

TO: Otago Regional Council
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FROM: Annabelle Coates

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ECOLOGY REVIEW OF CONSENT APPLICATION RM22.434 – LAND USE, WATER TAKE AND DISCHARGE OF SEDIMENT LADEN WATER FOR OPERATION OF SUCTION DREDGE.

Cold Gold Clutha Ltd (the applicant) has applied to Otago Regional Council (ORC) for a new permit to operate suction dredge on the Clutha River. As part of the application, it is also proposed to construct two slipways, one permanent (for the life of the consent) and one temporary, on the banks of the Clutha River. The applicant already holds a number of consents permitting suction dredge gold mining in the mid reaches of the Clutha. The application this review concerns is for mining in the Clutha River between the bridge at Luggate, downstream to where the river flows into Lake Dunstan.

Babbage Consultants Limited (Babbage) has been engaged by ORC to review the ecological aspects of the resource consent application prepared by Terramark, dated May 2021, including the Freshwater Assessment prepared by e3 Scientific, dated July 2022. Our review focused on a number of questions provided by ORC which are answered below.

1. Is the technical information provided in support of the application robust (being the AEE prepared by Terramark and the Ecology Assessment prepared by e3 Environmental), including being clear about any uncertainties and assumptions? Please explain.

The application (Terramark, 2021) provides a good overview of the proposed activity, including the general location, and general methodology including mining and refuelling practices. The locations of the two slipways are stated. The site of the Rongahere Road slipway is the same location as a recent slipway that was established and remediated. The Rongahere Road slipway will be temporary and the river banks will be reinstated once the dredge has been slipped from the river. The Queensbury slipway will be located near the intersection of SH6 and Pukerangi Drive and will remain in place for the duration of the consent.

The section discussing potential effects generally provides a good overview of the potential effects. Some sections are lacking in explicit statements as to what they consider the actual level of effect will be (e.g. effects on water quality – discolouration, effects on waterfowl). Based on the information provided, it appears they consider the effects to be no more than minor, and in many cases less than minor.



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The e3 Scientific report provides a more in depth assessment of freshwater values, and the effects the proposal may have on the Clutha River. The report provides an overview of the aquatic fauna, aquatic and riparian vegetation, and any significant sites on the Clutha River or associated tributaries. Generally, we consider their assessment to be robust and covers the appropriate parameters. Macroinvertebrate sampling was undertaken at three locations within the proposed mining area, to reflect different substrates the activity will occur in. Due to the size of both the Clutha River and the proposed mining area, three samples provide only a very small snapshot of the community in the river. The majority of this section of the Clutha River is non-wadeable, therefore samples would only have been able to be collected from the banks and are therefore not overly representative of the river conditions. This is reflected in the low taxa richness and abundance counts for the samples. The samples do however provide some indication of water and habitat quality. Results suggest on average 'fair' to 'good' habitat and water quality. These values appear to be lower than what would have been expected for a river like the Clutha, however factors such as discharges, high flood flows and sampler bias can affect the results.

Ecological effects were considered in the e3 Scientific report. This included disturbance of benthic substrate, sedimentation, habitat disturbance, disturbance to fish spawning and migration, entrainment of fish, effects of the non-consumptive take, water contamination, spread of unwanted organisms, and riverbank disturbance. There are no other effects that require consideration, and the effects assessment is considered sufficient.

2. Are there any other matters that appear relevant to you that have not been addressed in the application? Is any additional information needed to adequately understand the proposal or associated effects? If so, please specify what additional info you require and explain why it is required.

The information provided is generally considered sufficient to assess ecological effects.

3. If consent is granted, are there any specific conditions that you recommend should be included in the consent?

Various conditions, including amendments to ones proposed by the applicants, are provided in the body of this review. They are identified through italicised text.

4. Page 6 of the application describes that there are two locations excluded from the proposed suction dredging activities. Do you consider there should be any additional areas that are excluded due to potential for adverse effects on aquatic ecology? If so, please explain why.

The draft of the dredge prevents it operating in waters shallower than 0.8m. This will protect koaro, trout and bully spawning habitat, as well as the areas where bullies are most likely to be found. Clutha flathead galixias spawn in small headwater streams, habitat which is not present in the Clutha River. They are also unlikely to reside in the Clutha River for any length of time due to the lack of suitable habitat.

Luggate Creek is listed in Schedule 1A of the Regional Plan: Water, due to provision of habitat for koaro. We support the exclusion zone around its confluence with the Clutha River. We also support the exclusion of the Lake Dunstan delta, downstream of the Lindis Creek confluence. This portion of the river is more braided than the upper reaches, and as such is expected to have different (higher) ecological values, due to the more diverse habitat.

The applicant has also stated existing consents for the mid-reaches of the Clutha River, which include 20m exclusion zones around any tributary confluence greater than 1m in width. We recommend this is also included in this consent.

It is also worth noting that there are only limited records in the NZ Freshwater Fish Database for this reach of the Clutha River, likely due to difficulties sampling a non-wadeable river. It is recommended that any fish entrained by the dredge be photographed, and records kept, including the GPS location of where they were captured, to allow for identification. This applies to both live, and dead fish. If identification of an At Risk or Threatened fish occurs, exclusion areas should be able to be revisited and potentially extended or new exclusion areas created.

5. Page 19 describes that there will typically be no visual discolouration at 50 m beyond the point of discharge, and that if any discolouration beyond 100 m occurs, they will wait until the discolouration has reduced before proceeding. The e3 report promotes a condition that there is no conspicuous change in colour or clarity beyond 100 m.

However, the applicant is seeking a zone of reasonable mixing of 200 m (condition 1 of discharge permit) so that they do not fall into non-compliance. The applicant refers to using an adaptive management model (page 19) however has not promoted any adaptive management conditions (e.g., monitor, alert triggers, cease actions).

a. What further information would be required from the applicant to support a zone of reasonable mixing of 200 m instead of 100 m as recommended in the e3 report?

In the first instance, we agree with the e3 Scientific recommendation for a 100m mixing zone.

In order for an adaptive management approach to be effective, there would need to be investigations as to how the sediment plume affects the behaviour of fish and macroinvertebrates. Sediment is a natural part of the river and it will experience elevated sediment in the water column on a temporary basis following rainfall. Under baseflow conditions, sediment pulses can trigger invertebrate drift, and fish avoidance. The noise and disturbance associated with operating the dredge is likely to trigger fish avoidance and invertebrate drift in the area immediately around the dredge, which is also where sediment is expected to be highest. There would need to be evidence that sediment plumes beyond 100m were insignificant enough so as to not alter fish and invertebrate behaviour.

Based on the applicants' statements in page 19, a consent condition could be developed and enforced requiring dredge operation to cease if the plume exceeds 100m, until discolouration has reduced back to not exceeding 100m. 'Adaptive management' does not seem to be the best way to describe this though, rather it would just be a set condition.

We do not support the relaxation of conditions, just to reduce the chances of a non-compliance.

We recommend the conditions of the discharge permit be amended to the following:

- i. There must be no conspicuous change in colour or visual clarity of the Clutha River/Mata-Au beyond a distance of 200m downstream from the point of discharge at any time.*
- ii. If there is a conspicuous change in colour or visual clarity of the Clutha River/Mata-Au beyond a distance of 100m downstream from the point, the activity must cease until there is no conspicuous change in colour or visual clarity beyond 100m.*
- iii. In the event of a noticeable sediment plume beyond a distance of 200 metres downstream from the point of discharge, all dredging activity must cease, and the Consent Holder must immediately notify the Consent Authority.*

b. What further information would be required from the applicant if they wish to take an adaptive management approach to the discharge?

Please see response above for this answer.

6. The e3 report (section 3.3) has not undertaken sampling or assessed macroinvertebrates in the proposed mining area under permit 60299. Is further information required on potential macroinvertebrate health at these locations? Please explain.

No. Accurate macroinvertebrate sampling for a river the size of the Clutha is difficult. The lack of consistent wadeability means sampling can only occur from the shallower edges, meaning a complete picture of the macroinvertebrate community cannot be gathered. The result of the macroinvertebrate

sampling undertaken yielded values lower than we would have expected, with only a small number of taxa encountered. In contrast, sampling we have undertaken in large, but still wadeable rivers, regularly yield in excess of 20 different taxa. In this case, additional sampling of the macroinvertebrate community would provide little extra, valuable information.

7. The e3 assessment (section 3.4) describes that the water quality assessment previously undertaken by CGCL is appropriate due to the similarity of the activity and receiving environment. Do you agree with this statement? Please explain.

Without knowing the relative proportion of fine sediments in the substrates at the study site and the reach subject to this consent, it is not possible to be completely certain. It is likely that the various dams between the reach to be consented and the study site in the mid reaches of the Clutha River have some effect on how substrates, including both large substrates and fine sediment, move down the reach of the river. However, from review of aerial images, it appears habitat is largely the same. Therefore, providing the dredge is operated in the same manner in the upper reaches as to where the study was undertaken, we consider the results from the previous assessment are applicable to this application.

8. The e3 report presents an Ecological Impact Assessment (section 6 and Table 10). This describes the potential impacts, level of effect, proposed mitigation measures and residual impact. It concludes that, subject to the proposed mitigation measures, residual effects will be 'low'. Do you agree with this assessment and the conclusions that have been drawn? Please explain.

Yes, mostly.

We generally agree with the assessment provided in Table 10 of the e3 Scientific report. The report utilised the Environment Institute of Australia and New Zealand Ecological Impact Assessment (EclA) guidelines to determine ecological values, and overall level of effects. We consider the assessment regarding disturbance to eel (elver) migration to be too conservative. There are several major dams downstream of the proposed mining reaches. These dams act as barriers to elver migration upstream and therefore it is highly unlikely there will be elvers in the upper reaches of the Clutha River. It is also considered unlikely lamprey are present in the upper reaches, for the same reasons. We also consider the magnitude of effects on the riparian zone during construction and operation of the slipways to be higher than stated. Within the works area, there will be significant disturbance and alteration of the riparian zone. There can be inconsistencies in the scale the EIANZ guidelines are applied at, and we assume the e3 Scientific report has applied them to the entire reach, rather than the works area itself. Regardless, providing construction is undertaken in line with good practice, and erosion and sediment control is in place, we consider the effects of the construction and operation of the slipways will be low.

9. Section 7.1 of the e3 report presents proposed consent conditions to mitigate effects of the proposal. Do you consider these conditions are appropriate? Should any other conditions be recommended to mitigate effects on ecology values? Please explain.

We generally agree with the proposed conditions.

We recommend some minor amendments. Point 9 concerns trout redds being identified within the 1500m section to be mined during the sport fish season. How it reads currently is that if redds are found at any stage, a new 1500m section can then be mined. If the redds are identified at the end of the season, then potentially close to 3000m could be mined. We recommend the following wording, or similar, providing the intent is retained.

*Should any sports fish redds be identified by the Otago Fish & Game Council in consultation with the consent holder within the 1,500 metre section of the Clutha River/ Mata-Au approved for mining **at any time between 1 May and 31 August**, the consent holder must then liaise with the Otago Fish & Game Council and determine an alternative **1,500-metre** section of the Clutha River/ Mata-Au as identified in Condition 22. **The length of the alternative section must not exceed 1500m, or 1500m less the length that has already been mined between 1 May and 31 August, whichever is smaller.** Once determined, the Consent Authority must be notified of the amended mining location within 5 working days.*

We also recommend the following amendments to the new condition regarding fish entrainment.

*The dredge operator is to maintain a **photographic** record of any fish observed to be entrained by the suction dredge. If the species survives, **the fish should be photographed, and** the record should be entered into the NZFFD with species and location provided. If mortality is observed, **the fish should be photographed and photographs this** shall be **reported provided** to the consenting authority in a brief quarterly report with species and GPS location provided.*

10. The Regional Plan: Water for Otago identifies that the location of the proposed suction dredging has the presence of a significant range of indigenous waterfowl (Schedule 1).

a. The applicant has provided an assessment of effects on waterfowl (see page 23). Are the conclusions in this assessment appropriate?

Yes. Waterfowl are highly mobile birds. They are likely to simply move away from the dredge if its presence disturbs them. It will not operate at night, therefore there will be periods of time where no disturbance exists. Waterfowl may nest on the riparian margin, however the draft of the dredge will generally prevent it operating directly adjacent to these areas.

- b. The applicant describes that there are no known bird nests in the location of the proposed Queensberry slipway, however has proposed a 100m exclusion around any nesting colonies identified. Is this appropriate?**

Yes. This is a standard precaution. We would recommend amending this condition to be inclusive to only indigenous bird species.

- c. Section 7.1 of the e3 report presents proposed consent conditions to mitigate effects of the proposal. In particular condition 1 relates to submission of an annual works programme highlighting where dredging will occur during bird nesting season. Do you consider these conditions are appropriate?**

We do not consider this is overly necessary, but if the applicants have volunteered it, we support it. Conditions such as this are generally used in braided river habitat where birds nest on the islands in and around the braided channels. As this habitat is really only present in the Lake Dunstan delta, and as such is part of the proposed exclusion area, effects on nesting birds are expected to be low.

- d. The applicant also puts forward conditions 7 and 8 relating to works around black fronted tern, black billed gull and banded dotterel. Are these proposed conditions appropriate?**

As above, nesting is unlikely, however as the applicant has proposed it, we support both conditions. Generally, the exclusion area is 100m however, and we recommend this is included in both conditions 7 and 8.

- 11. The AEE and e3 report has not assessed the ecological effects of the proposed slipway construction at Rongahere Road in Beaumont and Queensberry. Is further information required form the applicant on the potential adverse effects on ecology values associated with these works? If so, please describe what further information is required.**

Section 6.5.1 of the e3 report considers effects of riverbank disturbance as a result of the slipway construction. We agree with their assessment that effects will likely be negligible, as works in the river itself are not required. We do recommend that all works be undertaken under an erosion and sediment control plan prepared by an appropriately qualified person/s. All exposed ground should be suitably stabilised immediately following works. It does not state if any vegetation will need to be removed, particularly for the new slipway at Queensburry (it is assumed the Rongahere Road site is free from vegetation as a slipway has been recently constructed and then removed). From an ecological perspective, it appears any vegetation that may need to be removed consists of willows. These have limited ecological values, however there may be effects on bank stabilisation.

Clarification should be sought as to if any vegetation removal will be undertaken. Otherwise, we do not consider any further information is required.

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