

MEMORANDUM

To: Brandon Ballie – Hawkes Bay Regional Council
From: Michael Parsonson
Date: 31 August 2023
Subject: APP-128957_Waikare Gorge Erosion and Sediment Control Technical Review

Introduction

SouthernSkies Environmental Limited (SouthernSkies) has been engaged by Hawkes Bay Regional Council (HBRC) to provide a technical review of the erosion and sediment control (ESC) design for the State Highway 2 - Waikare Gorge Realignment Project ('Project') proposed by Waka Kotahi. HBRC has also requested SouthernSkies to review draft consent conditions proposed by Waka Kotahi and provide any additional draft conditions relating to the implementation of ESC during the project.

To date, I have not undertaken a site visit. The assessment is based on the application material, s92 responses, and other information provided by you and available online.

Documents

The following documents have been specifically considered in this review:

Technical Guideline

- *Hawke's Bay Waterway Guidelines Erosion and Sediment Control*; April 2009 (HBRC Guideline)

Report

- *Volume 1 Assessment of Effects on the Environment, State Highway 2 – Waikare Gorge Realignment Project*; NZ Transport Agency (Waka Kotahi), May 2023 (AEE)
- *State Highway 2 Waikare Gorge Realignment, Ecological Assessment*; Stantec New Zealand, 17 February 2023
- *SH2 Waikare Gorge, Stormwater Preliminary Design*; Stantec New Zealand, December 2022
- *Road Realignment SH2 Waikare Gorge, Preliminary Erosion and Sediment Control Plan*; Stantec New Zealand, 18 July 2023 (ESCP)

Drawings

- *General Arrangement Plan and Long Section Sheet 1 of 8*; DWG No. WGR-DES-GEM-00-DRG, Sheet 0002, Revision F, 04.02.22, prepared by Waka Kotahi, WSP, Stantec New Zealand, & GHD
- *General Arrangement Plan and Long Section Sheet 2 of 8*; DWG No. WGR-DES-GEM-00-DRG, Sheet 0003, Revision F, 04.02.22, prepared by Waka Kotahi, WSP, Stantec New Zealand, & GHD
- *General Arrangement Plan and Long Section Sheet 3 of 8*; DWG No. WGR-DES-GEM-00-DRG, Sheet 0004, Revision F, 04.02.22, prepared by Waka Kotahi, WSP, Stantec New Zealand, & GHD

- *General Arrangement Plan and Long Section Sheet 4 of 8; DWG No. WGR-DES-GEM-00-DRG, Sheet 0005, Revision F, 04.02.22, prepared by Waka Kotahi, WSP, Stantec New Zealand, & GHD*
- *General Arrangement Plan and Long Section Sheet 5 of 8; DWG No. WGR-DES-GEM-00-DRG, Sheet 0006, Revision F, 04.02.22, prepared by Waka Kotahi, WSP, Stantec New Zealand, & GHD*
- *General Arrangement Plan and Long Section Sheet 6 of 8; DWG No. WGR-DES-GEM-00-DRG, Sheet 0007, Revision F, 04.02.22, prepared by Waka Kotahi, WSP, Stantec New Zealand, & GHD*
- *General Arrangement Plan and Long Section Sheet 7 of 8; DWG No. WGR-DES-GEM-00-DRG, Sheet 0008, Revision F, 04.02.22, prepared by Waka Kotahi, WSP, Stantec New Zealand, & GHD*
- *General Arrangement Plan and Long Section Sheet 8 of 8; DWG No. WGR-DES-GEM-00-DRG, Sheet 0009, Revision F, 04.02.22, prepared by Waka Kotahi, WSP, Stantec New Zealand, & GHD*
- *Stock Underpass (CH15855) Site Plan and Long Section; DWG No. WGR-PLA-STR-00-DRG, Sheet 00047, Revision A, 19.10.22, prepared by Waka Kotahi, WSP, Stantec New Zealand, & GHD*
- *Stock Underpass (CH15855) Plan and Sections; DWG No. WGR-PLA-STR-00-DRG, Sheet 00048, Revision A, 19.10.22, prepared by Waka Kotahi, WSP, Stantec New Zealand & GHD*
- *Stock Underpass (CH14540) Site Plan and Long Section; DWG No. WGR-PLA-STR-00-DRG, Sheet 00049, Revision A, 19.10.22, prepared by Waka Kotahi, WSP, Stantec New Zealand & GHD*
- *Stock Underpass (CH14540) Plan and Sections; DWG No. WGR-PLA-STR-00-DRG, Sheet 00050, Revision A, 19.10.22, prepared by Waka Kotahi, WSP, Stantec New Zealand & GHD*
- *Stock Underpass (CH13275) Site Plan and Long Section; DWG No. WGR-PLA-STR-00-DRG, Sheet 00051, Revision A, 19.10.22, prepared by Waka Kotahi, WSP, Stantec New Zealand & GHD*
- *Stock Underpass (CH13275) Plan and Sections; DWG No. WGR-PLA-STR-00-DRG, Sheet 00052, Revision A, 19.10.22, prepared by Waka Kotahi, WSP, Stantec New Zealand & GHD*
- *Stock Underpass (CH12840) Site Plan and Long Section; DWG No. WGR-PLA-STR-00-DRG, Sheet 00053, Revision A, 19.10.22, prepared by Waka Kotahi, WSP, Stantec New Zealand & GHD*
- *Stock Underpass (CH12840) Plan and Sections; DWG No. WGR-PLA-STR-00-DRG, Sheet 00054, Revision A, 19.10.22, prepared by Waka Kotahi, WSP, Stantec New Zealand & GHD*
- *Kings Creek Stock Bridge (CH15600) Site Plan and Long Section; DWG No. WGR-PLA-STR-00-DRG, Sheet 00055, Revision A, 19.10.22, prepared by Waka Kotahi, WSP, Stantec New Zealand & GHD*
- *Kings Creek Stock Bridge (CH15600) Plan and Sections; DWG No. WGR-PLA-STR-00-DRG, Sheet 00056, Revision A, 19.10.22, prepared by Waka Kotahi, WSP, Stantec New Zealand & GHD*
- *Kings Creek Overbridge (CH15550) Site Plan; DWG No. WGR-PLA-STR-00-DRG, Sheet 00057, Revision A, 19.10.22, prepared by Waka Kotahi, WSP, Stantec New Zealand & GHD*
- *Kings Creek Overbridge (CH15550) Sections; DWG No. WGR-PLA-STR-00-DRG, Sheet 00058, Revision A, 19.10.22, prepared by Waka Kotahi, WSP, Stantec New Zealand & GHD*
- *Railway Overbridge (CH12750) Site Plan; DWG No. WGR-PLA-STR-00-DRG, Sheet 00059, Revision A, 19.10.22, prepared by Waka Kotahi, WSP, Stantec New Zealand & GHD*
- *Railway Overbridge (CH12750) Sections; DWG No. WGR-PLA-STR-00-DRG, Sheet 00060, Revision A, 19.10.22, prepared by Waka Kotahi, WSP, Stantec New Zealand & GHD*
- *Erosion and Sediment Control Sheet 1 of 8; 17.07.23, prepared by Stantec New Zealand.*

- *Erosion and Sediment Control Sheet 2 of 8*; 17.07.23, prepared by Stantec New Zealand.
- *Erosion and Sediment Control Sheet 3 of 8*; 17.07.23, prepared by Stantec New Zealand.
- *Erosion and Sediment Control Sheet 4 of 8*; 17.07.23, prepared by Stantec New Zealand.
- *Erosion and Sediment Control Sheet 5 of 8*; 17.07.23, prepared by Stantec New Zealand.
- *Erosion and Sediment Control Sheet 6 of 8*; 17.07.23, prepared by Stantec New Zealand.
- *Erosion and Sediment Control Sheet 7 of 8*; 17.07.23, prepared by Stantec New Zealand.
- *Erosion and Sediment Control Sheet 8 of 8*; 17.07.23, prepared by Stantec New Zealand.

General Site Description

The project is located approximately midway between Napier and Wairoa, Hawke's Bay.

Drawing on the site description provided in Section 4 of the AEE, it is understood that the major feature within the realignment area is the Waikare Gorge. The project is located entirely within the Waikari River catchment with the two largest watercourses being the Waikari River and Kings Creek. The project includes seven crossings of existing watercourses, including two bridges and five culvert stream crossings. The site is almost exclusively pasture, with open pasture and stream side habitat provided by native and exotic shrubs, are located along streams and the railway line.

Much of the land is moderate gradient, incised by the natural drainage systems noted above.

Two HAIL sites have been identified within the farm at the southern end of the alignment. The Preliminary Site Investigation has indicated that consent is not triggered by the presence of those sites. A Contaminated Land Management Plan has been prepared to address works in that vicinity.

As described in Section 3.2.6 of the Ecological Assessment, seven natural inland wetlands were and six are anticipated to be impacted by the proposed works.

Proposal

The proposed realignment extends over a distance of approximately 3.8km to the west of the existing 6km section of State Highway 2 (SH2).

The project comprises approximately 400,000m³ of earthworks over approximately 31.3ha. This will include approximately 280,000m³ of cut to fill with the remainder cut to waste. The works are proposed to be undertaken in separable portions which will be decided by the contractor.

A preliminary Erosion and Sediment Control Plan (ESCP) and ESC drawings, as listed above, have been prepared in accordance with the HBRC Guideline¹ and provided in response to a s92 request for further information. Sediment control is based on decanting earth bunds (DEBs) and silt fences. It is noted in the ESCP that sediment retention ponds (SRPs) will be used for catchments greater than 0.3ha and up to 5ha however, the ESC drawings do not indicate any SRPs at this stage.

The staging of works has not been finalised and will be confirmed by the contractor in a Construction Environmental Management Plan (CEMP). In broad terms the construction sequence and methodology involve the following:

- Site possession and establishment, including construction laydown areas, offices, and associated buildings;
- Property fence setbacks;
- Vegetation clearance and service relocations;
- Installation of ESC measures;
- Construction of haul roads and cross culverts;

¹ *Hawke's Bay Waterway Guidelines Erosion and Sediment Control*, 2009.

- Earthworks;
- Bridge construction, including piling;
- Drainage infrastructure;
- Pavement and surfacing, road tie-ins;
- Road safety installations and line marking; and
- Landscaping works.

In-stream works are also proposed for the installation and extension of culverts and fish passage. Only a very brief description of the streamworks methodology has been submitted by the applicant to date. The AEE notes that these works will likely be undertaken during the summer months where there is little to no flow in the streams and if temporary diversions are required these will be created, taking into consideration the recommended ESC measures as well as any fish passage requirements during construction. The fish passage requirements have not been specified.

Assessment

ESC Design Approach

The ESCP and ESC drawings presented are preliminary, based on the HBRC Guideline. Typical details for ESC measures have been included in the ESCP. The ESC drawings submitted do not identify or provide sizing details for any DEBs, or SRPs if required, and do not define any of the corresponding catchments. As the ESCPs that have been submitted are preliminary this detail is not currently required but will be necessary for a consent condition requiring Site-Specific ESCPs (SSESCPs) to ensure that final ESC design is aligned with detail earthworks design and confirming full compliance with the HBRC Guideline.

It is unclear on the ESC drawings how the DEB catchments are proposed to be delineated. It appears silt fences are proposed as a form of dirty water diversion to the DEBs. Silt fence is a treatment device and using it as a clean water or dirty water diversion is not compliant with the HBRC Guideline (or any other ESC guideline). Additional diversions will be required to separate the catchment areas and these details can be included in the SSESCPs. It is also unclear whether diversion channels or bunds are diverting clean water, dirty water, or both, as across various plans diversion channels/bunds are indicated directly behind the proposed Silt Fences. These matters can be resolved through more detailed design and via SSESCPs to be reviewed and certified against the NBRC Guideline.

No SRPs were indicated on the ESCP provided although some of the catchment areas appear to be greater than 0.3ha, which exceed the Guideline recommended maximum for a DEB. Again, this detail can be reviewed and certified prior to construction.

The ESC report notes that chemical treatment will be used for exposed working areas greater than 0.3ha (SRPs) and for DEB practices “as required”. It is recommended that both DEBs and SRPs are chemically treated in accordance with a Chemical Treatment Management Plan (ChemTMP), subject to confirmatory bench testing of site soils. Chemical treatment is proven to significantly improve sediment retention efficiency for most soils in various regions of New Zealand. I have recommended a condition that imposes chemical treatment in accordance with a ChemTMP for all SRPs and DEBs.

I have not identified any reason that HBRC Guideline compliant ESC measures cannot be successfully implemented throughout the Project area. Best practice ESC that is promoted through the guideline requires significant focus on erosion control to minimise sediment generation, supported by sediment control to capture sediment that is eroded and mobilised within the site. No sediment control devices are 100% efficient. Hence erosion control and sediment control are required to be implemented in a treatment train approach at all times, to minimise sediment yield i.e., the sediment load that leaves the site and enters the receiving environment. I have recommended a consent

condition that requires SSESCPs to be prepared in accordance with the HBRC Guideline and include details on erosion and sediment control measures that will minimise overall sediment yield. This should include staging to minimise the extent of open area at any given time.

High Risk Areas

High-risk areas have not been identified on the submitted ESCP as requested under s92. Such areas would be those adjacent or within streams and wetlands, and include:

- approx. CH14700 culvert;
- Kings Creek stock bridge (abutments);
- Kings Creek overbridge (reinforced earth block abutments and rip rap erosion blankets); and
- Waikari River bridge (design to be confirmed).

While such detail could be required at this time, it is accepted that methods for undertaking culvert and bridge construction and works within minor streams are commonly certified and adopted for state highway construction. Accordingly, it is anticipated that the effects of these activities can be appropriately minimised using proven construction methods. However, it will be critical that those methods are addressed and able to be carefully considered by HBRC through a certification process prior to works commencing. This can be achieved through the specific conclusion of these works in SSESCPs, to be submitted via a consent condition. The SSESCP for each site should include measures to isolate the works site from upstream flows and maintenance of base flow downstream of the site. This should also include a dewatering / pumping methodology, as required for a given site.

I defer any requirement for fish capture and relocation to the assessment provide by Dr Bellingham, but I consider this would be an appropriate requirement and consistent with similar consented works with which I am familiar.

I also confirmed that this assessment does not consider hydraulic impact of structures within streams or flood plains. It is understood that this is being assessed by Kyle Christensen (of Christensen Consulting).

Wetlands

The original resource consent application identified Regulation 42 (1) and (2) of the National Environmental Standard: Freshwater (NES: FW) as a reason for consent. These two rules relate to the construction of a wetland utility structure within, or within a 10m setback of a natural inland wetland. In the applicant's s92 response it was noted that this reason for consent is not applicable as no wetland utility structure is proposed. As works are proposed within, or within a 10m setback regulation 45(2) of the NES: FW is likely triggered by the proposal as the works are for specified infrastructure. This reason for consent is yet to be confirmed by the applicant, however, it has been assumed for this assessment.

The Ecological Assessment prepared by Stantec New Zealand provides detail of the location, size, and nature of the wetlands. I am aware that Dr Mark Bellingham of PDP is providing the ecological peer review for HBRC, addressing the overall ecological effects of the project, including the proposed loss of wetland and diversion of surface water within the catchment of wetlands. Dr Bellingham² has provided me the following commentary on the proposed offsets and compensation for the loss of wetlands within the alignment.

² Email received 31 August 2023.

Constructed wetlands cannot be considered as offsets or compensation for the loss of natural wetlands. They may have a sediment control function but do not have the biodiversity functions appropriate for compensating for natural wetlands lost.

As with the comments above, areas of wetlands proposed for offsetting or sites proposed for compensation would need to be assessed with the MfE Wetland Delineation Protocols and the offset or compensation area and values would need to be assessed with Environmental Compensation Ratio (ECR) calculations to enable residual loss to be properly addressed.

My assessment does not address the ecological loss of wetlands or associated offset and compensation. To the extent possible at this time, I have considered the potential impact of earthworks in close proximity to wetlands in terms of temporary diversion of surface water through sediment control devices or by clean water diversions, and the temporary discharge of treatment sediment-laden runoff into wetlands.

Consistent with my conclusion on general earthworks, I consider that ESC measures that are designed, constructed, and maintained in accordance with the HBRC Guideline can be successfully implemented. Such controls will appropriately minimise sediment related effects on adjacent wetlands, subject to the works being demarcated and separated from the wetlands. To that end, I recommend a consent condition that requires all wetlands that are not directly impacted by works to be fenced off to ensure that construction activities do not encroach into the wetland. The fencing may be temporary but should be sufficient to ensure that all construction personnel understand to avoid entry beyond the fencing.

Works that are approved to occur within wetlands should be covered by a SSESCP and treated as a high-risk area, similar to stream works. This will include isolating the works area from upstream flows and maintaining baseflow downstream of the site.

Sediment Effects Summary

The applicant has provided a draft ESCP and ESC drawings that provide a general indication of an ESC management system that can be adopted for the site. Some of the details of the drawings are ambiguous, but overall the principles that are proposed are appropriate. No reasons have been identified that would prevent an ESC methodology consistent with the HBRC Guideline from being successfully implemented. Moreover, I anticipate that a guideline approach will acceptably minimise sediment yield and off-site effects.

Higher risk areas such as stream works and works within wetlands must be specifically addressed in SSECPs. I have recommended specific clauses in the corresponding consent conditions to require the necessary information to be submitted to ensure that the HBRC reviewer can appropriately identify all necessary measures and have sufficient specificity to allow certification to be provided.

Conditions

I have reviewed the applicant's draft conditions. Based on my assessment, I recommend that the Preliminary ESCP submitted with application be included in the listed documents, and that draft Conditions 7 and 8 be replaced with the following.

Documents

- *Road Realignment SH2 Waikare Gorge, Preliminary Erosion and Sediment Control Plan*; Stantec New Zealand, 18 July 2023 (ESCP)

Pre-Commencement Meeting

1. Prior to the commencement of any earthworks within each stage, the Consent Holder must hold a pre-start meeting that:
 - a) is located on the subject site;
 - b) is scheduled not less than five days before the anticipated commencement of earthworks;
 - c) includes Hawke's Bay Regional Council compliance monitoring officer and any other relevant Council specialist; and
 - d) includes representation from the contractors who will undertake the works.

The meeting must discuss the erosion and sediment control measures, as well as the earthworks methodologies, confirm the location and extent of any streams and wetlands adjacent to the earthworks, and must ensure all relevant parties are aware of and familiar with the necessary conditions of this consent.

The following information must be made available at the pre-start meeting:

- a) Timeframes for key stages of the works authorised under this consent;
 - b) Defined the extent of the relevant works;
 - c) The archaeological authority for the works;
 - d) Resource consent conditions; and
 - e) The relevant Site-Specific Erosion and Sediment Control Plan (SSESCP) for the coming stage of works.
2. At least 20 working days prior to the commencement of the consented earthworks, a Chemical Treatment Management Plan (ChemTMP) must be prepared in accordance with Section 6.2 *Hawke's Bay Waterway Guidelines Erosion and Sediment Control*; April 2009 (HBRC Guideline) and submitted to Council for written certification. No earthwork activities may commence until written certification is provided by Council that the ChemTMP meets the requirements of HBRC. The ChemTMP must include as a minimum:
 - a) Specific design details of chemical treatment system based on a rainfall activated dosing methodology for sediment retention ponds and decanting earth bunds;

- b) Monitoring, maintenance (including post-storm) and contingency programme (including a record sheet); Details of optimum dosage (including assumptions);
- c) Results of initial chemical treatment trial of site soils (bench testing);
- d) A spill contingency plan; and
- e) Details of the person or bodies that will hold responsibility for long term operation and maintenance of the chemical treatment system and the organisational structure which will support this system.

Advice Note:

In the event that minor amendments to the ChemTMP are required, such amendments should be limited to the scope of this consent. Any amendments which affect the performance of the ChemTMP may require an application to be made in accordance with section 127 of the RMA. Any minor amendments should be provided to the Council prior to implementation to confirm that they are within the scope of this consent.

Earthworks: General Performance Standards

- 3. Erosion and sediment control measures must be constructed and maintained in accordance with *Hawke's Bay Waterway Guidelines Erosion and Sediment Control*; April 2009, except where a higher standard is detail in a Site Specific Erosion and Sediment Control Plan, in which case this higher standard shall apply.
- 4. Subject to confirmatory bench testing results that show improved settlement rates and a pH above 5.5, all sediment retention ponds and decanting earth bunds must be chemically treated in accordance with the ChemTMP certified under **Condition 2**.
- 5. Earthworks must be managed to avoid deposition of earth, mud, dirt, or other debris on any public road resulting from earthworks on the subject site. In the event that such deposition does occur, it must be removed as soon as practicable taking into account safety. In no instance may roads or footpaths be washed down with water without appropriate erosion and sediment control measures in place to prevent contamination of the stormwater drainage system, watercourses or receiving waters.
- 6. The operational effectiveness and efficiency of all erosion and sediment control measures must be maintained throughout the duration of earthworks, or until the catchment of a control is permanently stabilised against erosion.
- 7. The site must be progressively stabilised against erosion in accordance with *Hawke's Bay Waterway Guidelines Erosion and Sediment Control*; April 2009, as soon as practicable as earthworks are finished over various areas of the site.
- 8. All erosion and sediment control measures must be inspected on a regular basis and within 24 hours of each rainstorm event that is likely to impair the function or performance of the controls. A record must be maintained of the date, time and any maintenance undertaken in association with this condition which must be forwarded to the Council on request.

Site Specific Erosion and Sediment Control Plans

9. Prior to land disturbance commencing in a given stage of the consented project, a Site-Specific Erosion and Sediment Control Plan must be prepared for the stage by a suitably qualified and experienced person and submitted to Council for certification. The purpose of each Site-Specific Erosion and Sediment Control Plan is to ensure that the potential adverse effects of the discharge of treated sediment-laden runoff during the earthworks is appropriately minimised. The Site-Specific Erosion and Sediment Control Plan must be prepared in general accordance with the Preliminary Erosion and Sediment Control Plan listed in Condition 1 and the *Hawke's Bay Waterway Guidelines Erosion and Sediment Control*; April 2009.
10. The Site-Specific Erosion and Sediment Control Plans must contain:
 - a) Identification of the persons with defined roles and responsibilities to monitor compliance with the ESCP.
 - b) Construction methodology statement.
 - c) A plan showing the location and contributing catchments of all erosion and sediment controls for the earthworks including but not limited to stabilised site entrances, sediment retention ponds, decanting earth bunds, clean water and dirty water diversions, silt fences and super silt fences.
 - d) Supporting calculations and design drawings.
 - e) Contributing slope lengths for silt fences and super silt fences.
 - f) Erosion control methods, including methods such as sub-staging (if any), temporary and progressive stabilisation.
 - g) Specific detail for stream works and works within wetlands (if any) including isolation of works from upstream flow, sizing of diversions, and maintenance of baseflow downstream of the works area.
 - h) Exclusion fencing to prevent encroachment or works into adjacent wetlands (if present and not subject to direct works).
 - i) Monitoring and maintenance requirements; catchment boundaries and contour information.
 - j) Details relating to the management of dust generated by earthworks.
 - k) Methodology for any dewatering (if required).

Certification of Controls

11. Within ten (10) working days following installation of the erosion and sediment control works referred to in a Site-Specific Erosion and Sediment Control Plan, and prior to the commencement of earthworks at that site, a suitably qualified and experienced person must provide written certification to Council that the erosion and sediment control measures have been constructed and installation completed in accordance with the certified Site-Specific Erosion and Sediment Control Plan. Certification must include confirmation of location, dimensions and capacity of all sediment retention ponds, decanting earth bunds, other impoundment systems, diversion bunds or channels, silt fences and super silt fences. Information must include but not be limited to:
 - a) Contributing catchment area and flow path lengths;
 - b) Size of structure (dimensions, including volume of structure);
 - c) Position of inlets/outlets; and
 - d) Stabilisation of the structure.

Completion or Abandonment of Works

12. As soon as practicable upon completion or abandonment of earthworks on the subject site, all areas of bare earth must be permanently stabilised to prevent the discharge of sediment. If vegetative cover is used for stabilisation, sediment retention devices may not be removed until the contributing catchment has obtained a density of more than 80% of a normal pasture sward.