ASSESSMENT OF ENVIRONMENTAL EFFECTS AS PER SCHEDULE 4 OF THE RESOURCE MANAGEMENT ACT 1991

In support of an application by Gary Robert Wilson and Raelene Cynthia Wilson for Consent to divert and discharge field drainage water to a seepage pond and to modify a watercourse.

Requirements for AEE Clauses 6 and 7 Schedule 4 of the Resource Management Act 1991.

An assessment of the activity's effects on the environment must include the following information:

(a) if it is 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: *The assessment below demonstrates that there will be no significant adverse effects on the environment. Nevertheless, because a discharge is included, a description of the alternative has been included in the Consideration of Statutory and Planning matters in accordance with s105.*

(b) an assessment of the actual or potential effect on the environment of the activity: *This is included below.*

(c) if the activity includes the use of hazardous installations, an assessment of any risks to the environment that are likely to arise from such use: *No hazardous installations will be used.*

(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: *No consent is sought to discharge contaminants, because any discharges of contaminants will be allowed by Rule 5.75 of the Canterbury Land and Water Regional Plan. However, the nature and sensitivity of the receiving environment are described below. The alternative has also been considered under the matters required by s105.*

(e) a description of the mitigation measures (including safeguards and contingency plans where relevant) to be undertaken to help prevent or reduce the actual or potential effect: *A set of proposed consent conditions is enclosed, containing and*

requiring the implementation of the mitigation measures proposed.

(f) identification of the persons affected by the activity, any consultation undertaken, and any response to the views of any person consulted: *See attached Consideration of Statutory and Planning Matters.*

(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: *The assessment of effects provided below demonstrates that the effects will be minimal. As a result no additional monitoring over and above the consent authority's normal consent monitoring will be required.*

(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). *The assessment below demonstrates that the effects will not be more than minor. Nevertheless, local Iwi have been consulted and their written approval is enclosed in Appendix Three.*

An assessment of the activity's effects on the environment 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 hazardous installations.

All of these matters are considered below, to the extent relevant.

BACKGROUND/REASON FOR THE APPLICATION

A full background document has been provided with this application. By way of a brief summary, the Applicant's predecessor in title had dug a drain through the middle of the property to divert land drainage water entering from the north. When he acquired the property there was no information indicating that there had been any enforcement action or

record of this drain construction being unauthorised. As a result he had no reason to believe that the drain had been constructed other than lawfully and could be moved lawfully. He accepts now that he was mistaken. No record of any authorisation of the construction of the drain by the previous owner can be found. It seems that the Applicant had unknowingly taken over an existing unauthorised diversion.

The alignment of the drain increased the risk of flooding of his land. It also provided an easy path for any runoff (stormwater) from his land to reach surface water. As a result, believing that the drain could be lawfully relocated, he dug a new drain taking the water westwards to an old unused irrigation intake pond. That pond is not connected via surface water to the Hinds River, but discharges via seepage to this waterbody. He chose this new alignment because it would:

- Reduce the risk of flooding of his land;
- Reduce the risk of contaminants from farming making their way into surface water;
- Provide for treatment of any discharge to the Hinds River; and
- Discharge better quality (filtered) water to the Hinds River some 2km upstream of where the water would eventually have entered that river.

This Assessment is submitted to attempt to resolve through alternative means an objection to the rejection of application to divert and discharge, under Section 88(3) of the RMA.

Over the course of the compliance investigation and in pre-application discussions, various Environment Canterbury staff have stated that they have determined that this water drain is a "modified river" and not an "artificial drain". Ms Aitken (Environment Canterbury Senior Consent Planner) has by email of 3 April 2019 (Copy in Appendix Three) provided the following explanation:-

"Though intermittent at times, the watercourse is spring fed and a pre-existing flowing surface waterbody existed on the site which is visible from historic aerial photographs that show a natural meandering pattern leading to the Hinds River. You can see this channel on Map 2A on page 4 of the Background to the AEE you submitted. A pre-existing natural watercourse may have been extensively modified is still an intermittently flowing waterbody of freshwater within the definition of a river. ".

The Applicant does not accept that view, but has agreed to prepare and submit an application based on ECan staff's view, as if the drain is a "river". This has been agreed with ECan and includes assessment of any required modification of the newly formed drain under Section 13 of the RMA. Primarily this will set out any works ECan considered would be required to satisfy it that the new water course is fit for purpose and is maintained in a way that ensures adverse effects are less than minor, but which will require resource consent.

The Applicant accepts that his new drain is causing water to flow in a direction it would not flow without that new drain and that by allowing the water to continue to flow down that new drain he continues to divert water. He also accepts that there is no resource consent, permitted activity rule or national environmental standard authorising that diversion. As a result he accepts that he is diverting water in contravention of s14(2)(a).

He also accepts that the result of the diversion is that the water is discharged into the pond and then to the Hinds River by seepage. This is a discharge of water to water. As long as he allows water to flow to that pond via the new drain and then seep into the Hinds River he is allowing the discharge of water to water. He also accepts that this discharge is not allowed by resource consent, permitted activity rule or national environmental standard. As a result he accepts that he is discharging water to water in contravention of s15(1)(a).

As a result, to cease contravening sections 14(2)(a) and 15(1)(a) it is necessary for him to:

- Obtain a resource consent authorising the diversion and discharge; or
- Cease the diversion and discharge.

It is not possible to cease unlawfully diverting water, because in the absence of an authorisation for the previous alignment, reinstating that would reinstate a previous unauthorised diversion. The same applies to the discharge from that drain into the downstream drain, as that was not expressly allowed either.

In any event, as this assessment will demonstrate (see in particular the Report and Addendum by Dr Vaughan Keesing, enclosed), the overall effects on the environment of retaining the new alignment are preferable to attempting to reinstate the previous alignment. As a result the resource consents sought are required to ensure that the Applicant ceases diverting and discharging in contravention of ss14(2)(a) and 15(1)(a) and to ensure that he appropriately avoids, remedies or mitigates adverse effects on the environment.

By applying for a Land Use Consent under Section 13 the new watercourse will be able to be modified and managed so that ECan can be satisfied that it is fit for purpose and that any effects of these works or actions are less than minor.

For completeness, the land use for excavating gravel for the purposes of filling in a portion of the old drain and for digging the new one occurred some six months ago. That was an activity that has ceased. To the extent that a land use consent would have been required for digging the new drain and the gravel extraction works when they were occurring, at the time they were occurring they may well have contravened s9(2), because they were not authorised by a land use consent or a national environmental standard. However, at present there are no such works occurring and there is therefore no land use currently occurring that requires a resource consent. Therefore there is no current contravention of s9(2) and no need for a land use consent to authorise such a land use. It is not clear whether there would have been a stormwater discharge that contravened the conditions of the relevant permitted activity rule, but if there was, it was temporary and has ceased. There is therefore no need to apply for a discharge permit to authorise on-going discharge of construction phase storm water.

DESCRIPTION OF THE PROPOSAL

1. The applicants are applying for consent to:

    - Divert water into the farm drain at 1485416-5128931 and discharge the water into a seepage pond at 1485306- 5128595 as shown on Map 1A. As described in this report, the effects are less than minor and as such a 35 year duration is required being the maximum the RMA allows.

    - Modify the farm drain between 1485416-5128931 and 1485306- 5128595, of approximately 470 metres. A consent of 18 months will allow the works to be undertaken without delay but also allow for the dry conditions required for them to be safely undertaken.

2. A concrete structure at the diversion point directs the water into the recently constructed drain and protects the bank from erosion, at this 90 degree angle. Photograph 1A, was taken at the diversion point looking south west.

3. Figure 1A is a sketch of the concrete diversion structure; it is a concrete box with a base, no top and only two sides. Originally the structure was placed to direct water to

the north-east. To allow water to be diverted to the south-west and into the newly dug drain, the concrete structure was lifted from the drain and swung round 90 degrees, Figure 1B, shows how the structure was reset. To increase the length of concrete protecting the bank from water entering from the farm to the north, a slab, 1 metre X 2 metres X 150 mm was placed against the bank and secured with waratahs driven into the bed. An L shaped, 2 X 0.6 metre concrete beam, overlaps the top of the concrete slab to increase stability.

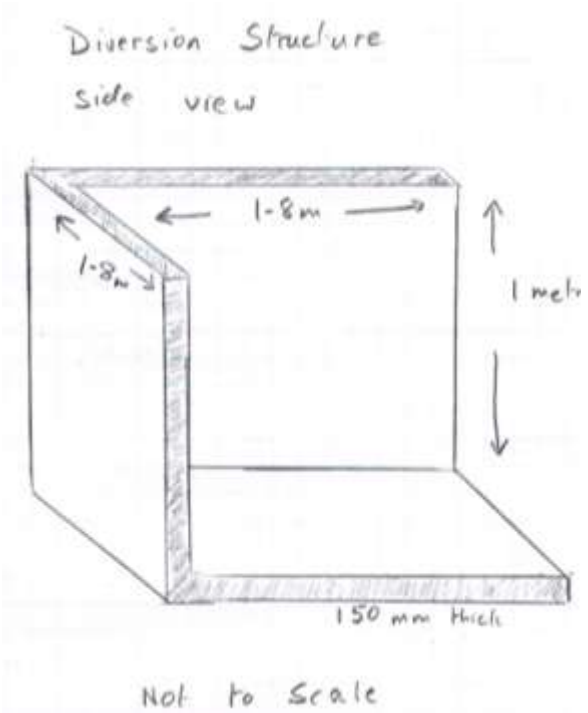


Figure 1A: Concrete diversion structure

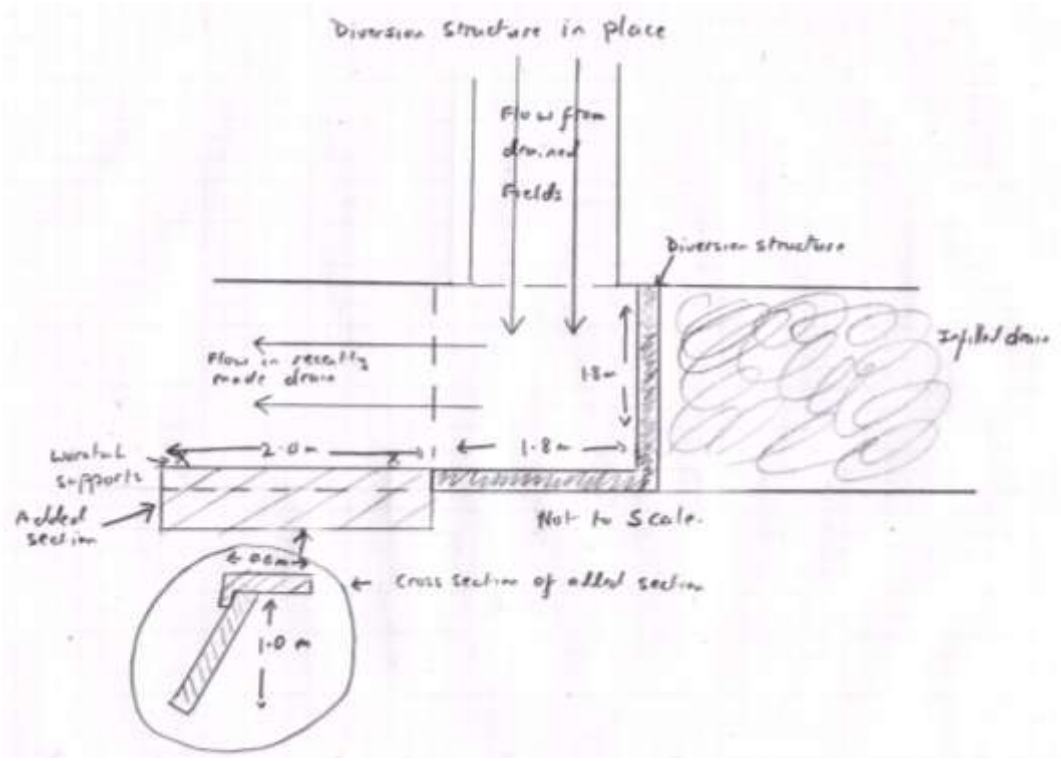
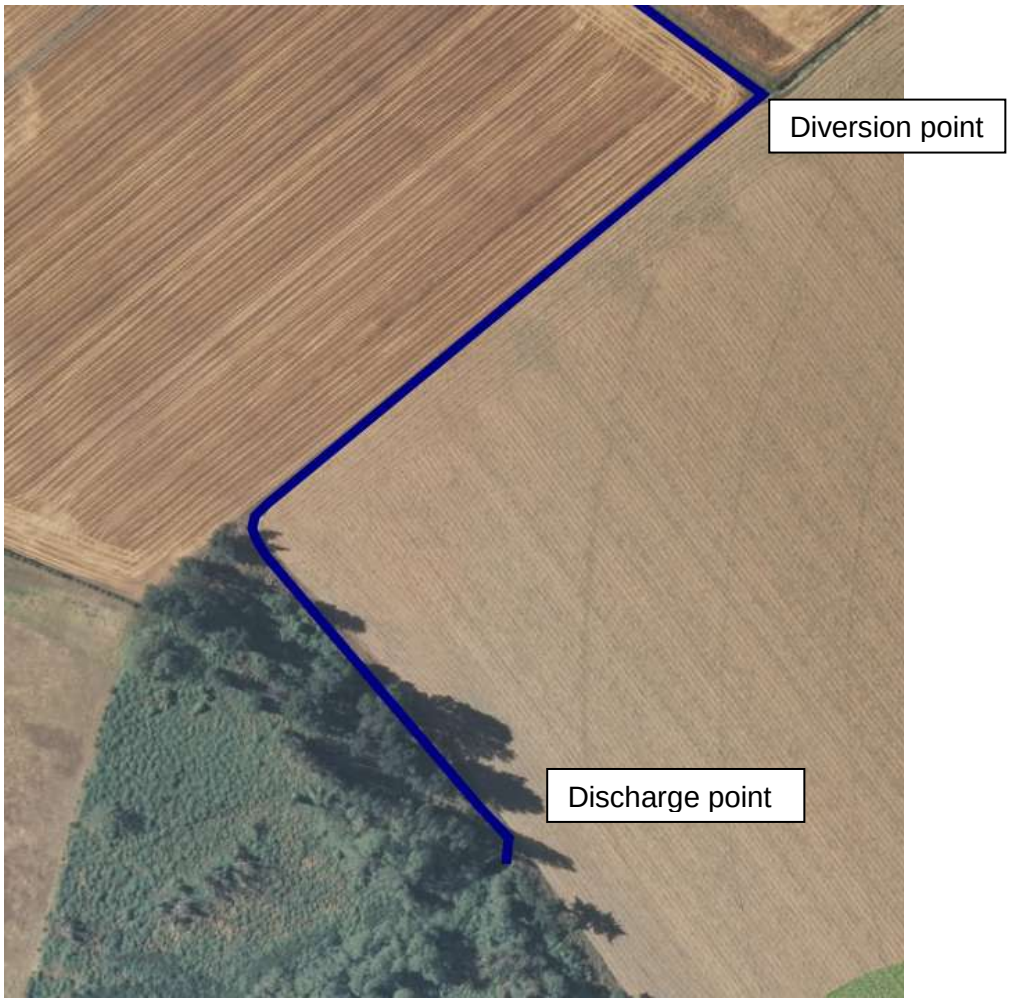


Figure 1B: Repositioned diversion structure



Map 1A: Recently constructed drain


Photograph 1A: Recently constructed drain, looking south-west from the diversion point.

4. Map 1B shows the points along the drain where measurements were taken. Table 1A shows the batters of the bank.

Map 1B: Points where drain was measured.

Point	Width at top in metres	Width at bottom in metres	Depth in metres	Batter	Angle - degrees
1	1.8	0.9	0.9	0.50	63
2	1.8	0.8	1	0.50	63
3	2.1	1	1.5	0.37	70
4	1.9	0.8	0.75	0.73	54
5	1.7	1.2	0.4	0.63	58

Table 1A: Bank batters at points marked on Map 1B.

5. Photographs have been taken near the points marked on Map 1B as listed

- Photograph 1B: Looking south-west near point 2 shows steep sided banks (0.5:1), in reasonably consolidated soil with a little erosion at base.

- Photograph 1C: Showing the drain as it curves near point 3 with steep banks (0.37:1), the stony loose soil has been eroded and undercut.

- Photograph 1D: Looking north-west near point 4 shows the relatively steep sided banks (0.73:1), this stony loose soil has been eroded.

- Photograph 1E: Looking north-west near point 5 shows how the banks have been colonised and stabilised by vegetation.

6. It is proposed that this new drain is modified as follows :

    - Banks no steeper than 0.58 in 1 batter (60 degrees) on the section between 1 and 3 on Map 1B and

    - Banks no steeper than a 1 in 1 batter (45 degrees) for the rest of the drain (where the soil is more stony.

    - Plant the banks (where practicable) and drain margins to stabilise the soil, prevent silt in runoff and provide shade, where possible native plantings will be used. The nature of the steeper sided drains and the need to keep the drains clean and free flowing mean than any planting on the actual bank must be carefully planned. Plants have to be chosen which do not contaminate the seed crops.

    This will require removal of up to 66 cubic metres of material.

7. The choice of batter angles will be discussed in detail later in this report.

8. It is proposed to undertake the initial works within 12 months of issue of consent and all planting complete within a further 6 months.

Photograph 1B: Looking south-west near point 2 on Map 1B.

Photograph 1C: Showing the drain curve near point 3 on Map 1B.

Photograph 1D: Looking north-west near point 4 on Map 1B.

Photograph 1E: Looking north-west near point 5 on Map 1B.

DESCRIPTION OF CAPACITY TO DEAL WITH FLOWS

9. Photograph 2 shows the drain entering the Wilson property, historically vegetation has been dislodged from this drain.

10. The existing drain is crossed by culverts some 600 mm in diameter and some 400 mm in diameter, as can be seen in Photograph 3. These culverts provide constrictions in the drain of 0.5 square metres for the 400 mm culverts. Mr Wilson has observed that this drain has coped with most flows except when the narrower culverts block with vegetation swept downstream.

11. The new drain is about 470 metres long, it has two bends one right angled where water enters the Wilson property, the right angle is enabled by a concrete structure described above. The second bend is curved where water enters the stretch leading to the seepage pond.

12. The old drain is about 1,879 metres and changed direction by 90 degrees at 6 locations as well as through a curved loop around an irrigator's centre pivot.

13. The new drain is larger in cross section than the old one and designed to be able to take the expected high flows, as shown in table 1B. Table 1C shows that by battering the drain to the proposed angles, the cross sectional area is increased, allowing the drain to carry higher flows.

Point	Width at top in metres	Width at bottom in metres	Depth in metres	Cross section in square metres	Section length in metres	Volume material removed cubic metres
1	1.8	0.9	0.9	1.22	137	166.46
2	1.8	0.8	1	1.30	138	179.40
3	2.1	1	1.5	2.33	20	46.50
4	1.9	0.8	0.75	1.01	87	88.09
5	1.7	1.2	0.4	0.58	88	51.04
Totals					470	531.48

Table 1B: Drain areas and volume at points marked on Map 1B

Point	Battered width at top in metres	Width at bottom in metres	Depth in metres	Cross section in square metres	Section length in metres	Volume material removed cubic metres
1	1.94	0.9	0.9	1.28	137	175.04
2	1.95	0.8	1	1.38	138	190.07
3	4.00	1	1.5	3.75	20	75.00
4	2.30	0.8	0.75	1.16	87	101.14
5	2.00	1.2	0.4	0.64	88	56.32
Totals					470	597.57

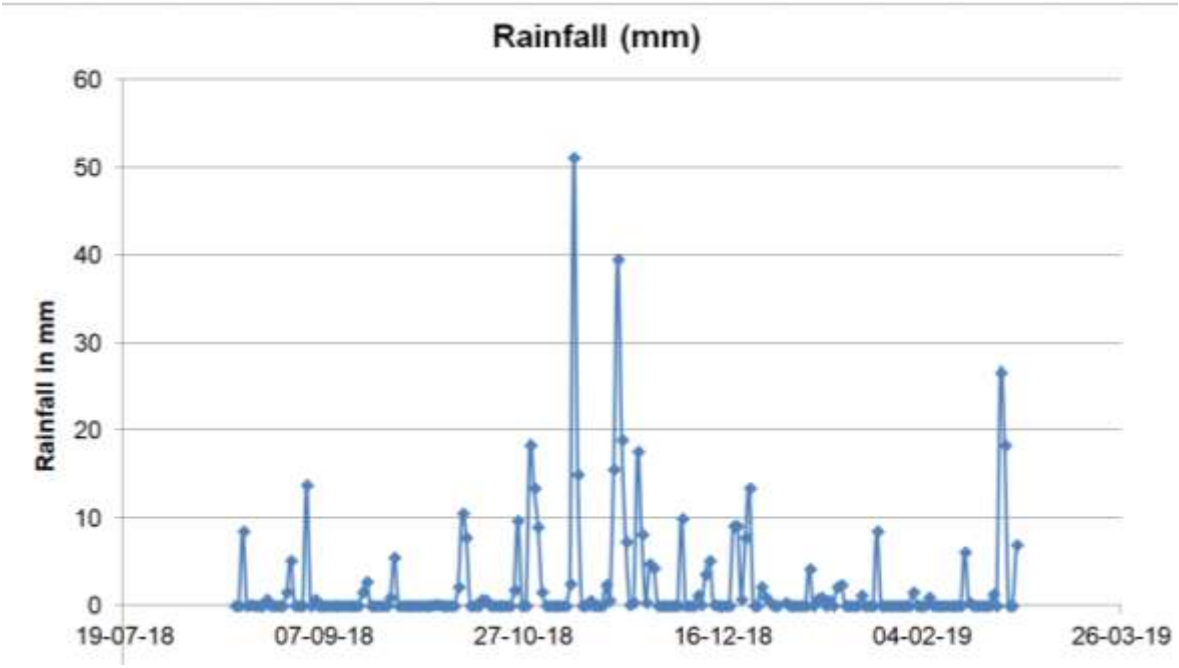
Table 1C: Drain area and volume with proposed batters

14. Water was diverted into the newly formed drain on 16 August 2018. Graph 1 shows rainfall recorded at the Lismore (Raceman's House) site about 9.7 kilometres to the north-north-west of the Wilson property.

15. Mr Wilson has observed that the new drain has been able to cope with all flows without any problems. He also states that the water level in the seepage pond fluctuates in line with the level of water in the Hinds River i.e. when the river is dry, the pond is dry. Even after heavy rain and subsequent increased flow in the drain, he has not observed the water level in the seepage pond rise above about 0.75 metres below surrounding ground level.

16. The seepage pond was originally dug to provide a source of irrigation water. Historically surface water drained to this area, as can be seen by the trace of a watercourse, see Map 1B. It is possible that this drainage pattern influenced the choice of location for where the seepage pond was originally dug to provide water for irrigation.

17. In conclusion, considering that the new drain can carry higher flows than the original and that even with heavy rainfall of just over 50 mm in a day, both the drain and seepage pond have been able to cope; therefore it is considered that both are fit for their purposes of conveying and discharging field drainage water.

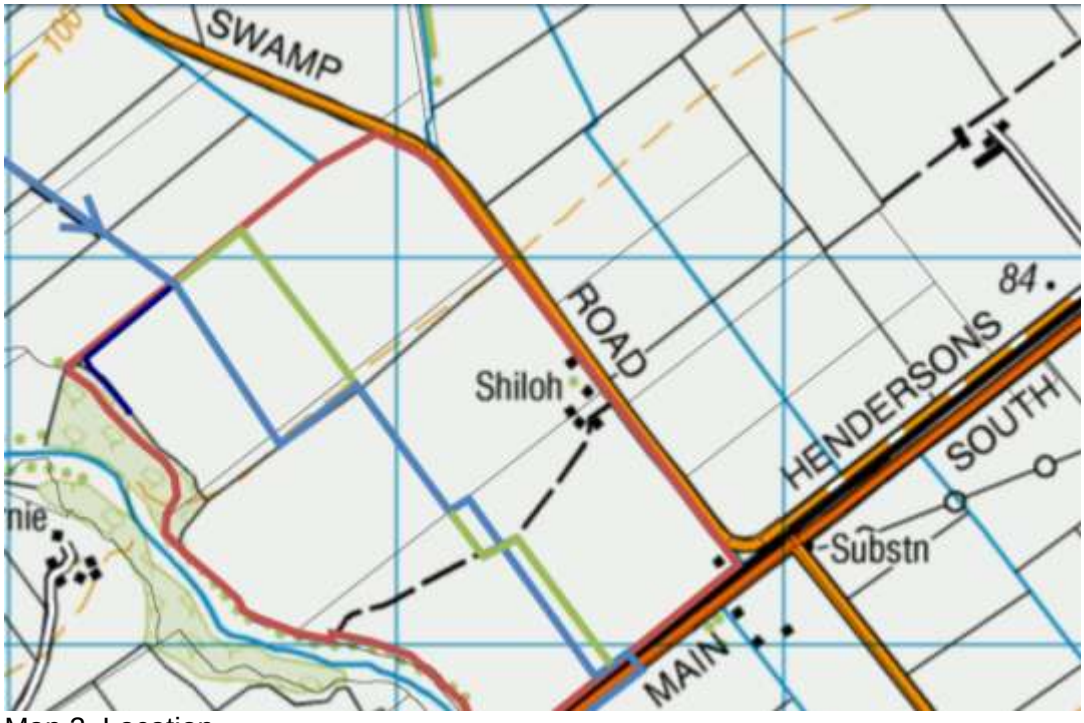


Graph 1: Rainfall measured at the Lismore (Raceman's House) site.

DESCRIPTION OF THE AFFECTED ENVIRONMENT

18. The property is just to the east if the Hinds River and bordered to the south by State Highway One, the Swamp Road Drain borders the east of the property, location is shown on Map 2. (outlined in red).

19. This property is within the Ashburton/Hakatere Management Zone (Chapter 13 CLWRP), being west of State Highway One these drains are within the Upper Hinds/Hekeao Plains Area.



Map 2. Location

20. Photograph 2, shows the choked farm drain looking north from the boundary of the Wilson property. Prior to drainage these paddock were part of a swamp, now drained by a herringbone pattern of “tile drains” leading to the farm drain, see Map 4A.

21. Photograph 3 is the farm drain looking south, showing the culverts which can become blocked by weed mass and foliage washed downstream from the property to the north. Photographs 4 and 5 show the discharge point and the seepage pond.

22. The closest Department of Conservation Reserve is to the west of the Hinds River.

23. There are no nearby:-

- Sites of Special Wildlife Significance.
- Wetlands of representative importance.
- DOC Wetland Areas.
- DOC Wetland Points.
- Archaeological sites.

Photograph 2: Upstream farm drain looking north from farm boundary

Photograph 3: Farm Drain culverts on Wilson property.

Photograph 4: Discharge into seepage pond.

Photograph 5: Seepage Pond

24. The Hinds River is noted as an Open Water Habitat for Native Birds and is defined as having moderate protection under the “Protected Areas Network New Zealand”.

25. The site is within the rohe of Arowhenua Runanga.

26. The Hinds River is a Statutory Acknowledgement Area and listed as a Runanga Sensitive Area.

27. There are no Silent Files Areas on or near this property.

28. Map 3A shows how the farm drain was originally made and has changed over time. The water is now diverted into the new farm drain 1485416-5128931 and discharged into a seepage pond at 1485306- 5128595.

Map 3A: Light blue line is farm drain pre 2005, green line is farm drain 2005 to 2018 and dark blue line is farm drain 2018 to date.

Map 3B: Local Drains.

29. Map 3B shows local drainage, the Swamp Road Drain is a straightened watercourse. It joins the drain parallel to State Highway One and then is diverted to become Taylors Drain. Excess water flows to the South West and down a flood relief channel (known as the Windermere Cutoff) to the Hinds River.

30. Map 4A shows how the fields to the north of the Wilson property have been tile drained, the green dots show where Environment Canterbury records springs. This map was drawn by the land owner Mr Lowe.

SPRING_NO	SPRING TYPE	SPRING CHARACTER	MORPHOLOGY TYPE	VARIABILITY TYPE	GEOLOGY_TYPE
K37/2022	Undetermined	Gravitational	Unknown	Intermittent	Undetermined
K37/2023	Undetermined	Gravitational	Unknown	Intermittent	Undetermined
K37/2020	Undetermined	Gravitational	Unknown	Intermittent	Undetermined
K37/2021	Undetermined	Gravitational	Unknown	Intermittent	Undetermined

Table 2: Springs

31. Map 4B shows the springs as recorded by Environment Canterbury and Table 2 shows the Environment Canterbury record of these springs. These springs are all defined as intermittent and are now ploughed and crops planted over them. Old aerial photographs show no evidence of a central waterway that could have been straightened, but do show evidence of short sections of, now drained, ephemeral surface water runs.

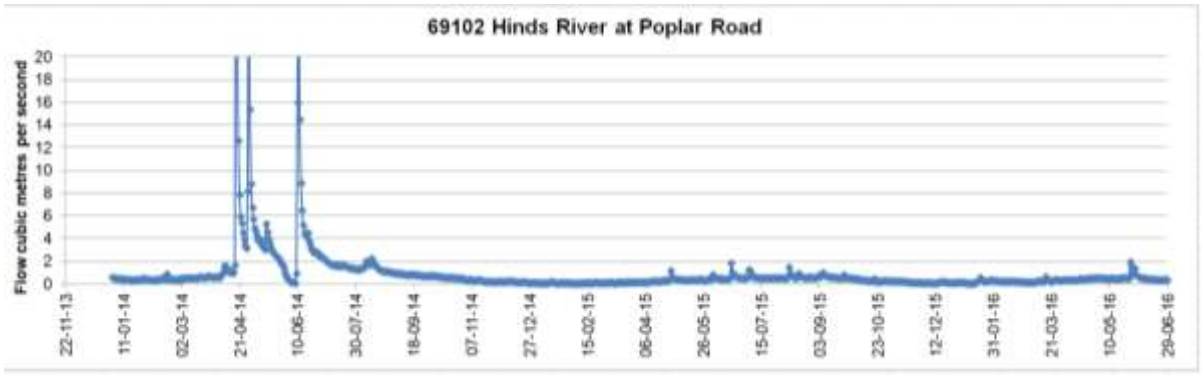
32. Mr Wilson states that in dry summers such as in 2015 even the Swamp Road Drain goes dry, when this last happened fish and eels were concentrated in pools by culverts etc. Local farmers helped with fish rescues from the Swamp Road Drain. The farm drain has never shown any evidence of fish or eels when it was flowing or when it has run dry in the past. He concludes that in the last 5 years the drain was completely dry for periods between 4 weeks at the shortest and 5 months in the driest years. In the two previous years the drain was dry 4 and 5 months respectively.

33. The Hinds River has a long, continuous daily record at its flow measuring site at Poplar Road; this site is about 10 kilometres downstream from the Wilson property. Graphs 2A and 2B show how the Hinds River and by inference its associated drains have experienced very low flow in periods over the past 5 years. This is consistent with Mr Wilson's observations

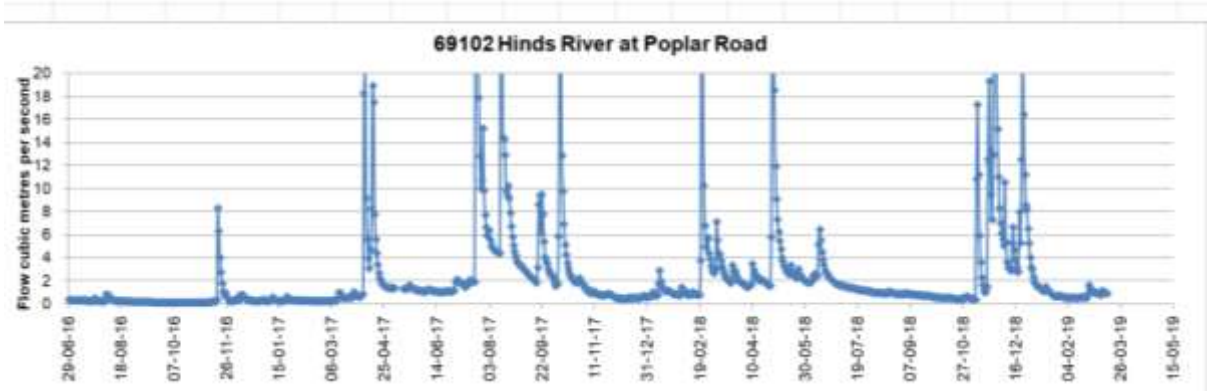
34. Mr Wilson has also observed that when flood irrigation was a common practice, springs would rise and drains gain flow shortly after the start of the irrigation season. Over the years this has been replaced by more efficient spray irrigation and he has seen shallow groundwater levels dropping, to the extent that his shallow domestic bore at his home farm (about 3 kilometres north of the subject drain) became unreliable and he had to replace it with a deeper bore K37/3588 in 2012.

Map 4A: Tile drain system as provided by Mr Lowes, green dots are where springs have been recorded by Environment Canterbury.

Map 4B: Springs.



Graph 2A: Flow in the Hinds River from 01-01-2014 to 29-06-2016



Graph 2B: Flow in the Hinds River from 29-06-2016 to 13-03-2019

35. The Hinds Drains Working Party – Final Recommendation March 2016 describes the Hinds Plains Drains as follows:-

"Hinds Plains drains are typically man-made, straight and narrow, with fast shallow water, a uniform substrate of pea-sized gravel, and little or no instream cover. These conditions make poor habitat for most fish species and particularly for eels and trout. The physical habitat for fish is constrained by the lack of habitat diversity that in natural waterways is provided by a range of water depths, bed gradients, substrate sizes and instream and bank cover types.

Hind's drains generally have excessive periphyton growth sustained by nutrient enrichment to a level that likely restricts invertebrate abundance, and a silt embedded gravel substrate providing poor spawning habitat. Fish species diversity is significantly impacted by drying reaches and other fish passage barriers notably between the dongas and the lower plains, and upstream from culverts and weirs."

The report states:-

"The main purpose of the drains is to remove water from the land, both rainfall (stormwater) and groundwater (springs) and to control groundwater levels. The system is not designed as a flood control system but to control water levels and remove surplus water after a flood event."

The report defines intermittent drains as drains defined by seasonal flow conditions, it recommends, relative to this project:-

- Encourage wetland development
- Promote indigenous species for riparian management
- Enhance and extend habitats that support taonga fish species (eg short finned eel)
- Reduce spraying
- Avoid spraying mahinga kai sites
- Avoid spraying grass on banks
- Encourage mid season spraying where appropriate to lessen weed build up.
- Promote shade planting and planting at specific sites (ie mahinga kai sites).
- Enhance the Swamp Road Drain west of Winslow Road for approximately 1.5 kilometres.

36. The photographs in this report were taken on 16 January 2019 by Mr D Hendrikz.

37. Dr Vaughan Keesing (Senior Ecologist –Boffa Miskell ltd) has provided a report dated 05-03-2019 in which he assesses the past and future ecological effects of diverting the farm drain. Dr Keesing finds that the farm drains did not, when in flow, support any form of valued, aquatic, indigenous community. This report is provided separately.

38. Dr Keesing investigated the dry bed for signs of biodiversity. Although it can be argued that investigation would need to be done when the drain is flowing, this is an ephemeral drain, often dry (as can be seen in Graphs 2A and 2B) and scraped bare every year. Dr Keesing's assessment of evidence of habitat provides valid conclusions, irrespective of whether the drain was seen when wet or dry.

39. In the light of this re-application to include application for consent for activities that would contravene s13 of the RMA, Dr Keesing has provided an Addendum to his original Report dated 23-5-2019. In this report he states that he based his initial

conclusions on his expertise and extensive knowledge of these types of similar and comparable drains and remains comfortable with his original conclusions. This Addendum is provided separately.

SENSITIVITY OF THE RECEIVING ENVIRONMENT TO ADVERSE EFFECTS

40. Dr Keesing found that the existing farm drain had little ecological value and diverting flow would have little effect on the catchment wide scale, the water would now be filtered and more rapidly conveyed to the Hinds River.

41. Neither the old drain nor the seepage pond can be described as “sensitive environments”, however the original downstream environment would be sensitive to any silt discharged if the old drain was to be re-established.

SUMMARY OF REGIONAL PLANNING RULES

Rules setting Activity Status

42. The rules below set the status of the activities for which consent is required.

- Diversion: The diversion of water for which consent is sought is a discretionary activity under Rule 5.6 of the CLWRP (Canterbury Land and Water Regional Plan) because permanent diversion of a waterway is not an activity specifically provided for in the CLWRP rules.

- Discharge: The discharge of water for which consent is sought is a discretionary activity under Rule 5.78 of the CLWRP because the water is being discharged at a different location and cannot meet the terms of 5.77condition 1).

- Disturbance in the bed of a river: Rule 5.141A of the CLWRP makes any disturbance in or under the bed of a river that does not comply with one or more of the conditions of Rules 5.136 to 5.141 a discretionary activity. As this activity cannot fully comply with condition 4 of 5.136, consent is required.

Rules Permitting Activities

43. The rules governing relevant permitted activities are listed below:-

- Disturbance of banks and beds by stock: Rule 5.68 permits limited stock access to river beds and banks with conditions to minimise associated discharges to water. Rule 13.5.26 includes (in the Hinds/Hakeao Plains area) drains in any reference to stock exclusion rule such as 5.68. Drains that do not have water in them are however excluded.

- Discharge of drainage water from a drainage system to a constructed wetland: Rule 5.75 permits this discharge providing it meets certain quality criteria and is not within a Community Drinking-water Protection Zone.

- Construction-phase stormwater discharge (other than that from a Reticulated Stormwater System): Rule 5.94A permits stormwater discharge while relatively small works are undertaken, with conditions to limit adverse effects of the discharge.

- Unclassified discharges to water: Rule 5.99 permits discharges not specifically covered by other rules such as bank maintenance and weed clearing, there are conditions limiting adverse effects of this type of discharge.

- Use and maintenance of structures: Rule 5.139 permits structures in a river to be maintained, with conditions preventing contamination, unnatural colouring, size creep and damage to spawning sites. The notes in Chapter 13 of the CLWRP advise that for all structures in or near a waterway, reference should be made to Canterbury Flood Protection Bylaw 2013 and that any activity to modify pre-1900 archaeological sites is subject to the archaeological authority process under the Heritage New Zealand Pouhere Taonga Act 2014.

- Introduction or removal or disturbance of vegetation; Rule 5.163 permits the introduction, removal or disturbance of vegetation in the bed of a river with conditions to prevent unacceptable discharges and environmental damage.

- Vegetation clearing outside the bed of a river or adjacent to a wetland: Rule 5.167 permits clearance providing (in this instance) it is undertaken in accordance with a Farm Environment Plan, with conditions to prevent unacceptable discharges and environmental damage.

- Use of land for earthworks outside the bed of a river or adjacent to a wetland boundary: Rule 5.168 permits earthworks within 5 metres of the bed of a river or wetland boundary providing (in this instance) it is undertaken in accordance with a Farm Environment Plan.

- Use of land to excavate: Rule 5.175 permits excavation of material over a semi-confined aquifer providing this does not pose a risk to groundwater.

ASSESSMENT OF ACTUAL AND POTENTIAL EFFECTS

44. Having considered Schedule 4 of the RMA , the following are considered as potential effects relevant to these proposals with regards to:-

- Potential adverse effects on surface water habitat from diversion

- Potential adverse effects on biodiversity, ecosystems and habitat from excavation and deposition of material during drain modification.

- Potential adverse effects on water quality from excavation and deposition during drain modification.

- Potential adverse effects of removal, disturbance or introduction of vegetation

- Potential adverse effects on water quality from drain and pond management

- Potential adverse effects on the flow carrying capacity from diversion and discharge

- Potential adverse effects on other surface water users from diversion

- Potential adverse effects on ground water from discharge

- Potential adverse effects on tangata whenua values from drain modification, diversion and discharge

Potential adverse effects on surface water habitat from diversion

45. Diverting water denies the downstream habitat the water responsible for its development and maintenance.

46. Dr Keesing's report and addendum describes in detail the ecological effects of the diversion and discharge to the seepage pond; overall he has concluded that no aquatic habitat of any value has been removed. The creation of the new drainage channel has been well done and is of an appropriate size, and any sediment generated and lost will affect the seepage pond not the Hinds River. Replacing the old farm drain would not recreate a habitat of any value and any net ecological gains would be lost.

47. Photograph 6A was taken on 16 January 2019 showing a southerly view of the remaining farm drain, photograph 6B taken the same day, is a close up of the drain bed. This drain was flowing the previous week after heavy rain and in parts was damp. The drain exhibits evidence typical of a managed farm drain, dredged out every year and weed sprayed twice a year. There was some desiccated cress, but other than that all the plants were exotic weeds and grasses. Mr Hendrikz walked the entire length of this drain finding no evidence of fish or eels, even in the odd downstream puddles. As this farm drain is downstream of and had the same management regime as the filled in portion it is concluded that the habitats were very similar.

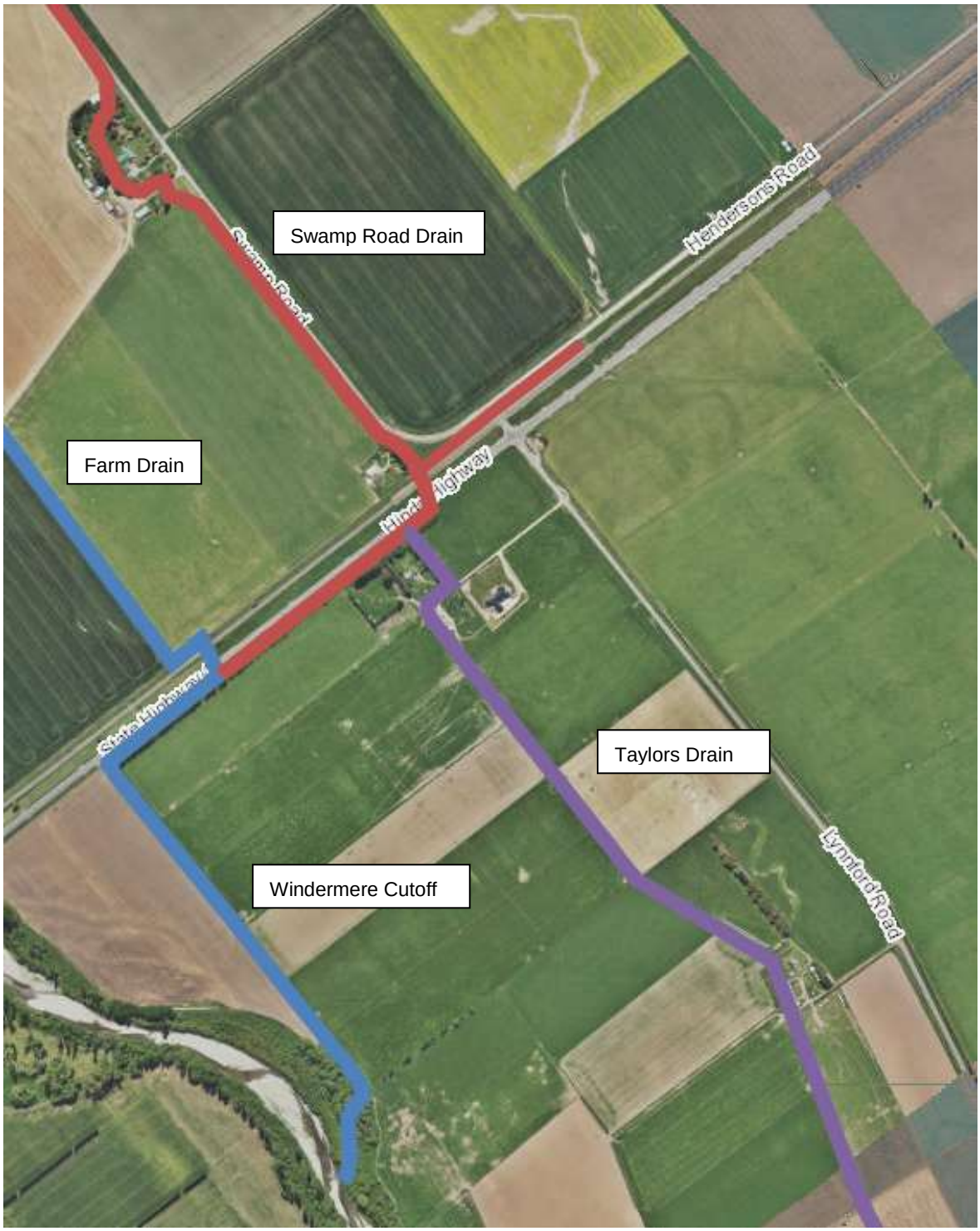
48. The remaining length of the old drain will continue to drain the fields and carry off storm-water.

Photograph 6A: Remaining Farm Drain, taken on 16 January 2019.

Photograph 6B: Bed of remaining Farm Drain, taken on 16 January 2019.

49. Map 5A shows the downstream drainage system. Swamp Road Drain is recognised as an altered or straightened watercourse, it is joined by a drain running parallel to Henderson's Road which drains the fields to the east before going under State Highway One and running parallel to the road. Sandbags placed in the drain parallel to State Highway One ensures that water enters Taylor's Drain, which has significant habitat and value for water users. The Wilson farm drain enters the drain, parallel to the Highway, downstream of where water enters Taylor's Drain and provides no contribution to flow in Taylors Drain. From this point on water flows via the Windermere Cutoff, which was designed as a relief channel to rapidly take water, to the Hinds River.

50. The drains downstream of where the farm drain leaves the Wilson property and where it enters the Hinds River are maintained by Environment Canterbury and kept clear and free of vegetation to allow storm water and runoff from the road to be quickly removed.



Map 5A: Downstream drainage system

51. Dr Keesing's report notes that the farm drain would have added water to the drain flowing parallel to State Highway One (Windermere Cutoff) but this small loss has been balanced by the recent addition of drainage water from fields to the east. Dr Keesing goes on to say that in any event the loss of the small amount of water diverted will not have a measurable effect.

52. Mr Wilson has explained that fields to the east were drained a couple of years ago and the drainage water directed into the drain just to the north of and parallel to State

Highway One. Map 5B shows the purple line as the field drain, the dark blue line traces how the water used to flow to the south-east, the green line shows the rerouted watercourse, now connected to the Swamp Road/Taylors Drain.

53. Dr Keesing also notes that water will be entering the Hinds River after being filtered through gravel substrate, whereas if the old drain was re-established it would take time to heal, with a subsequent danger of sediment being washed downstream. The shorter pathway to the Hinds River also reduces the risk of nutrient runoff from cropped land. In conclusion, the current regime is likely to result in more water of better quality being in a longer stretch of the Hinds River than would have been prior to the diversion.

54. Photograph 7A was taken on 20-4-2019 and shows water exiting the farm drain to the east (looking south-west).

55. Photograph 7B taken the same day shows water passing under Henderson Road, prior to joining Swamp Road/Taylors Drain.

56. Mr Wilson has stated that in his experience the flow contributed from this recent alteration is at least equal to if not greater than the flow he has diverted.

57. Given this assessment, the adverse effects on surface water habitat from the diversion is less than minor.

Map 5B: Rerouted drains to the east. The purple line is the field drain, the dark blue is where the water used to go, the green line is the rerouted watercourse.

Photograph 7A : Water exiting farm drain to the east (looking south-west)

Photograph 7B: Water passing under Henderson Road, prior to joining Swamp Road/Taylors Drain

Potential adverse effects on biodiversity, ecosystems and habitat from excavation and deposition of material during drain modification .

58. Excavating material can destroy habitat by removing plants and destroying the surface habitat, depositing material can smother the existing habitat. Both activities will negatively impact on the local biodiversity.

59. It is proposed to modify the drain by reshaping the batters no steeper than 0.58 in 1 (60 degrees) on the section between 1 and 3 on Map 1B and no steeper than a 1 in 1 batter (45 degrees) for the rest of the drain (where the soil is more stony).

60. This drain was dug in August 2018 and has not had time to establish a habitat of any complexity. Battering will involve soil being scraped form the sides of the drain and spread on the edge of the fields, where it will not smother any existing natural habitat.

61. Any vegetation removed will be deposited at least 10 metres from the watercourse or pond.

62. Given this explanation and mitigation, the excavation and deposition of material required to modify this drain will have a less than minor effect on biodiversity, ecosystems and habitat.

Potential adverse effects on water quality from excavation and deposition during drain modification.

63. These are the effects that arise specifically from the s13 consent sought and the modification of the drain to satisfy ECan that it is fit for purpose. They were assessed in the initial applications. The assessment remains the same.

64. Excavating material during drain modification could release silt into running water, material deposited on banks could allow silt to be eroded and end up in the water course.

65. The use of machinery poses the risk of oil and fuel leaks into surface water.

66. It is proposed to only undertake the drain modification when the drain is dry, material scraped from the banks will be spread on the edge of the fields, away from the bank. Where standing crops prevent efficient spreading, the spoil may either be removed or made into a ridge as close to the crop as possible and spread after harvest.

67. An Erosion and Sediment Control Plan will be made and presented to ECan, prior to work commencing.

68. Oil and fuel contamination shall be prevented by:

- Leaky equipment will not be allowed on site.
- Storage of fuel and refuelling will not be undertaken within 20 metres of the watercourse, pond or riparian areas.
- Fuel and oil shall be stored off-site at night.
- Any spill shall be immediately cleaned and Environment Canterbury informed of the details of the spill, nature and volume of the material, procedures

undertaken to clean it up, assessment of possible effects and measures to ensure it will not occur again.

69. Rule 5.168 of the CLWRP permits earthworks outside the bed of a river or adjacent to a wetland boundary, but within 10 m of the bed of the river or wetland boundary. While the modification is to batter the banks of the watercourse, it is still worth mentioning this rule. This rule permits earthworks in the riparian margin less than 500 square metres or undertaken as part of a Farm Environment Plan and has conditions to prevent contamination of the water course and if required will be identified in the Erosion and Sediment Control Plan and/or Farm Environment Plan, ensuring that the conditions of this rule will be complied with.

70. Rule 5.94A of the CLWRP permits the discharge of construction phase stormwater (other than that from a reticulated stormwater system) to surface or ground water. As the proposed battering will remove less than 2 hectares of soil and given the mitigation discussed above, the conditions of this rule will be complied with.

71. Considering the mitigation proposed, excavation and deposition during drain modification will have a less than minor effect.

Potential adverse effects of removal or disturbance or introduction of vegetation

72. Vegetation could be removed during the modification and later the maintenance of the drain and seepage pond. The drain's riparian margins and upper banks (where practicable) will be planted to prevent erosion and catch sediment in runoff. Land adjacent to the seepage pond margins will be planted with native vegetation to provide an improved habitat.

73. Removal of vegetation can dislodge soil allowing sediment to enter surface water. Most of this work will occur outside the bed of the watercourse, removal of material to create the new batters will also involve the removal of any associated vegetation; this work will be undertaken as described above and be part of the Sediment Control Plan. Vegetation separated from soil (i.e. significant vegetation) will be placed at least 10 metres from the watercourse.

74. Planting vegetation near a watercourse can disturb soil allowing silt to enter the water. Initially stabilisation planting will take place as soon as practicable after the works are completed and at least two months after the works are completed. Most planting will occur soon after the drain modification and be a permitted activity as covered by Rule 5.94A of the CLWRP, as discussed above and be part of the Erosion and Sediment Control Plan.

75. Later enhancement planting and replacement planting will be managed under the Farm Environment Plan and is discussed under the heading below as part of drain and pond management.

76. Rule 5.167 of the CLWRP permits the clearance of vegetation outside the bed of a river or adjacent to a wetland. As this work will be undertaken as part of the Sediment Control Plan (in the establishment phase) and later as managed by the Farm Environment Plan, the drain is not a spawning site and the vegetation is not for flood protection, the conditions of this rule will be met.

77. Removal or disturbance of vegetation in or under the bed can cause sediment to be released. As described above this work will only take place when the drain is dry, both in the modification phase and when the drain is being maintained. The Erosion

and Sediment Control Plan will manage the modification phase; the Farm Environment Plan will manage on-going maintenance and is described in more detail below.

78. Rule 5.163 of the CLWRP permits the introduction, removal or disturbance of vegetation in, on or under the bed of a river with conditions to protect structures, access, bank stability, water quality, biosecurity, naturalness and spawning sites. All the conditions of this rule will be met.

79. The adjacent area of the pond is to be planted with native vegetation to allow a more natural habitat to develop around the pond. The banks and the riparian margin of the watercourse will be planted to provide stability, prevent silt in runoff and provide shade and habitat improvement

80. Considering this discussion and the mitigation proposed, the potential adverse effects of removal, disturbance or introduction of vegetation will be less than minor.

Potential adverse effects on water quality from drain and pond management

81. Drain and management involves:-

- The removal of unwanted vegetation from the bed of the drain, its banks and riparian margins.
- Repair of bank batters
- Planting of drain banks and riparian margins.
- The removal of unwanted vegetation from the bed of the seepage pond, its edges and surrounding margins.
- Removal of silt from the bottom of the seepage pond and drain
- Planting of the seepage pond edges and surrounding margins.
- Protection from stock.

Any of these activities can result in silt being discharged into water.

82. The removal of vegetation can be done physically or by using chemical sprays, with a potential of silt or chemicals entering water.

83. Repairing bank batters and removing silt from the seepage pond and drain bottom can release silt.

84. The Farm Environment Plan sets out how farm watercourses and the seepage pond are to be managed, in summary:-

- No residual herbicides (eg long lasting pre-emergent herbicides) shall be used.
- Only herbicides approved by or used by Environment Canterbury for spraying near water can be used.
- No broadcast spraying allowed, only spot spraying to target specific plants.

- No spray allowed into or onto water.
- The bed of the watercourse may only be sprayed when there is no water flowing.
- Batter repair and silt removal will only take place when the drain is dry.
- Silt removal from the seepage pond will be undertaken generally when dry or when water levels are low, however, if a build-up of silt is preventing water freely entering the gravels, it will be necessary to clear the silt even with water in the pond.
- Physical removal of vegetation to be undertaken with the minimum of disturbance to prevent siltation.
- All vegetation cut or dug out physically will be removed from the watercourse and deposited at least 10 metres from the watercourse or pond, in a position where it cannot enter water.
- Stock will be excluded from the watercourse and riparian margins the pond and its adjacent area.

85. The adjacent area of the pond is to be planted with native vegetation to allow a more natural habitat to develop around the pond. The banks and the riparian margin of the watercourse will be planted to provide stability, prevent silt in runoff and provide shade and habitat improvement. Initially stabilisation planting will take place as soon as practicable after the works are completed and at least two months after the works are completed.

86. Rule 5.79 of the CLWRP permits the discharge of contaminants during the maintenance of “artificial drains” and associated structures and constructed wetlands, however as the drain has been defined by Environment Canterbury as a modified water course, this rule does not apply. Rule 5.99 CLWRP permits discharge of water and contaminants not classified by other rules, with conditions to ensure there are no adverse effects. Given the mitigation above, the discharge is not into a Natural State water body and the discharge has no hazardous contaminants or comes from contaminated land the conditions of Rule 5.99 will be met.

87. The concrete diversion structure may need maintenance, especially if there is undercutting and scour. Rule 5.139 of the CLWRP permits the use and maintenance of structures (excluding dams) in the bed of a river, providing the structure is not greatly changed, the water contaminated or spawning sites damaged. The diversion structure is the same one that has been in the drain for many years, when the drain was diverted, this structure was lifted, turned around 90 degrees and replaced. Maintenance will be carefully undertaken when the drain is dry and only natural, inert material will be used to repair undercutting and scour, maintenance will be described in the Farm Environment Plan, given these factors the conditions of this rule will be met.

88. Considering the mitigation proposed, adverse effects on water quality from maintenance of drain, drain structures and pond management are considered to be less than minor.

Potential adverse effects on flow carrying capacity from diversion and discharge

89. High rainfall events can result in localised flooding of fields, if the drains do not have a sufficient carrying capacity. Farm drains (such as the one discussed here) are primarily designed to provide field drainage; it is impractical to design for extreme storm events.

90. All drainage water from the Wilson property ends up in the Hinds River.

91. If the seepage pond and recently constructed drain are not able to cope with high flows better than the old system, then the Wilson fields will be flooded more than they are at present.

92. The original farm drain was about 1,879 metres long, it changes direction by 90 degrees at six places and is restricted by culverts with diameters of 400 and 600 millimetres. Field flooding occurred when vegetation washed down from the upstream property blocked these culverts. Water leaving the property discharged to the Hinds River through the Windermere Cutoff. Map 5A shows this drainage system.

93. The recently established drain is about 470 metres long, changes direction in two places and has no culverts. The cross sectional area of the new drain is significantly larger than the old drain (Table 1B) and will be further increased when the banks are battered to the recommended angles (Table 1C). As described above, the new drain and pond have been able to cope with flow resulting from high rainfall events (50 mm in one day),without any field flooding.

94. As described previously in this report, the seepage pond and recently constructed drain has, to date, been able to cope and is fit for purpose. To ensure that this continues, the drain will need to be kept clear of obstructions and silt to ensure free flow and the seepage pond kept clear of silt to allow the seepage connection with the Hinds River to be maintained. It is proposed that the divert and discharge consent has conditions requiring:-

    - Silt to be removed from the bottom of the drain to encourage rapid flow and returned to the cropping fields.

    - Silt to be removed from the seepage pond (to allow water to enter the underlying gravels) and returned to the cropping fields.

95. The Farm Environment Plan will contain a description of how the drain and seepage pond will be managed and maintained to ensure they continue to be fit for purpose.

96. The Canterbury Flood Protection Bylaw 2013 Flood Protection Maps show that the boundary of a Flood Protection Vegetation area encloses a portion of the Wilson property and the seepage pond. Environment Canterbury River Engineer Melissa Shearer advised by email of 17 April 2019 that the discharge of water does not breach anything in the Bylaw, so an Authority for the discharge is not required (copy of email in Appendix Three)

97. As described above there is little risk to the neighbouring farm, despite which written approval was obtained from the neighbour to the north, Mr Lowe, (copy in Appendix Three).

98. Given the above explanation and proposed mitigation, it is considered that the adverse effects on flood carrying capacity from the diversion and discharge, is less than minor.

Potential adverse effects on other surface water users from diversion

99. Diverting surface water will deny downstream users its beneficial use and effect.

100. There are no consents to take water downstream of where the farm drain enters the drain parallel to State Highway One and where the Windermere Cutoff enters the Hinds River.

101. Consent CRC000341 - Grattanville Farm Limited has the following minimum flow condition:-

"The taking of water in terms of this permit from Swamp Road Drain shall cease whenever the flow in Windermere Cutoff (at or about map reference NZMS 260 K37:967-896), as estimated by the Canterbury Regional Council, falls below 25 litres per second."

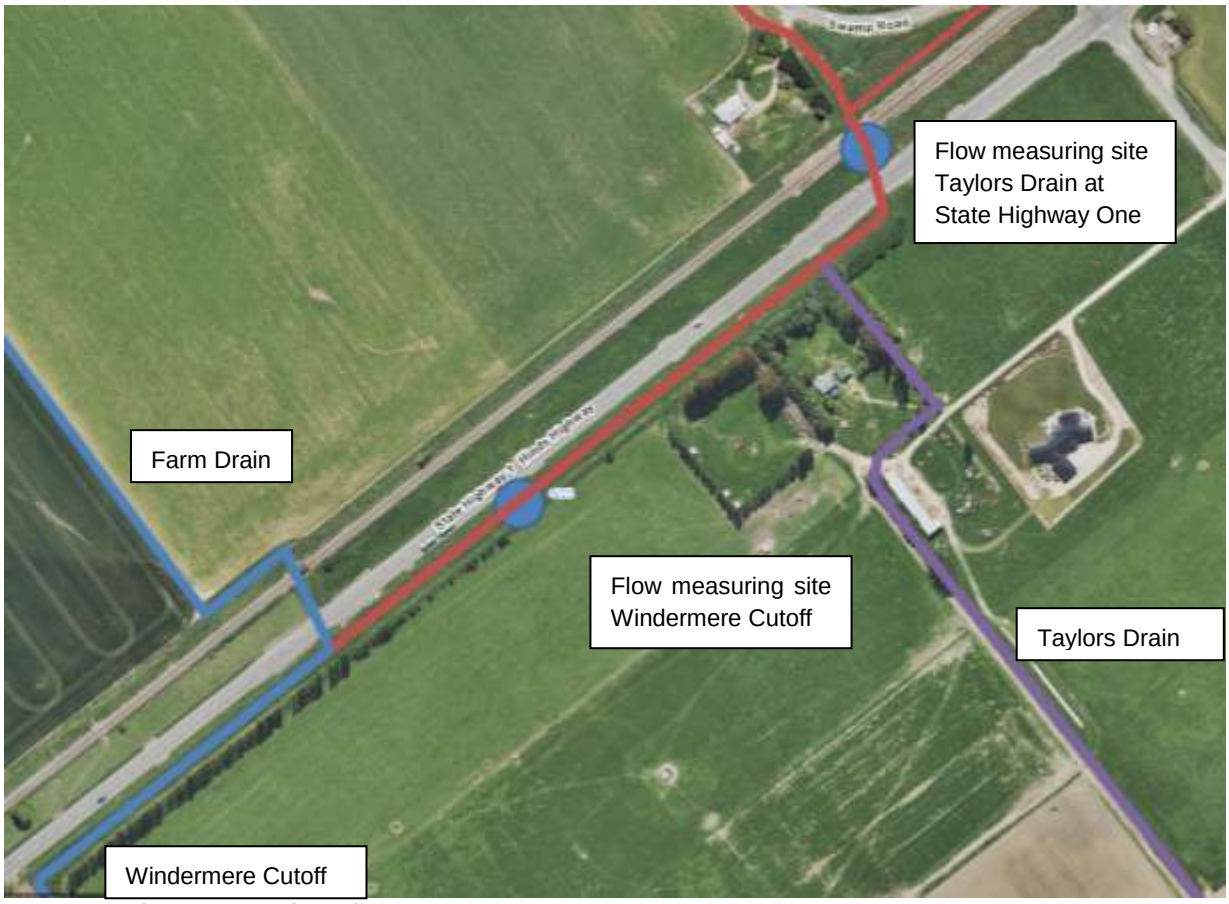
102. Map 5C shows the flow measuring sites at:

- Taylors Drain – State Highway 1
- McLeans Swamp Road Drain at Windermere Cutoff.

Flow into the top of Taylors Drain can be estimated by removing downstream flow from that measured upstream.

103. As both these flow measuring sites are upstream of where the farm drain enters the drain running parallel to State Highway One (Windermere Cutoff), reduced inflow from the farm drain will not affect downstream users and uses of water.

104. As there are no consented downstream users and the flow measuring sites are also not affected, it is concluded that diversion has a less than minor effect on other surface water users.



Map 5C: Flow measuring sites.

Potential adverse effects on groundwater from discharge

105. The seepage pond is directly linked with the Hinds River via infiltration through the underlying gravels. Mr Wilson has observed that since the diversion started in August 2018, the seepage pond has been able to cope with the flows experienced (maximum of 50 mm/day).

106. Discharge into the local strata could raise groundwater levels which could affect local vegetation.

107. Erosion of the drain sides produces silt, which can settle on the bottom of the drain and seepage pond, reducing the seepage rate and potentially cause local flooding.

108. It is proposed to modify the drain by reshaping the batters to no steeper than 0.58 in 1 batter (60 degrees) on the section between 1 and 3 on Map 1B and no steeper than a 1 in 1 batter (45 degrees) for the rest of the drain (where the soil is stonier). The choice of these batters have been made with reference to the following:

- Consultation with ECan River Engineers, who provided useful documents but advised that the angle chosen for batters depends on site specifics.

- CRC191426 (Eiffleton Contractors Limited) was issued in September 2018 and provided by ECan as a recent example; it requires banks to be battered no more than 45 degrees.

- Experience of on-farm drains management; the existing drain has batters steeper than 45 degrees.

- Dr Keesing's report which concludes "The creation of the new drainage channel has been done well and is of an appropriate size". In the Addendum to his report he addresses effects of reshaping the batters and assessment under s13, observing, with relation to any temporary sediment release:-

  "The settling pond and discharge via filtration to the Hinds River would reduce those potential effects to Nil"

- Swamp Road Drain which becomes Taylors Drain is a modified watercourse managed by ECan. Photographs 8A and 8B show the drain and its banks, which are maintained by ECan at angles steeper than 45 degrees. This drain is on the West side of the Wilson property and dug in similar soil to the Northern reach of the new drain.

109. The riparian margins will be planted to consolidate material and prevent runoff siltation.

110. An Erosion and Sediment Control Plan will be made and presented to ECan, prior to work commencing.

111. Aerial photographs have shown the remnants of surface water courses flowing to the general area of where the seepage pond is located; historically the land near the seepage pond was probably a wetland.

112. The land immediately to the west of the seepage pond is managed by ECan's Property Team and leased to the Wilsons. Jean Jack works in the Science Group at ECan and provides ecology advice to the Property Team, - after her site visit on 29 January 2019, she commented on the discharge

"From my perspective of advising our Property team on the implications of the water entering the pond - I didn't identify any ecological concerns for the ECan lease lot of doing so."

(See Appendix Three for full email dated 1 February 2019).

113. By emails of 9 and 29 April 2019, Grayson Papatua confirmed that the property team were happy with Ms Jack's assessment stating *"There are no other concerns in moving the drain from a property perspective"* and *"We're happy from a property perspective"*, (See Appendix Three for full emails).

114. Rule 5.75 of the CLWRP permits the discharge of water from a drainage system into a constructed wetland providing it is of good quality, (no contaminants, oil, scum etc) has not passed through contaminated land or is within a Community Drinking Water Protection Zone.

115. The seepage pond is too far from the Hinds community water supply bore to have any effect. The closest community drinking water supply is K37/2085 is about 1.7 kilometres to the south west of the seepage pond and screened from 92.5 to 98.5 metres below ground level. Its protection zone is a circle of about 100 metres. As the drainage water is from under farm lands and is clean, the conditions of Rule 5.75 are complied with.

8A: Swamp Road Drain bank.

8B: Swamp Road Drain

116. Stock effluent can pollute surface water and erode banks and stir up beds allowing silt to be carried downstream.

117. Rule 5.68 of the CLWRP permits limited stock access to river beds and banks. Rule 13.5.26 expands this to cover farm drains as well. As the drain and the seepage pond will be fenced from stock, the permitted activity conditions are met.

118. The Farm Environment Plan will contain a description of how the drain and seepage pond will be managed and maintained to ensure they continue to be fit for purpose. This plan will also describe how stock is kept out of the water course and pond.

119. Excavating material can break the confining seal protecting water bearing material and allowing contaminants to enter ground water. Rule 5.175 permits excavation of small volumes of material (less than 100 cubic metres) providing there is more than 1 metre of undisturbed material left over the unconfined/semi confined aquifer.

120. The borelog of BY20/0110 (on the south east of the Wilson property) shows a thin section of water bearing gravels 4 metres below ground level. Bore K37/3825 (on the east of the Wilson property) shows that water bearing gravels are found deeper than 5 metres below ground level. The drain is no deeper than 1.5 metres below ground level at its deepest point and does not intercept groundwater. Battering this drain will not break the confining seal. Given that the drain modification may only remove up to 66 cubic metres of soil and will not break the seal to the underlying aquifer, the conditions of Rule 5.175 are met.

121. As described previously, the drain will be managed to prevent silt eroding and being washed into the seepage pond, silt will be removed from the seepage pond and drain as required to keep the free flow of water into the gravel strata and subsequently the Hinds River.

122. Given the proposed mitigation, effects of discharge on ground water are less than minor.

Potential adverse effects on tangata whenua values from drain modification, diversion and discharge

123. Aoraki Environmental Consultancy Ltd, on behalf of Arowhenua Runanga was retained to provide cultural advice. Ally Crane (General Manager Aoraki Environmental Consultancy Limited) visited the site on 5 February 2019 together with Karl Russell (Cultural Consultant) and Kylie Hall (Principal Planner). Following the visit a letter was provided accepting the proposal (copy in Appendix Three).

124. This approval is subject to :-

- The periphery of the seepage pond is planted with suitable native plants that are recommended by ECan's Ecologists.
- The seepage pond and new plantings are to be permanently fenced from stock and machinery
- Any dead or diseased plants from the planted area are replaced with the same or similar plant species as soon as possible.

These conditions will be added to the proposed consent conditions and the Farm Environment Plan.

125. In determining if there are any further cultural interests affected, the following four documents have been referred to

- Te Whakatau Kaupapa:- Resource Management Strategy for Canterbury Region- Ngai Tahu
- Te Rūnanga o Ngāi Tahu Freshwater Policy Statement 1999.
- Mahaanui IMP
- Iwi Management Plan of Kati Huirapa – For the area Rakaia to Waitaki Part One – Land, Water and Air Policy Arowhenua

leading to the conclusion that there are no adverse cultural effects in modifying the drain and continuing the diversion and discharge to the seepage pond.

126. It is concluded that modifying the drain and continuing this diversion and discharge will have less than minor effects on Tangata Whenua values.

Comparison with alternatives

127. The alternative to this proposal is to reinstate the old drain.

128. Diverting the field drainage water provides an economic benefit to the property :-

- There will be fewer field flood events
- As the existing drain will be converted to a gentle swale there will be less weeds contaminating the valuable seed crops, easier passage for the irrigators and less soil lost to runoff and drain erosion.

Re-establishing the old drain, which would be pointlessly costly and provide no economic benefits to the property and wider community.

129. As the drain has already been dug and the unnecessary section filled in there will be no change in physical effects apart from the continuing diversion and discharge to the seepage pond. The improvements to the margins of the seepage pond with native planting will add to diversity to the landscape and enhance biodiversity.

130. Restoring the old drain would require diggers to access the property and the seepage pond to remain as it is, to be gradually overtaken by exotic vegetation.

131. The farm drain had a negligible aesthetic value; whereas the improved pond and planting scheme will have aesthetic value. Replacing the old drain with a gentle swale will also be a visual improvement.

132. There was no recreational value to the old farm drain and with little downstream recreational value in the Windermere Cutoff, replacing the small quantity of water lost by the diversion will make no impact on downstream recreational value

133. Overall the Hinds River does have scientific, cultural, historical, recreational and aesthetic value. As described in Dr Keesing's report and addendum, the current regime is likely to result in more water of better quality being in a longer stretch of the Hinds River than would have been prior to the diversion.

134. Dr Keesing notes that in discussion with Mr Wilson, it was agreed that eroded batters would need to be improved, some sediment may be released when this work is undertaken, but will be caught in the seepage pond. Once healed these bank improvements will benefit the pond.

135. There are no increased hazards that can be identified with the current regime.

136. High flows from heavy rainfall events will be conveyed at least as rapidly as before, with no risk to the neighbouring fields to the north, as recognised in Mr Lowe's written approval (Appendix Three).

137. As water will have to filter through the gravels before entering the Hinds River, as opposed to rapidly entering that waterbody via the Windermere Cutoff, any contribution to flooding in the Hinds River is ameliorated.

CONCLUSION

Based on the above assessment, the **attached** assessment by Dr Vaughan Keesing, his **attached** Addendum, and the written permissions obtained, the effects of the drain modification and continued diversion and discharge of water, as mitigated by the proposed conditions will be less than minor overall and no other person will be affected to a degree that exceeds the less than minor threshold. The long-term water quality and ecological effects will be better than those which existed prior to the commencement of the diversion and discharge and better than the effects of reinstating the artificial drain dug without authorisation some ten years prior.