.
2. This policy applies to:
- (a) any new activity; and
 - (b) any change in the character, intensity or scale of any established activity;

that involves any taking, using, damming or diverting of freshwater or draining of any wetland, which is likely to result in any more than minor adverse change in the natural variability of flows or level of any freshwater, compared to that which immediately preceded the commencement of the new activity or the change in the established activity (or in the case of a change in an intermittent or seasonal activity, compared to that on the last occasion on which the activity was carried out).

4. This policy does not apply to any application for consent first lodged before the National Policy Statement for Freshwater Management 2011 took effect on 1 July 2011.

Policy 21

Manage the allocation of surface water and groundwater by:

- 1. determining the primary allocation for confined aquifers not identified in Appendix L.5, following the methodology established in Appendix L.6;
- 2. determining that a waterbody is fully allocated when the total volume of water allocated through current resource consents and permitted activities is equal to either:
 - (a) the maximum amount that may be allocated under the rules of this Plan, or
 - (b) the provisions of any water conservation order;
- 3. enabling secondary allocation of surface water and groundwater subject to appropriate surface water environmental flow regimes, minimum lake and wetland

water levels, minimum groundwater level cutoffs or seasonal recovery triggers, to ensure:

- (a) long-term aquifer storage volumes are maintained; and
- (b) the reliability of supply for existing groundwater users (including those with existing resource consents for groundwater takes that have not yet been implemented) is not adversely affected;

- 4. when considering levels of abstraction, recognise the need to exclude takes for nonconsumptive uses that return the same amount (or more) water to the same aquifer or a hydraulically connected lake, river, modified watercourse or natural wetland.

Policy 22 Manage the effects of surface and groundwater abstractions by:

- 1. avoiding allocating water to the extent that the effects on surface water flow would not safeguard the mauri of that waterway and mahinga kai, taonga species or the habitat of trout and salmon;
- 2. ensuring interference effects are acceptable, in accordance with Appendix L.3; 3. utilising the methodology established in Appendix L.2 to:
 - (a) manage the effects of consented groundwater abstractions on surface waterbodies; and
 - (b) assess and manage the effects of consented groundwater abstractions in groundwater management zones other than those specified in Appendix L.5.

Policy 23 Manage stream depletion effects resulting from groundwater takes which are classified as having a Riparian, Direct, High or Moderate hydraulic connection, as set out in Appendix L.2 Table L.2, to ensure the cumulative effect of those takes does not:

- 1. exceed any relevant surface water allocation regime (including those established under any water conservation order) for groundwater takes classified as Riparian, Direct, High or Moderate hydraulic connection; or
- 2. result in abstraction occurring when surface water flows or levels are less than prescribed minimum flows or groundwater levels for takes classified as Riparian, Direct or High hydraulic connection.

Policy 40 When determining the term of a resource consent consideration will be given, but not limited, to:

1. granting a shorter duration than that sought by the applicant when there is uncertainty regarding the nature, scale, duration and frequency of adverse effects from the activity or the capacity of the resource;
2. relevant tangata whenua values and Ngāi Tahu indicators of health;
3. the duration sought by the applicant and reasons for the duration sought;
4. the permanence and economic life of any capital investment;
5. the desirability of applying a common expiry date for water permits that allocate water from the same resource or land use and discharges that may affect the quality of the same resource;
6. the applicant's compliance with the conditions of any previous resource consent, and the applicant's adoption, particularly voluntarily, of good management practices; and
7. the timing of development of FMU sections of this Plan, and whether granting a shorter or longer duration will better enable implementation of the revised frameworks established in those sections.

Policy 41 Consider the magnitude of environmental effects and risk when determining requirements for auditing and supply of monitoring information on resource consents.

Policy 42 When considering resource consent applications for water permits to take and use water:

1. except for non-consumptive uses, consent will not be granted if a water body is over allocated or fully allocated; or to grant consent would result in a water body becoming over allocated or would not allow an allocation target for a water body to be achieved within a time period defined in this Plan; and
2. except for non-consumptive uses, consents replacing an expiring resource consent for an abstraction from an over-allocated water body will generally only be granted at a reduced rate, the reduction being proportional to the amount of over-allocation and previous use, using the method set out in Appendix O; and
3. installation of water measuring devices will be required on all new permits to take and use water and on existing permits in accordance with the

Resource Management (Measurement and Reporting of Water Takes) Regulations 2010; and

4. where appropriate, minimum level or flow cut-offs and seasonal recovery triggers on resource consents for groundwater abstraction will be imposed; and
5. conditions will be specified relating to a minimum flow or level, or environmental flow or level regime (which may include flow sharing), in accordance with Appendix K, for all new or replacement resource consents (except for water permits for non-consumptive uses, community water supplies and water bodies subject to minimum flow and level regimes established under any water conservation order) for:
 - (a) surface water abstraction, damming, diversion and use; and
 - (b) groundwater abstraction in accordance with Policy 23

Rules

Rule 39

Other agricultural effluent disposal

(a) The discharge of agricultural effluent, water containing contaminants from vegetable or bulb washing sludge, stationary agricultural dips, mobile sheep dips and spray dips onto or into land in circumstances where contaminants may enter water, other than as provided for in Rules 32A to 38, is discretionary activity.

Rule 54

Abstraction and use of groundwater

.....

- (d) Other than as provided by Rules 54(a), 54(b), 54(c) and 54(ca) the take and use of groundwater from groundwater management zones listed in Appendix L.5 is a discretionary activity provided the following conditions are met:
 - (i) the total volume of authorised groundwater abstraction is within the primary allocation limits established in Appendix L.5; and
 - (ii) if the degree of hydraulic connection, calculated in accordance with Appendix L.2 Table L.2. is Riparian, Direct, High or Moderate the relevant surface water minimum flows and allocation limits specified in Table L.2 are complied with; and

- (iii) any interference effects are 'acceptable' in accordance with Appendix L.3; and
 - (iv) minimum groundwater level cut-offs and seasonal recovery triggers are established in accordance with criteria outlined in Appendix L.6.
- (e) Other than as provided by Rules 54(a), 54(b), 54(c) and 54(ca) the take and use of groundwater from a confined aquifer is a discretionary activity provided the following conditions are met:
 - (i) the total volume of authorised groundwater abstraction is within the primary allocation limits (including minimum water level cut-offs and seasonal recovery triggers) established in Appendix L.5 or following the methodology outlined in Appendix L.6; and
 - (ii) any interference effects are 'acceptable' in accordance with Appendix L.3.
- (f) Other than as provided by Rules 54(a), 54(b) and 54(c) and 54(ca) the take and use of groundwater outside the groundwater management zones listed in Appendix L.5 is a discretionary activity provided the following conditions are met;
 - (i) the total volume of authorised groundwater abstraction is within the primary allocation limit established following the methodology outlined in Appendix L.7; and
 - (ii) any interference effects are 'acceptable' in accordance with Appendix L.3.
- (g) The take and use of groundwater that does not comply with Rules 54(b) to 54(f) is a non-complying activity.

Discussion

This application is not contrary to or inconsistent with any of the objectives and policies in the PSWLP. This activity is consistent with Objectives 13 and 18, which are the most relevant, particularly in regard to the use of "good (environmental) management practices" (from Objective 18). The mitigation measures in place address the issues under Policies 6 and 10 in regard to the physiographic zone. The activity is consistent with, and gives effect to, Policies 13 and 14 through appropriate mitigation measures.

The specialist groundwater report obtained from Land and Water Science to assess the potential effects of the groundwater abstraction, addresses the allocation, interference effects and stream depletion as outlined in policies 21, 22 and 23.

The discharge is a discretionary activity under the pSWLP, with the relevant rule being operative. The proposed groundwater abstraction is discretionary under both the pSWLP and RWP, although the rule in the former is currently under appeal.

Similar considerations to those for the RWP apply, though the provisions of the pSWLP are considered to be more up to date. The decisions on the submissions have been released with a number of objectives, policies and rules related to this activity subject to appeal, so the most weight is still put on the operative RWP. However, for this type of activity, consideration of the application under either is likely to have the same outcome. The application is consistent with the objectives and policies of both the Regional Water Plan and the Proposed Southland Water & Land Plan.

Policy 40 is relevant to the setting of the consent term. In regard to each of the matters to be considered, the following comments are made to support a term of 20 years:

1. the level of uncertainty relating to this activity is very low. This type of treatment system and method of disposal is considered to be best practice for treatment and disposal of vegetable wash water;
2. each of the indicators of health are not listed here but the activities are not considered to be affected by the discharge. The indicators are mostly relevant to surface water;
3. please refer to application documentation;
4. the site has been in operation for the past 40 years and plays a large part in the local economy. The investment of infrastructure on this site over the years has been considerable along with careful maintenance and management. The method of disposal is in line with industry guidelines issued by Horticulture New Zealand that are specific to this activity. The investment has been significant and a term that enables security of that investment is appropriate and reasonable;
5. common expiry dates have not been applied to this area or these activities, and is not a matter to be considered in this case;
6. a copy of the previous compliance history is appended, with no significant non-compliance identified. The applicant has been proactive in installing telemetry on the groundwater take before it has become a requirement by way of consent condition. With appropriate management and maintenance, many systems similar to this have proven to be robust and reliable; and
7. the timing is unknown but it is unlikely that this scale of activity will cause any issue with the implementation of the FMU's.

11. Conclusion

Pyper's Produce Ltd is seeking replacement consents to enable it to continue discharging vegetable wash water and abstracting water groundwater for use at its vegetable washing plant located at Branxholme. The overall assessment of the potential impact on the environment from these activities are that they will be no more than minor.

The proposal is based on using best practice for the management of the operation and the disposal of vegetable wash water from the onsite processing plant. Soakage infiltration and the discharge via irrigation to land during times when accumulated sediment removal will occur, will minimise the risk of an incident having an adverse environmental effect.

A specialist groundwater assessment has been undertaken to assess the potential effects of the groundwater abstraction. Based on information provided in the report from Land and Water Science, it is likely that the abstraction will have no more than minor adverse effects on other groundwater users and surface water ways. The interference assessment indicated that there will be negligible drawdown of groundwater level in neighbouring bores, and the stream depletion analysis suggests that connection of the bore to Tomoporakau Creek is low, with an estimated 80% return of abstracted groundwater to the aquifer via soakage pits. It is therefore considered that the effect of the groundwater abstraction on the environment will be less than minor.

I therefore submit that this application can be processed without notification and be granted.

Part A Application Form

Includes Certificate of Incorporation



Application for Resource Consent (PART A)

This application is made under Section 88 of the Resource Management Act 1991



The purpose of this Part A form and the relevant Part B form(s) is to provide applications with guidance on information that is required under the Resource Management Act 1991. Please note that these forms are to act as a guide only, and Environment Southland reserves the right to request additional information.

To: Environment Southland
Private Bag 90116
Invercargill 9840

Full name, address and contact details of applicant (in whose name consent is to be issued)

Name: Pyper's Procude Ltd

Address: 1035 Lochiel Braxholme Road, RD4, Invercargill

Email: brendan@pypers.co.nz

Phone: 027 535 4001 03 221 7277 Fax: _____
Preferred Additional

Consultant contact details (if different from above)

Contact name/agent: Bonisch Environmental C/- Bridgett Aitken

Address: PO Box 1262 Invercargill 9840

Email: bridgett@bonisch.nz

Phone: 03 218 2546 _____ Fax: _____
Preferred Additional

Please tick the box for the consent(s) you are applying for and complete the relevant Part B form(s) where available:

Land Use	Discharge	Coastal
<input type="checkbox"/> Bore/well	<input type="checkbox"/> To air	<input type="checkbox"/> Whitebait stand
<input type="checkbox"/> New or expanded dairy farming	<input type="checkbox"/> To water	<input type="checkbox"/> Structures/occupation of space
<input type="checkbox"/> Effluent storage	<input checked="" type="checkbox"/> To land	<input type="checkbox"/> Removal of natural materials
<input type="checkbox"/> Cultivation	Water	<input type="checkbox"/> Disturb foreshore/seabed
<input type="checkbox"/> Tree planting	<input type="checkbox"/> Take and use surface water	<input type="checkbox"/> Discharge/deposit substances
<input type="checkbox"/> Gravel extraction	<input checked="" type="checkbox"/> Take and use groundwater	<input type="checkbox"/> Commercial surface water activity
<input type="checkbox"/> Feed-pad, wintering pad, calving pad or silage pad	<input type="checkbox"/> Dam water	<input type="checkbox"/> Reclaim/drain foreshore/seabed
<input type="checkbox"/> Riverbed activity	<input type="checkbox"/> Divert water	<input type="checkbox"/> Marine farming
<input type="checkbox"/> Bridges and culverts		<input type="checkbox"/> Other coastal activities

1 Are there any **current** or **expired** consents relating to this proposal?

Yes No

If yes, please provide consent number(s) and description:

Water Permit 205659 and Discharge Permit 205660-V1

2 Are any other consents required from Environment Southland or other authorities?

Yes No

If yes, please state the relevant authority and the type of consent(s) required:

3 For what **purpose** is this consent(s) required: (e.g. discharge of effluent, gravel extraction etc.)

To take groundwater and discharge washwater to land from a vegetable washing operation

4 **Location** of proposed activity

Address: 1035 Lochiel Branxholme Road

Legal Description: lot 1 DP 3692

Map Reference (NZTM 2000): _____ E _____ N

5 The name and address of the **owner /occupier**: (if other than the applicant)

Name: _____ Phone: _____

Address: _____

6 Please attach a map or a coloured aerial photograph, showing at a minimum, the location of the proposed activities.

7 Assessment of effects on the environment (AEE)

Please complete the applicable Part B form(s) for the proposed activities. For those activities where no Part B form is available, please attach a written statement that assesses the effects that your activities may have on the environment. An assessment of effects **must** include the following information:

- (a) *if it likely that the activity will result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity;*
- (b) *an assessment of the actual or potential effect on the environment of the activity;*
- (c) *if the activity includes the use of hazardous substances and installations, an assessment of any risks to the environment that are likely to arise from such use;*
- (d) *if the activity includes the discharge of any contaminant, a description of—*
 - (i) *the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and*
 - (ii) *any possible alternative methods of discharge, including discharge into any other receiving environment;*
- (e) *a description of the mitigation measures (safeguards and contingency plans where relevant) to be undertaken to help or prevent or reduce the actual or potential effect;*
- (f) *identification of the persons affected by the activity, any consultation undertaken, and any response to the views of any persons consulted;*
- (g) *if the scale and significance of the activity's effects are such that monitoring is required, a description of how and by whom the effects will be monitored if the activity is approved;*
- (h) *if the activity will, or is likely to, have adverse effects that are more than minor on the exercise of a protected customary right, a description of possible alternative locations or methods for the exercise of the activity (unless written approval for the activity is given by the protected customary rights group).*

You should also include:

- (a) *an assessment of the activity against any relevant provisions of any relevant objectives, policies, or rules;*
- (b) *any information specified to be included in the application in accordance with the relevant regional plan;*
- (c) *for an application to replace an existing consent, an assessment of the value of the investment of the existing consent holder:*

An assessment of effects **must** address the following matters:

- (a) *any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects;*
- (b) *any physical effect on the locality, including any landscape and visual effects;*
- (c) *any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity;*
- (d) *any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations;*
- (e) *any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants;*
- (f) *any risk to the neighbourhood, the wider community, or the environment through natural hazards or the use of hazardous substances or hazardous installations.*

8 Affected Parties

Please attach written approval from parties who may be affected by your activity. *Written Approval of an Affected Party* forms are available on the Environment Southland website. During the processing of your application, Council may determine that additional approvals are required.

9 Correspondence from Council when using a consultant

It is standard practice that both you and your consultant are copied into all correspondence relating to the consent process. This is so that you know what is going on with your application. Please let us know below if you would like us to only contact your consultant. This means you will only hear from us when your application is/is not accepted, when a decision is made or if we feel that you need to be contacted.

I want all correspondence about my application to go to my consultant only Yes No

10 Site visit from the Consents Team

Consents staff are able to meet with you, visit your site and see what you are proposing to do. We find that this is beneficial to everyone involved. The cost of the visit will be included in the total cost of processing your consent. However, we find that applications that have an on-site visit are processed with less congestion and at a similar or lesser overall cost. Please let us know below if you would like us to come and see your site.

I would like a member of the Consents Team to visit my site Yes No

11 How much will it cost to process my application?

The cost of a consent depends on the complexity of the activities. Staff time is charged out at a rate of \$145/hr and vehicle use for site visits is charged at \$0.73/km (inclusive of GST).

The fees shown below under section two are **deposits to be paid at the time of application**. Due to the complexity of these activities, this deposit will not usually cover the full cost of processing the application. **Further costs may be incurred** relating to staff time, disbursements, legal charges, consultation fees, and hearing commissioner fees. Environment Southland’s User Charges and Fees document is available at:

www.es.govt.nz/fees-and-charges

When the consent has been processed you will receive an invoice for an additional fee, or for a refund.

The Council’s user charges are fixed under Section 36 of the Resource Management Act 1991. Our fee schedule is:

1. Fixed fee:	
Bores and wells	\$290
Whitebait stand	\$220
2. Deposit:	
All other non-notified applications including: <ul style="list-style-type: none"> • Certificates of compliance • Changes to consent conditions (variations) • Change of lapse date 	\$1,500
Applications that require notification or limited notification	\$2,000

How to pay

Environment Southland accepts payment in the forms of cash, Eftpos, cheque, or electronic transfer. All electronic transfers must include the applicant's name and "consent application" as a reference. Please make electronic payments to: Environment Southland, 01-0961-0018998-00.

User Charges

Please note that additional Annual User Charges will apply to all consents. These are payable in advance on the first day of July each year. Tables 4, 5 and 6 of the Environment Southland User Charges and Fees Schedule outlines the fees associated with Annual Administration Charges and Annual Consent Monitoring and Inspection Charges. Table 7: Annual Research and Monitoring Charges applies only to surface and groundwater takes and comprises the following:

- **Surface water takes (per consent, for volumes up to 50,000 m³/day):**
 - A charge of **\$1.89** per year per cubic metre authorised as a maximum daily take.
 - Minimum of **\$138**, maximum of **\$7,585**.
- **Surface water takes (per consent, for volumes over 50,000 m³/day):**
 - **\$0.0031** per cubic metre authorised as a maximum daily take.
- **Groundwater takes (per consent):**
 - A charge of **\$0.89** per year per cubic metre.
 - Minimum of **\$162**, maximum of **\$1,782**.

Municipal and stock water discount (of 50%) no longer applies.

12 Checklist: Have you included the following?

- | | |
|-------------------------------------|---|
| <input type="checkbox"/> | Payment of the required deposit (see fee schedule) <i>paid electronically</i> |
| <input checked="" type="checkbox"/> | Written approval from all potentially affected parties (forms available from the Environment Southland website) |
| <input checked="" type="checkbox"/> | Site plan/location map/sketch of the proposed activity |
| <input checked="" type="checkbox"/> | A copy of the Certificate of Incorporation (where applicant is a company) |
| <input checked="" type="checkbox"/> | Part B form(s) specific to your activity and/or a separate assessment of environmental effects (AEE) |

Note:

(a) If your application does not contain the necessary information and the appropriate fee, Environment Southland must return the application.

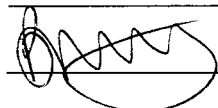
Signature of applicant

I hereby certify that to the best of my knowledge and belief, the information given in this application is true and correct.

I undertake to pay all actual and reasonable application processing costs incurred by Environment Southland.

Name (block capitals) BRIDGETT AITKEN

Signed



Date

30/11/19

(Signature of applicant or person authorised to sign on behalf of applicant)

Certificate of Incorporation

PYPER'S PRODUCE LIMITED

1969735

NZBN: 9429033226361

This is to certify that PYPER'S PRODUCE (2007) LIMITED was incorporated under the Companies Act 1993 on the 27th day of July 2007 and changed its name to PYPER'S PRODUCE LIMITED on the 1st day of August 2007.



Registrar of Companies
22nd day of January 2019



Part B Application Form
Discharge Permit



Application to Discharge to Land (PART B) (non-dairy activity)



This application is made under Section 88 of the Resource Management Act 1991

A complete Part A form needs to be provided with this Part B form. The purpose of this Part B form is to provide applicants with guidance on information that is required under the Resource Management Act 1991. These forms are to act as a guide only and Environment Southland reserves the right to request additional information. **Please also refer to Appendix A of the Regional Water Plan for Southland, 2010 and the proposed Southland Water and Land Plan, 2018.**

To: Environment Southland
Private Bag 90116
Invercargill 9840

1 What is this application for?

- The discharge of contaminants to land where it may enter water
- The discharge of contaminants to land

2 What duration of resource consent is sought? _____ 20 _____ years

3 Please describe the proposed activity:

The irrigation of vegetable wash water, from settling ponds to land using pod irrigation.

Please refer to attached information.

4 Please describe the following elements of the proposed discharge to land:

(a) The chemical content (including heavy metals or toxic substances, nitrates, ammonia and dissolved reactive phosphorous)

Vegatable wash water.
Sample results of wash water attached.

(b) Number of discharge points _____

(c) Location/area of each discharge point Please refer to attached information

(d) Maximum rate/thickness of application _____

(e) If the proposed discharge is continuous or intermittent Intermittent

- 5 What is the proposed frequency and seasonality of discharge (e.g. hours, days, weeks and months that the discharge will occur). Please describe any variations, where appropriate.

Irrigation is undertaken during the summer months of Dec-Feb to remove water prior to undertaking the removal of sediment from the ponds.

Please refer to attached information.

- 6 Has there been any discharge monitoring carried out in relation to this proposal, or do you have access to any background monitoring? If yes, please describe and attach results.

The applicant has provided the results of a sample of wash water.

A copy of these sample results are attached

- 7 What is the depth to groundwater beneath the disposal area? Please also discuss seasonal variations in groundwater depth.

Based on bore records located on beacon, the initial water level ranges from 6-10m in this area. It is unlikely that the proposed discharge onto land will have a more than minor effect on groundwater in this area.

- 8 Has a subsoil investigation been carried out? Yes No

Note: All bore holes and test pits should be drilled in the location of the proposed disposal field and/or reserve area and their location marked on the appended site plan. Generally a minimum of three bore holes or test pits are required for soil category assessment. A separate resource consent may be required for your investigative bore(s).

9 Please provide details of the investigation bore(s)/test pits.

<input type="checkbox"/>	Test pit (maximum depth) _____ m	No of test pits _____
<input type="checkbox"/>	Bore hole (maximum depth) _____ m	No of bore holes _____
<input type="checkbox"/>	Other (specify)	
<input type="checkbox"/>	N/A	

10 Has percolation or soil infiltration testing been carried out and is the test report attached?

<input checked="" type="checkbox"/>	No
<input type="checkbox"/>	Yes, please specify method

K value: _____

11 What is the discharge site soil category (based on the dominant soil type in the first 1 m depth)?

Soil Category	Description	Tick
1	Gravels and sands	
2	Sandy loams	
3	Loams	
4	Clay loams	
5	Light clays	
6	Medium to heavy clays	

See soil map and soil data sheets appended for more information.

Existing Environment

12 Are any of the following features found within the existing environment of the proposed activity? Describe these features in the space below, along with details of the assessment undertaken to determine the presence of these features.

	Yes	No
(a) Signs of instream life (e.g. fish, eels, bullies, crayfish, native birds, frogs)?		X
(b) Areas where food is gathered from watercourses (e.g. watercress, eels, wildfowl)?		X
(c) Wetlands, wildlife habitats or bird nesting habitats (e.g. swamp areas)?		X
(d) Other activities occurring in the area (e.g. commercial activity, fishing, swimming, boating)?		X
(e) Areas of particular aesthetic, cultural or scientific value (e.g. archaeological sites)?		X
(f) Other waste discharges, any water takes and/or monitoring sites?	X	

A monitoring bore (E46/1007) is located within the discharge area and has been monitored during the term of the current consent.

The Tomoporakau Creek is located to the west of the infiltration ponds.

The abstraction of groundwater also occurs on this site. An application for the groundwater abstraction is included in the attached documents.

Please refer to attached information

Please also include a map or site plan (and photographs if necessary) showing the location of roads and property boundaries, water bodies, wetlands and other wildlife habitats, buildings and residential properties, location of discharge points, any registered drinking water takes, and the location of any sensitive sites (e.g. historic places, sites of importance to iwi, public gathering areas etc.) in proximity to the site.

Assessment of Effects

- 13 Please describe any possible long term or short term effects the discharge may have on the quality of the receiving environment and including effects on water bodies, biota (plant and animal life), soil quality, and odour and dust effects.**

Please refer to attached information

- 14 Pursuant to Schedule 4 of the Resource Management Act, 1991, there are a number of matters that must be addressed by an assessment of environmental effects. Please discuss what effects the proposed activity will have on the following:**

- (a) any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects

The impact on the wider community is considered to be less than minor. The activity of discharging wastes to land is common on dairy farms, of which there are a number in the immediate area.

The wash water is not odorous and it is operated in such away that effects on water are at least minor, if not less than minor. The company is not aware of any concerns from the landowner, neighbours or any others in the community.

The business is a long-standing one, having operated on this site for many years. It provides work for a number of people in the wider area, and is a part of the local and regional economy.

There are no known archeological or cultural sites that are affected by this existing activity.

(b) any physical effect on the locality, including any landscape and visual effects

The wash water irrigation is visible but relatively unobtrusive and consistent with the rural environment it is in.

There are no physical effects associated with the activity.

(c) any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity

No effects on ecosystems specific to this activity. It is acknowledged that there are cumulative effects on water quality from all land use activities but using best practice, the effects from discharging wash water have been sufficiently mitigated.

(d) any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations

No effects on these matters

(e) any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants

The effects of the discharge are addressed above and in the supporting information appended.

There is no unreasonable emission of noise from this activity - the discharge itself is not a noisy activity.

The noise limits for the Rural Zone, as specified in the Southland District Plan, will be complied with.

- (f) any risk to the neighbourhood, the wider community, or the environment through natural hazards or the use of hazardous substances or hazardous installations

No risk from these matters

- 15 Please include a description of the monitoring or mitigation measures (including safeguards and contingency plans where relevant) to be undertaken to help avoid, reduce, remedy or mitigate the actual or potential effects on environmental features and values. For example, if relevant, please include the following:**

- (a) treatment of the contaminants prior to discharge;
- (b) buffer distances from water bodies, sloping land, site boundaries;
- (c) details of any storage to be provided to enable deferred irrigation;
- (d) a description of the monitoring system to be used for checking and recording the quality and quantity of the discharge. Please include how and when the monitoring will occur, and by whom; and
- (e) contingency planning – describe how the equipment controlling the discharge will be operated and maintained to prevent equipment failure, and what measures will be implemented to ensure that the effects of any malfunction are remedied.

Please refer to attached information

16 Please justify the term of consent sought with regard to any effects on the environment.

The 20 year term applied for is appropriate because of the minor scale and nature of the discharge, and the extent of the mitigation that is provided, that ensures the overall impact is no more than minor. The washing of produce is an integral part of the horticulture industry and will continue to be required for the foreseeable future.

Because the disposal of the wash water meets the best practice requirements, a 20 year term is considered to be reasonable and appropriate. Further discussion on this matter can be found in the policy consideration.

17 Please include a description of any possible alternative locations or methods for undertaking the activity and why these alternatives have not been selected.

Please refer to attached information

18 Please include evidence of any consultation undertaken for this application. This may include (but not be limited to) consultation with adjoining landowners, other consent holders in the immediate area, iwi (e.g. Te Rūnanga O Ngāi Tahu, Te Ao Marama Inc), government departments/ministries (e.g. DOC), territorial authorities and recreational associations.

Please note that in accordance with Schedule 4 of the RMA, you may also be required to provide an assessment of whether or not the proposed activity is contrary to any of the relevant provisions of the following documents.

- (a) Regional Policy Statement for Southland, 2017 (and any proposed/subsequent versions)*
- (b) Regional Water Plan for Southland, 2010 (and any proposed/subsequent versions)*
- (c) proposed Southland Water and Land Plan, 2018 (and any proposed/subsequent versions)*
- (c) National Policy Statement for Freshwater Management, 2014*
- (d) National Environmental Standard for Sources of Human Drinking Water, 2007*

Staff are able to advise whether this is required, as it is dependant on the location, scale and complexity of your proposal. We invite you to come in for a pre-application meeting with Environment Southland consents staff to discuss this.

END OF FORM

Part B Application Form
Water Permit



Application for a Water Permit (PART B) - To Take and Use Groundwater



This application is made under Section 88 of the Resource Management Act 1991

A complete Part A form needs to be provided with this Part B form. The purpose of this Part B form is to provide applicants with guidance on information that is required under the Resource Management Act 1991. These forms are to act as a guide only and Environment Southland reserves the right to request additional information. **Please also refer to Appendix A of the Regional Water Plan for Southland, 2010 AND Appendix L of the proposed Southland Water and Land Plan 2018 .**

User Charges: Please note that annual User Charges will apply to all water permits. Schedule 6 of Environment Southland’s User Charges and Fees document outlines the Annual Research and Monitoring Charges, which you should consider before applying for a water permit. Please refer to www.es.govt.nz/resource-consent/fees for more information on annual user fees and charges.

To: Environment Southland
Private Bag 90116
Invercargill 9840

1 What is this application for?

a new groundwater take the renewal of existing consent no: 205659

2 What duration of resource consent is sought?

20 years

3 For what purpose(s) will the water be used?

Stock water and/or dairy shed use Irrigation Community supply Commercial/industrial
 Other

If other, please describe:

For vegetable washing purposes

4 Please provide details of the bore(s) from which you wish to take water. If you do not have an existing bore, you will need to apply for a consent to construct a bore before you apply to take groundwater. Please refer to the relevant Part B form.

Bore 1: NZTM 2000	<u>1238240</u>	E	<u>4863387</u>	N	Bore number:	<u>E46/0489</u>
Bore 2: NZTM 2000	E	N	Bore number:

	Bore depth (m)	Screen depth (m)	Diameter (mm)	Pump type	Pump capacity (l/s)
Bore 1	16m	15m	200mm		11 l/sec
Bore 2					

5 How much water do you propose to take and at what rate will it be taken?

Maximum rate of take 11 litres per second

Maximum daily volume 380 cubic metres per day

Maximum weekly volume 1,900 cubic metres per week

Maximum monthly volume 7,600 cubic metres per month

Maximum annual volume 91,200 cubic metres per year

6 What is the frequency of the proposed water take?

How many hours per day (maximum)? 10

How many days per week (maximum)? 5

How days per month (maximum)? 20

7 Please state the name of the aquifer that you propose to take water from.

Lower Oreti

8 Do you intend to store your water before subsequent use?

If yes, what/how much storage will be 140 m³ provided?

What type of storage facilities are proposed? Existing water storage tanks

You may need a building permit and/or additional resource consents for the construction of storage facilities.

9 **What type of water metering system is installed or proposed to be installed?** Environment Southland prefers all takes for 5 l/s or more to be fitted with telemetry to report in line with the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010.

Water meter

Data logger

Telemetry

Telemetry has already been installed and access can be provided upon request.

10 **If you propose to use water for stock and/or dairy shed use – please answer the following:**

(a) What type of animal and numbers of stock will be supplied with water for drinking?

<input type="checkbox"/>	Sheep	Number	Water required:	litres/head/day
	:	_____	_____	
<input type="checkbox"/>	Beef cattle	Number	Water required:	litres/head/day
	:	_____	_____	
<input type="checkbox"/>	Dairy cows	Number	Water required:	litres/head/day
	:	_____	_____	
<input type="checkbox"/>	Other	Number	Water required:	litres/head/day
	:	_____	_____	

(b) How much water do you require for your dairy shed? _____ litres/head/day

11 **If you propose to use water to irrigate land – please answer the following:** N/A

(a) How many hectares of land will be irrigated? _____

(b) What is the soil type(s) of the land being irrigated _____

(c) What will you be irrigating (i.e. crop, pasture etc)? _____

(d) What type of irrigation system will be used? _____

(e) What is the target application rate (mm/day and mm/year)? _____

(f) How have you calculated the amount of water you need? (attach separate pages if required)

12 If you propose to use water for industrial use – please answer the following:

(a) What type of industry will be using the water and how will the water be used?

Horticulture. For a large scale vegetable washing plant

(b) How have you calculated the amount of water you need? (attach separate pages if required)

Please refer to Q5 and attached information

13 If you propose to use water for commercial/domestic supply – please answer the following:

N/A

(a) What type of establishment will use the water?

	Households – number of households to be supplied:	_____
	Camping grounds – maximum number of visitors and staff per year:	_____
	Schools – maximum number of students and staff per year:	_____
	Motel units – number and expected occupancy:	_____
	Other:	_____

(b) How have you calculated the amount of water you need? (attach separate pages if required)

14 If you propose to use water for any other purpose, please describe the amount of water you will need and how this has been calculated (please attach a separate sheet to this application, if necessary).

Please refer to attached information

- 15 Please describe any other sources of water available for the property. Describe how much water is available and what it is used for.

Rainwater collection and surface water are present on the property. Rainwater is used for drinking water/ domestic use on site.

Based on the large volume of water required to run the washing plant year round, the volume of water available from alternative sources is unreliable and insufficient

- 16 Please also describe any measures you are proposing to minimise wastage of water and maximise its efficient use:

Please refer to attached information

- 17 Does your proposed water take have any associated discharges? If yes, please describe.

Yes

No

Please note that a discharge into the environment may require a resource consent application to be made specifically for the discharge (please refer to the relevant Part B form).

The discharge of sediment laden wash water to land through soakage and irrigation.

Please refer to attached information.

Existing Environment

18 Are any of the following features found within the existing environment of the proposed activity? Describe these features in the space below, along with details of the assessment undertaken to determine the presence of these features.

- (a) Signs of instream life (e.g. fish, eels, bullies, crayfish, native birds, frogs)?
- (b) Areas where food is gathered from a water body (e.g. watercress, eels, wildfowl)?
- (c) Wetlands, wildlife habitats or bird nesting habitats (e.g. swamp areas)?
- (d) Other activities occurring in the area (e.g. commercial activity, fishing, swimming, boating)?
- (e) Areas of particular aesthetic, cultural, heritage or scientific value (e.g. archaeological sites)?
- (f) Waste discharges and/or monitoring sites?
- (g) Other water takes?
- (h) Surface water bodies? Natural springs?

Yes	No
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>

No, not in the immediate vicinity of the groundwater abstraction.

Please refer to attached information

Please also include a map or aerial photograph showing the following:

- the location(s) of the existing points of take;
- the location of proposed points of take(s);
- the location of water measuring device(s);
- the total property area boundary;
- the area(s) to be irrigated (if relevant);
- the area(s) of community supply (if relevant);
- distances to any discharge activities;
- other surface water bodies and wetlands nearby and the distance from the point of take(s) to them;
- the coastline and the distance to it (if relevant);
- the location of any dairy sheds (if relevant).

Assessment of Effects

19 Will the take and use of groundwater have any effects on the following:

- (a) Aquifer storage volumes
- (b) Existing bore or well yields
- (c) River and stream flows, including minimum flows and allocation levels
- (d) Wetland and lake water levels
- (e) Groundwater quality

Yes	No
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>

*For those answered **No** above, please describe why there will be no effects. For those answered **Yes**, please describe how these effects may occur.*

Please refer to attached information and the technical report prepared by Land and Water Science.

20 Pursuant to Schedule 4 of the Resource Management Act, 1991, there are a number of matters that must be addressed by an assessment of environmental effects. Please discuss what effects the proposed activity will have on the following:

- (a) any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects

Please refer to attached information

- (b) any physical effect on the locality, including any landscape and visual effects

The water abstraction is from groundwater.

There are no physical effects associated with the activity.

- (c) any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity

No effects on ecosystems specific to this activity.

Please refer to attached information

- (d) any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations

No effects on these matters

- (e) any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants

Please refer to attached information

- (f) any risk to the neighbourhood, the wider community, or the environment through natural hazards or the use of hazardous substances or hazardous installations

No risk from these matters

- 21 Please include a description of the monitoring or mitigation measures (including safeguards and contingency plans where relevant) to be undertaken to help avoid, reduce, remedy or mitigate the actual or potential effects on environmental features and values.**

Please refer to attached information

- 22 Please include a description of any possible alternative locations or methods for undertaking the activity and why these alternatives have not been selected.**

This has been discussed in question 15 above.

Please refer to attached information

- 23 Please include evidence of any consultation undertaken for this application. This may include (but not be limited to) consultation with adjoining landowners, other consent holders in the immediate area, iwi (e.g. Te Rūnanga O Ngāi Tahu, Te Ao Marama Inc.), government departments/ministries (e.g. DOC), territorial authorities and recreational associations.**

- 24 Appendix A of the Regional Water Plan for Southland, 2010, details the level of further assessment required as part of your application. This may include the following assessments (please attach as a separate report):**

- interference effects/drawdown;
- radius of influence;
- stream depletion effects;
- an assessment of the dynamic aquifer response to abstraction.

- 25 Appendix L of the proposed Southland Water and Land Plan, 2016, details the level of further assessment required as part of your application. This may include the following assessments (please attach as a separate report):**

- aquifer test requirements;
- stream depletion effects;
- interference effects;
- calculation of seasonal groundwater allocation;
- establishing allocation volumes for confined aquifers.

Please note that in accordance with Schedule 4 of the RMA, you may also be required to provide an assessment of whether or not the proposed activity is contrary to any of the relevant provisions of the following documents.

(a) Regional Policy Statement for Southland, 1997

(b) Southland Regional Policy Statement, 2017 (and any proposed/subsequent versions)

(c) Regional Water Plan for Southland, 2010

(d) Proposed Southland Water and Land Plan, 2018 (and any proposed/subsequent versions)

(e) National Policy Statement for Freshwater Management, 2014

(f) National Environmental Standard for Sources of Human Drinking Water, 2007

(g) Resource Management (Measurement and Reporting of Water Takes) Regulations, 2010

Staff are able to advise whether this is required, as it is dependant on the location, scale and complexity of your proposal. We invite you to come in for a pre-application meeting with Environment Southland consents staff to discuss this.

END OF FORM

Appendix 1

Site Plan



- NOTES:
- All areas and dimensions are subject to final survey.
 - Boundary data is sourced from Land Information New Zealand Landonline GIS and is indicative only.
 - Aerial imagery has been sourced from the LINZ Data Service and licensed by The Southland Consortium for re-use under the Creative Commons Attribution 4.0 International licence.
 - Aerial imagery is indicative only.

LOCHIEL BRANXHOLME ROAD

Abstraction Bore
E46/0489

Existing Pond

Existing Pond

Existing Pond

Monitoring Bore
E46/1007

Last Edited by: Chas on 05/02/2019 8:38:53 AM

REV	REVISION DETAILS
A	Draft - for client comment
B	Consent Issue

DRN	CHK	APP	DATE
CHM	BVA	BVA	30/01/2019
CHM	BVA	BVA	05/02/2019

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environmental

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19 The Crescent, P.O. Box 1262, Invercargill 9840
john@bonisch.co.nz
www.bonischenvironmental.nz

CLIENT:
PYPER'S PRODUCE

PROJECT:
**RESOURCE CONSENT APPLICATION,
RYAL BUSH WALLACETOWN ROAD,
BRANXHOLME, SOUTHLAND**

SHEET TITLE:
**PYPERS PRODUCE LIMITED
POND LAYOUT PLAN**

SURVEYED:	SCALE
	(ORIGINAL SIZE A1) 1:1,000
DESIGNED:	DATE ISSUED
DRAWN: CHM 25/01/2019	05/02/2019
DRAWING CHECK: BVA 30/01/2019	JOB NO SHEET REV.
DESIGN CHECK:	6544 1 of 1 B
APPROVED: BVA 30/01/2019	

Appendix 2

Disposal Areas Plan



See right for 'Collinson-Ryal Bush' Site Plan

- NOTES:
- All areas and dimensions are subject to final survey.
 - Boundary data is sourced from Land Information New Zealand Landonline GIS and is indicative only.
 - Aerial imagery has been sourced from the LINZ Data Service and licensed by The Southland Consortium for re-use under the Creative Commons Attribution 4.0 International licence.
 - Aerial imagery is indicative only.

COLLINSON ROAD

RYAL BUSH WALLACETOWN ROAD

BREEZE ROAD

See below for 'Lochiel-Ryal Bush' Site Plan

SITE LOCALITY PLAN
NTS

LOCHIEL BRANXHOLME ROAD

RYAL BUSH SCHOOL ROAD

Sec 4 SO 11880
Frances Ellen Russell,
Holly Frances Flannery,
Ken Russell

Pt Sec 15 Blk III New River HUN
Frances Ellen Russell,
Holly Frances Flannery,
Ken Russell

10.87ha

5.81ha

COLLINSON ROAD

RYAL BUSH WALLACETOWN ROAD

WINTON LORNEVILLE HWY (SH6)

COLLINSON-RYAL BUSH SITE PLAN
1:2,000

BREEZE ROAD

Abstraction Bore
E46/0489

LOCHIEL BRANXHOLME ROAD

Effluent Area: 12.72ha
Lot 1 DP 3692
Pyper's Produce Limited

Monitoring Bore
E46/1007

Effluent Area: 18.69ha
Lot 1 DP 517446
Piobaire Homestead Ltd

Effluent Area: 14.97ha
Lot 2 DP 517446
Andrew Christie Roxburgh,
Louanne Jane Roxburgh,
McCulloch Trustees Limited

MCNEECE ROAD

Effluent Area: 8.83ha
Pt Sec 14 Blk II New
River HUN
Strome Farms Ltd

Effluent Area: 7.45ha
Pt Sec 13 Blk II New River HUN
Strome Farms Ltd

Effluent Area: 6.42ha
Lot 1 DP 7335
Strome Farms Ltd

LOCHIEL-RYAL BUSH SITE PLAN
SCALE: 1:3,500

REV	REVISION DETAILS	DRN	CHK	APP	DATE
A	Draft - for client comment	CHM	BVA	BVA	30/01/2019
B	Consent issue	CHM	BVA	BVA	05/02/2019

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CLIENT:
PYPER'S PRODUCE

PROJECT:
**RESOURCE CONSENT APPLICATION,
RYAL BUSH WALLACETOWN ROAD,
BRANXHOLME, SOUTHLAND**

SHEET TITLE:
LOCALITY & SITE PLANS

SURVEYED:	DESIGNED:	DRAWN:	DESIGN CHECK:	APPROVED:	SCALE (ORIGINAL SIZE A1)	DATE ISSUED	JOB NO	SHEET	REV
		CHM	BVA	BVA	AS SHOWN	05/02/2019	6544	1 of 1	B

Drawn by: CHM on 05/02/2019 9:36:53 AM

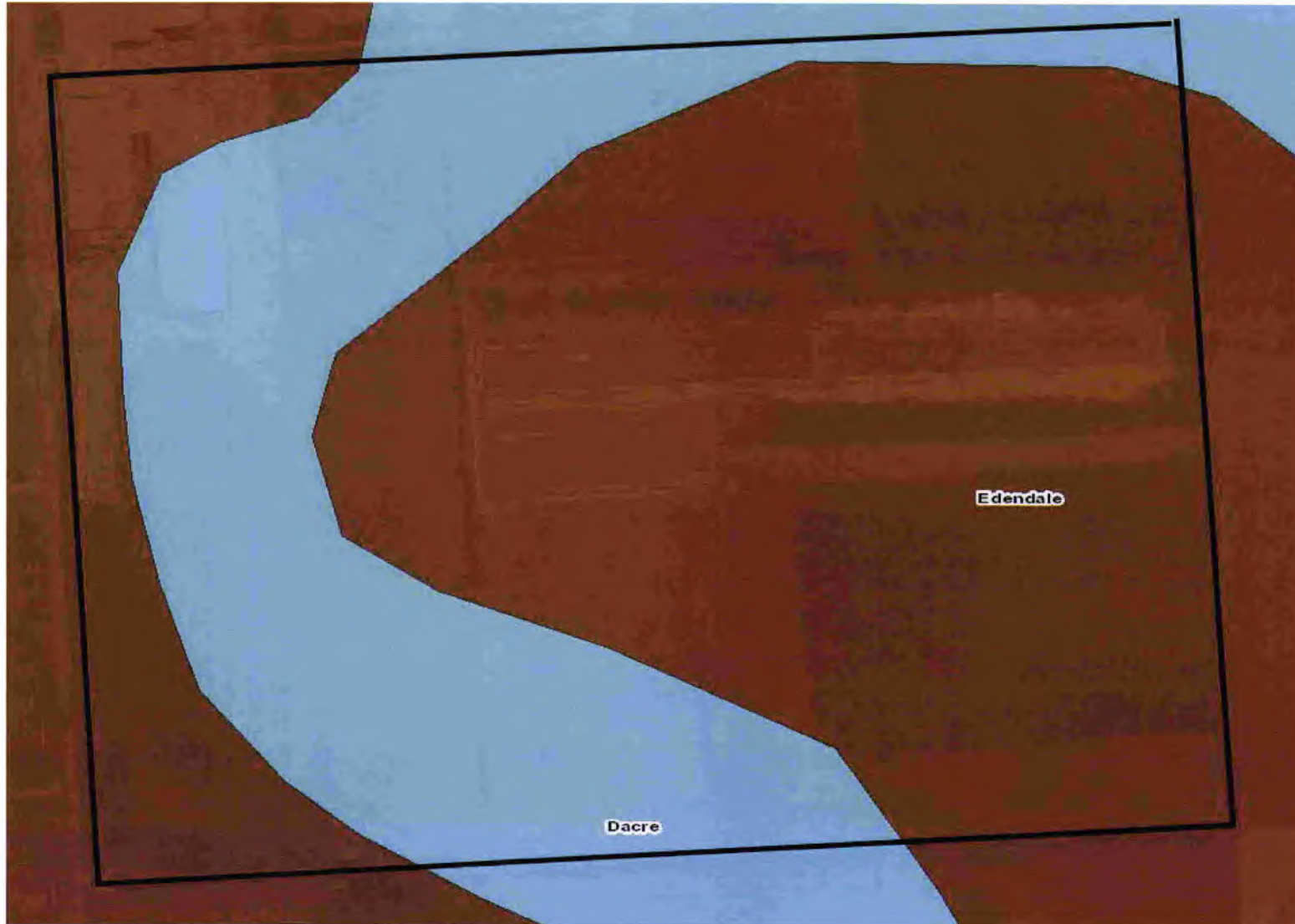
Appendix 3

Property Maps – Pyper’s Block

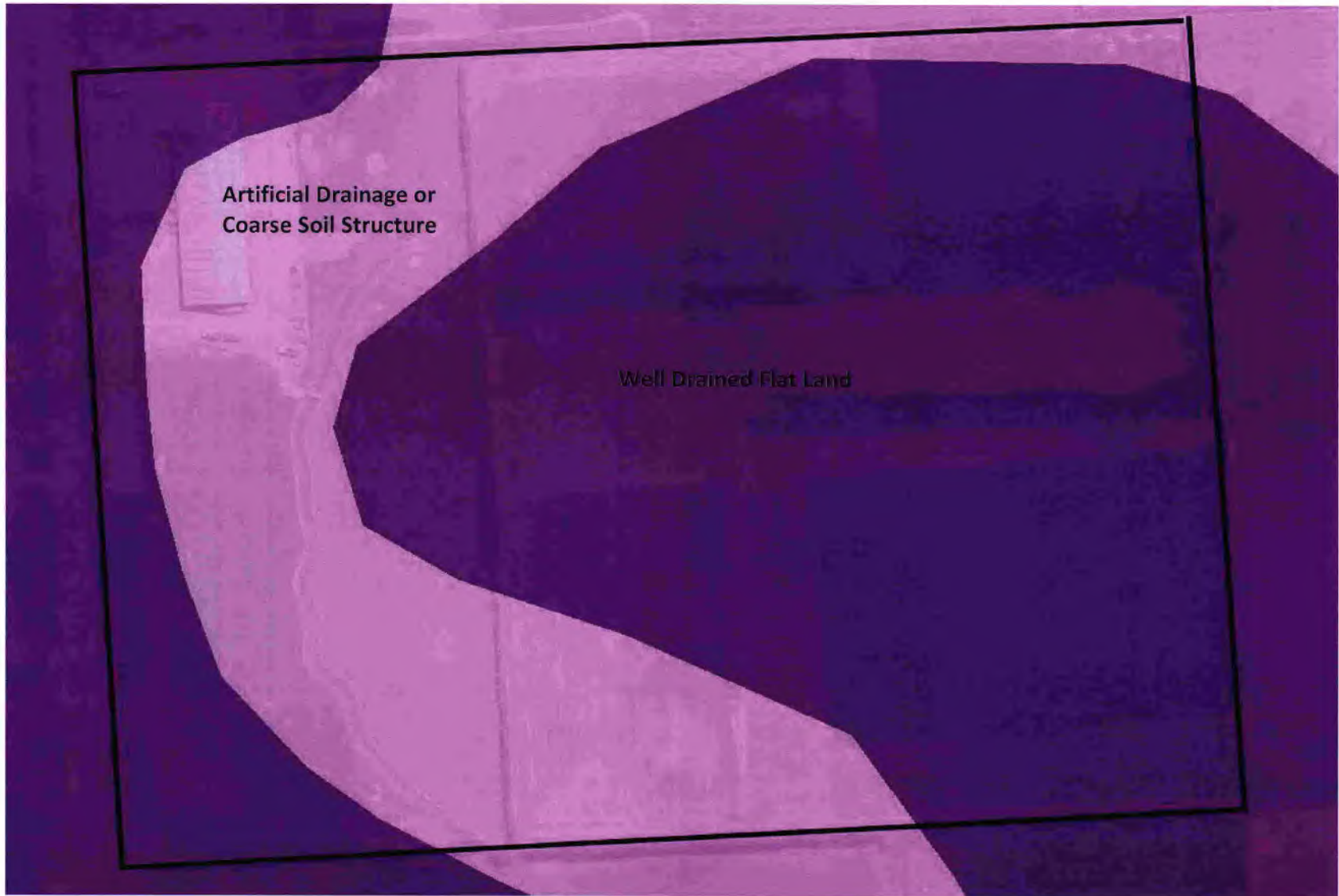
- | | |
|-------|-------------------------|
| Map 1 | Soil Types |
| Map 2 | FDE Soil Classification |
| Map 3 | Physiographic Zones |
| Map 4 | Regional Nitrate Levels |

Pyper's Produce Block

Soils



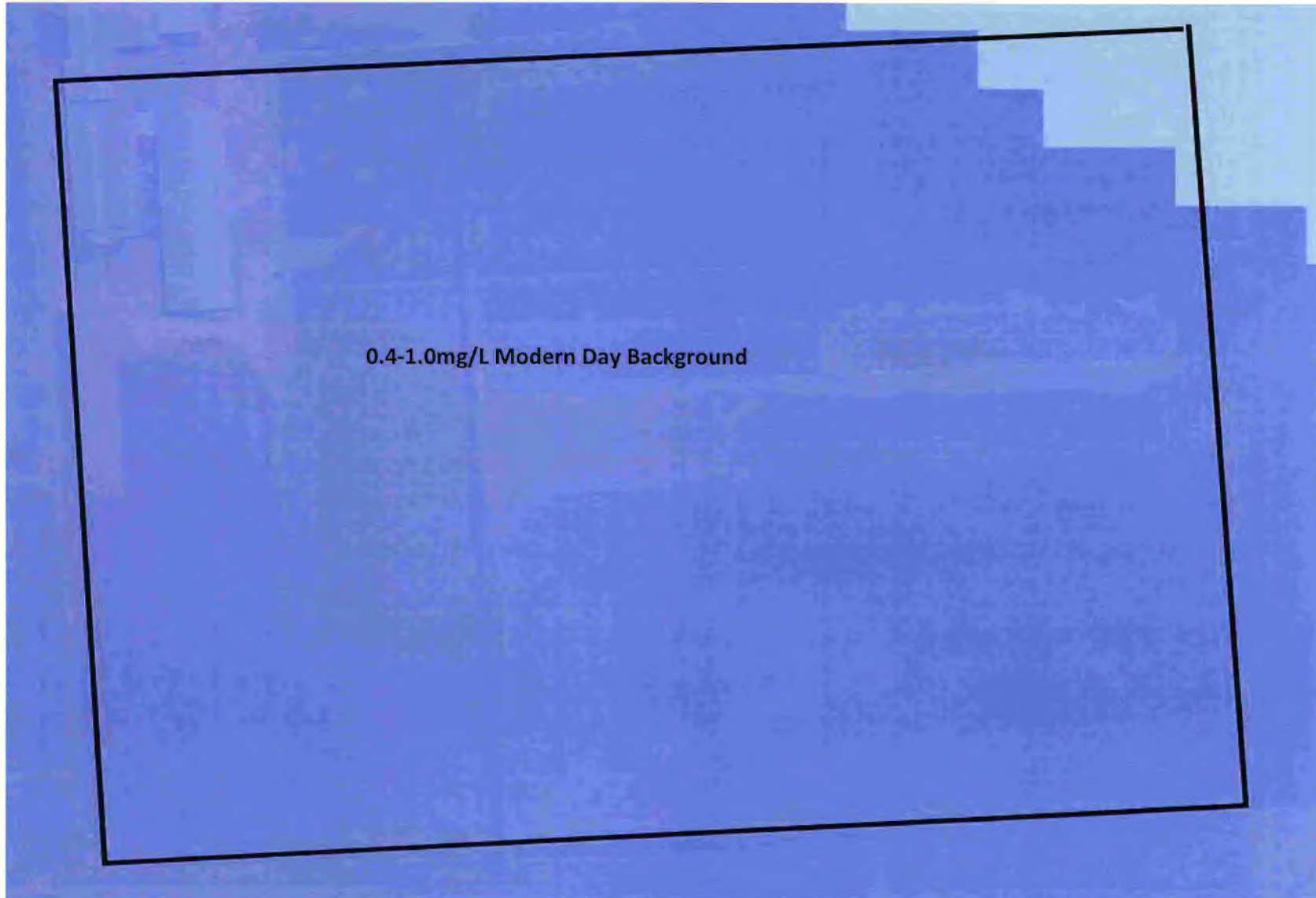
Farm Dairy Effluent Soil Classifications



Physiographic Zones



Regional Nitrate Levels -2007-2012



Appendix 4

Property Maps – Piobiare Homestead Ltd Block

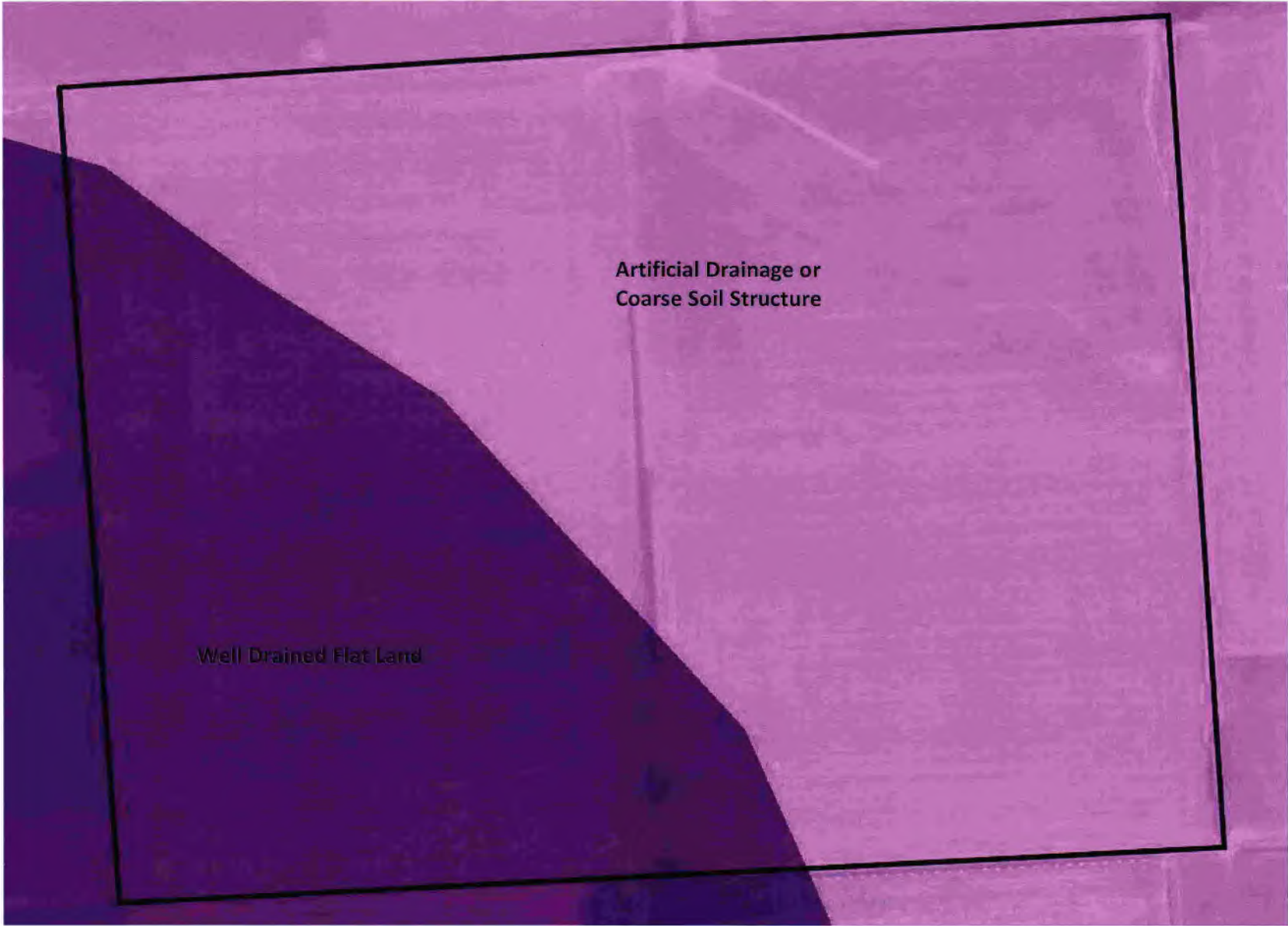
Map 1	Soil Types
Map 2	FDE Soil Classification
Map 3	Physiographic Zones
Map 4	Regional Nitrate Levels

Piobiare Homestead Ltd

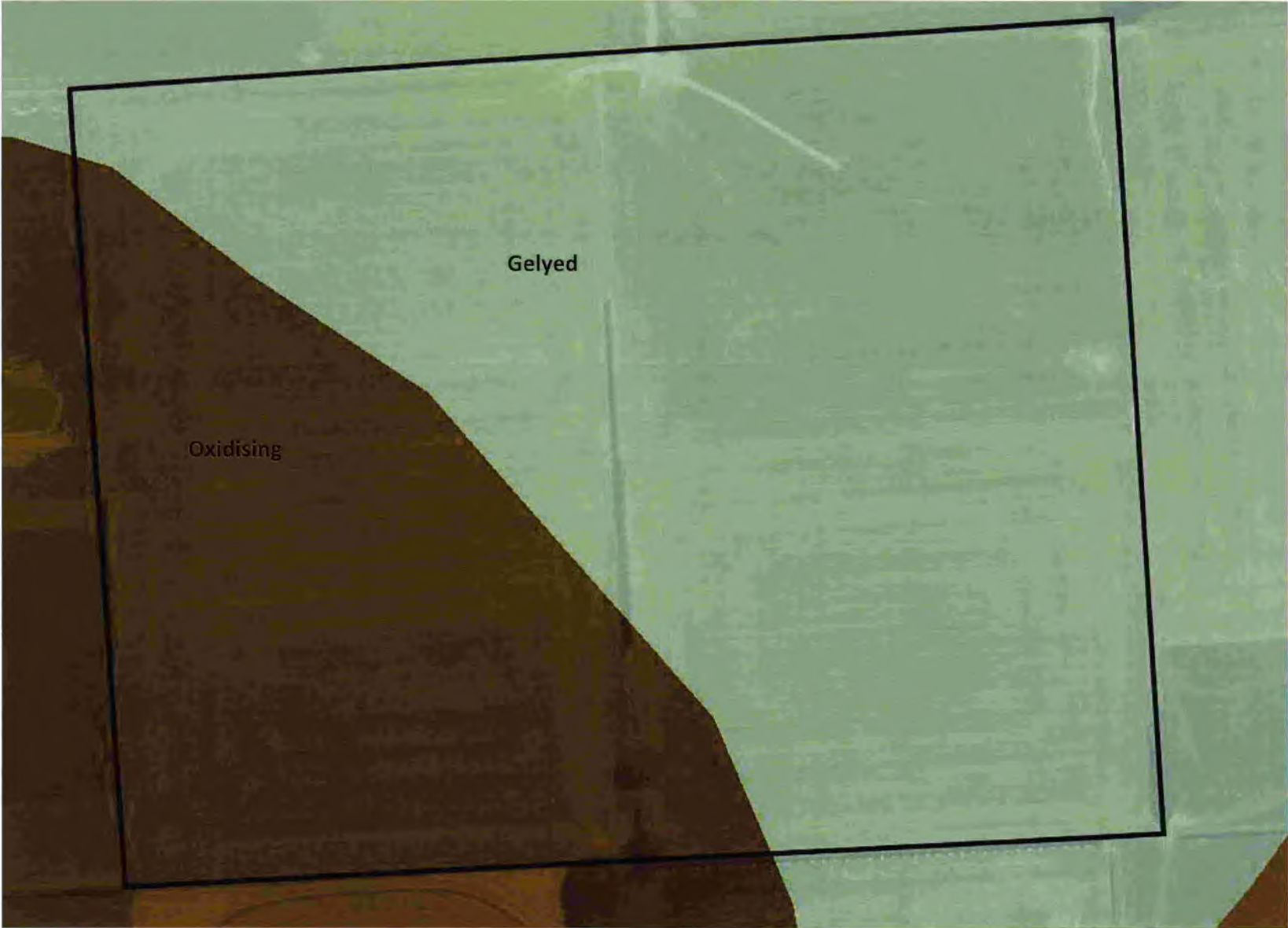
Soil Types



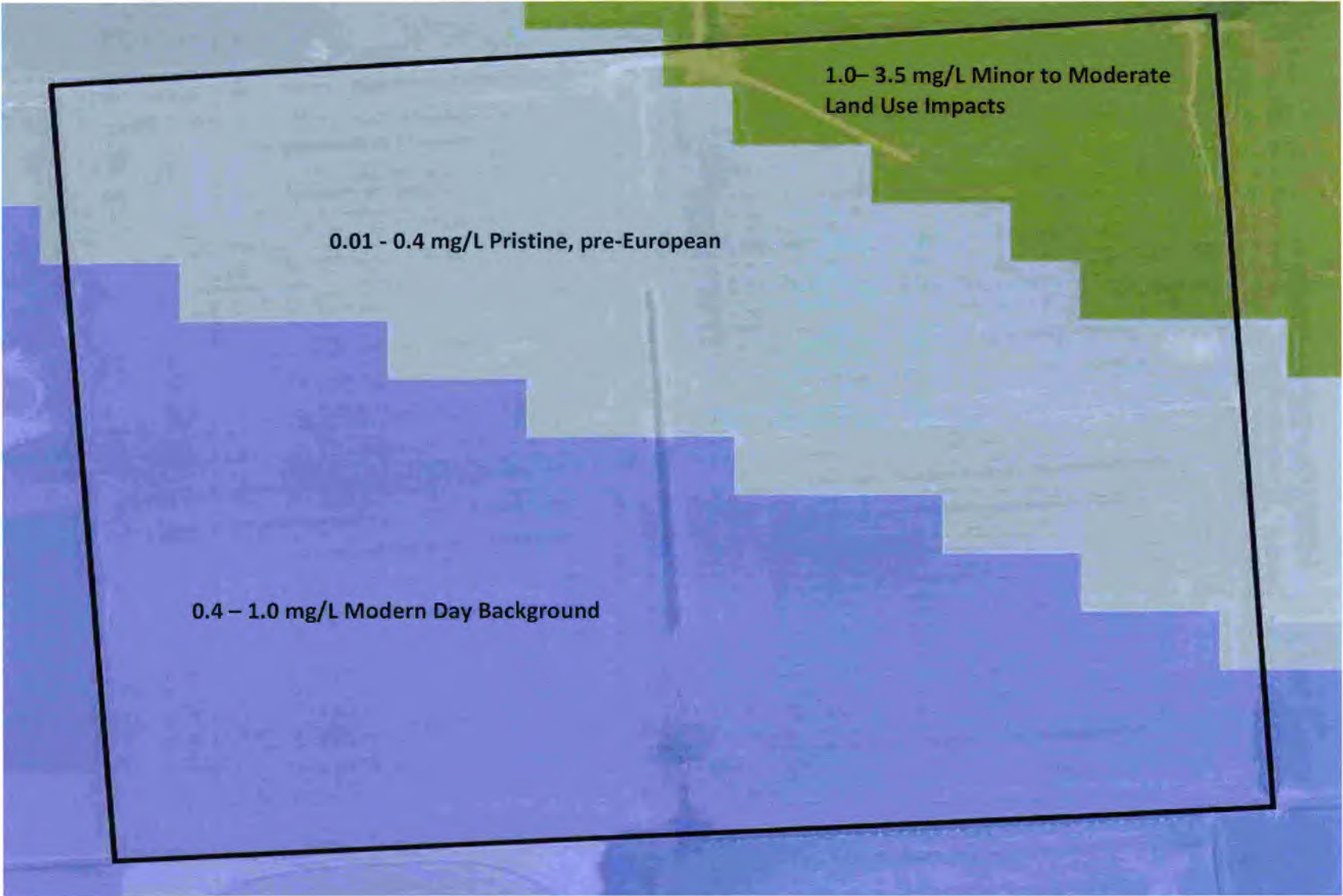
Farm Dairy Effluent Soil Classifications



Physiographic Zone



Regional Nitrate Levels 2007-2012



Appendix 5

Property Maps – Roxburgh Block

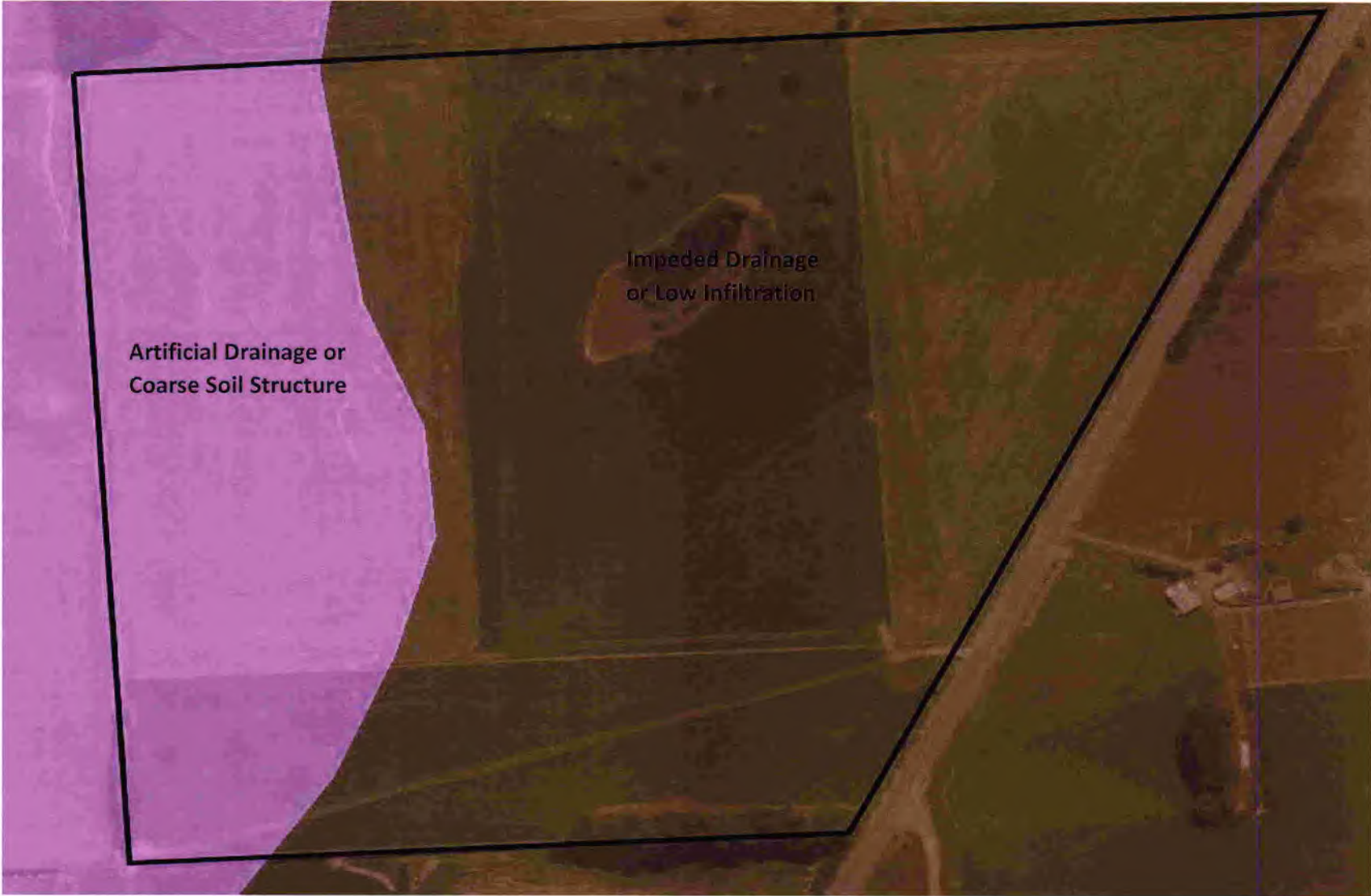
Map 1	Soil Types
Map 2	FDE Soil Classification
Map 3	Physiographic Zones
Map 4	Regional Nitrate Levels

Roxburgh Block

Soil Type



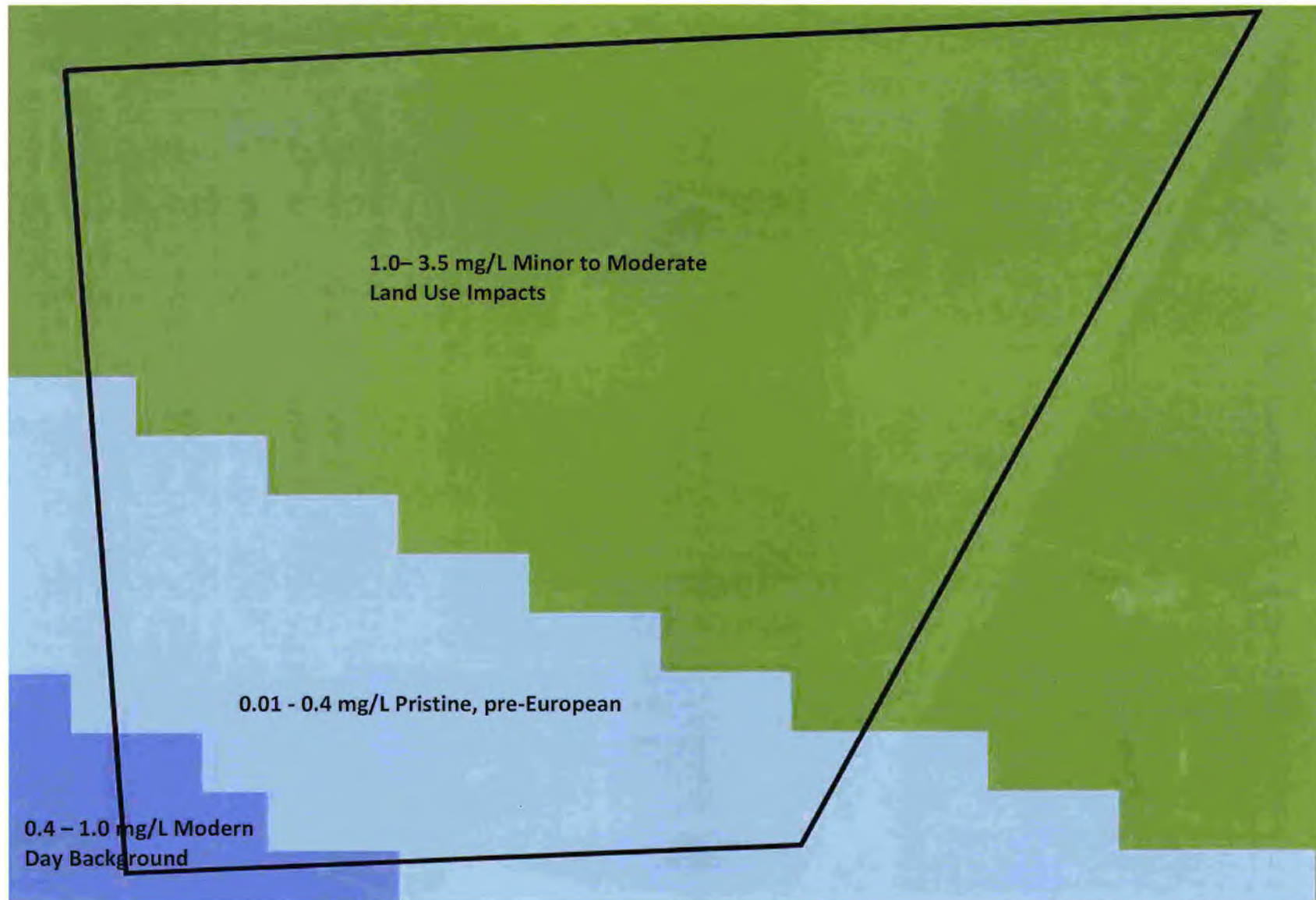
Farm Dairy Effluent Soil Classifications



Physiographic Zones



Regional Nitrate Levels 2007-2012



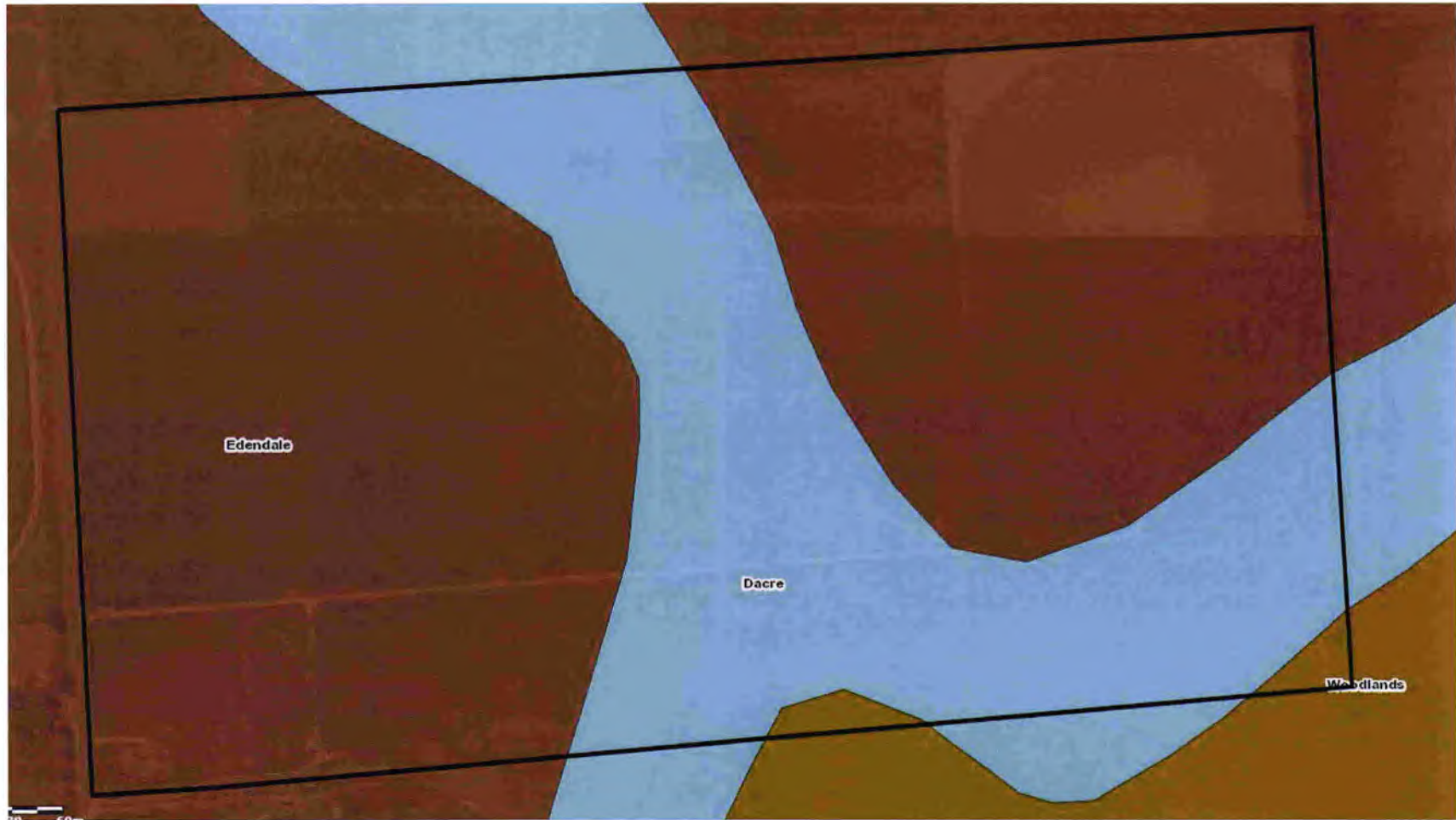
Appendix 6

Property Maps- Strone Farms Ltd Block

Map 1	Soil Types
Map 2	FDE Soil Classification
Map 3	Physiographic Zones
Map 4	Regional Nitrate Levels

Strone Farms Ltd

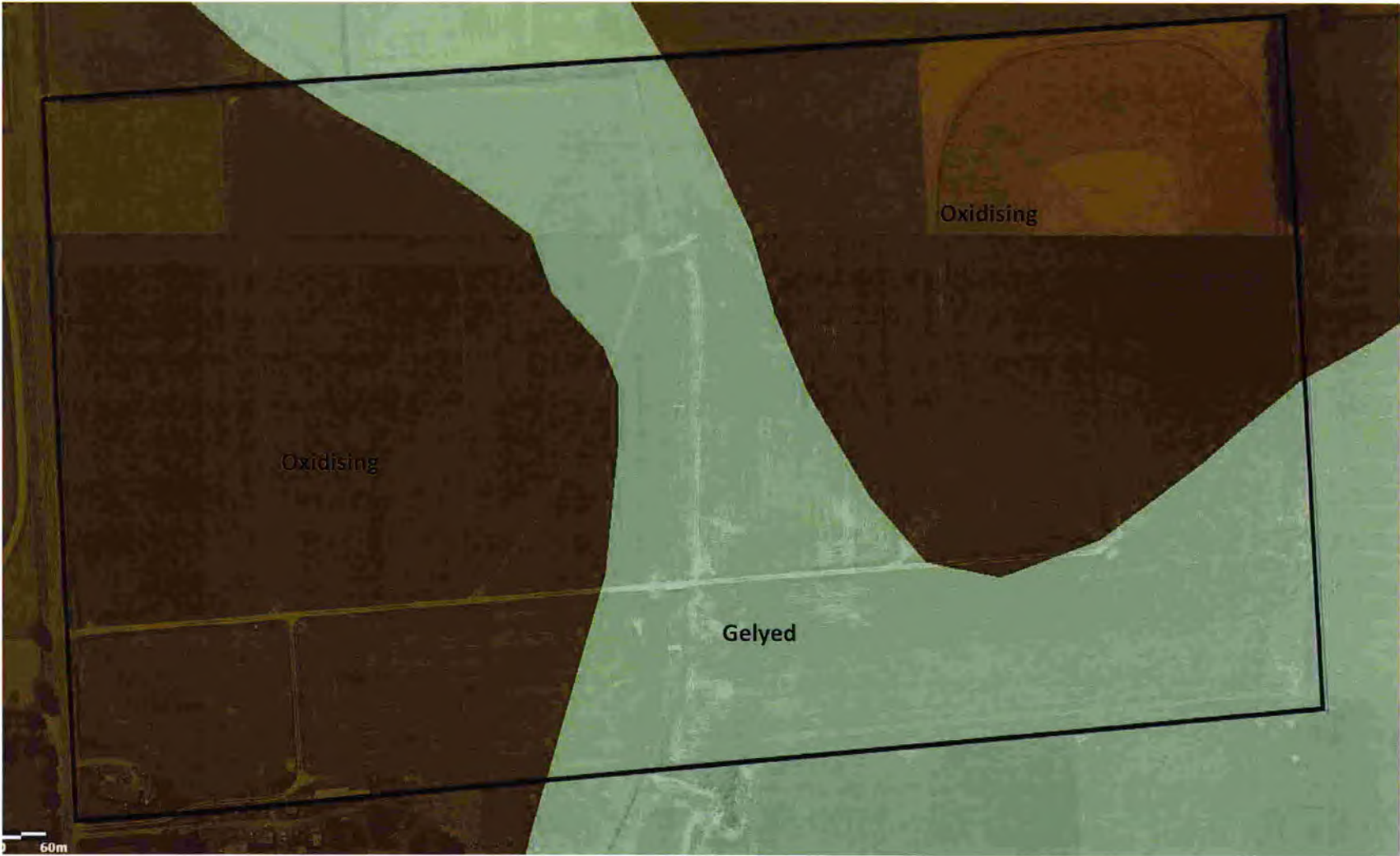
Soil Types



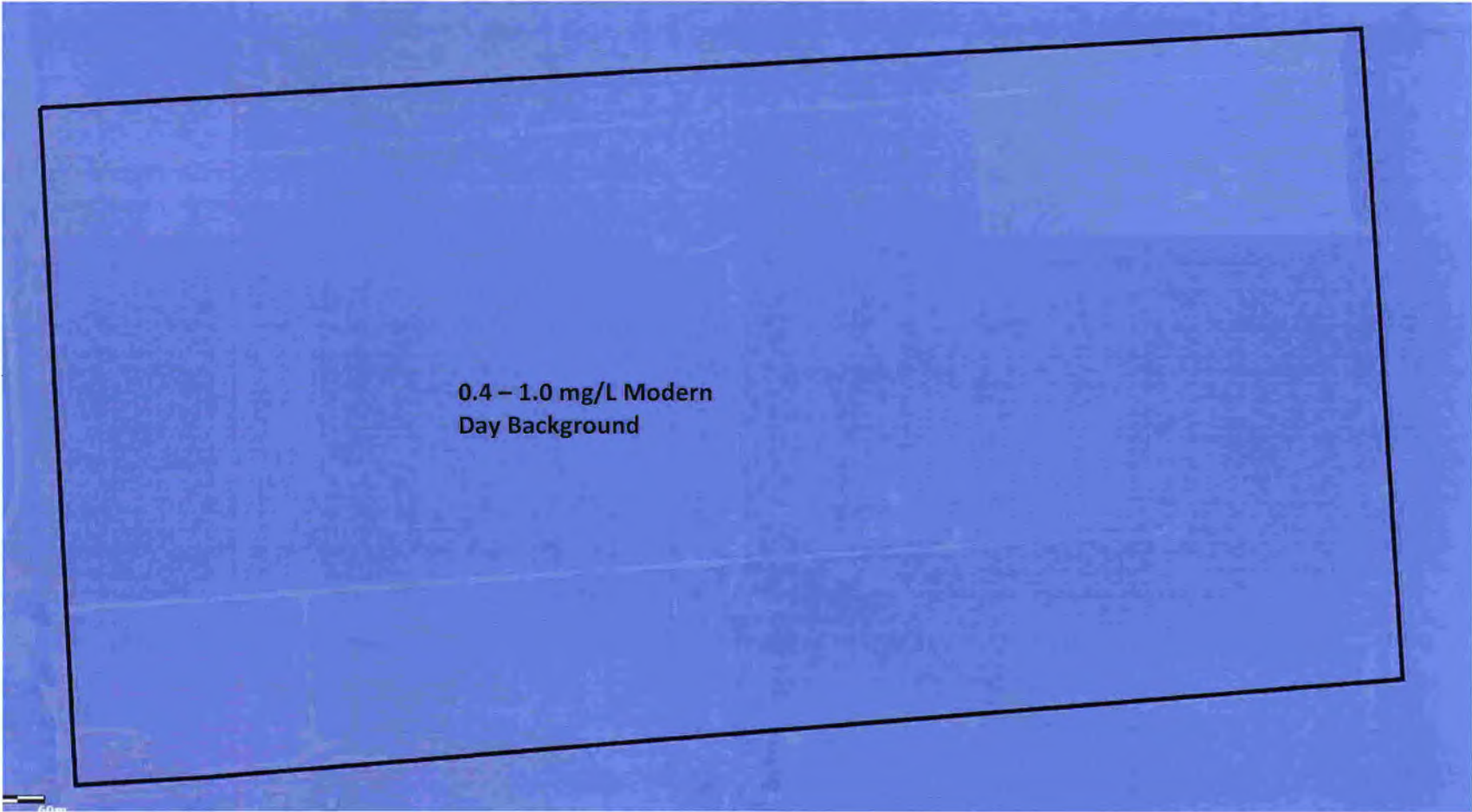
Farm Dairy Effluent Soil Classifications



Physiographic Zones



Regional Nitrate Levels 2007-2012



Appendix 7

Property Maps – Russell-Collinson Road Block

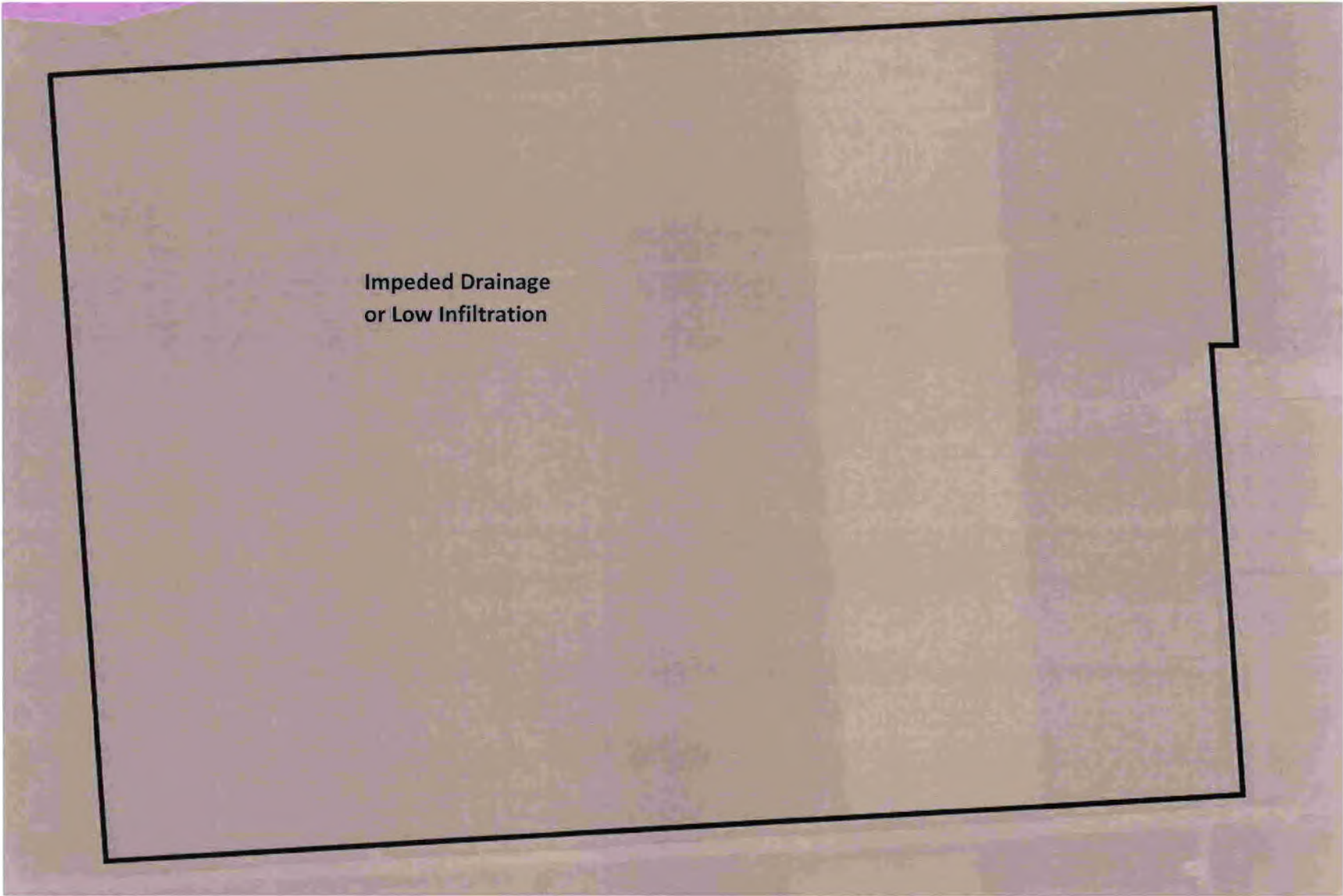
Map 1	Soil Types
Map 2	FDE Soil Classification
Map 3	Physiographic Zones
Map 4	Regional Nitrate Levels

Russell- Collinson Road Block

Soil Type



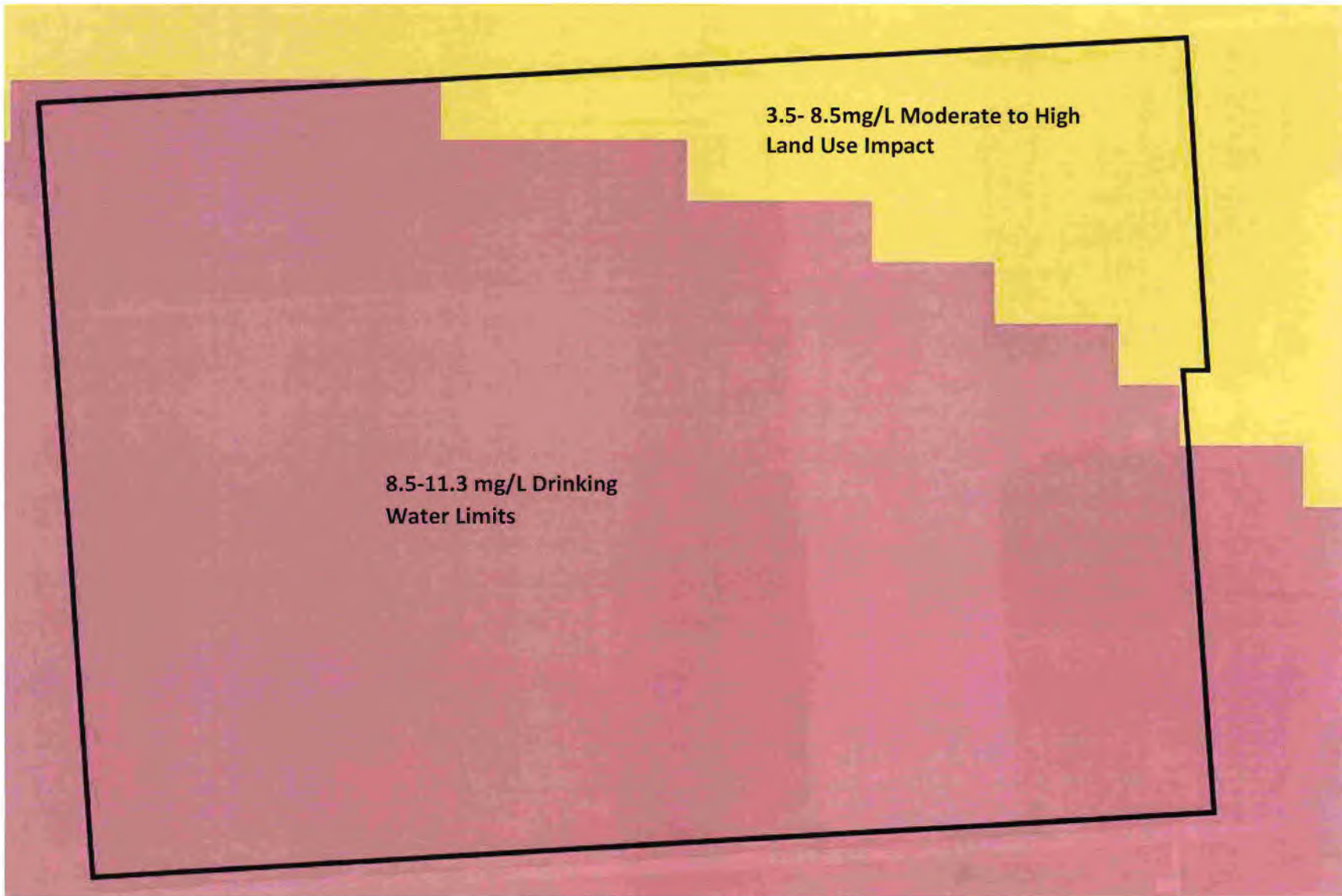
Farm Dairy Effluent Soil Classifications



Physiographic Zones



Regional Nitrate Levels



Appendix 8

Soil and Physiographic zone information sheets

Sheet 1 Edendale soil information sheet

Sheet 2 Dacre soil information sheet

Sheet 3 Waikiwi soil information sheet

Sheet 4 Physiographic Zone: Oxidising Factsheet

Sheet 5 Physiographic Zone: Gleyed Factsheet



bonisch
environmental

This Information Sheet describes the *typical average properties* of the specified soil. It is essentially a summary of information obtained from one or more profiles of this soil that were examined and described during the Topoclimate survey or previous surveys. It has been prepared in good faith by trained staff within time and budgetary limits. However, no responsibility or liability can be taken for the accuracy of the information and interpretations. Advice should be sought from soil and landuse experts before making landuse decisions on individual farms and paddocks. The characteristics of the soil at a specific location may differ in some details from those described here.
No warranties are expressed or implied unless stated.

Soil name: **Edendale**

Overview

Edendale soils occupy 9,700 ha of land on gently sloping to undulating intermediate terraces in the lower Mataura and Oreti river valleys. They are formed in deep wind-blown loess derived from greywacke and schist rocks. Edendale soils are well drained and have a deep rooting depth, high water-holding capacity, and silt loam textures. They are high producing soils currently used for intensive sheep, dairy and deer production, with limited cropping. They have a cool temperate climate with rain over the year and seldom dry out.

Physical properties

Edendale soils have a deep rooting depth and high plant-available water, meaning there is no significant physical barrier to root growth. The soils are well drained but the compact subsoil is slowly permeable, and may cause short-term waterlogging after heavy rainfall. Texture is silt loam in all horizons, with topsoil clay content of 25-30%. Edendale soils are typically stone free, although the moderately deep phases have gravels between 45 and 90cm depth that may restrict rooting depth and available water to moderately high.



Edendale profile

Fertility properties

Topsoil organic matter levels are 10-15%, P retention values 55-75%, pH values are usually above 5.5 in all horizons, with moderate cation exchange capacity and base saturation values. Natural reserves of P, K, Mg, and S are moderate to high. Soils respond well to lime and phosphate. Potassium and nitrogen are required in intensive use situations. Micro-nutrient levels are generally adequate, although boron responses in brassicas and molybdenum responses in legumes can occur.

Associated and similar soils

Some soils that commonly occur in association with Edendale soils are:

- Mokotua: imperfectly drained soils on the same landform west of Invercargill
- Arthurton: imperfectly drained soils on the same landform in the Edendale township area
- Waikoikoi: poorly drained soils on low terraces and foot slopes of adjacent high terraces
- Jacobstown: poorly drained soils on floodplains.

Some soils that have similar properties to Edendale soils are:

- Clinton: occur on undulating fans west of Clinton township; have P-retention of 30-45% throughout profile.
- Pourakino: occur on the flanks of the Pourakino Valley; paler colours; P-retention 70-85% throughout profile.
- Waikiwi: very similar soil profile; occur on high terraces of the Southland Plains.
- Waimatuku: very similar soil profile; occur on high terraces of the Southland Plains west of the Waimatuku Stream; have a distinct subsoil fragipan.

Sustainable management indicators

Note: the vulnerability ratings given in the table below are generalised and should not be taken as absolutes for this soil type in all situations. The actual risk depends on the environmental and management conditions prevailing at a particular place and time. Specialist advice should be sought before making management decisions that may have environmental impacts. Where vulnerability ratings of Moderate to Very severe are indicated, advice may be sought from Environment Southland or a farm management consultant.

Vulnerability factor	Rating	Vulnerability compared to other Southland soils
Structural compaction	slight	These soils have a slight vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the good drainage and the topsoil clay and P-retention values.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the moderately high water-holding capacity and slow subsoil permeability offset by the good profile drainage.
Topsoil erodibility by water	slight	Due to the clay content, topsoil erodibility in these soils is slight. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
Organic matter loss	minimal	Vulnerability to long-term decline in soil organic matter levels is partly dependent on soil properties and highly dependent on management practices (e.g., crop residue management and cultivation practices).
Waterlogging	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the good drainage but slowly permeable subsoil.

General landuse versatility ratings

Note: The versatility ratings in the table below are indicative of the major limitations for semi-intensive to intensive land use. These ratings differ from those used in the past in that sustainability factors are incorporated in the classification. Refer to the Topoclimate district soil map or property soil map to determine which of the soil symbols listed below are applicable, then check the versatility ratings for that symbol in the appropriate table.

EdU1 (Edendale undulating deep)

EdU1vi (Edendale undulating deep, imperfectly drained variant)

Versatility evaluation for soil EdU1, EdU1vi		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Short-term waterlogging after heavy rain
Arable	Moderate	Short-term waterlogging after heavy rain
Intensive pasture	High	Vulnerability to leaching to groundwater
Forestry	High	Few limitations

EdU2 (Edendale undulating moderately deep): as above, except that forestry landuse versatility rating is only moderate, due to restricted rooting depth.

EdR1 (Edendale rolling deep)

Versatility evaluation for soil EdR1		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Rolling slopes; risk of short-term waterlogging after heavy rain
Arable	Limited	Rolling slopes
Intensive pasture	High	Rolling slopes; vulnerability to leaching to groundwater
Forestry	High	Few limitations

Management practices that may improve soil versatility

- Careful management after heavy rainfall and wet periods will reduce the impact of short-term waterlogging. Intensive stocking, cultivation and vehicular traffic should be minimised during these periods.
- Installation and maintenance of subsurface drainage with moles and tiles may reduce the risk of short-term waterlogging
- If compaction occurs, aerating at the correct depth and moisture condition can be of benefit.

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This Information Sheet describes the *typical average properties* of the specified soil. It is essentially a summary of information obtained from one or more profiles of this soil that were examined and described during the Topoclimate survey or previous surveys. It has been prepared in good faith by trained staff within time and budgetary limits. However, no responsibility or liability can be taken for the accuracy of the information and interpretations. Advice should be sought from soil and landuse experts before making landuse decisions on individual farms and paddocks. The characteristics of the soil at a specific location may differ in some details from those described here.
No warranties are expressed or implied unless stated.

Soil name: **Dacre**

Overview

Dacre soils occupy about 13,200ha on floodplains of minor streams of the Southland plain between the Oreti River and Tokanui. They are formed into fine alluvium from rewashed loess. These soils are moderately deep to deep, poorly drained, and have silty textures. They are used in association with adjacent well drained soils for intensive pastoral farming with sheep, dairy and deer. Climate is cool temperate with regular rain, so soils are often wet.

Physical properties

Dacre soils have a deep rooting depth and high available soil water, although the rooting depth may be limited by poor aeration during wet periods due to the poor drainage and slow subsoil permeability. Texture is typically silt loam and topsoil clay content is 20–30%. The soils are typically stone free, although the moderately deep phase will have gravels between 45–90cm depth.



Dacre profile

Fertility properties

Topsoil organic matter levels are variable and range from 6 to 16%; P-retention values 25–50%; pH values moderate and low in the subsoil. Cation exchange values are moderate, grading to low in the subsoil, while base saturation values are high in the subsoil. Available magnesium and potassium are low, as are soil reserve phosphorus levels. Micro-nutrient levels are generally adequate.

Associated and similar soils

Some soils that commonly occur in association with Dacre soils are:

- Otanomomo: very poorly drained peat soils
- Otepuni: shallow, poorly drained soil on quartz gravels
- Tisbury: poorly drained gley soil, formed in loess on terraces
- Woodlands: imperfectly drained soil formed in loess on terraces.

Some soils that have similar properties to Dacre soils are:

- Titipua: has over-thickened slightly peaty topsoils
- Jacobstown: has a more developed structure with silty textures
- Caroline: has a cemented ironpan in the subsoil.
- Makarewa: has a clayey subsoil with greater structural development.

Sustainable management indicators

Note: the vulnerability ratings given in the table below are generalised and should not be taken as absolutes for this soil type in all situations. The actual risk depends on the environmental and management conditions prevailing at a particular place and time. Specialist advice should be sought before making management decisions that may have environmental impacts. Where vulnerability ratings of Moderate to Very severe are indicated, advice may be sought from Environment Southland or a farm management consultant.

Vulnerability factor	Rating	Vulnerability compared to other Southland soils
Structural compaction	moderate	These soils have a moderate vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the poor drainage, that is offset by the moderate topsoil organic matter and P-retention levels.
Nutrient leaching	slight	These soils have a slight vulnerability to leaching to groundwater. This rating reflects the high water holding capacity and slow subsoil permeability.
Topsoil erodibility by water	slight	Due to the medium organic matter and clay content, the topsoil erodibility of these soils is slight. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
Organic matter loss	slight	Vulnerability to long-term decline in soil organic matter levels is partly dependent on soil properties, and highly dependent on management practices (e.g., crop residue management and cultivation practices).
Waterlogging	severe	These soils have a severe vulnerability to waterlogging during wet periods. This rating reflects the poor drainage and slow subsoil permeability.

General landuse versatility ratings

Note: The versatility ratings in the table below are indicative of the major limitations for semi-intensive to intensive land use. These ratings differ from those used in the past in that sustainability factors are incorporated in the classification. Refer to the Topoclimate district soil map or property soil map to determine which of the soil symbols listed below are applicable, then check the versatility ratings for that symbol in the appropriate table.

DcU1 (Dacre undulating deep)

DcU2 (Dacre undulating moderately deep)

Versatility evaluation for soil DcU1, DcU2		
Landuse	Versatility rating	Main limitation
Non-arable horticulture	Limited	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain.
Arable	Limited	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain.
Intensive pasture	Moderate	Inadequate aeration during wet periods; risk of short-term waterlogging after heavy rain.
Forestry	Limited	Inadequate aeration during wet periods; potential flood risk.

Management practices that may improve soil versatility

- Careful management after heavy rain and wet periods will reduce the impact of short-term waterlogging. Intensive stocking, cultivation and heavy vehicular traffic should be minimised during these periods.
- Installation and maintenance of subsurface mole and tile drains will reduce the risk of short-term waterlogging.
- If compaction occurs, aeration at the correct moisture content and depth can be of benefit.

This Information Sheet describes the *typical average properties* of the specified soil. It is essentially a summary of information obtained from one or more profiles of this soil that were examined and described during the Topoclimate survey or previous surveys. It has been prepared in good faith by trained staff within time and budgetary limits. However, no responsibility or liability can be taken for the accuracy of the information and interpretations. Advice should be sought from soil and landuse experts before making landuse decisions on individual farms and paddocks. The characteristics of the soil at a specific location may differ in some details from those described here.
No warranties are expressed or implied unless stated.

Soil name: **Waikiwi**

Overview

Waikiwi soils occupy about 29,000 ha on high terraces of the southern Southland Plain between the Mataura and Aparima rivers. They are formed in deep wind-deposited loess derived from greywacke and schist rocks. Waikiwi soils are well drained, have a deep rooting depth, high water-holding capacity and silt loam textures. They are high producing soils currently used for intensive sheep, dairy and deer production, with limited cropping. They have a cool temperate climate and receive regular rain over the year and seldom dry out.

Physical properties

Waikiwi soils have a deep rooting depth and high plant available water, meaning there is no significant physical barrier to root growth. The soils are well drained but the compact subsoil is slowly permeable, and may cause short-term waterlogging after heavy rainfall. Texture is silt loam in all horizons, with topsoil clay content of 25–30%. Waikiwi soils are typically stone free, although the moderately deep phases have gravels between 45 and 90cm depth that may restrict rooting depth and available water to moderately high.



Insert soil name profile

Fertility properties

Topsoil organic matter levels are 6–8%; P-retention values 40–60% but higher in the subsoil; pH values are moderate in all horizons. Cation exchange and base saturation values are moderate, with low availability of magnesium and potassium. Reserve phosphorus levels are low and sulphate sulphur levels are high in the subsoil. Micro-nutrient levels are generally adequate, although boron responses in brassicas and molybdenum responses in legumes can occur.

Associated and similar soils

Some soils that commonly occur in association with Waikiwi soils are:

- Woodlands: occurs on the same landforms, but has imperfect drainage
- Dacre: poorly drained soil on floodplains of streams and minor drainage channels.
- Mokotua: occurs on the same landforms, but has imperfect drainage (tending to poor); has a structured subsoil to 90cm.
- Oteramika: shallow soil occurring on shoulder and sideslopes where loess has been eroded away

Some soils that have similar properties to Waikiwi soils are:

- Edendale: have a similar soil profile and occur on intermediate terraces in the lower Mataura and Oreti River valleys.
- Waimatuku: have a similar soil profile and occur on the high terraces of the Southland Plain west of the Waimatuku stream. They have a distinct subsoil fragipan.
- Tokanui: have a similar soil profile and occur on the rolling to hilly land east of the Mataura River, south of Mataura township.
- Waimahaka: occur in near-source loess east of the Mataura River, east of Fortrose; has pale coloured subsoils with loamy silt textures.
- Pourakino: occur on the flanks of the Pourakino Valley; paler colours; P-retention 70–85% throughout profile.

Sustainable management indicators

Note: the vulnerability ratings given in the table below are generalised and should not be taken as absolutes for this soil type in all situations. The actual risk depends on the environmental and management conditions prevailing at a particular place and time. Specialist advice should be sought before making management decisions that may have environmental impacts. Where vulnerability ratings of Moderate to Very severe are indicated, advice may be sought from Environment Southland or a farm management consultant.

Vulnerability factor	Rating	Vulnerability compared to other Southland soils
Structural compaction	slight	These soils have a slight vulnerability to structural degradation by long-term cultivation, or compaction by heavy stocking and vehicles. This rating reflects the good drainage, and the topsoil clay and P-retention values.
Nutrient leaching	moderate	These soils have a moderate vulnerability to leaching to groundwater. This rating reflects the high water-holding capacity and slow subsoil permeability, but is offset by the good profile drainage.
Topsoil erodibility by water	slight	Due to the clay content, the topsoil erodibility of these soils is slight compared to other Southland soils. Erodibility is highly dependent on management, particularly when there is no vegetation cover.
Organic matter loss	minimal	Vulnerability to long-term decline in soil organic matter levels is partly dependent on soil properties, and highly dependent on management practices (e.g., crop residue management and cultivation practices).
Waterlogging	slight	These soils have a slight vulnerability to waterlogging during wet periods. This rating reflects the good drainage, but slowly permeable subsoil.

General landuse versatility ratings

Note: The versatility ratings in the table below are indicative of the major limitations for semi-intensive to intensive land use. These ratings differ from those used in the past in that sustainability factors are incorporated in the classification. Refer to the Topoclimate district soil map or property soil map to determine which of the soil symbols listed below are applicable, then check the versatility ratings for that symbol in the appropriate table.

WiU1 (Waikiwi undulating deep); WiU2 (Waikiwi undulating moderately deep)

Versatility evaluation for soil WiU1; WiU2

Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Risk of short-term waterlogging after heavy rain.
Arable	Moderate	Risk of short-term waterlogging after heavy rain
Intensive pasture	Moderate	Vulnerability to leaching to groundwater
Forestry	High	Few limitations.

WiR1 (Waikiwi rolling deep); WiR2 (Waikiwi rolling moderately deep)

Versatility evaluation for soil WiR1; WiR2

Landuse	Versatility rating	Main limitation
Non-arable horticulture	Moderate	Risk of short-term waterlogging after heavy rain; rolling slopes
Arable	Limited	Rolling slopes
Intensive pasture	Moderate	Vulnerability to nutrient leaching to ground water; rolling slope
Forestry	High	Few limitations.

WiH1 (Waikiwi hilly deep)

Versatility evaluation for soil WiH1

Landuse	Versatility rating	Main limitation
Non-arable horticulture	Unsuitable	Hilly slope
Arable	Unsuitable	Hilly slope
Intensive pasture	Limited	Hilly slope
Forestry	Moderate	Hilly slope

Management practices that may improve soil versatility

- Careful management after heavy rain and wet periods will reduce the impact of short-term waterlogging. Intensive stocking, cultivation and heavy vehicular traffic should be minimised during these periods.
- Installation and maintenance of sub-surface mole and tile drains will reduce the risk of short-term waterlogging.
- If compaction occurs, aeration at the correct depth and soil moisture can be of benefit.

Physiographic zone: Oxidising

Southland's physiographic zones allow us to better understand why we have variations in water quality in different areas. We've divided Southland into nine different zones according to factors such as soil type, geology and topography. Through them we can target solutions to higher risk areas as opposed to a region-wide, generalised approach.

Understanding your zone

Each zone is different in the way contaminants build up and move through the soil, areas of groundwater, and into our streams and rivers. Physiographic zones allow us to target advice and management strategies to keep farm nutrients on the farm and out of waterways.

The Physiographics of Southland project was developed as part of *Water and Land 2020 & Beyond* so we can better understand:

- where our water comes from
- how water moves through the landscape
- why we have differences in water quality across the region

What does 'Oxidising' mean?

Oxidising means well aerated, with plenty of oxygen.

The Oxidising zone is characterised by soil water and groundwater that contains high levels of oxygen, which allows nitrogen to accumulate.

Key features of the Oxidising zone

- Low elevation, flat to gently undulating land on elevated terraces along the outer margins of the major river systems.
- Also located in inland basins and some lowland areas.
- Soils and aquifers have low denitrification potential.

Water source and movement

- A high density of small streams runs through the zone, which can rise rapidly during heavy rainfall.
- Alluvial deposits contain an extensive groundwater resource.
- Drainage to waterways varies depending on slope, soil texture and permeability.
- Flat, free-draining soils - water seeps straight down to underlying aquifers (areas of groundwater). Groundwater in this zone is 'recharged' (topped up) by rainfall that drains down through the soil.
- Slowly permeable soils may experience seasonal waterlogging. On flatter areas, they will often have artificial drainage when elevated above nearby streams. On more sloping areas, they will often have overland flow.

Contaminant movement

Groundwater in the Oxidising zone is susceptible to nitrate accumulation. Soils and underlying aquifers in the Oxidising zone have little ability to remove nitrogen (via a process called denitrification).

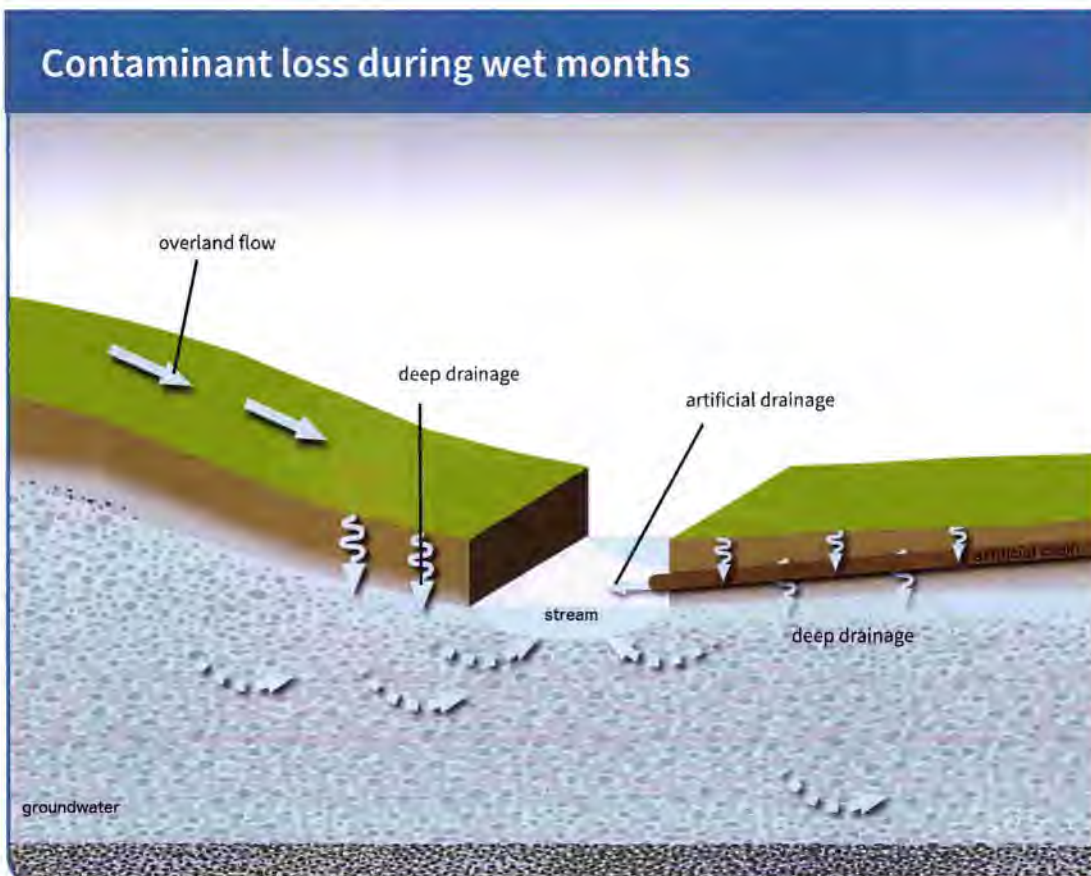
Streams in this zone rise rapidly during heavy rain when soils are wet. Soil water and groundwater carries with it contaminants, which continue to seep into streams after periods of heavy rain.

Oxidised soils can be very good at absorbing and storing water and any nitrogen it contains. During drier months, nitrogen is able to accumulate in soil to high levels. During winter when soils are wet, any nitrogen not used by plants leaches down into the underlying aquifer (deep drainage).

Artificial drainage (mole and tile drains) is used where soils have low subsoil permeability to help to reduce waterlogging. Contaminant loss through artificial drains to nearby streams can be high during wetter months. Overland flow may also occur during periods of heavy rain when soils are wet, especially where soils are sloping.

What does this mean for water quality?

- ✓ Soils have good phosphorus retention.
- ✓ Limited potential for contaminant losses to rivers and streams as deep drainage is the main pathway.
- ✗ High risk of nitrogen build-up in groundwater.
- ✗ Following heavy or prolonged rainfall, contaminant losses to rivers and streams may occur via overflow or artificial drainage.



- ▶ Deep drainage (leaching) of nitrogen to groundwater is the main contaminant pathway in this zone. Artificial drainage and overland flow are also important contaminant pathways in some parts of the zone and can carry nitrogen, phosphorus, sediment and microbes.

Improving water quality

The following good management practices are applicable to all physiographic zones in Southland:

- Capture nutrients, sediment and microbes in wetlands and sediment traps
- Nutrient management
- Riparian management
- Effluent management

Good management in the Oxidising zone

In addition to the above, good management in the Oxidising zone includes measures for reducing the effects of deep drainage, artificial drainage and overland flow.

Reduce the effects of deep drainage by reducing the accumulation of surplus nitrogen in the soil, particularly during autumn and winter.

Reduce the effects of artificial drainage by:

- Protecting soil structure, particularly in gullies and near stream areas
- Reducing phosphorus use and loss
- Reducing the accumulation of surplus nitrogen in the soil, particularly during autumn and winter
- Avoiding preferential flow of effluent through drains
- Capturing contaminants at drainage outflows

Reduce the effects of overland flow by:

- Protecting soil structure, particularly in gullies and near stream areas
- Managing critical source areas (CSA)
- Reducing phosphorus use or loss

Physiographic zones and the Southland Water and Land Plan

Environment Southland has developed a proposed Southland Water and Land Plan, using the science behind the physiographic zones to inform the plan and provide a tailored approach to particular issues that have been identified for each zone.

The main aim of the plan is to introduce new methods that help to halt any further decline in water quality by managing activities that we know adversely affect the quality of Southland's freshwater – such as land use intensification, wintering and stock in waterways. A key focus of the changes is to shift all land owners towards good management practices in ways that will give the best gains for maintaining water quality.

Further information

For more information about physiographic zones and good management practices contact Environment Southland. Phone 0800 76 88 45 or email service@es.govt.nz. You can also find out more about the Physiographics of Southland and your zone on our website, www.es.govt.nz.

What zone is your property in? View our map online: <http://bit.ly/waterandlandmaps>.

Oxidising means well aerated,
with plenty of oxygen.

Physiographic zone: Gleyed

Southland's physiographic zones allow us to better understand why we have variations in water quality in different areas. We've divided Southland into nine different zones according to factors such as soil type, geology and topography. Through them we can target solutions to higher risk areas as opposed to a region-wide, generalised approach.

Understanding your zone

Each zone is different in the way contaminants build up and move through the soil, areas of groundwater, and into our streams and rivers. Physiographic zones allow us to target advice and management strategies to keep farm nutrients on the farm and out of waterways.

The Physiographics of Southland project was developed as part of *Water and Land 2020 & Beyond* so we can better understand:

- where our water comes from
- how water moves through the landscape
- why we have differences in water quality across the region

What does 'Gleyed' mean?

The Gleyed zone is found in low-lying areas.

Soils are poorly drained, prone to waterlogging, and have distinctive grey or rust-coloured spots or mottles.

Soils and aquifers can remove some to all nitrogen via denitrification.

Key features of the Gleyed zone

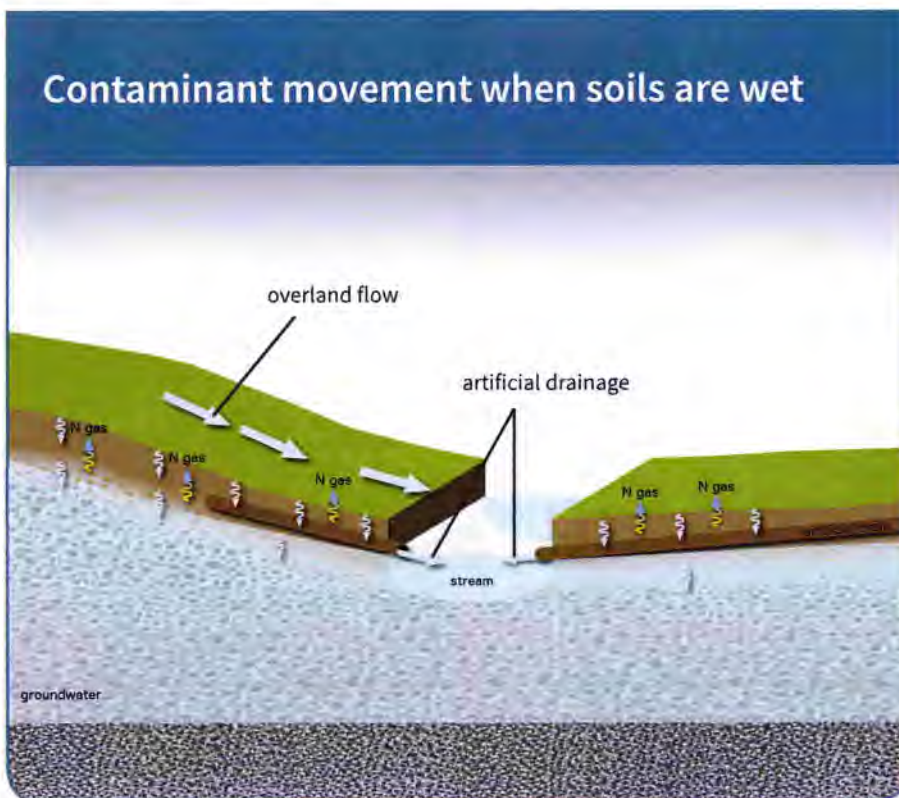
- Low-lying flat to undulating land on alluvial terraces, located between the major river systems on northern and southern plains.
- Generally found in historic wetland areas, and have a high water table during winter that's up to one metre below ground.
- Soils are generally fine textured, prone to water-logging, and have extensive artificial drainage (mole and tile drains).
- Some nitrogen is removed from water infiltrating through the soil zone via denitrification (lost as nitrogen gas).
- Loss of nutrients, sediments and microbes via artificial drains following heavy or prolonged rainfall are a key feature of this zone.
- Water in this zone is not directly linked to any of the major rivers and therefore does not experience dilution from Alpine or pristine Bedrock/Hill Country zones.

Water source and movement

- When soils are wet, excess water from rainfall in flatter areas will flow via an extensive drainage network to nearby streams.
- In undulating areas excess water may also flow across the land surface as overland flow (runoff) during heavy rainfall.
- Some water will slowly make its way down to underlying aquifers.
- Aquifers are shallow and interconnect with streams and drains.

Contaminant movement

Soils may accumulate and store nitrogen during summer and early autumn when soil moisture levels are low. However, some nitrogen will be removed from the soil and aquifers via denitrification (lost as nitrogen gas), resulting in relatively low groundwater nitrate concentrations. Accumulated nitrogen starts moving with water when soils become wet in late autumn and winter and may be lost via artificial drains or overland flow.



- ▶ During periods of heavy rain, phosphorus, nitrogen, sediment and microbes flow with water overland (overland flow) and via artificial drain networks to neighbouring streams. Some nitrogen is lost to underlying groundwater however the denitrifying ability of soils results in low levels of nitrogen contamination in groundwater.

What does this mean for water quality?

- ✓ Some denitrification may occur within the soil zone.
- ✗ Artificial drainage rapidly move excess soil water and contaminants to rivers and streams particularly during heavy rainfall and wet periods.

Improving Southland's water quality

The following good management practices are applicable to all physiographic zones in Southland:

- Capture nutrients, sediment and microbes in wetlands and sediment traps
- Nutrient management
- Riparian management
- Effluent management

Good management in the Gleyed zone

In addition to the above, good management in the Gleyed zone includes measures for reducing the effects of artificial drainage and overflow drainage.

Reduce the effects of artificial drainage by:

- Protecting soil structure, particularly in gullies and near stream areas
- Reducing phosphorus use and loss
- Reducing the accumulation of surplus nitrogen in the soil, particularly during autumn and winter
- Avoiding preferential flow of effluent through drains
- Capturing contaminants at drainage outflows

Reduce the effects of overland flow by:

- Protecting soil structure, particularly in gullies and near stream areas
- Managing critical source areas (CSA)
- Reducing phosphorus use or loss

Physiographic zones and the Southland Water and Land Plan

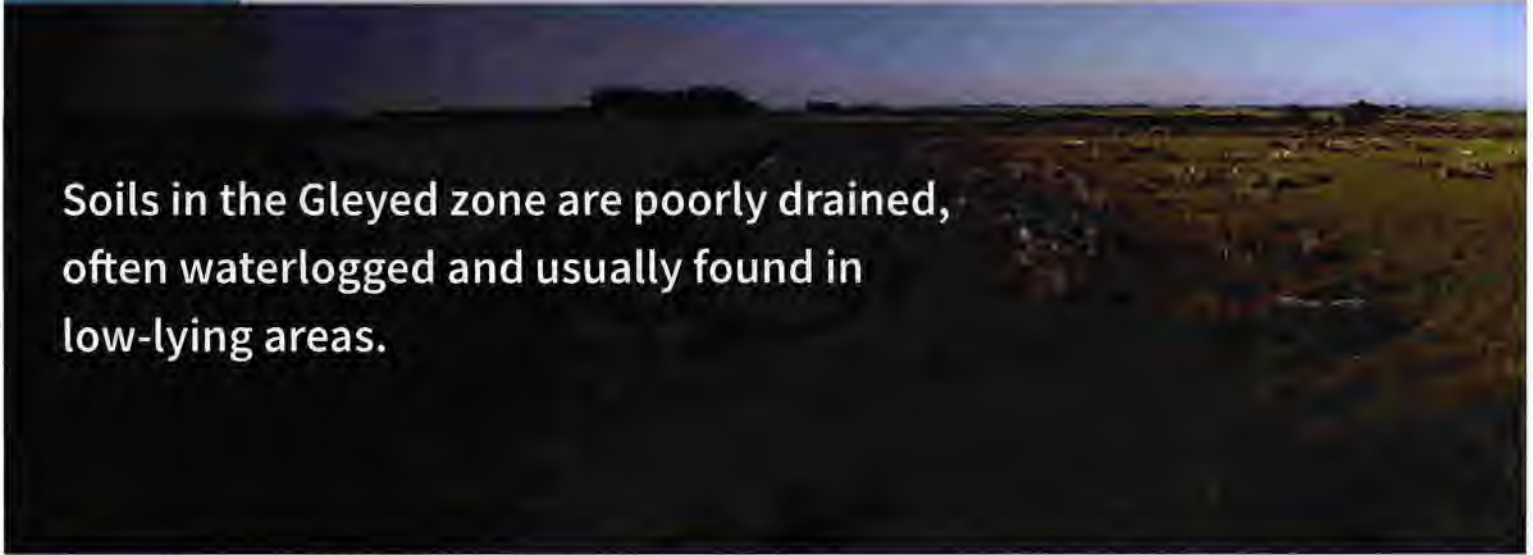
Environment Southland has developed a proposed Southland Water and Land Plan, using the science behind the physiographic zones to inform the plan and provide a tailored approach to particular issues that have been identified for each zone.

The main aim of the plan is to introduce new methods that help to halt any further decline in water quality by managing activities that we know adversely affect the quality of Southland's freshwater – such as land use intensification, wintering and stock in waterways. A key focus of the changes is to shift all land owners towards good management practices in ways that will give the best gains for maintaining water quality.

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What zone is your property in? View our map online: <http://bit.ly/waterandlandmaps>



Soils in the Gleyed zone are poorly drained, often waterlogged and usually found in low-lying areas.

Appendix 9

Groundwater Technical Report

Stream Depletion and Well Interference Assessment for Bore E46/0489 – Pyper's Produce Ltd.

1 Introduction

Bonisch Environmental approached Land and Water Science to collect and interpret pump test data for bore interference and stream depletion for Pyper's Produce Ltd. Pyper's Produce Ltd. are currently preparing a resource consent application for the renewal of consent AUTH-205659 for the continued abstraction of groundwater from bore E46/0489 of 380 m³/day seasonally at a maximum rate of 11 L/s (equivalent to 146 days of constant pumping), for their vegetable washing operation near Branxholme (1035 Lochiel Branxholme Road). According to Pyper's Produce, the pumping would occur for approximately 10 hours per day during operation of the plant for approx. 50 weeks of the year.

After the abstracted groundwater has been used in the vegetable washing plant, it is discharged into a series of settling ponds (to settle out small soil particles remaining after scrubbing vegetables), and then pumped to a series of 3 soakage pits at the eastern end of the site, only 2 of which have been used in the past (Robson, 1997¹). From the soakage pits, a significant amount of the water that was originally abstracted is expected to be returned to the aquifer through infiltration. The wastewater is only irrigated to land from the settling ponds approximately every 2 years for the purposes of removing accumulated sediments.

It is understood that there is a single perennial waterway within the vicinity of the bore (E46/0489), Tomoporakau Creek, at a distance of ca. 90 m. Environment Southland require a stream depletion analysis to be undertaken to establish the hydraulic connectivity of the bore (E46/0489) to the nearby streams and waterways. An assessment of the interference effects on the neighbouring wells is also required. These assessments are needed to determine any negative effects on the stream/waterway, and neighbouring bores.

¹ Robson, J. (1997) Pyper's Produce Branxholme Resource Consent Application. Prepared by Kingston Morrison Architects Engineers Planners Scientists.

Land and Water Science have been engaged to a) oversee the operation of an aquifer test needed to determine aquifer properties, and b) to subsequently complete the stream depletion and well interference analysis for the groundwater take from E46/0489. Both are presented in the following.

2 Bore data

E46/0489 was drilled to a depth of 16 m below ground level (BGL) at unknown date, likely over 40 years ago. Available information for the bore, provided by Environment Southland, include that the bore has a diameter of 200 mm, is screened for a 1 m interval from 15 to 16 m BGL, and that the bore is within Environment Southland's Lower Oreti Groundwater Management Zone (GWMZ²). Otherwise, there is no record of bore log information describing the composition of the aquifer.

Based on a groundwater assessment that was undertaken by Liquid Earth in 2009 (when the last consent renewal was granted), the static water level in bore E46/0489 varies between 2 to 4 m BGL reflecting variations in land surface recharge (Liquid Earth, 2009). That report estimated a higher than average maximum yield (of 12.5 L/s) during basic pump testing of the bore and based on that concluded that the bore is likely to tap a layer of higher permeability than usually found in the Lower Oreti GWMZ. Aquifer transmissivity in that report was estimated to be 150 m²/d based on transmissivity data for the Lower Oreti GWMZ.

As required for consent renewal, a pump test was undertaken on the bore E46/0489 in December 2018 following the a new set of guidelines detailed in Appendix L.1 of the proposed Southland Water and Land Plan (pSWLP). Drawdown and recovery were recorded at bore E46/0489 (also referred to the main bore) and observation bore E46/1007 - a groundwater quality observation well operated by Environment Southland. The observation bore is located 475 m away from E46/0489 (Figure 1). Drawdown in E46/0167, a residential water supply located 40 m away from E46/0489, was not recorded as the bore is regularly pumped to fill a water tank for stock water. However, communication with Lex and Faye Dudfield, the owners of the bore E46/0167, revealed they have had never any issues with unacceptable drawdown in their bore over the last 20 years during which groundwater from E46/0489 was regularly abstracted.

According to the bore information provided by Environment Southland, observation bore E46/1007 (E1238704, N4863333) located 475 m from E46/0489 has a depth of 6.5 m, is screened from 3.5 to 6.5 m BGL, and had an initial water level of 3.74 m BGL. The characteristics of the bore, and the strata/lithologies encountered during drilling of E46/1007 (Table 1) suggest the bore draws groundwater from an unconfined aquifer hosted in a gravel, sand and clay matrix.

Due to the lack of bore log information available for E46/0489, it is unclear whether the bore intersects the same unconfined aquifer as E46/1007. However, water quality data available for bores E46/0489 and E46/1007 show similar composition (Table 2) suggesting both bores draw from the same aquifer. Further, pump test data support that E46/0489 taps into the same unconfined aquifer as E46/1007 (i.e. the Lower Oreti GWMZ) as demonstrated in the following.

² GWMZs are units of groundwater resources defined by Environment Southland to manage its groundwater resources (Environment Southland, 2016).

Table 1: Bore log information available for observation bores E46/1007 provided by Environment Southland.

E46/1007			
Depth [m BGL]	Lithology code	Description	Strata description
-2.8	SOIL	Soil	Brown CLAY
-5.3	GRSACLTR	Gravel sand and clay trace	Gravels, sand, clay trace
-5.9	CL	Clay	Brown clay
-6.5	MU	Mudstone	Mudstone



Figure 1: Map illustrating the locations of bore E46/0489 (centre of the map), observation bores E46/1007, and other nearby bores and steams (Tomoporakau Creek). Map sourced from Beacon (<http://gis.es.govt.nz>).

Table 2: Available water quality data for bore E46/0489, and E46/1007. The data suggests similar water quality of groundwater sampled from each bore.

Site	Easting	Northing	Sampling times	Data type	NNN (mg/L)	NO ₃ -N (mg/L)	Conduct. (lab) (uS/cm)	E-Coli (MPN)
E46/0489	1238236	4863384	1x in Nov 2010	median	9.4	9.4	260.0	<1
E46/1007	1238700	4863335	12 x in Mar & Nov 2011 to 2016 (no data 2015)	SD	2.8	2.9	32.1	695

3 Estimation of aquifer properties from pump test data

The minimum aquifer test requirements to support resource consent applications for groundwater takes are provided in Appendix L of the pSWLP. For takes between 250 and 750 m³/day, Appendix L specifies a step-drawdown aquifer test comprising a minimum of three, 1-hour pumping steps followed by measurement of water level recovery, where the maximum pumping rate utilised should be equal to or greater than the maximum proposed abstraction rate. In addition, a 24-hour constant rate aquifer test undertaken at the maximum proposed abstraction rate is required. Water level monitoring during the 24-hour constant rate test should include drawdown and recovery (to

within 10% of the initial static water level) in the pumped bore and in at least one observation bore within the area of localised drawdown. The pump rate should be kept constant within +/- 5%.

Pump tests for the target bore, E46/0489, carried out by SouthDrill on December 6th to 7th 2018, included a step drawdown tests at approximately 4, 8, and 11 L/s for 1 hour each. Subsequent recovery was monitored until it was within no less than 90% of the initial static water level. The step drawdown test was followed by a 24-hour constant rate test at 11 L/s with subsequent recovery on December 10th 2018. Drawdown during both tests was recorded at the pumped bore E46/0489 and one observation bore E46/1007. The recorded drawdowns in both bores are displayed in Figure 2.

Drawdown and recovery monitored in observation bore E46/1007 did not show any obvious correlation with the timing and length of pumping carried out in bore E46/0489 during both the step drawdown and 24-hour constant rate tests (Figure 2). This suggests that pumping carried out in E46/0489 during the pump test had limited effect on water level in observation bore E46/1007 which is located 475 m away from E46/0489 (Figure 2a).

Importantly, when not pumped water level variability in the observation bore was similar to the background water level variability of bore E46/0489 suggesting both bores indeed intersect the same unconfined aquifer (Figure 2b). For unconfined aquifers, groundwater level varies naturally due to seasonal changes in recharge.

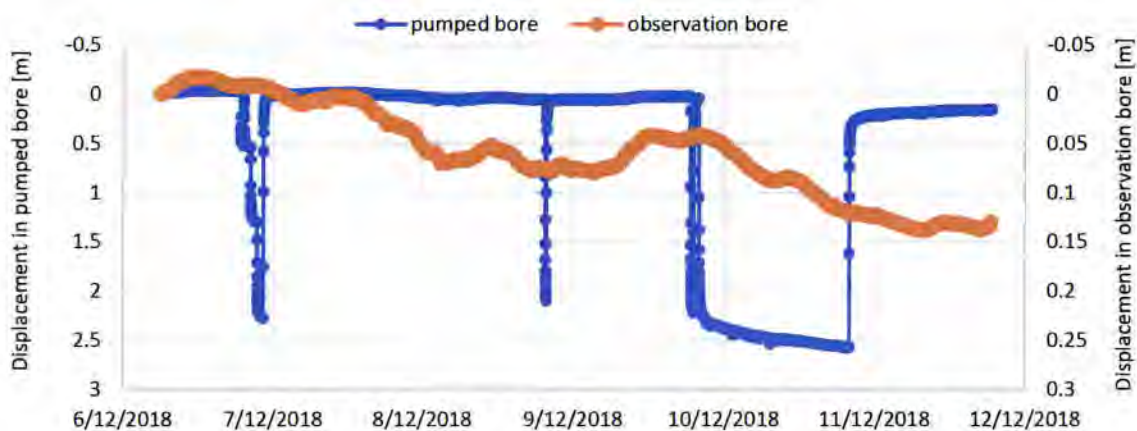


Figure 2a: Drawdown recorded at the pumped bore E46/0489 and observation bore E46/1007. There is no obvious correlation between drawdown in the pumped bore and in the observation bore suggesting pumping in E46/0489 has limited effects on drawdown in bore E46/1007 under the tested pumping rates and durations. Note that scale of displacement in the observation bore (secondary y-axis) in upper Figure is 10 times lower than for the pumped bore.

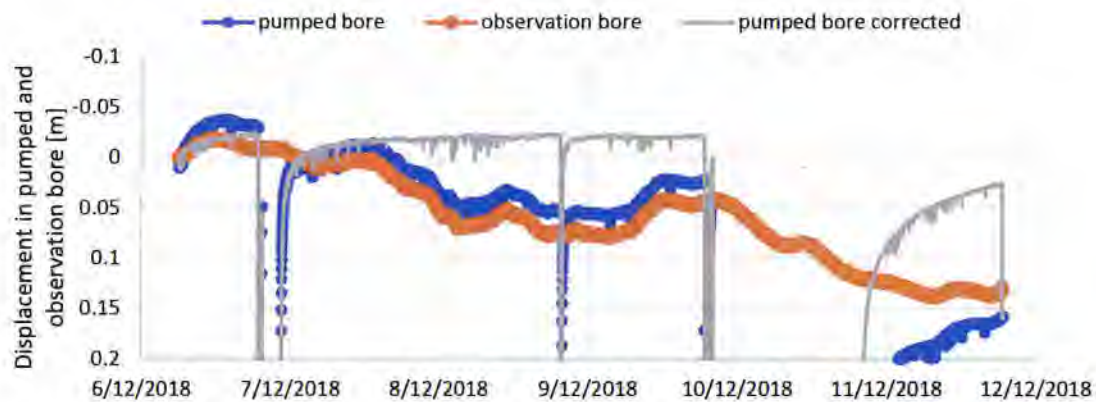


Figure 2b: Displacement in both bores is plotted on the same axis/same scale suggesting water level variability in the observation bore is similar to the background variability of bore E46/0489 when not pumped. Also plotted are the observations in the test bore which were corrected for the ambient level changes using the unaffected observation bore level record.

With regard to the quality of the pump test data, a significant ambient variation in water level is evident from Figure 2 affecting the validity of the test data. Therefore, the observations in the test bore were corrected for the ambient level changes using the unaffected observation bore level record. Apart from that, SouthDrill appear to have had issues with the pump and/or equipment leading to sudden jumps in the drawdown data during the first step of the step-test and early stages of the 24-hour constant rate test (Figure 2a). These data were excluded from further analysis as they would interfere with the data fitting. However, in addition to the data recorded in December, drawdown and recovery data recorded during an earlier pump test for E46/0489 in November (which lacked observation of drawdown in E46/1007) were used for aquifer modelling to verify aquifer property estimates obtained using the December pump test data. The pump test data collated in November is shown in Appendix 1.

The results of the aquifer test, specifically drawdown and recovery recorded during the 24-hour constant rate test and step test, at the pumped bore E46/0489 in November and December³, were analysed using Aqtesolv software version 4.50 using a range of formulas. The Theis (1935) solution provided the best fit, particularly for the recovery data, with lowest standard error⁴. The results indicated an estimated transmissivity of ca. 2,520 m²/day using the step drawdown test data obtained in December 2018 (Figure 3), and 2,840 m²/day using the step drawdown test data obtained in November 2018 (Appendix 2). The 24-hour constant rate test yielded 2,310 and 2,270 m²/day using the step drawdown test data obtained in December and November, respectively (Appendix 2).

³ December data were corrected for ambient the ambient level changes using the unaffected observation bore level record.

⁴ The variable quality of the pump test data collated in December made it quite challenging to fit the data. In general, the recovery data is more reliable than the drawdown data because the recovery occurs at a constant rate, whereas pumping occurred at a variable rate (it is often difficult to achieve a true constant pump rate). The Theis solution provided a better fit and a higher (more conservative) transmissivity estimate than the Neumann solution. Details are presented in Appendix 2.

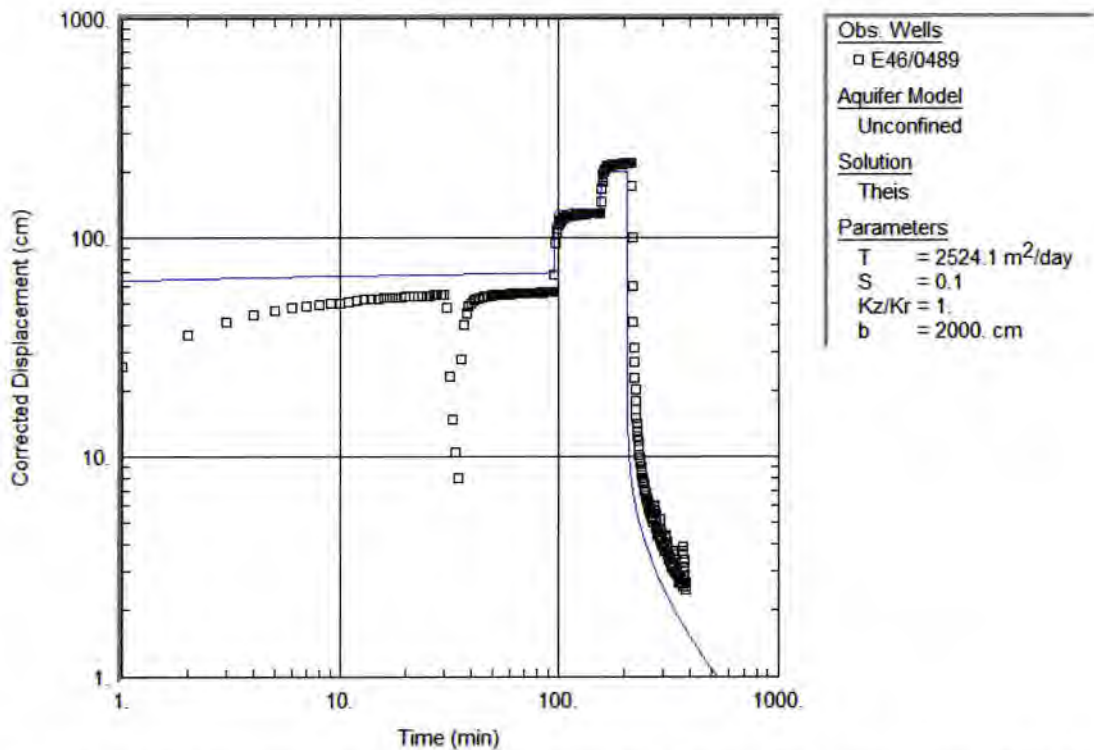


Figure 3: Main bore (E46/0489) step drawdown and recovery test dataset (black squares) solved for the Theis solution for unconfined aquifers with partial penetration (solid line) using Aqtesolv software. As expected, displacement (=drawdown) in the observation bore is lower than in the pumped bore. Drawdown in the observation well during abstraction changes slowly until it reaches steady state, while recovery occurs relatively quickly. Transmissivity (T) was estimated to be approximately 1,708 m²/day with a storativity (s) of 0.5. Discrepancies between modelled and observed data are likely to be due to seasonal variability of water level in the bore, and heterogeneities in the subsurface, e.g. in transmissivity. Therefore, drawdown in the pumped bore will likely not behave ideally, not following a simple model, such as the Theis solution.

The estimated transmissivities equate to a hydraulic conductivity of approximately 114 to 142 m/d assuming an aquifer thickness of 20 m based on bore log information provided for bore E46/1007, and the general characteristics of the Lower Oreti GWMZ (Environment Southland). The results of the aquifer test, supports that bore E46/0489 is located within an unconfined aquifer system of high transmissivity as also noted by Liquid Earth, (2009).

Overall, the estimated aquifer transmissivity (in the range of 2,300 to 2,800 m²/d) is relatively high compared to other bores in the area⁵. However, Liquid Earth (2009) also estimated a higher than average max yield (of 12.5 L/s) during basic pump testing of the bore, and based on that concluded that the bore is likely to tap into a layer of higher permeability than normally found in the Lower Oreti GWMZ. Generally higher aquifer transmissivity is expected in close proximity to the Oreti River (and recent gravel deposits) based on the depositional history of the subsurface geology in the

⁵ Available transmissivity estimates in the Lower Oreti GWMZ:

Bore	Easting	Northing	Depth [m]	T [m ² /d]
E45/0206	2147434	5442534	unknown	400-800
E45/0532	2148410	5457878	12	223-577

Lower Oreti GWMZ (Environment Southland). The estimated hydraulic conductivity is comparable to those found for alluvial gravel aquifers in New Zealand (Moore et al., 2010).

4 Well interference and stream depletion effects

The results of the aquifer test indicated that bore E46/0489 was likely to penetrate an unconfined aquifer system as is consistent with the hydrogeological setting and well depth within the area. Therefore, a determination of acceptable interference effects with other lawfully established groundwater takes is required as per Appendix L.3 of the pSWLP (Environment Southland, 2016). A stream depletion assessment is also required as the take from an unconfined aquifer is more likely to be hydraulically connected to surface water bodies.

Bore Interference

According to Environment Southland, there are only 3 other registered groundwater bores located within a 1 km radius from E46/0489 (Table 3). These include a residential water supply bore (E46/0167) at a distance of 40 m, a groundwater quality monitoring bore (E46/1007) at a distance of 475 m, and a stock supply bore (E46/0321) at a distance of 1 km. These bores are likely to draw from the same unconfined aquifer as E46/0489 based on available well construction details (Table 3). Therefore, of relevance to this application are the requirements for acceptable bore interference detailed in Appendix L.3 of the pSWLP. Specifically, *'The cumulative interference effect of any new groundwater abstraction is considered "acceptable" if the drawdown does not exceed 20 percent of the available drawdown in any existing (properly constructed and operated) bore which adequately penetrates an unconfined aquifer that is not utilised for long-term monitoring of water levels.'*

The data provided in Table 3 suggest, available drawdown in bores penetrating the Lower Oreti GWMZ within a 1 km radius around E46/0489 is 1.3 to 7.5 m based on available screen and initial Static Water Level (SWL) information. With that, acceptable drawdown for the neighbouring groundwater users caused by the proposed take becomes 0.26 m to 1.5 m (i.e., 20% of available drawdown according to the pSWLP).

A calculation of drawdown over distance at 3 selected pumping durations i.e., 10, 146 and 365 days, was undertaken for the nearby consumptive groundwater takes. This analysis was carried out using the Theis assessment provided in the Environment Canterbury drawdown tool (Environment Canterbury, 2018). A transmissivity of 1,700 m²/day⁶ and a storativity of 0.2 were used as input data obtained from the aquifer test, along with the pumping rate of 11 L/s.

*Table 3: Summary of bores within 1 km radius of E46/0489 and estimated available drawdown based on available depth, screen depth, and initial water level information. *=estimated based on well screen and initial water level data of nearby/typical bores.*

Well No	Depth (m)	Primary Use	Screen top (m)	Screen bott. (m)	Initial SWL (m)	Easting	Northing	avail. draw-down (m)
E46/0321	9.0	Stock Supply	7.0*	9.0*	-2.00*	1238208	4862410	6.0
E46/1007	6.5	Quality monitor.	-3.5	-6.5	-3.74	1238704	4863333	1.3
E46/0167	10.0	Household	-8.0	-10.0	-1.50	1238206	4863411	7.5

⁶ For the analysis the lowest transmissivity estimate obtained in this work was used to provide a relatively conservative drawdown estimate for neighbouring bores.

Results indicate drawdown is 'acceptable' (<1.5 m) for the bores located within (and beyond) a 1 km radius of E46/0489 at the proposed 146 days of constant pumping at 11 L/s (Figure 4). Even if pumping was carried out all year round, the effect on drawdown on neighbouring bores is minimal and therefore 'acceptable' outside a <1 m radius from E46/0489. It is concluded that groundwater abstraction from bore E46/0489 is likely to have minor or no impact on any neighbouring groundwater bores and takes. The results are supported by a statement from Lex and Faye Dudfield, the owners of the bore E46/0167 located 40 m away from E46/0489, saying they have had never any issues with drawdown in their bore during abstraction from E46/0489 over the last 20 years.

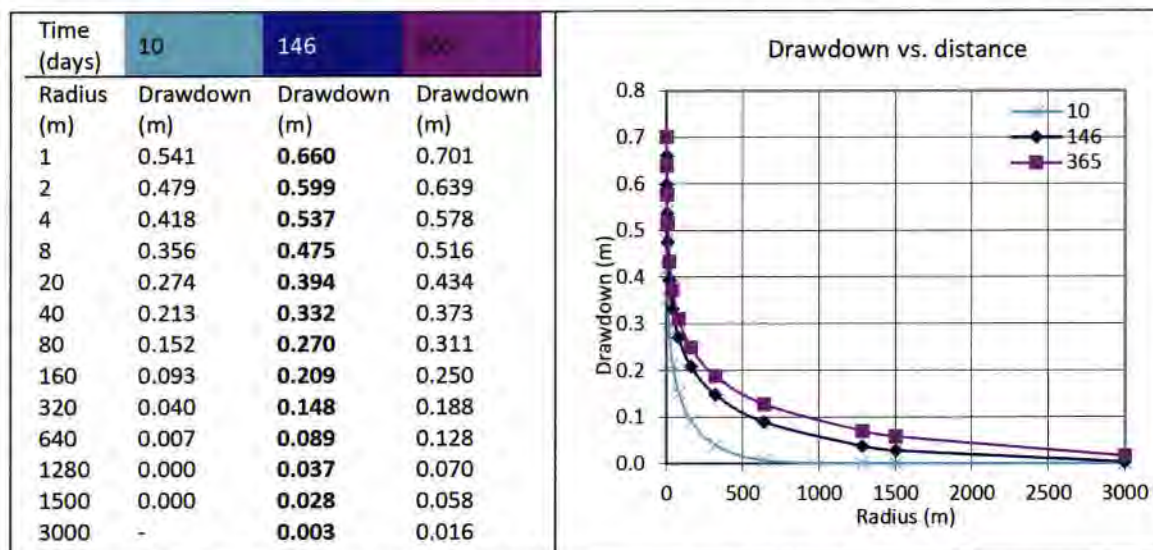


Figure 4: Distance-drawdown calculations using Theis equation for well E46/0489 using the Environment Canterbury drawdown tool. Values most relevant for the proposed application are highlighted in bold.

Stream Depletion

The closest surface water way is located approximately 92 m to the east, the Tomoporakau Creek (Figure 1). In the absence of evidence suggesting the stream is ephemeral, the Tomoporakau Creek is considered for stream depletion assessment⁷.

The hydraulic connection and potential magnitude of stream depletion was estimated using the method of Hunt (1999). The conceptual model of Hunt (1999), illustrated in Figure 5, is considered appropriate for application to the hydrological setting in the Lower Oreti GWMZ. However, the authors note that the Hunt equation assigns all depletion to the local stream used for analysis when in reality the cumulative draw down is likely to be more widely distributed. Accordingly, this assessment provides a maximum stream depletion rate for the Tomoporakau Creek.

⁷ Ephemeral streams do not require a stream depletion assessment under the pSWLP. Evidence for an ephemeral stream includes growth of grass or terrestrial vegetation in the bed of the stream, and absence of a permanent stream bed characterised by materials including rock pebbles, boulders, clay, etc.

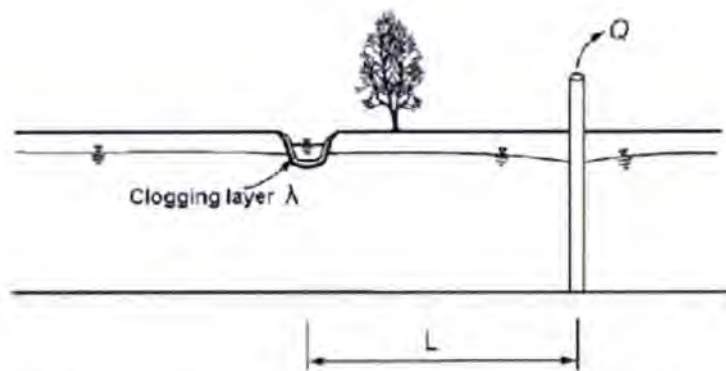


Figure 5: Conceptual model representing the hydrological setting for stream depletion after Hunt (1999).

Any return of the abstracted groundwater to groundwater and/or the Tomoporakau Creek is assumed to occur through two of the three operating soakage pits (irrigation to land only occurs approximately every 2 years to remove accumulated sediments from the settling ponds) (Robson, 1997). The locations of soakage pits and the Tomoporakau Creek with respect to the abstraction bore are illustrated in Figure 6.



Figure 6: Location of the bore E46/0489 with regards to the Tomoporakau Creek and the settling ponds used for discharge of the water used for vegetable washing.

In absence of any recharge or percolation data, return to groundwater from the soakage pits was estimated assuming evaporation is the main loss of water returning to the aquifer. Based on a mean annual evaporation rate of 865 mm/year and maximum monthly mean evaporation rate of 113 mm/month determined at Invercargill weather station (Figure 7), and a total surface area of 6,000 m² of the soakage pits determined from aerial photography, total loss associated with evaporation is likely to be less than 3.7 and 5.9% of the discharged water, respectively⁸. Losses during the

⁸ For simplicity, total evaporation was determined as the product of evaporation rate and surface area, equating to 5,190 and 8,136 m³/year for mean annual and max monthly evaporation rates, respectively.

vegetable washing operation and losses in the subsurface due to vertical drainage are assumed to be minor (in total < 10%) with >80% of the abstracted water returned to the aquifer via soakage pits. The return rate to groundwater and other parameters utilised for stream depletion modelling are summarised in Table 4.

Table 4: Model parameters used for stream depletion assessment.

Model parameter	Value
Aquifer transmissivity	2,300-2,800 m ² /d
Storativity	0.2
Stream bed conductance (λ)	100 m/d
Pumping rate	11 L/s
Distance to water way	92 m
Return to groundwater	40-80%
Distance from ponds centroid to stream	200 m



Figure 7: Mean monthly open water evaporation rates (Penman) in Invercargill using data from 1997 to 2018.

The outcome of the stream depletion assessment (Table 5) suggests that bore E46/0489 is likely to be hydraulically connected to the Tomoporakau Creek. The estimated stream depletion rate is relatively insensitive to the actual aquifer transmissivity for the range 1,700 to 2,800 m²/d. However, the stream depletion rate is also sensitive to the rate of return to groundwater from the soakage pits. At a pumping duration of 7 days or the proposed 146 days, 35 - 37% or 24 - 25%, respectively, of the groundwater take is drawn from surface water, while the remainder is drawn from groundwater when assuming 80% of the abstracted and subsequently discharged groundwater returns to the aquifer via the soakage pits.

Based on this analysis, according to Appendix L.2 of the pSWLP, the hydraulic connection between E46/0489 and the Tomoporakau Creek is considered low, as stream depletion is less than 30% of the assessed rate. At low hydraulic connection, the take can be managed solely as a groundwater take according to Appendix L.2 of the pSWLP.

Further analysis suggested that a groundwater return of more than 75% (at the assessed parameters and pumping regime) yields enough groundwater recharge to keep the stream depletion rate below 30% of the proposed abstraction rate which is considered a low hydraulic connection. Further, according to Pyper's Produce, the pumping would occur for approximately 10 hours per day during operation of the plant at approx. 50 weeks of the year, which is going to have a lower effect on stream depletion than estimated during 146 days of constant pumping at maximum rate of 11 L/s (which is required under the pSWLP).

Table 5: Estimated stream depletion after selected times of pumping at 11 L/s at 80% return to groundwater, and 1,700 or 2,800 m²/d aquifer transmissivity.

Duration of pumping [days]	Stream depletion rate [L/s] at 1,700 m ² /d – 2,800 m ² /d	% of proposed take
7	3.2-3.5	35 – 37 %
150	2.4-2.5	24 - 25 %
365	2.4	23 %

5 Conclusion

It is likely that the abstraction of 11L/s at a maximum seasonal rate of 380 m³/day from bore E46/0489 will have little or minor adverse effects on other groundwater users and surface water ways. Specifically, a well interference assessment indicated that there will be negligible drawdown of groundwater level in neighbouring bores from the proposed activity. Stream depletion analysis suggests that connection of the bore to the surface water network (Tomoporakau Creek) is low at the proposed maximum pump rate (ca. 11 L/s) over 146 days of continuous pumping and estimated 80% return of abstracted groundwater to the aquifer via soakage pits.

Please do not hesitate to contact us if you require any further information or clarification.

Dr Monique Beyer



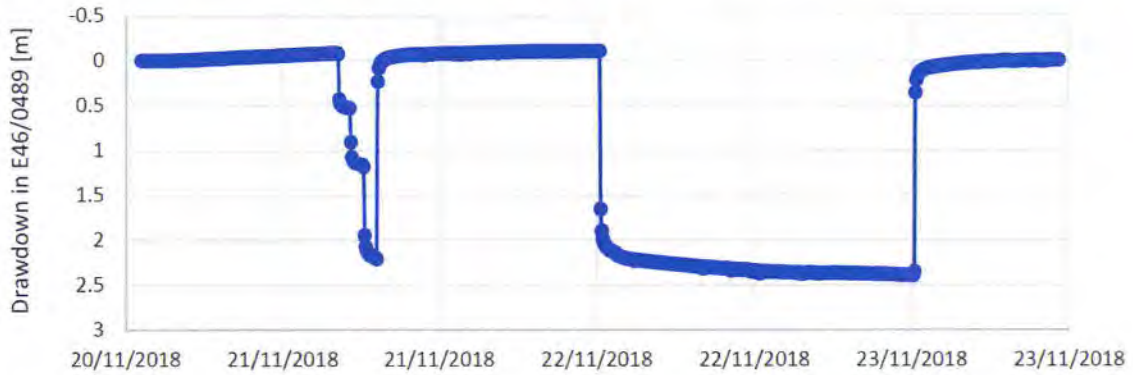
Senior Environmental Engineer
Land and Water Science
11/01/2019

Reviewed by Dr Clint Rissmann



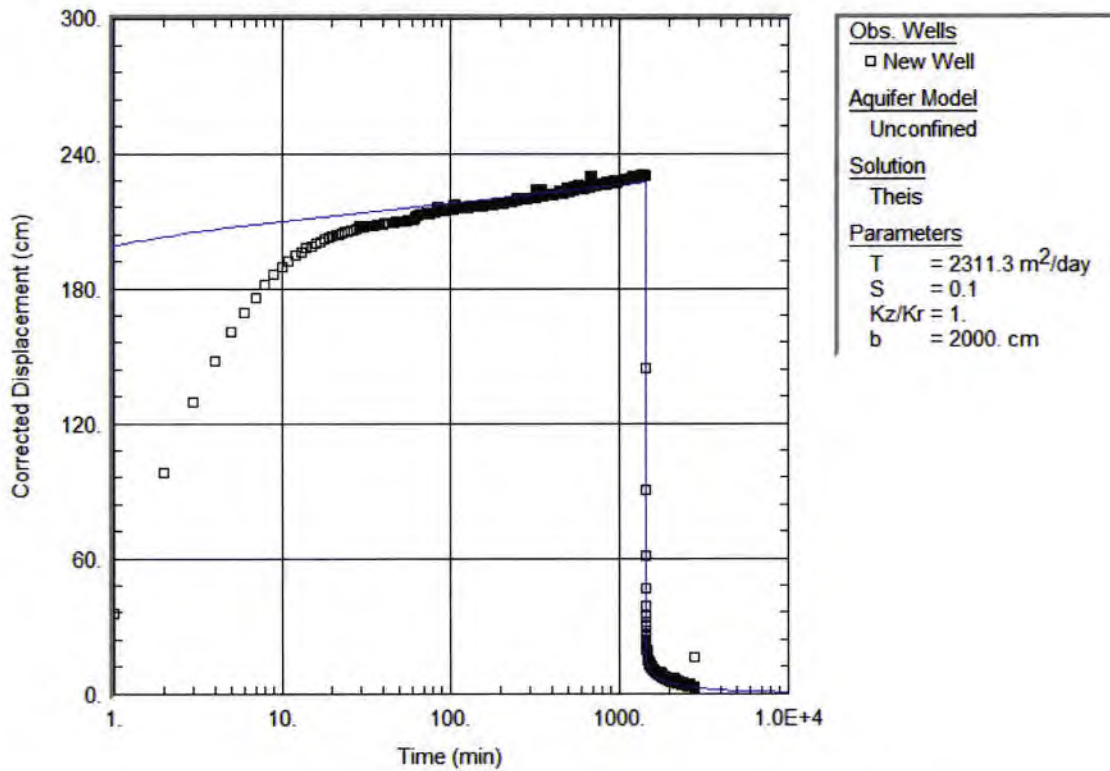
Director Land and Water Science Ltd
11/01/2019

Appendix 1: Pump test results from November 2018

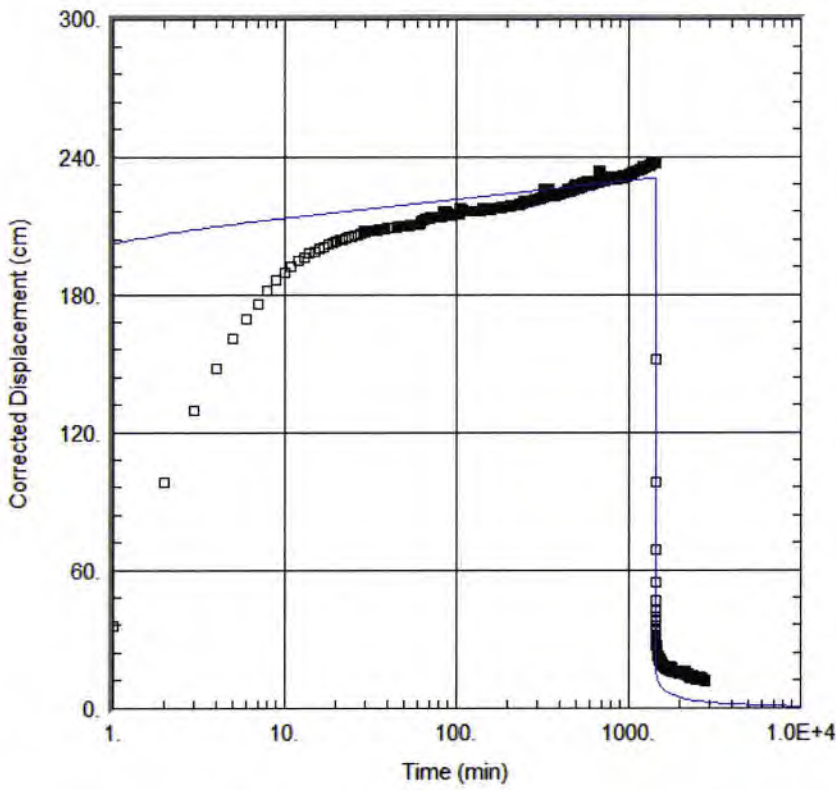


Appendix 2: Other pump test solutions

This fit to 24-hour constant rate test December data:

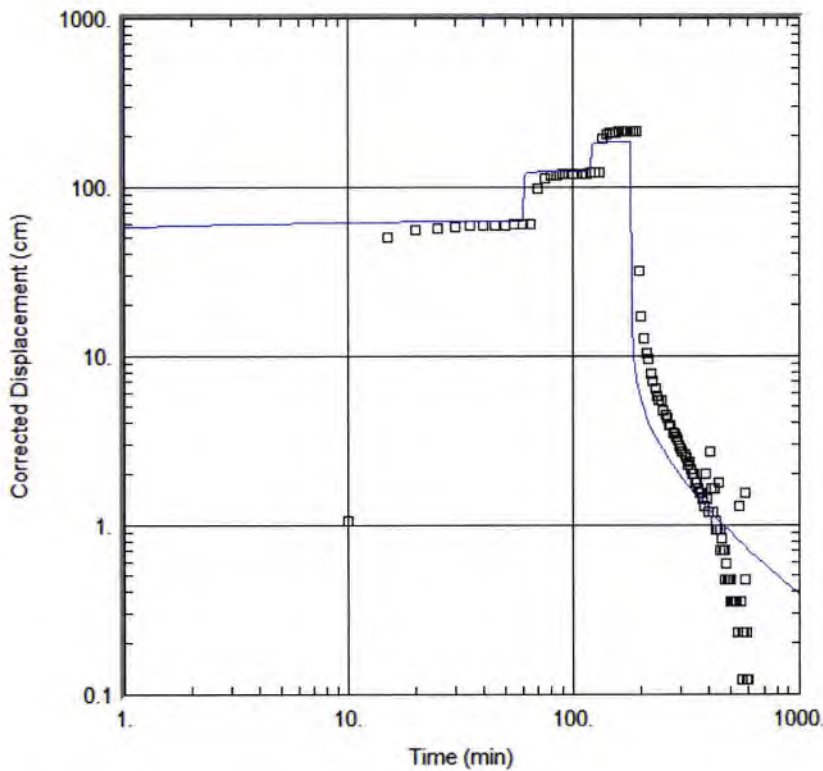


This fit 24-hour constant rate test November 2018:



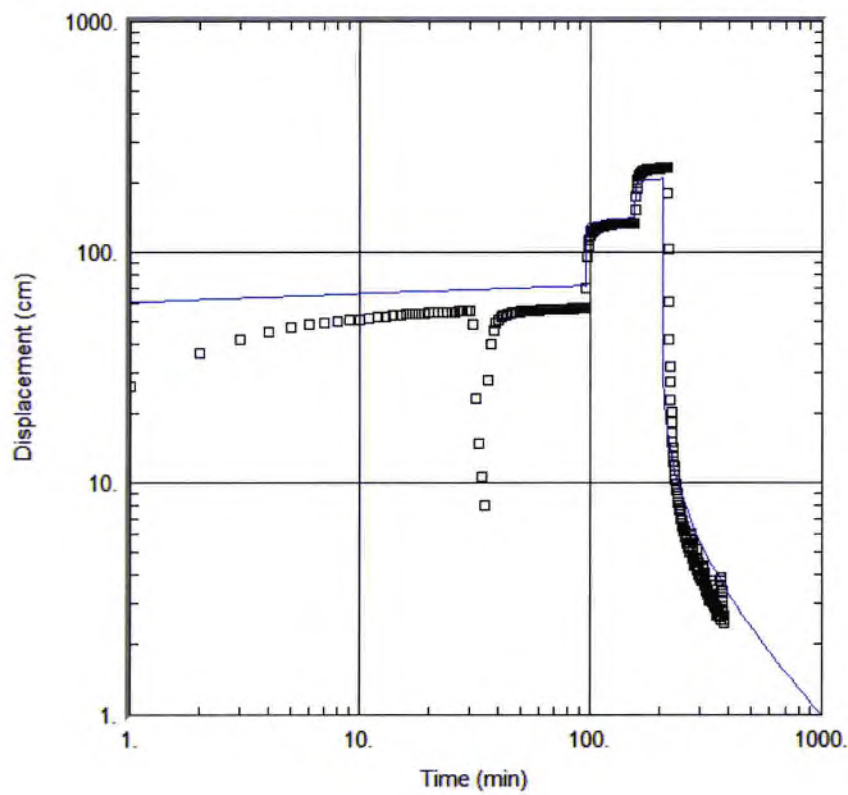
Obs. Wells
 □ New Well
Aquifer Model
 Unconfined
Solution
 Theis
Parameters
 $T = 2273. \text{ m}^2/\text{day}$
 $S = 0.1$
 $Kz/Kr = 1.$
 $b = 2000. \text{ cm}$

This fit to November step test data:



Obs. Wells
 □ E46/0489
Aquifer Model
 Unconfined
Solution
 Theis
Parameters
 $T = 2842.2 \text{ m}^2/\text{day}$
 $S = 0.2$
 $Kz/Kr = 1.$
 $b = 1711. \text{ cm}$

Neumann fit to December step test data. Very poor.



Obs. Wells
 □ E46/0489

Aquifer Model
 Unconfined

Solution
 Neuman

Parameters
 $T = 1149.3 \text{ m}^2/\text{day}$
 $S = 0.1$
 $S_y = 0.001$
 $\beta = 0.001291$

Appendix 10

Wash Water Sample Results



WATER TESTING LABORATORY

Lake Street Invercargill
ph(03) 216 2189 fax (03) 216 2789

14-Nov-18

Lab Reference Number: B 21890

Water Test Report:

Name: Pypers Produce
Address: 1053 Lochiel Branxholme Rd. RD4 Invercargill 9874
Order No:
Date Received: 1/11/2018 12:55
Date Sampled: 1/11/2018
Sample Description: Settling Ponds

Chemical Analysis

Test	Result	Units	Method
Nitrate Nitrogen:	0.22	mg per litre as N	(NWASCO 38)
Ammoniacal Nitrogen:	0.09	mg per litre as N	(NWASCO 38)
Total Nitrogen:	32.6	mg per litre	(TKN + TON)
Total Phosphorus:	0.94	mg per litre	(NWASCO 38)
Chloride:	69	mg per litre	(APHA 23ed 4500-Cl B)
Sodium:	42	mg per litre	(Watercare)
Potassium:	28	mg per litre	(Watercare)

A. Cocker
Lab Manager

Appendix 11

Compliance History Summary

Full Compliance Observation Listing

Observation Date <i>(click to open observation)</i>	Activity Name	Observation Type	Performance Rating	Authorisation Compliance Status	Condition Compliance Status	Council Response	Comments	Condition Number	Condition Text HTML
07 Jun 2018		Verification Report		Full compliance	Full compliance		Make: Arad. Model: Octave 100mm. Serial number: 174019506. Calibration Merer Status: 3.934%.		
21 Mar 2018	Abstraction Records (Low Rate) - Monthly 2017/2018	Abstraction records					Monthly		
08 Jun 2017	Pyper's Produce - 205659 - Abstraction Records	Abstraction records		Full compliance	Full compliance		Monthly Abstraction Records for 30 June 2016 - 30 May 2017. Take complies with daily limit.		
08 May 2016	Pyper's Produce - 205659 - Abstraction Records	Abstraction records		Full compliance	Full compliance		Received Monthly abstraction records for June 2015 - May 2016. Take limit complied with		
22 Apr 2016	Abstraction Records (Low Rate) - Monthly 2015/2016	Abstraction records		Full compliance	Full compliance		Monthly		
07 May 2015	Abstraction Records - Monthly 2014/2015	Abstraction records		Full compliance	Full compliance		Monthly		
16 Jun 2014	<5l. Per second takes - Volume Analysis	Abstraction records							
06 Jun 2014	Pyper's Produce - 205659 - Abstraction Records	Abstraction records					Monthly abstraction records for June 2013 - May 2014 supplied.		
13 Sep 2013	Compliance Inspection: Abstraction records	Abstraction records	Awaiting results	Non-compliance	Non-compliance		Monthly water take data submitted for June 2012 - May 2013. Late.		
05 Apr 2011	Compliance Inspection: Abstraction records	Abstraction records	Unsatisfactory	Non-compliance	Non-compliance		Annual water take results sheet returned without data but with comment - ' water is used for washing potatoes and carrots. We need about between 50,000 ltr/hr and 500,000 a day per year. 182,000.000ltr.		

Full Compliance Observation Listing

Authorisation: AUTH-205660-V1

Observation Date (click to open observation)	Activity Name	Observation Type	Performance Rating	Authorisation Compliance Status	Condition Compliance Status	Council Response	Comments	Condition Number	Condition Text HTML
13 Apr 2018	Pyper's Produce - Irrigation Inspection & SW & Discharge Monitoring - 205660-V1	Inspection		Full compliance	Full compliance		Inspection of soakage pits and discharge pond on 13 April 2018. Pond levels were ok. No issues identified. No irrigation to land has occurred since January 2017.		
13 Apr 2018	Pyper's Produce - April GW Sampling & Inspection - 205660-V1	ES Sample		Full compliance	Full compliance		Results for groundwater sample collected 13 April 2018 had both E.coli (<1 MPN/100ml) and Nitrate nitrogen levels (8.8 g/m ³) less than drinking water standards. No issues identified during inspection and soak pits and ponds had lots of freeboard. No irrigation to land was occurring.		
21 Nov 2017	Pyper's Produce - Nov GW Sampling - 205660-V1	ES Sample		Full compliance	Full compliance		Results for groundwater sample collected 21 November 2017 had both E.coli (<1 MPN/100ml) and Nitrate nitrogen levels (9.3 g/m ³) less than drinking water standards. No issues identified during inspection and soak pits and ponds had lots of freeboard. No irrigation to land was occurring.		
21 Apr 2017	Pyper's Produce - April Council Inspection - 205660-V1	ES Sample		Full compliance	Full compliance		April groundwater sample collected 21 April 2017. E.coli result of 1 MPN/100mL exceeds drinking standards while Nitrate-N (8.0 g/m ³) results now complies. No issues from inspection.		
09 Feb 2017	Pyper's Produce - Discharge Logs - 205660-V1	Application Rate Results		Full compliance	Full compliance		Received discharge logs for 2016/2017 showing when and for how long the irrigator pump was run and information showing the maximum volume the pump can apply (l/s). The amount irrigated was fully compliant with the consent limits.		
13 Jan 2017	Pypers Produce - 205660-V1 - Surfacewater Monitoring	Inspection		Full compliance	Full compliance		Undertook routine inspection while wash water was being irrigated from the ponds. No signs of over application or the irrigated wash water getting into the waterway. Distances from waterways and boundaries were complied with. The 1 line of 4 pods was being run on average 8 hours a day and it took 3 days to empty a pond. There are 6 ponds in total. Irrigation only occurred during suitable weather conditions.		
09 Nov 2016	Pyper's Produce - Nov Council Inspection - 205660-V1	Inspection		Full compliance	Full compliance		Inspection undertaken 9/11/16 same day as bore water monitoring. No issues identified from inspection. No irrigation to land has occurred to date. The sediment had been removed from the initial sediment ponds and stored behind grassed dirt bunds alongside stream. The water level in the soak pits is higher than in April.		
09 Nov 2016	Pyper's Produce - Nov GW Sampling - 205660-V1	Client Sample		Full compliance	Full compliance		Collected bore sample for 9 November 2016. The E.coli complied with the drinking water standard <1 MPN/100mL while the nitrogen (nitrate + nitrite) result of 11.3 mg/L, exceeds the New Zealand drinking water standards (11.3 mg/L). The paddock where the monitoring bore is located was in crop this year/season so it is likely that the increase in the groundwater nitrogen (nitrate + nitrite) level is due to the paddock being in crop.		
03 Oct 2016	Pyper's Produce - SW & Discharge Monitoring - 205660-V1	Clients report/letter		Full compliance	Full compliance		Rung Pyper's Produce and spoke to Sarah Hattrill (Works in Administration). She confirmed that no discharge to land from the soakage ponds had occurred since my last visit in April 2016.		

Full Compliance Observation Listing

Authorisation: AUTH-205660-V1

<u>04 May 2016</u>	Pypers Produce - 205660-V1 - Surfacewater Monitoring	Clients report/letter	Full compliance	Full compliance	No irrigation of wash water discharge to land has occurred since 2014. Was verbally informed during inspection on 4 May 2016. Therefore surfacewater samples are not required.
<u>04 May 2016</u>	Pyper's Produce - April GW Sampling - 205660- V1	ES Sample	Full compliance	Full compliance	April groundwater sample collected 4 May 2016. E.coli and Nitrate-N results comply with drinking water standards. The nitrate-N result of 2.13 g/m ³ is the lowest result date. The average result for April/early May was 10.6 g/m ³ . Discharge sample was also collected.
<u>04 May 2016</u>	Pyper's Produce - April Council Inspection - 205660-V1	Inspection	Full compliance	Full compliance	No issues identified on site. New overflow ponds have been established to ensure the soak pits do not overflow. Should be no longer possible to get discharges directly from the ponds to land.

1 February 2018

Mr B Hamilton
Pyper's Produce Southland
Lochiel-Branxholme Road
RD 4
Invercargill 9874

Our References: A365403, A376465,
A376487
Enquiries to: Ruth Williamson



Te Taiao Tonga

Dear Brendon

Pyper's Produce Monitoring - Resource Consent 205660-V1

Bore Monitoring

Enclosed are the analytical results for the monitoring bore (E46/1007) routine water sample collected on 21 November 2017. I apologise for the delay in sending the results.

It is pleasing to see that the *E.coli* result for the bore was <1 MPN/100 mL which is compliant with the New Zealand drinking water standards of < 1 MPN/100 mL.

The Nitrogen (nitrate + nitrite) result of 9.3 mg/L was also less than the New Zealand drinking water standards (11.3 g/m³) and consistent with historical results.

It is pleasing to see that the Nitrogen (nitrate + nitrite) result for November 2017 is also lower than the 9 November 2016 result (11.3 g/m³), which was at the drinking water standards limit. The decrease in the April and November 2017 results compared to the November 2016 result further supports the theory that the November Nitrogen (nitrate + nitrite) result was due to the paddock being in crop last season (hence the low 4 May 2016 result of 2.14 g/m³), then ploughed and fertilised for new the grass present in November 2016.

Inspection

An inspection of the discharge and soakage ponds was also undertaken during the site visit and there were no issues identified.

It is my understanding that no irrigation of the wash water to land has occurred since January 2017 therefore sampling as per conditions 10 (b) & (c) was not required on this occasion.

If you have any question please do not hesitate to contact me.

Yours sincerely

A handwritten signature in dark ink, appearing to read 'Ruth Williamson', with a long horizontal flourish extending to the right.

Ruth Williamson
Compliance Technical Officer

Sample Results

Pyper's Produce Limited
1035 Lochiel Branxholme Road
RD 4
Branxholme
Invercargill 9874

File No. : P078-001

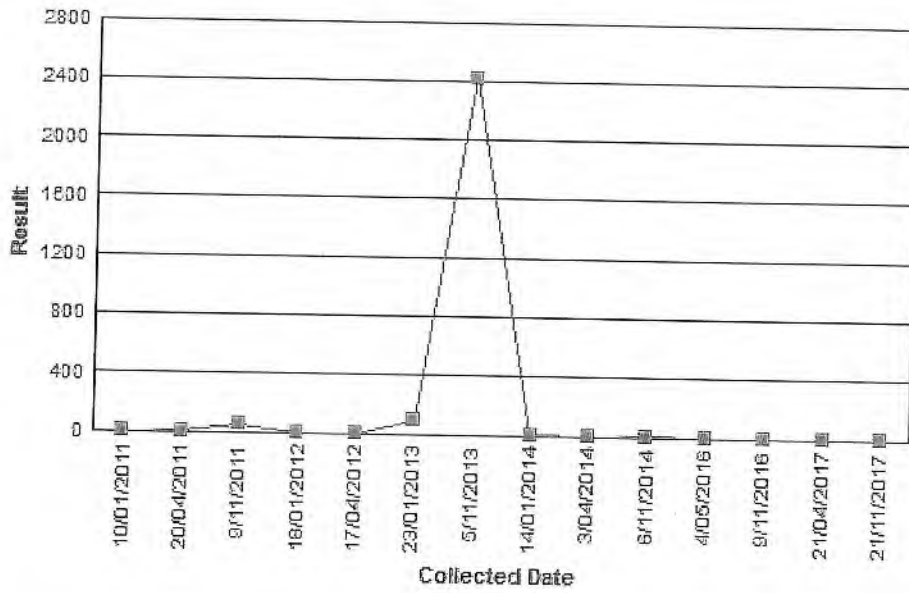
Consent No. : 205660-V1

Sample No: 20172902
Sample Description: E46/1007
Date Samples Collected : 21/11/2017
Water Temperature: (°C) 10.7

E. Coli (MPN)	MPN / 100mL	< 1
Electrical Conductivity	uS/cm	331
Nitrogen (Nitrate)	g/m ³	9.3
Nitrogen (Nitrate + Nitrite)	g/m ³	9.3

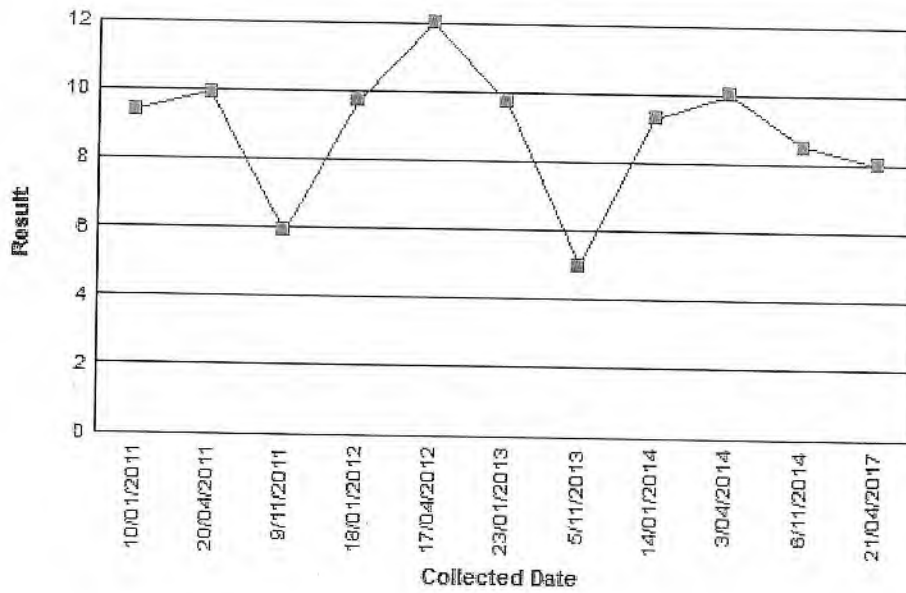
E46/1007 - E. Coli (MPN)

Maximum for Drinking Water Standard - < 1 MPN/100 ml



E46/1007 - Nitrogen (Nitrate+Nitrite)-Combined

Maximum for Drinking Water Standard - 11.3 g/m³



3 February 2017

Mr B Hamilton
Pyper's Produce Southland
Lochiel-Branxholme Road
RD 4
Invercargill 9874

Our References: A310034, A309883
Enquiries to: Ruth Williamson



Dear Brendon

Pyper's Produce Monitoring - Resource Consent 205660-V1

Irrigation Inspection and Sampling

Enclosed are the analytical results for the discharge sample collected on 13 January 2017. The sample was taken from the 5th pond and not pond 4 which was being irrigated at the time of the inspection. However the wash water in all the ponds was expected to be similar and therefore the results are indicative of the quality of all the wash water irrigated.

The results are also similar to the discharge sample that was collected 4 May 2016.

The pods were set up on the northern side of the soak pits approximately 100m from the ditch which joins with Tomoporokau Creek. Samples were not collected from the ditch as there was no discernible flow in the ditch. On this occasion samples were also not collected from Tomoporokau Creek as there no signs of over application, no discernible tile outlets into Tomoporokau Creek which was running clear, the waterway was bunded along the banks where the irrigator was set up and it was determined to be very unlikely that any of the irrigated washwater would reach the creek.

Although the receiving water samples were not collected on this occasion if the pods are set up on the northern side of the soak pits again then these samples may be collected during future inspections.

It was mentioned that the pods are normally set up in the paddocks on the southern side of the soak pits which is a more ideal location as it is further away from the waterway. Please ensure that if the pods are set up near the monitoring bore that no discharge occurs onto or into the bore.

The irrigation was fully compliant with the consent conditions 2, 4, 5 and 6.

Volume Discharged

To determine compliance with condition 3 which states that "the volume of waste shall not exceed 380 m³/day as a monthly average," the volume of discharge needs to be recorded every month. Condition 9 requires that a copy of this record is supplied to Environment Southland by 31 October each year. If all irrigation has ceased and is not likely to commence again prior to October then this report can be submitted early.

If you have any question please do not hesitate to contact me.

Yours sincerely

A handwritten signature in cursive script, appearing to read 'Ruth Williamson', written in dark ink.

Ruth Williamson
Compliance Technical Officer

Sample Results

Pyper's Produce Limited
1035 Lochiel Branxholme Road
RD 4
Branxholme
Invercargill 9874

File No. : P078-001

Consent No. : 205660-V1

Sample No: 20170124
Sample Description Pypers Produce Discharge
Date Samples Collected : 13/01/2017

Nitrogen (Nitrate)	g/m ³	0.049
Nitrogen (Nitrate+Nitrite)-Combined	g/m ³	0.095
Nitrogen (Nitrite)	g/m ³	0.046
Phosphorus (Dissolved Reactive)	g/m ³	0.004
Nitrogen (Total)	g/m ³	4.03

7 May 2018

Mr B Hamilton
Pyper's Produce Southland
Lochiel-Branxholme Road
RD 4
Invercargill 9874

Our References: A388940, A3396030,
A396050
Enquiries to: Ruth Williamson



Te Taiao Tonga

Dear Brendon

Pyper's Produce Monitoring - Resource Consent 205660-V1

Bore Monitoring

Enclosed are the analytical results for the monitoring bore (E46/1007) routine water sample collected on 13 April 2018.

It is pleasing to see that the *E.coli* result for the bore continues to be <1 MPN/100 mL which is compliant with the New Zealand drinking water standards of < 1 MPN/100 mL.

The Nitrogen (nitrate + nitrite) result of 8.8 mg/L was also less than the New Zealand drinking water standards (11.3 g/m³) and consistent with historical results.

Inspection

An inspection of the discharge and soakage ponds was also undertaken during the site visit and there were no issues identified.

Thank you for confirming that no irrigation of the wash water to land has occurred since January 2017 therefore sampling as per conditions 10 (b) & (c) was not required on this occasion.

If you have any question please do not hesitate to contact me.

Yours sincerely

A handwritten signature in black ink, appearing to read "Ruth Williamson".

Ruth Williamson
Compliance Technical Officer



Sample Results

Pyper's Produce Limited
1035 Lochiel Braxholme Road
RD 4
Braxholme
Invercargill 9874

File No. : P078-001

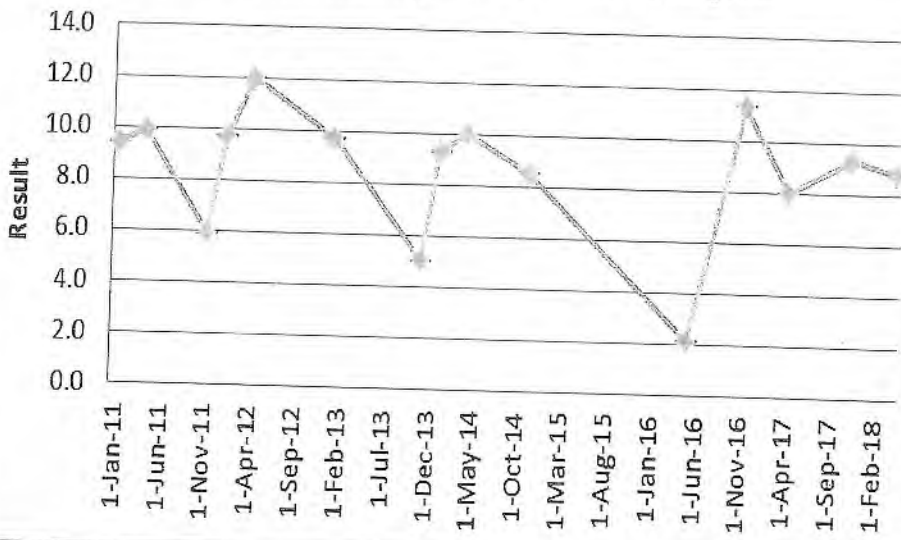
Consent No. : 205660-V1

Sample No: 20181350
Sample Description E46/1007
Date Samples Collected : 13/04/2018

E. Coli (MPN)	MPN / 100mL	< 1
Electrical Conductivity	uS/cm	340
Nitrogen (Nitrate)	g/m ³	8.8
Nitrogen (Nitrate + Nitrite)	g/m ³	8.8

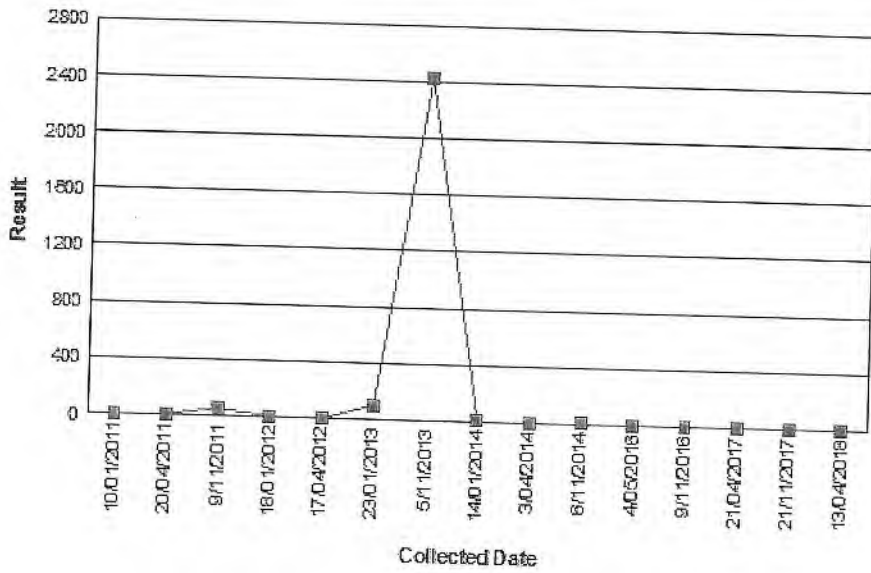
E46/1007 - Nitrogen (Nitrate + Nitrate)

Maximum for Drinking Water Standard - 11.3 g/m³



E46/1007 - E. Coli (MPN)

Maximum for Drinking Water Standard - < 1 MPN/100 ml



Appendix 12

Written Approvals



**environment
SOUTHLAND**

Cnr North Road and Price Street
(Private Bag 90116)
Invercargill

Telephone (03) 211 5115
Fax No. (03) 211 5252
Southland Freephone No. 0800 76 88 45

WRITTEN APPROVAL FORM

To: Environment Southland
Private Bag 90116
Invercargill 9840

Affected person's written approval to an activity that is the subject of a resource consent application

To be completed by the person requesting approval

Applicant: Pypers produce LTD

Application Number: _____ Officer in Charge: _____

Type of Resource Consent: Water Take

Proposed Activity(ies): water use for vegetable washing

Location: 1035 Lochiel Branxholme Road

To be completed by the person giving approval:

Name: Nelson Pyper

and/or Organisation: _____

Street/Road Address: Branxholme Road, RD4, Invercargill

*I am the owner/occupier of the following property and have authority to sign on behalf of all other owners/occupiers of the property: _____ *Delete if not applicable

I/we have studied the application for resource consent and give my/our written approval to the proposed activity/activities.

In signing this written approval, I/we understand that the consent authority must decide that I/we am/are no longer an affected person(s), and the consent authority must not have regard to any adverse effects on me/us.

[Signature] 3/9/18
(Signature) (Date)

(Signature) (Date)

Notes: If you do not understand this form and/or any details regarding the application for resource consent, then you should not provide your written approval.



**environment
SOUTHLAND**

Cnr North Road and Price Street
(Private Bag 90116)
Invercargill

Telephone (03) 211 5115
Fax No. (03) 211 5252
Southland Freephone No. 0800 76 88 45

To: Environment Southland
Private Bag 90116
Invercargill 9840

WRITTEN APPROVAL FORM

Affected person's written approval to an activity that is the subject of a resource consent application

To be completed by the person requesting approval

Applicant: Pypers Produce

Application Number: _____ Officer in Charge: _____

Type of Resource Consent: To Discharge wash water From

Proposed Activity(ies): vegetable cleaning to land

Location: 1035 Lachie Branxholme Road

To be completed by the person giving approval:

Name: Nelson Pyper

and/or Organisation: _____

Street/Road Address: Branxholme Road, 4RD Invercargill

*I am the owner/occupier of the following property and have authority to sign on behalf of all other owners/occupiers of the property: _____ *Delete if not applicable

I/we have studied the application for resource consent and give my/our written approval to the proposed activity/activities.

In signing this written approval, I/we understand that the consent authority must decide that I/we am/are no longer an affected person(s), and the consent authority must not have regard to any adverse effects on me/us.

[Signature] 3/9/18 _____ _____
(Signature) (Date) (Signature) (Date)

Notes: If you do not understand this form and/or any details regarding the application for resource consent, then you should not provide your written approval.



**environment
SOUTHLAND**

Cnr North Road and Price Street
(Private Bag 90116)
Invercargill

Telephone (03) 211 5115
Fax No. (03) 211 5252
Southland Freephone No. 0800 76 88 45

WRITTEN APPROVAL FORM

To: Environment Southland
Private Bag 90116
Invercargill 9840

Affected person's written approval to an activity that is the
subject of a resource consent application

To be completed by the person requesting approval

Applicant: Pyper's Produce Ltd

Application Number: _____ Officer in Charge: _____

Type of Resource Consent: Water and Discharge Permits for Vegetable Washing Operation

Proposed Activity(ies): To abstract groundwater and discharge vegetable wash water to land using low rate spray irrigation for a vegetable washing operation.

Location: 1035 Lochiel Branxholme Road, Branxholme

To be completed by the person giving approval:

Name: Mark McCalum

and/or Organisation: Stoone Farms Ltd

Street/Road Address: 1107 Branxholme Lane

*I am the owner/occupier of the following property and have authority to sign on behalf of all other owners/occupiers of the property: _____ **Delete if not applicable*

I/we have studied the application for resource consent and give my/our written approval to the proposed activity/activities.

In signing this written approval, I/we understand that the consent authority must decide that I/we am/are no longer an affected person(s), and the consent authority must not have regard to any adverse effects on me/us.

Mark McCalum
(Signature)

29/1/19
(Date)

(Signature)

(Date)

Notes: If you do not understand this form and/or any details regarding the application for resource consent, then you should not provide your written approval.



**environment
SOUTHLAND**

Cnr North Road and Price Street
(Private Bag 90116)
Invercargill

Telephone (03) 211 5115
Fax No. (03) 211 5252
Southland Freephone No. 0800 76 88 45

WRITTEN APPROVAL FORM

To: Environment Southland
Private Bag 90116
Invercargill 9840

**Affected person's written approval to an activity that is the
subject of a resource consent application**

To be completed by the person requesting approval

Applicant: Pyper's Produce Ltd

Application Number: _____ Officer in Charge: _____

Type of Resource Consent: Water and Discharge Permits for Vegetable Washing Operation

Proposed Activity(ies): To abstract groundwater and discharge vegetable wash water to land using low rate spray irrigation for a vegetable washing operation.

Location: 1035 Lochiel Branxholme Road, Branxholme

To be completed by the person giving approval:

Name: K & F Russell Family Trust

and/or Organisation: _____

Street/Road Address: 20 Ryat Bush / Wallaceston Road Ryat Bush

*I am the owner/occupier of the following property and have authority to sign on behalf of all other owners/occupiers of the property: _____ **Delete if not applicable*

I/we have studied the application for resource consent and give my/our written approval to the proposed activity/activities.

In signing this written approval, I/we understand that the consent authority must decide that I/we am/are no longer an affected person(s), and the consent authority must not have regard to any adverse effects on me/us.

[Signature] 25/1/19
(Signature) (Date)

(Signature) (Date)

Notes: If you do not understand this form and/or any details regarding the application for resource consent, then you should not provide your written approval.



environment
SOUTHLAND

Cor North Road and Price Street
(Private Bag 90116)
Invercargill

Telephone (03) 211 5115
Fax No. (03) 211 5252
Southland Freephone No. 0800 76 88 45

WRITTEN APPROVAL FORM

To: Environment Southland
Private Bag 90116
Invercargill 9840

Affected person's written approval to an activity that is the
subject of a resource consent application

To be completed by the person requesting approval

Applicant: Pyper's Produce Ltd

Application Number: _____ Officer in Charge: _____

Type of Resource Consent: Water and Discharge Permits for Vegetable Washing Operation

Proposed Activity(ies): To abstract groundwater and discharge vegetable wash water to land using low rate spray irrigation for a vegetable washing operation.

Location: 1035 Lochiel Branxholme Road, Branxholme

To be completed by the person giving approval:

Name: ANDREW AND LOUANNE ROXBURGH

and/or Organisation: _____

Street/Road Address: 256 RYAL BUSH/WALLACETOWN ROAD

*I am the owner/occupier of the following property and have authority to sign on behalf of all other owners/occupiers of the property: 256 RYAL BUSH/WALLACETOWN ROAD *Delete if not applicable

~~I~~/we have studied the application for resource consent and give ~~my~~/our written approval to the proposed ~~activity~~/activities.

In signing this written approval, ~~I~~/we understand that the consent authority must decide that ~~I~~/we ~~are~~/are no longer an affected person(s), and the consent authority must not have regard to any adverse effects on ~~me~~/us.

[Signature] 24/1/2019
(Signature) (Date)

[Signature] 24/1/19
(Signature) (Date)

Notes: If you do not understand this form and/or any details regarding the application for resource consent, then you should not provide your written approval.

Appendix 13

Current Consent



**environment
SOUTHLAND**

AUTH-205660-V1

Cnr North Road and Price Street
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Invercargill

Telephone (03) 211 5115
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Discharge Permit

Pursuant to Section 104B of the Resource Management Act 1991, a resource consent is hereby granted by the Southland Regional Council (the "Council") to **Pyper's Produce Ltd** (the "consent holder") of 393 Lochiel-Branxholme Road, R D 4, Invercargill from 18 May 2009.

Please read this Consent carefully, and ensure that any staff or contractors carrying out activities under this Consent on your behalf are aware of all the conditions of the Consent.

Details of Permit

Purpose for which permit is granted:	To discharge vegetable wash water to land via a soakhole
Location	- site locality - map reference - receiving environment - catchment
	Bransholm, Wallacetown E46:484-254 Land Makarewa River
Legal description of land at the site:	Lot 1 3692
Expiry date:	18 May 2019

Consent Amended

Conditions amended on 30 July 2014, as follows:

Schedule of Conditions

1. The consent period is 10 years, and expires on 18 May 2019.

(Note: Pursuant to Sections 123 and 124 of the Resource Management Act 1991, a new consent will be required at the expiration of this consent. The application will be considered in accordance with the plans in effect at that time, and the adverse effects of the proposed activity).

2. This consent authorises:
 - (a) the discharge of vegetable wash water onto land via a soak pit; and
 - (b) the discharge of vegetable wash water onto land via a land irrigation system;as described in the application, on land known as Lot 1 3692 at about map reference NZMS 260 E46:484-254.
3. The volume of waste shall not exceed 380 m³/day as a monthly average.
4.
 - (a) No vegetable wash water shall be discharged to any surface watercourse by overland flow, run-off, or via a pipe, nor shall there be any surface run-off/overland flow, ponding or contamination of water resulting from the exercise of this consent.
 - (b) The land irrigation system shall be operated and maintained to ensure that there is no offensive or objectionable odour beyond the property boundary, or any spray drift into or beyond the buffer zones specified in Condition 6.
5. Subject to Condition 4(a), the land irrigation system is limited to a maximum depth of application of 20 mm for each individual application, at an instantaneous rate not exceeding 10 mm/hour;

Note 1: The application depth needs to be less than the soil-water deficit (i.e. the depths above are maximum depths and as soil moisture levels approach field capacity, smaller depths will be necessary to avoid losses of contaminants from the root zone. When soil moisture levels reach field capacity, irrigation will need to cease completely to prevent these losses.)

Note 2: This condition is specific to the land irrigation system and does not apply to the soak pits.
6. Effluent may be applied to the land as described in the application and generally as shown in Appendix 1, but the following specific buffers shall be observed:
 - (a) 20 metres of any surface watercourse;
 - (b) 20 metres of any property boundary (unless the adjoining landowner's consent is obtained to do otherwise); and
 - (c) 100 metres of any residential dwelling other than residential dwellings on the property.Where there is conflict between Appendix 1 and these specified buffers, the latter shall apply.
7. Water quality standards for surface water bodies classed as lowland hard beds shall apply during the exercise of this consent in the Tomoporakau Creek.
8. By 30 June 2010 the consent holder shall take one sample of the wash water at the point of discharge into the soakage pits and analyse it for the following chemicals;
 - Linuron
 - Boron
 - Clethodim
 - Tebuconazole
 - Pendimethalin
 - Fenamiphos

The result of the sample is to be provided to the Councils Compliance Manager by 1 September 2010.

9. The consent holder shall monitor the discharge to land to ensure compliance with Condition 3 by recording the volume of the discharge, at or about the same time each month when Condition 2(b) is being exercised. A copy of this record is to be provided to the Council's Compliance Manager by 31 October each year.
10. The consent holder shall pay an annual administration and monitoring charge to the Southland Regional Council, collected in accordance with Section 36 of the Resource Management Act. This charge may include the costs of inspecting the site twice each year (or otherwise as set by the Council's Annual Plan), and:

(a) monitoring the effects of the discharge on groundwater by taking representative samples of the bore water once every six months and analysing for:

- electrical conductivity
- nitrate nitrogen concentration
- *E. coli* concentration

Except that the first sample shall also be analysed for Total Iron concentration.

(b) monitoring the effects of the discharge on surface water, as follows:

- i. monitoring of watercourses may be undertaken up to three times each year,
- ii. representative samples will be taken from the watercourse near the effluent disposal field, upstream and downstream of the discharge area, at points approved by the Council's Compliance Manager.

iii. the samples will be analysed for:

- pH
- electrical conductivity
- total suspended solids
- black disk distance
- nitrate nitrogen concentration
- dissolved reactive phosphorous concentration
- *E. coli* concentration

(c) monitoring the quality of the discharge by taking samples of the wash water twice within the year ended 31 December 2015, and up to once per year thereafter and analyzing for:

- total nitrogen loading
- nitrate nitrogen loading
- dissolved reactive phosphorous loading

11. The consent holder shall drill or access a bore or well within the area outlined in Appendix 1, for the purposes of monitoring groundwater. The bore or well shall not be more than 6 meters deep and the location and construction is to be to the satisfaction of the Council's Environmental Compliance Manager.

12. The Southland Regional Council may serve notice of its intention to review the conditions of this consent, in accordance with the conditions of this resource consent and Sections 128 and 129 of the Resource Management Act 1991, during the period May to November each year, or within two calendar months of the completion of any enforcement action (prosecution or infringement notice), for the purposes of:
- (a) dealing with any adverse or cumulative effects on the environment which may arise from the exercise of this consent;
 - (b) considering any changes to information on the effects of land disposal of waste water; or
 - (c) complying with the requirements of a regional plan; or
 - (d) amending monitoring requirements; or
 - (e) imposing a notification requirement for potential effects on registered drinking water supplies.

for the **Southland Regional Council**



Vin Smith
Director of Policy, Planning, and Regulatory Services



**environment
SOUTHLAND**

File No: P078-001

Consent: 205659

Cnr North Road and Price Street
(Private Bag 90116)
Invercargill

Telephone (03) 211 5115

Fax No. (03) 211 5252

Southland Freephone No. 0800 76 88 45

Water Permit

Pursuant to Section 104B of the Resource Management Act 1991, a resource consent is hereby granted by the Southland Regional Council (the "Council") to **Pyper's Produce Ltd** (the "consent holder") of **393 Lochiel-Branxholme Road, R D 4, Invercargill** from **18 May 2009**.

Please read this Consent carefully, and ensure that any staff or contractors carrying out activities under this Consent on your behalf are aware of all the conditions of the Consent.

Details of Permit

Purpose for which permit is granted:	To take groundwater for vegetable washing
Location	- site locality - map reference - groundwater zone - catchment
Legal description of land at the site:	Lot 1 DP 3692
Expiry date:	18 May 2019

Schedule of Conditions

1. This consent is granted for a period of 10 years.

(Note: Pursuant to Sections 123 and 124 of the Resource Management Act 1991, a new consent will be required at the expiration of this consent. The application will be considered in accordance with the plans in effect at that time, and the adverse effects of the proposed activity).

2. This consent authorises the abstraction of water from bore/well E46/0489 at about NZMS 260 E46:480-254

3. The rate of abstraction shall not exceed 380,000 litres per day.
4. The consent holder shall install a backflow prevention device or take other appropriate measures to ensure water and/or contaminants cannot return to the water source.
5. The consent holder shall monitor water usage to ensure compliance with Condition 3 of this consent, as follows:
 - (a) by installing flow meters:
 - (i) capable of accuracy to within 5% of the true flow rate, on each abstraction;
 - (ii) the meters shall be installed in accordance with the manufacturer's instructions;
 - (iii) the water meters shall record volumes in litres or cubic metres; and
 - (b) by recording the volume of abstraction, at or about the same time each month when the consent is being exercised.

A copy of this record is to be provided to the Council's Compliance Manager by 30 May each year.

6. The consent holder shall pay an administration and monitoring charge to the Southland Regional Council collected in accordance with Section 36 of the Resource Management Act, payable in advance on the first day of July each year.
7. The Council may, in accordance with section 128 and 129 of the Act, serve notice, during the period May to July each year, of its intention to review conditions for the purpose of:
 - (i) Dealing with any adverse effects on the environment which may arise from the exercise of this consent; and/or
 - (ii) Requiring monitoring of the rate of, or the effects of, the abstraction; and/or
 - (iii) Requiring efficiency of water use; and/or
 - (iv) Complying with the requirements of a regional plan.

for the **Southland Regional Council**

W J Tuckey
Director of Environmental Management