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28 August 2018

Hannah Goslin  
Environment Southland  
Private Bag 90116  
**Invercargill 9840**

Dear Hannah

***Application to vary AUTH-20171214-01-V1 – Wilson Contractors – response to request for further information.***

In response to the matters that you seek further information on in your letter dated 17 July 2018, I can advise as follows:

**Fish Passage**

*Environment Southland Technical Specialist – Environment Scientist Surface Water Quality has reviewed the application and assessment of effects and considers that the culvert as installed could be a barrier to fish passage. This is on the basis that insufficient evidence has been provided to demonstrate that a ‘backwater’ effect occurs at the site of the culvert and that this will remain the case following the expiry of the consent. Even if there is a ‘backwater’ effect occurring, this cannot be maintained by the Applicant and therefore cannot be relied upon to ensure fish passage is continuously provided.*

*Further mitigation measures or evidence about what is proposed is required to demonstrate that fish passage will be provided for following the expiry of the consent. You may wish to consider further instream works to provide fish passage such as a fish ramp. Such mitigation will need to consider the species present in the stream. You may also wish to consult with Fish and Game and Environment Southland when considering suitable mitigation options.*

As outlined in the application, it is clear that the water level through that part of the stream has sufficient depth through the culvert to provide for fish passage. As part of the culvert installation rock was placed on the edge between the culvert apron and the stream bed, which could also be used as a fish ramp. Photographs showing this rock placement were included in the application documents.

What is also clear when looking at the site is that flow velocities in the stream are very low. Wilson Contractors extended the longitudinal survey of the stream bed above and below the culvert to see if the reason for the depth of flow could be verified. The total distance surveyed was 4.14 km, and the bed level went from 102.722m to 94.498m using an assumed datum. No change in the bed level was detected but it was noted that the stream bed slope is very consistent and very shallow, namely, 1.99 m/km or 0.2%. At a constant flow, flow depth is inversely proportional to the gradient, i.e. if the gradient decreases, depth

increases, and *vice versa*. The stream slope is therefore likely to be the main control on the depth of water in the watercourse.

The stream slope is related to the general land topography and there is no way it can be made steeper, so the issue of being maintained does not arise. The stream is fed by groundwater draining from the Central Plains and is known to have a reasonably consistent base flow. Flow will continue to decline in a prolonged dry spell, but it would take a reasonably extreme event for the flow to stop.

Without a long-term flow record for this watercourse, it is not possible to provide certainty around the flow and depth of water through the culvert under all conditions. However, it is clear that the channel slope is very low, and it would take a very dry spell for the water levels to drop to the extent that fish passage would be restricted. Expert advice has not been sought but our understanding is that fish movement/migration under low flow conditions tends to be reduced.

Various structures can be constructed to provide for fish passage (which are likely to require an additional consent), however if there is insufficient flow in the waterway, due to various environmental factors that cannot be controlled, the structures are of little use.

The applicant has contacted Jacob Smyth from Fish and Game, to discuss the further changes being requested as per this application. Mr Smyth has commented;

*"I don't have an issue what is physically in place and it sounds like a case of making sure that the drafting of the consent reflects this."*

#### **Flood risk**

*The application states that "the culvert is large enough not to restrict flows, the crux of the issue in the installation was not at the specified 300mm below bed level to provide for fish passage."*

*As the culvert has been installed 240mm above the bed level, the culvert may present an impediment to flood flows and therefore exacerbate flood risk. Please provide further evidence to demonstrate that the placement of the culvert will not increase flood risks to neighbouring properties.*

It is not anticipated that there will be any adverse effect in regard to flood flows through the culvert structure. There is no loss to the culvert capacity, water will still be able to pass through it at high flows. The applicant has indicated that there is a naturally occurring spillway around the culvert structure for flood events greater in design, which is in line with best practice.

The applicant requested information from Environment Southland about significant flood events over the past 50-100 years, in particular on this tributary. Environment Southland has responded stating that flood waters from the Oreti River in 1977, 1978, 1984 and 1987 floods would have flowed down into the Oporo Flat drains causing significant flooding. Since the construction of the flood protection scheme in 1990, flood flows from the Oreti River no longer affect this waterway, reducing the risk of flooding.

Based on the fact that the waterway is primarily groundwater fed and has a small catchment area above the culvert structure, it is not expected that the flood risk to neighbouring properties has increased as the result of the culvert installation.

***On-going use of the culvert***

*Please provide an assessment of the proposed activity against Rule 59(c) of the proposed Southland Water and Land Regional Plan and Rule 28(c) of the Regional Water Plan to demonstrate that the on-going use of the culvert is permitted. If the permitted activity conditions cannot be complied with, a new resource consent application will be necessary.*


The activity meets all the criteria specified in Rule 59 (c), including the general conditions for activities in river and lake beds specified in Rule 55A of the pSWLP, therefore the ongoing use of the culvert structure is a permitted activity.

In regard to Rule 28 (c) of the Regional Water Plan, the activity also meets all the specified criteria making the ongoing use of the culvert structure a permitted activity.

The main concern that you have identified out of all the criteria specified in the above rules, is that fish passage will not be impeded as a result of the activity. Based on the information included in the application document, we consider that there will be no adverse effect to fish passage as the result of the culvert installation except under natural conditions that may restrict fish passage in all parts of the stream.

I hope that this information addresses the matters you have queried. Please contact me if any clarification is required.

Yours faithfully,



Bridgett Aitken  
**Planner Environmental**