



LANDPRO

Make the most of your land

30 April 2020

Landpro Reference: S15298

Council Reference: RM20.079

Otago Regional Council
70 Stafford Street
Dunedin, 9054

Dear Charles,

Re: Request for Further Information under Section 92(1) of the Resource Management Act 1991 – Application to take and use water from Bendigo Creek (Bendigo Station Limited).

In reference to your request for further information dated 19 March 2020, please find outlined below our responses to this request.

1. Regionally Significant Wetlands

Your application does not identify any Regionally Significant Wetlands in the proximity of the site. A review of the Council's database shows that the Bendigo Wetland is located downstream of the abstraction within the margins of the Clutha River/Mata Au and Lake Dunstan. Please provide an assessment of the actual and potential effects on the Bendigo Wetland and any other Regionally Significant Wetlands?

The confluence of the Bendigo Creek channel and the Clutha River/Mata-Au lies just upstream from the northern margin of the Regionally Significant Bendigo Wetland, with the applicant's abstraction itself located approximately 8 km upstream from this confluence.

Bendigo Wetland occupies the wetted margins of the Clutha River, meaning any significant changes Clutha River inputs (i.e. from tributaries) have the potential to indirectly affect the wetland. The fact that there is a clearly incised channel in Bendigo Creek lower reaches implies that there are occasions when water flows all the way to the Clutha River, however there is no evidence of this having occurred at all in recent years – as explained in the AEE. While there may

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still be subsurface inputs to the Clutha River or connected groundwater from Bendigo Creek, it is expected that these inputs would be relatively insignificant regardless of whether upstream abstraction is occurring or not – meaning the proposal to take up to 50 L/s primary allocation and up to 110 L/s supplementary allocation would likely not have a significant adverse effect on Bendigo Wetland.

In situations where Bendigo Creek did happen to flow its full length, presumably there would also be corresponding high flows in the Clutha River. Thus the proposed abstraction rates would have little effect on the amount of water flowing past or through the downstream wetland.

2. Water race / Conveyance

It is understood that water is conveyed from the point of abstraction throughout the Applicant's property via a pipeline (formerly an open race). To better understand how water is conveyed, please provide:

- (a) Where the pipeline is located (on an annotated map);*
- (b) The total length of pipeline; and*
- (c) Estimated losses of water to conveyance.*

The pipeline is already clearly marked on Figure 1 of the AEE, and again in a larger copy of that figure in Appendix A. As also stated in the AEE (just below Figure 1) the length of the pipeline from abstraction point to pond is approx. 2 km. As the deemed permit conveyance infrastructure is new, fully piped and fit for purpose, estimated loss of water to conveyance should be less than 2%.

3. Irrigation infrastructure

You have provided an irrigable areas map in Figure 9 of the Application; however, it is unclear what irrigation infrastructure is proposed. Please confirm what irrigation infrastructure that is proposed?

The yellow zones shown on Figure 9 are currently or planned to be planted in vines respectively. Irrigation in these zones will be via drip. The green zone is pasture, with the half-pivot clearly marked out over the pond and the rest K-Line irrigation. The red zone is to be planted in cherries but irrigated via Clutha water, and is not the subject of this application.

Irrigation areas and methods are further detailed in Figure 13.

4. Bywash / Overflow

In Section 2.1 (Figure 8) of your Application, you indicate that overflows from the irrigation pond is discharged back into Bendigo Creek. Please confirm:

- (a) Why is this overflow and discharge necessary? Due to the large distance between the take point and the storage pond, it is not always possible to abstract the exact amount that is*

needed for irrigation. This means that occasionally there is a surplus of water in the pond, with excess water returned to Bendigo Creek via the overflow. It is noted that this is not a constant occurrence (under normal conditions the overflow is simply an emergency spillway), and as the applicant gains better understanding of their new take, storage and irrigation infrastructure it is expected that less water will need to be discharged back to the creek.

(b) Are there alternatives to overflowing/discharging? The only real alternative would be to keep the pond at a constant lower level to provide enough freeboard to accommodate any fluctuation in water supply vs. demand, and hence avoid the need to return surplus water to the creek. This is also not an ideal situation as the pond is designed to operate best when it is close to capacity and the applicant will lose water security by being forced to keep the pond at a lower level.

(c) At what rate and volume is water that overflows and discharges into the Bendigo Creek? The exact rate of discharge is unknown and varies over time. There are also long periods where no discharge occurs at all.

(d) How will water that overflows and discharges into Bendigo Creek be measured? The overflow discharge to Bendigo Creek falls under Rule 12.C.1.1, meaning it is a permitted activity. There is no requirement under this rule for measurement of discharges, nor are we aware of any other requirements for this under the RPW or any other legislation.

(e) What is the coordinate location (in NZTM 2000) for where the water discharges into the Bendigo Creek? This is provided in the AEE (Table 2)

(f) Does the overflow and discharge comply with relevant permitted rules of the Regional Plan: Water for Otago? Yes – see (d) above.

5. Damming of water

You have indicated that water is stored in two ponds throughout the Applicant's property. In your consideration of the status of the Application, you have noted that the ponds are not subject to the provisions of the Regional Plan: Water for Otago ("RPW") as they are located out of the river bed. Although the land use component of the ponds is not subject, the damming of water is subject to the rules contained within the RPW. Please confirm if the damming of water meets the relevant permitted rules of the RPW? I note that if permitted rules cannot be met, you may require an additional water permit application to authorise the damming of water.

It has always been ORC's approach not to subject a pond or reservoir to the rules of the RPW where it is located outside of a watercourse. The applicant developed their pond under the assumption that there would be no deviation from this approach, particularly given ORC's ongoing encouragement to farmers to develop storage as a way of alleviating instantaneous demand on watercourses around the region.

6. Supplementary allocation

You have applied to take water as supplementary allocation in accordance with Policy 6.4.9(a) and Restricted Discretionary Rule 12.1.4.7 of the RPW. You have advised that the maximum rate of take will be up to 110 litres per second and water will be abstracted when flows are above 50% of the natural flows. Please provide the following:

- (a) *How the Applicant propose to monitor when flows are above 50% of the natural flows?*
Per Section 3.4.2 of the AEE, Bendigo Creek flows will be monitored via a newly installed flow meter. Natural flows will be easy to determine, given that the meter is only shortly downstream from the abstraction with no known tributaries in between. Thus natural flow = measured flow+abstracted rate.
- (b) *Provide a proposed consent condition for ensuring water is only taken when flows are above 50% of the natural flows? I note this may include a proposed minimum flow. The follow condition has already been proposed in Section 6.12 of the AEE: "Supplementary abstraction shall only occur when the Bendigo Creek naturalised flow exceeds 50% of the naturalised flow plus the primary rate of take of 50 L/s, and will not cause the flow in the creek to fall below this level."*
- (c) *Confirm how the intake structure will control and limit the abstraction of water so as to not exceed the proposed primary and supplementary limits?* Abstraction via the intake structure is controlled via a valve. The downstream meter transmits flow data in real time to a web portal. The applicant already knows which valve setting corresponds to the approximate abstraction rate (as evidenced by the comparatively flat hydrograph in Figure 10 of the AEE), and can use this knowledge in conjunction with the real time flow data to ensure that the primary and supplementary limits are not exceeded.

7. Effects on aquatic ecology

Waterway Consulting provided a memorandum which is appended to your AEE. This memorandum provides the result of the fish survey that was undertaken and provides a recommendation for a residual flow (not an assessment of the effects on aquatic ecology). An assessment of effects on aquatic ecology is provided in Section 6.2 of the AEE which has made assumptions based on the memorandum of Waterway Consulting. T&T have reviewed this assessment and consider that this assessment does not provide a sufficient assessment of effects on aquatic ecology. Please provide an updated assessment of effects on aquatic ecology from a suitably qualified ecologist that:

- (a) *Outlines the actual and potential effects of the abstraction on aquatic ecology when considering it against the receiving environment⁴. Matters to be considered in this might include (but not limited to): specific residual and low flow rates, periphyton, macroinvertebrates, dissolved oxygen, temperature, and residual flows necessary to maintain the life supporting capacity of the creek; and*
- (b) *Provides a recommendation for any residual flow (in flow rate) and identifies how this will flow will maintain aquatic ecosystem and natural character values of the watercourse.*

The further information requested has been included in a supplementary memo, attached in Appendix A.

8. Residual flow

In Section 6.2 of your AEE you indicate that a visual residual flow is proposed. It is unclear how this will be maintained and monitored. Please confirm how the proposed residual flow is to be monitored?

There is no mention of a visual residual flow in Section 6.2, nor anywhere else in the AEE. Section 6.3 assesses the need for a residual flow.

9. Fish screen

You have proposed to install a fish screen on the intake structure. Please provide details of the fish screens design? I note this may be incorporated in the response to Question 5.

It has been noted in multiple locations in the AEE (6.2, Table 8) that no fish screen on the intake is proposed. Sufficient reasoning for this is provided in the AEE.

10. Plan Change 7

On 18 March 2020, the Council notified proposed Plan Change 7 (Water Permits Plan Change). This plan change introduces additional objectives, policies and rules in relation water permit applications to take and use water from lakes, rivers and connected groundwater. As the provisions relate to freshwater, they take immediate legal effect. Your application was lodged prior to this plan change; therefore, the application will continue to be considered under the rules of the operative plan in accordance with Section 88A of the Act. However, the notified objectives and policies must be considered when making the decision on the application. Please provide an assessment of the relevant provision of proposed Plan Change 7?

As the application was lodged prior to notification of Plan Change 7 (PC7), and due to the fact that PC7 has not yet been subject to submissions or decisions on submissions, little weighting should be given to the policies and objectives of PC7 in relation to this application. This view is reflected

in the recent Glenayr Limited Decision (RM19.322), which stated that “very little weight should be given to the objectives and policies of PPC7 as it is in its infancy, having only just been notified, and the provisions have not been subject to any independent testing or decision making.”

Nonetheless, as requested an assessment of the objectives and policies of PC7 as they relate to the application is provided below.

10A.1.1 *Transition toward the long-term sustainable management of surface water resources in the Otago region by establishing an interim planning framework to manage new water permits, and the replacement of deemed permits and water permits to take and use surface water (including groundwater considered as surface water) where those water permits expire prior to 31 December 2025, until the new Land and Water Regional Plan is made operative.*

The proposal has incorporated long term sustainable surface water management approaches, particularly with regards to the applicant voluntarily installing a costly flow meter on Bendigo Creek in order to accurately measure the ongoing affect their abstraction has on the hydrology and (indirectly) ecology of Bendigo Creek. There is very little that would be achieved by forcing the applicant into a replacement permit term of 6 years to align with a new LWRP, as there is already a very good understanding of the natural environment (notably Bendigo Creek) and the application has made due consideration of the National Policy Statement for Freshwater Management 2014, which is one of the main drivers for Plan Change 7 and the proposed 6 year replacement consent term.

10A.2.1 *Irrespective of any other policies in this Plan, avoid granting resource consents that replace deemed permits, or water permits to take and use surface water (including groundwater considered as surface water under policy 6.4.1A (a), (b) and (c) of this Plan) where those water permits expire prior to 31 December 2025, except where:*

- (a) The deemed permit or water permit that is being replaced is a valid permit; and***
- (b) There is no increase in the area under irrigation, if the abstracted water is used for irrigation; and***
- (c) There is no increase in the instantaneous rate of abstraction; and***
- (d) Any existing residual flow, minimum flow or take cessation condition is applied to the new permit; and***
- (e) There is a reduction in the volume of water allocated for abstraction.***

- (a) There is no definition provided in PC7 of what constitutes a “valid permit”, however based on the fact that the subject deemed permits are current (i.e. have not expired or been surrendered) it is assumed that they are indeed “valid”.
- (b) As specified in the application, there are proposed increases in irrigable area, however as there is no proposed increase in instantaneous rate of take it is not envisaged that there will be any negative environmental consequences of this expansion. Conversely, there will be significant positive economic effects from establishing new vineyard and cherry blocks in what is otherwise relatively unproductive and undeveloped land.
- (c) There is no proposed increase in the instantaneous rate of take, as discussed above.
- (d) Residual flow is discussed elsewhere in this document and in the AEE. There are no residual flow, minimum flow or take cessation conditions specified on the current permits.
- (e) There is a proposed increase in monthly allocation when compared to historic use, but a significant reduction compared to what the applicant is authorised to take under their current permits. The increase is due to the applicant only having around 1 season of abstraction data, and this was during a particularly wet season. That, in addition to proposed expansions in irrigable area, means the applicant will need more monthly water than what they have historically take. Proposed annual allocation is considerably less than what has been taken historically and what is currently authorised.

10A.2.2 Irrespective of any other policies in this Plan concerning consent duration, only grant new resource consents for the take and use of water for a duration of no more than six years.

A maximum 6 year replacement consent duration is illogical and impractical, for the following reasons:

- A 6 year does not provide enough water security for the applicant to obtain financing for irrigable area expansions or water infrastructure upgrades. Bendigo Station is a thriving business that contributes significantly to the regional economy – restricting organic growth and critical services by drastically limiting the consent term will have far-reaching negative economic impacts. This policy makes no consideration of Policy B8 of the NPSFM, which requires regional councils to give consideration to enabling the economic well-being of communities.

- The voluntary installation (at considerable cost) of a water meter on Bendigo Creek will enable the applicant to directly monitor the effects of their abstraction and very closely adhere to any flow-related conditions of consent.
- The applicant has recently made significant investments in the water take, conveyance and storage infrastructure, meaning water is already being used very efficiently with little wastage. Enabling a longer consent term will allow the applicant to ensure that highly efficient reticulated irrigation systems can be installed to close the water use efficiency loop.
- Review conditions on the replacement consent(s) would enable Council to address any environmental or operational issues that arise – including those that may follow from the new regional land and water plan becoming operative.

10A.2.3 Irrespective of any other policies in this Plan concerning consent duration, only grant new resource consents that replace deemed permits, or resource consents that replace water permits to take and use surface water (including groundwater considered as surface water under policy 6.4.1A (a), (b) and (c) of this Plan) where those water permits expire prior to 31 December 2025, for a duration of no more than six years, except where Rule 10A.3.2.1 applies and:

- (a) The activity will have no more than minor adverse effects (including no more than minor cumulative effects) on the ecology and the hydrology of the surface water body (and any connected water body) from which the abstraction is to occur; and**
- (b) The resource consent granted will expire before 31 December 2035.**

The activity is not expected to have more than minor adverse effects on the environment as explained in Section 6 of the AEE, however the consent term sought is 25 years. This is considered justified, given the reasons provided above.

I trust that the information set out above satisfies the request for further information. However, if you have any further queries, please do not hesitate to contact me.

Kind Regards,



Will Nicolson

Scientist/Resource Management Planner

Appendix A: Additional assessment of effects on Bendigo Creek

To: Will Nicolson, Landpro

From: Richard Allibone, Water Ways Consulting Ltd

Date: 30 April 2020

Subject: Bendigo Creek fish survey

Dear Will,

This memo provides response to the Section 92 request for an assessment of effects on the Bendigo Creek water abstraction, including assessment of the possible water quality, periphyton and invertebrate community effects.

Potential effects

Water abstractions can have a range of effects on the environment:

- Loss of habitat for fish
- Loss of fish passage
- Loss of habitat for invertebrates
- Algal blooms
- Changes to water quality, especially water temperature and subsequently dissolved oxygen levels.

Assessment of effects

As noted in the original site assessment work no fish were present either immediately upstream or downstream of the abstraction point. Furthermore, no fish were located at two sites upstream from the abstraction. Brown trout were located at the most downstream site sampled. It was also noted that downstream of the fish survey sites the stream was dry and it appears to be an ephemeral channel in these lower reaches.

With respect to fish passage at the abstraction site there is no effect as no fish are present. Longfin eels could attempt to occupy the stream, but first they would have to negotiate the lower ephemeral reach and this must have surface water during the migration season (December to March) for this to occur. This would require a significant high flow event and at such times Bendigo Creek will have flows greater than the water abstraction and a continuous pathway will be available through the water abstraction site. The site visit also noted that the water abstraction structure has no free fall drops or other impediments to fish passage. Therefore, we conclude that the water abstraction will not prevent fish passage in Bendigo Creek, but the likelihood of migratory fish reaching the water abstraction site is low.

There is a loss of habitat for the brown trout population that resides between the ephemeral reach and the steep stream section downstream of the water intake. The natural upstream limit of the ephemeral reach is unknown, but it will be downstream of the steep gorge section where the bedrock will prevent loss of water to ground. Site 5 of our fish survey was in an alluvial outwash zone and I expect water loss to ground water occurs at or above this site and the upper limit of the drying reach can be upstream of Site 5 in dry summer (or all summers). The water abstraction will increase the duration of the drying and may increase the extent. However, the presence of adult (albeit stunted) brown trout at Site 5 indicates the stream retains permanent wetted habitat capable

of supporting brown trout. It is expected that the water abstraction is presenting an additional limitation on the brown trout population aside from the natural limitation of the ephemeral reach and a limit on the upstream penetration in the lower gorge above Site 5. However, this additional limitation is not considered significant as the population has no sports fishing value and is one of many populations of stunted brown trout that occupy streams in Otago and such populations are not rare or of sports fish value.

Effects on invertebrates

The invertebrate community will be subject to a reduction in habitat downstream of the water take. The magnitude of the reduction will vary through the year and also between years and is dependent on rainfall and the rate of water abstraction.

The stream survey found no koura or freshwater mussels present at any of the sites. This is not surprising, koura have not been reported in the upper Clutha River catchment and freshwater mussels do not exist where fish are absent as there is no fish for the parasitic juvenile life history stage (glochidia) to attach to. Therefore, there are no impacts on the large mega-invertebrates due to this water abstraction. For aquatic insects, molluscs and crustaceans, there will be a reduction in habitat. However, the stream retains flow through the naturally permanent wet reach and continuously provides a diverse range of habitats and is expected to continue to support the range of habitat and hence invertebrate diversity, although the total abundance will be lower due to the habitat reduction. Water also continues to flow through the abstraction zone maintaining a connection between the upstream and downstream reaches of the water take so there is no loss in connectivity.

Periphyton

The stream has a catchment with low to very low intensity grazing as the dry hill country surrounding the stream supports very few stock units (Figure 1). In addition, the steep hillside and grey scrub in the stream gorge restrict stock access to the stream so there is no bank trampling or direct nutrient inputs. The water quality in the stream is expected to be good and this is supported by the presence of didymo mats in the lower reaches at Site 5. It has been reported (Kilroy 2010) that didymo does not form the large thick mats unless the phosphorus concentration in the water is less than 2 ppb.

The steep turbulent stream course that is present from upstream of the abstraction downstream for another 750 m will also limit nuisance algal growths that can occur during low flows created by the abstraction. Long filamentous green algal and thick algal mats will be more readily scoured due to the turbulent flow. The reach below the intake for the steep 750 m reach is also well shaded and this will further limit the potential for algal blooms. Downstream of the steep reach the stream flows across the lower gradient alluvial fan and is unshaded. This reach has the potential to suffer algal blooms during the low flow. The presence of didymo in this reach means that this algal is likely to dominate and the blooms are more a result of the presence of didymo than the operation of the upstream water abstraction. It was also noted at Site 5 that this reach that is susceptible to blooms did not have a large algal biomass, aside from clumps of didymo. The rainfall event ten days before sampling may have flushed the site and supports the assessment that the stream will continue to flush algal build ups when rainfall does occur. In dry summers this won't occur, but the algal build up in the lower reaches will be limited by the extent of the ephemeral reach. Therefore, it is concluded that the steep shaded reach immediately downstream of the intake will have little potential for algal blooms due to the gradient and shading. The lower reach of Bendigo Creek will have didymo blooms but these will occur regardless of the water abstraction.



Figure 1: Bendigo Creek showing the steep terrain and lack of stock access to the stream.

Water quality

The stream will be subject to reduced flow downstream of the water take. In summer this has the potential to lead to higher water temperatures and this in turn will reduce the dissolved oxygen carrying capacity. As noted above the first 750 m downstream from the water take is well shaded and it is expected that this will limit any potential for the water temperature to increase in this reach. Downstream of the gorge reach the stream is open and unshaded and this reach is likely to have naturally higher water temperatures, and these will be elevated due to the water abstraction.

The stream above and below the water intake is a series of steep cascades and plunge pools with the cascades appearing more frequent downstream of the water take. These cascades create long reaches where aeration of the water is occurring. Therefore, it is expected that the water abstraction will prevent a drop in the dissolved oxygen level in the stream. In addition low periphyton biomass and a lack of macrophytes in this steep reach will exclude the probability of a low dissolved oxygen levels at night.

There is also a lack of macrophytes downstream of the gorge and riffle habitat is common providing aeration and maintain overnight oxygen levels. The presence of brown trout in this low gradient reach at Site 5 also indicates that water conditions, temperature and dissolved oxygen are sufficient to support trout, a species that has a requirement for cool water and high oxygen levels. Their presence is a good indicator the stream, outside the drying reach, provides good instream conditions even during the summer low flow period.

Conclusion

The water abstraction will lead to a reduction in aquatic habitat and this will reduce habitat for aquatic invertebrates. It is expected that the abstraction will increase the size and duration of the natural ephemeral reach and this will lead to a loss of some brown trout habitat. This effect is not considered significant.

The shaded, steep stream downstream of the water intake will prevent the occurrence of algal blooms, maintain good dissolved oxygen levels and prevent increases in water temperature. Algal blooms, aside from didymo, will also be limited by the good water quality present in the stream that limits nutrients available for algal growth.

If you have queries regarding this assessment please contact Richard Allibone by phone 03-4544849, 021 904950 or by email at waterwayscon@gmail.com.

Regards

A handwritten signature in blue ink, appearing to read 'R. Allibone', is positioned above the printed name.

Richard Allibone