Appendix 16: Sediment report

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SEADOWN DRAIN REALIGNMENT: SEDIMENT EFFECTS ON ECOLOGY

Dear Julian

1. BACKGROUND

Seadown Drain is a tributary of Waitarakao – Washdyke Lagoon that runs along the coastline north of Timaru (Figure 1). Coastal erosion has prompted Environment Canterbury (ECan) to progressively move stopbanks and Seadown Drain landward over the decades. ECan is looking to move Seadown Drain again, in response to ongoing coastal erosion. The broader drain relocation project area covers approximately 7 km of Seadown Drain and its tributaries from Waitarakao – Washdyke Lagoon to Phillips Lagoon at Beach Road and will be implemented in Phases (Figure 1). Phase 1 of the project will span approximately 1.8 km from Waitarakao – Washdyke Lagoon to the northern end of the Timaru Wastewater Treatment Ponds (Figure 2). Draft designs for the proposed new Seadown Drain alignment are attached.

An aquatic ecology assessment report has been prepared to accompany consent applications for Phase 1 of the drain realignment[1]. That report noted that sediment generation during construction could result in negative effects on aquatic values, but concluded that adverse effects could be readily avoided and mitigated via implementation of an erosion and sediment control plan. ECan have further developed construction methods since the aquatic ecology report was written, so there is greater certainty around mitigation measures and ecological impacts.

This letter assesses ecological effects of potential sediment discharges associated with the channel realignment. This supplements the original ecology assessment report, provides my expert opinion of the likely effectiveness of proposed mitigations, and makes recommendations for monitoring. Any ecology advice provide herein does not constitute advice on erosion and sediment control or construction methodology, as that is not my area of expertise. Rather, this letter interprets the likely effectiveness of the proposed methods in avoiding and mitigating adverse ecological effects.

[1] Instream Consulting (2025). Seadown Drain relocation: ecology assessment. Report prepared for Environment Canterbury by Instream Consulting, July 2025.

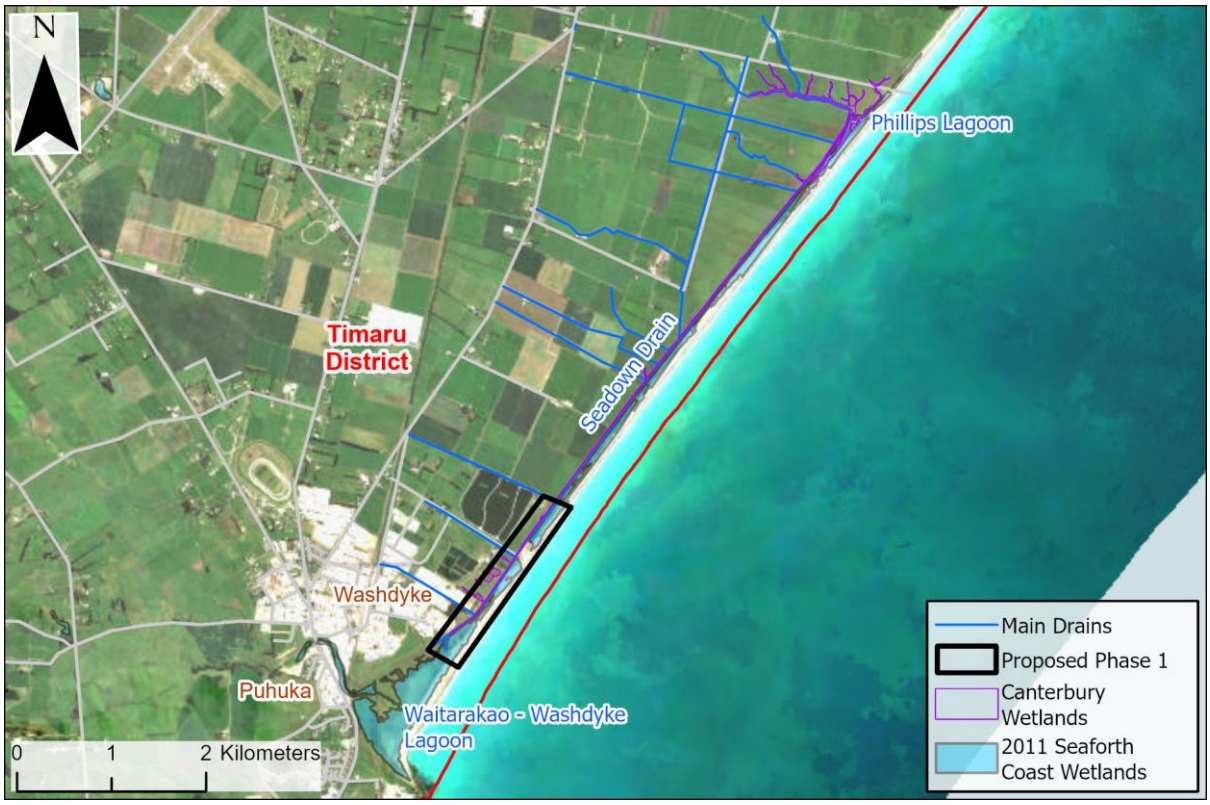

Figure 1: Broader Seadown Drain project area.

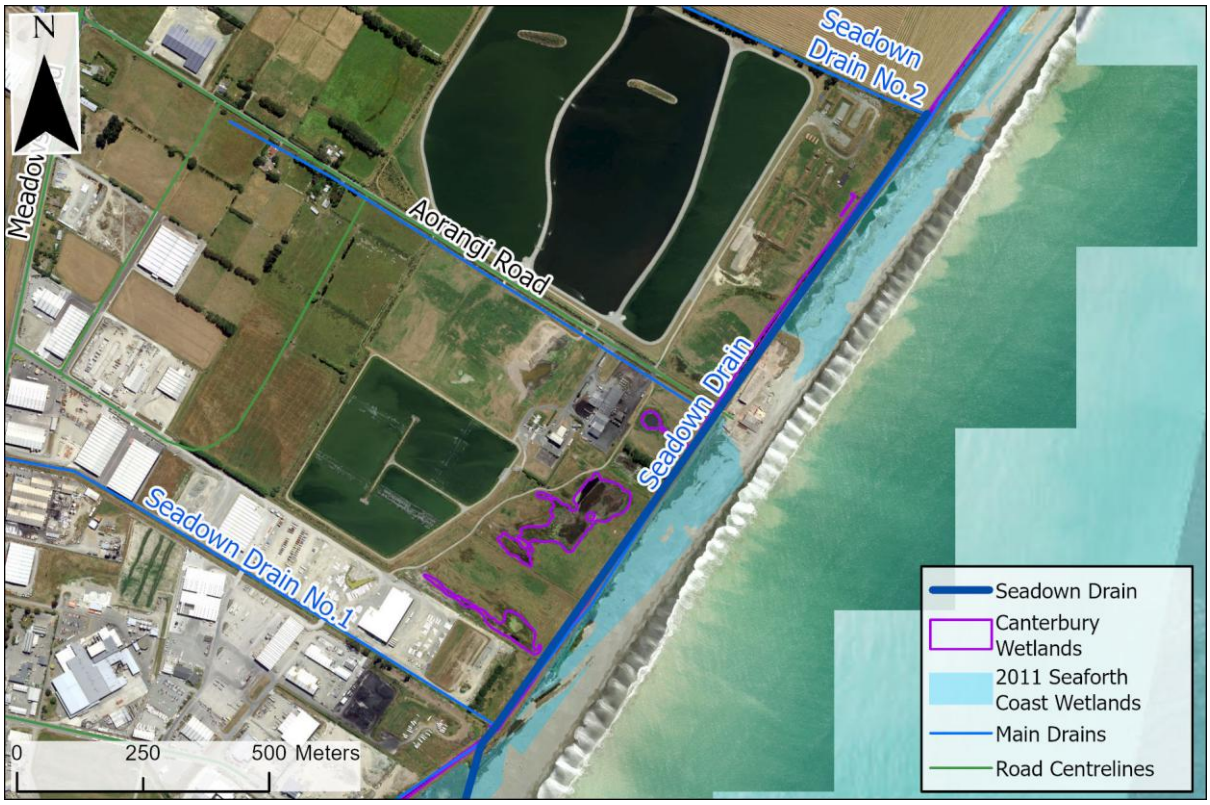

Figure 2: Extent of proposed Phase 1 of the Seadown Drain relocation project.

2. PROPOSED CONSTRUCTION METHODS

Potential sources of sediment generation during Phase 1 of the project include:

- Installation of a maintenance track to enable excavation of the new Seadown Drain alignment and construction of the new coastal stopbank;
- Upgrade of the inland track between Hilton Haulage and Aorangi Road, as this will likely be used throughout the project;
- Installation of inland bunding and related drainage works;
- Construction of the Seadown Drain alignment offline (i.e., separate from existing drains and wetlands);
- Connection of the new Seadown Drain channel to existing drains and wetlands.

Key construction methods aimed at avoiding and mitigating sediment effects are as follows:

- Construction of the new alignment offline.
- Maintaining a 20 m buffer between the offline construction works and tie-in points.
- Construction done sequentially upstream (north) in approximately seven sections that avoid existing wetland areas and side drains.
- Tie-ins of each section to existing waterways done progressively, rather than all at once, starting by opening the downstream connection of the new Seadown Drain to the existing drain.
    - This staging will allow time for hydraulics to normalise and minimise the amount of sediment exposure at a given time.
    - The last tie-in will be the upstream end of the new alignment to the old, by which time the entire new alignment will have had water in it for several weeks at least, providing time for sediments to gradually settle, and aquatic plants and fish to start colonising the new channel.
- Hydroseeding of newly formed banks as soon as practicable after their formation, so that grass is established prior to flow getting “switched on” at the upstream end.
- Macrophytes (aquatic plants) will be kept in the approximately 150 m length of old channel downstream for duration of the tie-in process, to enhance sediment settling out prior to reaching the lagoon.
    - If there are concerns about flood water conveyance, then a “minimal cut” will be made, so that some vegetation is maintained.
- If practical, silt curtains will be deployed near the confluence of Seadown Drain and Waitarakao – Washdyke Lagoon, as a final “backstop” to minimise the amount of sediment entering the lagoon.
    - The effectiveness of silt curtains is reduced in flowing water environments, due to bed scour. Therefore, silt curtains should only be placed if there is a location near at the mouth of the drain with lower velocities (to avoid undermining) and where it is not too wide to isolate with a silt curtain.

3. LIKELY ECOLOGY EFFECTS

I consider that the ecological effects of sediment generation caused by the proposed works will most likely be small, with any sediment effects being localised and of short duration. It is also my opinion that sediment effects will be less than those associated with removal of aquatic weed that occurs 2-3 times per year by ECan as part of drainage maintenance. That is because sediment sources will be minimised by hydroseeding and grass establishment, sequencing will minimise the exposure of each new channel section to the existing channel downstream, there will be some time for sediment to settle out in the new channel prior to flow

being added to it, and the combination of a weedy existing channel downstream and silt curtains will further encourage sediment to settle out prior to sediment-laden water reaching the lagoon.

In addition to the scale and significance of sediment generation, which should be relatively localised and short-lived, the existing ecosystems are relatively tolerant of fine sediment. Notably, the downstream reaches of Seadown Drain and Waitarakao – Washdyke Lagoon have naturally fine sediment beds, due to their coastal location. This means that they are insensitive to clogging of interstitial spaces by fine sediment, in contrast to waterways with naturally stony beds. In addition, Seadown Drain is regularly disturbed by weed removal activities that will make the water turbid and reduce dissolved oxygen levels. While this is undesirable from an ecological perspective, it is the existing environment that aquatic species are exposed to. Thus, the resident fish and invertebrate fauna is tolerant of sediment effects.

The most recent local example of a project of comparable scale was the relocation of Cashmere Stream in Christchurch in 2022-23. Approximately 800 m of Cashmere Stream was relocated into a new alignment as part of the Te Kuru Wetlands restoration and flood resilience project. As with the proposed Seadown Drain construction scheduling, water was gradually introduced first to the downstream end of the new Cashmere Stream alignment, before diverting all flow into it. I was present when flow was transferred to the new alignment and observed that the water cleared quickly, following an initial slug of dirty water. Ecological monitoring one year after the realignment found that the old and new alignments had comparable invertebrate and fish communities[2]. The Te Kuru Wetlands have subsequently won an international award for excellence and sustainability[3], providing independent validation of the overall project's success. My experience with the Cashmere Stream project gives confidence in the ability to manage construction effects with the Seadown Drain relocation project. I do not consider that post-construction monitoring is necessary for Seadown Drain, as the likely scale of sediment effects is less than that caused by routine weed removal. The monitoring for Te Kuru was primarily aimed at assessing the effectiveness of the ecological enhancement, rather than monitoring sediment effects.

In summary, I consider that the proposed construction methodology should minimise the potential for sediment discharges to waterways, that any potential effects would be less than those that occur as part of routine waterway maintenance, and therefore aquatic ecosystems are unlikely to be adversely affected by the construction activities beyond a localised, short-term disturbance.

4. MONITORING

I recommend monitoring of the following, to ensure that any sediment-related effects are minimal:

- Daily checks for potential erosion of project areas that could result in sediment entering wetlands and drains.
    - These checks should be made by the contractor and any potential sediment sources to waterways isolated and remediated to prevent further erosion and sediment discharges.
- Weekly checks of grass establishment in hydroseeded areas.

[2] Instream Consulting (2024). Cashmere Stream Restoration: Follow-up Ecological Survey 2024. Report prepared for Christchurch City Council, August 2024.
[3] https://www.newsline.ccc.govt.nz/news/story/christchurchs-award-winning-te-kuru-to-the-rescue

    - If the grass strike rate is inadequate, assess why and remedy (e.g., install irrigation and/or sow additional grass).
- Sample water clarity or turbidity immediately prior to each tie-in.
    - Clarity or turbidity in each new section should be no more than 35% greater than within the downstream section it is being exposed to.
        - If the clarity/turbidity difference is greater than 35%, then the tie-in must be delayed until the difference is within 35%.
    - The clarity or turbidity measurement may be made by the contractor, using a SHMAK clarity tube or calibrated turbidity meter, and provided they have had adequate training and provided that there is a follow-up audit of their methods.
        - The training, monitoring programme, and audit would need to be done by someone with experience taking and interpreting water quality measurements.
    - The 35% clarity/turbidity difference is consistent with receiving water standards for Spring-fed – plains water quality class waterways in the Canterbury Land and Water Regional Plan[4]. There is no clarity receiving water standard for coastal lakes in the plan.
    - If the clarity difference exceeds 35%, then the new section of offline waterway shall not be tied into the existing channel until the clarity or turbidity difference drops below 35%.

5. CONCLUSIONS

The information on construction methodology summarised above provides confidence in the ability of contractors to avoid and mitigate potential effects of sediment generation on aquatic ecology in drains and wetlands in the Seadown Drain area. Monitoring will provide additional certainty that any sediment issues can be quickly addressed and remedied.

Yours sincerely

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Attachment: Engineering Designs

[4] Canterbury Land and Water Regional Plan, Schedule 5.