

IN THE MATTER of the Resource Management Act
1991

AND

IN THE MATTER of applications by Meridian Energy Limited to Manawatū-Whanganui Regional Council, Greater Wellington Regional Council, Tararua District Council and Masterton District Council for resource consents to enable the construction, operation, and maintenance of a new wind farm on Mount Munro, located approximately 5km south of Eketāhuna

SECTION 87F REPORT OF KERRY PEARCE – EROSION AND SEDIMENT CONTROL

**MANAWATŪ-WHANGANUI REGIONAL COUNCIL, GREATER WELLINGTON
REGIONAL COUNCIL, TARARUA DISTRICT COUNCIL AND MASTERTON DISTRICT
COUNCIL**

15 March 2024

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A. OUTLINE OF REPORT

- 1 This report, required by section 87F of the Resource Management Act 1991 (**RMA**), addresses the issues set out in sections 104 to 112 of the RMA, to the extent that they are relevant to the applications lodged with the Manawatū-Whanganui Regional Council (**Horizons**), Greater Wellington Regional Council (**GWRC**), Tararua District Council (**TDC**) and Masterton District Council (**MDC**).
- 2 The resource consents applied for, by Meridian Energy Limited (**Meridian or the Applicant**), are required to authorise the construction, operation and maintenance and improvement of a new wind farm on Mount Munro, located approximately 5km south of Eketāhuna. The project is known as the Mt Munro windfarm project (the **Mt Munro Project or Project**).
- 3 In this report I address earthworks related erosion and sediment control (**ESC**) standards in relation to resource consent applications lodged with Horizons and GWRC (the **Regional Councils**) and TDC and MDC (the **District Councils**) (the **Application**). Specifically, this report relates to the Application lodged with the Regional Councils.
- 4 While this report is pursuant to section 87F of the RMA, I have in accordance with section 42A(1A) and (1B) attempted to minimise the repetition of information included in the application and where I have considered it appropriate, adopt that information.

B. QUALIFICATIONS / EXPERIENCE

- 5 My name is Kerry Stewart Pearce. I am Director of Environmental Land Management Limited, which is subcontracted to Bryant Environmental Solutions Limited. I have been in that position since May 2025.
- 6 My role involves providing technical advice on earthworks and ESC components of resource consent applications for Waikato Regional Council, Auckland Council, and Horizons, along with monitoring the ESC components of land use resource consents for those regional councils.

7 I hold the Bachelor of Applied Science (Agriculture) degree from Massey University. I am a member of the New Zealand Association of Resource Management.

8 I have specific experience in both preparing technical assessments to support RMA processes, as well as on-site monitoring experience with a number of large projects including:

- (a) Mighty River Power Puketoi Wind Farm;
- (b) New Zealand Steel Managed Landfill;
- (c) NZTA Upper Harbour Corridor;
- (d) Contact Energy Limited Te Mihi Power Station;
- (e) NZTA Atiamuri Bridge Replacement;
- (f) Mighty River Power Ngatamariki Power Station;
- (g) Transpower Wairakei to Whakamaru "C" Transmission Line;
- (h) Mercury Turitea Wind Farm;
- (i) NZTA Te Ahu a Turanga; and
- (j) NZTA Otaki to North Levin.

9 I am familiar with site and surrounding area. I visited the site along with the Applicant's experts and experts of the Regional and District Councils on 19 June 2023.

C. CODE OF CONDUCT

10 I confirm that I have read and agree to comply with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. This report has been prepared in accordance with that Code. In particular, unless I state otherwise, the opinions I express are within my area of expertise, and I have not omitted to consider material facts that might alter or detract from the opinions that I express.

11 In preparing this report, I have reviewed the s 87F report from Dr Forbes, who is the freshwater ecologist, advising Horizons and GWRC.

12 I note that I have identified gaps in the ESC Monitoring of the Mt Munro Project and this is discussed in my report along with suggested conditions.

D. EXECUTIVE SUMMARY

13 The key conclusions of my report include:

(a) GWRC guidelines provide ‘best practice’ ESC tools for earthworks sites. The Applicant’s undertaking to meet these standards and guidelines should be captured through conditions, along with flocculation of all sediment control devices.

(b) The ESC framework and the development of Specific Environmental Management Plans (**SEMPs**) in accordance with the application documents and relevant Guidelines provides a robust framework under which ESC measures are designed and implemented on site. I support this approach provided a Regional Council certification process is implemented.

(c) I support the imposition of performance standards to provide certainty that the ESC measures are working effectively in reducing the sediment discharge and avoiding unanticipated effects on the receiving environment. I consider that a consent condition imposing a discharge standard or target is necessary, along with clear processes to be followed should it not be met.

(d) The management and monitoring system proposed for the Mt Munro Project covers a range of matters and is intended to ensure that measures have been designed, installed, and managed in accordance with consent conditions and guidance documents. I support this approach subject to there being performance standards and/or triggers that are part of the monitoring regime and guide improvements on site to meet these standards.

E. SCOPE OF REPORT

14 This report focuses only on issues related to the earthworks and ESC methodology and practices associated with the construction of the Mt Munro Project. It covers the following topics:

- (a) A description and understanding of the receiving environment as it is relevant to the ESC components of the construction;
- (b) The ESC methods, practices and standards proposed to be implemented during construction in order to avoid, remedy or minimise potential effects during construction of the Mt Munro Project;
- (c) Submissions relating to issues concerning erosion and sediment control; and
- (d) Proposed mitigation and management of effects.

15 In preparing my report, I have considered the following information:

- (a) Mt Munro Wind Farm Resource Consent Application May 2023;
- (b) Assessment of Environmental Effects on behalf of Meridian Energy Limited Mt Munro Wind Farm Project May 2023 (**AEE**), including the Proffered Regional Resource Consent Conditions (**draft conditions**);
- (c) Meridian Energy Mt Munro Wind Farm Construction Water Management Plan and Effects Assessment Report Final May 2023 (**CWMP**);
- (d) Mt Munro Wind Farm Draft Ecological Assessment Prepared for Meridian Energy Ltd 29 November 2022 (**Ecological Assessment**); and
- (e) Mount Munro Section 92 Response to Items 96-109 (**RFI#1 Response 1**) of s 92 request dated 6 July 2023 (**RFI#1**).

F. BACKGROUND

- 16 The Mt Munro Project is described in detail in Section 1.2 of the AEE, with the earthworks details provided in Table 1 of the CWMP. I adopt those descriptions and details for the purpose of my report with the exception of the earthworks volumes, detailed below.
- 17 The Applicant is seeking resource consents for development to occur within an 'envelope' (zone) within the site for the location of the wind farm components. This approach is intended to allow for a degree of flexibility in the final placement of infrastructure. The Application and AEE have assessed the maximum development to be authorised under the 'envelope' approach, however this will be subject to final design.
- 18 The proposed construction footprint area is approximately 55.8ha with a maximum cut volume of 1,723,100m³ and maximum fill volume of 505,700m³. This requires a fill disposal volume of 1,217,400m³. These volumes are detailed in Table 3.1 of RFI#1 Response 1.
- 19 The catchment of the Project is described in the CWMP as follows:¹

The area that will be subject to earthworks is pastoral farmland originally part of the "Wairarapa Bush". The Project site still contains some signs of major burn-offs, with large log remains present in the paddocks. The site is relatively flat along most of the top plateau, but access to these ridgelines is steep from the valley floor.

The area is drained by two river systems, with the area in the northern, western and southern part of the site containing tributaries of the Makakahi River system which eventually flows into the Manawatu River. The eastern area of the site containing tributaries that flow into the Kopuranga River, a tributary of the Ruamahanga River.

¹ At section 3.2.1.

- 20 The geomorphological setting and soils of the Project are described in the CWMP as:²

The geotechnical factual report that supports the Project confirms that the area is generally underlain by older, stronger volcanoclastic greywacke sandstones and mudstones of the Waioeka Terrane. The river terrace adjacent to State Highway 2 comprises Quaternary-age alluvial deposits whilst the lower lying hillslopes to the east are underlain by much younger, weaker Miocene-age conglomerates and Pleistocene-mudstones. Geotechnical investigations were carried out at the Project site on 14th and 15th December 2021. The investigations comprised the excavation of test pits to determine geological features. Soil samples from these same test pits were collected and tested for soil settlability as detailed within Section 5.2.6 of this Report.

- 21 The existing freshwater receiving environments are described in Section 5 of the Ecological Assessment. The Mt Munro Project is located in the catchment of the Mākākahi and Kopuaranga Rivers, and eventually discharges through the Manawatū River and Ruamahanga River. The Kopuaranga River is listed under the Natural Resources Plan (NRP) as having Schedule B (Nga Taonga Nui o Kiwa) and Schedule I (Trout Fishery River) values. Dr Forbes addresses these catchments in his s 87F report.³

G. EFFECTS OF EROSION AND SEDIMENTATION

- 22 The CWMP details the erosion and sedimentation process and how ESC can manage resultant effects on the receiving environment.⁴ I agree with the overview provided in this part of the CWMP.
- 23 To summarise, the environmental effects associated with the discharge of sediment into watercourses are well documented and accepted, and can include adverse effects on the aquatic flora and fauna of an area. These effects can extend substantial distances downstream from the works area and range from the smothering of aquatic life, the injury to the mouths and

² At section 3.3.

³ Section 87F Report – Freshwater Ecology (15 March 2024) at Section B.

⁴ Section 4.

gills of aquatic animals, and the destruction of spawning grounds. An increase in turbidity within a stream can also stop animals feeding due to poor visibility, can increase heat absorption and stop light penetrating the water reducing photosynthetic activity. The deposition of sediment from earthworks can also result in a disruption to stream hydraulics, which may result in an increase in extent and/or frequency of flooding and changes to in-stream habitat.

- 24 Significant quantities of sediment may be discharged from bare/disturbed earth surfaces where appropriate ESC measures are not implemented. Undertaking works within watercourses also has a very high potential for erosion and discharge of sediment. This is because these works are undertaken in, or near, flowing water which is the major cause of erosion. Flowing water causes on-going scour and provides the transport mechanism to allow sediment to be dispersed downstream of the works and ultimately, into the marine environment.
- 25 Robust ESC measures are therefore necessary for the Mt Munro Project. The objectives of the ESC measures for the Mt Munro Project are to minimise the extent of soil erosion and manage any resultant sediment yield. The CWMP identifies that erosion control will be the highest priority in the design and implementation of the ESC measures, along with proposed non-structural measures which are also to be crucial in avoiding significant environmental effects.⁵ I agree with these objectives.

Approach to erosion and sediment control

- 26 It is well understood that the key principles to follow when planning for and undertaking earthworks activities are:⁶
- (a) Minimise disturbance;
 - (b) Stage construction;

⁵ Section 4.1.

⁶ Erosion and Sediment Control Guide for Land Disturbing Activities in the Wellington Region (Greater Wellington Regional Council, February 2021) ("**GWRC Guidelines**") at A2.0.

- (c) Protect slopes;
- (d) Protect receiving environments;
- (e) Rapidly stabilise exposed areas;
- (f) Install perimeter controls and diversions;
- (g) Employ sediment detention devices;
- (h) Get trained and develop experience;
- (i) Adjust the ESC Plan as needed; and
- (j) Assess and adjust your ESC measures.

27 Meridian has proposed the following management plan structure to manage the adverse effects associated with the Mt Munro Project:

- (a) The CWMP submitted with the application which is, in summary, an umbrella environmental management document. The CWMP is described in the AEE as:⁷

An assessment of the construction water management measures (including erosion and sediment control).... The approach taken to manage construction water is broadly set out, with principles and control as per the Erosion and Sediment Control Principles and Plans as detailed in Appendices B and C of the Construction Water Management Plan and Effects Assessment Report. These measures and plans will be refined through the use of Specific Environmental Management Plans (SEMPs) to be submitted to the relevant regional council for certification prior to earthworks being undertaken.

- (b) The development of SEMPs in accordance with the resource consent conditions, CWMP and GWRC's *"Erosion and Sediment Control Guide for Land Disturbing Activities in the Wellington Region"* (GWRC

⁷ At section 5.7.1.

Guidelines). The SEMP's will focus on the management of specific sites and activities throughout the Mt Munro Project.

- 28 The GWRC Guidelines provide technical guidance for the selection, design and use of erosion and sediment control practices and measures for a range of land disturbing activities. The GWRC Guidelines' ultimate goal is *"to minimise erosion, sediment discharge and sedimentation that occurs as a consequence of land disturbance"*.⁸
- 29 The CWMP details the Project's approach to ESC design and implementation. It provides that all ESC measures will be designed, constructed and maintained in accordance with the GWRC Guidelines. The GWRC Guidelines in February 2021 adapted Auckland Council's *"Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region Guidance Document 2016/005 Incorporating Amendment 1"* (**GD05**) for the Wellington Region. In my opinion, GD05, and subsequently the GWRC Guidelines, are currently regarded as industry best practice when undertaking earthworks activities.
- 30 GD05, and consequently the GWRC Guidelines, are well recognised throughout New Zealand. They have a proven track record in ensuring successful ESC management for a range of projects I have been involved with. Both GD05 and the GWRC Guidelines are highly regarded and well understood by industry. They contain a 'toolbox' of measures that can be employed to minimise erosion and minimise sediment discharge from the earthworks site. Along with use in Greater Wellington, the use of GD05 and the GWRC Guidelines is also consistent with the One Plan.⁹
- 31 However, in this case, the draft conditions do not contain a design standard for the proposed ESC measures. Rather there is a requirement that the SEMP's meet the standards set in the CWMP. In my view a consent condition

⁸ I note that the GWRC Guidelines are a two-part document. Part 1 – Principles - contains the overarching principles of ESC, erosion and sedimentation and a process for selecting and using ESC practices; while Part 2 – Practices - contains specific practices including a range of options for ESC, along with the benefits and applicability of each practice.

⁹ See also, the ESCP Report, paragraph 5 note 1, which provides that *"Horizons Regional Council refer to GD05 as the Guideline to be used when preparing Erosion and Sediment Control Plans."*

requiring ESC measures to be designed, constructed, and maintained in accordance with the GWRC Guidelines is required.

Erosion and sediment control management framework – the CWMP

- 32 The overarching erosion and sediment control management framework is provided in the CWMP submitted with the Application. The CWMP details design and construction of ESC measures that will meet GWRC Guideline requirements. The Application also contains example ESC drawings showing how GWRC Guideline measures will be employed across the Project.
- 33 The ESC drawings indicate that Sediment Retention Ponds (**SRPs**) (primarily) and Decanting Earth Bunds (**DEBs**) will be utilised as the predominant sediment control devices for the Mt Munro Project. Hybrid Decanting Earth Bunds (**HDEBs**) are also proposed for shorter duration earthworks where construction of a full SRP may not be able to be justified. Chemically treated SRPs are considered to be the most efficient sediment control device in terms of sediment treatment efficiency, while DEBs and HDEBs can be less effective due to their more simplistic design. In order to achieve the highest possible sediment treatment efficiency, it is my opinion that all runoff practicable should be directed to SRPs for treatment.
- 34 Section 5.2.1 of the CWMP proposes that all SRPs will be designed in accordance with the 3% volume criterion applied, i.e. 300m³ SRP volume per 10000 m² or 1ha of contributing catchment. This criterion exceeds GWRC Guidelines which also allows for the provision of a 2% volume criterion to be applied for some lesser slope sites. The 3% volume criteria provides for a more robust and effective measure in the design of the SRPs. However, the CWMP also notes that there may be instances where this cannot be achieved, in which case best practice will still apply.
- 35 Section 4.2 of the CWMP also proposes that all measures utilised are structurally sound and have appropriate geotechnical approval where necessary. Whilst GWRC Guidelines require ESC measures to be structurally sound, there is not a requirement for there to be a geotechnical approval of their construction. Given the location of some of the devices is likely to be

on the edge of significant slopes, consideration should be given to the geotechnical requirement of the construction of these devices.

- 36 The CWMP also details how SEMP's will be developed in line with the CWMP and GWRC Guidelines. These plans will focus on the management of specific sites and activities throughout the Project. It is proposed to use the detail in the CWMP, the ESC Drawings, and GWRC Guidelines, and focus on implementation and management of the ESC devices. Use of the SEMP's will allow for future flexibility and provide the ability to adapt appropriately to changing site conditions.
- 37 I support the concept of using SEMP's provided these are certified by the Regional Councils prior to their implementation. The SEMP structure allows the site to implement the most effective ESC solution to a changing site; effectively employing the GWRC Guideline principle of adjusting the ESCP as needed at any given time.
- 38 Prior to earthworks or stream works commencing at any given location, the Applicant will prepare and submit a SEMP to the Regional Councils for certification against the resource consent conditions, CWMP, and GWRC Guidelines. Work will only commence in any given area once the SEMP has been certified by the Regional Council. The SEMP will take into account the specific construction activity; the area, volume and nature of the earthworks and the downstream receiving environment; methods for managing effects; the duration, the time of year and any additional specific measures required; stabilisation methods and timing; and chemical treatment.
- 39 Preparation of the SEMP is required under the draft conditions,¹⁰ however in my view the approach needs to be further supported through conditions requiring Regional Council certification of the SEMP prior to earthworks occurring in the catchment covered by the SEMP.
- 40 Section 7.2 of the CWMP recognises that undertaking earthworks in winter may pose a higher risk of sediment discharges. As earthworks during winter

¹⁰ Mt Munro Project Application – Assessment of Environmental Effects at Section 8.1: Proffered Regional Resource Consent Conditions at condition 9.

are more susceptible to wetter weather and a resultant increase in sediment discharge risk, a seasonal restriction is considered appropriate. However, the draft consent conditions are silent on winter works. In my view a condition should be included requiring any winter works to be approved in advance, and in writing, by the Regional Council. This is supported by the CWMP.

- 41 Chemical treatment (flocculation) is considered a key tool to assist in the sediment control efficiency of the SRPs, HDEBs, and DEBs. Chemical treatment is proposed for SRPs and HDEBs in the CWMP¹¹ and is documented in Section F2.0 of GWRC Guidelines. However, the use of chemical treatment is presently not provided for in the consent conditions or extended to cover DEBs. This is important, in my view; particularly given the preliminary bench testing results in Appendix D of the CWMP. Those results indicate that chemical treatment has a positive effect on settlement of the soils located on site and as such flocculation with PAC results in an improvement in clarity. I am also concerned that there is no management framework providing for the development of a Chemical Treatment Management Plan.
- 42 For these reasons, in my view a condition requiring a Chemical Treatment Management Plan to be provided and certified by the Regional Council is necessary. The conditions should also require chemical treatment of all sediment impoundment devices including SRPs, HDEBs, and DEBs to be supported by the Chemical Treatment Management Plan through specific consent conditions.
- 43 The CWMP also focuses on progressive and rapid stabilisation of disturbed areas using measures aligned with GWRC Guidelines such as mulch, aggregate, and geotextiles. Temporary and permanent stabilisation will be key to ongoing erosion control on completed areas. In my view a condition should be included on the consents requiring progressive stabilisation of completed earthworks areas.
- 44 The Mt Munro Project includes piling, earthworks, and stream works that may require dewatering by pumping. The CWMP states that any pumping of

¹¹ Section 5.2.6.

sediment laden runoff and groundwater during construction will be to existing grass buffer zones or to sediment retention devices. In my opinion, any dewatering should require a Dewatering Management Procedure to ensure that the required level of sediment treatment is achieved on site during dewatering operations. Furthermore, a condition should be included requiring any dewatering to be undertaken to meet a clarity standard or via a sediment treatment device provided that the device is not currently in use and can impound water to achieve the required clarity. I note my view that existing grass buffer zones are not a recognised sediment control measure and are not supported as a sediment control device by the GWRC Guidelines.

45 The proposed earthworks will generate excess unsuitable material that will be placed into spoil disposal sites. Spoil disposal sites are considered as part of the overall earthworks operation and ESC will be maintained to the same standard as 'typical' site earthworks. Currently there is no condition requiring that spoil sites are managed to ensure that they do not lead to any uncontrolled instability or collapse affecting either the spoil site or so as to avoid adversely affecting watercourses. In my opinion, such a condition should be imposed.

46 The Project site will include one concrete batching plant to be located within the Turbine Envelope Zone or the Turbine Exclusion Zone. The CWMR has specified in Section 6.4 that:

These will be fully bunded and fully contained systems to ensure that not only sediment discharges are minimised but that pH levels in any discharge, should they eventuate, are maintained below 8.5 at all times from the concrete activity.

47 This would be an appropriate measure to minimise the effects of the concrete batching plant and should be supported through consent conditions. I note Dr Forbes has also recommended instream monitoring of pH to ensure that it is managed in receiving environments.¹²

¹² Section 87F Report – Freshwater Ecology (15 March 2024), at paragraph [27].

Erosion and Sediment Control Monitoring

- 48 Section 4.2 of the CWMP states:
- Proactive water quality monitoring, both qualitative and quantitative, will occur as part of the Project implementation as a way of assessing the effectiveness of the treatment and allowing for improvements/modifications as the Project works continue.
- 49 Section 8 of the CWMP contains the overall approach to monitoring, both qualitative and quantitative. However, there is no discussion on what the definitive standards are that the site and ESC measures will be monitored against other than visual monitoring. There is discussion in Section 8.2 of the CWMP on the use of a field turbidity meter for SRP discharges and the upstream and downstream environments during a rainfall event, but there is no specific and measurable target.
- 50 Turbidity, total suspended solids (**TSS**) and clarity have all been used on various large-scale projects in recent years, with all three measures having been employed as a performance standard in some cases. The significant difference between the three parameters is that turbidity and clarity can be measured on site in real time, while TSS requires sampling and analysis in a laboratory before results can be reported. The advantage of measuring on site in real time is that immediate action can be undertaken should the on-site monitoring indicate there are potential issues.
- 51 As outlined earlier, the CWMP recommends on-site monitoring through the use of a field turbidity meter, without the requirement for any specific standard or target to be met. Given the effects I have described as potentially arising from the discharges of sediment, it is important to ensure that the sediment that enters watercourses from the proposed earthworks is minimised. In my view the triggers in the CWMP are not robust enough to provide absolute certainty that the ESC measures are working effectively to minimise any sediment discharges. To provide certainty that the ESC measures are working effectively in reducing the sediment discharge and avoiding unanticipated effects on the receiving environment, I consider that a consent condition imposing a discharge standard or target is necessary,

along with clear processes to be followed should it not be met. This is supported by Dr Forbes.¹³

- 52 Appendix C1.19 Dewatering of the GWRC Guidelines recommends a minimum of 100 mm water clarity is required to pump directly offsite. I therefore consider a 100mm clarity standard sufficient for the discharge of water off site to meet this GWRC Guideline standard and to minimise the adverse effects of the proposed works.

Assessment of CWMP and SEMPs

- 53 As outlined earlier, the CWMP is an umbrella environmental management document. It is this document that guides the overall principles and methodologies for erosion and sediment control to be adopted. The CWMP documents a framework for the management, mitigation, and monitoring measures to be implemented on site, and provides factors to be considered in the development of SEMP
- s. The SEMPs will be developed in line with the consent conditions, CWMP, and GWRC Guidelines to focus on the management of specific sites and activities throughout the Project.
- 54 Implementation of GWRC Guidelines requires consideration of all key principles of erosion and sediment control, including non-structural approaches such as:
- (a) Minimising disturbance;
 - (b) Staging construction;
 - (c) Protecting steep slopes; and
 - (d) Protecting watercourses (and other sensitive features).
- 55 Should implementation of GWRC Guideline measures not achieve (based on the proposed discharge standard) the required minimisation of impacts on the receiving environment, further consideration will need to be given to non-structural approaches in any catchment where these impacts are

¹³ Section 87F Report – Freshwater Ecology (15 March 2024), at paragraph [69].

occurring. This could require consideration of a more staged approach where parts of the catchment are rapidly stabilised, or earthworks are undertaken in stages to minimise the sediment laden flows to a treatment device.

- 56 Undertaking works within watercourses has a very high potential for erosion and discharge of sediment. This is because the work is undertaken in or near flowing water which is a major cause of erosion. Flowing water causes on-going scour and provides the transport mechanism to allow sediment to be dispersed downstream of the works and ultimately, into the receiving environment. Works within watercourses can also directly impact watercourse habitat through habitat disturbance or destruction, and watercourse ecology through sediment and temperature-related effects.
- 57 Greater care is therefore required for works in and around watercourses to minimise actual and potential effects as much as possible. Where this work is unavoidable, specific construction methodologies and ESC measures are required to minimise potential adverse impacts. In order to minimise the effects of sediment mobilised during stream works, it is important to avoid working in flowing water using the dam and divert principles detailed in GWRC Guidelines, to minimise the disturbed areas adjacent to the stream works and to promptly stabilise all areas upon completion of the works. This will limit the water quality effects related to sediment release to the livening of the in stream structures. This effect is usually minor and of short duration. In my view a condition of consent should be included requiring all works in a watercourse to be undertaken only when all flows can be diverted around the works area (e.g. beds are dry) and rapid stabilisation of areas on completion of the works and prior to the livening of flows.
- 58 The Application documents did not contain any SEMP examples; however, it did contain four conceptual ESCP drawings. These conceptual ESCP drawings provided examples of the works proposed as part of the Mt Munro Project and how ESC measures could be employed to meet the CWMP and GWRC Guideline requirements. While the conceptual drawings only represent smaller areas of construction involved with the Project, they illustrate how GWRC Guideline ESC measures will be provided on site.

- 59 There are four focus areas for the conceptual ESCP drawings:
- (a) Site Compound;
 - (b) Main Access Track;
 - (c) Secondary Access Road; and
 - (d) Fill Location and Typical Turbine Location.
- 60 I note that cable installation is not considered in the conceptual ESC drawings, but will, in my view, require a SEMP.
- 61 The Site Compound ESCP drawing details a Super Silt Fence as the primary method of sediment control, due to the flat nature of the site and immediate stabilisation of the compound with aggregate. Consideration was given on the site visit as to whether this was the best approach for ESC at the site, given the Site Compound will be in use for the duration of the Project. Consideration should be given to an SRP for these works, and this can be addressed through the provision and certification of the SEMP.
- 62 The Main Access Track ESCP drawing details an area of the main access track with sediment control provided by two SRPs. Dirty water diversions are shown directing runoff to the SRPs, with SSFs also shown. I consider these measures to be appropriate, noting my earlier comments on flocculation in paragraphs 41 and 42 above.
- 63 The Secondary Access Road ESCP drawing details an area of secondary access track with sediment control provided by two SRPs. It is noted on this plan that the dirty water diversions may require lining and check dams to minimise erosion. This is consistent with GWRC Guideline requirements for steeper sections of dirty water diversions, and is considered appropriate.
- 64 The Fill Location and Typical Turbine Location ESCP drawing details an area of fill below a proposed turbine location, with sediment control provided by an SRP to cater for the fill site and the turbine platform. Dirty water diversions are shown directing runoff to the SRP. I consider this appropriate.

- 65 Dewatering will potentially be required throughout the Mt Munro Project. GWRC Guidelines contain a best practice procedure for dewatering, and the dewatering/pumping methodology in the CWMP loosely follows that procedure. As a minimum, 100 mm clarity (100mm clear water depth) within the water to be discharged is required to allow water to be discharged directly offsite. Otherwise, water will need to be pumped to an SRP or DEB for treatment. Subject to the volumes pumped, the outlet may need to be blocked during pumping and the SRP/DEB treated in accordance with the CTMP following pumping. In my opinion this should be supported by consent conditions.
- 66 The performance outcomes, reporting requirements, and trigger response procedures (albeit with no clear and defined triggers) are currently in the CWMP and are not referenced in consent conditions. While some of the detail behind these outcomes/triggers can be included in the CWMP and SEMP, in my opinion there are a number of direct sediment related environmental effects on the receiving environment that should be addressed by way of “bottom lines” within the consent conditions. This includes the recommended ESC and discharge standards. This will ensure:
- (a) The adverse effects of the Mt Munro Project are avoided, remedied or mitigated through enforceable conditions and not via the content of management plans;
 - (b) The consent document is a transparent reference point for compliance when undertaking consent monitoring of key environmental (bottom line) outcomes, thereby avoiding having to search through management plans; and
 - (c) Important elements of the resource consents are not unintentionally changed through the management plan review and approval process; with conditions setting out bottom lines which are only able to change via the review condition.

H. SUBMISSIONS

67 I have reviewed the submissions on the Mt Munro Project. Very few submissions raise direct concerns with erosion and sediment control matters, however there are submissions expressing concern over water quality and dust, and the potential downstream effects of sediment discharges.¹⁴ As detailed earlier in this report, the Project proposes to design and construct ESC measures in accordance with GWRC Guidelines and these are considered current best practice for ESC on earthworks sites. Provided there are robust monitoring standards imposed on the Project and there is ongoing monitoring of ESC measures I consider that the construction (sediment) discharges from the Project will likely be less than minor.

I. CONDITIONS

68 I have made a number of recommendations regarding conditions already in my report. I note below the matter to be referenced and the specific paragraph reference within this report:

- (a) The approach to ESC and the GWRC Guidelines at [25]-[31];
- (b) The ESC Management Framework and the CWMP at [32]-[43]; and
- (c) ESC Monitoring and Implementation at [44]-[66].

69 Suffice to say, ESC is dependent on robust conditions, and management plans, and an effective pathway to respond to issues as they arise.

Kerry Pearce

15 March 2024

¹⁴ Submissions: 1, 3, 6, 7, 8, 13, 18, 20, 21, 23, 24, 25, 29, 30, 32, 34, 37, 40, 41, 43, 44, 45, 47, 48, 49, 53, 61, 63, 65, 67, 68, 71.