

7 September 2023

Horizons Regional Council

Greater Wellington Regional Council

Tararua District Council

Masterton District Council

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Tena Koutou

Response to the Mt Munro Proposed Wind Farm Resource Consent Application Section 92 Additional Information Request

The information included in this letter and its appendices are provided in response to your 6 July 2023 request for further information (RFI).

Given the nature of some of the matters, a number of technical reports, memoranda and letters have been prepared by independent experts appointed by Meridian. These are attached as appendices to this letter as follows:

- Appendix 1 – Landscape Memo;
- Appendix 2 – Traffic and Transportation Memo;
- Appendix 3 – Vehicle Tracking Memo and Concept Drawings;
- Appendix 4 – Waka Kotahi New Zealand Transport Agency Written Approval;
- Appendix 5 – Aggregate Supply Memo;
- Appendix 6 – Port to Site Routes Assessment;
- Appendix 7 – Assessment of Environmental Effects for Proposed Lighting;
- Appendix 8 – Acoustics Letter;
- Appendix 9 – Consultation Record;
- Appendix 10 – Open Day Flyer/Invite;
- Appendix 11 – Erosion and Sediment Control Letter;
- Appendix 12 – Ecology Memo;
- Appendix 13 – Stormwater Quality and Hydrology Memo;
- Appendix 14 – Harapaki Concrete Batching Plant Management Plan;
- Appendix 15 – Geotechnical and Land Stability Memo;
- Appendix 16 – Contaminated Land Preliminary Site Investigation; and
- Appendix 17 – Harapaki Dust Management Plan.

LANDSCAPE / VISUAL MATTERS

Rhys Girvan (Senior Principal Landscape Architect - Boffa Miskell Limited) prepared the Landscape Effects Assessment that formed part of the as lodged resource consent application. Mr Girvan has provided a memo that is attached as Appendix 1. Where that memo forms the response to a question raised in the RFI, it has been cross referenced in the answers to those question below.

Question 1 Response: The earthworks calculation and modelling does include cuts and batters required to support the full road width including feathered edges, drains, or removal of banks on the road shoulders to enable the transport of turbine blades. It is just the specified road widths that do not include these elements. Therefore, the scale of earthworks for the internal road layout is consistent with the level of effects assessed in the Landscape Effects Assessment.

Question 2 Response: Adjacent landowners were consulted with as part of the proposal as outlined in section 7.4 of the AEE. Meridian is working with landowners on appropriate planting for the boundaries of the site access/laydown area. This includes screening for all permanent buildings in this area, as well as building cladding options. Figure 1 below shows the general area where mitigation planting will be established. Note that the exact location will be determined in consultation with adjacent landowners:



Figure 1: Property boundary screening location between the construction laydown area and the adjoining neighbour to the north

The activities listed, with the exception of the proposed Operations and Maintenance building, are temporary in nature. As the boundary planting would need time to get established, it may not be mature enough to screen the temporary activities. It should be noted, however, that it is the

preference of the immediate neighbour that the boundary plants should be of medium height, so as to not block the views of the hills entirely.

It should also be noted that this is a rural environment where large and bulky buildings are expected.

To ensure that landscaping along this boundary is implemented, a condition of consent is proffered, as detailed below. Note this also includes proposed landscaping to address effects associated with the terminal substation as detailed in the response to Question 4 below:

X. *A landscape plan detailing vegetation to be planted:*

- *on the common boundary between Sec: 147 Blk: IX SD: MANGAONE (being the allotment where the construction laydown area is proposed) and Sec: 17 Blk: IX SD: MANGAONE (being the neighbouring allotment to the north); and*
- *Along the southeastern and southwestern boundaries of Section 1 and Section 62 Block XIV Tararua Survey District, to the extent necessary to provide screening of the terminal substation from State Highway 2;*

must be submitted to and approved by the Resource Consents Manager – Masterton and Tararua District Councils at least 40 working days prior to construction commencing.

The Landscape Plan must show a scale; the individual location and species (with both scientific and common names); PB size of proposed plants; and details of plants to be removed or pruned.

The Landscape Plan, must be completed by the next planting season post approval by the Resource Consents Manager – Masterton and Tararua District Councils. The plantings must be monitored for 18 months from time of planting in order to allow for plant establishment to the satisfaction of the Resource Consents Manager – Masterton and Tararua District Councils. Within this period monitoring includes the removal of weeds within the vicinity of the plantings and the replacement of plants that die, or are removed unlawfully, with plants of the same species and original size. Any plants that fail must be replaced at the expense of the consent holder. All plantings must continue to be maintained by the consent holder thereafter.

Question 3 Response: It is likely that the Concrete Batching Plant will be located within the Turbine Envelope Zone along the ridgeline, where it is closest to the turbine platforms it will be producing concrete for. However, it may be located in the Turbine Exclusion Zone. It can be confirmed that it will not be located in the Construction Laydown Area, and a condition is proffered to this effect (see the response to Question 88 of this RFI).

The final location of the batching plant will be confirmed with Masterton and Tararua District councils at least 40 days prior to commencement of construction works. It will be removed within six months of the wind farm being fully operational, and therefore will not have a permanent visual or landscape effect. The AEE contains proffered conditions in relation to these dates (refer conditions 8 and 10).

Question 4 Response: The location of the terminal substation was selected due to its proximity to Transpower's existing 110kV Mangamaire to Masterton transmission line. The Terminal Substation

site will consist of a switchyard and up to two control buildings (one approximately 20 m x 10 m, the other 10 m x 6 m) over a footprint of approximately 100 m x 125 m. A permanent Operations and Maintenance building of approximately 30 m x 25 m may be included within the substation compound, together with a water storage tank, on-site wastewater treatment, storage facilities and car parking. These buildings and structures are of a scale typical of rural buildings. However, additional areas of planting could be designed to screen the substation and fencing visible from State Highway 2. Such planting could be illustrated on a landscape plan submitted for approval prior to construction and implemented in the first planting season following works commencing. As such, this has been included in the proffered condition under Question 2 of this RFI.

TRAFFIC MATTERS

Tonkin + Taylor prepared the Traffic and Transportation Assessment that formed part of the as lodged resource consent application. Tonkin + Taylor have subsequently provided two memos, attached as Appendices 2 and 3. Appendix 2 addresses RFI points 5, 7, 8, 18, 22, 25, 32 and 33. Appendix 3 addresses matters associated with vehicle tracking. Where those memos form the response to a question raised in the RFI, it has been cross referenced in the answers to those question below.

Question 5 Response: Construction traffic activity will typically be as follows:

- Monday to Saturday 7am to 7pm (excluding concrete pouring activities which run continuously for up to 15 hours, and turbine component delivery);
- Heavy traffic (excluding turbine components, and concrete mixer/pumps trucks) will be restricted to only operate on Old Coach Rd, Monday to Saturday 7am to 7pm;
- Heavy traffic carrying turbine components (being over-dimensional) are typically restricted to only operate overnight on state highways, so will use Old Coach Rd outside the above hours. The residents of Old Coach Rd would be notified 30 days in advance of planned deliveries;
- Concrete mixer and pump trucks will operate over night, between the concrete batching plant and foundation location. These vehicles may return to base via Old Coach Road at the completion of pouring activities. The residents of Old Coach Rd would be notified 30 days in advance of planned pouring activities.

In the memo attached as Appendix 2, Tonkin + Taylor have reviewed the relevant Waka Kotahi Specification and Guidelines for Road Lighting Design (M30) and have concluded that there is no scenario created by the construction traffic which warrants the use of lighting at intersections. It is noted that Waka Kotahi have now provided their written approval for the resource consent application (see response to Question 6, below).

Question 6 Response: Consultation with Waka Kotahi is ongoing, and as a result they have now provided their written approval for the resource consent application (see Appendix 4). As part of the consultation with Waka Kotahi, the following conditions are now proffered:

- X. *Prior to construction, the consent holder shall provide the NZ Transport Agency with the detailed designs for the upgrade of Old Coach Road, to be reviewed and approved by the NZ Transport Agency Network Manager. This should be accompanied by an assessment of whether additional turn treatment at this intersection is required.*
- X. *Prior to construction, the consent holder shall prepare and circulate the Construction Traffic Management Plan to the NZ Transport Agency Network Manager for review and acceptance. This should detail how construction traffic will be safely and efficiently managed to and from the subject site along the highway corridor and at Old Coach Road, Kaiparoro Road and Opaki-Kaiparoro Road intersections with State Highway 2.*
- X. *Prior to construction, the consent holder shall undertake vegetation removal at the SH2/Opaki-Kaiparoro Road intersection so that Safe Intersection Sight Distances are achieved to the satisfaction of the NZ Transport Agency Network Manager.*
- X. *Prior to construction, the consent holder shall provide to the Consents Manager, Tararua District Council, correspondence from the NZ Transport Agency confirming that works in the State Highway, including vegetation clearance and intersection upgrades have been constructed to the NZ Transport Agency standards.*

Question 7 Response: In the memo attached as Appendix 2, Tonkin + Taylor have stated that the two-way traffic volume on SH2 as it passes the site is anticipated to be 5,304 vehicles per day in 2033 based on an estimated annual traffic growth of 3.6%.

Question 8 Response: In the memo attached as Appendix 2, Tonkin + Taylor have stated that between 2012 and 3 August 2023 there were three crashes involving trucks/High Productivity Motor Vehicles, and all three were non-injury crashes. The transport assessment identified 21 crashes in 2012-2021. There were no other crashes recorded in 2021 except the one non-injury crash reported in the transport assessment. Between 2022 and July 2023 (inclusive), a total of six crashes were recorded, including one of the abovementioned HCV crashes which occurred in 2022.

Question 9 Response: Waka Kotahi administers New Zealand Cycle Trails, and consequently are covered by the written approval provided by Waka Kotahi.

Question 10 Response: In the memo attached as Appendix 2, Tonkin + Taylor have outlined the consultation that they have undertaken with the Ministry of Education on this matter. Currently there is no school bus service on Old Coach Road. There are five landowners and four dwellings along this stretch of road. Consultation with these landowners is ongoing, and this will continue throughout the project, including during the construction phase.

Question 11 Response: Site specific requirements on road geometry and general road requirements are determined between Meridian Energy and the final chosen Wind Turbine manufacturer, covered under a mutual confidentiality agreement. Design considerations and parameters include and are not limited to:-

- Road marking i.e. reflective delineators or similar devices;

- Road surface: The detailed design phase will determine road surfacing requirements. Road surfaces will be engineered so they are sufficient to support construction loads;
- Road widths and cross fall;
- Gradient and longitudinal radius: For gradients greater than 11% and up to a maximum of 16%, a pulling unit may be required. The use of a pulling unit is highly dependent on conditions such as length of gradient, straight/curved roads, road surface quality, and weather conditions;
- Road maintenance: A well-maintained site road shall not have potholes deeper than 30 mm and/or a distribution/collection of potholes that cause unsuitable or unsafe driving conditions; and
- Drainage: Along the site roads and hardstands, sufficient drainage shall be included and maintained to ensure the site roads and hardstands are functional.

Question 12 Response: Meridian's wind farm roading will be used to access the turbines for the life of the wind farm. A regular maintenance programme for the roads internal to the site will therefore be required, including the maintenance of the surfaces of those roads. This includes maintaining the pavements for truck and over-dimension vehicle movements and ensuring the cables located within the roads are protected. Meridian will also maintain drainage at the road edge to protect against erosion of the roads from stormwater.

Three geological subgrades have been assumed for the site roading pavement. With the corresponding proportion of the total as-built road footprint, these are assumed to be Greywacke (70%), Tertiary Deposits (5%) and Overlying Soils (25%). Roading pavement assumptions are outlined in Appendix 5: Mt. Munro Aggregate Supply Assessment Memo. Note section 5 of that memo has been removed due to commercial sensitivities.

Drainage and stormwater effects do not vary by surface treatment of roads. Run off quality and quantity are the same from both metalled and sealed roads as they are equally impervious.

Question 13 Response: There are currently five dwellings accessed from Old Coach Road, including a dwelling within the application site.

Question 14, 15, 20 Response (quarries): The application includes all information held about potential truck movements from quarries. No decisions have been made on which quarries will provide aggregate for the proposed wind farm. This is not a decision Meridian would make until resource consents were obtained and a contractor appointed. Ultimately, the aggregate source is a commercial decision for the appointed contractor. It is envisaged that these decisions would be made before the Construction Traffic Management Plan (CTMP) is submitted to Tararua District Council and Waka Kotahi New Zealand Transport Agency for approval, (as per Proffered District Resource Consent Condition 23) and as such any transport matters associated with aggregate supply will be considered under the CTMP. Further, Proffered District Resource Consent Condition 25 specifically identifies the need to provide for Safe Intersection Sight Distances at the SH2/Opaki-Kaiparoro Road intersection should aggregate be required to be transported via that location. It is noted that Waka Kotahi is comfortable with this approach as per the written approval.

Question 16 Response: If an emergency occurs, then the nearest access will be used as an emergency access to meet Health and Safety Responsibilities. The Traffic and Transportation Effects Assessment makes this point with regard to Coach Road South (section 2.1.5, page 16):

Significant upgrades to the road would be required to allow for access to the site. Due to the considerable constraints, transport of oversize or heavy vehicles along this road is unlikely to be viable. As such, no access to the site is proposed along this route except in an emergency.

Question 17 Response: It is confirmed that Meridian is seeking consent to construct the Operations and Maintenance Building at either the substation site or at the laydown area at the entrance to the wind farm site as stated in Section 2.4.16 of the Assessment of Environmental Effects.

Question 18 Response: In the memo attached as Appendix 2, Tonkin + Taylor confirms that Table 3.4 of the Traffic and Transportation Assessment (detailing vehicles per day to the site) lodged as part of the resource consent application includes provision for diesel transportation.

Question 19 Response: In the memo attached as Appendix 2, Tonkin + Taylor confirms that Table 3.4 of the Traffic and Transportation Assessment as lodged with the resource consent application includes provision for 60 truckloads of water to be delivered to the site per day.

Question 20 Response: The Aggregate Supply Memo is attached as Appendix 5 to this RFI response (again noting section 5 of that memo has been removed due to commercial sensitivities).

Question 21 Response: As outlined in section 3.3. of the Traffic and Transportation Effects Assessment, all site accesses will be designed to comply with the permitted activity standards in the Tararua District Plan.

Question 22 Response: It is highly unlikely that workers will travel to Eketāhuna for lunch. It is over a 40-minute round trip from the northernmost part of the construction site to Eketāhuna and back. This would well exceed a standard 30-minute lunch break. As noted in the memo attached as Appendix 2, Tonkin + Taylor considers that unpredicted staff trips would be unlikely to significantly impact the safety and operation of any intersections.

Question 23 Response: The Port to Site Routes Assessment is attached as Appendix 6.

Question 24 Response: Concept designs for the Old Coach Road upgrades are provided as part of the Tonkin + Taylor documentation attached as Appendix 3 to this letter. Final design drawings must be submitted for approval to Waka Kotahi prior to construction, as per their written approval and the resulting proffered condition under the response to Question 6, above.

Question 25 Response: In the memo attached as Appendix 2, Tonkin + Taylor confirms that no modelling has been undertaken as traffic impacts are so low against current and ten-year forecast volumes. Calculations are provided in the memo.

Question 26 Response: Concept designs for road upgrades are provided as part of the Tonkin + Taylor documentation attached as Appendix 3 to this letter.

Question 27 Response: Concrete and Aggregate Trucks will remain on site for as long as they are needed to complete the tasks they are used for. Concrete trucks may leave site in between each foundation pour if these are not concurrent.

Question 28 Response: Vehicle tracking into the terminal substation site from Kaipororo Road is included on the Tonkin + Taylor Plan Set in Appendix 3. The design of the vehicle access will be determined at detailed design stage and will be designed to comply with the Tararua District Plan permitted activity standards.

Question 29 Response: Vehicle tracking into the internal transmission line site from Opaki-Kaipororo Road is included on the Tonkin + Taylor Plan Set in Appendix 3. Trucks are expected to be the largest vehicles to use this access.

Question 30 Response: Please refer to the response to Question 97 of this RFI.

Question 31 Response: Regardless of whether or not sections of internal access road are sealed, Meridian will use a similar overall pavement depth. Traffic volumes will therefore not be significantly impacted relative to the as lodged resource consent application, regardless of surfacing. Unsealed roads with grades of 16% and steeper on Meridian's operational wind farms, including West Wind and White Hill, are performing well.

Question 32 Response: In the memo attached as Appendix 2, Tonkin + Taylor confirms that Table 3.4 of the Traffic and Transportation Assessment includes provision for gravity pad foundations.

Question 33 Response: In the memo attached as Appendix 2, Tonkin + Taylor confirms that Table 3.4 of the Traffic and Transportation Assessment includes provision for truck movements associated with wastewater and portalooos.

Question 34 Response: Road hierarchy matters are answered in the Tonkin + Taylor memo attached as Appendix 2.

LIGHTING MATTERS

Stephenson and Turner have prepared an Assessment of Environmental Effects for Proposed Lighting from wind farm activities (attached as Appendix 7). Where that report forms the response to a question raised in the RFI, it has been cross referenced in the answers to those question below.

Question 35 Response: The Stephenson and Turner report in Appendix 7 quantifies the anticipated and potential lighting effects of the proposed wind farm. An appendix to the report includes lighting concept designs, which have been used to inform the quantification of effects. Through the lighting concept designs, light sources from the wind farm will include the following:

Construction Stage:

- Vehicle movements – headlight sweep;
- Security building lighting (sensor lights);

- Main laydown area lighting;
- Concrete batching plant lighting (limited to when the concrete batching plant is operational);
and
- Turbine laydown area lighting (again limited to when an individual turbine is being constructed).

Operational Stage:

- Vehicle movements – headlight sweep;
- Operation and maintenance building lighting (sensor lights);
- Site substation lighting (sensor lights);
- Terminal substation lighting (sensor lights and any nighttime operation switchyard lighting);
and
- Aviation warning lights.

The report confirms that none of the above light sources will breach the permitted activity standards in either the Tararua District Plan (Rule 5.4.7.2) or the Combined Wairarapa Plan (Rule 21.1.11) in regard to light spill over site boundaries.

Question 36 Response: The Stephenson and Turner report in Appendix 7 concludes that the level of skyglow effects will be no more than minor. The Landscape Memorandum in Appendix 1 agrees with the conclusion reached in the Stephenson and Turner report.

Question 37 Response: Light effects will be mitigated through meeting the relevant district plan permitted activity standards, using sensor lights where appropriate, and keeping light levels to no greater than those required for the task that they are providing light for.

A Construction Light Management Plan is proposed through a condition of resource consent that would require all lights to be directed/focussed to the work area, and not in the direction of light sensitive receivers such as dwellings and public roads. This condition is proffered as follows:

- X. *A Construction Light Management Plan detailing where all lights associated with construction are to be located, and when they are likely to be used, must be submitted to and approved by the Resource Consents Manager – Masterton and Tararua District Councils prior to construction commencing.*

The Construction Light Management Plan must include all measures to ensure that are lights are to be focussed on a work area, and not in the direction of light sensitive receivers such as dwellings and public roads.

NOISE MATTERS

Marshall Day Acoustics prepared the Noise Effects Assessment that formed part of the as lodged resource consent application. Marshall Day Acoustics have subsequently provided a letter attached as

Appendix 8 which directly responds to questions 38 to 41 of the RFI. Rather than repeat the answers in this memo, the Marshall Day Acoustics letter in Appendix 8 is relied upon.

In terms of the mitigation options noted in the letter in response to Question 38, a Construction Noise Management Plan condition is proffered in respect of the road upgrade works along Old Coach Road.

X *20 working days prior to any road upgrade works commencing on Old Coach Road, a Construction Noise Management Plan (CNMP) must be submitted to the Manager, Resource Consents, Tararua District Council, for certification. The CNMP must:*

- *Be prepared by a suitably qualified acoustic specialist;*
- *Identify any dwellings within 20m of the work;*
- *Outline consultation which has occurred with those living in the identified dwellings;*
- *Detail the mitigation for each dwelling. Mitigation options include, but are not limited to:*
 - *For the brief periods when activity noise exceeds the noise trigger levels of 70 dB LAeq, assisting in the temporary relocation of residents during daytime activity periods;*
 - *If significant activity is required directly in front of a dwelling for a period longer than can be mitigated by scheduling and relocation, the erection of temporary barriers to reduce the noise level received at the dwelling by up to 10 decibels;*
- *Include specific details relating to methods for control of noise associated with the works, including, but not limited to the normal suite of recommendations included in construction noise management plans – avoiding unnecessary shouting or external radio use, using non-tonal reversing alarms, maintaining equipment and particularly engine exhausts, and watering equipment tracks to reduce squeaking;*
- *Demonstrate that these controls adopt the best practicable option to reduce noise to a reasonable level in accordance with section 16 of the Act and at all times be formulated to so as far as practicable, comply with the recommended upper limits for construction noise specified in NZS 6803:1999, Acoustics - Construction Noise when assessed in accordance with this standard; and*
- *Specify details of complaint handling, communication procedures including notification, and any necessary monitoring.*

Guidance on the preparation of a Construction Noise Management Plan can be found in the guidance document enclosed with this decision, and in Annexure E2 of New Zealand Standard NZS 6803:1999 Acoustics— Construction Noise.

SHADOW FLICKER

Question 42 Response: The identified hours of shadow flicker show a worst-case scenario and do not take account of the orientation or presence of sheds or windbreaks around the buildings which may restrict direct effects between wind turbines and affected dwellings. This explanation is set out in paragraph 6.6.3 of the Landscape Effects Assessment.

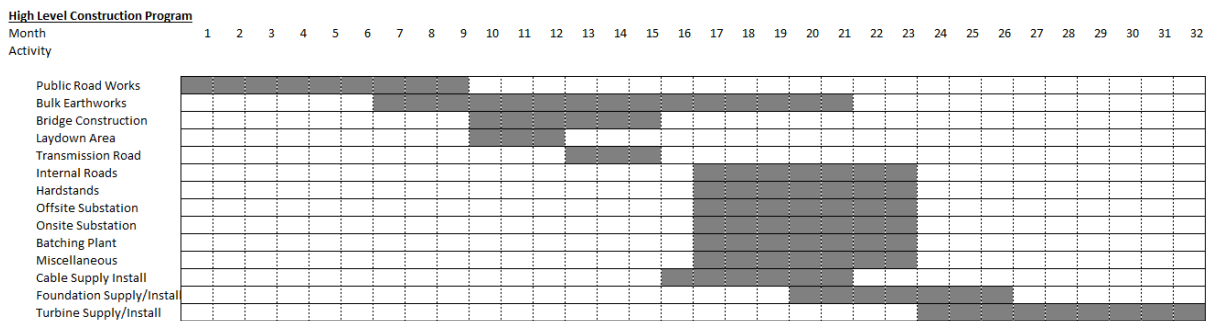


AGGREGATE CRUSHING

Question 43 Response: Aggregate crushing will occur at the location where suitable aggregate is found on the site. To this end, aggregate crushing will largely be done within the road alignments where earthworks which include bedrock are undertaken, being either the turbine exclusion zone or turbine envelope zone. Aggregate crushing will not occur in the construction laydown area as bedrock is unlikely to be disturbed in this area.

PLANNING

Question 44 Response: The following is a high-level breakdown of the key construction activities, duration and overlap between activities.



Question 45 Response: As can be seen from the response to Question 44 above, the works will take less than three years to complete, with varying levels of intensity at different locations through that time.

The Taranua District Plan definition of temporary activities is limited to six months, and the Combined Wairarapa District Plan is limited to 12 months. The proposed works therefore are not considered temporary as defined in the district plans. The effects of all activities associated with the construction and operation of the wind farm have been assessed in the as lodged resource consent application under the relevant rules. Regardless of the district plan definitions, some effects associated with the proposal are for a limited period, and conditions have been proffered to ensure this, such as requiring the removal of the structures used during the construction phase within six months of the wind farm becoming operational.

CIVIL AVIATION REQUIREMENTS

Question 46 Response: Meridian have been consulting with the Civil Aviation Authority (CAA) on the proposed Mt Munro Wind Farm since April 2021. Meridian will continue to work with the CAA through the development process for the wind farm, in order to address any impacts on airspace hazard.

The resource consent application and this RFI response includes provision for aircraft navigation lighting. Helpfully, as part of Meridian’s consultation with CAA, those guidelines have been provided, and have been used to inform the lighting analysis. Ultimately CAA will review the final wind farm design against their guidelines.

RECORD OF CONSULTATION

Question 47 Response: Specific questions (a) through (d) are answered as follows:

- a. Public meetings have included two public open days, visits and phone calls to neighbours, meetings with Tangata Whenua and meetings with other key stakeholders for the as lodged resource consent application since February 2022. Meetings with individual directly affected landowners intensified from May 2022 through to the present. A record of consultation is provided in Appendix 9.
- b. Information was shared freely with directly affected landowners regarding the proposal. During the early engagement, Meridian shared conceptual details, and then as they became available, more detailed plans, including visual simulations, maps showing distances from the proposed turbines, and noise contours for specific properties (where landowners took up the opportunity to engage further).
- c. Due to privacy issues, a list cannot be provided of landowners engaged with or the nature of those engagements. However, Meridian attempted to consult with all neighbours within a 2 km radius of proposed turbine locations. Some landowners indicated they were opposed to the proposal in general and did not want to engage. Public notification of the application has been requested by Meridian, which will ensure anyone who considers themselves affected has an opportunity to have their say on the proposal.
- d. Moving forward, outside the public notification process, Meridian intends to continue engaging with individual landowners who are willing. As outlined in the as lodged resource consent application, through the proffered conditions of consent, Meridian will establish a Community Liaison Group which will facilitate communication between the community, the Consent Holder and the District and Regional Councils on issues arising from the construction and first two years of operation of the Mt Munro wind farm.

In addition, Meridian hand delivered a flyer outlining the project and inviting people to the community open day on 13th December 2022 to every letterbox in Eketahuna, and within a 7km diameter of the project site. Advertising was also printed in the Wairarapa Times-Age. A second flyer was posted to every letter box in Eketahuna, and advertising included in the Wairarapa Times-Age inviting people to the community open day on 18th February 2023. Copies of the flyers/invites are provided in Appendix 10.

EROSION AND SEDIMENT CONTROL

Ridley Dunphy prepared the Construction Water Management Plan and Effects Assessment Report that formed part of the as lodged resource consent application. Ridley Dunphy has subsequently provided a letter in response to Questions 48 to 63 of the RFI, which is attached as Appendix 11. Rather than repeat the answers in this letter, the letter in Appendix 11 is relied upon. However, where there is an implication in terms of proffered conditions, these are commented on below.

Question 48 Response: The Construction Water Management Plan and Effects Assessment Report (CWMP) as included in Appendix F of the as lodged resource consent application provides the function of a CEMP. On that basis, a CEMP is not required, and the proffered regional consent Conditions 6 and 7 should be deleted (with an amendment to Condition 8 to refer to the CWMP).

The reason for this is that within Section 1.1 of the CWMP, it is noted that *“It is also envisaged that through the detailed design phase the contents of this Report will also be refined and amended to include specific Project construction and earthworks analysis. This will occur prior to earthworks (or any stream works) commencing at a given location and will be produced in the form of a Specific Environmental Management Plan (SEMP). These SEMPs will be submitted to Manawatū- Whanganui Regional Council (Horizons) and Greater Wellington Regional Council (GWRC) for certification against the consent conditions, this Report and best practice ESC. The SEMPs will be informed by the principles of this Report and will enable specific construction constraints and opportunities to be incorporated into the final design for the works at that location. The SEMPs further will allow for flexibility, for enhanced outcomes and the opportunity for implementing improved practices based on any new knowledge and Project outcomes.”*

In addition, Table 3 of the CWMP provides the details and content of the SEMPs to be provided.

To allow for this process, proffered Condition 8 should be amended as follows (deletions shown in ~~strikethrough~~, and additions as underline):

8. *At least 20 working days prior to earthworks (or any stream works) commencing at a given location or locations, a Specific Environmental Management Plan (SEMP) must be submitted to Manawatū-Whanganui Regional Council (Horizons) and Greater Wellington Regional Council (GWRC), depending on which jurisdiction the given location falls within, for certification against ~~CEMP~~the CWMP.*

Further, as raised in RFI Question 48, and to allow for future certification of amendments to the SEMPs process, it is suggested that proffered Condition 10 be amended as below.

10. *The Consent Holder may request amendments to the ~~CEMP~~the CWMP or any SEMPs by submitting the amendments in writing to the Consent Authority ~~prior to any change taking effect~~. Written certification of amendments must be obtained prior to any change taking effect.*

Question 49 Response: Please refer to the response to Question 97 for a breakdown of cut and fill volumes.

Question 50 Response: Stabilisation within the 14-day period is addressed in the Ridley Dunphy letter in Appendix 11.

Question 51 Response: Section 5.1.5 of the CWMP outlines the proposed approach clearly:

Stabilisation options include traditional grass sowing methodologies, however this is not considered stabilised until such a time as 80% vegetative cover is established on site. Hardfill with clean aggregate also creates a stabilised surface. If other alternatives, such as polymer/soil binder products, are to be utilised they will need to be verified as stabilised,



demonstrated to have no residual impacts and will need to be trialled on site to demonstrate appropriateness prior to use.

As outlined above, an environmental manager (or equivalent) will implement the SEMP's including all required monitoring, management and necessary communication to the regulatory agencies. Proffered regional resource consent condition 12 provides for the regional councils to inspect works to ensure the site has been remediated correctly.

This matter is further addressed in the Ridley Dunphy letter in Appendix 11.

Question 52 Response: The hierarchy of sediment control is addressed in the Ridley Dunphy letter in Appendix 11.

Question 53 Response: Chemical treatment is addressed in the Ridley Dunphy letter in Appendix 11.

Question 54 Response: The SEMP process is the trigger for whether a geotechnical assessment is necessary. This is addressed in the Ridley Dunphy letter in Appendix 11.

Question 55 Response: Rapid stabilisation is addressed in the Ridley Dunphy letter in Appendix 11.

Question 56 Response: Stockpiles are addressed in the Ridley Dunphy letter in Appendix 11.

Question 57 Response: Subsoil drainage for turbine excavations is addressed in the Ridley Dunphy letter in Appendix 11, noting that the detailed design of turbine excavations and platforms has not been undertaken and that any subsoil drainage will form part of this design. Specific erosion and sediment control methodology will be documented within a SEMP at that time.

Question 58 Response: Sediment control measures for the construction laydown area are addressed in the Ridley Dunphy letter in Appendix 11.

Question 59 Response: It is confirmed that there is only one concrete batching plant proposed. As outlined in the AEE and in response to question 3 above and 88 below, the final location of the batching plant will be confirmed at least 40 days prior to the commencement of construction, and it will not be in the construction laydown area.

As outlined in section 1.1. of the CWMR, SEMP's are intended to guide works at specific sites or for specific activities. Any erosion controls required at the concrete batching plant location will be addressed by a SEMP.

Question 60 Response: Specific information on the timing and methodology of erosion and sediment control for cable installation will be addressed in a SEMP.

Question 61 Response: Specific information on culverts and stream works will be addressed through the SEMP process, to allow for detailed design to take place.

Question 62 and 63 Response: Proffered Regional Consent Condition 9 requires SEMP's to include monitoring and contingencies. Monitoring has been discussed in the Ridley Dunphy Memo in Appendix 11, and in regard to Question 63, in the Boffa Miskell Memo in Appendix 12, including potential triggers which could form part of the SEMP monitoring process.

Question 64 Response: As outlined in the as lodged Assessment of Environmental Effects, the transmission line will be constructed via the use of existing farm access tracks, and by driving machinery over pasture to the transmission line location. Other than the line and support pole, no other 'associated' infrastructure is proposed. An excavator will be used to fix the poles into the ground. Some minor track resurfacing (placement of aggregate on existing farm tracks) may be necessary in certain locations for excavator access. Aside from these two processes, no earth will be disturbed for the transmission line.

Question 65 Response: Clarification around sediment discharge and its impact on the freshwater environment is provided in the Boffa Miskell Memo in Appendix 12.

AQUATIC AND TERRESTRIAL ECOLOGY MATTERS

Boffa Miskell prepared the Ecological Assessment that formed part of the as lodged resource consent application. Boffa Miskell have subsequently provided a memo in response to Questions 66 to 86 of the RFI, which is attached as Appendix 12. Rather than repeat the answers in this memo, the letter in Appendix 12 is relied upon.

STORMWATER QUALITY AND HYDROLOGY MATTERS

Tonkin + Taylor were engaged to prepare technical responses on stormwater quality and hydrology matters. Their memo is attached in Appendix 13, which directly responds to questions 87 to 95 of the RFI. Rather than repeat the answers in this response, the Tonkin + Taylor memo in Appendix 13 is relied upon. Additional comments as they relate to the resource consent, and based on the information provided by Tonkin + Taylor in Appendix 13 as lodged, are made below.

Question 87 Response: Stormwater discharges associated with both the construction and operational phases are assessed in section 4.3.2 and section 4.4.3 of the AEE for Horizons and Greater Wellington Regional councils respectively.

The proposal is permitted under the Horizons One Plan as it complies with rule 14-18 with regard to the discharge of stormwater to surface water and land (as demonstrated in Table 4 of the as lodged resource consent application).

The proposal is permitted under the GWRC Natural Resources Plan as it complies with Rule R48 with regard to stormwater from an individual property (as demonstrated in Table 11 of the as lodged resource consent application).

Question 88 Response: The following condition is proffered regarding a Concrete Batching Plant Management Plan. Note, use of a Concrete Batching Plant Management Plan has successfully been implemented by the applicant at other wind farm locations in New Zealand, including Harapaki in Hawkes Bay. A copy of the Harapaki Concrete Batching Plant Management Plan is attached for reference in Appendix 14.

The proffered condition, to be included as part of the regional resource consent, is as follows:

- X. *At least 40 working days prior to the commencement of construction works authorised as part of this resource consent, the consent holder or their contractor shall provide the Resource Consents Manager – Greater Wellington and Horizons Regional Councils with a Concrete Batching Plant Management Plan (CBPMP). The CBPMP shall, as a minimum, include:*
- a. *Confirm the location of the Concrete Batching Plant. This location may be within the Turbine Envelope Zone or Turbine Exclusion Zone, but must not be in the Construction Laydown Area.*
 - b. *Detail the plant and equipment to be used for the Concrete Batching Plant.*
 - c. *Detail the environmental management measures for the Concrete Batching Plant. These measures must include, but are not limited to:*
 - i. *How water generated within the Concrete Batching Plan is confined and re-used within the Concrete Batching Plant.*
 - ii. *Detail how any water generated by the Concrete Batching Plan is treated for sediment and pH prior to re-use or discharge;*
 - iii. *Detail the standards (that align with the relevant permitted standard in the Greater Wellington Natural Resources Plan or Horizons One Plan, depending on final location of the Concrete Batching Plant) for pH and suspended sediment for any water that is discharged from the Concrete Batching Plant.*
 - iv. *Detail of operational limits for when concrete batching can and cannot take place*
 - v. *Detail of the drainage system to dissipate any water.*
 - vi. *Detail of how air discharges associated with the Concrete Batching Plant will be managed to meet the conditions/standards/terms in Rule 15-14 of the Horizons One Plan or the conditions of Rules R27 and R28 of the Greater Wellington Natural Resources Plan, whichever is relevant depending on the final location of the Concrete Batching Plant.*
 - vii. *Detail of how monitoring and reporting of the above measures i. to vi. will occur.*

Note, erosion and sediment control will also be specified in a SEMP
 - d. *Detail of site records and logs which will be kept, and provided to Council on request; and*
 - e. *Detail of how the concrete batching plant will be decommissioned.*

Question 89 Response: As explained in the memo in Appendix 13, the proposal results only in a small increase in impervious surfaces on the site, and while peak flows are expected to increase, it is only a minimal increase.

Question 90 Response: In addition to the culverts identified in the as lodged resource consent application, a further nine culverts are identified as necessary. Culverts C4, C6, C11 and C12 will be small culverts with an indicative size of 300mm in diameter and will have a catchment area of less than

1 hectare. Culverts C5, C8, C9 and C10 will be medium culverts with an indicative size of 600mm in diameter and will have a catchment area of 1 to 5 hectares. Culvert C7, will, like the three identified in the as lodged resource consent, be larger with a diameter of between 900mm and 1200mm, with catchments exceeding 5ha.

Culvert locations and numbers are indicative only, and will not be able to be finalised until detailed design is completed. It is noted that Proffered Condition 3 in the as lodged resource consent application requires that final design drawings are provided to the Regional Council prior to construction commencing, must include a detailed design report, and must include a hydraulic assessment of any stormwater infrastructure including culvert inlet and outlet structures. An additional sub-clause could be added to this condition to confirm the final number and location of culverts.

Question 91 Response: Hydrological and hydraulic calculations are provided in the memo in Appendix 13.

Question 92 Response: Information regarding erosion and scour protection measures are required through Proffered Regional Resource Consent Condition 3 in the as lodged resource consent application, and will need to be approved by Council through the process outlined in that condition.

Question 93 Response: Any necessary operation and maintenance manuals will need to be provided as part of Proffered Regional Resource Consent Condition 3 in the as lodged resource consent application.

Question 94 Response: Fill location sites need to be confirmed as part of Proffered Regional Resource Consent Condition 3, as set out in the as lodged resource consent application. Further information on fill location sites is provided in response to Question 99 below.

Question 95 Response: Section 4 of the AEE contains a comprehensive analysis of the proposals against all regional council rules.

GEOTECHNICAL/LAND STABILITY MATTERS

Tonkin + Taylor, who prepared the Civil Engineering Report lodged with the resource consent application, were engaged to prepare technical responses to geotechnical/land stability matters. Their memo is attached in Appendix 15, which directly responds to questions 96 to 109 of the RFI. Rather than repeat the answers in this response, the Tonkin + Taylor memo in Appendix 15 is relied upon.

Note, in terms of Questions 102 and 103, please also see the responses to Questions 59 and 3, respectively.

CONTAMINATED LAND MATTERS

Question 110: Tonkin + Taylor have prepared a Preliminary Site Investigation (PSI), attached as Appendix 16. The PSI identifies activities that have been undertaken on the wider wind farm site,



including sheep dipping and bulk storage of fuel and fertiliser, which are included on the Ministry for the Environment's Hazardous Activities and Industries List, (HAIL).

However, the PSI identifies that the project footprint avoids the HAIL areas, and samples collected from the project footprint near HAIL areas show that contaminants are below the predicted background levels. As such, the PSI concludes that the proposal will not disturb HAIL areas, and no resource consents are required under the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011, the Horizons One Plan or the Greater Wellington Natural Resources Plan.

AIR QUALITY MATTERS

Question 111: The concrete batching plant, including its air discharges, will be subject to the CBPMP as detailed in the response to Question 88 and its associated proffered condition. The proffered condition ensures that the relevant conditions/standards/terms in the relevant regional plan rules will be complied with as part of the operation of the concrete batching plant. It is noted that resource consent was sought under Rule 4.5.6 of the Combined Wairarapa District Plan through Section 4.6.2 of the as lodged resource consent application.

Generators will be used on the site from time to time. These will generally be used by a yet to be appointed contractor, who will also supply the generators. The contractor's generators will either comply with Horizons One Plan Rule 15-6 or Greater Wellington Natural Resources Plan Rule R8, as well as the National Environmental Standards for Air Quality, or the contractor will be required to obtain resource consents or utilise any existing resource consents for generators which do not meet the aforementioned regulations.

Any aggregate crushing on site will be done by mobile machinery, arranged by the appointed contractor. The contractor's aggregate crusher will either comply with Horizons One Plan Rule 15-14 or Greater Wellington Natural Resources Plan Rule R27, as well as the National Environmental Standards for Air Quality, or the contractor will be required to obtain resource consents or utilise any existing resource consents for aggregate crushers which do not meet the aforementioned regulations.

In terms of dust management, a condition requiring a Dust Management Plan is proffered as follows. Note, use of a Dust Management Plan has successfully been implemented by the applicant at other wind farm locations in New Zealand, including Harapaki in Hawkes Bay. A copy of the Harapaki Dust Management Plan is attached for reference in Appendix 17.

The proffered condition, to be included as part of both the district and regional resource consents, is as follows:

- X. *At least 40 working days prior to the commencement of construction works authorised as part of this resource consent, the consent holder or their contractor shall provide the Resource Consents Manager – Greater Wellington and Horizons Regional Councils/Tararua and Masterton District Councils with a Dust Management Plan (DMP). The DMP shall, as a minimum, include:*
 - a. *identification of potential sources of dust taking into account construction activities and the construction programme;*

- b. *identification of sensitive receptors likely to be adversely affected by emissions of dust;*
- c. *methods for managing and mitigating adverse dust effects that may arise from construction activities, particularly in proximity to sensitive receptors. Where appropriate, these methods may include:*
 - i. *the use of water carts or sprinklers to apply water to areas generating dust;*
 - ii. *reducing vehicle speeds on unsealed surfaces; and*
 - iii. *the use of commercial dust suppressants;*
- d. *the methods of monitoring for potential dust generation, including assessment of weather conditions, soil conditions and visual dust assessments.*

GREENHOUSE GASES/CARBON LIFE CYCLE MATTERS

Question 112 to 114 response: Extensive new renewable electricity generation development is necessary for the country to accelerate the transformation of the economy to clean energy sources, meet Government targets and give effect to international obligations related to climate change. Meridian is Aotearoa New Zealand’s largest electricity generator and generates approximately 30% of the country’s electricity from renewable energy. Meridian generates electricity only from 100% renewable sources – wind, water, and sun. Meridian is a significant developer of renewable energy projects in Aotearoa New Zealand.

Action on climate change, including emissions measurement and reduction commitments, is central to Meridian’s three climate priorities: renewable generation, customer decarbonisation and managing Meridian’s own emissions.

Meridian’s renewable development projects represent material opportunities to reduce gross emissions for New Zealand by creating additional capacity to enable multi-sector decarbonisation. Meridian is also committed to reducing gross emissions in its own business both for one-off construction activities, and while assets are in operational service (such as action on a [Half by 30](#) goal - By 2030, Meridian plans to reduce their gross operational emissions by 50 percent). Meridian completes due diligence with suppliers to understand end of life solutions for goods/materials to maximise re-use and minimise end of life emissions, factoring these into decisions.

Meridian’s [Greenhouse Gas Inventories](#) are produced annually in accordance with the Greenhouse Gas Protocol and information is stated in accordance with the requirements of International Standard ISO 14064-1 Greenhouse gases – Part 1: Specification with guidance at the organisation level for quantification and reporting of greenhouse gas emissions and removals (‘ISO 14064-1:2018’), the Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (2004) (‘the GHG Protocol’) and the Corporate Value Chain (Scope 3) Accounting and Reporting Standard (2011) (‘the Corporate Value Chain Standard’). Meridian’s GHG Inventories are independently assured to a reasonable level of assurance.



PLANNING – RESOURCE CONSENT REQUIREMENTS

Question 115 Response: Based on the information provided in this response, including the appendices, the resource consent application as lodged identifies all resource consents we consider necessary for the proposal¹. It is noted that there are additional culverts identified as part of this RFI response, however they do not require any additional rule assessment to those culverts already assessed as part of the as lodged resource consent application.

PLANNING - STATUTORY PLANNING ASSESSMENT

Question 116 Response: Given no additional resource consent requirements have been identified through this RFI process, the statutory planning documents identified in Section 3 of the as lodged resource consent application and assessed in Sections 5 and 9 of that application are considered valid². Further assessment of the relevant national, regional and district planning instruments is not considered necessary.

GENERAL COMMENT - PROFFERED CONDITIONS

As a result of this RFI process, proffered regional council conditions of consent 6 and 7 have been deleted and 8 and 10 amended as per the response to RFI Question 48.

The following new conditions of consent are proffered through this RFI response:

District Resource Consent Conditions:

- Landscape Plan (as detailed in the response to RFI Questions 2 and 4);
- Waka Kotahi Transport Conditions (as detailed in the response to RFI Question 6);
- Construction Light Management Plan (as detailed in the response to RFI Question 37);
- Construction Noise Management Plan (as detailed in the response to RFI Question 38); and
- Dust Management Plan (as detailed in the response to RFI Question 111).

Regional Resource Consent Conditions:

- Concrete Batching Plant Management Plan (as detailed in the response to RFI Question 88); and
- Dust Management Plan (as detailed in the response to RFI Question 111).

Meridian and its appointed consultants are willing to continue to work with Council on draft conditions, with a view to having an agreed set of conditions for a decision maker to consider at a hearing.

¹ The rule assessment and interpretation for the proposed wind farm is that of Incite and is intended as a guide only and is not in substitution of the Council's own assessment of the proposal, nor is it a restriction on the matters resource consent is being sought for. Resource consent is applied for the proposal described in Section 2 of the as lodged Assessment of Environmental Effects, including any plans and other information submitted. Resource consent is applied for the rule infringements described in that application, and any other resource consents necessary, whether specifically identified or not, to allow the proposal to be established, maintained and operated.

² The interpretation and assessment of the relevant statutory planning instruments for this resource consent application is that of Incite and is intended as a guide only and is not in substitution of the Council's own assessment of the proposal against statutory planning instruments.



I trust that this is sufficient for your purposes and that the application can now proceed to public notification.

Yours sincerely

Incite

A handwritten signature in blue ink, appearing to read "Tom Anderson".

Tom Anderson

Director/Principal Planner

tom@incite.co.nz

04 801 6862 or 027 231 0246

APPENDIX 1
LANDSCAPE MEMO

7 September 2023

Lynley Fletcher
Meridian Energy Limited
Level 2
55 Lady Elizabeth Lane
Wellington 6011



Lynley.Fletcher@MeridianEnergy.co.nz

Dear Lynley

Mount Munro: s92 Further Information Request – Landscape

This letter sets out my response to relevant aspects of a Further Information Request received from Horizons Regional Council, Greater Wellington Regional Council, Tararua District Council and Masterton District Council for the above project, dated 6 July 2023.

My response to this request covers, landscape and visual matters as well as related aspects of lighting and shadow flicker, insofar as they relate to my expertise. For completeness, I have set out the specific information request in full ahead of my responses below:

Landscape / Visual

- 1. The roading alignment included in the Tonkin + Taylor Indicative Roading Section Plan essentially adopts an alignment that is positioned central to the Turbine Consent Envelope and Turbine Exclusion Zone corridors. It is considered that the effects conclusions made within the Landscape Effects Assessment, in relation to the earthworks associated with the construction of the internal road network, are credible based on the demonstrated alignment and prepared visual simulations. However, there is the potential for a considerably larger scale earthworks within these proposed consent corridors, particularly when it is noted that the specified road width “don’t include feathered edges, drains, or removal of banks on the road shoulders to enable the transport of turbine blades”¹. Please confirm that the scale of earthworks (cut/fill), associated with the final alignment of the internal road layout, is consistent with the level of effect assessed in the Landscape Effects Assessment.*

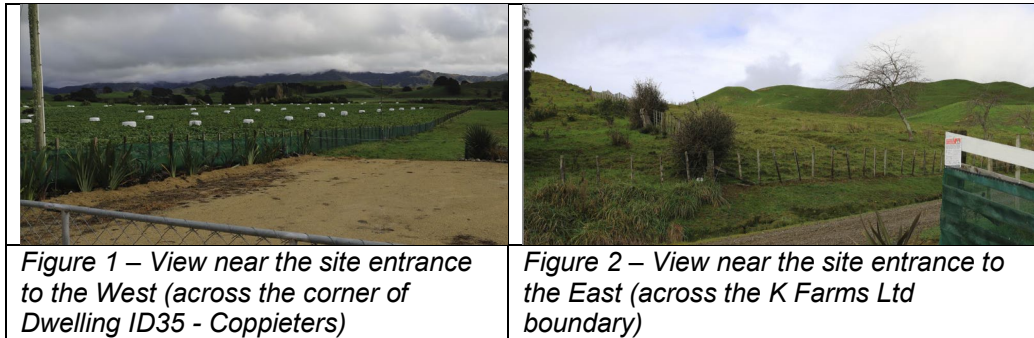
The earthworks modelling used in visual simulations was prepared by Tonkin and Taylor (v10.01). This includes an understanding of cut and fill batters where necessary to support an indicative access alignment and inform the assessment of potential landscape and visual effects. The dimensions in the report refer to road widths only. The full extent of earthworks included in the model incorporates indicative batter slopes which enable feathered edges, drains and removal of banks on the road shoulders to facilitate the transport of turbines.

Since the Landscape Effects assessment was lodged, I have been provided an update to the earthworks model (V10.04) as represented in Figures 4 and 6 of the Landscape and Visual Effects Assessment Graphic Supplement. This relates to facilitating access to the south of the laydown area along Old Coach Road and associated bridge crossing along Makakahi tributary as assessed. There is no change to the indicative internal earthwork’s layout as modelled or assessed within the windfarm.

¹ Appendix K - Landscape Effects Assessment (Boffa Miskell 2023); Section 4.2.5

I can therefore confirm that the scale of earthworks which have been assessed have incorporated an allowance for earth worked batters beyond the specified road widths and within identified exclusion zone corridors. Once completed, resulting batters will be re-established in grass. This understanding has informed the overall level of effect identified within the Landscape Effects Assessment.

2. *Additional information on the boundary treatment (for mitigation purposes) with the immediately adjacent properties along Old Coach Road (Figures 1 & 2) is requested. These two properties are in close proximity to the proposed site access, which is the beginning of the new internal access road and the location of the laydown area (including temporary site offices, amenities, security, parking, and potentially a permanent Services/O&M building).*



Figures 1 and 2 included in the s.92 request are taken from the same property located along Old Coach Road – owned by the Coppieters (WN43/255). The property to the east of Old Coach Road and visible in the foreground is owned by K Farms Limited (WN585/31). No dwellings are currently located on either property from which planting would provide a reduction in fixed views.

Through discussions with Meridian, it is understood that a future dwelling may be constructed by the Coppieters on their property in the future, the timing of which is yet to be determined. Having visited this property it was evident that a future dwelling would likely be orientated to face north-west towards the Makakai River and away from the windfarm resulting in moderate-high effects². If a dwelling is constructed adjacent to this boundary with potential views into the construction compound, however, I agree planting along the intervening boundary may assist with establishing a meaningful reduction in intervisibility during construction and ameliorate potential for higher adverse visual effects.

As with all nearby properties within which planting is employed to reduce views from dwellings, I consider any planting should be developed through agreement with affected landowners as part of seeking to ensure this provides an appropriate outcome. This is discussed within existing recommendations included in para. 7.1.3 of the Landscape Effects Assessment. In some contexts, planting may not be necessary or desirable. To ensure any agreed planting is effectively established, I consider conditions should ensure this engagement will occur with this landowner and result in planting illustrated on an agreed plan being implemented in the first available planting season following works commencing.

K Farms Limited has no identified fixed views from dwellings and is not therefore considered more sensitive in terms of its existing working rural context with respect to the northern boundary of the internal access road or laydown area. Accordingly, no additional planting is considered necessary along the northern boundary of the Site as part of integrating these rural properties and within what will remain part of a working rural landscape within which the windfarm is proposed.

² Assessed as dwelling ID35 in Appendix 3 of the Landscape Effects Assessment.

3. *The proposed on-site concrete batching plant(s) has not been definitively identified and is an activity that warrants its own effects considerations. It is difficult to understand the potential level of landscape and visual effect associated with this activity in the absence of a defined location(s). Please provide further detail on the proposed location(s) of the on-site concrete batching plant(s) and an associated landscape and visual assessment and any associated mitigation measures required to accommodate this facility.*

The batching plant is a temporary structure, required for the construction of the turbine and mast foundations. It is understood that this would only be in operation for around 30 days, over a 3–4 month window. The application as lodged currently allowed for the concrete batching plant to be located anywhere within the Turbine Envelopment, or the Turbine Exclusion Zones.

In response to this further information request, Meridian have reviewed where the batching plant may be located given its scale and flat site conditions required. This has restricted the areas available to those along the main ridges, or saddles on the access roads. A likely location has also been identified along the main ridgeline in the vicinity of turbine 7.

The concrete batching plant will occupy an area of approximately 100m by 60m. All structures required are below a maximum height of 7m and surrounded by a fence. The temporary structures associated with the concrete batching plant include the following (indicative dimensions included in brackets):

- Control room and storage building (6m long x 3m high x 3m wide);
- Portacoms for office and amenities (6m long x 3m high x 3m wide);
- Mobile batching plant unit which includes, but is not limited to, hoppers, aggregate storage bins, compressor, cement silos and conveyors (18m long x 4m wide x 7m high);
- Additional cement storage silo (6m long x 3m wide x 3m high);
- Diesel storage facility;
- Water tank;
- Aggregate stockpile area (50m x 20m);
- Generator.

During construction, the concrete batching plant is expected to remain largely contained within the broader working landform supporting the wider windfarm and at least 800 metres from the nearest offsite dwelling. If constructed within the indicative location, some temporary views of structures and activity may be available of this elevated area, including limited lighting, however this is over 1.2 kilometres from the nearest offsite dwelling. Any lighting effects have also been assessed to avoid any obtrusive light spill or excessive glare.

As a result of the additional timeframes and defined locations, any temporary adverse effects resulting from the concrete batching plant are considered to be limited and well absorbed in the surrounding working rural context within which it may appear, resulting in no material change in the level of nature of identified effects.

4. *Please provide comment on the potential visual effect of the Terminal Substation adjacent to State Highway 6, noting that this location may also house the Services/O&M Building. While this area is well screened by the existing roadside shelterbelt when travelling south, when travelling north (Figure 2) there will be a reasonably open view toward the proposed substation footprint. This aspect of the proposal provides for a main envelope up to 7m in height and poles/gantries up to 18m in height), and likely security style fencing. Have you considered any potential mitigation (such as a planted buffer area)?*

Any effects from State Highway 6 of the Terminal Substation / O & M Building when travelling north will remain transient in the context of a working rural landscape and are not considered to result in potential for any significant adverse effects. Whilst I agree there will be a reasonably open view when travelling north along State Highway 6, this is then rapidly obscured by existing shelter planting when passing adjacent this site. Any transient views which occur will therefore remain well integrated within their surrounding rural context which includes existing wider utilitarian influences. This location also ensures no significant views from any surrounding dwellings.

In response to further information provided through this s.92 request, I acknowledge that lighting of the substation and O and M building may also occur. Building and exterior lights will only be on at night when occupancy has been detected. Switchyard lighting will have 20m high poles with each pole top floodlight providing a target of 30 lux average for site operations and maintenance. When present this has been designed to remain well below AS/NZS 4282:2019 limits of 20%. Accordingly, I agree any visual effects associated with this aspect of the windfarm will remain low and less than minor.

Based on this more detailed assessment, I therefore consider the potential for any limited visual effects which may occur would be readily reduced through the addition of a planted buffer along the southern boundary of the Site between the existing shelter belt and required setbacks from the existing 110kV line. I consider the extension of the existing shelter belt to achieve a fast-growing screen along this boundary would remain in keeping with the surrounding rural landscape and would provide additional mitigation which further addresses any concerns in this context.

Lighting

35. *Please quantify the anticipated actual and potential lighting effects that may be visible from beyond the site in terms of likely receivers, potential frequency, duration and nature (e.g., light spill, glare, intermittent switching and light sweep [headlights, mobile plant lights]). Matters to address include:*

a. Construction Phase

- i. Temporary buildings*
- ii. Access roads*
- iii. Carparks*
- iv. Security*
- v. Concrete Batching Plant*
- vi. Vehicles on access roads (headlight sweep)*
- vii. Mobile machinery (headlights, working lights & hazard lights)*
- viii. Any other light sources*

b. Operational Phase

- i. Permanent buildings*
- ii. Access roads*
- iii. Carparks*
- iv. Security*
- v. Vehicles on access roads (headlight sweep)*
- vi. Functional lighting (if any) and aircraft warning lights on the wind turbine structures*
- vii. Any other light sources*

36. *Please also quantify the anticipated sky glow effects.*

37. *Please provide any proposed mitigation associated with actual and potential lighting effects.*

I have reviewed the additional lighting detail as set out in the Assessment of Environmental Effects for Proposed Lighting: Mt Munro Wind Farm Project prepared by Stephenson and Turner (August 2023). Within this assessment, lighting concept designs for temporary and fixed lighting have been prepared to address the potential frequency, duration and nature of night-time effects. This covers both the construction phase and the limited lighting as required

during operation, including the requirement for low and medium intensity aviation lighting in accordance with CAA standards which employs directional lighting to limit effects below. Accordingly, any potential night-time effects which remain visible from surrounding rural dwellings will remain limited.

In all instances, I consider lighting has been designed to minimise potential for obtrusive light spill, glare and sky glow effects. As a consequence, this ensures lighting will meet or exceed the 8-lux permitted standard at the site boundary in the Tararua and Wairarapa Combined District Plans and manages potential for adverse effects. From a landscape perspective, I consider proposed temporary and limited permanent lighting will remain well integrated within this working rural environment and within which low-level lighting will not appear out of character. The Site is also located outside the Combined Wairarapa District Plans Dark Sky Management Area within which greater night-time sensitivity may occur. Accordingly, I consider the findings of the lighting assessment are plausible and accept that any lighting effects will be no more than minor.

Shadow Flicker

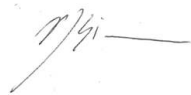
42. *The proposed shadow flicker condition has limits calculated in accordance with the EPHC “National Wind Farm Development Guidelines – Draft” July 2010 (draft Guidelines). However, the assessment/proposed conditions do not provide sufficient clarity on how existing barriers such as trees and shelterbelts are taken into account in assessing compliance with the limit. Please provide further clarification.*

As set out in paragraph 6.6.3 of the LEA, the identified hours of shadow flicker do not take account of the orientation or presence of sheds or windbreaks around the buildings which may restrict direct effects between wind turbines and affected dwellings. This therefore represents a worst-case scenario based on bare ground topography when assessing compliance with the limits in terms of hours per day.

I trust the above sets out a clear response to Council’s queries. Please do not hesitate to contact me should you have any additional requests.

Yours sincerely

BOFFA MISKELL LTD



Rhys Girvan

Senior Principal: Landscape Planner



APPENDIX 2
TRAFFIC AND TRANSPORTATION MEMO



APPENDIX 3
VEHICLE TRACKING MEMO AND CONCEPT DRAWINGS

31 August 2023
Job No: 1016884.1000

Meridian Energy Limited
Level 11, NTT Tower
157 Lambton Quay
Wellington 6011

Attention: Nick Bowmar

Dear Nick

S92 response to transport-related issues for the proposed Mount Munro Windfarm Application APP-2022203902.00

1 Background

Meridian Energy Limited (Meridian) propose to construct a 20-turbine (90 MW) wind farm on an 8.9 km² site located east of State Highway 2 (SH2), approximately 35 km north of Masterton and 4 km south of Eketāhuna.

Tonkin & Taylor Ltd (T+T) was commissioned by Meridian to undertake transport reporting of the effects of a proposed wind farm (Mount Munro) in the Wairarapa, consisting of an Integrated Transport Assessment (ITA) in May 2023 and a Port to Site Assessment in July 2021.

The resource consent application was lodged with Horizons Regional Council, Greater Wellington Regional Council, Tararua District Council and Masterton District Council on 26 May 2023 and 9 June 2023. The application numbers with each consenting authority are as follows:

- Horizons Regional Council – APP-2022203902.00;
- Greater Wellington Regional Council – WAR230312 [39005, 39006, 39007, 39008, 39009];
- Tararua District Council – 202.2023.53.1;
- Masterton District Council – RM 230068.

Additional information was requested under Section 92(1) of the Resource Management Act on 6 July 2023. This letter report addresses transport-related information requests numbered 21, 24, 26, 28 and 29 in the Section 92 request.

2 Vehicle templates

2.1 Turbine Blade transporter

This assessment was completed considering transportation of the Vestas V136 wind turbine, with a blade length of 67 m¹.

Tracking was completed at a speed of 5km/hr.

¹ Refer Mount Munro Windfarm – Update to Port to Site Assessment, Tonkin and Taylor, June 2022



Figure 1 Turbine blade transporter vehicle template

2.2 Transformer trailer

The weight of a transformer requires a special trailer with multiple rows of wheels to appropriately spread the load across the pavement surface.

This assessment has used a trailer suitable for a 120t transformer² (17 rows of tyres) with a traction unit at each end.

Tracking was completed at a speed of 5km/hr

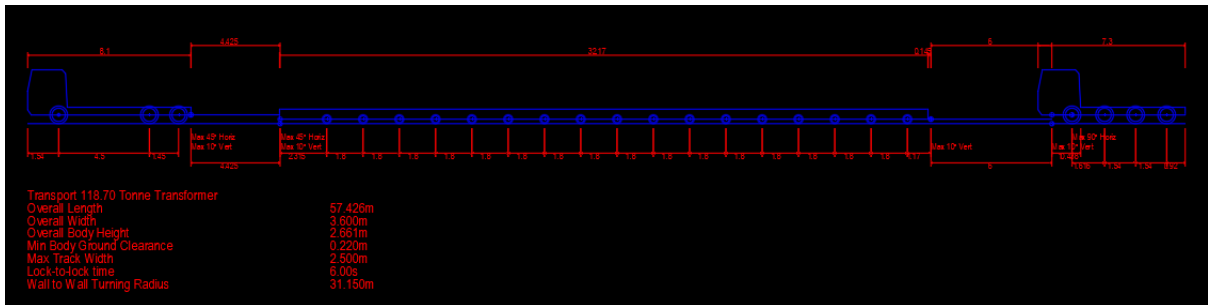


Figure 2 Transformer trailer vehicle template

2.3 Truck and trailer



Figure 3 Construction Truck and Trailer photo

² Refer Mount Munro Windfarm – Update to Port to Site Assessment, Tonkin and Taylor, June 2022

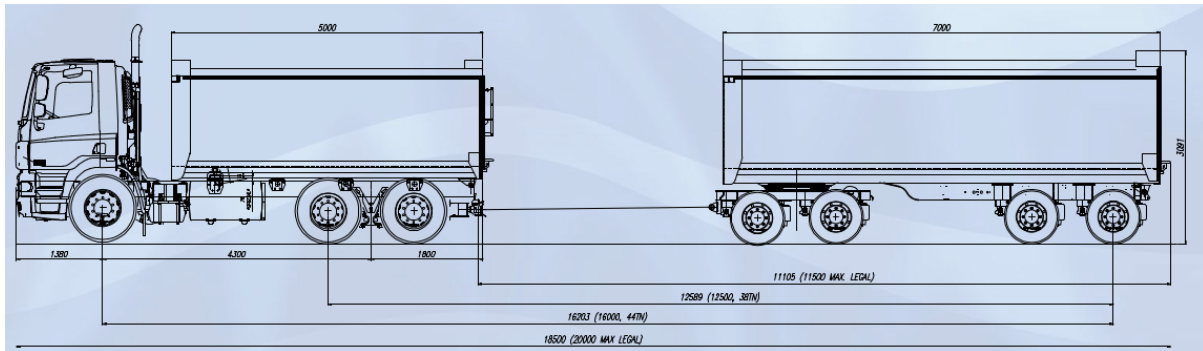


Figure 4 Construction Truck and Trailer, source <https://www.transfleet.co.nz>

A construction truck and trailer has been modelled based on the dimensions of a Transfleet Construction Aluminium Tipper Truck and Trailer³. This will transport materials such as bulk aggregate to and from the site. It is also larger (with a larger tracking envelope) than other construction vehicles such as for concrete, water or portable toilets.

Tracking was completed at a speed of 20km/hr for all intersections, and 30km/hr along Old Coach Road.

2.4 Truck

Where a truck and trailer could not be accommodated additional tracking has been completed with just the Truck portion of the Truck and Trailer described in Section 2.3.

Tracking was completed at a speed of 20km/hr.

3 Sites

3.1 Main access (SH2, Old Coach Road)

A Turbine Blade transporter was tracked along old Coach Road. This approached along SH2 from the north in accordance with the Port to Site Assessment (all port options approached from the north).

The existing intersection accommodates truck and trailer units.



Tracking envelopes were developed to identify if a central island could be added in the centre of Old Coach Road at SH2 (and reduce vehicles being able to cross the opposing lane when turning and control intersection turning speeds). However the tracking envelopes overlap meaning there isn't a space that would be clear of turning vehicles.



Truck and trailer units have also been tracked along Old Coach Road, with two-way passing around corners as shown on the plans.



Specific works required along Old Coach Road are shown on drawings 1016884.1000-100 to 109 and described below in Table 1.

³ https://www.transfleet.co.nz/product_brochures.cfm

Table 1 Main access (SH2, Old Coach Road) required works

Location	Description
<p>Intersection of SH2 and Old Coach Road (Drawing 100)</p>	 <p><i>Figure 5 Ch 50. Looking northwest with SH2 in the background. Existing fence and field to be relocated for turbine blade transport</i></p> <ul style="list-style-type: none"> • Temporary surface for turbine blades. Existing fence to be removed and earthworks to cut down the corner of the field. Excess cut material removed from site. • Existing drainage channels to be temporarily culverted into existing manhole • Fence and existing drainage channels to be reinstated following turbine transport • Existing manhole to be protected from turbine trailers • Relocate existing give way sign to new removable pole in current location.
<p>Ch160 (Drawing 101)</p>	 <p><i>Figure 6 Ch170. Looking northwest</i></p> <ul style="list-style-type: none"> • Trim lower branches of tree to accommodate swing of turbine blade • Relocate existing intersection warning sign to new post

Location	Description
Ch320 (Drawing 101)	 <p><i>Figure 7 Ch250. Looking southeast.</i></p> <ul style="list-style-type: none"> • Tail swing to the left over the adjacent paddock. No obstructions noted • Remove small existing tree on the LH side of the road • Road widening (see below)
Ch0-Ch400 (Drawings 100 to 102)	<p>Ch0-Ch400. Widen road to 7m. In addition further widening to 9m around two corners. This will require;</p> <ul style="list-style-type: none"> • Earthworks of adjacent bank • Some fence relocation • Relocation of drainage ditch and field access culverts • New unsealed pavement • Adjacent to 84588 State Highway 2
Ch640-Ch850 (Drawings 103 & 104)	 <p><i>Figure 8 Ch730. View south. Widen road on the inside of the corner (LH side)</i></p> <p>Widen road to 7m around inside of corner opposite power poles. This will require;</p> <ul style="list-style-type: none"> • Earthworks of adjacent bank • Some fence relocation • Relocation of drainage ditch and field access culverts • New unsealed pavement • Adjacent to 56 Old Coach Road

Location	Description
Ch850-Ch1080 (Drawings 104 to 106)	 <p><i>Figure 9 Ch970. View south. Removal of adjacent trees and bushes and bank on the left side of the road approaching the corner.</i></p>  <p><i>Figure 10 Ch1060. View north. Letterbox relocated and road widened to the left.</i></p> <p>Widen road to 8m through corners. This will require;</p> <ul style="list-style-type: none"> • Removal of adjacent trees and bushes and bank on the west side of the road approaching the corner (Ch960-Ch1120) • Removal of adjacent trees and bushes and earthworks to fill adjacent slope on the east side of the road through the corner opposite #103 Old Coach Road. This will require work within the dripline of the remaining trees. • Relocate #103 letterbox • Some fence relocation • New unsealed pavement

Location	Description
Ch1130-Ch1220, Ch1250-Ch1340, Ch1370-Ch1490 (Drawings 106 to 108)	<div> </div> <p><i>Figure 11 Ch1220. View south across culvert. Power pole in the back right of the photo to be relocated back to the property boundary. Bank to the back left to be cut back and road widened</i></p> <div> </div> <p><i>Figure 12 Ch1280. View south. Power poles on the right of the photo to be relocated back to the property boundary. Road widened to the left</i></p> <p>Sections of widening road to 7m either side of existing culvert. This will require;</p> <ul style="list-style-type: none"> • Earthworks of adjacent bank • Some fence relocation • Relocation of drainage ditch and field access culverts • Further earthworks of bank at Ch1370 and Ch1440 to achieve blade swing. Note the existing bank is 2m to 3m high • New unsealed pavement • Relocate power poles at Ch1270 and Ch1440 back to the property boundary • Adjacent land parcel has no street address

Location	Description
Ch1700 (Drawing 109)	 <p><i>Figure 13 Ch1650. View south with site entrance on the left</i></p> <ul style="list-style-type: none">• Exact scope of works to be confirmed in detailed design to align with the proposed access road• Adjacent land parcel has no street address

3.2 Terminal substation access (SH2, Kaiparoro Road)



Refer to Drawing 1016884.1000-200

A Transformer trailer was tracked to the site entrance. This approached from the north in accordance with the Port to Site Assessment (all port options approached from the north). This requires temporary works to cut the corner as described below.

Truck and trailer units have also been tracked at the intersection with SH2. No issues were noted with the current intersection width.

Specific works required are shown on Figure 1016884.1000-200 and described below in Table 2.

Table 2 Terminal substation access required works

Location	Description
<p>Intersection of SH2 and Kaiparoro Road</p>	 <p><i>Figure 14 Kaiparoro Road looking east to its intersection with SH2. Works required on the left</i></p> <ul style="list-style-type: none"> • Relocate approximately 35m fence and remove five pine trees around corner. • Relocate existing give way sign to new removable pole in current location. • Investigate existing culvert and extend beyond tracking path if impacted. • Reinstate tracked path (approximately 200m²) and drainage features following completion of works
<p>Kaiparoro Road at site entrance</p>	 <p><i>Figure 15 Kaiparoro Road at the site entrance looking east. Site entrance will be on the right.</i></p> <ul style="list-style-type: none"> • Widen site access point to accommodate vehicle tracking. Extend culvert if required to accommodate entrance splay

Location	Description
	<ul style="list-style-type: none"> • Relocate existing intersection warning sign to new removable pole in current location • Remove existing fence line (approximately 15m) from opposite the site entrance to the existing warning sign • Widen pavement by 1.0m for approximately 20m around inside of corner

3.3 Internal Transmission line access (SH2)

Refer to Drawing 1016884.1000-201

Trucks are expected to be the largest vehicle to use this access.

Tracking showed that the existing entrance is suitable for truck units only. Additional widening will be required if truck and trailers are proposed.

We recommend that this entrance is restricted to truck units only.

3.4 Internal Transmission line access (Opaki-Kaiparoro Road)

Refer to Drawing 1016884.1000-202

Trucks are expected to be the largest vehicle to use this access.

Tracking showed that it is technically possible for a truck and trailer unit to turn left out of the existing entrance but to achieve this they would be required to fully cross into the opposing traffic lane across the adjacent Makakahi River bridge with limited visibility to opposing traffic.



Figure 16 Internal Transmission line access (Opaki-Kaiparoro Road) and Makakahi River bridge

We recommend that this entrance is restricted to truck units only.

The existing driveway is also steep and may require more intensive pavement maintenance especially where trucks accelerate and decelerate approaching Opaki-Kaiparoro Road.

4 Applicability

This report has been prepared for the exclusive use of our client Meridian Energy Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of a S92 request for the resource consent application (APP-2022203902.00) and that Horizons Regional Council, Greater Wellington Regional Council, Tararua District Council and Masterton District Council as the consenting authority will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd

Report prepared by:



.....
Billy Rodenburg
Civil and Transport Engineer

Reviewed and authorised for Tonkin & Taylor Ltd by:



.....
Maurice Mills
Senior Civil Engineer

Tonkin & Taylor Ltd

31-Aug-23

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MERIDIAN ENERGY MT MUNRO - MEL WAIRARAPA WIND FARM

CONCEPT DESIGN

DRAWING

Rev Title

GENERAL INFORMATION

- 1016884.1000-000
- 1016884.1000-001
- 1016884.1000-002

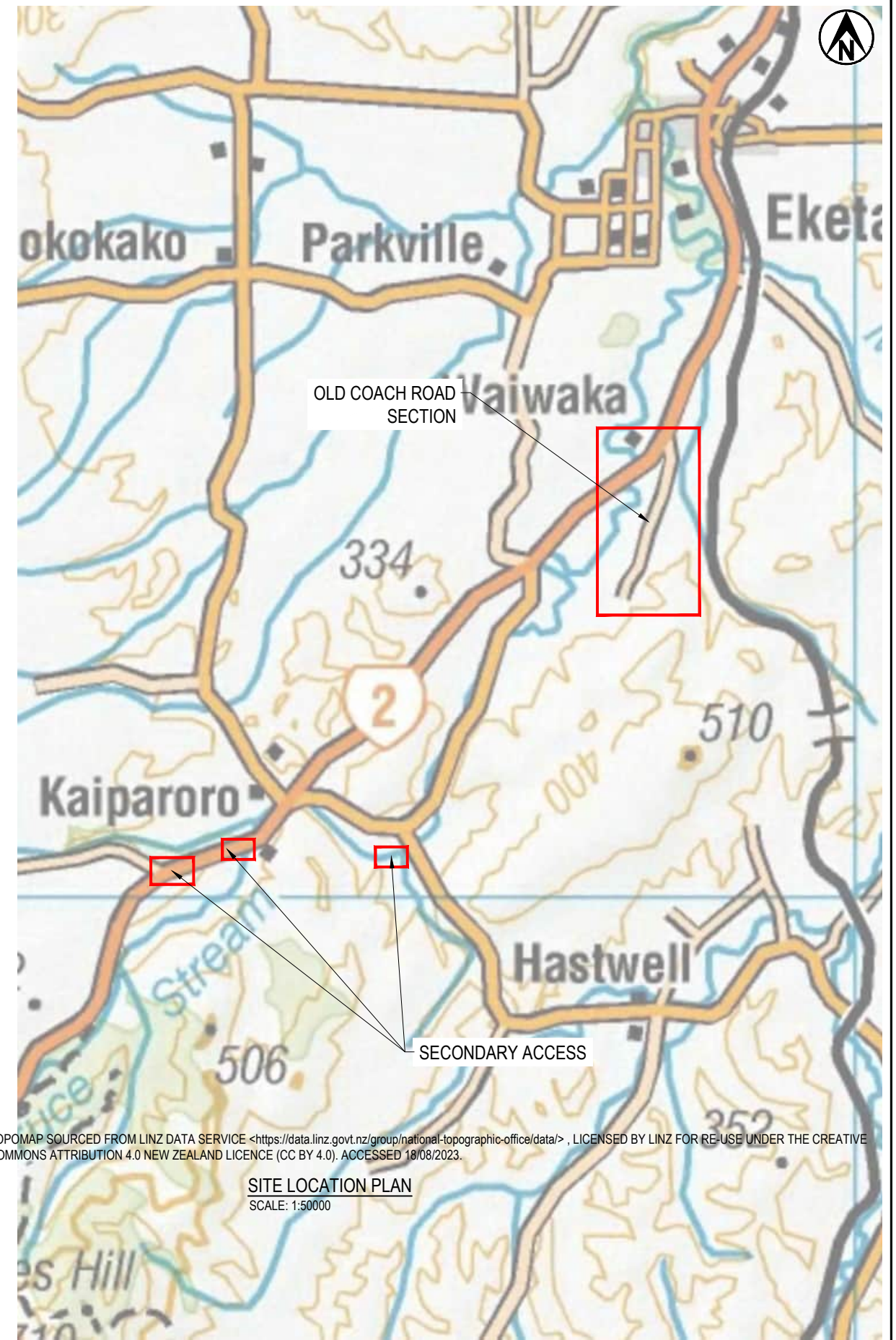
OLD COACH ROAD

- 1016884.1000-100
- 1016884.1000-101
- 1016884.1000-102
- 1016884.1000-103
- 1016884.1000-104
- 1016884.1000-105
- 1016884.1000-106
- 1016884.1000-107
- 1016884.1000-108
- 1016884.1000-109

SECONDARY ACCESS

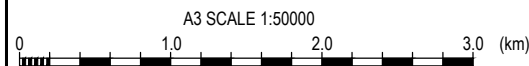
- 1016884.1000-200
- 1016884.1000-201
- 1016884.1000-202

1	DRAWING LIST AND OVERALL SITE LOCATION
1	SECTION COVERSHEET - OLD COACH ROAD
1	SECTION COVERSHEET - SECONDARY ACCESS
1	OLD COACH ROAD SHEET 1 OF 10
1	OLD COACH ROAD SHEET 2 OF 10
1	OLD COACH ROAD SHEET 3 OF 10
1	OLD COACH ROAD SHEET 4 OF 10
1	OLD COACH ROAD SHEET 5 OF 10
1	OLD COACH ROAD SHEET 6 OF 10
1	OLD COACH ROAD SHEET 7 OF 10
1	OLD COACH ROAD SHEET 8 OF 10
1	OLD COACH ROAD SHEET 9 OF 10
1	OLD COACH ROAD SHEET 10 OF 10
1	TERMINAL SUBSTATION ACCESS SH2, KAIPARORO ROAD
1	INTERNAL TRANSMISSION LINE ACCESS (SH2)
1	INTERNAL TRANSMISSION LINE ACCESS OPAKI-KAIPARORO ROAD



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SITE LOCATION PLAN
SCALE: 1:50000

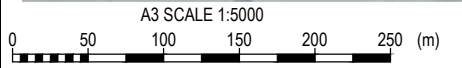


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					DRAWING CHECKED	MGM	Aug.23			GENERAL INFORMATION	
REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE				SCALE (A3)	1:50,000
										DWG No.	1016884.1000-000
										REV	1

NOT FOR CONSTRUCTION

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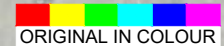
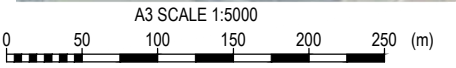
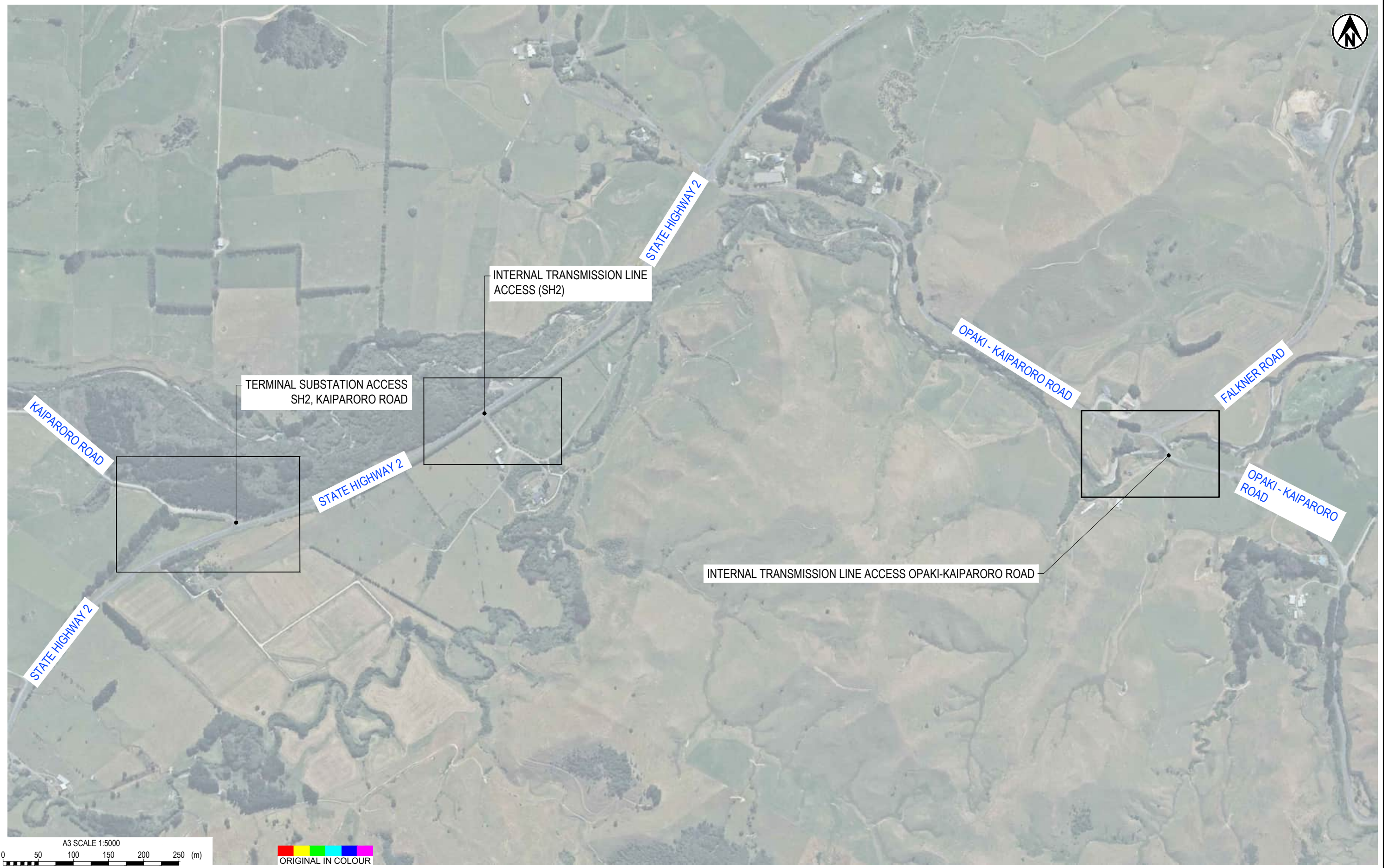
ORIGINAL IN COLOUR



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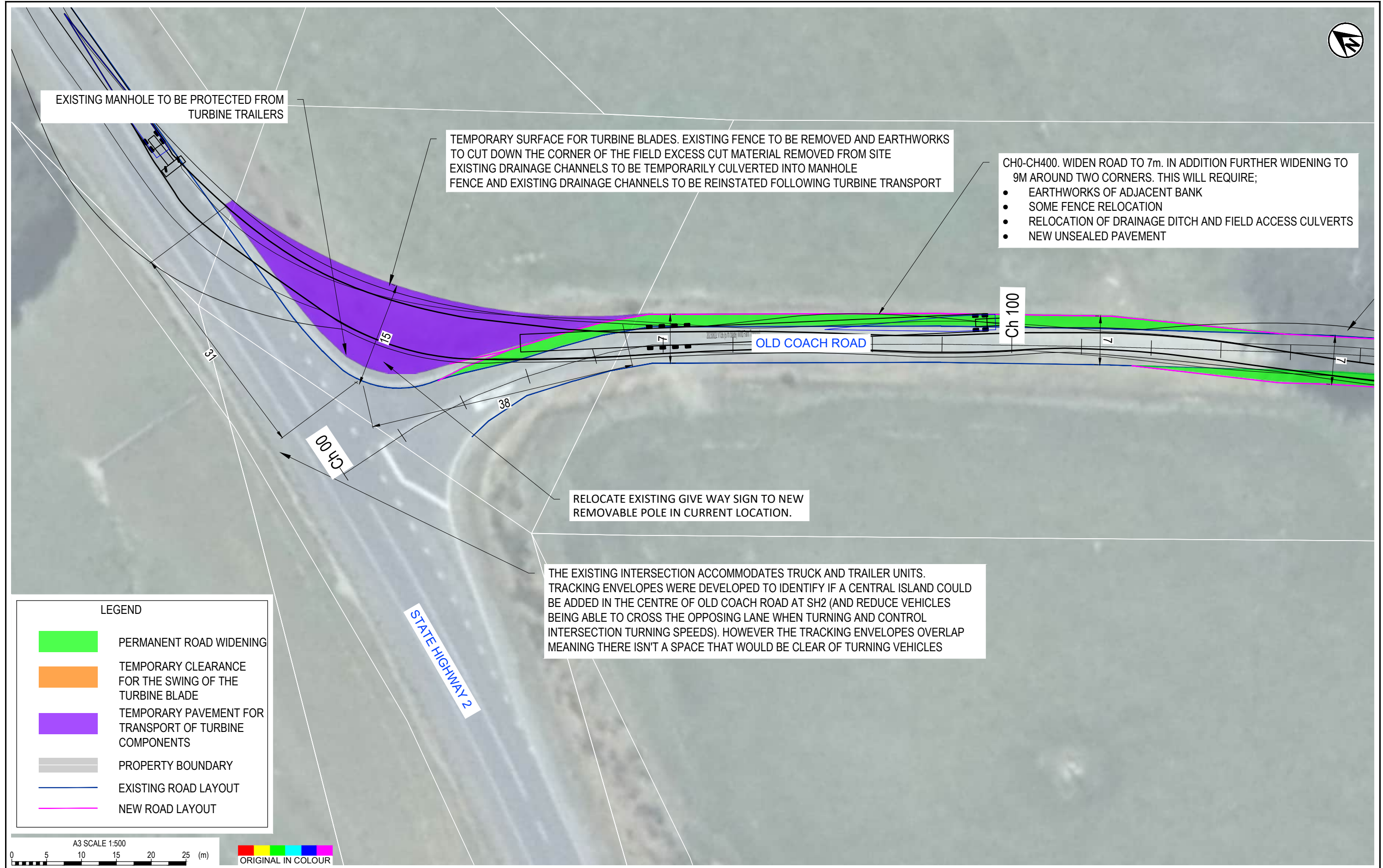
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PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM
TITLE	OLD COACH ROAD SECTION COVERSHEET
SCALE (A3)	1:7500
DWG No.	1016884.1000-001
REV	1



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REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE			

CLIENT	MERIDIAN ENERGY		
PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM		
TITLE	SECONDARY ACCESS SECTION COVERSHEET		
SCALE (A3)	1:7500	DWG No.	1016884.1000-002
REV	1		



LEGEND

	PERMANENT ROAD WIDENING
	TEMPORARY CLEARANCE FOR THE SWING OF THE TURBINE BLADE
	TEMPORARY PAVEMENT FOR TRANSPORT OF TURBINE COMPONENTS
	PROPERTY BOUNDARY
	EXISTING ROAD LAYOUT
	NEW ROAD LAYOUT



DESIGNED	BLR	Aug.23	DRAWING STATUS	PRELIMINARY DRAFT
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DESIGN CHECKED	MGM	Aug.23		
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REV	DESCRIPTION	CAD	CHK	DATE

CLIENT	MERIDIAN ENERGY
PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM
TITLE	OLD COACH ROAD SHEET 1
SCALE (A3)	1:500
DWG No.	1016884.1000-100
REV	1



BLADE SWING TO THE EAST OVER THE ADJACENT Paddock. NO OBSTRUCTIONS NOTED
REMOVE SMALL EXISTING TREE ON THE EASTERN SIDE OF THE ROAD

TRIM LOWER BRANCHES OF TREE TO
ACCOMMODATE SWING OF TURBINE BLADE

Ch 200

OLD COACH ROAD

Ch 300

RELOCATE EXISTING INTERSECTION
WARNING SIGN TO NEW POST

CH0-CH400. WIDEN ROAD TO 7m. IN ADDITION FURTHER WIDENING TO
9M AROUND TWO CORNERS. THIS WILL REQUIRE;

- EARTHWORKS OF ADJACENT BANK
- SOME FENCE RELOCATION
- RELOCATION OF DRAINAGE DITCH AND FIELD ACCESS CULVERTS
- NEW UNSEALED PAVEMENT

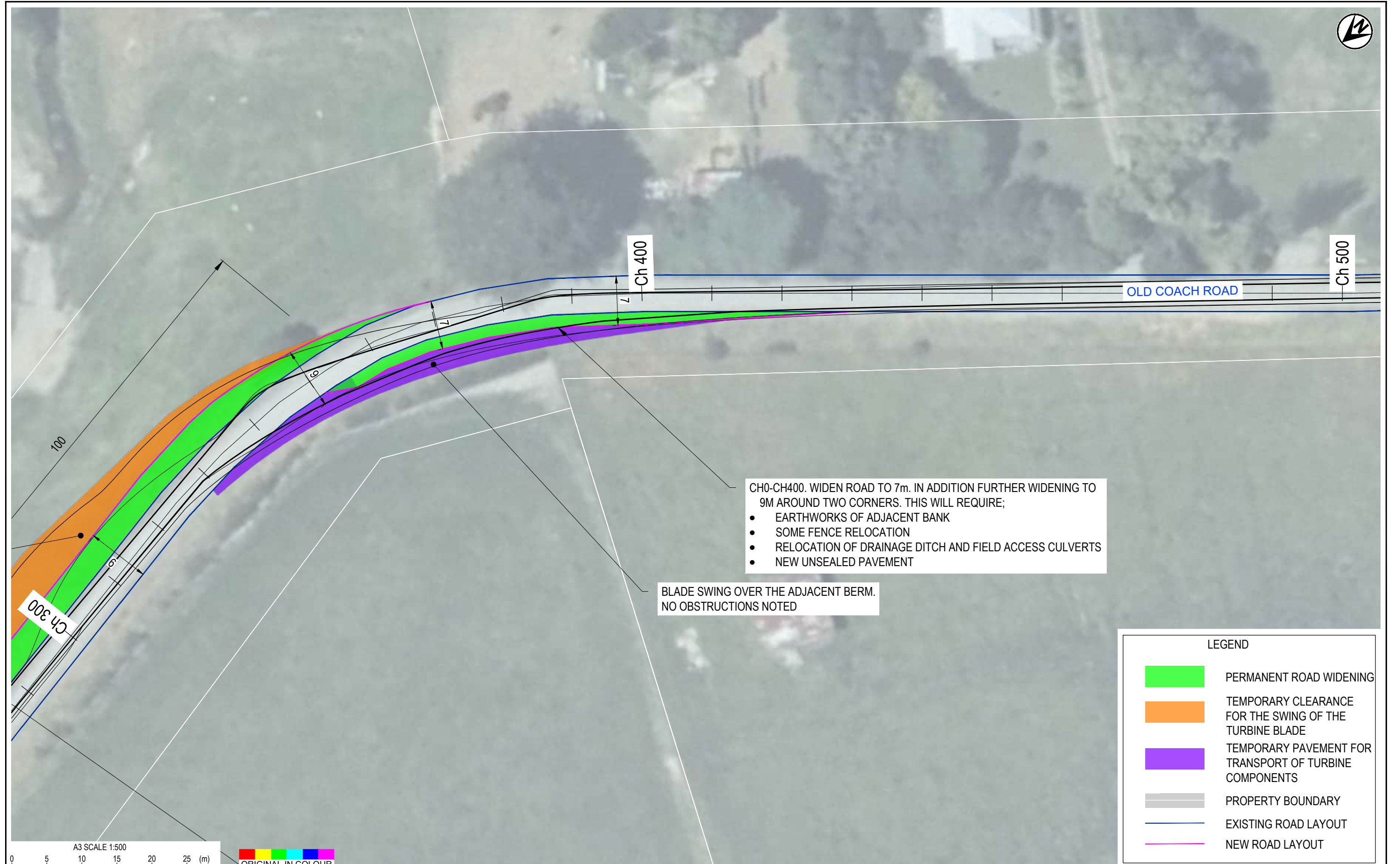
LEGEND

- PERMANENT ROAD WIDENING
- TEMPORARY CLEARANCE FOR THE SWING OF THE TURBINE BLADE
- TEMPORARY PAVEMENT FOR TRANSPORT OF TURBINE COMPONENTS
- PROPERTY BOUNDARY
- EXISTING ROAD LAYOUT
- NEW ROAD LAYOUT



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CLIENT	MERIDIAN ENERGY
PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM
TITLE	OLD COACH ROAD SHEET 2
SCALE (A3)	1:500
DWG No.	1016884.1000-101
REV	1

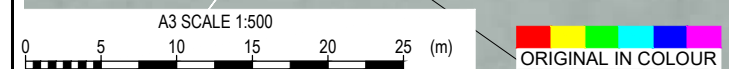


CH0-CH400. WIDEN ROAD TO 7m. IN ADDITION FURTHER WIDENING TO 9M AROUND TWO CORNERS. THIS WILL REQUIRE;

- EARTHWORKS OF ADJACENT BANK
- SOME FENCE RELOCATION
- RELOCATION OF DRAINAGE DITCH AND FIELD ACCESS CULVERTS
- NEW UNSEALED PAVEMENT

BLADE SWING OVER THE ADJACENT BERM.
NO OBSTRUCTIONS NOTED

LEGEND	
	PERMANENT ROAD WIDENING
	TEMPORARY CLEARANCE FOR THE SWING OF THE TURBINE BLADE
	TEMPORARY PAVEMENT FOR TRANSPORT OF TURBINE COMPONENTS
	PROPERTY BOUNDARY
	EXISTING ROAD LAYOUT
	NEW ROAD LAYOUT



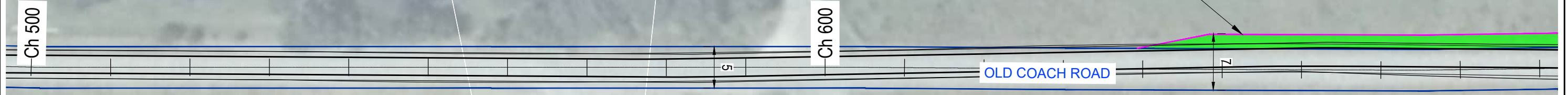
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CLIENT	MERIDIAN ENERGY
PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM
TITLE	OLD COACH ROAD SHEET 3
SCALE (A3)	1:500
DWG No.	1016884.1000-102
REV	1



CH640-CH850. WIDEN ROAD TO 8m AROUND INSIDE OF CORNER OPPOSITE POWER POLES. THIS WILL REQUIRE;

- EARTHWORKS OF ADJACENT BANK
- SOME FENCE RELOCATION
- RELOCATION OF DRAINAGE DITCH AND FIELD ACCESS CULVERTS
- NEW UNSEALED PAVEMENT



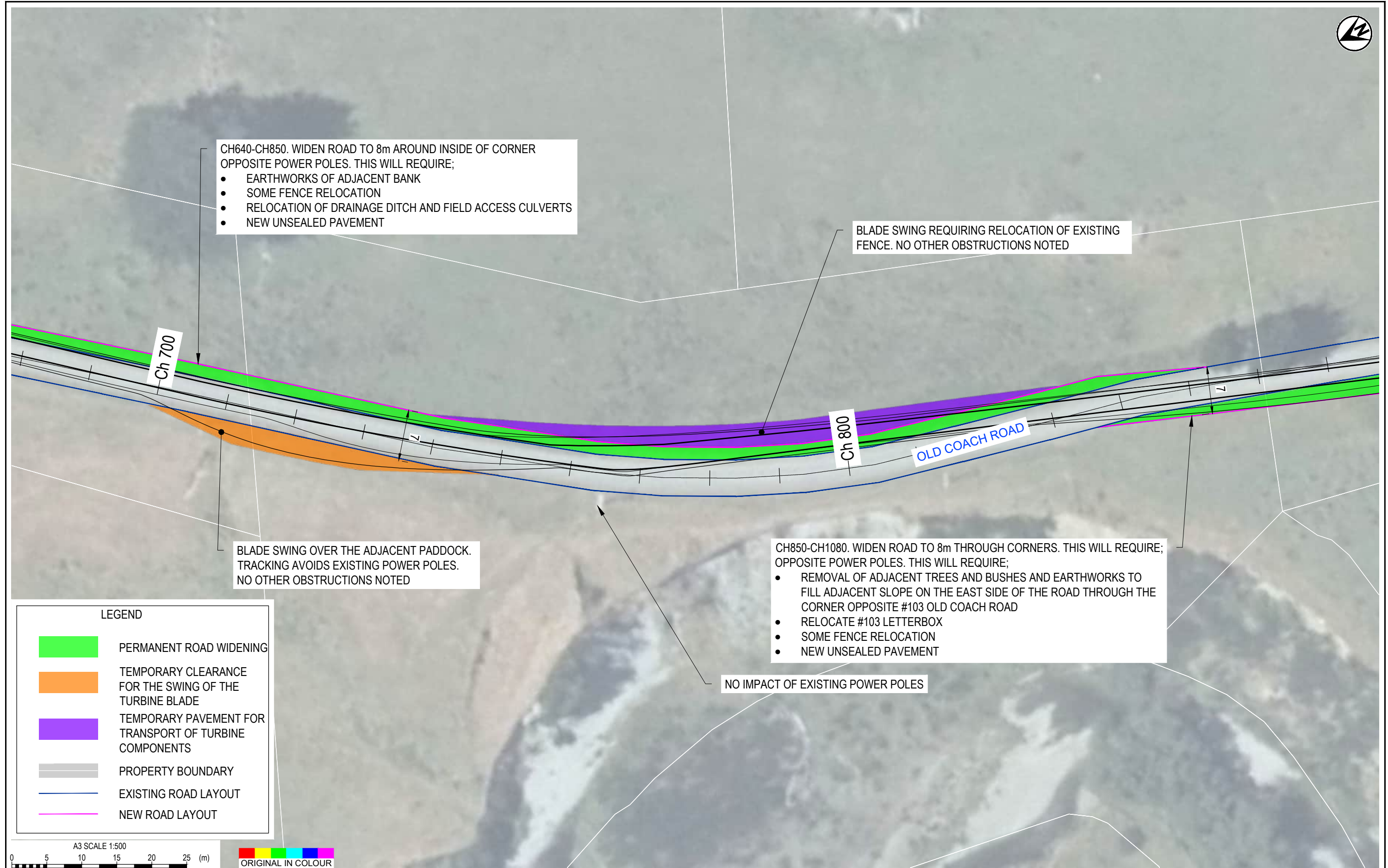
LEGEND

- PERMANENT ROAD WIDENING
- TEMPORARY CLEARANCE FOR THE SWING OF THE TURBINE BLADE
- TEMPORARY PAVEMENT FOR TRANSPORT OF TURBINE COMPONENTS
- PROPERTY BOUNDARY
- EXISTING ROAD LAYOUT
- NEW ROAD LAYOUT



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CLIENT	MERIDIAN ENERGY		
PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM		
TITLE	OLD COACH ROAD SHEET 4		
SCALE (A3)	1:500	DWG No.	1016884.1000-103
REV	1		



CH640-CH850. WIDEN ROAD TO 8m AROUND INSIDE OF CORNER OPPOSITE POWER POLES. THIS WILL REQUIRE;

- EARTHWORKS OF ADJACENT BANK
- SOME FENCE RELOCATION
- RELOCATION OF DRAINAGE DITCH AND FIELD ACCESS CULVERTS
- NEW UNSEALED PAVEMENT

BLADE SWING REQUIRING RELOCATION OF EXISTING FENCE. NO OTHER OBSTRUCTIONS NOTED

BLADE SWING OVER THE ADJACENT Paddock. TRACKING AVOIDS EXISTING POWER POLES. NO OTHER OBSTRUCTIONS NOTED

CH850-CH1080. WIDEN ROAD TO 8m THROUGH CORNERS. THIS WILL REQUIRE; OPPOSITE POWER POLES. THIS WILL REQUIRE;

- REMOVAL OF ADJACENT TREES AND BUSHES AND EARTHWORKS TO FILL ADJACENT SLOPE ON THE EAST SIDE OF THE ROAD THROUGH THE CORNER OPPOSITE #103 OLD COACH ROAD
- RELOCATE #103 LETTERBOX
- SOME FENCE RELOCATION
- NEW UNSEALED PAVEMENT

NO IMPACT OF EXISTING POWER POLES

LEGEND

- PERMANENT ROAD WIDENING
- TEMPORARY CLEARANCE FOR THE SWING OF THE TURBINE BLADE
- TEMPORARY PAVEMENT FOR TRANSPORT OF TURBINE COMPONENTS
- PROPERTY BOUNDARY
- EXISTING ROAD LAYOUT
- NEW ROAD LAYOUT



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CLIENT	MERIDIAN ENERGY
PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM
TITLE	OLD COACH ROAD SHEET 5
SCALE (A3)	1:500
DWG No.	1016884.1000-104
REV	1



REMOVAL OF ADJACENT TREES AND BUSHES AND BANK ON THE WEST SIDE OF THE ROAD APPROACHING THE CORNER

Ch 900

0001100

OLD COACH ROAD

TEMPORARY ROAD WIDENING FOR BLADE TRANSPORT

CH850-CH1080. WIDEN ROAD TO 8m THROUGH CORNERS. THIS WILL REQUIRE; OPPOSITE POWER POLES. THIS WILL REQUIRE;

- REMOVAL OF ADJACENT TREES AND BUSHES AND EARTHWORKS TO FILL ADJACENT SLOPE ON THE EAST SIDE OF THE ROAD THROUGH THE CORNER OPPOSITE #103 OLD COACH ROAD. THIS WILL REQUIRE WORK WITHIN THE DRIPLINE OF THE REMAINING TREES
- RELOCATE #103 LETTERBOX
- SOME FENCE RELOCATION
- NEW UNSEALED PAVEMENT

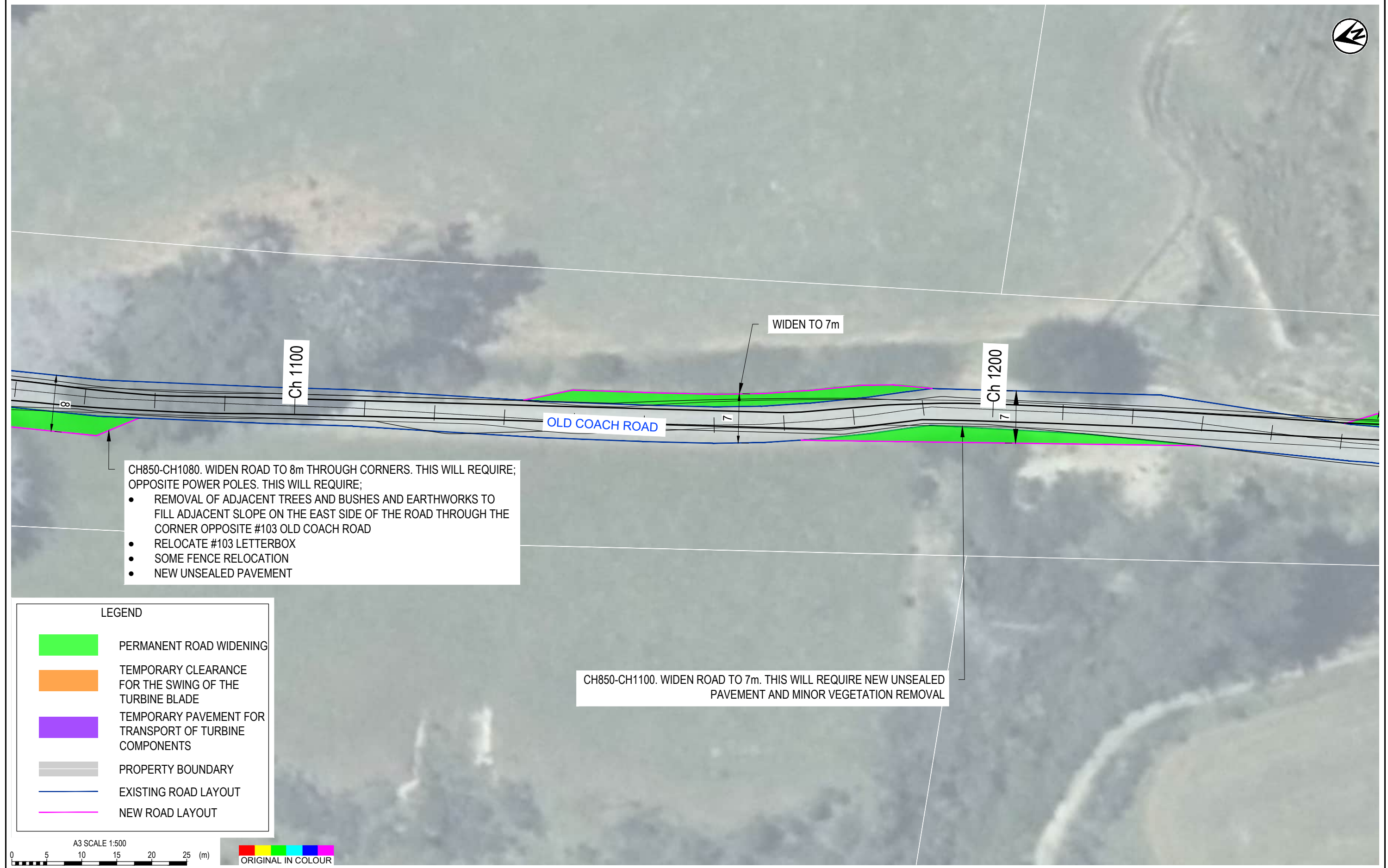
LEGEND

- PERMANENT ROAD WIDENING
- TEMPORARY CLEARANCE FOR THE SWING OF THE TURBINE BLADE
- TEMPORARY PAVEMENT FOR TRANSPORT OF TURBINE COMPONENTS
- PROPERTY BOUNDARY
- EXISTING ROAD LAYOUT
- NEW ROAD LAYOUT



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CLIENT	MERIDIAN ENERGY
PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM
TITLE	OLD COACH ROAD SHEET 6
SCALE (A3)	1:500
DWG No.	1016884.1000-105
REV	1



CH850-CH1080. WIDEN ROAD TO 8m THROUGH CORNERS. THIS WILL REQUIRE; OPPOSITE POWER POLES. THIS WILL REQUIRE;

- REMOVAL OF ADJACENT TREES AND BUSHES AND EARTHWORKS TO FILL ADJACENT SLOPE ON THE EAST SIDE OF THE ROAD THROUGH THE CORNER OPPOSITE #103 OLD COACH ROAD
- RELOCATE #103 LETTERBOX
- SOME FENCE RELOCATION
- NEW UNSEALED PAVEMENT

CH850-CH1100. WIDEN ROAD TO 7m. THIS WILL REQUIRE NEW UNSEALED PAVEMENT AND MINOR VEGETATION REMOVAL

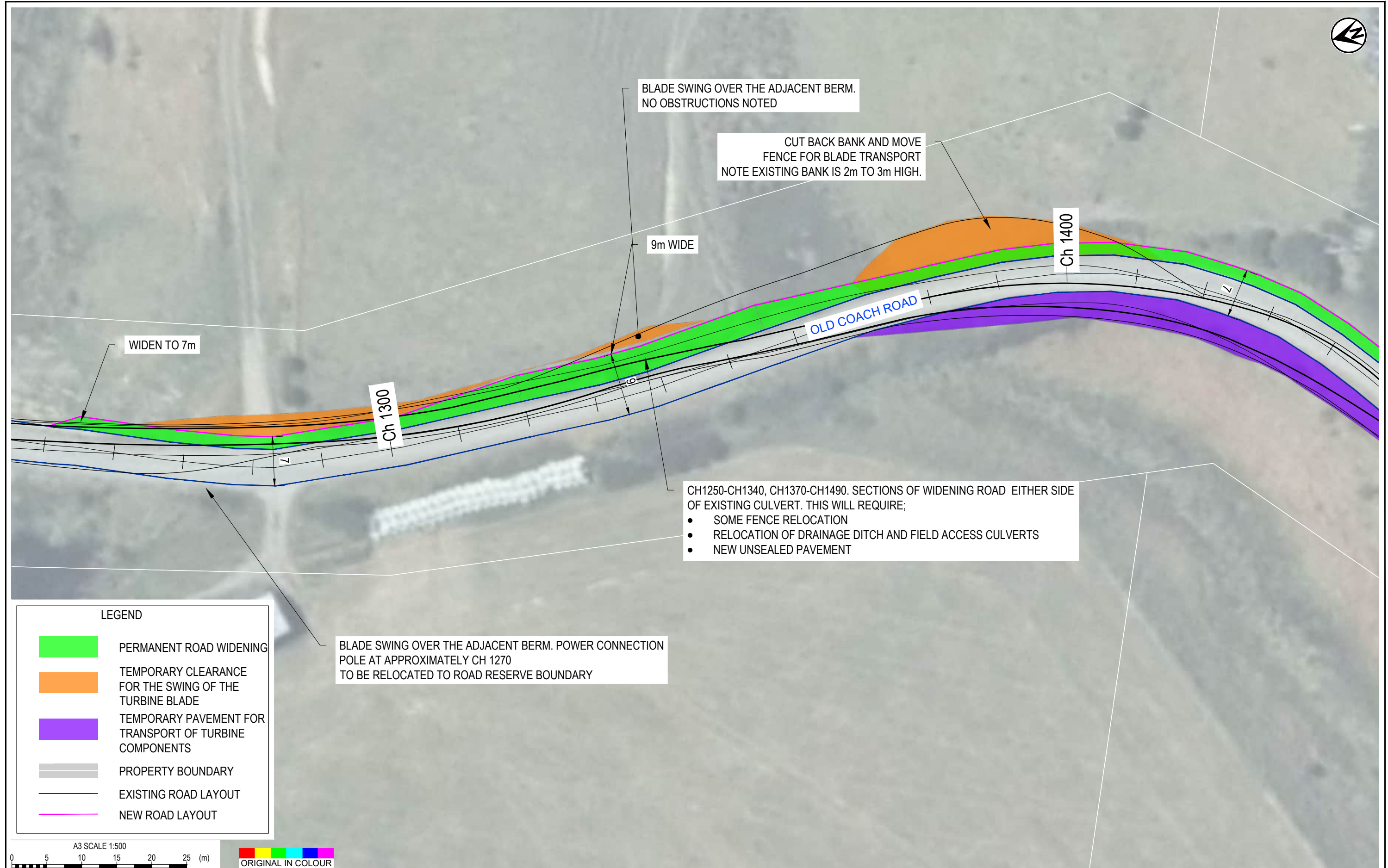
LEGEND

- PERMANENT ROAD WIDENING
- TEMPORARY CLEARANCE FOR THE SWING OF THE TURBINE BLADE
- TEMPORARY PAVEMENT FOR TRANSPORT OF TURBINE COMPONENTS
- PROPERTY BOUNDARY
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- NEW ROAD LAYOUT



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CLIENT	MERIDIAN ENERGY
PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM
TITLE	OLD COACH ROAD SHEET 7
SCALE (A3)	1:500
DWG No.	1016884.1000-106
REV	1



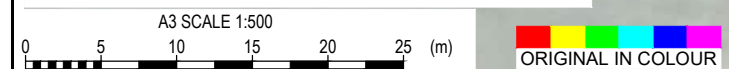
LEGEND

	PERMANENT ROAD WIDENING
	TEMPORARY CLEARANCE FOR THE SWING OF THE TURBINE BLADE
	TEMPORARY PAVEMENT FOR TRANSPORT OF TURBINE COMPONENTS
	PROPERTY BOUNDARY
	EXISTING ROAD LAYOUT
	NEW ROAD LAYOUT

BLADE SWING OVER THE ADJACENT BERM. POWER CONNECTION POLE AT APPROXIMATELY CH 1270 TO BE RELOCATED TO ROAD RESERVE BOUNDARY

CH1250-CH1340, CH1370-CH1490. SECTIONS OF WIDENING ROAD EITHER SIDE OF EXISTING CULVERT. THIS WILL REQUIRE;

- SOME FENCE RELOCATION
- RELOCATION OF DRAINAGE DITCH AND FIELD ACCESS CULVERTS
- NEW UNSEALED PAVEMENT



1	PRELIMINARY DRAFT	CHLI	BLR	30/08/2023	DESIGNED DRAWN DESIGN CHECKED DRAWING CHECKED	BLR CHLI MGM MGM	Aug.23 Aug.23 Aug.23 Aug.23	DRAWING STATUS PRELIMINARY DRAFT PROJECT PHASE CONCEPT DESIGN
REV DESCRIPTION					CAD CHK DATE		APPROVED DATE	

CLIENT	MERIDIAN ENERGY
PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM
TITLE	OLD COACH ROAD SHEET 8
SCALE (A3)	1:500
DWG No.	1016884.1000-107
REV	1

NOT FOR CONSTRUCTION
 THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED



CH1250-CH1340, CH1370-CH1490. SECTIONS OF WIDENING ROAD EITHER SIDE OF EXISTING CULVERT. THIS WILL REQUIRE;

- SOME FENCE RELOCATION
- RELOCATION OF DRAINAGE DITCH AND FIELD ACCESS CULVERTS
- NEW UNSEALED PAVEMENT

BLADE SWING OVER ADJACENT BERM.
POWER POLE AT APPROXIMATELY CH1440 TO BE RELOCATED TO THE ROAD RESERVE BOUNDARY

OLD COACH ROAD

Ch 1500

Ch 1600

ROAD ALIGNMENT WITHIN THE RED HATCHED AREA TO BE CONFIRMED FOLLOWING CONSENT. EXACT EXTENT WILL BE SUBJECT TO TEMPORARY AND PERMANENT INTERNAL ACCESS ROAD DESIGN.

LEGEND

- PERMANENT ROAD WIDENING
- TEMPORARY CLEARANCE FOR THE SWING OF THE TURBINE BLADE
- TEMPORARY PAVEMENT FOR TRANSPORT OF TURBINE COMPONENTS
- PROPERTY BOUNDARY
- EXISTING ROAD LAYOUT
- NEW ROAD LAYOUT



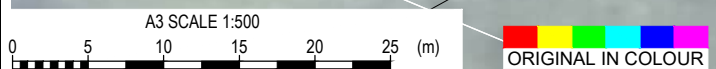
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					DESIGN CHECKED	MGM	Aug.23	PROJECT PHASE	CONCEPT DESIGN
					DRAWING CHECKED	MGM	Aug.23		
					NOT FOR CONSTRUCTION		THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED		
REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE			

CLIENT	MERIDIAN ENERGY
PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM
TITLE	OLD COACH ROAD SHEET 9
SCALE (A3)	1:500
DWG No.	1016884.1000-108
REV	1

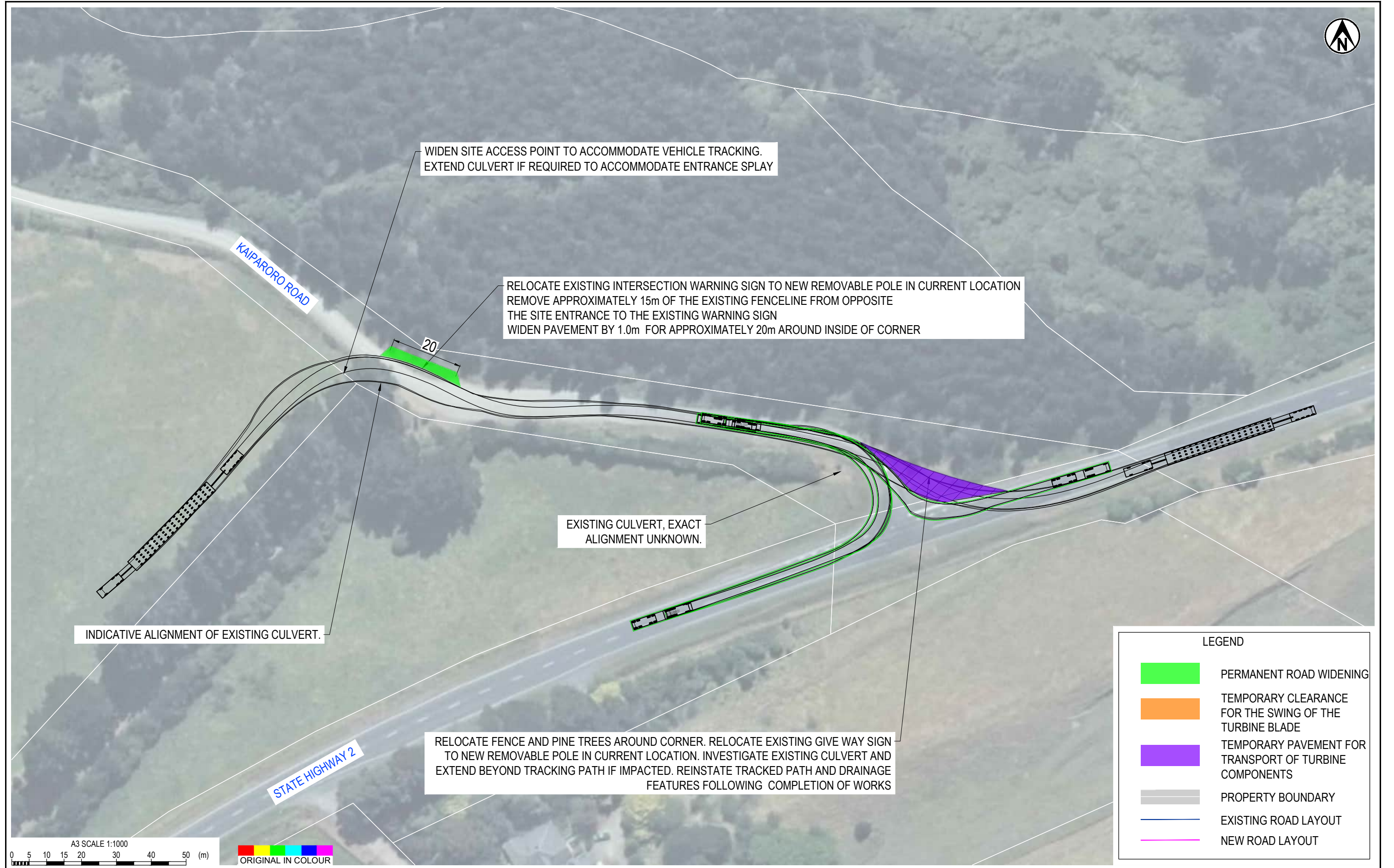


LEGEND	
	PERMANENT ROAD WIDENING
	TEMPORARY CLEARANCE FOR THE SWING OF THE TURBINE BLADE
	TEMPORARY PAVEMENT FOR TRANSPORT OF TURBINE COMPONENTS
	PROPERTY BOUNDARY
	EXISTING ROAD LAYOUT
	NEW ROAD LAYOUT

ROAD ALIGNMENT WITHIN THE RED HATCHED AREA TO BE CONFIRMED FOLLOWING CONSENT. EXACT EXTENT WILL BE SUBJECT TO TEMPORARY AND PERMANENT INTERNAL ACCESS ROAD DESIGN.



DESIGNED	BLR	Aug.23	DRAWING STATUS	CLIENT	MERIDIAN ENERGY						
DRAWN	CHLI	Aug.23	PRELIMINARY DRAFT	PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM						
DESIGN CHECKED	MGM	Aug.23	PROJECT PHASE	TITLE	OLD COACH ROAD						
DRAWING CHECKED	MGM	Aug.23	CONCEPT DESIGN	SHEET 10							
NOT FOR CONSTRUCTION			THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED								
REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE	SCALE (A3)	DWG No.	1016884.1000-109	REV	1
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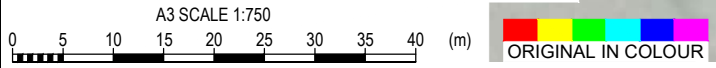


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					DRAWING CHECKED	MGM	Aug.23		
					NOT FOR CONSTRUCTION		THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED		
REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE			

CLIENT	MERIDIAN ENERGY
PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM
TITLE	TERMINAL SUBSTATION ACCESS SH2 KAIPARORO ROAD
SCALE (A3)	1:750
DWG No.	1016884.1000-200
REV	1



LEGEND	
	PERMANENT ROAD WIDENING
	TEMPORARY CLEARANCE FOR THE SWING OF THE TURBINE BLADE
	TEMPORARY PAVEMENT FOR TRANSPORT OF TURBINE COMPONENTS
	PROPERTY BOUNDARY
	EXISTING ROAD LAYOUT
	NEW ROAD LAYOUT

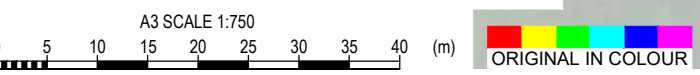


REV	DESCRIPTION	CAD	CHK	DATE	DESIGNED	BLR	Aug.23	DRAWN	CHLI	Aug.23	DESIGN CHECKED	MGM	Aug.23	DRAWING CHECKED	MGM	Aug.23	DRAWING STATUS
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<p style="text-align: center;">THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED</p>																	

CLIENT	MERIDIAN ENERGY
PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM
TITLE	INTERNAL TRANSMISSION LINE ACCESS (SH2)
SCALE (A3)	1:750
DWG No.	1016884.1000-201
REV	1



LEGEND	
	PERMANENT ROAD WIDENING
	TEMPORARY CLEARANCE FOR THE SWING OF THE TURBINE BLADE
	TEMPORARY PAVEMENT FOR TRANSPORT OF TURBINE COMPONENTS
	PROPERTY BOUNDARY
	EXISTING ROAD LAYOUT
	NEW ROAD LAYOUT



1	PRELIMINARY DRAFT	CHLI	BLR	30/08/2023	DESIGNED	BLR	Aug.23	DRAWING STATUS	PRELIMINARY DRAFT
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					DESIGN CHECKED	MGM	Aug.23	PROJECT PHASE	CONCEPT DESIGN
					DRAWING CHECKED	MGM	Aug.23		
					NOT FOR CONSTRUCTION		THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION PURPOSES UNLESS SIGNED AS APPROVED		
REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE			

CLIENT	MERIDIAN ENERGY
PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM
TITLE	INTERNAL TRANSMISSION LINE ACCESS OPAKI-KAIPARORO ROAD
SCALE (A3)	1:750
DWG No.	1016884.1000-202
REV	1



APPENDIX 4

WAKA KOTAHI NEW ZEALAND TRANSPORT AGENCY WRITTEN APPROVAL

Waka Kotahi NZ Transport Agency Reference: 2023-0854

30 August 2023

Meridian Energy Limited
C/- Lynley Fletcher
PO Box 10 840
Wellington 6143

Sent via: Lynley.Fletcher@MeridianEnergy.co.nz

Dear Lynley,

MOUNT MUNRO WINDFARM – EKETAHUNA, WAIRARAPA – MERIDIAN ENERGY LIMITED

Thank you for your request for written approval from Waka Kotahi New Zealand Transport Agency (Waka Kotahi). Your proposal has been considered as follows:

Proposal

Resource consent is sought for the following activities:

- To construct, operate and maintain a windfarm over three pastoral farms. The proposal is for up to 20 wind turbines to be established.
- The project will require 10.7km of internal roading network which will require suitable surfacing to enable heavy components to be safely transported.
- A terminal substation is proposed to be located on the western side of the corner of Kaiparoro Road and State Highway 2.
- The project will also require further infrastructure including an internal substation, turbine unity transformers, wind monitoring tower, services, operation and maintenance building, portacom buildings, fuel storage tank and concrete batching plant.

The key transportation requirements of the proposal are as follows. All of the roads in question sit within the Tararua District.

- Initial delivery of earthmoving machinery and ongoing service and maintenance visits;
- Importing aggregate for road basecourse and concrete production;
- Importing water, principally for concrete production and dust control;
- Delivery of equipment, including transformers, for the off-site substation and cables;
- Delivery of other construction materials and consumables to the wind farm site, including reinforcing steel;
- Delivery of electricity circulation and transmission infrastructure including the conductors for the on-site underground cabling and poles for the 4 km line between the site and the substation;
- Transport of over-dimension and overweight turbine components; and
- Regular movement of personnel on site during construction.

Assessment

In assessing the proposed activity, Waka Kotahi notes the following:

- The subject site is located east of State Highway 2, approximately 35km north of Masterton and 4km south of Eketahuna. During construction, site access is proposed via the following roads which intersect with State Highway 2:

- Old Coach Road – main site access during construction and operation
 - Kaiparoro Road - access for the construction and maintenance of the off-site substation
 - Opaki-Kaiparoro Road – access for the construction and maintenance of the transmission line
- The applicant has provided an assessment of the vehicle movements associated with construction (both light and heavy) and operation. It is understood that there is proposed to be a 32-month construction programme.
 - Waka Kotahi understands that the majority of the vehicle movements will be associated with the construction stage of the proposal. It is estimated that the project will require four to eight full time staff to manage the maintenance and operational aspects of the wind farm, of which the associated vehicle movements will be minimal.
 - In order to facilitate the heavy vehicle movements association with construction the applicant will need to be undertake improvements to the intersection of Old Coach Road and State Highway 2 (predominantly widening). The works are proposed to be entirely within the road reserve but may require relocation of a swale and street signage on the northeast corner of the intersection. Furthermore, the applicant has identified that additional work is required to understand whether a turn treatment is required, taking into consideration the origin of vehicles to the site. While the applicant has assessed there to be appropriate sight distances for an approaching vehicle to see a turning vehicle at this intersection, there are also some further options to improve safety outcomes at the intersection including temporarily decreasing speeds and truck crossing warning signs on the intersection approach. These are proposed to be considered as part of the Construction Traffic Management Plan process.
 - To achieve sight distances to the north of the SH2/Opaki-Kaiparoro Rd intersection the applicant has identified that vegetation removal will be required within the road reserve.
 - Overweight and Over-Dimension permits will be required from Waka Kotahi. Approved permits will be required from these authorities prior to transport of overweight or oversize components.

Overall, Waka Kotahi is satisfied with the findings of the Transportation Assessment provided by the applicant. For works within the state highway corridor such as widening or new turning treatments, the applicant will need to provide plans of the upgrades to Waka Kotahi for review and approval. Furthermore, Waka Kotahi expects to be consulted on the drafting of the Construction Traffic Management Plan and for formal approval to be sought through the Corridor Access Request process prior to physical works on the highway.

Conditions

In discussion with Waka Kotahi your clients have agreed to include the following conditions as part of their resource consent application. The legal name of Waka Kotahi is the New Zealand Transport Agency; therefore, our full legal name is referred to in the conditions and approval:

1. Prior to construction, the consent holder shall provide the NZ Transport Agency with the detailed designs for the upgrade of Old Coach Road, to be reviewed and approved by the NZ Transport Agency Network Manager. This should be accompanied by an assessment of whether additional turn treatment at this intersection is required.
2. Prior to construction, the consent holder shall prepare and circulate the Construction Traffic Management Plan to Waka Kotahi for review and acceptance. This should detail how construction traffic will be safely and efficiently managed to and from the subject site along the highway corridor and at Old Coach Road, Kaiparoro Road and Opaki-Kaiparoro Road intersections with State Highway 2.
3. Prior to construction, the consent holder shall undertake vegetation removal at the SH2/Opaki-Kaiparoro Road intersection so that Safe Intersection Sight Distances are achieved to the satisfaction of the NZ Transport Agency Network Manager.

4. Prior to construction, the consent holder shall provide to Council, correspondence from the NZ Transport Agency confirming that works in the State Highway, including vegetation clearance and intersection upgrades have been constructed to the NZ Transport Agency standards.

Determination

On the basis of the above assessment of the proposed activity, and the conditions volunteered by the applicant, Waka Kotahi provides written approval under section 95E of the Resource Management Act 1991.

Advice Notes

Before you undertake any physical work on the state highway you are legally required to apply to the New Zealand Transport Agency for a Corridor Access Request (CAR) and for that request to be approved.

Please submit your CAR to the New Zealand Transport Agency CAR Manager via erin.johnson@nzta.govt.nz a minimum of fourteen working days prior to the commencement of any works on the state highway; longer is advised for complex works.

Expiry of this approval

Unless resource consent has been obtained this approval will expire two years from the date of this approval letter. This approval will lapse at that date unless prior agreement has been obtained from Waka Kotahi.

If you have any queries regarding the above or wish to discuss matters further, please feel free to contact Emily Hunt via email at emily.hunt@nzta.govt.nz or you can contact the environmental planning team at the following email address for future approvals– environmentalplanning@nzta.govt.nz.

Yours sincerely,



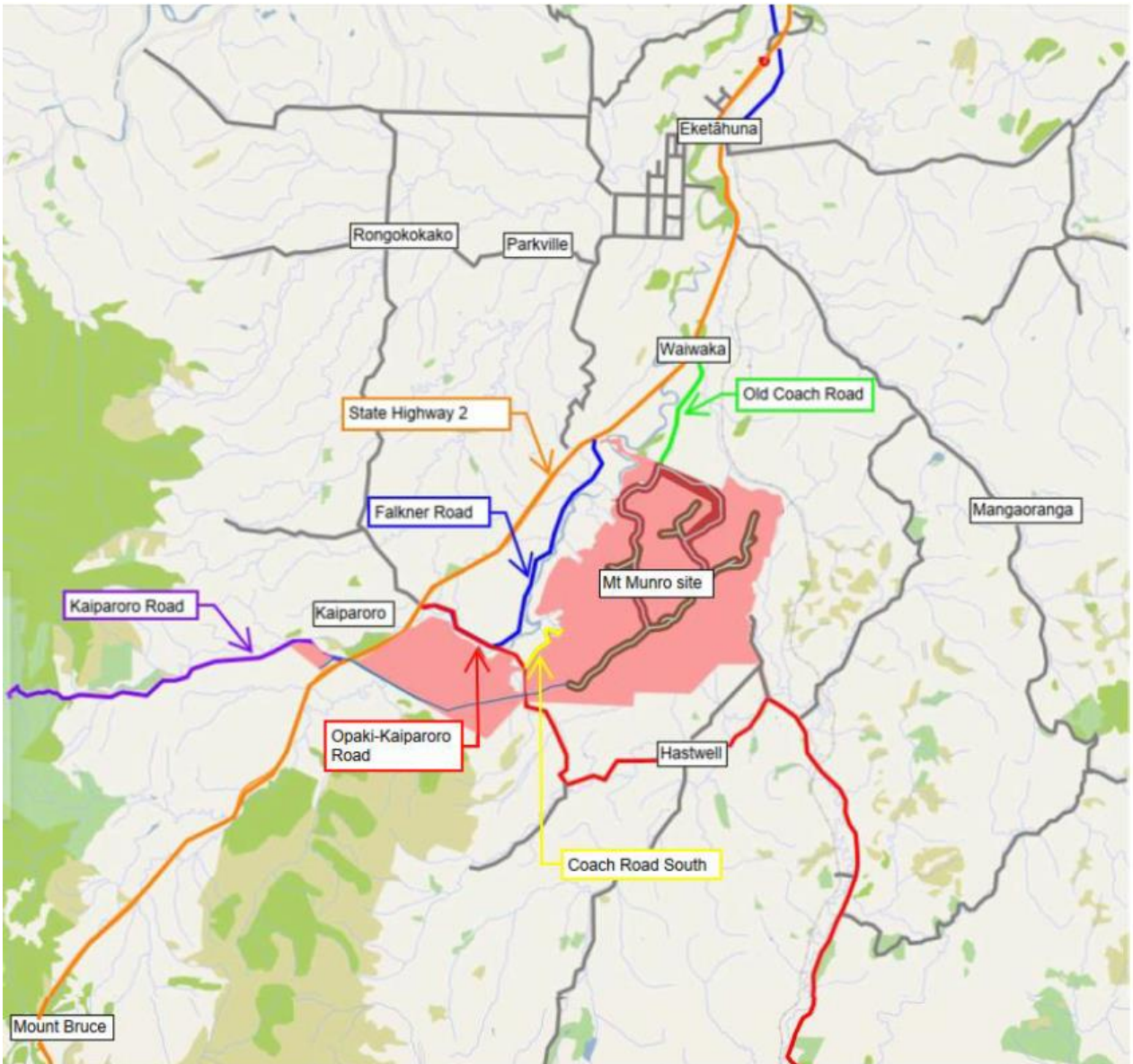
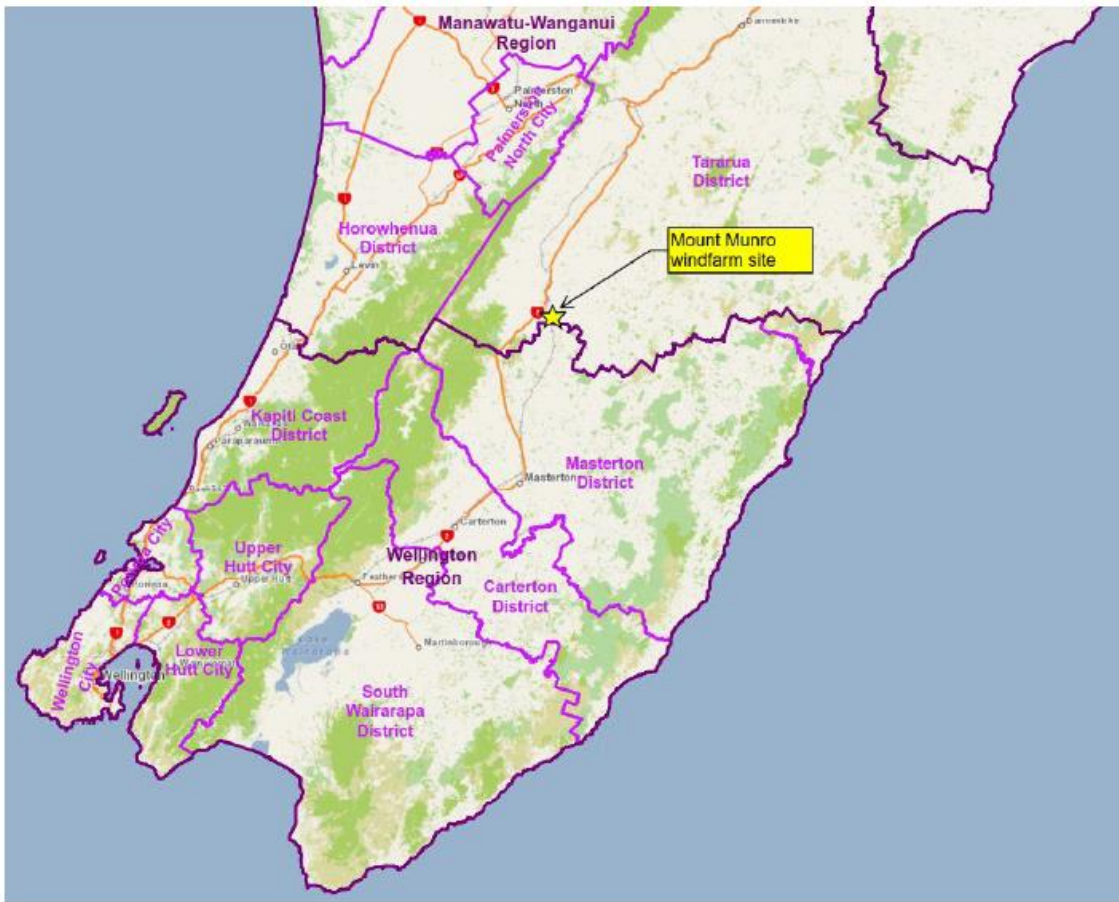
Emily Hunt

Senior Planner

Poutiaki Taiao (Environmental Planning), System Design, on behalf of Waka Kotahi New Zealand Transport Agency

Enclosed:

- Attachment 1 and 2: Site Location Plans





APPENDIX 5
AGGREGATE SUPPLY MEMO

Memorandum

To	Nick Bowmar Meridian Energy
Copy	Gene Sams Meridian Energy
From	Leonard Wiles
Office	Wellington
Date	11 May 2023
File/Ref	5-C4317.00
Subject	Mt Munro Aggregate Supply Assessment Memo Report

1 Purpose

The purpose of this memo report is to provide an assessment of the available aggregates for concrete production, paving and backfill material for internal cabling required for the construction of Mt Munro windfarm located in Eketāhuna.

2 Approximate Volume of Construction Materials (Aggregates)

2.1 Assumptions

This section describes the assumptions for assessing the materials comprising the turbine foundations, paving and backfill material for internal cabling – noting that the following documents formed the basis of our assumptions:

- WSP Updated Proof of Concept Foundation Design (136m rotor diameter)
- Meridian (Tonkin Taylor) Construction Footprints, Pavement depths etc.
- Meridian Update (Cable trench distances)

Turbine Foundation Assumptions

The quantities of sand, aggregate and cement estimated for the turbine foundations are based on a 'proof of concept design' of a standard reinforced concrete gravity pad (octangular) for a total of 20 wind turbines with a 136m rotor diameter. Details on the foundation design dimensions of this 'proof of concept design' of these foundations are provided in Appendix B. The 'proof of concept design' assumes that all the turbine sites are expected to be underlain by greywacke rock. This provides a conservative estimate of the resource inputs to foundation construction.

Roading Pavement Assumptions

The internal roads are made up of main roads and spine roads with a total as-built road footprint of approximately 93,000m². We have assumed the main road component is approximately 70,000 m² and the spine road component is approximately 23,000m².

The make-up of the roading pavement depends on the roading type (main road or spine road) and geological subgrade. 3 geological subgrades have been assumed for this site. These are listed below along with the corresponding proportion of the total as-built road footprint assumed for each.

- Greywacke (70%)

- Tertiary Deposits (5%)
- Overlying Soils (25%)

Tables 1 and 2 below summarise the assumed pavement make-up for main and spine roads respectively for each subgrade.

Table 1- Main Road Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Greywacke	150	n/a
Tertiary Deposits	200	300
Overlying Soils	200	500

Table 2 - Spine Road Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Greywacke	100	n/a
Tertiary Deposits	100	150
Overlying Soils	100	300

Refer to Appendix A for further details on pavement design assumptions.

Hardstand Pavement Assumptions

A total as-built hardstand footprint of approximately 80,000m² has been assumed based on each footprint being approximately 4,000 m² for 20 turbines.

The same assumptions for the make-up of the main road pavement have been made for the hardstand pavements. Table 3 below summarises the make-up has been assumed pavement make-up for the hardstands each underlying subgrade.

Table 3 - Hardstand Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Greywacke	150	n/a
Tertiary Deposits	200	300
Overlying Soils	200	500

Construction Village Pavement Assumptions

We have assumed that the total as-built construction village footprint is approximately 14,000m². The construction village is located near the site entrance close to the Makakahi River where the geological subgrade is identified as overlying soils. The same assumptions for the make-up of the spine road pavement have been made for the construction village pavement. This is summarised in Table 4 below.

Table 4 - Construction Village Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Overlying Soils	100	300

Refer to Appendix A for further details on pavement design assumptions.

On-site and Off-site Substation Pavement Assumptions

We have assumed that the as-built construction footprint of the on-site and off-site substations are approximately 7,500m² and 12,000m² respectively. The geological subgrade for the on-site substation and off-site substation is assumed to be greywacke and overlying soils respectively. The same assumptions for the make-up of the spine road pavement have been made for the on-site and off-site substation pavement This is summarised in Tables 5 and Table 6 below.

Table 5 – On-site Substation Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Greywacke	100	n/a

Table 6 – Off-site Substation Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Overlying Soils	100	300

Refer to Appendix A for further details on pavement design assumptions.

Concrete Batching Plant Assumptions

We have assumed that the as-built construction footprint of the concrete batching plant is approximately 6,000m². The geological subgrade is assumed to be greywacke and the same assumptions for the make-up of the spine road pavement have been made for concrete batching plant pavement This is summarised in Table 7 below.

Table 7 – Concrete Batching Plant Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Greywacke	100	n/a

Refer to Appendix A for further details on pavement design assumptions.

Miscellaneous Facilities Assumptions

We have assumed that the as-built construction footprint of miscellaneous facilities is approximately 10,000m². The geological subgrade is assumed to be greywacke and the same assumptions for the make-up of the spine road pavement have been made for miscellaneous facilities pavement This is summarised in Table 8 below.

Table 8 – Miscellaneous Facilities Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Greywacke	100	n/a

Transmission Road Assumptions

We have assumed that the as-built construction footprint of the transmission road is approximately 15,000m². The geological subgrade is assumed to be Tertiary Deposits and the and the same assumptions for the make-up of the spine road pavement has been made for the transmission road. This is summarised in Table 9 below.

Table 9 – Transmission Road Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Tertiary Deposits	100	150

Old Coach Road (Public Road) Assumptions

We have assumed that the as-built construction footprint of the upgraded Old Coach Road is approximately 12,800m². The geological subgrade is assumed to be Tertiary Deposits and the same assumptions for the make-up of the spine road pavement has been made for this road. This is summarised in Table 10 below.

Table 10 – Old Coach Road Pavement Make-up

Geological Subgrade	Basecourse (GAP40) Thickness (mm)	Subbase (AP60) Thickness (mm)
Tertiary Deposits	100	150

Internal Cabling Materials Assumptions

We have made the following assumptions with respect to internal cabling

- Cable trenches will be buried under internal roads
- With 4-6 turbines per string, and 2 sets of cables per string, between 2 and 6 trenches will be required depending on location
- Standard trench dimensions between 350mm-500mm wide, 500mm deep and 1m between trenches
- Area of each trench is approximately 0.25m²
- Approximately 11km of cable trenching will be required

2.2 Summary of Aggregate Quantities

Table 11 on the following page provides a detailed summary of the quantities of aggregates based on the assumptions above. This table also indicates the expected period in the programme the aggregates will be required,

Table 11 – Summary of Aggregate Quantities

Item	Description	Vol(m3)/turbine	No. of Turbines	Total Quantity (m3)		Programme Month of 26 Month Programme
1	TURBINE FOUNDATIONS					
1.1	Total sand (dry) (m3)	445	20	9,000		20-26
1.2	Total aggregates (dry) (m3)	890	20	18,000		
1.3	Total cement (dry) (m3)	297	20	6,000		
2	ROADING PAVEMENTS					
2.1	GAP40 - Basecourse			Quantity In-place (m3)	Quantity Loose (m3)	
	Main Roads - On Rock	150	49,000	7,000	10,000	17-23
	Main Roads - On Soil	200	17,500	4,000	6,000	
	Main Roads - On Tertiary Deposits	200	3,500	1,000	1,000	
	Subtotal		70,000	12,000	17,000	
	Spine Roads - On Rock	100	16,100	2,000	3,000	
	Spine Roads - On Soil	100	5,750	1,000	1,000	
	Spine Roads - On Tertiary Deposits	100	1,150	-	-	
	Subtotal		23,000	3,000	4,000	
2.2	AP65 - Subbase					
	Main Roads - On Rock	-	49,000	-	-	10-15
	Main Roads - On Soil	500	17,500	8,750	12,000	
	Main Roads - On Tertiary Deposits	300	3,500	1,050	1,000	
	Subtotal		70,000	10,000	13,000	
	Spine Roads - On Rock	-	16,100	-	-	13-15
	Spine Roads - On Soil	300	5,750	2,000	3,000	
	Spine Roads - On Tertiary Deposits	150	1,150	-	-	
	Subtotal		23,000	2,000	3,000	
3	HARDSTAND PAVEMENTS					
3.1	GAP40 - Basecourse			Quantity In-place (m3)	Quantity Loose (m3)	
	On Rock	150	56,000	8,000	11,000	17-23
	On Soil	200	20,000	4,000	6,000	
	On Tertiary Deposits	200	4,000	1,000	1,000	
	Subtotal		80,000	13,000	18,000	
3.2	AP65 - Subbase					
	On Rock	-	-	-	-	17-23
	On Soil	500	20,000	10,000	14,000	
	On Tertiary Deposits	300	4,000	1,200	2,000	
	Subtotal		24,000	11,000	16,000	
4	CONSTRUCTION VILLAGE PAVEMENTS					
4.1	GAP40 - Basecourse			Quantity In-place (m3)	Quantity Loose (m3)	
	On Soil	100	14,000	1,400	2,000	10-12
	Subtotal		14,000	1,400	2,000	
4.2	AP65 - Subbase					
	On Soil	300	14,000	4,200	6,000	10-12
	Subtotal		14,000	4,200	6,000	
5	OFFSITE SUBSTATION PAVEMENTS					
5.1	GAP40 - Basecourse			Quantity In-place (m3)	Quantity Loose (m3)	
	On Soil	100	12,000	1,000	1,000	17-23
	Subtotal		12,000	1,000	1,000	
5.2	AP65 - Subbase					
	On Soil	300	12,000	4,000	6,000	17-23
	Subtotal		12,000	4,000	6,000	
6	ONSITE SUBSTATION PAVEMENTS					
6.1	GAP40 - Basecourse			Quantity In-place (m3)	Quantity Loose (m3)	
	On Rock	100	7,500	1,000	1,000	17-23
	Subtotal		8,000	1,000	1,000	
7	CONCRETE BATCHING PLANT PAVEMENTS					
7.1	GAP40 - Basecourse			Quantity In-place (m3)	Quantity Loose (m3)	
	On Rock	100	5,000	1,000	1,000	17-23
	Subtotal		5,000	1,000	1,000	
8	MISCELLANEOUS PAVEMENTS					
8.1	GAP40 - Basecourse			Quantity In-place (m3)	Quantity Loose (m3)	
	On Rock	100	10,000	1,000	1,000	17-23
	Subtotal		10,000	1,000	1,000	
9	TRANSMISSION ROAD PAVEMENTS					
9.1	GAP40 - Basecourse			Quantity In-place (m3)	Quantity Loose (m3)	
	On Tertiary Deposits	100	15,000	2,000	3,000	13-15
	Subtotal		15,000	2,000	3,000	
9.2	AP65 - Subbase					
	On Tertiary Deposits	150	15,000	2,000	3,000	13-15
	Subtotal		15,000	2,000	3,000	
10	OLD COACH ROAD PAVEMENTS					
10.1	GAP40 - Basecourse			Quantity In-place (m3)	Quantity Loose (m3)	
	On Tertiary Deposits	100	12,800	1,000	1,000	1-9
	Subtotal		13,000	1,000	1,000	
10.2	AP65 - Subbase					
	On Tertiary Deposits	150	12,800	2,000	3,000	1-9
	Subtotal		13,000	2,000	3,000	
11	INTERNAL CABLING MATERIALS					
11.1	Backfill material (crusher dust)			Quantity In-place (m3)	Quantity Loose (m3)	
	Backfill material (crusher dust)	11,000	0.25	3,000	4,000	16-21
	Subtotal	11,000	0.25	3,000	4,000	
SUMMARY						
TURBINE FOUNDATIONS		QUANTITY DRY (m3)				
Total sand (dry) (m3)		9,000				
Total aggregates (dry) (m3)		18,000				
Total cement (dry) (m3)		6,000				
PAVEMENTS		QUANTITY IN-PLACE (m3)		QUANTITY LOOSE (m3)		
GAP40 - Basecourse		36,400		49,000		
AP65 - Subbase		35,200		50,000		
Backfill material (crusher dust)		3,000		4,000		

3 Aggregate Supply Programme

Figure 1 below shows the assumed 26 month aggregate supply programme between Oct 2024 and Nov 2026 based on Table 11 above.

Mt Munro Wind Farm - Aggregate Supply Programme

Activity	Year	2024			2025												2026												
	Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
	Month No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
Paving Aggregates																													
- Old Coach Road (Public Road)																													
- Main Laydown/Accommodation																													
- Internal Roads																													
- Transmission Road																													
- Hardstands																													
- Offsite Substation																													
- Onsite Substation																													
- Concrete Batching Plant																													
- Miscellaneous																													
Concrete Aggregates																													
- Turbine Foundations																													
Cable Trenching Aggregates																													
- Internal Roads																													

Figure 1 – Assumed Aggregate Supply Programme

4 Investigating Aggregate Sources

Assuming that no significant volumes can be won on-site this task involved investigating the volumes of aggregates that can be won from local quarries, the wider Wairarapa region and beyond.

A total of 9 Contractors/Quarries were contacted as shown in Table 12 below.

Table 12 – Contractors/Quarries Contacted

Contractors/Quarries	Location	Email
Haults Contractors	Palmerston North	dave@haultcontractors.co.nz
Blackley (Byfords)	Ashhurst	richard@byfords.co.nz
Hirock	Pahiatua	enquiries@hirock.co.nz
Pratts Quarry	Palmerston North	prattharvestingltd@xtra.co.nz
Stringfellows (Troup Rd)	Dvk	simon@stringfellows.co.nz
Prenters	Pahiatua	office@prenters.co.nz
Longburn Shingle	Longburn	sales@longburnshingle.co.nz
Winstone Aggregates	Lower Hutt	ben.hawkins@winstoneaggregates.co.nz
Kieran Oliver	Masterton	contact@kieranoliver.co.nz

Figure 2 shows the location of the Contractors/Quarries in relation to the Mt Munro project site.

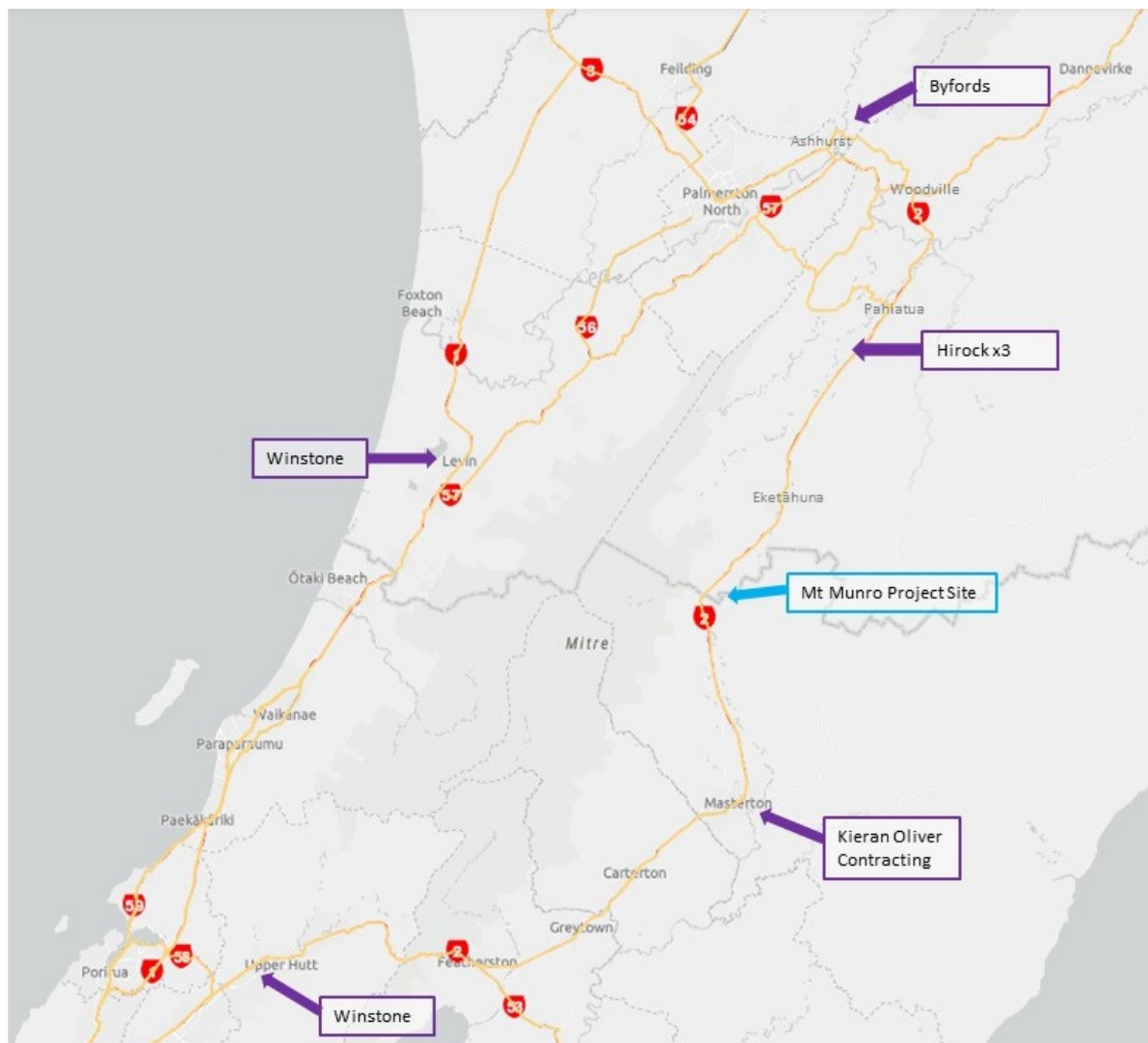


Figure 2 – Indicative Location of the Contractors/Quarries in relation to Mt Munro

6 Traffic Movement Assessment

This section provides an estimate of the truck movements to supply the aggregate materials over the construction period based on the following assumptions:

- the required material can be supplied as outlined in the previous section
- the supply rate is based on Table 9 in the first section of this memo
- Capacity of 6 wheel truck is 10 tonnes
- Capacity of truck and trailer is 25 tonnes

Figures 3 and 4 on the following pages show the monthly and daily traffic volumes generated from the supply of aggregates to the site over the assumed 26 month aggregate supply programme between Oct 2024 and Nov 2026.

Figure 3 includes the following aggregate supply generating activities:

- Paving Aggregates
 - Old Coach Road (Public Road)
 - Main Laydown/Accommodation
 - Internal Roads
 - Transmission Road
 - Hardstands
 - Offsite Substation
 - Onsite Substation
 - Concrete Batching Plant
 - Miscellaneous
- Concrete Aggregates
 - Turbine Foundations
- Cable Trenching Aggregates
 - Internal Roads

Figure 4 includes all the above activities excluding paving aggregates for the transmission road and off site substation.

Mt Munro Wind Farm - Truck Movements Over Aggregate Supply Period																													
Activity	Year	2024									2025									2026									
		Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
		Month No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Paving Aggregates																													
- Old Coach Road (Public Road)																													
- Main Laydown/Accommodation																													
- Internal Roads																													
- Transmission Road																													
- Hardstands																													
- Offsite Substation																													
- Onsite Substation																													
- Concrete Batching Plant																													
- Miscellaneous																													
Concrete Aggregates																													
-Turbine Foundations																													
Cable Trenching Aggregates																													
- Internal Roads																													
Material Type	Volume (m3)	Supply Rate (m3/month)																											
GAP40	48,000	222	222	222	222	222	222	222	222	222	222	667	667	667	667	667	667		6000	6000	6000	6000	6000	6000	6000				
AP65	50,000	333	333	333	333	333	333	333	333	333	333	2,000	2,000	2,000	1,000	1,000	1,000		5429	5429	5429	5429	5429	5429	5429				
Sand (dry)	9,000																												
Aggregates (dry)	18,000																												
Backfill Material (crusher dust)	4,000																		667	667	667	667	667	667					
Cement	6,000																												
Total volume per month		556	556	556	556	556	556	556	556	556	556	2,667	2,667	2,667	1,667	1,667	1,667	667	12,095	12,095	12,095	16,810	16,810	16,143	16,143	4,714	4,714	4,714	
		Truck return trips per month																											
Truck (10 tonne)		75	75	75	75	75	75	75	75	75	75	360	360	360	225	225	225	103	1,646	1,646	1,646	2,325	2,325	2,222	2,222	679	679	679	
Truck and Trailer (25 tonne)		30	30	30	30	30	30	30	30	30	30	144	144	144	90	90	90	41	658	658	658	930	930	889	889	272	272	272	
		Truck return trips per day																											
Truck (10 tonne)		3	3	3	3	3	3	3	3	3	3	17	17	17	10	10	10	5	76	76	76	107	107	102	102	31	31	31	
Truck and Trailer (25 tonne)		1	1	1	1	1	1	1	1	1	1	7	7	7	4	4	4	2	30	30	30	43	43	41	41	13	13	13	

Figure 3 - Estimated Truck Movements Over Aggregate Supply Period

Mt Munro Wind Farm - Truck Movements Over Aggregate Supply Period																													
Activity	Year	2024									2025									2026									
		Month	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
		Month No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Paving Aggregates																													
- Old Coach Road (Public Road)																													
- Main Laydown/Accommodation																													
- Internal Roads																													
- Hardstands																													
- Onsite Substation																													
- Concrete Batching Plant																													
- Miscellaneous																													
Concrete Aggregates																													
- Turbine Foundations																													
Cable Trenching Aggregates																													
- Internal Roads																													
Material Type	Volume (m3)	Supply Rate (m3/month)																											
GAP40	48,000	222	222	222	222	222	222	222	222	222	222	667	667	667					5714	5714	5714	5714	5714	5714	5714				
AP65	50,000	333	333	333	333	333	333	333	333	333	333	2,000	2,000	2,000					4714	4714	4714	4714	4714	4714	4714				
Sand (dry)	9,000																												
Aggregates (dry)	18,000																												
Backfill Material (crusher dust)	4,000																		667	667	667	667	667	667					
Cement	6,000																												
Total volume per month		556	556	556	556	556	556	556	556	556	556	2,667	2,667	2,667	-	-	-	667	11,095	11,095	11,095	15,810	15,810	15,143	15,143	4,714	4,714	4,714	
Truck return trips per month																													
Truck (10 tonne)		75	75	75	75	75	75	75	75	75	75	360	360	360	-	-	-	103	1,511	1,511	1,511	2,190	2,190	2,087	2,087	679	679	679	
Truck and Trailer (25 tonne)		30	30	30	30	30	30	30	30	30	30	144	144	144	-	-	-	41	604	604	604	876	876	835	835	272	272	272	
Truck return trips per day																													
Truck (10 tonne)		3	3	3	3	3	3	3	3	3	3	17	17	17	-	-	-	5	70	70	70	101	101	96	96	31	31	31	
Truck and Trailer (25 tonne)		1	1	1	1	1	1	1	1	1	1	7	7	7	-	-	-	2	28	28	28	40	40	38	38	13	13	13	

Figure 4 - Estimated Truck Movements Over Aggregate Supply Period (excluding paving aggregates for the transmission road and offsite substation)

Appendix A – Pavement Design Assumptions

Geological subgrade	Likely California Bearing Ratio (CBR)	Main Roads
Greywacke Sandstone and Siltstone	High >50	150mm Compacted GAP40 over Cut
Tertiary Mudstone or Siltstone (very limited section of road expected)	Assumed CBR>10	200mm Compacted GAP40 over 300mm Compacted AP65
Overlying Soils	Assumed CBR>5	Compacted 200mm GAP40 over 500mm Compacted AP65

Geological subgrade	Likely California Bearing Ratio (CBR)	Spine Roads
Greywacke Sandstone and Siltstone	High >50	100mm Compacted GAP40 over Cut
Tertiary Mudstone or Siltstone (very limited section of road expected)	Assumed CBR>10	100mm Compacted GAP40 over 150mm Compacted AP65
Overlying Soils	Assumed CBR>5	Compacted 100mm GAP40 over 300mm Compacted AP65

Appendix B – Mt Munro Wind Farm Civil Works Assessment Wind Turbine Foundations – ‘Proof of Concept’ Design Gravity Pad Foundation Dimensions

CALCULATION SHEET

Project/Task/File No:	5-C4317.00	Sheet No:	2	of	
Project Description:	Mt Munro Wind Turbines	Office:	Wgtn		
	Gravity Pad Foundations	Computed	EB	12/11/2021	
	Dimensions	Checked:			

Foundation Design			
<i>Conservatively assume bad ground conditions and high water level</i>			
Inputs	Input Symbol	Input Value	References
Foundation Dimensions			
Diameter of Steel Cylinder	d	6 m	
Embedment of Steel Cylinder in Pad		0 m	
Steel Cylinder Projection above Ground		0 m	
Thickness of concrete cover around shell		0 m	
Foundation Depth	h_1	2 m	
	h_2	0.5 m	
Depth of Soil above	h_3	1 m	
Water level below ground	h_4	N m	
			"N" for no effect
Dimensions of octagonal pad	D	23 m	
	r	12.45 m	
	s	9.53 m	
Plan Area	A	438 m ²	
Average Foundation Depth	h_{avg}	2.25 m	
Area of Concrete Cylinder	A_{cyl}	28.3 m ²	
Total Volume of Concrete	V_{conc}	1021 m ³	
Equivalent diameter of circle	d	23.62 m	
Section Modulus	Z	1294 m ³	



APPENDIX 6
PORT TO SITE ROUTES ASSESSMENT



Mount Munro Windfarm

Update to Port to Site Assessment

Prepared for
Meridian Energy Limited

Prepared by
Tonkin & Taylor Ltd

Date
September 2023

Job Number
1016884.1000 v2



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sustain a better world**

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Document control

Title: Mount Munro Windfarm					
Date	Version	Description	Prepared by:	Reviewed by:	Authorised by:
21/06/2023	1	DRAFT for client review	T Breitenmoser	B Rodenburg	B Symmans
07/09/2023	2	Issue for consent application	T Breitenmoser	B Rodenburg	B Symmans

Distribution:

Meridian Energy Limited

1 copy

Tonkin & Taylor Ltd (FILE)

1 copy

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Executive summary

In July 2021, Tonkin & Taylor Ltd (T+T) completed a port to site assessment for the proposed Mt Munro Wind Farm in the lower North Island. The purpose of the assessment was to provide information on the practicality of delivering turbine components to the site. Transport route options from five North Island ports were assessed.

The July 2021 assessment was completed considering transportation of the Siemens Gamesa SWT-DD-120 wind turbine, with a blade length of 59 m. The maximum weight assessed was the transformer – with an indivisible load of 120 tonnes.

However, as the project has progressed a larger turbine blade is being considered. This report outlines the update to the port to site assessment to consider a turbine blade length of up to 67 m. There has been no change to the maximum weight assessed.

This update to the port to site assessment has been completed considering only the two ports considered most feasible. Therefore, the two routes assessed in this update to the port to site assessment are:

- Napier Port; and
- Centre Port (Wellington).

Options and constraints.

The ability of the transport routes to be used for different turbine components and transformer loads is summarised in Table 1.1.

Table 1.1: Summary of constraints for each port to site route

Port	Weight			Length	Height (4.8 m)
	Transformer (120 t)	Nacelle (98 t)	Tower section (80 t)	Blade (67 m)	
Napier Port	✓ ¹	✓ ¹	✓ ¹	✓	✓
Centre Port (Wellington)	✓	✓	✓	✓	✓

¹ Subject to further assessment of structures on local road diversion routes around constraints on the state highway network.

Cost estimates

The costs of modification to the State Highway network and length of local road to the site access for the different delivery options for turbine components are shown in Table 1.2 below.

Table 1.2: Summary of cost estimates for each port to site route

Port	Weight	Length/Height ¹
Napier Port	\$0.3 to \$0.5 M	\$1.2 to \$2.1 M
Centre Port (Wellington)	\$No cost	\$1.3 to \$2.2 M

¹ Based on estimated construction rates and scope of work required for each modification required. Range applied to cost estimate -20% to +40%

Cost estimates do not include transporter costs, the temporary removal and replacement of roadside signage, streetlights and overhead power cables, or traffic management. Further engagement with transporters will be required to determine a cost estimate for these.

Meridian should note that a level of contingency has been applied to the cost estimates for physical modifications. However, Meridian may also wish to apply additional risk contingency to the totals reported in Table 1.2 above.

These costs are for physical works only. It is therefore recommended that Meridian add an allowance for professional services costs, client managed costs and contractor costs.

Risks and opportunities

It should be noted that the cost estimates are primarily based on a desk top assessment. Ground truthing may increase or decrease costs. It would be prudent to add a risk component to these costs until further work on transport routes is undertaken.

Local road diversion routes around constraints such as under strength/too low structures on the state highway network are required on all routes. There are smaller structures on these diversion routes which we have been unable to obtain desktop information for assessment. These should be further assessed as part of ground truthing.

Where a weight constraint has been identified along the state highway network, cost estimates assume that full replacement of the bridge is required. Potential cost savings may be available if bridges can be strengthened, rather than fully replaced.

Recent innovation in blade transporting using a blade manipulator trailer to lift the blade and reduce the effective length, as demonstrated recently for the Turitea Wind Farm¹, may present an opportunity to make the transport of blades easier and reduce costs in route modifications.

Summary

Based on this assessment of the specific turbine component specifications provided by Meridian, available information, and subject to reasonable route modifications where required, it is expected that the proposed turbine components can be transported to site.

¹ <https://www.stuff.co.nz/business/125116033/turbine-blades-tilt-for-their-journey-to-the-ridges-above-palmerston-north>

1 Introduction

Meridian Energy Limited (Meridian) is considering development of a new wind farm (Mount Munro Windfarm) in the Lower North Island, approximately five kilometres south of Eketāhuna. T+T have been engaged by Meridian to provide an update to the port to site assessment for the Mount Munro Windfarm project.

This work has been undertaken by T+T in accordance with T+T's offer of service dated 11 October 2021.

1.1 Previous work

A port to site assessment was completed in July 2021. This is documented in T+T report *Mount Munro Windfarm: Port to Site Routes Assessment* (version 2, issued July 2021).

The purpose of this report was to assess the port to site considerations for the transport of large turbine components. The feasibility of five port to site routes were assessed.

This assessment was completed considering transportation of the Siemens Gamesa SWT-DD-120 wind turbine, with a blade length of 59 m. The proposed transformer option advised by Meridian had a weight of 120 tonnes.

The transport routes assessed were from the following ports to the wind farm site;

- Ports of Auckland;
- Port of Tauranga;
- Napier Port;
- Taranaki Port; and
- Centre Port (Wellington).

The report was peer reviewed by WSP² in June 2021. Following this peer review, the report was updated and finalised.

1.1.1 Summary of July 2021 assessment

The ability of the transport routes to be used for different turbine components and transformer loads is summarised in Table 1.1.

² WSP memorandum – Mt Munro Port to Site Feasibility Review 21 June 2021. File Ref 5-C4317.00.

Table 1.1: Summary of constraints for each port to site route, as identified in the July 2021 assessment

Port	Weight			Length	Height
	Transformer (120t)	Nacelle (98t)	Tower section (80t)	SWT-DD-120 (59m)	
Ports of Auckland	✓ ¹	✓ ¹	✓ ¹	✓	X
Port of Tauranga	Only if upgraded	Only if upgraded	Only if upgraded	✓	✓
Napier Port	✓ ¹	✓ ¹	✓ ¹	✓	✓
Port Taranaki	X	X	X	✓	✓
Centre Port (Wellington)	✓ ¹	✓ ¹	✓ ¹	✓	✓

¹ No assessment of structures along local road diversions was completed. Therefore, in the July 2021 assessment, the feasibility of each route outlined above was subject to further assessment of structures on local road diversion routes around constraints on the state highway network.

Based on the July 2021 assessment of the specific turbine component specifications provided by Meridian, available information, and subject to reasonable route modifications where required, it was concluded that the proposed turbine components could be transported to site. It was concluded that the only two routes along which all components could be transported were from Napier and Wellington to the site. There were several routes or combination of routes that provided for transport of overweight and oversize components that did not have any fatal flaws. The most significant potential constraints identified were those on the off-highway bypass routes.

1.2 Update to Port to Site Assessment

Meridian are considering installation of larger wind turbines, with a diameter of up to 136 m diameter (67 m blade length). Consideration for turbine componentry transit for this larger turbine blade size is also required. As outlined in Section 1.1.1, based on the previous port to site assessment, the two port options considered the most likely by Meridian were Napier and Wellington. This updated assessment has therefore only considered these two routes.

1.3 Comparison of Port to Site Assessments

A comparison between the assessment parameters of the July 2021 and this update to the port to site assessment are shown in Table 1.2 below.

Table 1.2: Port to site assessments completed for Mount Munro Windfarm

Assessment	Routes assessed		Maximum Weight		Maximum Length (m)	Maximum Height (m)
	Number of routes	Ports	Component	Weight (tonnes)		
July 2021	5	Auckland, Tauranga, Taranaki, Napier, Wellington	Transformer	120	59	4.8
June 2022	2	Napier, Wellington	Transformer	120 (no change)	67	4.8 (no change)

2 Methodology

This assessment has been completed primarily as a desktop review of routes between the two ports and the site access.

2.1 Vehicle tracking

Along each of the two port to site routes the vehicle tracking has been updated. Previously, a maximum blade length of 59 m was assessed. This was increased to a length of 67 m. This assessment is a desktop study, based on aerial views and Google street view only.

2.1.1 Routes

The two routes considered in this assessment are:

- Napier Port to site (200 km); and
- Centre Port (Wellington) to site (220 km).

These port to site route assessments extend from each port to the State Highway Two (SH2)/local road intersection, and the local road to the site, accessed off Old Coach Road. The two routes outlined in this report are those which we believe would be the most feasible. These are based off Waka Kotahi approved over-dimension routes and specific restrictions noted by the Waka Kotahi permit process.

2.2 Weight

2.2.1 July 2021 assessment

In the July 2021 assessment, the maximum weight assessed was the transformer. The transformer is an indivisible load with a weight of 120 tonnes. Including the weight of the truck, trailer and second tractor unit, the maximum gross weight considered in the July 2021 assessment was 240 tonnes.

Waka Kotahi have strict controls on the weight and axle loads of overweight vehicles to protect the state highway road network assets. Overweight permits are required where indivisible loads exceed permitted axle loads.

Overweight Feasibility Studies for transport of this transformer load were requested from Waka Kotahi and received on 28 April 2021.

Where a constraint on the state highway network was identified, alternative local road diversion routes were proposed – either for just the transport of the wind turbine blades or for all components. The maximum gross weight along the route was either that of the transformer (240 tonnes) or the blades (assumed to be 42 tonnes). Structures on these diversion routes are not assessed as part of the Waka Kotahi Overweight Feasibility Study. Use of the local road diversion routes will be subject to Council approval which has not been considered for this assessment. Council will require assurance that overweight loads will not adversely impact their road network assets. For this high-level assessment, Local Councils were not engaged. Where a diversion along local roads was required, weight constraints have been identified but not further assessed.

2.2.2 Update to assessment

Despite consideration of larger wind turbines, Meridian have advised that the overall capacity of the project is comparable to the previous assessment. A transformer weight of 120 tonnes is still considered to be the maximum indivisible load. This will be transported to the intersection of SH2 and Kaiparoro Road.

Therefore, no update to the Overweight Feasibility Assessments previously received from Waka Kotahi are required.

The reports for each route are attached in Appendix C for reference and the route constraints noted in Table 3.1 below.

2.3 Drive over

Between completion of the July 2021 report, and the June 2022 report, a site visit was completed to assess the transport considerations of the project. Drive overs of sections of the route were completed to check assumptions made based on the available desktop information. This was not a full drive over and does not replace the need for assessment by a transport operator. Key sites visited were:

- Waipukurau bypass along Ongaonga Road;
- Norsewood bypass;
- Woodville bypass; and
- Eketāhuna bypass.

2.3.1 Waipukurau bypass

A bypass was proposed along Ongaonga Road. This bypass is required due to a length constraint through Waipukurau. As such, this bypass is only required for transport of the wind turbine blades, with a maximum componentry weight of 42 tonnes.

The key constraint along this route is a 22 m long bridge across Kahahakuri Stream (Figure 2.1 and Figure 2.2 below). The bridge was constructed in 1966.



Figure 2.1: Kahahakuri Stream Bridge on Ongaonga Road



Figure 2.2: Kahahakuri Stream Bridge on Ongaonga Road

2.3.2 Norsewood bypass

A bypass was proposed along Hovding Street. This bypass is required due to a height constraint under a 4.8 m high rail bridge. A diversion route was identified along Hovding Street. An opportunity to remove fencing and cross directly back to SH2 was identified. Following the drive over, it was concluded more likely to divert back from Hovding Street to SH2 prior to the bridge if required. This also removes the need to strengthen the bridge along Hovding Street.

2.3.3 Woodville bypass

A diversion along Nelson Street, Range Road and Troup Road East was proposed. This bypass is required due to a length constraint on SH2. Drive over of a number of different routes through Woodville was completed. As such, this bypass is only required for transport of the wind turbine blades.

Combined with vehicle tracking, the preferred route is considered to be along Tay Street and Station Street. This will avoid the two bridges and two railway crossings that would be required along Range Road.

2.3.4 Overhead powerlines

There is a substantial number of overhead power lines crossing the proposed routes. We consider a rate of two per kilometre³ of route is a conservative estimate, noting that this is much lower sections of the road (for instance most crossings on the Wellington motorway network are underground). We estimate that approximately a quarter of these will require raising, but this will be dependent on the transport provider engaged and their specific equipment.

³ Between Eketāhuna and Waipukurau (120km) we counted approximately 200 locations where power lines cross the route. This has been extrapolated as a reasonable estimate for the entire route.

3 Update to constraints

Potential constraints identified are shown on the Route Plans in Appendix A and listed in the route constraint tables in Appendix B. Where a Waka Kotahi approved diversion route is available, the length constraints along these routes have also been identified through vehicle tracking. We have assumed that the vertical curves along the State Highway network do not present any constraints.

3.1 Length

Vehicle tracking has been updated along the Napier and Wellington routes. Based on the updated tracking, the following additional/changed constraints were identified along the Napier route:

- Pedestrian crossing infrastructure at Dannevirke (near Miller Street)

Based on the updated tracking, the following additional/changed constraints were identified along the Wellington route:

- Roberts Line/Mihaere Drive roundabout; and
- Tight left turn at Roberts Line/SH3 intersection.

The most likely bypass route for transport of the turbine blades through Woodville (both routes) is now considered to be along Tay Street and Station Street. The following constraints are present:

- Tight left turn from SH2/Tay Street intersection;
- Tight right bend along Tay Street; and
- Tight left turn from Station Street/SH2 intersection.

3.2 Weight

As outlined in Section 2.2, no update to the Overweight Feasibility Assessments has been completed. The Overweight Feasibility Assessments for the two routes are attached in Appendix C.

As outlined in Section 2.3, the recommended local road diversion routes have been refined. Therefore, the only local road bridge that is now considered unavoidable is the Kahahakuri bridge, along the Ongaonga Road bypass.

3.3 Height

There is a substantial number of overhead power lines crossing the proposed routes. Applying the estimates described in Section 2.3.4 to each route this gives;

- Port of Napier (200 km) would have approximately 100⁴ power lines to be temporarily raised and reinstated; or
- CentrePort (220 km) would have approximately 110⁵ power lines to be temporarily raised and reinstated.

The cost estimates included in this report do not include these works, as it has been assumed that the cost associated with this will be included in transporter costs.

In addition overbridges at Eketāhuna (both routes) and Norsewood (Napier route only) are height constraints. Both have local road diversion routes as described in Appendix B.

⁴ 200km x 2 (powerlines per km) x 0.25 (quarter of powerlines require raising) = 100

⁵ 220km x 2 (powerlines per km) x 0.25 (quarter of powerlines require raising) = 110

3.4 Costs

High-level comparative cost estimates have been prepared for the modifications required to enable each route to carry the turbine components. Estimates of ranges for the common modifications are summarised below in Table 3.1. For physical works we have estimated a cost range of -20% to +40% rounded to the nearest round number.

These ranges are applied in Section 4 to determine high-level comparative cost estimates of the expected modifications required to enable each route option to carry the turbine components.

The development of these costs has been done as a desktop exercise. There is a risk that the estimates have not identified the full costs. The full cost can only be reliably estimated when ground truthing takes place. We therefore recommend that Meridian may want to add an additional risk factor.

These estimates are for physical works only and do not include allowance for professional services costs, client managed costs or contractor costs. We recommend that Meridian add an allowance for this.

Table 3.1 High level modification cost estimates

Modification	High level cost estimate	Comments
Temporary removal and replacement of roadside signage, streetlights, and overhead power cables	Cost to be included in the transportation of the components.	<ul style="list-style-type: none"> Assumed this will be undertaken by the transport staff as they approach and pass each location.
Temporary removal and replacement of overhead signage (mounted on roadside poles)	\$35k to \$75k	<ul style="list-style-type: none"> Allowing for five trips per turbine and to be lowered and replaced once per trip (20 turbines, 100 trips total). If able to be undertaken by transport staff this would be more cost effective.
Temporary removal and replacement of overhead traffic signals or gantries	\$100k to \$170k	<ul style="list-style-type: none"> Allowing for five trips per turbine and to be lowered and replaced once per trip (20 turbines, 100 trips total). If able to be undertaken by transport staff this would be more cost effective.
Temporary removal and replacement of traffic signal poles	\$50k to \$100k	<ul style="list-style-type: none"> Assumes temporary removal of signal poles or replacement with hinged poles. If able to be undertaken by transport staff this would be more cost effective.
Temporary removal and replacement of railway level-crossing signs and infrastructure	\$75 to \$150k	<ul style="list-style-type: none"> Allowing for removal and replacement of railway level-crossing signs and infrastructure.
Vegetation trimming (individual tree or per 50 m brush clearing)	\$1.5k to \$2.5k	<ul style="list-style-type: none"> Once per location, no allowance for vegetation maintenance between loads.
Temporary removal and replacement of sheep/cattle fencing (per 50 m)	\$2.5k to \$5k	<ul style="list-style-type: none"> Allowing for removal and replacement of fencing. No allowance for acquisition, or approval to access and temporarily occupy private property.

Modification	High level cost estimate	Comments
Bank excavation (Per 50 m or part thereof, up to 150 cubic metres)	\$10k to \$20k	<ul style="list-style-type: none"> Bank shaped to current profile (not changed to include benches or a changed slope). Cleanfill disposal available. Disposal at general refuse rates will incur additional costs. Hydroseed surface stabilisation. Works within the road corridor. Consents not allowed for (if required).
Intersection modification/ widening	\$40k to \$70k	<ul style="list-style-type: none"> Once per location. Allowing for temporary widening, removal of splitter islands and temporary asphalt. Includes reinstatement at end of project (if required).
Approval to access and temporarily occupy non-developed private property (i.e., farmland or garden)	\$100k	<ul style="list-style-type: none"> Assumes a willing landowner. Covers the costs of temporary occupation, fence and vegetation removal, rehabilitation and reinstatement, legal fees, and loss of use.
Replacement of Kahahakuri Stream bridge	\$300k to \$500k	<ul style="list-style-type: none"> Estimate to replace span with new HN-HO-72 rated two lane concrete deck steel beam bridge in existing location with road closure during installation. This is subject to road controlling authority approval. Estimate is based on discussions with Bridge It NZ on 3 June, 2022. No allowance for ground improvement works that could be required to support bridge abutments. Central Hawkes Bay District Council have offered to facilitate a structural review through their consultants (costs to be paid by Meridian) which would provide more certainty for this estimate.
<p>Notes;</p> <ol style="list-style-type: none"> We have not allowed for transporter costs as this will be subject to negotiation between the transport contractor and Meridian. This may vary due to differing distances and other factors between each port. Our estimate for property temporary occupation costs is preliminary and needs further verification. Cost estimates do not include allowance for temporary traffic management. The construction rates utilised for this high-level cost estimate are based on assumed design concepts, estimated quantities and a combination of recently submitted tender rates for similar projects within the regional area along with the latest available rates from QV Cost Builder database (formerly Rawlinsons). Consequently, a significant margin of uncertainty exists on the cost estimate and the contingency we have allowed should be considered as part of the cost rather than a potential add on. No allowance has been included for cost escalation beyond 2022. COVID-19 impacts: The derived rates are based on information and data obtained prior to COVID 19 being declared a pandemic by the World Health Organisation. New Zealand subsequently entering COVID 19 Alert Level 4 "lockdown" plus the global economic impacts of COVID 19 will have an impact on the construction industry in at least the immediate and medium term future. The significance and extent of COVID 19 impacts is uncertain at this time but likely to impact both labour and materials rates. We have not made any attempt to allow for the impact of COVID-19 in this estimate and recommend you seek specialist economic advice on what budgetary allowances you should make for escalation and changed construction costs post COVID 19. 		

3.5 Upcoming Waka Kotahi projects

Waka Kotahi's interactive projects map⁶ and Arataki reports⁷ (10-year guidance documents) were reviewed to identify any upcoming Waka Kotahi projects that could impact the transport of large turbine components. These are listed in Table 3.2 below.

Table 3.2 Upcoming Waka Kotahi Projects

Route	Name	Description	Assessment
Wellington	Te Ahu a Turanga: Manawatū Tararua Highway Project	Construction of a new road over the Ruahine Range between Woodville and Ashhurst. Completion estimated by the end of 2024.	Without construction of this highway, the route from Wellington and Taranaki to the site is not considered a feasible option.
Wellington	Peka Peka to Ōtaki Expressway	Construction of a four-lane expressway. Completion estimated late 2022.	Will improve feasibility of the Wellington route.
Wellington	Ōtaki to North of Levin	Construction of a new four-lane expressway from Ōtaki to North of Levin. Construction estimated 2025-2029.	Will improve feasibility of the Wellington route.

Table 3.2 only includes publicly notified projects recorded on the Waka Kotahi website. We have not considered any routine maintenance or general safety projects which are expected to have limited impact of the routes capacity to take wind turbine loads. This project list may also be subject to change with future releases of Waka Kotahi's National Land Transport Plans and should be reviewed at regular intervals.

⁶ <https://www.nzta.govt.nz/projects/>

⁷ <https://www.nzta.govt.nz/planning-and-investment/planning/arataki/>

4 Summary

Port	Approximate Route Distance (km)	Weight constraints	Length constraints	Height constraints	Estimated route modification costs
Napier Port	200 km (Napier – Hastings – Waipukurau – Woodville – Eketāhuna – Site entrance)	Central Hawkes Bay District Council will need to be engaged to determine if structures along local roads will require strengthening or replacement. The structures and maximum gross weights are: <ul style="list-style-type: none"> A 22 m bridge on Ongaonga Road, Ongaonga (42 tonnes) 	The 67 m blade is able to achieve tracking requirements with modifications to various intersections and constrained curves.	Thor Street overbridge, Norsewood (4.8 m clearance). An alternate route along Hovding Street exists. Rail bridge north of Eketāhuna (4.4 m clearance). An alternate route along Newman Road exists. Temporary raising or lowering and reinstatement of overhead powerlines and constraints required at various locations along the route.	Length/ Height: \$1.2 to \$2.1 M Weight: \$0.3 to \$0.5 M
CentrePort (Wellington)	240 km (Wellington – Tawa – Transmission Gully – Paraparaumu – Levin – Foxton – Sanson – Palmerston North – Ashurst – Woodville – Eketāhuna – Site entrance)	No constraints identified along State Highway network.	The 67 m blade is able to achieve tracking requirements with modifications to various intersections and constrained curves. Assumes Peka Peka to Ōtaki and the Te Ahu a Turanga: Manawatū Tararua Highway Projects are complete.	Rail bridge north of Eketāhuna (4.4 m clearance). An alternate route along Newman Road exists. Temporary raising or lowering and reinstatement of overhead powerlines and constraints required at various locations along the route	Length/ Height: \$1.3 to \$2.2 M Weight: No cost

From a transport assessment, both routes are considered feasible.

5 Risks and opportunities

The costs outlined in Section 4 are the best estimates of physical work costs associated with the level of detail at this stage of the assessment. These cost estimates are based on a desktop assessment and are indicative only. Ground truthing may increase or decrease costs. It would be prudent to add a risk component to these cost until further work on transport routes is undertaken. Cost estimates do not include transporter costs, the temporary removal and replacement of roadside signage, streetlights and overhead power cables or traffic management. Further engagement with transporters will be required to determine a cost estimate for this.

Travel along local roads is proposed, around diversions and at the site access. Diversions from the State Highway network are required around buildings restricting turns (Waipukurau and Woodville) and under-height structures (Norsewood and Eketāhuna).

There are also opportunities for reductions in costs. These include:

- Cost savings available for the Port of Napier route if the Kahahakuri Stream bridge can be strengthened (either permanent or temporarily propped) rather than fully replaced as has currently been priced;
- Potential for cost sharing of costs if Kahahakuri Stream bridge is replaced and Central Hawkes Bay District Council see benefit from the upgrade;
- Further optimisation of routes to minimise transportation costs. For example, transporting the turbine components from Wellington via SH57 could be investigated further. There is also an opportunity to transport blades from Auckland or Tauranga through the central North Island, while transporting heavier components from Napier via SH5; and
- Using innovative trailer configurations to reduce the length constraints along the route. This technology is being utilised to transport 55 m long wind turbine blades for the Turitea Wind Farm. Smith Crane and Construction have developed a trailer configuration that requires only one trailer at the front, tilting the blade to reduce the length to 27 m. A conversation with Smith Crane and Construction on 19 May 2021 indicate that transport of 59 m blades could be feasible, with the opportunity to significantly reduce civil works required for this project.

6 Applicability

This report has been prepared for the exclusive use of our client Meridian Energy Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

The construction rates utilised for this high level cost estimate are based on assumed design concepts, estimated quantities and a combination of recently submitted tender rates for similar projects within the regional area along with the latest available rates from QV Cost Builder database (formerly Rawlinsons). These rates are based on historic information and data and do not include allowance for any cost escalation since the date of the data other than where/as specifically stated.

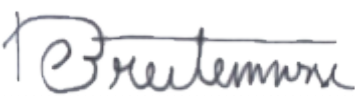
Consequently, a significant margin of uncertainty exists on the cost estimate and the contingency we have allowed should be considered as part of the cost rather than a potential add on.

In particular, we have not made any attempt to allow for the potential impact of COVID-19 in this estimate. Also, supply chain disruptions are currently having quickly-changing effects on construction costs and schedules. We recommend you seek up-to-date specialist economic advice on what budgetary allowances you should make for escalation, including for any potential changes in construction costs and timing in relation to both COVID-19 and supply-chain issues.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:

Reviewed by:



Tess Breitenmoser
Transport Engineer



Billy Rodenburg
Senior Transport Engineer

Authorised for Tonkin & Taylor Ltd by:



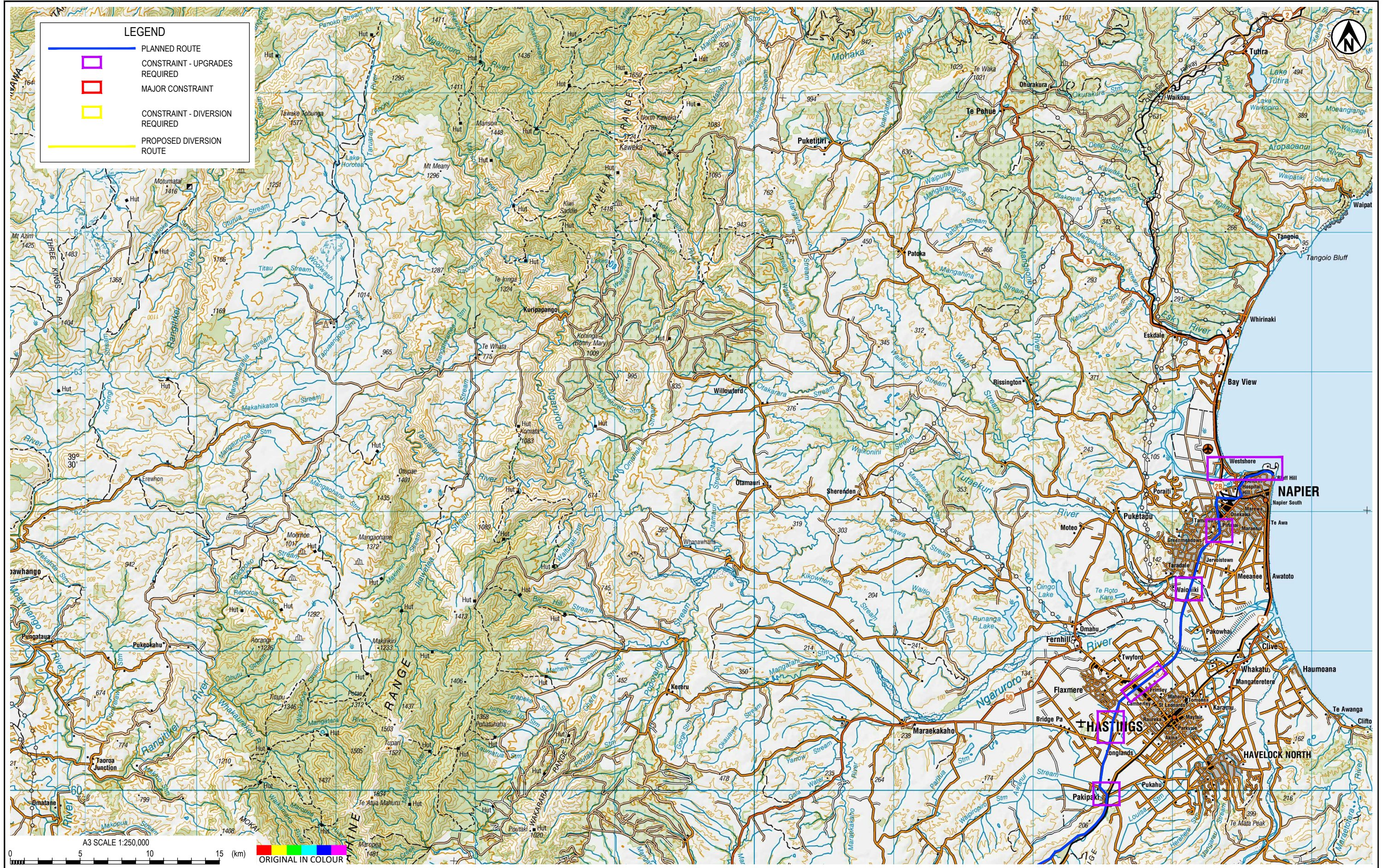
Bruce Symmans
Project Director

TEBR

\\ttgroup.local\corporate\Christchurch\TT Projects\1016884\1016884.1000\IssuedDocuments\07.9.23 1016884.1000 Port to site update.docx

Appendix A Updated route plans

- Figures 1016884.0000-F21 to F23 (Napier)
- Figures 1016884.0000-F41 to F42 (Wellington)



NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. COORDINATE DATUM: NZGD2000, NEW ZEALAND TRANSVERSE MERCATOR (NZTM2000).
3. TOPOMAP SOURCED FROM LINZ DATA SERVICE LICENSED BY LINZ FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 NEW ZEALAND LICENCE (CC BY 4.0). ACCESSED 10/05/2021.

PROJECT No. 1016884.0000

DESIGNED	TEBR	Apr. 21
DRAWN	MROH	Apr. 21
CHECKED		

CLIENT **MERIDIAN ENERGY**

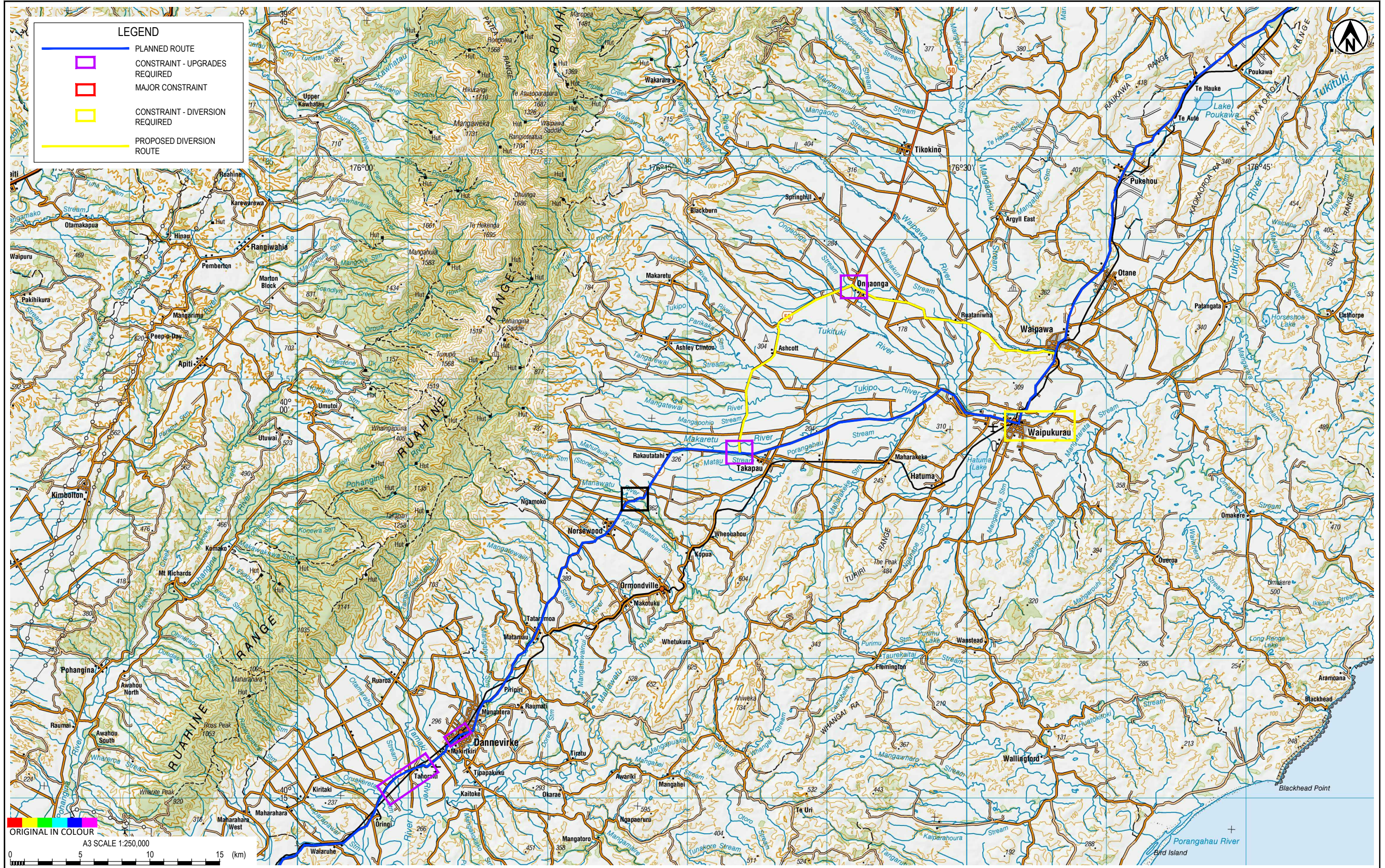
PROJECT **MT MUNRO - MEL WAIRARAPA WIND FARM**

TITLE **PORT TO SITE ROUTE
NAPIER TO MT MUNRO WIND FARM SHEET 1**

APPROVED DATE

SCALE (A3) AS SHOWN FIG No. 1016884.0000-F21

REV 1

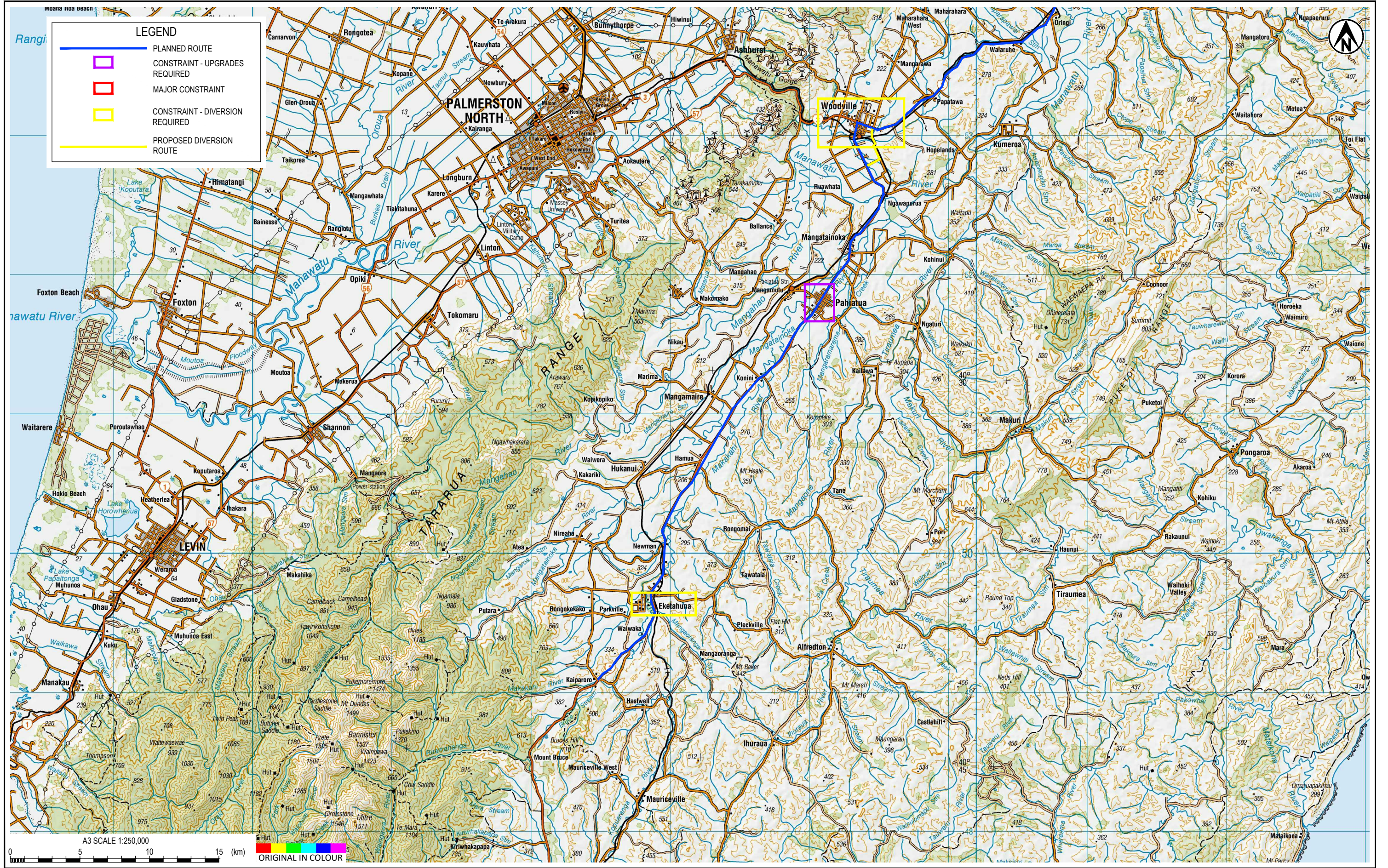


NOTES:

- ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
- COORDINATE DATUM: NZGD2000, NEW ZEALAND TRANSVERSE MERCATOR (NZTM2000).
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PROJECT No. 1016884.0000		
DESIGNED	TEBR	Apr. 21
DRAWN	MROH	Apr. 21
CHECKED		
APPROVED		DATE

CLIENT	MERIDIAN ENERGY
PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM
TITLE	PORT TO SITE ROUTE NAPIER TO MT MUNRO WIND FARM SHEET 2
SCALE (A3)	AS SHOWN
FIG No.	1016884.0000-F22
REV	1



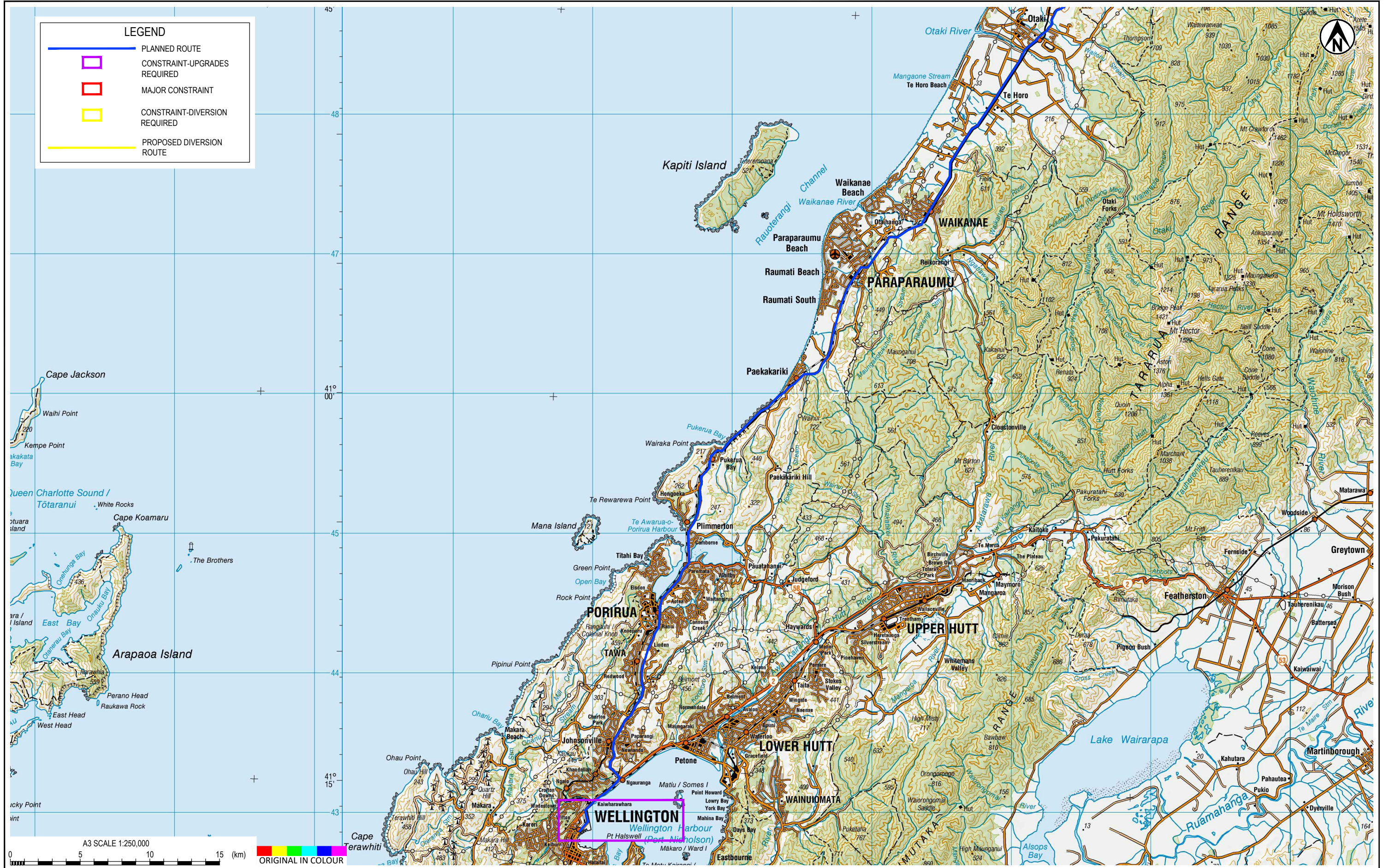
LEGEND

- PLANNED ROUTE
- CONSTRAINT - UPGRADES REQUIRED
- MAJOR CONSTRAINT
- CONSTRAINT - DIVERSION REQUIRED
- PROPOSED DIVERSION ROUTE

NOTES:

- ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
- COORDINATE DATUM: NZGD2000, NEW ZEALAND TRANSVERSE MERCATOR (NZTM2000).
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PROJECT No. 1016884.0000		CLIENT MERIDIAN ENERGY
DESIGNED	TEBR	PROJECT MT MUNRO - MEL WAIRARAPA WIND FARM
DRAWN	MROH	TITLE PORT TO SITE ROUTE
CHECKED		NAPIER TO MT MUNRO WIND FARM SHEET 3
APPROVED _____ DATE _____		SCALE (A3) AS SHOWN FIG No. 1016884.0000-F23
		REV 1



LEGEND

- PLANNED ROUTE
- CONSTRAINT-UPGRADES REQUIRED
- MAJOR CONSTRAINT
- CONSTRAINT-DIVERSION REQUIRED
- PROPOSED DIVERSION ROUTE

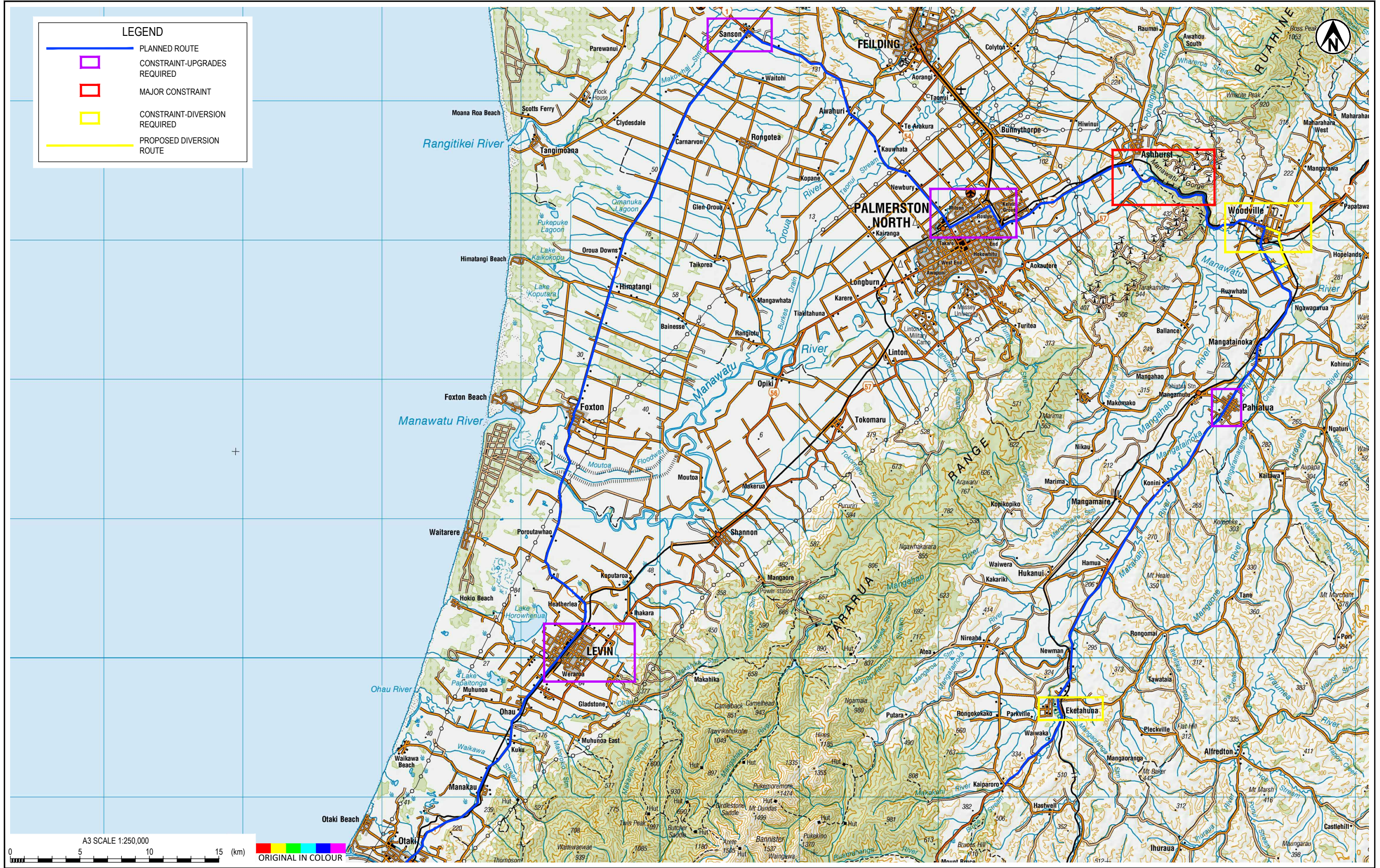
NOTES:

- ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
- COORDINATE DATUM: NZGD2000, NEW ZEALAND TRANSVERSE MERCATOR (NZTM2000).
- TOPOMAP SOURCED FROM LINZ DATA SERVICE LICENSED BY LINZ FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 NEW ZEALAND LICENCE (CC BY 4.0). ACCESSED 10/05/2021.

PROJECT No. 1016884.0000		
DESIGNED	TEBR	Apr. 21
DRAWN	MROH	Apr. 21
CHECKED		
APPROVED		DATE

CLIENT	MERIDIAN ENERGY
PROJECT	MT MUNRO - MEL WAIRARAPA WIND FARM
TITLE	PORT TO SITE ROUTE WELLINGTON TO MT MUNRO WIND FARM SHEET 1
SCALE (A3)	AS SHOWN
FIG No.	1016884.0000-F41
REV	1

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LEGEND

- PLANNED ROUTE
- CONSTRAINT-UPGRADES REQUIRED
- MAJOR CONSTRAINT
- CONSTRAINT-DIVERSION REQUIRED
- PROPOSED DIVERSION ROUTE

A3 SCALE 1:250,000

0 5 10 15 (km)

ORIGINAL IN COLOUR

NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. COORDINATE DATUM: NZGD2000, NEW ZEALAND TRANSVERSE MERCATOR (NZTM2000).
3. TOPOMAP SOURCED FROM LINZ DATA SERVICE LICENSED BY LINZ FOR RE-USE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 NEW ZEALAND LICENCE (CC BY 4.0). ACCESSED 10/05/2021.

PROJECT No. 1016884.0000

DESIGNED	TEBR	Apr. 21
DRAWN	MROH	Apr. 21
CHECKED		

CLIENT **MERIDIAN ENERGY**

PROJECT **MT MUNRO - MEL WAIRARAPA WIND FARM**

TITLE **PORT TO SITE ROUTE**
WELLINGTON TO MT MUNRO WIND FARM SHEET 2

SCALE (A3) AS SHOWN FIG No. 1016884.0000-F42

REV 1



APPROVED

DATE

Appendix B Updated route constraint tables

B1.1 Updated route constraint tables

- B1 Napier
- B2 Wellington

B1.2 Route constraint table notes

- 1 Temporary raising or lowering and reinstatement of roadside signage, streetlights, and overhead power cables has been to be included in transporter costs and is not specifically identified below
- 2 Tables B1 and B2 are based on the route constraint tables produced for the 59m long blades and 120t indivisible load in July 2021. Most constraints are still a constraint for the updated assessment. Changes to the constraints previously reported in July 2021 are shown as follows;
 - Additional constraints identified for passage of the 67 m long blades are shown in *red italics*
 - Constraints no longer applicable due to a diversion route or reassessed following the drive over are shown ~~struck through~~
 - Constraints not able to be temporarily addressed (for example buildings blocking passage or understrength bridge) and necessitating significant works or diversion have been made bold

B2 Napier

Port	Road/SH sections	Location/Intersection	Length and/or height constraints
Napier	Port of Napier	Port Access/Breakwater Rd	Tight right turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Traffic signals • Street furniture and signs
Napier	SH50	Customs Quay/Coronation St roundabout	The through movement of the trailer is restricted. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Widening of the existing bypass
Napier	SH50	SH50/Prebensen Dr-roundabout	Tight right turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Two splitter islands • Street furniture and signs
Napier	SH50	SH50/Ford Rd/Severn St roundabout	The through movement of the trailer is restricted. This may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Two splitter islands • Part of the central island
Napier	SH50	SH50/SH51 Roundabout junction	The through movement of the trailer is restricted. This may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Two splitter islands • Streetlights and signs
Napier	SH50	SH50/SH2 roundabout junction at Pakowhai Rd	The through movement of the trailer is restricted. This may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Two splitter islands • Part of the central island • Streetlights and signs

Port	Road/SH sections	Location/Intersection	Length and/or height constraints
Napier	SH2	SH2 roundabout with Evenden Rd	The through movement of the trailer is restricted. This may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Two splitter islands • Part of the central island • Streetlights and signs
Napier	SH2	SH2 roundabout with Omaha Rd	The through movement of the trailer is restricted. This may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Two splitter islands • Part of the central island
Napier	SH2	SH2 roundabout with York Rd	The through movement of the trailer is restricted. This may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Two splitter islands • Part of the central island
Napier	SH2	SH2 Roundabout with Maraekakaho Rd	The through movement of the trailer is restricted. This may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Two splitter islands • Part of the central island
Napier	SH2	Between Maraekakaho Rd and Railway Rd roundabouts	<u>Possible restriction:</u> Overhead powerlines
Napier	SH2	SH2 Roundabout with Railway Rd	The through movement of the trailer is restricted. This may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Two splitter islands • Part of the central island
Napier	SH2	SH2 Roundabout in Waipukurau	The right turn is extremely tight; The movement of the blade transporter cannot be accommodated due to adjacent buildings. Diversion route available via Ongaonga Road and SH50, as outlined below.

Port	Road/SH sections	Location/Intersection	Length and/or height constraints
Napier	Diversion route: SH50	Ongaonga Rd/SH50	Tight left turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Splitter island • Road signs • Overhead powerlines • Vegetation
Napier	Diversion route: SH2/ SH50 intersection	SH2/ SH50 intersection	Tight right turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Splitter island • Road signs • Vegetation
Napier	SH2	Between Waipukurau and Norsewood	<u>Possible restriction:</u> Overhead powerlines
Napier	SH2	Sharp bend in road north of Manawatu River bridge	Tight horseshoe bend with bank on the right hand side and gully on the left hand side. <u>Possible solution:</u> Cutting of trees and cutting of embankment
Napier	SH2	Norsewood	Road Bridge Clearance 4.8 m Diversion available along Hovding St. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Widening of two intersections; • Roadside signs • Vegetation There is also an opportunity to remove fencing and cross directly back to SH2. Further investigation would be required.
<i>Napier</i>	<i>SH2</i>	<i>Dannevirke (near Miller Street)</i>	<i>Tight alignment through the pedestrian crossing. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed</i> <ul style="list-style-type: none"> • <i>Splitter island</i> • <i>Road signs</i>

Port	Road/SH sections	Location/Intersection	Length and/or height constraints
Napier	SH2	Between Dannevirke and Woodville	The following restrictions have been identified along the route between Dannevirke and Woodville: <ul style="list-style-type: none"> • Possible vegetation/tree removal • Overhead powerlines • Railway level crossing infrastructure (near Wi Duncan Road)
Napier	SH2	Between Dannevirke and Woodville	<u>Possible restriction:</u> Overhead powerlines
Napier	SH3/SH2	Woodville	The left turn is extremely tight; The movement of the blade transporter cannot be accommodated due to adjacent buildings. Diversion route available via Nelson Street, Range Road and Priest Road. Overhead powerlines and vegetation at various locations along the route.
<i>Napier</i>	<i>Diversion route at Woodville</i>	<i>Intersection SH2/Tay St</i>	<i>Tight left turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed:</i> <ul style="list-style-type: none"> • <i>Roadside signs</i> • <i>Shoulder widening</i> • <i>Vegetation removal</i>
<i>Napier</i>	<i>Diversion route at Woodville</i>	<i>Tay St</i>	<i>Tight right turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed:</i> <ul style="list-style-type: none"> • <i>Blade tracking crosses private property at 2 Tay St;</i> • <i>Vegetation</i> • <i>Fences</i> • <i>Shoulder widening</i>
<i>Napier</i>	<i>Diversion route at Woodville</i>	<i>Station St</i>	<i>Tight left turn. Utilise existing railway level crossing at yard.</i>
Napier	Diversion route at Woodville	Intersection SH2/Nelson St	Tight left turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Roadside signs • Shoulder widening

Port	Road/SH sections	Location/Intersection	Length and/or height constraints
Napier	Diversion route at Woodville	Nelson St	Tight S bend. Blade tail overhang may be accommodated if the following restrictions are modified: <ul style="list-style-type: none"> • Vegetation
Napier	Diversion route at Woodville	Range Rd at Railway line	Tight S bend across railway line. Blade tail overhang may be accommodated if the following restrictions are modified: <ul style="list-style-type: none"> • Railway crossing infrastructure • Vegetation • Power pole • Road signs
Napier	Diversion route at Woodville	Range Rd/Priest Rd	Tight right turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Roadside signs • Shoulder widening • Utility pole
Napier	Diversion route at Woodville	Priest Rd/SH2	Tight left turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Roadside signs • Shoulder widening
Napier	SH2	Pahiatua	<u>Possible restriction:</u> Overhead power cable crossings over traffic lanes.
Napier	SH2	Eketāhuna	Road Bridge Clearance 4.34 m Diversion available along Newman Rd. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Blade tracking crosses private property at 103 and 105 Newman Road; • Vegetation • Fences
Napier	SH2	Eketāhuna	Tight left turn bend. Blade tail overhang may be accommodated if the following restrictions are modified: <ul style="list-style-type: none"> • Streetlights • Road signs

Port	Road/SH sections	Location/Intersection	Length and/or height constraints
Napier	SH2	SH2/Old Coach Road Intersection	Tight left turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none">• Road signs• Vegetation• Wooden fences

B3 Wellington

Port	Road/SH sections	Location/Intersection	Length and/or height constraints
Wellington	CentrePort Wellington	Port Exit -Whitmore Street-Lambton Quay Intersection	<u>Possible restriction:</u> Overhead power cable crossing over traffic lanes.
Wellington	Bunny Street	Whitmore St/Thorndon Quay intersection	Tight right turn onto Thorndon Quay. The blade end turn movement is restricted by: <ul style="list-style-type: none"> • Existing street furniture • Splitter islands • Traffic signals
Wellington	Thorndon Quay	Thorndon Quay bus station	Trees/signals
Wellington	Thorndon Quay	At Wellington Urban Motorway	<u>Possible restriction:</u> Overhead bridge
Wellington	Hutt Road	Intersection with railway and Aotea Quay	<u>Possible restriction:</u> Overhead bridge
Wellington	Hutt Road	At Aotea Quay intersection	<u>Possible restriction:</u> Overhead sign
Wellington	Hutt Road	Kaiwharawhara Rd intersection	<u>Possible restriction:</u> Overhead signal
Wellington	Hutt Road	Railway interchange just north of Onslow Rd	<u>Possible restriction:</u> Overhead bridge

Port	Road/SH sections	Location/Intersection	Length and/or height constraints
Wellington	SH1	Between Ngauranga Interchange and Porirua	<p>The possible restrictions along SH1 are:</p> <ul style="list-style-type: none"> • Overhead sign • Overhead bridge / Newlands interchange • Johnsonville south overpass • Johnsonville north overpass • Overhead bridge • Approx. 45 m Takapu Road • Overbridge • Approx. 45 m long bridge • Overhead signal • Long bridges along the route: (50m, 70m) • Overhead power cables
Wellington	SH1N	Levin	<p>The possible restrictions along SH1N are:</p> <ul style="list-style-type: none"> • Overhead bridge • Overhead signal
Wellington	SH1N	Sanson – SH1N/SH3 Intersection	<p>Tight right turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed:</p> <ul style="list-style-type: none"> • Widen the right turn movement to include part of the parking area • Power poles (2) • Splitter islands (2) • Road signs
Wellington	SH3	SH3/ J F Kennedy Intersection	<p>Possible restriction;</p> <ul style="list-style-type: none"> • Overhead streetlight
Wellington	Tremaine Ave/SH3	Intersection Tremaine Ave and SH3	<p>Tight left turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed:</p> <ul style="list-style-type: none"> • Overhead traffic signals

Port	Road/SH sections	Location/Intersection	Length and/or height constraints
Wellington	Roberts Line	Roberts Line/Mihaere Drive roundabout	The through movement of the trailer is restricted. This may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Two splitter islands • Part of the central island
Wellington	Roberts Line	Roberts Line/SH3	Tight left turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Roadside signs • Shoulder widening • Utility pole • Vegetation
Wellington	SH3	Manawatū Gorge	Current road closure for Te Ahu a Turanga: Manawatū Tararua Highway Project Te Ahu a Turanga: Manawatū Tararua Highway Project scheduled to be completed by 2024
Wellington	SH3/SH2	SH3/SH2 (Woodville)	The right turn is extremely tight; The movement of the blade transporter cannot be accommodated due to adjacent buildings. Diversion route available via Troup Road West. Vegetation clearance and intersection widening required along diversion route to accommodate swept path of blade
Wellington	Diversion route at Woodville	Intersection SH2/Tay St	Tight right turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Roadside signs • Shoulder widening Vegetation removal
Wellington	Diversion route at Woodville	Tay St	Tight right turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Blade tracking crosses private property at 2 Tay St; • Vegetation • Fences Shoulder widening

Port	Road/SH sections	Location/Intersection	Length and/or height constraints
Wellington	Diversion route at Woodville	Station St	Tight left turn. Utilise existing railway level crossing at yard.
Wellington	Diversion route along SH3/Troup Rd West	Intersection SH3 and Troup Rd West	Tight right turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Roadside signs
Wellington	Diversion route at Woodville	Tight left bend along Troup Rd West	Tight left bend. Through movement of the trailer may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Shoulder widening
Wellington	Diversion route at Woodville	Troup Rd West	Tight 90° left bend. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Shoulder widening
Wellington	Diversion route at Woodville	Intersection Troup Rd West and SH2	Tight right turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Roadside signs • Shoulder widening
Wellington	SH2	Pahiatua	<u>Possible restriction:</u> Overhead power cable crossing over traffic lanes.
Wellington	SH2	Eketāhuna	Road Bridge Clearance 4.34 m Diversion available along Newman Rd. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none"> • Blade tracking crosses private property at 103 and 105 Newman Road; • Vegetation • Fences
Wellington	SH2	Eketāhuna	Tight left turn bend. Blade tail overhang may be accommodated if the following restrictions are modified: <ul style="list-style-type: none"> • Streetlights • Road signs

Port	Road/SH sections	Location/Intersection	Length and/or height constraints
Wellington	SH2	SH2/Old-Coach Road Intersection	Tight left turn. Blade tail overhang may be accommodated if the following restrictions are modified/ temporarily removed: <ul style="list-style-type: none">• Road signs• Vegetation• Wooden fences

Appendix C Waka Kotahi Overweight Feasibility Assessments

- Port of Napier, Breakwater Road to SH2/Kaipararo Rd intersection
- Centreport Wellington to SH2/Kaipararo Rd intersection

Tonkin+Taylor Ltd
PO Box 2083
Wellington 6140

Attn: Tess Breitenmoser Cell: 027 8551715 Phone: 04 3818560

TSL No.

is hereby authorised to use (vehicle description): **Special Project Transporter**

Registered N^o(s): **TT Feas 1, TT Feas 2, TT Feas 3**

Feasibility Study Only - not for issue as an Overweight Permit

For the transport of: **Substation transformer**

On Route: **SH50 PON to SH2/Kaipararo Rd intersection**

Over the route specified below, subject to the conditions, restrictions, and maximum mass limits in this Permit.

VAI: **1.25**

Axle Number	1	2	3	4	5	6	7	8	9	10
Axle Type*	S	T	T	8	8	8	8	8	8	8
Individual Axle Mass Limit (kg)	6500	9000	9000	9500	9500	9500	9500	9500	9500	9500
Spacing from previous axle (m)	0.00	4.50	1.45	5.80	1.80	1.80	1.80	1.80	1.80	1.80
Tyre Size	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard

Axle Number	11	12	13	14	15	16	17	18	19	20
Axle Type*	8	8	8	8	8	8	8	8	8	8
Individual Axle Mass Limit (kg)	9500	9500	9500	9500	9500	9500	9500	9500	9500	9500
Spacing from previous axle (m)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
Tyre Size	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard

Axle Number	21	22	23	24	25	26	27
Axle Type*	8	8	8	S	S	T	T
Individual Axle Mass Limit (kg)	9500	9500	9500	5500	5500	7500	7500
Spacing from previous axle (m)	1.80	1.80	1.80	8.35	1.92	1.73	1.35
Tyre Size	Standard	Standard	Standard	Standard	Standard	Standard	Standard

* S=Single tyred axle, T=Twin tyred axle, 4=Four tyred oscillating axle, 8=Eight tyred oscillating axle, 12=Twelve tyred oscillating axle, 16=Sixteen tyred oscillating axle. The tyre sizes shall be as indicated above.

The total mass on any individual axle, axle set, or combination of axles must not exceed the sum of the mass limits shown for those axles in the table above.

Critical Conditions

The vehicle must not—

1. exceed the maximum permitted gross mass of **240,500** kilograms
2. exceed design limits, such as GVM
3. breach a travel restriction or requirement for a specified bridge or culvert.

Additional Conditions

1. *Separate Plant* - The carriage or towing of separate items of plant, equipment or materials not specifically nominated in the description of load is not permitted.
2. *Mass* - The mass of any axle shall not exceed the mass specified in this permit. The gross mass of the vehicle or combination of vehicles must not exceed the limit specified on the current certificate of loading issued to the vehicles.
3. *Authorised Agent* - The vehicle shall not be operated on a road or bridge under this permit when in the opinion of an authorised agent of the road controlling authority, as communicated to the operator, it would be contrary to public interest to do so.
4. *Non-Transferable* - This permit is not transferable either to other users of or to any vehicle other than the vehicle described by this permit.
5. *Weighing* - Police are authorised to divert vehicles up to five kilometres from the approved route for the purpose of weighing, provided under strength bridges are not included on the route.

Feasibility

ROUTE AND SPECIAL INSTRUCTIONS: Feasibility Study

This Feasibility Study has been issued as a guide to ascertain possible crossing restrictions for the vehicle combination listed under the following NZTA State Highway Route:

Hawkes Bay Region:

This permit covers State Highway and Napier City Council routes as specified below.

State Highway

Section	Highway	From RP	From Junction	To RP	To Junction
1	SH50	0 / 0.0		2 / 2.27	
PON SH50 to SH50/SH2 Intersection					
1	SH2	648 / 1.39		743 / 7.75	
SH2/SH50 intersection to SH2 CHB/Tararua District Bdry					

Local Authority Permit is required to travel on Local Authority roads not covered by this overweight permit.

For access to CHBDC please contact:

Central Hawke's Bay District Council – Shawn McKinley (06) 857 8060 shawn.mckinley@chbdc.govt.nz or
Ross Munroe (06) 857 8060 ross.munro@chbdc.govt.nz

Operator to obtain prior approval (at least 48 hours) to travel on Local Authority Roads

Manawatu Region:

Section	Highway	From RP	From Junction	To RP	To Junction
1	SH2	751 / 0.0		842 / 10.66	
SH2, from Norsewood Boundary to Kaipararo Rd Intersection, Eketahuna					

Special Instructions

- THIS PERMIT IS ISSUED FOR STATE HIGHWAY USE ONLY**
- This permit does not cover travel on Local Authority Roads and prior approval must be obtained from the appropriate Local Authority to use their roads. (See below for Local Authority Contacts).
- NOTE: Vehicle is to avoid moving through peak traffic hours. Vehicle travel times that apply to this permit are those that relate specifically to each type of vehicle as covered by the Land Transport Rule Vehicle Dimension and Mass 2016 Rule 41001.
- Use bypasses when available.

Prior approval (at least 48 hours) must be obtained from the appropriate local authority to use the following bypasses:

SH 2 – Norsewood Subway (if vehicle height exceeds 4.8m)

South Bound Travel: SH2 Hovding Street, Norsewood, rejoin SH2

North Bound Travel: SH2 to Coronation Street to Upper Norsewood, Odin Street, rejoin SH2

Local Authority Contacts:

Tararua District Council – tmp@tararuaalliance.co.nz

Special Instructions**Requirement to observe permit conditions**

A breach of weight limits specified on this form, or any permit condition, is an offence as provided in the *Land Transport (Offences and Penalties) Regulations 1999*.

Permit is invalid if:

- a. The permit is altered without authority
- b. The vehicles or persons operating the vehicles are not those described on the permit.

Revocation

This permit can be revoked, under clause 5.7 of the Rule.

Authorised Issuing Officer


 Angela O'Connor (Name)
 Permit Issuing Officer (Designation)
 (for) NZ Transport Agency (Controlling Authority)
 Napier (Location)
 207169 - 16 April 2021 (Permit Dated)

Advisory Notes:

1. This permit is an exemption from the mass limits set out in the Land Transport Rule: Vehicle Dimensions and Mass 2016, and does not authorise the user to exceed the exemption so permitted or exempt the user from complying with all other acts, regulations and other laws (including those relating to certificate of loading, road user charges or Static Roll Threshold).
2. This permit must be carried on the vehicle and must be surrendered for inspection on the demand of any enforcement officer, or an authorised agent of the NZ Transport Agency or a road controlling authority.
3. The conditions on the reverse of this form shall apply together with any other conditions on the attached sheets.
4. *Overdimension* - For the transport of vehicles and loads that exceed the limits specified in Section 6 of the Land Transport Rule: Vehicle Dimensions and Mass 2016, a separate permit must be obtained from the Overdimension Permit Issuing Agency (OPIA) at the NZ Transport Agency, Palmerston North. OPIA contact number 0800 OVERSIZE / 0800 683774.
5. *Railway Level Crossings* - Travel over level crossings is not fully covered by this permit. Operators of overweight and overdimension vehicles may require permission from KiwiRail or their agents for travel over railway level crossings
6. *Tyre pressure* - Tyres must be operated at the pressures recommended by either the manufacturer or the Tyre and Rim Associations but not exceeding the maximum pressures stated in the Land Transport Rule 32013: Tyres and Wheels 2001.
7. For copies of the HB and Gisborne route maps refer to NZ Transport Agency Overweight Permit Route Maps Manual – State Highway Section Pages 7 and 8 for the By-pass route for Hastings refer to Bypass Section Page 9 (available on our website www.nzta.govt.nz).

Fees Payable:

Permit Issuing Fee (As specified in 'Schedule' of the Land Transport certification and other fees) Regulations 2014	\$18.18
Bridge Supervision Fee (0 Trips)	\$0.00
Total Fee	\$18.18
GST	\$2.73
Total	\$20.91

Feasibility Study Only

Critical Conditions: Bridge Restrictions

1. Engineering supervision of bridges is required during the trip authorised by this permit. For this purpose the user to whom this permit is issued shall contact the agents of the road controlling authorities nominated below at least **24 hours** in advance of the bridge crossing and arrange to meet the supervisor.

The vehicle and its load shall be operated in strict accordance with all instructions given by the supervisor and it shall not proceed past the arranged meeting place without being instructed to do so by the supervisor.

- Note: (a) A police officer, unless specifically authorised by the road controlling authority, is not empowered to carry out bridge engineering supervision
 (b) If the operator fails to rendezvous within one hour of the time arranged and the supervised crossing(s) is/are postponed or cancelled, a fee of \$40 will be charged (the equivalent of one supervised crossing).

2. Agents are:

	Agents:	Telephone:
All SH Bridges Listed except DO NOT CROSS	Self-Supervision. BESS certified drivers only. BESS ID Card or Letter Must Be Carried on Vehicle. Failure to produce VOIDS Permit NOTE: Traffic control requirements	
SH Bridges showing as DO NOT CROSS	DO NOT CROSS ON THIS PERMIT	

All NCC Bridges Listed except DO NOT CROSS	Self-Supervision. BESS certified drivers only. BESS ID Card or Letter Must Be Carried on Vehicle. Failure to produce VOIDS Permit NOTE: Traffic control requirements	
NCC Bridges showing as DO NOT CROSS	DO NOT CROSS ON THIS PERMIT	

3. Bridges requiring engineering supervision are

4. **Hawkes Bay Region:**

Bridge No.	State Highway	Route Position	Bridge Name	BSN	Speed*	Position*	Risk to Other Vehicles*	GPS Co-ords N/E
1	2	651/0.64	Kennedy Road Overbridge (Incr Dir)	6516	20	Own Lane	Not Significant	5618709/1933399
2	2	651/4.87	Tutaekuri River Bridge (Incr Dir)	6559	10	Central	High	5615166/1931523
3	2	691/16.11	Kaikora Bridge (Incr Dir)	7071	20	Own Lane	Not Significant	5577821/1909668
4	2	707/6.82	Waipawa River Bridge (Incr Dir)	7138	10	1.56	High	5572083/1906382

Bridge No.	State Highway	Route Position	Bridge Name	BSN	Speed*	Position*	Risk to Other Vehicles*	GPS Co-ords N/E
5	2	707/12.31	Tukituki River (Waipukurau) Bridge (Incr Dir)	7193	10	Own Lane	Low	5567460/1903860
6	2	729/0.0	Maharakeke Stream Bridge (Incr Dir)	7290	10	Central	High	5568269/1896861

Feasibility Study Only

Manawatu Region:

Bridge No.	State Highway	Route Position	Bridge Name	BSN	Speed*	Position*	Risk to Other Vehicles*	GPS Co-ords N/E
1	2	758/0.42	Mangatewai-Nui River Bridge (Incr Dir)	7584	10	Central	High	5557389/1871639
2	2	758/11.13	Piri Piri Rail Overbridge (Incr Dir)	7691	10	Own Lane	Low	5548215/1866889
3	2	772/4.28	Tapuata Stream (Stanley St) Bridge (Incr Dir)	7763	20	Own Lane	Not Significant	5543935/1862900
4	2	772/11.97	Oringi North Rail Overbridge (Incr Dir)	7840	10	Own Lane	Low	5539133/1857564
5	2	772/15.75	Raparapawai Stream Bridge (Incr Dir)	7878	10	Own Lane	Low	5536697/1854877
6	2	788/0.7	Herberts Bridge (Incr Dir)	7887	50	Own Lane	Not Significant	5536672/1854018
7	2	808/0.0	Manawatu River (Ngawapurua) Bridge (Incr Dir)	8080	20	Own Lane	Not Significant	5525600/1845307
8	2	808/4.99	Mangatahoka River Bridge (Incr Dir)	8130	20	Own Lane	Not Significant	5521568/1842943
9	2	825/0.0	Makakahi River (Konini) Bridge (Incr Dir)	8242	50	Own Lane	Not Significant	5512556/1836607
10	2	842/2.79	Waiwaka No.2 Bridge (Incr Dir)	8448	20	Own Lane	Not Significant	5495844/1828870
11	2	842/9.64	Makakahi River (Kaiparoro) Bridge (Incr Dir)	8516	10	Central	High	5490734/1824617

*See the next page

4. The user to whom this permit is issued shall contact the police at least two working days in advance of the crossing of any bridge in the above list where "police control" is indicated and make arrangements for a police officer to be present to control other traffic during the supervised crossing.
5. Bridge Engineering Self Supervision is permitted only for the bridge listed and the person named in condition 2 above.

Critical Conditions: Bridge Restriction Requirements

A. SPEED

The speed of the overweight vehicle shall not exceed the value shown while on the bridge.

B. POSITION

The vehicle shall travel in the left hand lane on all bridges except those for which alternative bridge engineering supervision instructions are specifically provided in this permit.

Own Lane - the overweight vehicle shall travel in its own lane as far as is practicable.

Offset - the overweight vehicle shall travel so that its centre is at the indicated distance from the kerb on the left of the vehicle.

Central - the overweight vehicle shall travel on that part of the bridge most favourable to the structure. This shall be:

- (i) central on the beam system for bridges with beams and concrete decks;
- (ii) central between kerbs for slab bridges;
- (iii) approximately central on the beam system but with wheels as near as possible over the beams for bridges with timber decks.

Opposite Bridge - the overweight vehicle shall use the bridge for the opposing traffic direction.

Ford or Bypass - the overweight vehicle **shall not cross the bridge** but use the adjacent ford or bypass.

C. TRAFFIC CONTROL

Other heavy vehicles proceeding in the same direction shall be spaced at least 30 metres from the overweight vehicle while it is on the bridge. Cars may be closer if necessary.

Where "offset", "central" or "opposite bridge" is indicated for position, traffic travelling in the opposing direction shall be prevented from crossing the bridge while the overweight vehicle is on it.

Traffic control at bridge crossings shall be in accordance with the "Code of Practice for traffic control at bridges being crossed by overweight vehicles"

Traffic control requirements:

Risk to other vehicles	Traffic control requirements
Not significant	None required
Low	Overweight vehicle to have revolving amber light or flashing amber light visible from the rear together with rear facing retro-reflective hazard panels
High	Provide qualified traffic controllers or Class 1 or Class 2 certified pilots using approved industry procedures.

Tonkin+Taylor Ltd, PO Box 2083, Wellington 6140, Attn: Serene Saab, Fax: , Phone: 04 3818560

TSL No.

is hereby authorised to use (vehicle description): **Special Project Transporter**

Registered N^o(s): **TT Feas 1, TT Feas 2, TT Feas 3**

Feasibility Study Only - not for issue as an Overweight Permit

For the transport of: **1 x Substation Transformer**

On Route: **Centreport Wellington to SH2/ Kaipararo Rd Intersection, Eketahuna**

Over the route specified below, subject to the conditions, restrictions, and maximum mass limits in this Permit.

VAI: **1.25**

Axle Number	1	2	3	4	5	6	7	8	9	10
Axle Type*	S	T	T	8	8	8	8	8	8	8
Individual Axle Mass Limit (kg)	6500	9000	9000	9500	9500	9500	9500	9500	9500	9500
Spacing from previous axle (m)	0.00	4.50	1.45	5.80	1.80	1.80	1.80	1.80	1.80	1.80
Tyre Size	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard

Axle Number	11	12	13	14	15	16	17	18	19	20
Axle Type*	8	8	8	8	8	8	8	8	8	8
Individual Axle Mass Limit (kg)	9500	9500	9500	9500	9500	9500	9500	9500	9500	9500
Spacing from previous axle (m)	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80
Tyre Size	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard	Standard

Axle Number	21	22	23	24	25	26	27
Axle Type*	8	8	8	S	S	T	T
Individual Axle Mass Limit (kg)	9500	9500	9500	5500	5500	7500	7500
Spacing from previous axle (m)	1.80	1.80	1.80	8.35	1.92	1.73	1.35
Tyre Size	Standard	Standard	Standard	Standard	Standard	Standard	Standard

* S=Single tyred axle, T=Twin tyred axle, 4=Four tyred oscillating axle, 8=Eight tyred oscillating axle, 12=Twelve tyred oscillating axle, 16=Sixteen tyred oscillating axle. The tyre sizes shall be as indicated above.

The total mass on any individual axle, axle set, or combination of axles must not exceed the sum of the mass limits shown for those axles in the table above.

Critical Conditions

The vehicle must not—

1. exceed the maximum permitted gross mass of **240,500** kilograms
2. exceed design limits, such as GVM
3. breach a travel restriction or requirement for a specified bridge or culvert.

Additional Conditions

1. *Separate Plant* - The carriage or towing of separate items of plant, equipment or materials not specifically nominated in the description of load is not permitted.
2. *Mass* - The mass of any axle shall not exceed the mass specified in this permit. The gross mass of the vehicle or combination of vehicles must not exceed the limit specified on the current certificate of loading issued to the vehicles.
3. *Authorised Agent* - The vehicle shall not be operated on a road or bridge under this permit when in the opinion of an authorised agent of the road controlling authority, as communicated to the operator, it would be contrary to public interest to do so.
4. *Non-Transferable* - This permit is not transferable either to other users of or to any vehicle other than the vehicle described by this permit.
5. *Weighing* - Police are authorised to divert vehicles up to five kilometres from the approved route for the purpose of weighing, provided under strength bridges are not included on the route.

ROUTE AND SPECIAL INSTRUCTIONS: FEASIBILITY STUDY

This Feasibility Study has been issued as a guide to ascertain possible crossing restrictions for the vehicle combination listed under the following NZTA State Highway Route:

This permit applies only to the route or routes set out below (if any).

Section	Highway	From RP	From Junction	To RP	To Junction
1	SH1N	1068 / 2.86		932 / 0.0	37
SH1N, from the Aotea Quay Ramps to SH3 Junction, Sanson					
1	SH1T	1047 / 20.0		1030 / 0.0	
SH1T - Transmission Gully					
1	SH1P	995 / 20.0		995 / 0.0	
SH1P - New SH1N Section - Otaki to PekaPeka					
1	SH3	450 / 0.0	37	474 / 13.48	
SH3, from SH1N Junction, Sanson to Manawatu Scenic Route Intersection, Ashurst					
1	PalmCC - SADDLE ROUTE	0 / 0.0	SADDLE0	0 / 5.5	SADDLE5
Saddle Bypass Route					
1	TaraDC - SADDLE ROUTE	5 / 0.0	SADDLE5	5 / 10.2	SADDLE9
Saddle Bypass Route					
1	SH3	491 / 7.68		500 / 0.0	39

SH3 from Woodlands Rd Intersection to SH2 Junction, Woodville					
2	SH2	802 / 0.0	39	842 / 10.66	
SH2, from SH3 Junction, Woodville to Kaipararo Intersection, Eketahuna					

Wellington City Council Roads

Travel is permitted on the following New Plymouth District Council road subject to Clause 3 of Critical Conditions: Bridge Conditions below

Centreport Wellington – Bunny St – Featherston St – Thorndon Quay - Hutt Rd – Centennial Highway - SH1N (Ngauranga Interchange)

Operator to obtain prior approval (at least 48 hours) to travel on all other Local Authority Roads.
Refer below for Local Authority contact details.

Special Instructions

The following are not included under this Feasibility Study

- Compliance with the Land Transport Rule: Vehicle Dimension and Mass 2016
 - Final Approval for actual overweight permits is at the discretion of the road controlling authority.
1. **Vehicle must travel in the left hand lane at all times on the Wellington Urban Motorway (WUM)**
 2. **The Traffic Operations Center (TOC Ph: 0800 869 286) must be notified in advance of any trip commencing, informing the TOC of the time that the vehicle is expected to be on the Wellington Urban Motorway (WUM).**
 3. Travel on the Wellington Urban Motorway up to the Aotea Quay On and Off Ramps Only
 4. SH1N 1060/7.56 BSN 10676 NGAURANGA GORGE OVERPASS (NZMG 5994321/2662022) OVERLOAD VEHICLES MUST NOT TRAVEL ON SHOULDERS
 5. SH1N 1060/7.56 BSN 10676 NGAURANGA GORGE OVERPASS - NORTHBOUND (NZMG 5994318/2662009) OVERLOAD VEHICLES MUST NOT TRAVEL ON SHOULDERS
 6. Travel on the Porirua/Johnsonville Motorway is Approved Subject to:
 - a. Use Class 1 rear pilot for all restricted bridge crossings on Porirua/Johnsonville Motorway,
 - b. Load not to exceed 3.7m in width. Where the width of the load exceeds 3.7 metres then the Glenside By-Pass shall be used.
 - c. Travel in the left hand (slow) lane,
 - d. The vehicle with its load should be capable of maintaining a speed of 70km/h under normal operating conditions, where conditions such as speed of other vehicles, traffic congestion, weather, crashes or other incidents affect travel speed the vehicle's speed must be adjusted appropriately.
 7. The operator is responsible for ensuring that the load can negotiate overhead bridges, obstructions and structures. It is the operator's responsibility to get an over-dimensional permit if the vehicle requires one.

The following height clearance information is provided as general guidance for Wellington (Region 9) structures: SH1 Waikanae Railway Subway 4.9m; SH1 Helston Road Underpass 4.8m (slow lane); SH1 Newlands Overbridge 5.02m (slow lane); SH1 NIMT 4.92m (fast lane); SH2 Ngauranga Offramp Overbridge 4.9m; SH2 Petone Overbridge 4.3m.
 8. The Operator is responsible for all approvals related to the crossing of rail facilities.
 9. Vehicle travel times that apply to this permit are those that relate specifically to each type of vehicle as covered by the Land Transport Rule Vehicle Dimension and Mass 2016 Rule 41001. NOTE: No travel

during peak hours.

10. **MOTORWAY BYPASS**

Porirua - Johnsonville Motorway bypass via Glenside Route: (PCC Local Authority Permit required).

Glenside Route Northbound Travel: Hutt Road to Ngauranga intersection (SH1) - Johnsonville Road - Middleton Road - Willowbank Road - Main Road Tawa - Kenepuru Drive - Raiha St - Prosser St - Titahi Bay Road - Mungavin Intersection - SH1 - North.

Glenside Route Southbound Travel: SH1 - Mungavin Intersection - Titahi Bay Road - Prosser Street - Raiha Street - Kenepuru Drive - Main Road Tawa - Willowbank Road - Middleton Road - Johnsonville Road - SH1 -Ngauranga Intersection - Hutt Road - South.

11. **LOCAL AUTHORITY CONTACTS**

Wellington City Council – op.opermits.wellington@wsp.com

Porirua City Council - roadprotectionteam@pcc.govt.nz

For notification of over dimension travel on Wellington City Council roads please contact Peter.Hamilton@wcc.govt.nz Phone: 027 803 0341

Requirement to observe permit conditions

A breach of weight limits specified on this form, or any permit condition, is an offence as provided in the *Land Transport (Offences and Penalties) Regulations 1999*.

Permit is invalid if:

- a. The permit is altered without authority
- b. The vehicles or persons operating the vehicles are not those described on the permit.

Revocation

This permit can be revoked, under clause 5.7 of the Rule.

Authorised Issuing Officer

..... (Signature)
Rachel Field (Name)
23 April 2021 (Date)
Permit Issuing Officer (Designation)
(for) NZ Transport Agency, Wellington City Council (Controlling Authority)
Wellington (Location)
207672 - 22 April 2021 (Permit Dated)

Advisory Notes:

1. This permit is an exemption from the mass limits set out in the Land Transport Rule: Vehicle Dimensions and Mass 2016, and does not authorise the user to exceed the exemption so permitted or exempt the user from complying with all other acts, regulations and other laws (including those relating to certificate of loading, road user charges or Static Roll Threshold).
2. This permit must be carried on the vehicle and must be surrendered for inspection on the demand of any enforcement officer, or an authorised agent of the NZ Transport Agency or a road controlling authority.
3. The conditions on the reverse of this form shall apply together with any other conditions on the attached sheets.
4. *Overdimension* - For the transport of vehicles and loads that exceed the limits specified in Section 6 of the Land Transport Rule: Vehicle Dimensions and Mass 2016, a separate permit must be obtained from the Overdimension Permit Issuing Agency (OPIA) at the NZ Transport Agency, Palmerston North. OPIA contact number 0800 OVERSIZE / 0800 683774.
5. *Railway Level Crossings* - Travel over level crossings is not fully covered by this permit. Operators of overweight and overdimension vehicles may require permission from KiwiRail or their agents for travel over railway level crossings
6. *Tyre pressure* - Tyres must be operated at the pressures recommended by either the manufacturer or the Tyre and Rim Associations but not exceeding the maximum pressures stated in the Land Transport Rule 32013: Tyres and Wheels 2001.

Fees Payable:

Permit Issuing Fee (As specified in Schedule 4A of the Heavy Motor Vehicle Regulations 1974)	\$54.55
Bridge Supervision Fee (0 Trips)	\$0.00
Total Fee	\$54.55
GST	\$8.18
Total	\$62.73

Critical Conditions: Bridge Restrictions

1. Engineering supervision of bridges is required during the trip authorised by this permit. For this purpose the user to whom this permit is issued shall contact the agents of the road controlling authorities nominated below at least **24 hours** in advance of the bridge crossing and arrange to meet the supervisor.

The vehicle and its load shall be operated in strict accordance with all instructions given by the supervisor and it shall not proceed past the arranged meeting place without being instructed to do so by the supervisor.

- Note: (a) A police officer, unless specifically authorised by the road controlling authority, is not empowered to carry out bridge engineering supervision
 (b) If the operator fails to rendezvous within one hour of the time arranged and the supervised crossing(s) is/are postponed or cancelled, a fee of \$40 will be charged (the equivalent of one supervised crossing).

2. Agents are:

**Bridge Engineering Self-Supervision (BESS) registered Driver.
 BESS ID Card or Letter Must Be Carried On Vehicle
 Failure to produce VOIDS Permit**

3. Bridges requiring engineering supervision are:

Bridge No.	State Highway	Route Position	Bridge Name	BSN	Speed*	Position*	Risk to Other Vehicles*	GPS Co-ords N/E
1	1N	1068/2.24	Thorndon Overbridge - Northbound (Decr Dir)	10704	20	Own Lane	Not Significant	5429718/1749121
2	1N	1060/7.99	Ngauranga Overbridge - Northbound (Decr Dir)	10680	50	Own Lane	Not Significant	5432148/1751932
3	1N	1060/7.56	Ngauranga Gorge Overpass (Decr Dir)	10676	10	6.10	High	5432608/1752000
Overload Vehicles Must Not Travel On Shoulders								
4	1N	1050/6.84	Raroa – Temporary - Stage 2 (Tg Bridge 26) (Decr Dir)	10568	10	Own Lane	Low	5441921/1754106
5	1N	1035/15.27	Paremata Harbour Bridge (Northbound) (Decr Dir)	10504	20	Own Lane	Not Significant	5448107/1757010
6	1N	1035/7.63	Pukerua Bay Rail Overbridge (Decr Dir)	10426	10	Own Lane	Not Significant	5455223/1758466
7	1N	1035/0.0	Paekakariki Rail Overbridge (Decr Dir)	10350	10	Own Lane	Not Significant	5460147/1763774

Bridge No.	State Highway	Route Position	Bridge Name	BSN	Speed*	Position*	Risk to Other Vehicles*	GPS Co-ords N/E
8	1N	1011/15.37	Poplar Avenue Overpass (M2pp) (Decr Dir)	10264	50	Own Lane	Not Significant	5466033/1767767
9	1N	1011/11.66	Kapiti Road Overpass Northbound (M2pp) (Decr Dir)	10228	50	Own Lane	Not Significant	5469486/1768424
10	1N	1011/8.83	Otaihanga Road Overpass (M2pp) (Decr Dir)	10198	50	Own Lane	Not Significant	5471476/1770437
11	1N	1011/4.04	Nga Manu Road Overpass (M2pp) (Decr Dir)	10150	10	Own Lane	Low	5474953/1773225
12	1N	995/4.78	North Otaki Main Road Underpass (Pp2o Bridge 2) (Decr Dir)	9997	20	Own Lane	Not Significant	5485819/1782453
13	1N	995/0.0	Pukehou (Manakau South) Overbridge (Decr Dir)	9950	10	Own Lane	Low	5488541/1785844
14	1N	985/6.85	Manakau North Rail Overbridge (Decr Dir)	9919	10	Central	High	5492190/1787873
15	1N	985/6.53	Waikawa Stream Bridge (Decr Dir)	9915	50	Own Lane	Not Significant	5492365/1788136
16	1N	985/3.01	Ohau River Bridge (Decr Dir)	9880	10	Own Lane	Low	5495451/1789456
17	1N	932/4.35	Makahikaroa Stream Bridge (Decr Dir)	9364	20	Own Lane	Not Significant	5541545/1803622
18	1T	1047/8.948	Kenepuru Tua Tahi (TG Bridge 24) (Decr Dir)	10560	50	Own Lane	Not Significant	5442746/1754719
19	1T	1047/0.117	Pauatahanui (Tg Bridge15) (Decr Dir)	10471	10	5.75	High	5446865/1760972

Bridge No.	State Highway	Route Position	Bridge Name	BSN	Speed*	Position*	Risk to Other Vehicles*	GPS Co-ords N/E
20	1T	1030/17.227	Matai Taua (Tg Bridge 13) (Decr Dir)	10470	10	Own Lane	Low	5446960/1761039
21	1T	1030/17.227	Sh58 Northbound Exit Ramp (Tg Bridge 14) (Decr Dir)	10473	10	Central	High	5446904/1760927
22	1T	1030/11.373	Horokiri Ki Runga (TG Bridge 8) (Decr Dir)	10414	50	Own Lane	Not Significant	5453223/1763673
23	1P	995/6.64	Otaki River Bridge (Pp2o Bridge 5) (Decr Dir)	10015	50	Own Lane	Not Significant	5484511/1781283
24	1P	995/3.88	Waitohu Stream Bridge (Pp2o Bridge 1) (Decr Dir)	9988	10	Own Lane	Low	5486658/1782770
25	3	471/0.0	Mangaone Stream Bridge (Incr Dir)	4705	20	Own Lane	Not Significant	5531697/1820368
26	3	471/0.74	Rangitikei Line Rail Overbridge (Incr Dir)	4717	50	Own Lane	Not Significant	5531099/1820764
27	3	474/6.37	Stoney Creek Bridge (Sh 3) (Incr Dir)	4804	10	Own Lane	Low	5532606/1827593
28	3	474/6.73	Whakarongo Culvert (Incr Dir)	4807	10	Central	High	5532632/1827950
29	PalmCC - SADDLE ROUTE	0/3.27	SADDLE ROAD BRIDGE (Palmcc) (Incr Dir)	33	10	Central	High	5531231/1841479
30	3	491/8.24	Mangapapa Stream Bridge (Incr Dir)	4992	50	Own Lane	Not Significant	5531186/1842722
31	2	808/0.0	Manawatu River (Ngawapurua) Bridge (Incr Dir)	8080	20	Own Lane	Not Significant	5525600/1845307
32	2	808/4.99	Mangatainoka River Bridge (Incr Dir)	8130	20	Own Lane	Not Significant	5521568/1842943

Bridge No.	State Highway	Route Position	Bridge Name	BSN	Speed*	Position*	Risk to Other Vehicles*	GPS Co-ords N/E
33	2	825/0.0	Makakahi River (Konini) Bridge (Incr Dir)	8242	50	Own Lane	Not Significant	5512556/1836607
34	2	842/2.79	Waiwaka No.2 Bridge (Incr Dir)	8448	20	Own Lane	Not Significant	5495844/1828870
35	2	842/9.64	Makakahi River (Kaiparoro) Bridge (Incr Dir)	8516	10	Central	High	5490734/1824617

*See the next page

4. The user to whom this permit is issued shall contact the police at least two working days in advance of the crossing of any bridge in the above list where "police control" is indicated and make arrangements for a police officer to be present to control other traffic during the supervised crossing.
5. Bridge Engineering Self Supervision is permitted only for the bridge listed and the person named in condition 2 above.

Feasibility Study Only

Critical Conditions: Bridge Restriction Requirements

A. SPEED

The speed of the overweight vehicle shall not exceed the value shown while on the bridge.

B. POSITION

The vehicle shall travel in the left hand lane on all bridges except those for which alternative bridge engineering supervision instructions are specifically provided in this permit.

Own Lane - the overweight vehicle shall travel in its own lane as far as is practicable.

Offset - the overweight vehicle shall travel so that its centre is at the indicated distance from the kerb on the left of the vehicle.

Central - the overweight vehicle shall travel on that part of the bridge most favourable to the structure. This shall be:

- (i) central on the beam system for bridges with beams and concrete decks;
- (ii) central between kerbs for slab bridges;
- (iii) approximately central on the beam system but with wheels as near as possible over the beams for bridges with timber decks.

Opposite Bridge - the overweight vehicle shall use the bridge for the opposing traffic direction.

Ford or Bypass - the overweight vehicle **shall not cross the bridge** but use the adjacent ford or bypass.

C. TRAFFIC CONTROL

Other heavy vehicles proceeding in the same direction shall be spaced at least 30 metres from the overweight vehicle while it is on the bridge. Cars may be closer if necessary.

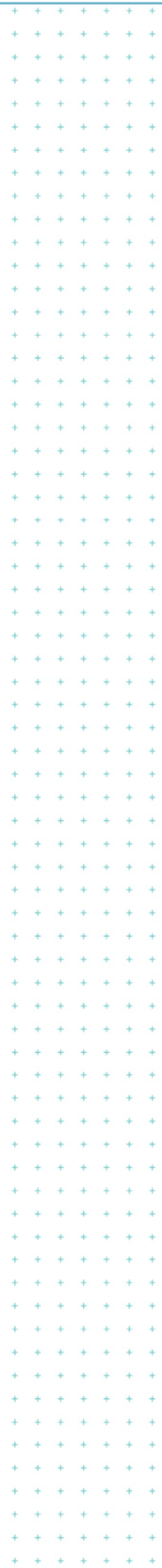
Where "offset", "central" or "opposite bridge" is indicated for position, traffic travelling in the opposing direction shall be prevented from crossing the bridge while the overweight vehicle is on it.

Traffic control at bridge crossings shall be in accordance with the "Code of Practice for traffic control at bridges being crossed by overweight vehicles"

Traffic control requirements:

Risk to other vehicles	Traffic control requirements
Not significant	None required
Low	Overweight vehicle to have revolving amber light or flashing amber light visible from the rear together with rear facing retro-reflective hazard panels
High	Provide qualified traffic controllers or Class 1 or Class 2 certified pilots using approved industry procedures.

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APPENDIX 7

ASSESSMENT OF ENVIRONMENTAL EFFECTS FOR PROPOSED LIGHTING

**ASSESSMENT OF ENVIRONMENTAL EFFECTS
FOR PROPOSED LIGHTING
MT MUNRO WIND FARM PROJECT
NORTH WAIRARAPA**



**Prepared for:
Meridian Energy**

50471

09 September 2023

Revision No. 1

Document Control

Rev.	Issue	Date	Status/Revision	Prepared by	Reviewed
0	For Review	28.08.2023	Client Review	GW	
1	For Issue	07.09.2023	Updated	GW	DDV

Approval
Name

Signature



Glen Wright, Principal

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1. INTRODUCTION

Stephenson & Turner was engaged by Meridian Energy to provide an assessment of the lighting effects for the lighting associated with their application for the proposed 20 turbine Mt Munro Wind Farm in North Wairarapa.

Stephenson & Turner is an Architectural and Engineering Consultancy, Principal Glen Wright carried out this assessment. I hold a New Zealand Certificate of Engineering (Electrical), am a Registered Engineering Associate, an Associate Member of the Illuminating Engineering Society of Australia and New Zealand and a Member of Engineering New Zealand.

I have over 30 years' experience in lighting design, application, and review of lighting effects; this includes aviation warning lights, digital billboards, illuminated signs, feature and facade floodlighting, security lighting and sports lighting in urban and rural environments. I was South Wairarapa District Councils lighting technical adviser for the recent Wairarapa Combined District Plan, Dark Sky Plan Change 12 associated with the establishment of the Dark Sky Management Area. I am a past recipient of six national lighting awards.

2. EXISTING ENVIRONMENT

I made a visit to the site and its immediate surrounds on Wednesday 9th August 2023, this included both daytime and nighttime observations of the existing environment.

The following existing stationary light sources are present in the surrounding environment:

- Rural residential dwelling lights, both interior and exterior.
- Eketahuna township streetlights, building lights both interior and exterior.

The following existing flashing or moving light sources are present in the surrounding environment:

- Headlights on vehicles moving through the area particularly SH2 which has a reasonable traffic count and includes B train trucks with truck and trailer amber and red marker lights.
- Headlights and amber flashing beacon warning lights on tractors and trucks working on and around farms after dark.
- Aviation warning lights on nacelles of selected wind turbines on Taraua Ranges (refer Photo 1 below), all eight lights visible from the top of Mt Munro were red and flashed in unison.



Photo 1 – Nighttime view from top of Mt Munro Wind Farm site looking towards Tararua Ranges, wind turbines with red warning lights circled.

With reference to the Environmental Zones defined in *AS/NZS 4282:2019 – Control of obtrusive effects of outdoor lighting* the environment surrounding the Mt Munro Wind Farm would be best described as an environmental lighting zone 'A2 – Low district brightness' as it is a sparsely inhabited rural and semi-rural area. The exception would be the Eketahuna township which would be best described as an environmental lighting zone 'A3 - Medium district lightness' as it has suburban areas.

3. RELEVANT STATUTORY PROVISIONS

3.1 National Policy Statement for Renewable Electricity Generation 2011

The NPS REG covers the construction, operation, maintenance and upgrading of new and existing structures associated with renewable electricity generation. Under the NPS REG decision-makers shall recognise and provide for the national significance of renewable electricity generation activities and have particular regard to the need to locate the renewable electricity generation activity where the renewable energy resource is available and the technical practicalities associated with developing, operating or maintaining the renewable electricity generation activity.

3.2 Tararua District Plan

Under the Tararua District Plan, the site is zoned Rural.

The applicable objectives and policies are outlined within Meridian Energy's AEE lodged on 4 May 2023 at section 3.10 (including objective 2.8.4.1 which seeks to recognise the potential of the District's Rural Management Area for renewable electricity generation and wind farms in particular).

Standard 5.4.7.2(b) states "In all Management Areas, any exterior lights shall be installed, designed, shaded and arranged in order that the level of lighting measured on the boundaries of the site are no greater than 8.0 lux (lumens per square metre).

3.3 Wairarapa Combined District Plan

Under the Wairarapa Combined District Plan, the site is zoned Primary Production.

Objective GAV1 seeks to maintain and enhance general amenity values, with its subsequent policies considering noise, vibration, lighting and odour. In particular Policy GAV1(e) addresses artificial lighting and to avoid light spill and glare onto adjoining sites and roads, and to protect the clarity and brightness of the night sky.

Under Rule 21.1.11 Outdoor Artificial Light, the emission of outdoor light (including glare) is a permitted activity provided that the artificial light level does not exceed eight lumens per square metre (8 lux) when measured at 1.5m above ground level at the site boundary.

There is additional Rule 21.1.11 rules that only apply within the Dark Sky Management Area, these do not apply as the site is not within the Dark Sky Management Area.

3.4 Civil Aviation Authority (CAA)

With reference to *CAA Level 4 Group Management Policies and Procedures, Lighting and Marking of Wind Farm Turbines, Version B dated 2 March 2020*, the following requirements apply to the proposed wind farm turbines.

5. Condition and Limitations

- (b)
1. Selected individual turbines at wind farms with turbines over 60 m high will be required to have lighting.
 2. Turbines 150m and 315m will require a secondary backup light and an array of 3 intermediate low intensity lights at a distance of half the nacelle height.
 4. The highest turbines, those at the extremities of the site, and other turbines around the perimeter of the site will be lit to enable pilots to identify the extent of the windfarm. The spacing between lit turbines will not exceed 900m along the perimeter, and the flashing should be coordinated between the lights in the wind farm so that they flash simultaneously.
 5. Lighting will be medium intensity red as defined in Rule Part 77, Appendix B10, i.e. an effective intensity of not less than 1600 candela of red light, and will flash between 20 and 60 times per minute.

With reference to CAA Rule Part 77, the following are the requirements for the obstacle lights.

B.9 Low-intensity obstacle light characteristics

(a) A low-intensity obstacle light on a fixed obstacle shall be a fixed red light having an intensity that is-

- (1) conspicuous in the surroundings in which it is placed; and
- (2) not less than 10 cd of red light.

B.10 Medium-intensity obstacle light characteristics

(a) A medium-intensity obstacle light on a fixed obstacle shall be a fixed red light having an intensity that is-

- (1) be red except when used in conjunction with a high-intensity obstacle light, in which case it shall be white; and
- (2) flash simultaneously at a rate of between 40 and 60 per minute; and
- (3) have an effective intensity of not less than 1600 cd of red light.

Based on these CAA requirements, selected turbines will have 3 intermediate low intensity red non flashing lights at a distance of half the nacelle height and 1 medium intensity flashing red light on top of their nacelle with secondary backup light should this light fail to operate.

4. LIGHTING CONCEPT DESIGNS

4.1 Fixed Lighting

Where a fixed lighting solution is proposed it will typically consist of building wall mounted security lights and tall pole mounted lights for yards.

For the purposes of this lighting assessment, lighting concept designs for fixed lighting were prepared by Stephenson & Turner, and computer models created. These designs are indicative of the expected proposed lighting performance and obtrusive effects. These obtrusive light calculations do not include any mitigation that may be provided by topography, vegetation or barriers and they use the initial light output with a maintenance factor of 1.0 to demonstrate the worst-case effect.

The results of these calculations are included in Appendix B – S&T AEE Lighting Calculations.

To minimise lighting effects this lighting has been designed to be as near as practicable to the minimum lighting levels required for the activities, safety and security. For areas where lighting is required for operations, maintenance, loading or unloading an average horizontal illuminance target of 30 lux is required and for areas where lighting is required for safe movement and security an average horizontal illuminance target of 3 lux is required.

Lights will have a light source colour temperature of 3000K, except the Concrete Batching Plant lights will be 4000K to provide better lighting for monitoring concrete mix colour.

Portacom building security lighting will be provided by wall mounted lights of 1400 lumen output, 105° side throw and 69° forward throw optics, no light is projected above their horizontal. Lights will be nominally mounted at 3m above ground level. Refer image of proposed wall light below.

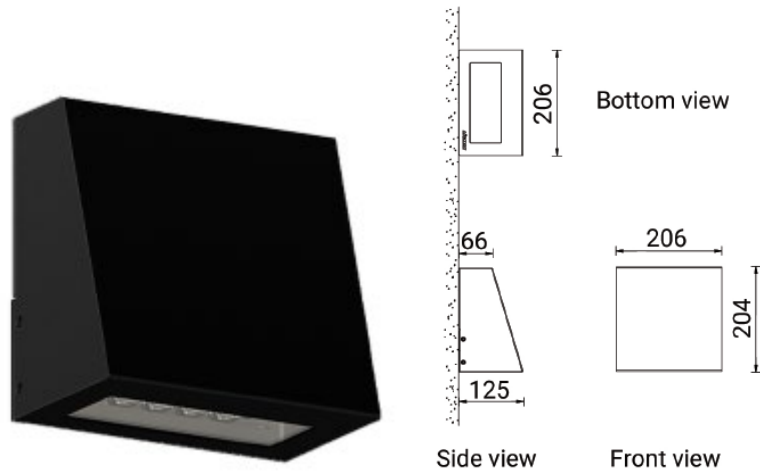


Image 1 – Typical wall light used in lighting design

The taller Operations and Maintenance building security lighting and concrete batching plant lights will be provided by similar wall mounted lights, but of higher 2050 lumen output. Lights nominally mounted at 6m above ground level.

Yard lighting will be provided by 0° tilt luminaires mounted on poles located around the yard perimeter and directing light into the site. The pole heights have been selected to control the obtrusive effects, a lower pole height would require the luminaires to be tilted above the 0° tilt with increased obtrusive effects.

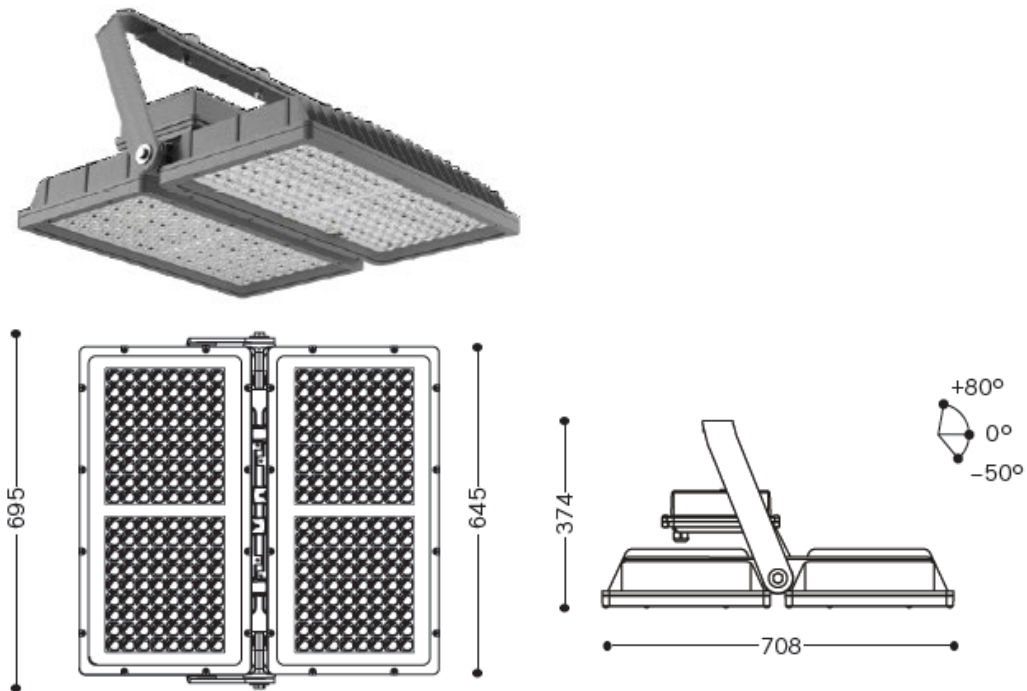


Image 2 – Typical tall pole mounted light used in lighting design

4.2 Temporary Lighting

Where temporary lighting is proposed it will typically consist of machinery mounted floodlights and portable telescopic pole mounted floodlights with extendable booms up to 9m in height. The selection and set up of the temporary lighting would be controlled through a Construction Lighting Management Plan that would provide guidance requiring all lights to be directed / focused to the work area and not in the direction of light sensitive receivers such as dwellings and public roads.



Image 3 – Typical portable lighting tower

5. PROPOSED LIGHTING - CONSTRUCTION

5.1 Internal Road Lighting

The roads built to construct and service the wind farm will have low traffic levels, with no regular traffic at night, and will not be lit.

5.2 Vehicle Movements – Headlight Sweep

As noted in the overall AEE the addition of construction vehicles on SH2 is low compared to current traffic volumes, therefore headlight sweep for construction vehicles on SH2 has not been assessed as it is an existing effect with no significant increase in frequency.

Construction traffic activity on the access road and site at night is expected to include:

- Monday to Saturday 7am to 7pm (excluding concrete pouring activities which run continuously for up to 15 hours, and turbine component delivery).
- Turbine components being over-dimensional are typically restricted to only operate overnight on state highways, so will use Old Coach Rd outside the above hours.

- Concrete mixer and pump trucks will operate over night, between the batching plant and foundation location. These vehicles may return to where they are based via Old Coach Road at the completion of pouring activities. There is no requirement for the delivery of aggregate from quarries at night.

5.3 Security Building Lighting

The security building will be a 6m x 3m portacom located at the eastern end of the Site Entrance area and adjacent to the main laydown area.

The security building lighting will consist of wall mounted perimeter lights controlled by occupancy sensors, these lights are only on at night when occupancy has been detected.

5.4 Main Laydown Area Lighting

During construction the main storage laydown area is proposed to be located on the western side of Old Coach Road, opposite the wind farm site entrance. This laydown area will be used to store turbine components transported in by road prior to being taken to the turbine site.

The size of the laydown area required will depend on the project construction schedule, the number of turbine components and other parts and equipment being stored, the requirements for any pre-erection activities such as preliminary work on the nacelles and the temporary building location and layout.

The temporary buildings in this area will be portacoms, and include:

- Kitchen and chiller portacom structures.
- 12m x 3m portacoms adjacent to the dwelling being used as temporary offices, toilet blocks and general staff areas.
- Security building.

The portacom structures are single storey buildings and will be removed upon the completion of the construction phase.

Post construction, some or all of this storage laydown area will be retained for spare parts storage (such as blades) and may be used for the operations and maintenance building.

Concept lighting design

All buildings will have wall mounted perimeter lights controlled by occupancy sensors.

The laydown areas will have 12m high poles adjacent to the north boundary and 20m high poles adjacent the south boundary, each pole will have a pole top floodlight providing a target of 30 lux average for the safe unloading and loading of materials at night.

There will also be truck and machinery with headlights and flashing amber warning lights.

Operation of lighting

Building exterior lights will only be on at night when occupancy has been detected.

Yard lighting will only be on when required for nighttime deliveries or pick up of components.

5.5 Concrete Batching Plant Lighting

A temporary concrete batching plant will be established within the site. The final location is yet to be determined but will be within the Turbine Envelope Zone or Turbine Exclusion Zone. For this assessment the concrete batching plant has been located on the main ridge of the site, within the turbine envelope zone near turbine 7, elevation 450m, we believe this will provide a good representation of any obtrusive lighting effects.

The concrete batching plant will occupy an area of approximately 100m by 60m, surrounded by a fence. The temporary structures to be located in this area would include the following (indicative dimensions included in brackets):

- Control room and storage building (6m long x 3m high x 3m wide);
- Portacoms for office and amenities (6m long x 3m high x 3m wide);
- Mobile batching plant unit which includes, but is not limited to, hoppers, aggregate storage bins, compressor, cement silos and conveyors (18m long x 4m wide x 7m high);
- Additional cement storage silo (6m long x 3m wide x 3m high);
- Diesel storage facility;
- Water tank;
- Aggregate stockpile area (50m x 20m);
- Generator.

Concept lighting design

The building lighting will consist of wall mounted perimeter lights controlled by occupancy sensors. These lights are only on at night when occupancy has been detected.

The yard areas will have 20m high poles with pole top floodlights providing a target of 30 lux average for the safe operations of the batching plant at night. The batching plant unit will also have some plant mounted lights as required for safe operation of the plant at night, with four wall mounted lights like the proposed building security lights, but of higher output and higher 6m mounting height.

There will also be truck and machinery with headlights and flashing amber warning lights.

Operation of lighting

The batching plant will be used during the night only when continuous concrete pours for turbine and metrological mast foundations, such pours are expected to be of up to 15 hours durations. Approximately 30 days of night operation of the plant and its lights is expected. The concrete batching plant and its lights will be removed within six months of the wind farm being fully operational.

5.6 Turbine Laydown Area Lighting

Each turbine will require a flat area for the foundation, crane pad, and blade laydown area onto which the turbine can be erected. This hardstand area will measure approximately 136m long by 60m wide (including the access road) and require cuts of up to 25.5m along a central ridge which is generally screened from external view.

Proposed lighting

For nighttime foundation concrete pours temporary lighting will be provided for task lighting and safety. This will be provided by concrete truck mounted spotlights and portable telescopic working lights.

For nighttime erection of turbines temporary lighting will be provided for task lighting and safety. This will be provided by crane mounted spotlights and portable telescopic working lights.

There will also be truck and machinery with headlights and flashing amber warning lights.

Operation of lighting

As continuous concrete pours of up to 15 hours are required for the turbine and metrological mast foundation, localised temporary construction lighting will be provided, estimated to occur over 30 nights spread across the pour sites and over 2.5 – 3 years.

As light wind conditions are required for the erection of turbines some nighttime lifts may be required, localised temporary construction lighting will be provided, estimated to occur over 30 nights spread across the turbine locations and over 9 months. When lifts are occurring the portable telescopic working lights will project light upwards to illuminate the object being lifted.

6. PROPOSED LIGHTING - OPERATIONAL

6.1 SH2 Intersection Lighting

Meridian's traffic engineering consultants have reviewed Waka Kotahi's street light guidance, and advise that no intersection lighting is required.

6.2 Internal Road Lighting

The roads built to service the wind farm will have low traffic levels, with no regular traffic at night, and will not be lit.

6.3 Vehicle Movements – Headlight Sweep

When the wind farm is operational the only nighttime vehicle movements will be those associated with nighttime maintenance when required.

As noted in the overall AEE the additional maintenance vehicles on SH2 is low compared to current traffic volumes, therefore headlight sweep for maintenance vehicles on SH2 has not been assessed as it is an existing effect with no significant increase in frequency.

6.4 Operations and Maintenance Building Lighting

A permanent operation and maintenance building will be located either within the main laydown area or terminal substation area.

This building will house a workshop, control room for managing the wind farm, and will be approximately 50m by 20m, and 6.5m high.

Concept lighting design

Operations and maintenance buildings has been included in the concept lighting designs for both sites.

Exterior lighting will be wall mounted lights at 6m, with the lights controlled by occupancy sensors.

Operation of lighting

Building exterior lights will only be on at night when occupancy has been detected.

6.5 Site Substation Lighting

A Site Substation will be located at the southern end of the Turbine Envelope Zone. The Site Substation will have a total footprint of approximately 70m x 90m and will consist of a switchyard and potentially up to two small control buildings, one approximately 20 m x 10m and the other approximately 10 m x 6 m and both up to 7m in height. The external perimeter of the compound will be fenced.

The Site Substation will take power from the underground cables from the wind turbines and connect to the Internal Transmission Line. The main transformer (33 kV to 110 kV) will be housed here (or at the Terminal Substation), as well as various switches and electrical protection devices.

Concept lighting design

All buildings will have wall mounted perimeter lights controlled by occupancy sensors.

Switchyard will have 20m high poles, each pole will have a pole top floodlight providing a target of 30 lux average for site operations and maintenance.

There will also be truck and machinery with headlights and flashing amber warning lights.

Operation of lighting

Building exterior lights will only be on at night when occupancy has been detected.

Switchyard lighting will only be on when required for nighttime operations and maintenance.

6.6 Terminal Substation Lighting

A Terminal Substation site will be located on Kaiparoro Road off SH2. The Terminal Substation will have a total footprint of approximately 100m x 125m and will consist of a switchyard and up to two control buildings one approximately 20m x 10m, the other 10m x 6m and both up to 7m in height. A permanent Operations and Maintenance building approximately 30m x 25m may be included within the substation compound, together with storage facilities and carparking. The substation will be accessed from Kaiparoro Road.

Concept lighting design

All buildings will have wall mounted perimeter lights controlled by occupancy sensors.

Switchyard will have 20m high poles, each pole will have a pole top floodlight providing a target of 30 lux average for site operations and maintenance.

There will also be truck and machinery with headlights and flashing amber warning lights.

Operation of lighting

Building exterior lights will only be on at night when occupancy has been detected.

Switchyard lighting will only be on when required for nighttime operations and maintenance.

6.7 Aviation Warning Lights

To meet CAA requirements 9 of the 20 turbines will be fitted with aviation warning lights. The lights will operate continuously. Lights that flash will all flash simultaneously across the wind farm.

Based on the CAA criteria (extremities, highest, no spacing larger than 900m along perimeter), Figure 1 below shows the turbines that will have aviation warning lights. Note that these are indicative locations, and that a 20-turbine layout would likely have this distribution of lit turbines to comply with the CAA guidelines.

Aviation warning lights will not be required on the wind monitoring tower as at 92m height it is shorter than nearby turbine 10 which will have aviation warning lights.

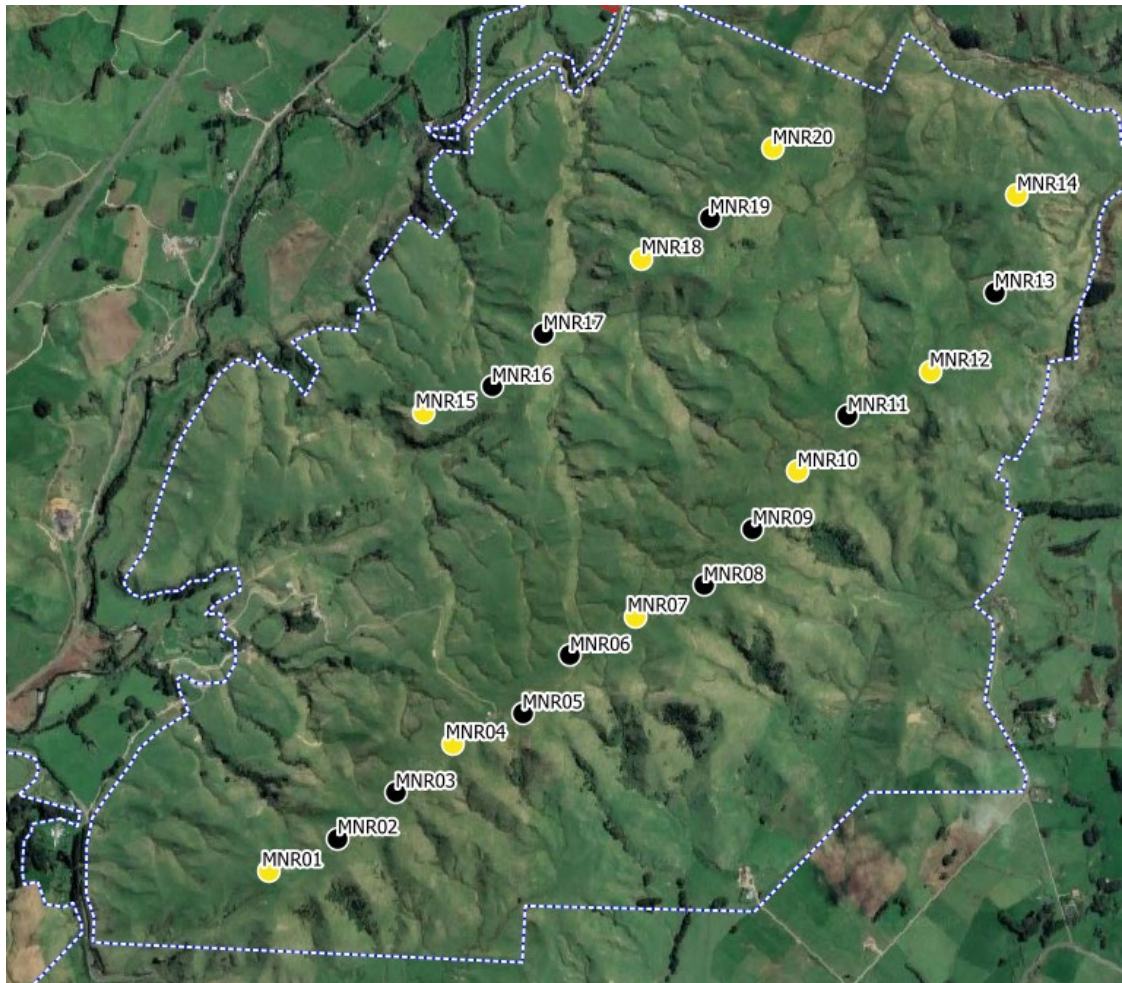


Figure 1 – Turbine Locations (Yellow dots denote turbine with lights)

The following table 1 lists the turbines that will have aviation lights, their platform elevation above sea level and the light elevation above sea level (lights are 72 metres above the turbine platform). Turbines are listed in order of elevation, from the lowest light at 213m through to the highest at 497m.

Turbine			Elevation		
Label	x	y	Base	Intermediate Light	Nacelle Light
MNR01#	1826726	5489947	450.9	497.9	544.9
MNR02	1826947	5490052	463.7	510.7	557.7
MNR03	1827134	5490201	463.8	510.8	557.8
MNR04#	1827320	5490359	468.3	515.3	562.3
MNR05	1827545	5490457	462.5	509.5	556.5
MNR06	1827699	5490644	458.7	505.7	552.7
MNR07#	1827909	5490770	471.6	518.6	565.6
MNR08	1828132	5490871	478.8	525.8	572.8
MNR09	1828291	5491053	495	542	589
MNR10#	1828436	5491240	496.4	543.4	590.4
MNR11	1828599	5491419	479.1	526.1	573.1
MNR12#	1828864	5491564	457.8	504.8	551.8
MNR13	1829074	5491819	387.3	434.3	481.3
MNR14#	1829146	5492134	395	442	489
MNR15#	1827223	5491430	372.7	419.7	466.7
MNR16	1827446	5491514	386.7	433.7	480.7
MNR17	1827613	5491685	386.3	433.3	480.3
MNR18#	1827931	5491929	418.9	465.9	512.9
MNR19	1828152	5492060	442.4	489.4	536.4
MNR20#	1828355	5492284	417.9	464.9	511.9

Table 1 – Turbine Schedule (# denote turbine with lights)

Low Intensity Aviation Warning Lights

If the tip height of the selected turbine model has a tip height of greater than 150 m, an array of 3 low intensity lights (equally spaced around the circumference of the turbine tower) will be installed at half the nacelle height, these lights will be red and will not be flashing.

Meridian are proposing to install Orga L92 Low-Intensity LED Obstruction Light (photo 4) which are specifically designed for wind turbine application., they utilise the latest LED optical technology providing a highly accurate and uniform beam or an equivalent light.

These lights will emit 32 candela day-time and night-time steady red light, with minimum 120 horizontal beam.

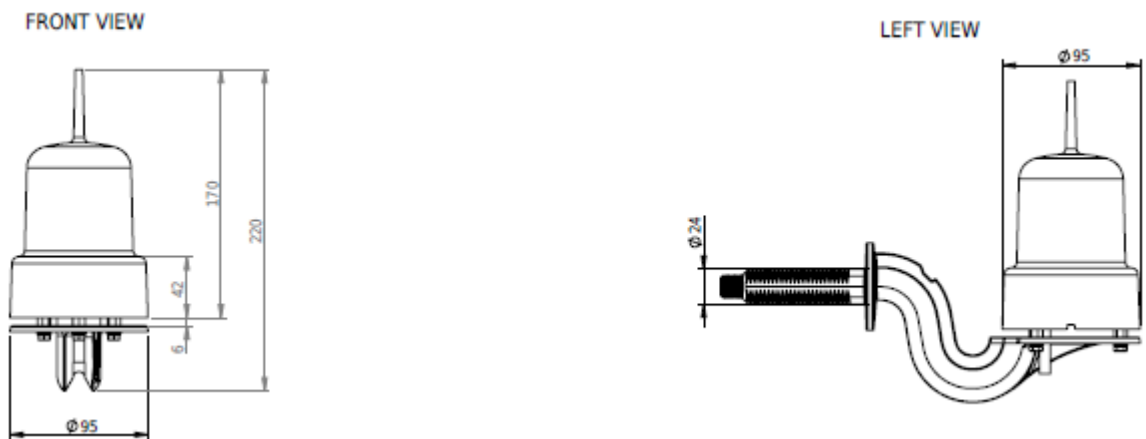


Image 4 – Proposed Orga L92 low intensity aviation warning light

Medium Intensity Aviation Warning Lights

Medium intensity aviation warning lights will be provided on selected turbines on top of the turbine nacelle, this light will be red and will flash simultaneously at a rate of between 40 and 60 per minute, it will have a secondary backup medium intensity obstacle light on top of turbine nacelle.

Meridian are proposing to install Orga L550 Medium-Intensity LED Obstruction Lights (image 4) or an equivalent lights which are specifically designed for wind turbine application, they utilise the latest LED optical technology, maximising both intensity and colour output. Their precision engineered reflective prism optics provide a highly accurate light beam which ensures light output is tightly focused beam spreads, limiting upward and downward lighting to the minimums required by CAA and thus providing reduced light pollution.

They will provide 20,000 candela day-time red flashing and 2,000 candela night time red flashing light, built-in photocell to automatically adjust intensity as ambient lighting levels drop (reducing intensity to 2,000 candela at night), integrated automatic GPS flash synchronisation and monitoring.



Image 5 – Proposed Orga L550 medium intensity aviation warning light

Refer to Appendix A - Proposed Orga L550 aviation warning light intensity distribution diagram.

Light intensities for horizontal and angles below the horizon are summarised in table 2.

Installation	West Winds Proposed Orga L550
0°(horizon)	2000 cd
-1.5°	800 cd
-3.0°	200 cd
-5.0°	60 cd

Table 2 – Light Intensities at horizon level and below

7. POTENTIAL OBTRUSIVE LIGHTING EFFECTS

7.1 Applicable Standards

In assessing the lighting effects of the Mt Munro Wind Farm, I have assessed the proposed lighting in relation to the following standards:

1. Tararua District Plan permitted activity lighting standards.
2. Wairarapa Combined District Plan permitted activity lighting standards.
3. Recommendations in the Australian / New Zealand standard AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting.

7.2 AS/NZS 4282:2019

My assessment of the obtrusive effects of the Mt Munro Wind Farm proposed lighting is with reference to the limits recommended in AS/NZS 4282:2019.

7.3 Obtrusive Effects

There are several possible obtrusive effects of the proposed lighting that require consideration and comment. These include:

- Spill light.
- Glare.
- Skyglow.
- Effects on road users
- Headlight sweep

To support the assessment of effects on surrounding dwellings, dwellings considered to be representative of the effects were those dwellings within approximately 2 km. This approach is consistent with the Boffa Miskell Landscape effects assessment and for consistency we have used the same dwelling numbering and included the Boffa Miskell Landscape effects assessment Figure 6 in our Appendix C which shows the dwelling locations and numbering.

7.4 Spill Light

Spill light is light emitted by an installation that falls outside of the design area. Spill light may or may not be obtrusive depending on what it affects. Spill light can be considered to be the amount of light hitting the windows of a dwelling as illustrated in figure 2 below.



Illuminance on vertical plane.

Figure 2 – Illustration of Spill Light.

Both the Taraua District Plan and Wairarapa Combined District Plan have a limit of 8 lux for spill lights at 1.5m height at the site boundary.

With reference to AS/NZS 4282:2019 limits for spill light at windows on dwellings, Table 3.2 (see below) for an A2 environmental zone the curfew limit is 1 lux.

**TABLE 3.2
MAXIMUM VALUES OF LIGHT TECHNICAL PARAMETERS**

Zones	Vertical illuminance levels (E_v) lx		Threshold increment (TI)		Sky glow
	Non-curfew	Curfew	%	Default adaptation level (L_{ad})	Upward light ratio
A0	See Note 1	0	N/A	N/A	0
A1	2	0.1	N/A	N/A	0
A2	5	1	20%	0.2	0.01
A3	10	2	20%	1	0.02
A4	25	5	20%	5	0.03

Computer models of the proposed lighting were created using AGI 32 Lighting Calculation Software. To assess the magnitude of spill light effects, within these computer models, vertical spill light calculation planes were placed along the line of selected property boundaries and the exterior of selected dwellings. The results of these calculations are included in Appendix B – S&T AEE Lighting Calculations.

7.5 Glare

Glare is light that hinders or bothers the human eye. It is the sensation produced by luminance within the visual field that is sufficiently greater than the luminance to which the eyes are adapted, which causes annoyance, discomfort, or loss in visual performance and visibility (Refer to Figure 3).



Intensity towards the observer: this concerns the luminous intensity emitted by the luminaire in the direction of the observer.

Figure 3 – Illustration of Glare.

For this assessment glare relates to an observer direct view of the luminaire.

Both the Taraua District Plan and Wairarapa Combined District Plan do not have any standards for glare.

With reference to AS/NZS 4282:2019 limits for glare at windows on dwellings, Table 3.3 (see below) for an A2 environmental zone the curfew limit is 1000 candela.

TABLE 3.3

MAXIMUM LUMINOUS INTENSITIES PER LUMINAIRE

Zone	Luminous intensity (<i>I</i>), cd		
	Non-curfew L1	Non-curfew L2	Curfew
A0	See Note	See Note	0
A1	2 500	5 000	500
A2	7 500	12 500	1 000
A3	12 500	25 000	2 500
A4	25 000	50 000	2 500
TV	100 000	150 000	0

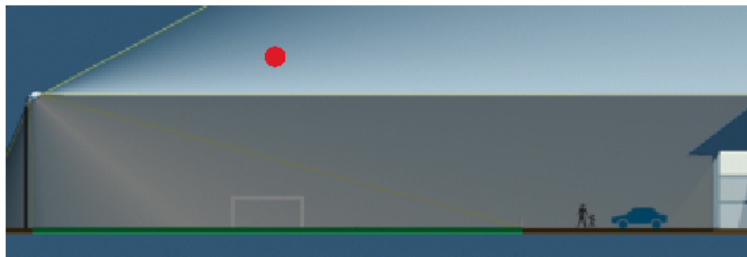
NOTE: For A0, *I* shall be as close to zero as practicable without impacting safety considerations.

Within the computer models, to assess the magnitude of glare effects, vertical glare calculation planes were placed along the exterior of selected dwellings. The results of these calculations are included in Appendix B – S&T AEE Lighting Calculations.

7.6 Skyglow

Sky glow is the lighting of the night sky caused by light directed into the sky either directly (from light sources that projected light above the horizontal) or indirectly (reflected from a surface) this light reflects off airborne particles and it is dependent on atmospheric conditions. On an atmospherically clear night there would be nil sky glow.

Skyglow is the upward leakage of light that artificially brightens the night sky, as illustrated in figure 4.



Upward light ratio (ULR)
Proportion of flux of a luminaire and / or installation that is emitted, at and above the horizontal, when the luminaire(s) is mounted in its installed position.

Figure 4 – Illustration of Skyglow

Both the Taraua District Plan and Wairarapa Combined District Plan do not have any standards for skyglow.

With reference to AS/NZS 4282:2019 limits for skyglow, Table 3.2 for an A2 environmental zone the limit is 0.01 upward light ratio (ULR).

The International Dark Sky Association states that “the issue is not light against darkness, it is good lights versus bad lights. You can have dark skies and still have lights”. By applying correct design principals and luminaires the sky glow can be minimised.

7.7 Effects on Road Users

Effects on road users (e.g. motorists, cyclists, pedestrians) normally involve a reduction in the ability to see caused by disability glare from bright light sources. The apparent contrast of objects against their backgrounds will be lowered, rendering them less visible or even invisible, especially if the environment is intrinsically dark. The magnitude of the effect will depend on the level of light to which the user is adapted. The relevant indicator is the threshold increment (TI), which is used to specify the limitation of glare in road lighting.

With reference to AS/NZS 4282:2019 limits for TI, Table 3.2 for an A2 environmental zone the limit is 20%.

Within the computer models, special calculation points were placed along roads that are near the proposed lighting, with separate points for different directions of travel. The results of these calculations are included in Appendix B – S&T AEE Lighting Calculations.

7.8 Headlight Sweep

The light beam generated from a headlight is the same for a truck and car. The headlight beam is made up of two components, the first being the oval more intense beam used for driving and the second being the wider low intensity beam on the edges. Only the oval beam is a source of glare, but this beam is directed down on to the road, this is where the intensity of light is the highest. The intensity of the beam dissipates quickly from this point.

Headlight sweep is a common occurrence particularly for properties located adjacent to intersections and bends. When the headlight sweep occurs across a dwelling bedroom window it can disrupt a person's sleep.

8. ASSESSMENT OF EFFECTS

8.1 Headlight Sweep

I have reviewed traffic movements in both directions from the SH2 intersection with Old Coach Road, along Old Coach Road to the site access and along the site turbine access roads. There are only two dwellings where there is potential for headlight sweep across their bedroom windows:

- 47 Old Coach Road (ID 24) is located near a bend in Old Coach Road, but the dwelling is enclosed within mature vegetation which I expect will block headlight sweep from windows.

- 168 Old Coach Road (ID 21) is located alongside one of the site access roads, but is at sufficient distance from any bends and intersections. The distance between the headlights and the location will reduce the intensity of the headlight sweep. Additionally, there is some vegetation that is expected to also reduce the intensity of any headlight sweep on the bedroom windows.

Therefore, it is my opinion that headlight sweep from wind farm construction and operations vehicles effects are less than minor.

8.2 Security Building and Main Laydown Area Lighting

With reference to the lighting concept design for the main laydown area (which includes the security building adjacent to the entry off Old Coach Road and the operations and maintenance building) obtrusive lighting calculations were included for the site's north boundary, Old Coach Road and dwellings 21, 22, 34 & 35A.

Spill light calculations show there will be 7 lux maximum on the north boundary and 0 lux spill light to surrounding dwellings. The 7 lux boundary maximum is less than the District Plan's limit of 8 lux and is therefore permitted.

Glare calculations show there is potential for a maximum luminous intensity of 478 candelas in the direction of dwelling 21. This is less than the AS/NZS 4282:2019 limit of 1000 candela.

With Old Coach Road running adjacent the main laydown area, threshold increment (TI) calculations were included for road users travelling in both directions, a maximum of 2% TI was calculated for Old Coach Road users travelling south, this is less than the AS/NZS 4282:2019 limit of 20%.

Therefore, it is my opinion that security building, main laydown area and operations and maintenance building lighting effects are less than minor.

8.3 Concrete Batching Plant Lighting

With reference to the lighting concept design for the concrete batching plant, obtrusive lighting spill and glare calculations were included for dwellings 1, 2, 6, 15, 17, 18, 19 & 21.

Spill light calculations show there will be 0 lux spill light to surrounding dwellings.

Glare calculations show there is potential for a maximum luminous intensity of 934 candelas in the direction of dwelling 6, this is less than the AS/NZS 4282:2019 limit of 1000 candela.

As this site is at significant distance from public roads, no public road users are affected by this lighting.

Therefore, it is my opinion that concrete batching plant lighting effects are less than minor.

8.4 Turbine Laydown Lighting

No lighting concept design calculations were prepared for any of the turbine laydown areas as nighttime lighting would only be in place at a turbine or metrological mast site on the night required and would be primarily provided by portable telescopic working lights which can be setup and directed to minimise effects on any surrounding dwellings.

As these sites are all at significant distance from public roads, no public road users are affected by this lighting.

Lighting is only expected be in operation for up to three nights per turbine site, with the considerable distance of these sites from surrounding dwellings and with the ability for the flexibility in location and direction of the portable telescopic working lights it is my opinion that any lighting effects are less than minor.

8.5 Site Substation Lighting

With reference to the lighting concept design for the site substation, obtrusive lighting spill and glare calculations were included for dwellings 6, 7, 8, 9, 10, 11, 14 & 15.

Spill light calculations show there will be 0 lux spill light to surrounding dwellings.

Glare calculations show there is potential for a maximum luminous intensity of 909 candelas in the direction of dwelling 10, this is less than the AS/NZS 4282:2019 limit of 1000 candela.

As the site substation is at significant distance from public roads, no public road users are affected by this lighting.

Therefore, it is my opinion that the site substation lighting effects are less than minor.

8.6 Terminal Substation Lighting

With reference to the lighting concept design for the terminal substation, which includes an operations and maintenance building, obtrusive lighting calculations were included for the site's south boundary, SH2 and Kaiparoro Road and dwellings 26 & 27.

Spill light calculations show there will be 4.2 lux maximum on the south boundary and 0 lux spill light to surrounding dwellings. The 4.2 lux boundary maximum is less than the District Plans limit of 8 lux and is therefore permitted.

Glare calculations show there is potential for a maximum luminous intensity of 458 candelas in the direction of dwelling 26, this is less than the AS/NZS 4282:2019 limit of 1000 candela.

With both SH2 and Kaiparoro Road running adjacent to the terminal substation, threshold increment (TI) calculations were included for road users travelling in both directions on these roads, a maximum of 1% TI was calculated for both SH2 road users travelling north and Kaiparoro Road users travelling west, these are less than the AS/NZS 4282:2019 limit of 20%.

Therefore, it is my opinion that terminal substation and operations and maintenance building lighting effects are less than minor.

8.7 Aviation Warning Lights

The low intensity aviation warning lights installed at half nacelle height have a very low intensity of only 32 candela, well below the AS/NZS 4282:2019 glare limit of 1000 candela.

The medium intensity aviation warning lights installed on top of the nacelle have a horizontal intensity of 2000 candela, but its lens drops the intensity to 800 candela @1.5° below the horizontal, therefore for dwellings below the elevation of a turbine base the intensity will be less than 800 candela which is less than the AS/NZS 4282:2019 glare limit of 1000 candela.

No health effects can be attributed to the flashing of the medium intensity aviation warning lights as the flashing rate is low.

Therefore, it is my opinion that aviation warning lights effects are less than minor.

8.8 Skyglow

The fixed lighting proposed will use luminaires that direct light downwards and not emit any light above their horizontal, therefore as the sky glow will be due to indirect light reflected off the ground surfaces, rather than direct rays, the upward light ratio is 0. This is less than the AS/NZS 4282:2019 limit of 0.01. As the reflectance off ground surfaces is typically low (10 to 30%), the lighting effect to a 'dark sky' environment will be low. Lighting levels have been kept to the minimum levels required for the activities and safety, there will be no overlighting which would increase the amount of light reflected skyward. Light sources will have 3000K colour temperature except for the concrete batching plant which has 4000K. 3000K light sources typically emit up to 25% less blue wavelength light, with blue wavelength producing more light scatter which contributes to skyglow. The use of occupancy sensor controlled lighting on buildings also reduces the skyglow.

When viewed on a misty or wet night, the location may present a minor 'glow in the sky effect'. On an atmospherically clear night there will be no noticeable glow.

The temporary lighting proposed for the turbine lift will project light above the horizontal which may contribute to skyglow, but this will not occur on more than 30 nights over the construction period.

The low intensity aviation warning lights will project light at and above their horizontal, but their low intensity of 32 candela means their contribution to skyglow would be less than minor.

The medium intensity aviation warning lights will project light at and above their horizontal and at up to 2000 candela they will contribute to skyglow, but this will be no more than minor.

With the site being outside and away from the Combined Wairarapa District Plans Dark Sky Management Area, the level of skyglow effects will be no more than minor.

9. CONCLUSIONS

Except for the aviation warning lights the proposal does not include any lighting that is on throughout every night, building mounted security lights are only on at night when there is occupancy. Yard lighting is only on when required and its expected usage is very low. This lighting will not project any light above the horizontal and no spill light to dwellings, obtrusive effects will be less than minor.

Temporary portable construction lighting usage is low, only required for continuous concrete pours and some turbine lifts. Only the turbine lift lighting will project light above the horizontal

and this is not expected to occur for more than 30 nights over the construction period.

Nighttime vehicle movements associated with the Wind Farm will not result in headlight sweep effects to dwellings on Old Coach Road.

Flashing aviation warning lights already exist within the wider environment, with views of the Turitea Wind Farm aviation warning lights available.

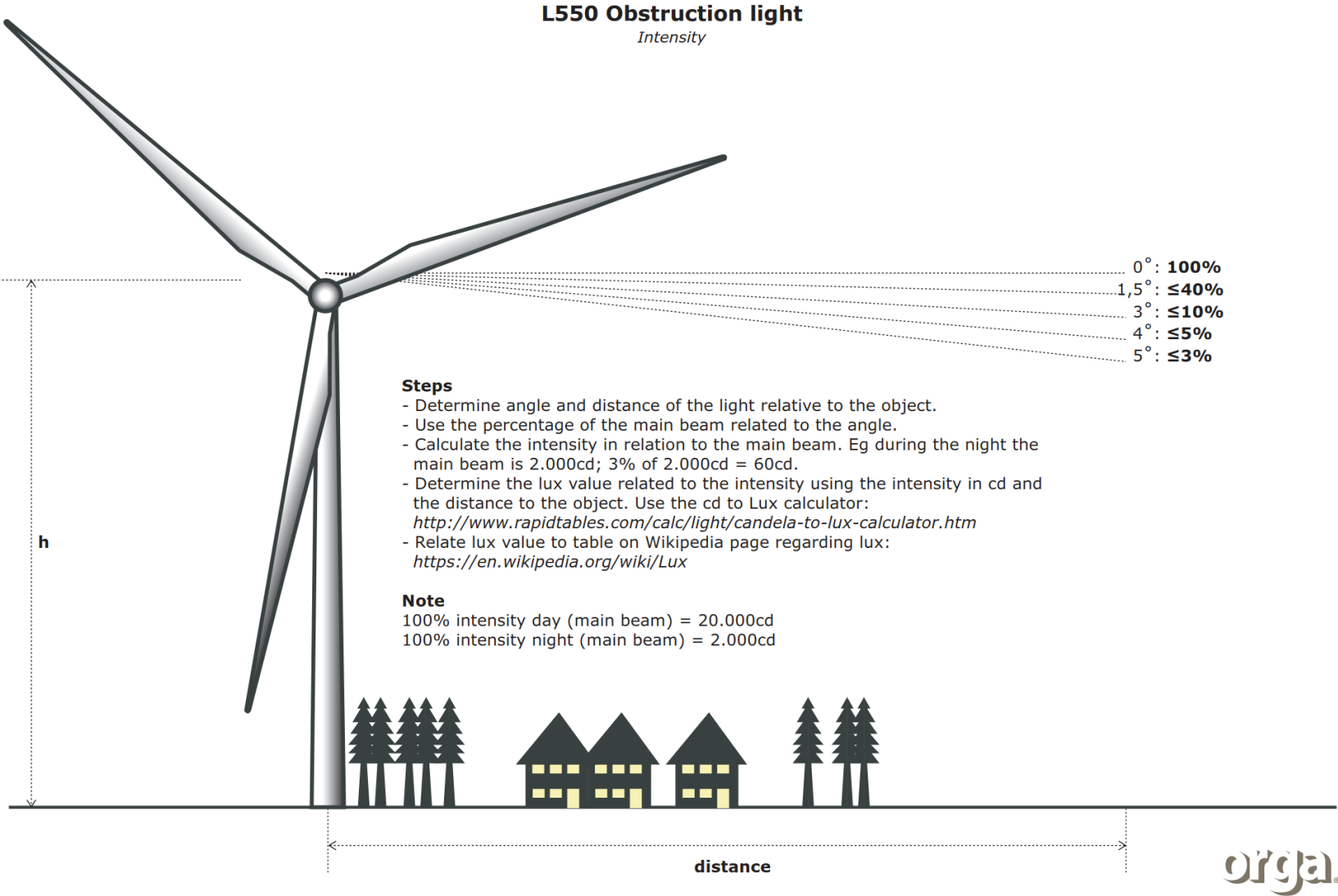
The proposed aviation warning lights provide positive aviation safety effects, there are no medical effects from their flashing as the flashing rate is too low and their obtrusive effects are no more than minor.

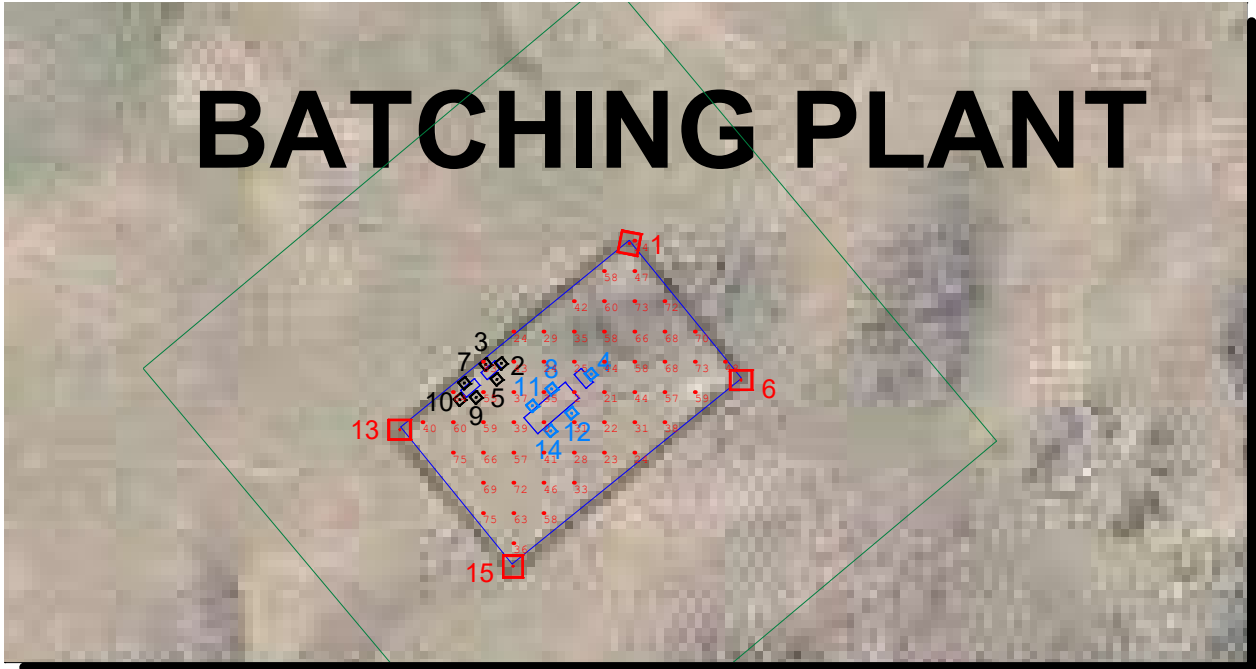
All of the proposed lighting will meet the Tararua and Wairarapa Combined District Plans permitted spill light standard of 8 lux at the site boundary.

10. APPENDICES

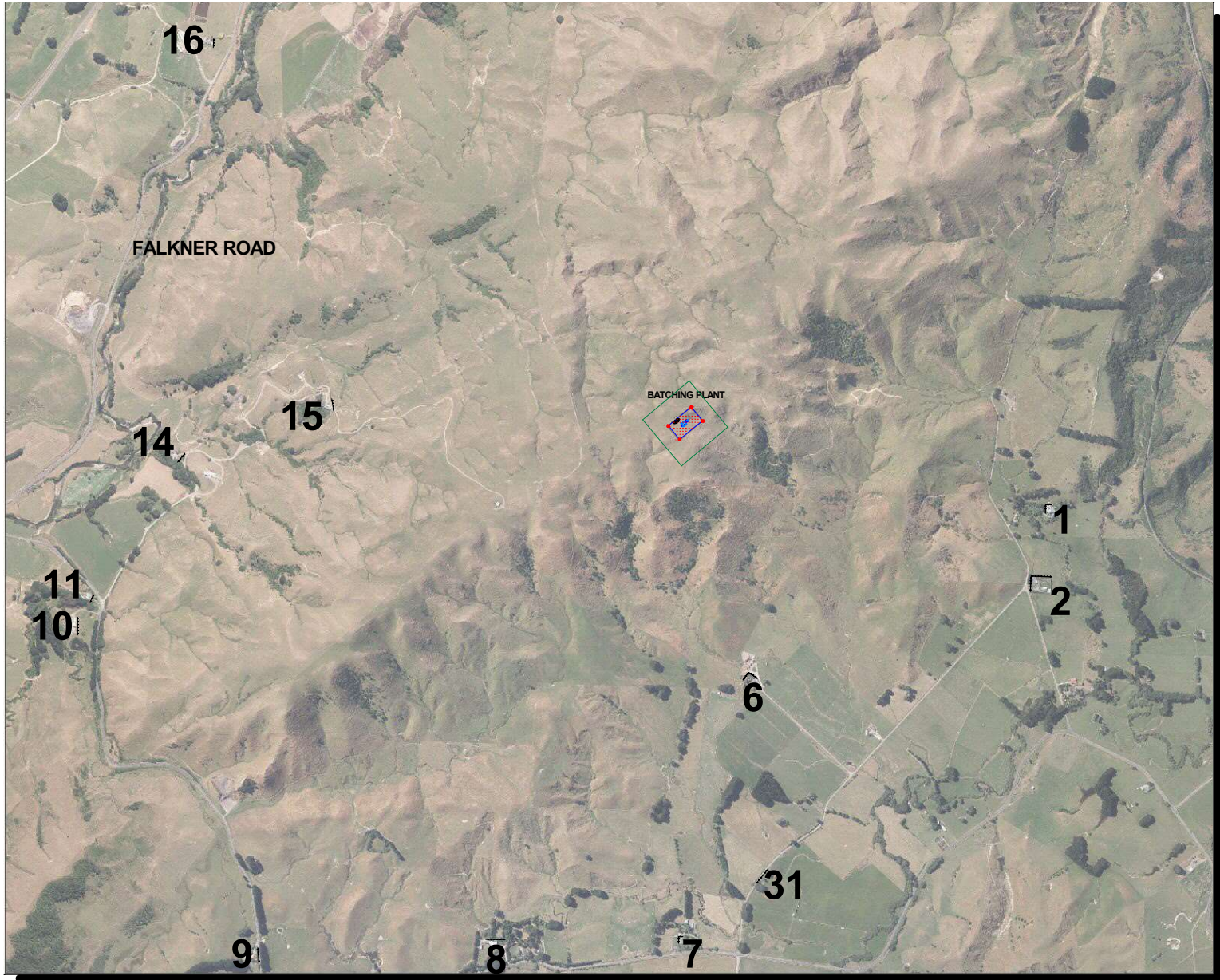
- A. Proposed Orca L550 medium intensity aviation warning light – Intensity distribution diagram
- B. S&T Concept Lighting Designs – AEE Lighting Calculations.
- C. Boffa Miskell Limited Landscape Assessment - Figure 6 - Dwellings

Appendix A – Proposed Orca L550 medium intensity aviation warning light – Intensity distribution diagram





Scale= 1: 2500



Scale= 1: 20000

Luminaire Schedule							
Symbol	Qty	Arrangement	Description	Tag	LLF	Luminaire Lumens	Luminaire Watts
	5	Single	Ligman Leeds Wedge 2 LEW-30021-T4-W30	L5	1.000	2045	19.6
	4	Single	Ewo R4 EP09 LR RBL 4000K 1800mA	L2	1.000	122923	1537
	6	Single	Ligman Leeds Wedge 2 LEW-30011-T4-W30	L4	1.000	1385	13.8

Calculation Summary					
Label	CalcType	Units	Avg	Max	Min
1_Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	602	579
1_Obtrusive_Cd_Seg2	Obtrusive - Cd	N.A.	N.A.	592	567
1_Obtrusive_III_Seg1	Obtrusive - III	Lux	N.A.	0	0
1_Obtrusive_III_Seg2	Obtrusive - III	Lux	N.A.	0	0
10_Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	427	415
10_Obtrusive_III_Seg1	Obtrusive - III	Lux	N.A.	0	0
11_Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	433	421
11_Obtrusive_III_Seg1	Obtrusive - III	Lux	N.A.	0	0
14_Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	476	457
14_Obtrusive_III_Seg1	Obtrusive - III	Lux	N.A.	0	0
15_Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	689	647
15_Obtrusive_III_Seg1	Obtrusive - III	Lux	N.A.	0	0
16_Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	454	438
16_Obtrusive_III_Seg1	Obtrusive - III	Lux	N.A.	0	0
17_Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	445	430
17_Obtrusive_III_Seg1	Obtrusive - III	Lux	N.A.	0	0
2_Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	863	825
2_Obtrusive_Cd_Seg2	Obtrusive - Cd	N.A.	N.A.	848	762
2_Obtrusive_III_Seg1	Obtrusive - III	Lux	N.A.	0	0
2_Obtrusive_III_Seg2	Obtrusive - III	Lux	N.A.	0	0
31_Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	642	592
31_Obtrusive_III_Seg1	Obtrusive - III	Lux	N.A.	0	0
6_Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	862	818
6_Obtrusive_Cd_Seg2	Obtrusive - Cd	N.A.	N.A.	864	828
6_Obtrusive_III_Seg1	Obtrusive - III	Lux	N.A.	0	0
6_Obtrusive_III_Seg2	Obtrusive - III	Lux	N.A.	0	0
7_Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	0	0
7_Obtrusive_Cd_Seg2	Obtrusive - Cd	N.A.	N.A.	488	473
7_Obtrusive_III_Seg1	Obtrusive - III	Lux	N.A.	0	0
7_Obtrusive_III_Seg2	Obtrusive - III	Lux	N.A.	0	0
8_Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	445	429
8_Obtrusive_III_Seg1	Obtrusive - III	Lux	N.A.	0	0
9_Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	394	378
9_Obtrusive_III_Seg1	Obtrusive - III	Lux	N.A.	0	0
Batching	Illuminance	Lux	47.36	83	0

Expanded Luminaire Location Summary					
Luminaire Number	Orient	Tilt	Tag	Mounting Height (m)	Dimming
1	259	0	L2	470	1.00
2	41	0	L4	453	1.00
3	130	0	L4	453	1.00
4	40	0	L5	456	1.00
5	310	0	L4	453	1.00
6	180	0	L2	470	1.00
7	130	0	L4	453	1.00
8	130	0	L5	456	1.00
9	310	0	L4	453	1.00
10	220	0	L4	453	1.00
11	130	0	L5	456	1.00
12	310	0	L5	456	1.00
13	0	0	L2	470	1.00
14	310	0	L5	456	1.00
15	90	0	L2	470	1.00

NOTES:

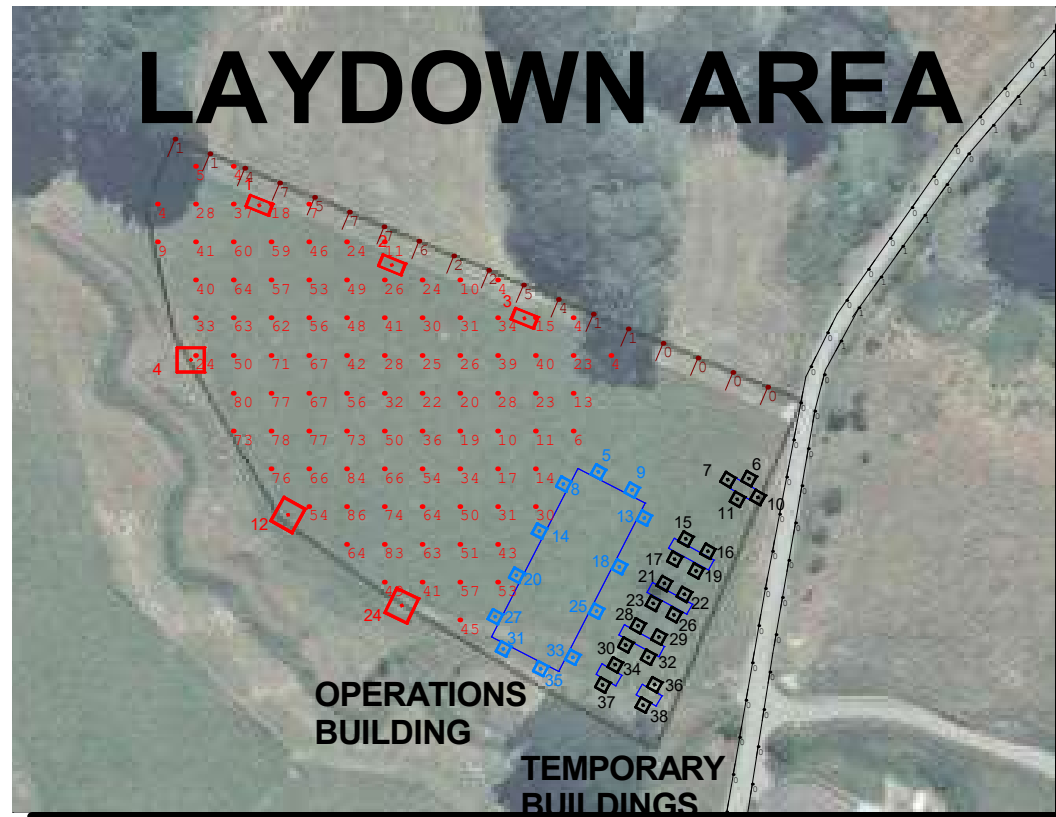
- All type L2 floodlights mounted at 20 metres above ground level.
- All type L4 fittings mounted at 3 metres above ground level.
- All type L5 fittings mounted at 6 metres above ground level.

S
&T
LIGHTING

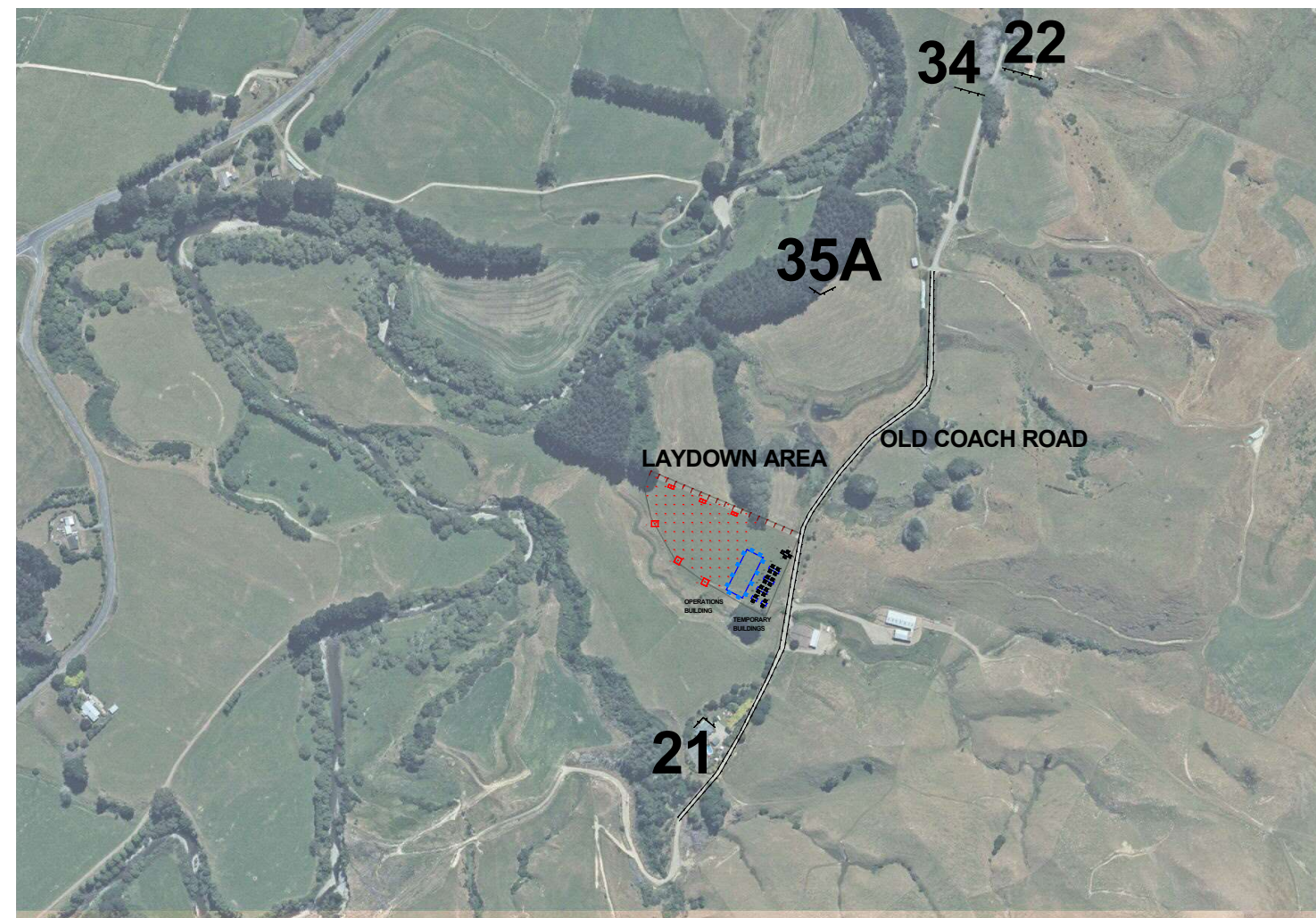
MT. MUNRO WIND FARM
AEE LIGHTING CALCULATION
BATCHING PLANT
REV 2.

PROJECT: 50471
DATE: 16/08/23
SHEET SIZE: A3

L001



Scale= 1: 2000



Scale= 1: 7500

Luminaire Schedule							
Symbol	Qty	Arrangement	Description	Tag	LLF	Luminaire Lumens	Luminaire Watts
□	12	Single	Ligman Leeds Wedge 2 LEW-30021-T4-W30	L5	1.000	2045	19.6
□	3	Single	Ewo R4 EP09 LR RBL 3000K 1800mA	L1	1.000	119247	1580.4
□	20	Single	Ligman Leeds Wedge 2 LEW-30011-T4-W30	L4	1.000	1385	13.8
□	3	Single	EWO R2 EP09 LR RBL 3000K 800mA	L3	1.000	32053	341.6

Calculation Summary					
Label	CalcType	Units	Avg	Max	Min
21 Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	478	402
21 Obtrusive_Cd_Seg2	Obtrusive - Cd	N.A.	N.A.	481	388
21 Obtrusive_Ill_Seg1	Obtrusive - Ill	Lux	N.A.	0	0
21 Obtrusive_Ill_Seg2	Obtrusive - Ill	Lux	N.A.	0	0
22 Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	136	105
22 Obtrusive_Ill_Seg1	Obtrusive - Ill	Lux	N.A.	0	0
34 Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	148	115
34 Obtrusive_Ill_Seg1	Obtrusive - Ill	Lux	N.A.	0.0	0.0
35A Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	309	227
35A Obtrusive_Cd_Seg2	Obtrusive - Cd	N.A.	N.A.	303	214
35A Obtrusive_Ill_Seg1	Obtrusive - Ill	Lux	N.A.	0	0
35A Obtrusive_Ill_Seg2	Obtrusive - Ill	Lux	N.A.	0	0
Laydown	Illuminance	Lux	41.05	86	4
Laydown_Spill_North	Illuminance	Lux	2.94	7	0
Old_Coach_NB_TI	Obtrusive - TI	%	N.A.	0	0
Old_Coach_SB_TI	Obtrusive - TI	%	N.A.	2	0

Expanded Luminaire Location Summary				
LumNo	Orient	Tilt	Mounting Height (m)	Tag
1	248	0	12	L3
2	248	0	12	L3
3	248	0	12	L3
4	0	0	20	L1
5	61	0	6	L5
6	61	0	3	L4
7	149	0	3	L4
8	152	0	6	L5
9	61	0	6	L5
10	330	0	3	L4
11	241	0	3	L4
12	61	0	20	L1
13	332	0	6	L5
14	152	0	6	L5
15	61	0	3	L4
16	61	0	3	L4
17	241	0	3	L4
18	332	0	6	L5
19	241	0	3	L4
20	152	0	6	L5
21	61	0	3	L4
22	61	0	3	L4
23	241	0	3	L4
24	64	0	20	L1
25	332	0	6	L5
26	241	0	3	L4
27	152	0	6	L5
28	61	0	3	L4
29	61	0	3	L4
30	241	0	3	L4
31	242	0	6	L5
32	241	0	3	L4
33	332	0	6	L5
34	61	0	3	L4
35	242	0	6	L5
36	61	0	3	L4
37	241	0	3	L4
38	241	0	3	L4

NOTES:

1. All type L1 floodlights mounted at 20 metres above ground level.
2. All type L3 floodlights mounted at 12 metres above ground level.
3. All type L4 fittings mounted at 3 metres above ground level.
4. All type L5 fittings mounted at 6 metres above ground level.



MT. MUNRO WIND FARM
AEE LIGHTING CALCULATION
LAYDOWN AREA
REV 1.

PROJECT: 50471
DATE: 16/08/23
SHEET SIZE: A3

L002

SITE SUBSTATION



Scale= 1: 2500

Luminaire Schedule							
Symbol	Qty	Arrangement	Description	Tag	LLF	Luminaire Lumens	Luminaire Watts
□	7	Single	Ligman Leeds Wedge 2 LEW-30011-T4-W30	L4	1.000	1385	13.8
□	4	Single	Ewo R4 EP09 LR RBL 3000K 1800mA	L1	1.000	119247	1580.4

Calculation Summary					
Label	CalcType	Units	Avg	Max	Min
10 Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	909	821
10 Obtrusive_Ill_Seg1	Obtrusive - Ill	Lux	N.A.	0	0
11 Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	786	734
11 Obtrusive_Ill_Seg1	Obtrusive - Ill	Lux	N.A.	0	0
14 Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	656	609
14 Obtrusive_Ill_Seg1	Obtrusive - Ill	Lux	N.A.	0	0
15 Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	577	547
15 Obtrusive_Ill_Seg1	Obtrusive - Ill	Lux	N.A.	0	0
6 Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	296	283
6 Obtrusive_Cd_Seg2	Obtrusive - Cd	N.A.	N.A.	295	282
7 Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	274	269
7 Obtrusive_Cd_Seg2	Obtrusive - Cd	N.A.	N.A.	274	269
7 Obtrusive_Ill_Seg1	Obtrusive - Ill	Lux	N.A.	0	0
7 Obtrusive_Ill_Seg2	Obtrusive - Ill	Lux	N.A.	0	0
8 Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	361	342
8 Obtrusive_Cd_Seg2	Obtrusive - Cd	N.A.	N.A.	359	344
8 Obtrusive_Ill_Seg1	Obtrusive - Ill	Lux	N.A.	0	0
8 Obtrusive_Ill_Seg2	Obtrusive - Ill	Lux	N.A.	0	0
9 Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	745	701
9 Obtrusive_Cd_Seg2	Obtrusive - Cd	N.A.	N.A.	733	673
9 Obtrusive_Ill_Seg1	Obtrusive - Ill	Lux	N.A.	0	0
9 Obtrusive_Ill_Seg2	Obtrusive - Ill	Lux	N.A.	0	0
Obtuki-Kaiparoro_NB_TI	Obtrusive - TI	%	N.A.	0	0
Obtuki-Kaiparoro_SB_TI	Obtrusive - TI	%	N.A.	0	0
SiteSubstation	Illuminance	Lux	41.93	52	26

Expanded Luminaire Location Summary					
LumNo	Orient	Tilt	Tag	Mounting Height (m)	Dimming
1	227	0	L1	420	0.75
2	317	0	L1	420	0.75
3	0	0	L4	403	1.00
4	180	0	L4	403	1.00
5	180	0	L4	403	1.00
6	0	0	L4	403	1.00
7	270	0	L4	403	1.00
8	270	0	L4	403	1.00
9	270	0	L4	403	1.00
11	133	0	L1	420	0.75
12	49	0	L1	420	0.75

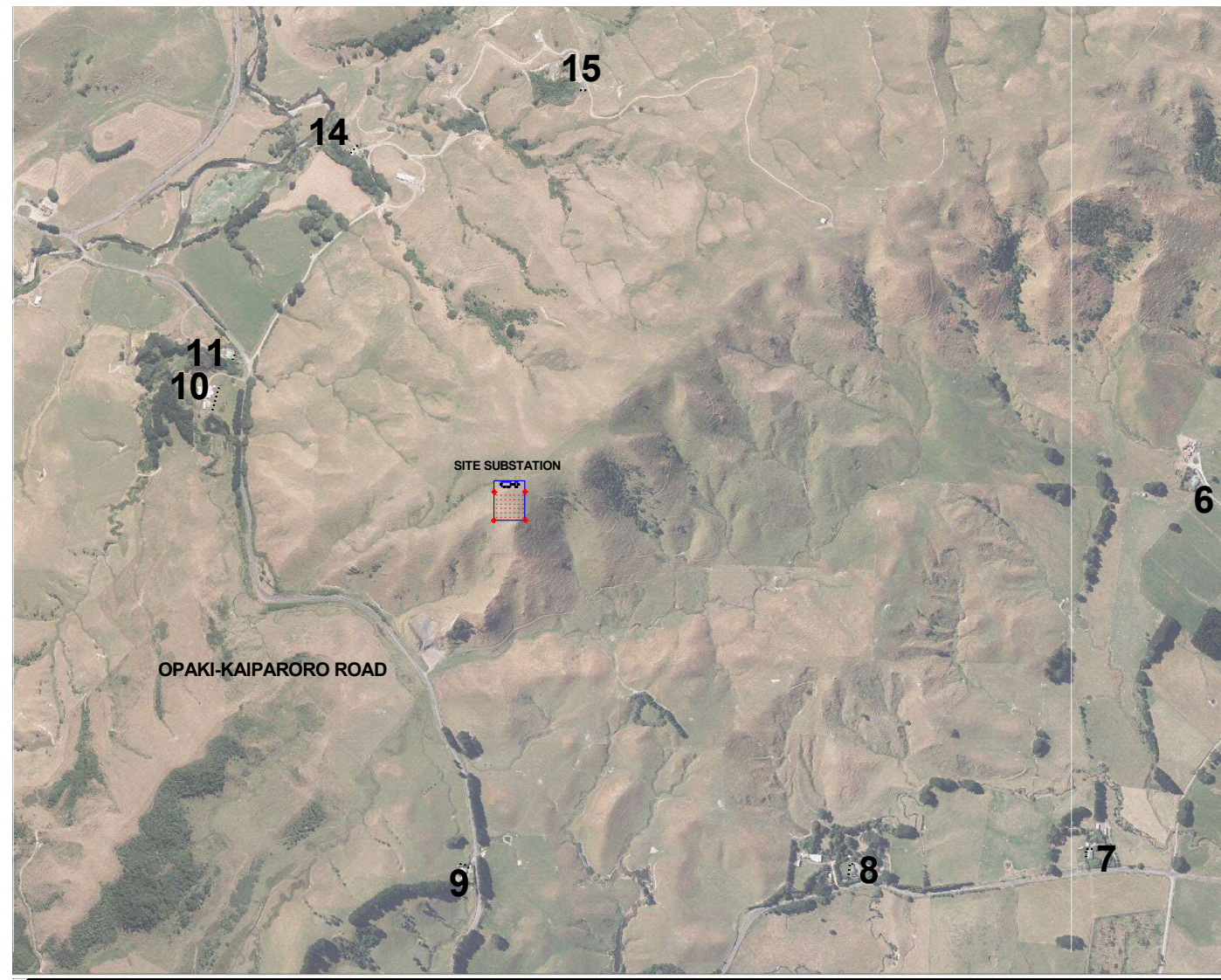
NOTES:

- All type L1 floodlights mounted at 20m above ground level.
- All type L4 fittings mounted at 3m above ground level.

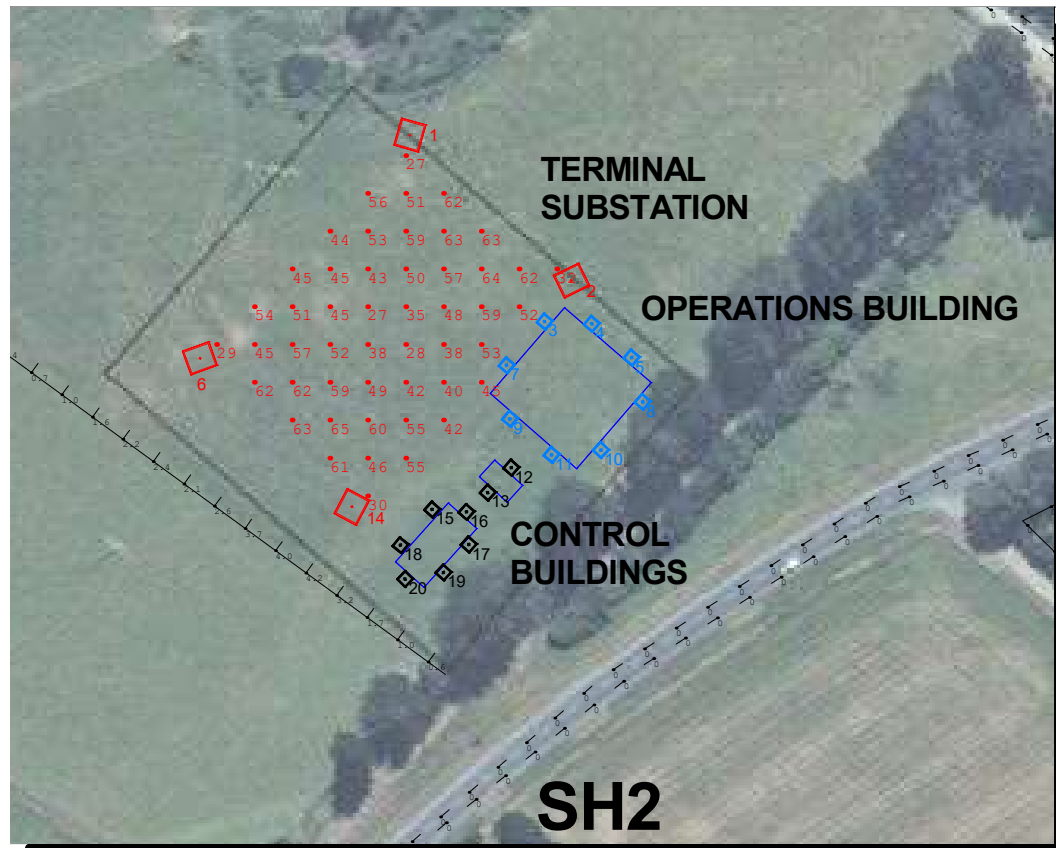


MT. MUNRO WIND FARM
AEE LIGHTING CALCULATION
SITE SUBSTATION
REV 1.

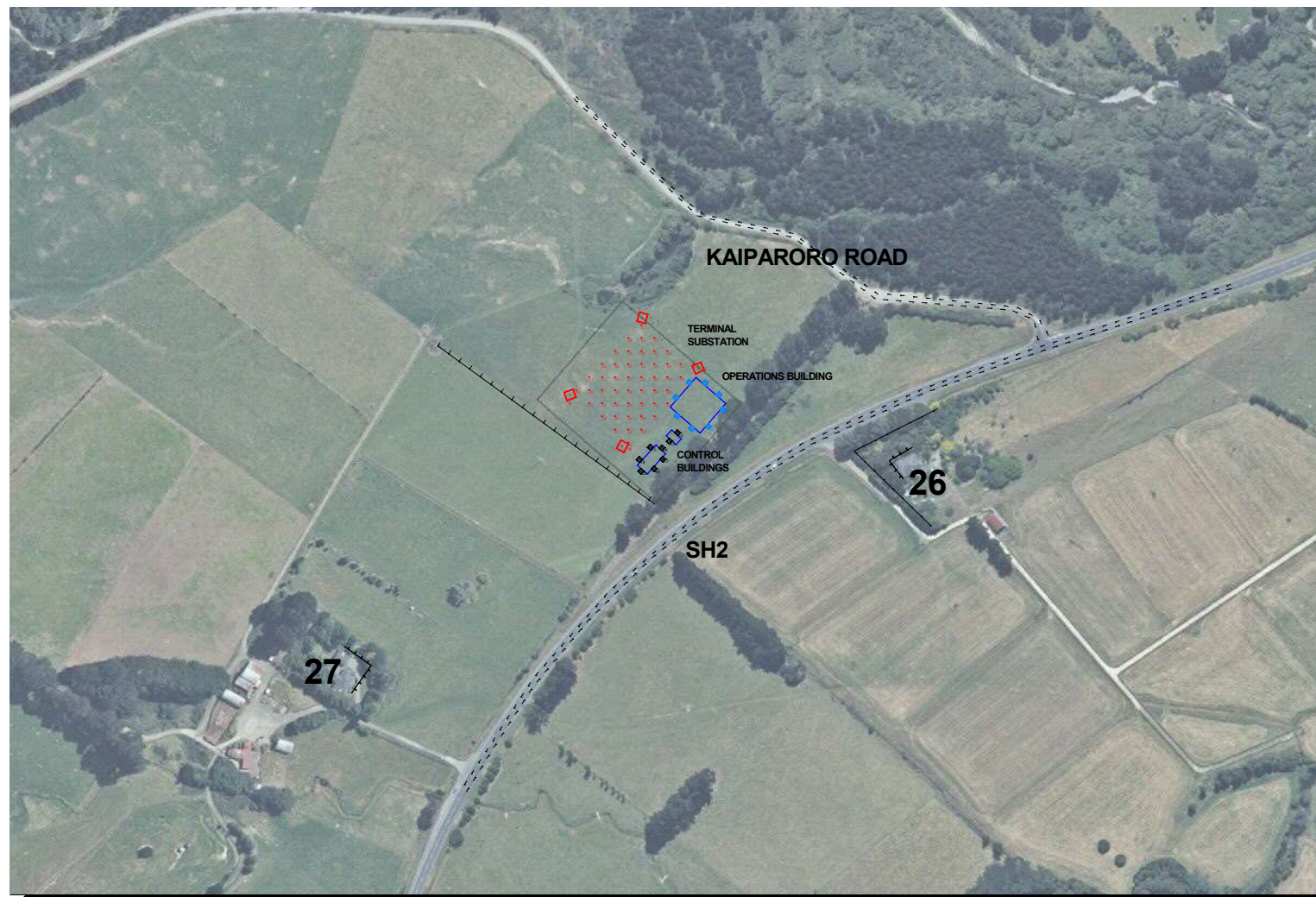
PROJECT: 50471
DATE: 16/08/23
SHEET SIZE: A3 **L003**



Scale= 1: 15000



Scale= 1: 2000



Scale= 1: 5000

Luminaire Schedule							
Symbol	Qty	Arrangement	Description	Tag	LLF	Luminaire Lumens	Luminaire Watts
□	8	Single	Ligman Leeds Wedge 2 LEW-30021-T4-W30	L5	1.000	2045	19.6
□	8	Single	Ligman Leeds Wedge 2 LEW-30011-T4-W30	L4	1.000	1385	13.8
□	4	Single	Ewo R4 EP09 LR RBL 3000K 1800mW	L1	1.000	119247	1580.4

Calculation Summary					
Label	CalcType	Units	Avg	Max	Min
26_Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	453	322
26_Obtrusive_Cd_Seg2	Obtrusive - Cd	N.A.	N.A.	458	338
26_Obtrusive_Ill_Seg1	Obtrusive - Ill	Lux	N.A.	0	0
26_Obtrusive_Ill_Seg2	Obtrusive - Ill	Lux	N.A.	0	0
26_Spill_Horz	Illuminance	Lux	0.00	0	0
27_Obtrusive_Cd_Seg1	Obtrusive - Cd	N.A.	N.A.	346	303
27_Obtrusive_Cd_Seg2	Obtrusive - Cd	N.A.	N.A.	347	304
27_Obtrusive_Ill_Seg1	Obtrusive - Ill	Lux	N.A.	0	0
27_Obtrusive_Ill_Seg2	Obtrusive - Ill	Lux	N.A.	0	0
Kaiparoro_EB_TI	Obtrusive - TI	%	N.A.	0	0
Kaiparoro_WB_TI	Obtrusive - TI	%	N.A.	1	0
SH2_NB_TI	Obtrusive - TI	%	N.A.	1	0
SH2_SB_TI	Obtrusive - TI	%	N.A.	0	0
Substation_Boundary_Spill_Sth	Illuminance	Lux	N.A.	4.2	0.1
Substation1	Illuminance	Lux	49.45	65	27

Expanded Luminaire Location Summary				
LumNo	Orient	Tilt	Tag	Mounting Height (m)
1	254	0	L1	20
2	206	0	L1	20
3	140	0	L5	6
4	50	0	L5	6
5	50	0	L5	6
6	20	0	L1	20
7	140	0	L5	6
8	320	0	L5	6
9	230	0	L5	6
10	316	0	L5	6
11	230	0	L5	6
12	49	0	L4	3
13	228	0	L4	3
14	62	0	L1	20
15	138	0	L4	3
16	49	0	L4	3
17	318	0	L4	3
18	141	0	L4	3
19	317	0	L4	3
20	226	0	L4	3

NOTES:

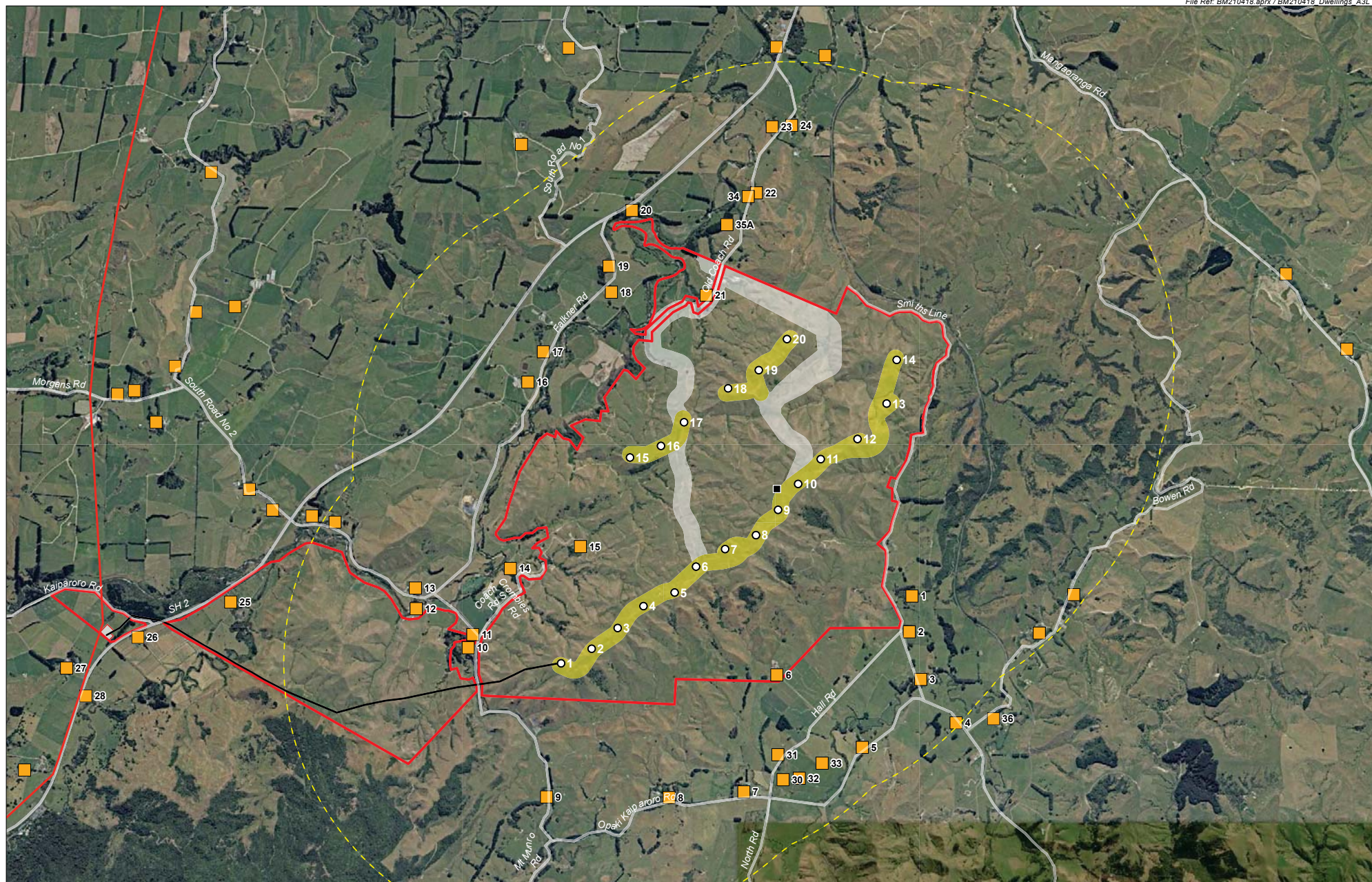
1. All type L1 floodlights mounted at 20m above ground level.
2. All type L4 fittings mounted at 3m above ground level.
3. All type L5 fittings mounted at 6m above ground level.

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LIGHTING

MT. MUNRO WIND FARM
AEE LIGHTING CALCULATION
TERMINAL SUBSTATION
REV 1.

PROJECT: 50471
DATE: 16/08/23
SHEET SIZE: A3

L004





APPENDIX 8
ACOUSTICS LETTER

29 August 2023

Meridian Energy
Level 2
55 Lady Elizabeth Lane
Wellington 6011

Attention: Gene Sams

Dear Gene

S92 ADDITIONAL INFORMATION REQUEST - NOISE

I have reviewed the noise matters contained in the s92 request from the combined councils and offer the following responses.

OLD COACH ROAD CONSTRUCTION

38. *Construction traffic on Old Coach Road is discussed in 4.4 of the Noise Effects Assessment. The Noise Effects Assessment identifies that additional construction traffic will be “very significant”. However, there is no assessment made of the resultant noise or of any mitigation measures other than managing noise through the CEMO or similar “such as controlling the hours” of construction traffic movement. The Noise Effects Assessment considers that the 8 months of construction traffic represents a temporary effect which is more readily tolerated. It is also anticipated that Old Coach Road will require a significant upgrade to be suitable for wind farm deliveries and construction traffic and the noise of this should also be factor in.*
- A. *What are the construction noise impacts relating to the upgrades to Old Coach Road that are necessary to accommodate wind farm construction and delivery traffic?*
 - B. *What is the noise impact of the windfarm construction and delivery traffic on residents of Old Coach Road?*
 - C. *What noise mitigation measures are available?*

Five external dwellings located on Old Coach Road will experience noise initially and briefly from improvements to the road, and later and for a much longer period, from vehicle movements – particularly trucks delivering aggregate and turbine components to site. Typical dwelling setbacks are between 20 and 35 metres from Old Coach Road. We discuss the matters raised in point 38 below.

Road Improvement

Widening will occur along Old Coach Road to accommodate construction traffic. This will generally occur at distances of at least 100 metres from a given dwelling, with shorter periods (several days) of activity directly in front of each dwelling.

When activity occurs directly in front of a dwelling 20 metres from the road, noise levels of up to 78 dB L_{Aeq} may be experienced at the façade at times. When the activity is further from the property, the longer-term noise level will be around 60 – 65 dB L_{Aeq} .

Construction and Delivery Traffic

There may be up to 150 heavy vehicles per day at the peak of construction works while earthworks and platform construction are carried out.

During the peak construction period there will typically be up to 5 truck movements per 15-minute period during daytime hours Monday - Saturday. The calculated sound level for this traffic is 59 dB L_{Aeq} for a dwelling with a 20-metre setback from Old Coach Road.

Noise Effects

The context of this noise can be estimated from measurements taken at Dwelling 9 during daytime hours. This dwelling is on Falkner Road but shares a similar proximity to SH2 as the Old Coach Road dwellings. At this property the typical daytime background noise level is between 40 and 50 dB L_{A90} . Although the ambient L_{Aeq} noise levels are not shown in this data set, they are expected to be around 5 dB higher than the L_{A90} values, or 45 - 55 dB L_{Aeq} .

In this context:

- Road construction directly in front of a given dwelling would represent an increase in noise level of 25 dB, a very significant increase lasting several days;
- Road construction along the more distant portions of the road relative to a given dwelling would represent a doubling of loudness – a substantial increase;
- Aggregate truck traffic represents a substantial increase in noise level during daytime hours for these dwellings over the limited construction period.

Mitigation Options

The noise levels emitted by the activities described above comply with the construction noise guidelines in NZS6803:1999 by a comfortable margin, with the exception of roadway widening when directly in front of a dwelling. The details of these noise levels are described in sections 4.2 and 4.3 of the Mt Munro Noise Effects Assessment report, Rp 002 R03 20210951.

The degree to which noise from roadway widening will exceed these guidelines will depend on the particular works required at each portion of the road. As described above, the highest noise levels from road construction are calculated to reach 78 dB L_{Aeq} for short-term road construction activities when dwellings are within 20 metres of the road. Although this would comply with the “short term” construction noise limits, we recognise that these residents will be exposed to “long term” construction activities. This 8 dB exceedance then becomes the subject of mitigation options.

The actual noise effect will also depend on the particular circumstances of each resident, and so mitigations of this activity noise should be decided in consultation with these neighbours. Suggested mitigations are as follows:

- At a minimum, works should be coordinated with the neighbours, in case there are particular accommodations around scheduling that can alleviate the noise effects. For instance, if the house is unoccupied during the day, no actual effect would occur. Limitations on hours of operation within the construction noise management plan should be used to ensure that residents have certainty about when noise effects would arise.
- For the brief periods when activity noise exceeds the noise trigger levels of 70 dB L_{Aeq} , more significant mitigations may be warranted. This could include assisting in the temporary relocation of residents during daytime activity periods.
- To limit noise effects, the normal suite of recommendations included in construction noise management plans should be implemented – avoiding unnecessary shouting or external radio use, using non-tonal reversing alarms, maintaining equipment and particularly engine exhausts, watering equipment tracks to reduce squeaking, etc.
- If significant activity is required directly in front of a dwelling for a period longer than can be mitigated by scheduling discussions, temporary barriers can be erected to reduce the noise level received at the dwelling by up to 10 decibels.
- Minimising the noise effects can be aided by ensuring the works are carried out efficiently and quickly, to minimise the amount of time spent in front of a given dwelling.

DETAILS OF NOISE MONITORING

39. *Wind farm sound monitoring is shown in Figures 8 to 13 inclusive of the Noise Effects Assessment. The (purple) line of best fit in the night-time results is the most critical. There are often times when the background sound levels are significantly below the line of best fit showing that the areas are regularly quieter when the wind farm hub height wind speed are less than 10 m/s. Because of the spread of background sound levels, the line of best fit is not representative of these quieter times and the assessment of wind turbine noise effects in 6.2 of the Noise Effects Assessment does not reflect the true picture. To clarify the situation:*
- A. *Please justify where higher than normal background sound levels were measured at night-time or remove them from Figures 9, 11, and 13 (and subsequent charts).*
 - B. *Please advise whether the monitoring equipment used can measure sound levels below 20dBA and, if not, whether this influences the charts in 6.1 of Appendix H and/or truly describes how quiet the area is.*

The procedure for assessing “preconstruction” background noise at a wind farm site is well established in NZS6808:2010. The measurement is intended to include both natural and man-made noise received over a representative period of several weeks, but does require that “unusual” events are removed. Examples of these sounds are rainfall, cicadas or other insects, and animal noise. These events have been removed in the presented data set – by excluding daytime measurements and by manually removing events with significant rainfall.

It is expected and required that natural and anthropogenic sound which is normally present in the area – including wind in trees, noise from water, traffic, etc – are included in the data set. It would not be reasonable to select only the quiet time periods to establish an artificially low average across the measurement period. The statement of noise effects is meant to relate to the average noise environment, which in the case of these sites does include a significant number of periods where the noise level is higher or significantly higher than the quietest periods.

The monitoring equipment used (01dB Cube) has a rated self-noise of 16 dBA – meaning that the microphone contributes this level of noise to the measured values. This is typical of all noise measurement equipment used in the industry, and is well below the noise levels at which judgements of noise impacts are made.

The quietest values shown in the Figures of the noise assessment report are around 21 dBA. The quietest of these data points will have been slightly influenced by this noise floor – a reading of 21 dBA will likely represent a noise environment of 20 dBA; however, data points higher than 24 dBA will not be numerically affected by this self-noise. The overall influence of sound level meter self-noise is very small and will not materially affect the average noise levels shown by the regression curve.

This equipment (01dB Cube) is therefore fit for purpose, can measure sound levels below 20 dBA, and has accurately captured the background sound environment in the area.

OPERATIONAL NOISE EFFECTS UNDER QUIET CONDITIONS

40. *The predictions are that the night-time background sound levels are often low at wind farm wind speeds of 10m/s and less. The Noise Effects Assessment relies on compliance with NZS 6808:2010 without assessing the actual impacts of wind farm noise on the residents.*

Please undertake a FIDOL (frequency, intensity, duration, offensiveness and location) analysis of wind farm noise predicted in 6.2 of the Noise Effects Assessment against the (commonly quieter) background sound level in Figures 9, 11 and 13, including an assessment of how often the different conditions would apply and the possible noise impact on residents.

The noise effects assessment report contains a summary of the conditions under which the wind farm is a dominant or significant noise source, and describes the noise effects in terms of the reasonableness of the noise. By way of addressing the concerns of this query, a more granular approach to summarising the noise effects can be made by considering the FIDOL properties of the noise.

Of the FIDOL parameters, intensity and offensiveness may be considered in relatively simple terms. *Intensity* is reflected in the predicted turbine noise levels in Table 8 of the report. All of the “external” properties will receive noise levels of less than 40 dBA at full turbine power, which is a noise level that produces a reasonable indoor sleeping environment with respect to World Health Organisation recommendations.

The *offensiveness* of the noise is related to the character of turbine noise. Modern turbines such as provided by Siemens and Vestas are designed to minimise the tonality and low-frequency noise associated with older designs – such as exhibited by downwind rotors, active stall speed control, and turbines with poorly designed gearboxes. The character is similar to the sound of surf or wind in trees and can be described as neutral in character. Safeguards around noise character are contained in the consent conditions requiring that special audible characteristics (SAC) are tested and mitigated.

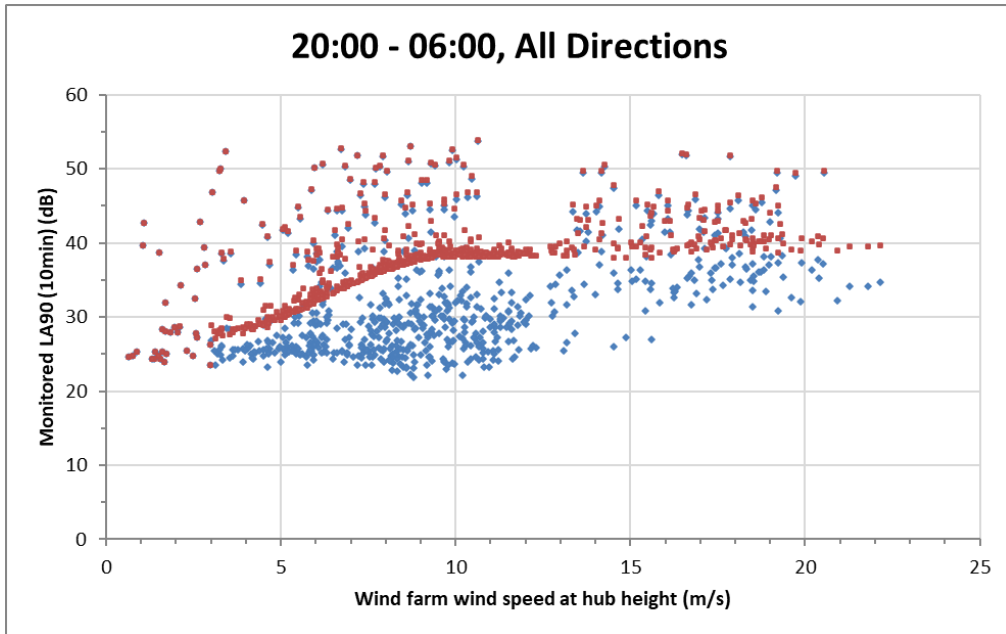
The *location* may be considered broadly in terms of the use of NZS6808:2010 and its recommendations to satisfy the objectives and policies of the District Plan. It is anticipated that some noise will arise from wind farms as a consequence of achieving renewable energy objectives, and the assessment procedure and noise limits contained in the standards has been chosen to afford that particular degree of protection in this location. More details of the *location* are incorporated into the assessment as discussed below.

Frequency and *duration* of turbine noise, and their relationship to the context specific to the *location* are wrapped into the scatter plots presented in Figures 9, 11 and 13 of the Report. These plots contain information about the range of existing background noise levels present (defining the *location*), and by comparing the predicted noise level of the turbines it is possible to describe how often the existing environment is changed (frequency of an ‘event’) by the operation of the turbines.

To provide a more complete picture of these matters, we have calculated, for each of the 10-minute background noise samples, the expected noise level that would have occurred had the turbines been in operation during these measurements, and described how frequently different ranges of noise level increase would have occurred.

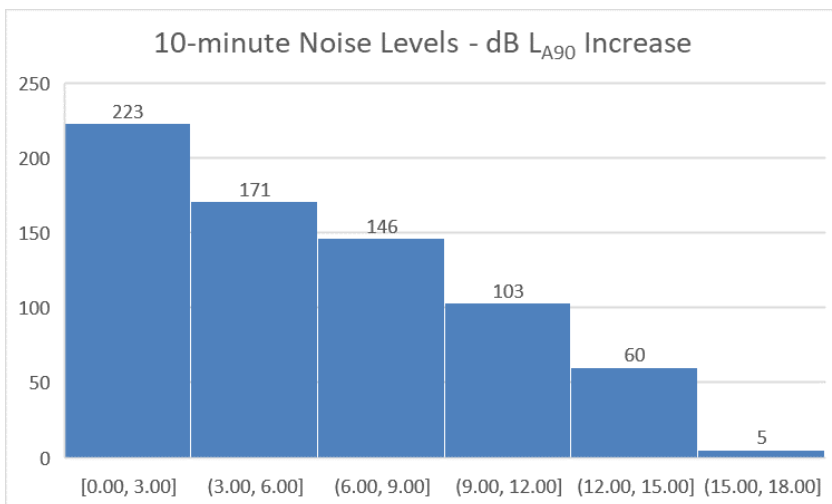
Dwelling H09

The calculated noise level at dwelling H09 is 38 dBA for the DD120 turbine running at full power. In the following figure, the background noise measurements (shown in blue) are accompanied by the calculated total background noise, plus turbine noise, that would have occurred with the wind farm constructed.



In general, the noise increase is slight at low wind speeds when the turbine output is low, and also slight when the background sound level is already high. The noise increase is significant when the turbine is operating near full power under quieter background conditions.

The following figure shows the frequency of occurrence of different degrees of noise level increase – grouped into 3 dB intervals.

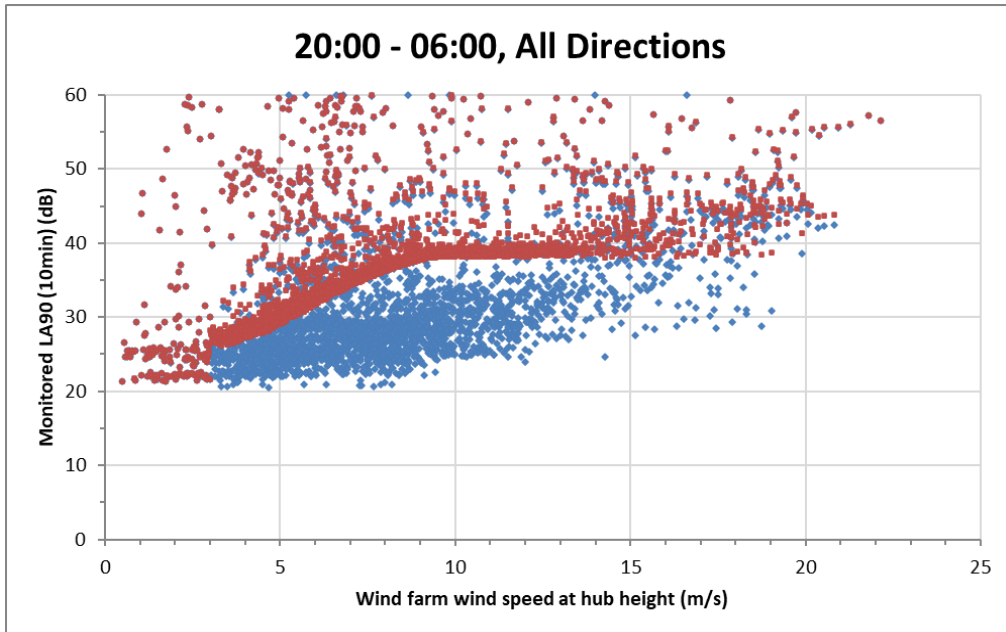


From the 708 night-time noise samples:

- 223 (31%) exhibit an undetectable increase in noise level
- 171 (24%) exhibit a discernible change
- 146 (21%) exhibit a noticeable change
- 103 (15%) exhibit a substantial change
- 65 (9%) exhibit a very significant change

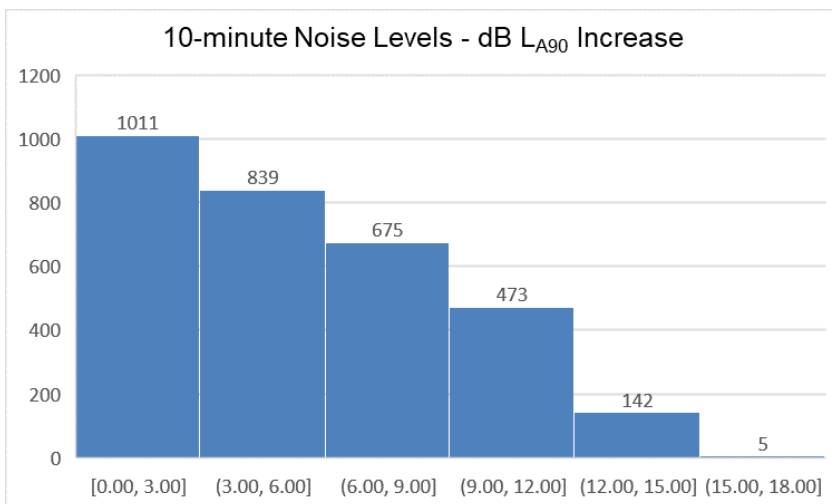
Dwelling H21

The calculated noise level at dwelling H21 is 38 dBA for the DD120 turbine running at full power. In the following figure, the background noise measurements (shown in blue) are accompanied by the calculated total background noise plus turbine noise that would have occurred with the wind farm constructed.



In general, the noise increase is slight at low wind speeds when the turbine output is low, and also slight when the background sound level is already high. The noise increase is significant when the turbine is operating near full power under quieter background conditions.

The following figure shows the frequency of occurrence of different degrees of noise level increase – grouped into 3 dB intervals.

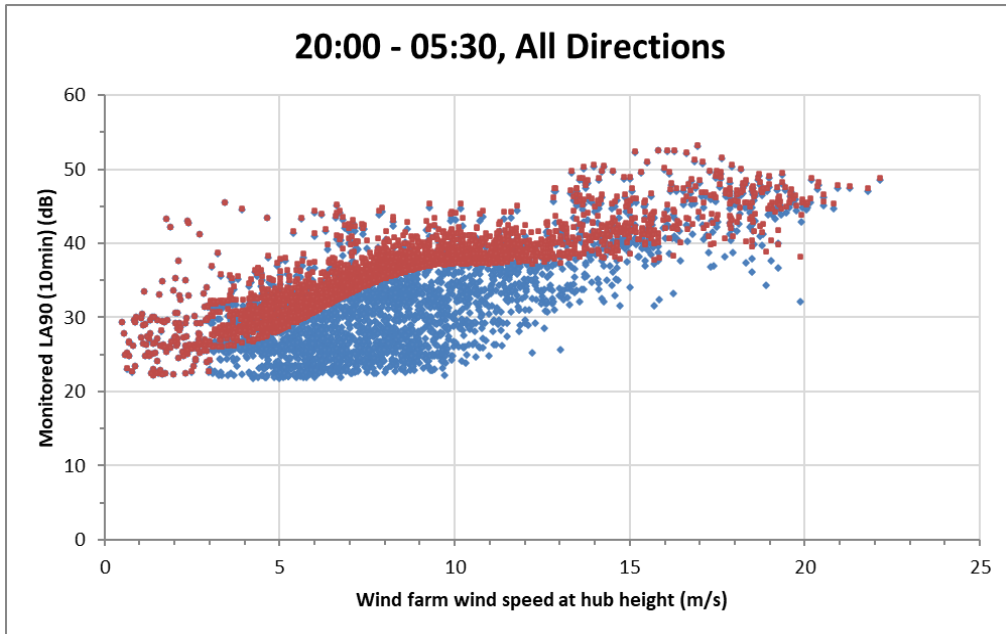


From the 3145 night-time noise samples:

- 1011 (32%) exhibit an undetectable increase in noise level
- 839 (27%) exhibit a discernible change
- 675 (21%) exhibit a noticeable change
- 473 (15%) exhibit a substantial change
- 147 (5%) exhibit a very significant change

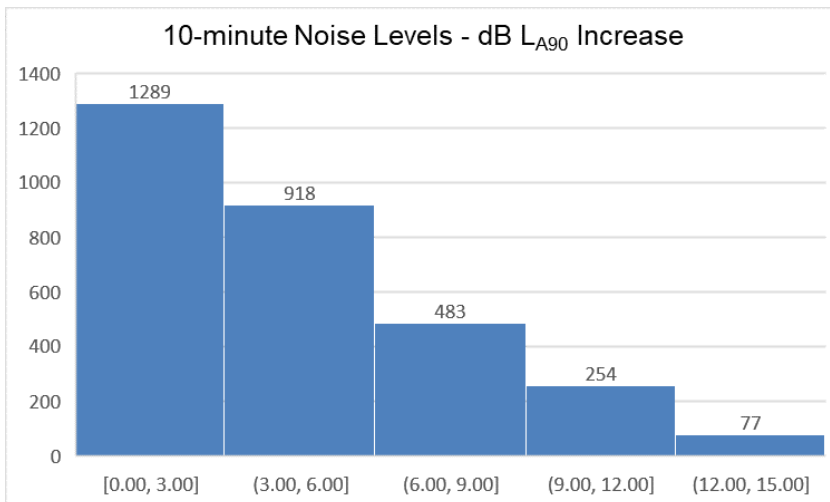
Dwelling H26

The calculated noise level at dwelling H26 is 37 dBA for the DD120 turbine running at full power. In the following figure, the background noise measurements (shown in blue) are accompanied by the calculated total background noise plus turbine noise that would have occurred with the wind farm constructed.



In general, the noise increase is slight at low wind speeds when the turbine output is low, and also slight when the background sound level is already high. The noise increase is noticeable when the turbine is operating near full power under quieter background conditions.

The following figure shows the frequency of occurrence of different degrees of noise level increase – grouped into 3 dB intervals.



From the 3021 night-time noise samples:

- 1289 (43%) exhibit an undetectable increase in noise level
- 918 (30%) exhibit a discernible change
- 483 (16%) exhibit a noticeable change
- 254 (8%) exhibit a substantial change
- 77 (3%) exhibit a very significant change

Summary of Effects

At the dwellings considered in this assessment, the wind farm would be the dominant background noise source for about 2/3 of the time – 57% for Dwelling H26 and its neighbours, and around 66% for others.

The overall noise level during these times would be consistent with noise levels anticipated by the District Plan, NZS 6808, and would meet WHO sleep criteria. We are satisfied that the noise character will not be penalizable for SAC under the criteria of NZS6808:2010. Taking these factors into consideration we do not consider the noise will be unreasonable.

CONCRETE BATCHING PLANT NOISE

41. *The Noise Effects Assessment (section 4.1.3) envisages locating the concrete batching plant at a distance of 35 metres from a dwelling when there is opportunity to maximize this separation distance. Concrete batching is a manufacturing activity with characteristics that are different to construction works e.g., it does not change its location or noise generating characteristics during the construction period.*

Is the proposed concrete batching plant noise more appropriately controlled using the relevant district plan (NZS 6802) noise limits in favour of the Construction Noise (NZS 6803) Standard given concrete batching is a manufacturing process and generates noise that is different to construction activities? If not, then what would the noise impact be on a dwelling located 35 metres from a concrete batching plant as identified in 4.1.3 of the Noise Effects Assessment?

The distinction between activities which are controlled by the construction noise standard, and those which are controlled under the permitted activity limits in the District Plan is not made on the basis of noise character, but rather on whether the activity is temporary (for the duration of the construction) or permanent. A construction activity may well retain the same location and character throughout a construction duration – for example a generator or dewatering pump which runs continuously.

In the case of concrete batching, the batching plant would only operate for a portion of the period of wind farm construction, and so is clearly a construction activity. If the batching plant were intended to continue operating after the completion of construction, for instance to service other projects, then it could be considered a permanent manufacturing activity. This is not the case.

The mention of the batching plant being able to be located as closely as 35 metres to a dwelling was only made to illustrate the setback associated with the applicable noise limit. The requirement to adopt best practicable option would still apply, and so it would be mandatory to consider alternative locations further from dwellings, which would reduce the noise received below that of the construction noise limit.

The noise effects of a concrete batching plant 35 metres from a dwelling would be significant, although they would be consistent with what is anticipated in the District Plan which uses NZS 6803:1999 to establish reasonable construction noise levels.

Similarly, if aggregate crushing were also to occur at the batching plant, or at another location within the site, a setback distance of approximately 50 metres would produce a compliant noise level of 70 dB L_{Aeq} . As with concrete batching, moving this activity further from dwellings would constitute best practicable option.

Yours faithfully

MARSHALL DAY ACOUSTICS LTD



Miklin Halstead

Associate



APPENDIX 9
CONSULTATION RECORD

Date	Type	Type
28-Apr-21	Other Stakeholder	Email
29-Nov-21	Project Neighbour	Meeting
10-Feb-22	Project Neighbour	Phonecall
29-Apr-22	Project Neighbour	Email
25-May-22	Project Neighbour	Phonecall
7-Jul-22	Project Neighbour	Email
11-Aug-22	Project Neighbour	Text and Phonecall
12-Aug-22	Project Neighbour	Text and Phonecall
13-Nov-22	Other Stakeholder	Email
14-Nov-22	Other Stakeholder	Email
14-Nov-22	Other Stakeholder	Email
14-Nov-22	Other Stakeholder	Email
14-Nov-22	Other Stakeholder	Email
15-Nov-22	Project Neighbour	Phonecall
16-Nov-22	Other Stakeholder	Email
17-Nov-22	Other Stakeholder	Email
22-Nov-22	Project Neighbour	Email
23-Nov-22	Project Neighbour	Phone calls and Text
23-Nov-22	Project Neighbour	Text
23-Nov-22	Project Neighbour	Email
24-Nov-22	Project Neighbour	Email
24-Nov-22	Project Neighbour	Email
24-Nov-22	Project Neighbour	Phonecall
24-Nov-22	Other Stakeholder	Email
24-Nov-22	Other Stakeholder	Email
25-Nov-22	Project Neighbour	Email
25-Nov-22	Project Neighbour	Site Visit Arranged
25-Nov-22	Other Stakeholder	Email
25-Nov-22	Other Stakeholder	Email
25-Nov-22	Other Stakeholder	Email
25-Nov-22	Other Stakeholder	Email
26-Nov-22	Project Neighbour	Email
28-Nov-22	Project Neighbour	Neighbour Visit
28-Nov-22	Project Neighbour	Neighbour Visit
28-Nov-22	Project Neighbour	Neighbour Visit
29-Nov-22	Project Neighbour	Neighbour Visit
29-Nov-22	Project Neighbour	Email
29-Nov-22	Project Neighbour	Neighbour Visit
29-Nov-22	Project Neighbour	Phonecall
29-Nov-22	Project Neighbour	Neighbour Visit
29-Nov-22	Project Neighbour	Postponed Site Visit
29-Nov-22	Project Neighbour	Neighbour Visit
30-Nov-22	Project Neighbour	Email
30-Nov-22	Project Neighbour	Neighbour Visit
30-Nov-22	Project Neighbour	Text
30-Nov-22	Project Neighbour	Text

30-Nov-22	Project Neighbour	Text
30-Nov-22	Project Neighbour	Text
30-Nov-22	Project Neighbour	Text
30-Nov-22	Project Neighbour	Text
30-Nov-22	Project Neighbour	Text (no response)
30-Nov-22	Project Neighbour	Email
1-Dec-22	Project Neighbour	Neighbour Visit
1-Dec-22	Project Neighbour	Neighbour Visit
1-Dec-22	Project Neighbour	Email
1-Dec-22	Project Neighbour	Phonecall
1-Dec-22	Project Neighbour	Text
1-Dec-22	Project Neighbour	Text
1-Dec-22	Project Neighbour	Email
1-Dec-22	Project Neighbour	Email
2-Dec-22	Project Neighbour	Email
2-Dec-22	Other Stakeholder	Email
5-Dec-22	Project Neighbour	Neighbour Visit
5-Dec-22	Project Neighbour	Email
5-Dec-22	Project Neighbour	Text
5-Dec-22	Project Neighbour	Phonecall
5-Dec-22	Project Neighbour	Neighbour Visit
5-Dec-22	Project Neighbour	Neighbour Visit
6-Dec-22	Project Neighbour	Neighbour Visit
6-Dec-22	Project Neighbour	Email
6-Dec-22	Project Neighbour	Phonecall and text
6-Dec-22	Project Neighbour	Email
9-Dec-22	Project Neighbour	Text
9-Dec-22	Other Stakeholder	Email
9-Dec-22	Other Stakeholder	Email
17-Dec-22	Project Neighbour	Email
20-Dec-22	Project Neighbour	Email
20-Dec-22	Project Neighbour	Email
20-Dec-22	Project Neighbour	Email
20-Dec-22	Project Neighbour	Email
21-Dec-22	Project Neighbour	Email
21-Dec-22	Other Stakeholder	Email
22-Dec-22	Project Neighbour	Email
11-Jan-23	Other Stakeholder	Email
17-Jan-23	Project Neighbour	Email
17-Jan-23	Project Neighbour	Email
1-Feb-23	Other Stakeholder	Email
1-Feb-23	Other Stakeholder	Email
1-Feb-23	Other Stakeholder	Email
1-Feb-23	Other Stakeholder	Email
1-Feb-23	Other Stakeholder	Email
10-Feb-23	Project Neighbour	Text
13-Feb-23	Project Neighbour	Text

13-Feb-23	Project Neighbour	Text
13-Feb-23	Project Neighbour	Email
13-Feb-23	Project Neighbour	Text
14-Feb-23	Project Neighbour	Phonecall
14-Feb-23	Project Neighbour	Phonecall
14-Feb-23	Project Neighbour	Text
15-Feb-23	Project Neighbour	Phonecall
15-Feb-23	Project Neighbour	Phonecall
15-Feb-23	Project Neighbour	Text
15-Feb-23	Project Neighbour	Text
15-Feb-23	Project Neighbour	Text
15-Feb-23	Project Neighbour	Phonecall
15-Feb-23	Project Neighbour	Text
15-Feb-23	Project Neighbour	Phonecall
15-Feb-23	Project Neighbour	Text
15-Feb-23	Project Neighbour	Text
15-Feb-23	Project Neighbour	Text
15-Feb-23	Project Neighbour	Email
15-Feb-23	Project Neighbour	Text
15-Feb-23	Project Neighbour	Text
16-Feb-23	Project Neighbour	Phonecall
16-Feb-23	Project Neighbour	Text
16-Feb-23	Project Neighbour	Text
16-Feb-23	Project Neighbour	Text
17-Feb-23	Project Neighbour	Text
17-Feb-23	Project Neighbour	Neighbour Visit
17-Feb-23	Project Neighbour	Neighbour Visit
17-Feb-23	Project Neighbour	Text
17-Feb-23	Project Neighbour	Text
20-Feb-23	Project Neighbour	Text
21-Feb-23	Other Stakeholder	Email
22-Feb-23	Project Neighbour	Text
22-Feb-23	Project Neighbour	Text
22-Feb-23	Project Neighbour	Phonecall
22-Feb-23	Project Neighbour	Text
22-Feb-23	Project Neighbour	Email
22-Feb-23	Project Neighbour	Text
22-Feb-23	Project Neighbour	Text
26-Feb-23	Other Stakeholder	Email
27-Feb-23	Project Neighbour	Text
27-Feb-23	Project Neighbour	Text
27-Feb-23	Project Neighbour	Phonecall
27-Feb-23	Project Neighbour	Text
27-Feb-23	Project Neighbour	Email
27-Feb-23	Project Neighbour	Email
27-Feb-23	Other Stakeholder	Email
27-Feb-23	Other Stakeholder	Email

28-Feb-23	Other Stakeholder	Email
28-Feb-23	Other Stakeholder	Email
28-Feb-23	Other Stakeholder	Email
1-Mar-23	Other Stakeholder	Email
1-Mar-23	Project Neighbour	Text
1-Mar-23	Project Neighbour	Phonecall
1-Mar-23	Other Stakeholder	Email
2-Mar-23	Project Neighbour	Text
2-Mar-23	Project Neighbour	Text
2-Mar-23	Project Neighbour	Neighbour Visit
2-Mar-23	Project Neighbour	Phonecall
2-Mar-23	Project Neighbour	Phonecall, site visit
2-Mar-23	Project Neighbour	Text
2-Mar-23	Project Neighbour	Text
2-Mar-23	Project Neighbour	Site Visit
2-Mar-23	Project Neighbour	Text
3-Mar-23	Project Neighbour	Phonecall
14-Mar-23	Other Stakeholder	Email
14-Mar-23	Other Stakeholder	Email
15-Mar-23	Other Stakeholder	Email
15-Mar-23	Other Stakeholder	Email
15-Mar-23	Other Stakeholder	Email
15-Mar-23	Other Stakeholder	Email
15-Mar-23	Other Stakeholder	Email
16-Mar-23	Project Neighbour	Email
20-Mar-23	Other Stakeholder	Email
22-Mar-23	Other Stakeholder	Email
22-Mar-23	Other Stakeholder	Email
23-Mar-23	Project Neighbour	Email
24-Mar-23	Project Neighbour	Email
25-Mar-23	Project Neighbour	Email
27-Mar-23	Other Stakeholder	Email
29-Mar-23	Other Stakeholder	Email
29-Mar-23	Other Stakeholder	Email
29-Mar-23	Other Stakeholder	Email
30-Mar-23	Project Neighbour	Phonecall
30-Mar-23	Other Stakeholder	Email
4-Apr-23	Project Neighbour	Phonecall
4-Apr-23	Other Stakeholder	Email
4-Apr-23	Other Stakeholder	Email
5-Apr-23	Other Stakeholder	Email
5-Apr-23	Other Stakeholder	Email
5-Apr-23	Other Stakeholder	Email
6-Apr-23	Project Neighbour	Phonecall
6-Apr-23	Other Stakeholder	Email
6-Apr-23	Other Stakeholder	Email
13-Apr-23	Project Neighbour	Phonecall
13-Apr-23	Other Stakeholder	Email

19-Apr-23	Project Neighbour	Email
19-Apr-23	Project Neighbour	Phonecall
20-Apr-23	Other Stakeholder	Email
27-Apr-23	Project Neighbour	Text
27-Apr-23	Project Neighbour	Text
27-Apr-23	Project Neighbour	Phonecall
28-Apr-23	Project Neighbour	Email
2-May-23	Other Stakeholder	Email
2-May-23	Other Stakeholder	Email
4-May-23	Other Stakeholder	Email
4-May-23	Other Stakeholder	Email
9-May-23	Project Neighbour	Phonecall
10-May-23	Project Neighbour	Email
17-May-23	Project Neighbour	Email
17-May-23	Project Neighbour	Email
17-May-23	Other Stakeholder	Email
18-May-23	Project Neighbour	Email
18-May-23	Other Stakeholder	Email
18-May-23	Other Stakeholder	Email
22-May-23	Other Stakeholder	Email
22-May-23	Other Stakeholder	Call
24-May-23	Project Neighbour	Neighbour Visit
25-May-23	Project Neighbour	text
25-May-23	Project Neighbour	Text
25-May-23	Project Neighbour	Text
25-May-23	Project Neighbour	Text
25-May-23	Project Neighbour	Email
25-May-23	Project Neighbour	Text
25-May-23	Project Neighbour	Text
25-May-23	Project Neighbour	Email
25-May-23	Project Neighbour	Email
25-May-23	Project Neighbour	Phonecall
25-May-23	Project Neighbour	Phonecall
25-May-23	Project Neighbour	Text
25-May-23	Project Neighbour	Text
25-May-23	Project Neighbour	Email
25-May-23	Project Neighbour	Phonecall
25-May-23	Project Neighbour	Email
25-May-23	Project Neighbour	Text
25-May-23	Project Neighbour	Text
26-May-23	Other Stakeholder	Email
29-May-23	Project Neighbour	Email
29-May-23	Project Neighbour	Email
30-May-23	Project Neighbour	Neighbour Visit - Postponed
6-Jun-23	Project Neighbour	Email
8-Jun-23	Project Neighbour	Email
8-Jun-23	Project Neighbour	Email

12-Jun-23	Project Neighbour	Email
12-Jun-23	Other Stakeholder	Email
12-Jun-23	Other Stakeholder	Email
13-Jun-23	Project Neighbour	Text
14-Jun-23	Project Neighbour	Neighbour Visit
14-Jun-23	Project Neighbour	Neighbour Visit
14-Jun-23	Project Neighbour	Neighbour Visit
19-Jun-23	Other Stakeholder	Email
19-Jun-23	Other Stakeholder	Email
20-Jun-23	Other Stakeholder	Email
20-Jun-23	Other Stakeholder	Email
20-Jun-23	Other Stakeholder	Email
20-Jun-23	Other Stakeholder	Email
20-Jun-23	Other Stakeholder	Email
21-Jun-23	Other Stakeholder	Email
21-Jun-23	Project Neighbour	Random Visit
22-Jun-23	Project Neighbour	Email
25-Jun-23	Project Neighbour	Email
26-Jun-23	Other Stakeholder	Email
26-Jun-23	Other Stakeholder	Email
27-Jun-23	Project Neighbour	Email
27-Jun-23	Other Stakeholder	Email
28-Jun-23	Other Stakeholder	Email
29-Jun-23	Other Stakeholder	Email
30-Jun-23	Other Stakeholder	Email
30-Jun-23	Other Stakeholder	Email
30-Jun-23	Other Stakeholder	Email
3-Jul-23	Other Stakeholder	Email
4-Jul-23	Other Stakeholder	Email
4-Jul-23	Other Stakeholder	Email
5-Jul-23	Other Stakeholder	Email
5-Jul-23	Other Stakeholder	Email
5-Jul-23	Other Stakeholder	Email
5-Jul-23	Other Stakeholder	Call
6-Jul-23	Other Stakeholder	Email
6-Jul-23	Other Stakeholder	Email
17-Jul-23	Project Neighbour	Email
18-Jul-23	Project Neighbour	Email
20-Jul-23	Project Neighbour	Neighbour Visit
20-Jul-23	Project Neighbour	Neighbour Visit
21-Jul-23	Project Neighbour	Phonecall
27-Jul-23	Other Stakeholder	Email
27-Jul-23	Other Stakeholder	Email
28-Jul-23	Project Neighbour	Email
28-Jul-23	Other Stakeholder	Email
28-Jul-23	Other Stakeholder	Email
31-Jul-23	Project Neighbour	Email
1-Aug-23	Other Stakeholder	Email

1-Aug-23	Other Stakeholder	Email
1-Aug-23	Other Stakeholder	Email
1-Aug-23	Other Stakeholder	Email
1-Aug-23	Other Stakeholder	Call
2-Aug-23	Other Stakeholder	Email
2-Aug-23	Other Stakeholder	Email
2-Aug-23	Other Stakeholder	Email
2-Aug-23	Other Stakeholder	Email
2-Aug-23	Other Stakeholder	Email
2-Aug-23	Other Stakeholder	Email
2-Aug-23	Other Stakeholder	Email
2-Aug-23	Other Stakeholder	Email
2-Aug-23	Other Stakeholder	Call
4-Aug-23	Project Neighbour	Email
4-Aug-23	Project Neighbour	Email
8-Aug-23	Other Stakeholder	Email
8-Aug-23	Other Stakeholder	Email
9-Aug-23	Other Stakeholder	Email
10-Aug-23	Other Stakeholder	Email
11-Aug-23	Other Stakeholder	Email
14-Aug-23	Project Neighbour	Email
15-Aug-23	Other stakeholder	Email
16-Aug-23	Project Neighbour	Text
16-Aug-23	Project Neighbour	Text
16-Aug-23	Project Neighbour	Text
16-Aug-23	Project Neighbour	Phonecall
16-Aug-23	Project Neighbour	Phonecall
16-Aug-23	Other Stakeholder	Email
16-Aug-23	Other Stakeholder	Email
21-Aug-23	Other stakeholder	Email
21-Aug-23	Project Neighbour	Email
21-Aug-23	Project Neighbour	Email
23-Aug-23	Project Neighbour	Neighbour Visit
23-Aug-23	Project Neighbour	Mail drop
23-Aug-23	Project Neighbour	Text
23-Aug-23	Project Neighbour	Text
23-Aug-23	Project Neighbour	Text
23-Aug-23	Project Neighbour	Mail drop
30-Aug-23	Project Neighbour	Neighbour Visit
30-Aug-23	Other Stakeholder	Email
30-Aug-23	Other Stakeholder	Email
31-Aug-23	Project Neighbour	Email
31-Aug-23	Other Stakeholder	Email
31-Aug-23	Other Stakeholder	Email
31-Aug-23	Other Stakeholder	Email
1-Sep-23	Project Neighbour	Email
1-Sep-23	Project Neighbour	Email

1-Sep-23	Project Neighbour	Phonecall
3-Sep-23	Project Neighbour	Email
3-Sep-23	Project Neighbour	Email
4-Sep-23	Project Neighbour	Email
5-Sep-23	Project Neighbour	Meeting
5-Sep-23	Project Neighbour	Neighbour Visit
5-Sep-23	Project Neighbour	Email
5-Sep-23	Project Neighbour	Email
5-Sep-23	Project Neighbour	Email
6-Sep-23	Project Neighbour	Email
6-Sep-23	Project Neighbour	Email



APPENDIX 10
OPEN DAY FLYER/INVITE

Mt Munro wind farm project

As we revisit plans to develop a wind farm at Mt Munro – we'd like to hear from you.

We will be hosting an open community day where you can meet with our project team, ask questions and find out the facts.



Tuesday 13th December, 2022

**Eketahuna Community Centre
on Haswell Street**

12pm–7pm



Meridian.

The Power to
Make a Difference.

Mt Munro wind farm project

As we revisit plans to develop a wind farm at Mt Munro – we'd like to hear from you.

We will be hosting an open community day where you can meet with our project team, ask questions and find out the facts.



Saturday 18 February, 2023

**Eketahuna Community Centre
on Haswell Street**

10am–3pm



Meridian.

The Power to
Make a Difference.

Mt Munro wind farm project

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Saturday 18 February, 2023
Eketahuna Community Centre
on Haswell Street
10am–3pm



Mt Munro wind farm project

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Saturday 18 February, 2023
Eketahuna Community Centre
on Haswell Street
10am–3pm



Mt Munro wind farm project

As we revisit plans to develop a wind farm at Mt Munro – we'd like to hear from you.

We will be hosting an open community day where you can meet with our project team, ask questions and find out the facts.



Visual simulation by Boffa Miskell

Saturday 18 February, 2023
Eketahuna Community Centre
on Haswell Street
10am–3pm


Meridian.

The Power to
Make a Difference.



APPENDIX 11
EROSION AND SEDIMENT CONTROL LETTER

Memorandum

To: Tom Anderson, Incite Limited and Lynley Fletcher, Meridian Energy Limited.

From: Graeme Ridley, Ridley Dunphy Environmental Limited.

Date: 7th September 2023.

Re: Meridian Energy Limited / Horizons and GWRC. Mt Munroe Section 92 Response Erosion and Sediment Control.

1.0 S92 ESC REQUEST

This memorandum addresses the specific items of further information requested by Horizons and Greater Wellington Regional Council through a formal s92 request dated 6th July 2023. This relates to Horizons Regional Council – APP-2022203902.00 and Greater Wellington Regional Council – WAR230312 [39005, 39006, 39007, 39008, 39009]. This memorandum provides the technical response to questions 48 to 63 as set out below.

2.0 S92 ESC RESPONSE

48. Consent conditions offered specify provision of Construction Environmental Management Plans (CEMPs) and Specific Environmental Management Plans (SEMPs), however there appears to be no ability to audit and certify or otherwise the CEMP by the Regional Council. There appears to be the ability to certify the SEMPs, however there does not appear to be an allowance for certification of amendments. The ESCP Report is silent on the use of a CEMP, however discusses SEMPs. The AEE only contains mention of CEMP in the offered conditions. Please provide further information on the intent and interaction of the CEMPs and SEMPs, including proposed certification processes and their implementation on site.

Within the CWMR in Section 1.1 it is noted that “It is also envisaged that through the detailed design phase the contents of this Report will also be refined and amended to include specific Project construction and earthworks analysis. This will occur prior to earthworks (or any stream works) commencing at a given location and will be produced in the form of a Specific Environmental Management Plan (SEMP). These SEMPs will be submitted to Manawatū-Whanganui Regional Council (Horizons) and Greater Wellington Regional Council (GWRC) for certification against the consent conditions, this Report and best practice ESC. The SEMPs will be informed by the principles of this Report and will enable specific construction constraints and opportunities to be incorporated into the final design for the works at that location. The SEMPs

further will allow for flexibility, for enhanced outcomes and the opportunity for implementing improved practices based on any new knowledge and Project outcomes."

In addition, Table 3 of the CWMR provides the details and content of the SEMP's to be provided.

Condition amendments have been provided within the updated condition framework.

49. In Table 1 of the Erosion Sediment Control Plan Report (ESCP), the road corridor for earthworks is listed as approximately 2ha, yet there is a proposed (excluding topsoil) cut volume of 935,100 cubic metres for the road corridor. Are those values correct, and what are the maximum cut and fill depths? We note a slightly larger volume (1,090,000 cubic metres) is to be placed in fill sites over 25ha. How does the 2ha of roading correlate to 11km roading and access track?

Please refer to the response to Question 97 within the primary s92 response for a breakdown of cut and fill volumes.

50. Section 4.2 of the ESCP Report indicates an open earthworks period of 14 days, however, it also indicates in Section 7.1 "...a 14-day maximum period of leaving exposed areas with no works occurring." Does this mean an area will be exposed for a maximum of 14 days, or only stabilised after 14 days of no earthworks? On a project of this size, and with the cut and fill depths alluded to in the query above, how are the 14 day open earthworks areas going to be managed? Please provide further information around how the 14 day open earthworks period is going to be managed for both general earthworks and fill sites.

Section 4.2 of the CWMR notes "The extent of exposed soil and length of time that area is exposed has a direct influence on the sediment yield leaving a particular area of the site. Earthworks and construction activities will be staged and sequenced in order to limit the area of exposed soil required to complete an element of the work. Open earthworks areas will be progressively stabilised to reduce the potential for erosion to occur with a 14-day period recommended"

Section 7.1 of the CWMR notes "To assist in this process, it is recommended that a 14-day maximum period of leaving exposed areas with no works occurring is assessed as a critical risk reduction element, and will in itself, encourage progressive stabilisation"

The intent of this 14-day period is that the earthworks areas will not be left in an un-stabilised state for a period of time with no works occurring. If earthworks in a particular location are completed, they will be progressively stabilised and at no time will areas remain open for more than a 14-day period. This provision ensures that areas of earthworks are not unnecessarily undertaken and then left in an unstable state for a period of time.

The management of this will require progressive stabilisation of cut and fill batters as they are established for all earthwork locations. This is a similar provision that applies on many earthworks sites with similar conditions and can be implemented successfully. The nature of the stabilisation is further defined within Section 4.2 and 5.1.5 of the CWMR.

51. Section 5.1.5 of the ESCP Report states that hydroseeding may be applied as an alternative to mulch, and other alternatives such as polymer/soil binder products may be used to aid in stabilisation if trialled on site. While hydroseeding and polymer/soil binder products are a useful tool to aid in stabilisation, these products are generally not considered to be a form of stabilisation on their own. Please provide further information on how these methodologies will be used to achieve stabilisation and how sediment controls will be maintained until stabilisation is achieved.

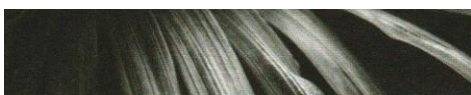
Stabilisation is clearly defined within the CWMR and this is recognised as the industry best practice definition of stabilised. If applications such as hydroseeding and traditional grass sowing methodologies are utilised, these will not achieve a stabilised surface and in that case the downstream sediment control measure will need to remain in place until stabilisation is achieved. The alternative option in this scenario is application of a surface cover that achieves stabilisation.

In recent years there has been a significant use of soil binders and polymers on earthworks site and these are recognised to have benefits but will not always achieve a stabilised surface. In the circumstance that these are utilised they will need to be verified as stabilised, demonstrated to have no residual impacts and will need to be trialled on site to demonstrate appropriateness prior to use. This is detailed within Section 5.1.5 of the CWMR.

52. The ESCP Report details Sediment Retention Ponds (SRPs), Hybrid Decanting Earth Bunds (HDEBs), and Decanting Earth Bunds (DEBs) as the primary methods of sediment control. Section 5.2.1 of the ESCP Report states that "SRPs provide the most robust and effective measure in achieving sediment removal from construction runoff however are only appropriate for larger areas of earthworks." It is therefore assumed that HDEBs and DEBs provide a lesser robust and effective measure. Please provide further information around the hierarchy of sediment control and criteria that will be used to determine the use of the 'lesser' controls. Is a tool such as USLE or similar proposed in this assessment?

It is well recognised that SRPs, HDEBs and DEBs all provide a robust and proven sediment control function with SRPs the most effective of these options. This is not to diminish the value and effectiveness of the alternatives (HDEBs, DEBs, Super silt fences etc) but simply confirms the highly efficient nature of SRPs for larger areas of earthworks. The Project will implement SRPs wherever room availability and best practice assessment applies. This will be documented in a SEMP and reviewed and certified by Council.

In some circumstances where smaller catchment areas exist the use of HDEBs and DEBs (and other options) will apply with these installed as per the design criteria specified within the CWMR and the GWRC Guidelines. There is no need or requirement to undertake USLE calculations or similar to determine the sediment control measure to be implemented however it is recognised that the SEMP process does require assessment of risk management and detail and this process will further expand on any site-specific requirements that may apply. Again, this SEMP is subject to Council certification.



53. Section 5.2.2 of the ESCP Report states that DEBs will typically not be subject to chemical treatment unless the SEMP confirms this requirement for higher risk locations. Section F1.2.1 of the GWRC Guidelines (which is considered best practice and proposed as the ESC standard for the proposed works) states "Flocculation treatment should be used for all DEBs to increase their efficiency, unless other justification is provided." This is also consistent with current best practice and should be the minimum standard. If chemical treatment is not the proposed standard for DEBs, further justification is required to explain why it is not required in this case. This may include further information on how higher risk locations are to be determined and when flocculation will be utilised or not.

As specified in Section F2.1.5 of the GWRC Guidelines it states that DEBs can benefit from chemical treatment. This is recognised and accepted within the CWMR with the process being confirmed through the SEMP process. It is not possible to determine if some DEB catchments will benefit or otherwise from chemical treatment until such a time as the SEMP is established and the activity and nature of the works is understood. The key driver to chemical treatment implementation or otherwise is based on bench testing of the soils that apply to the area of interest with the bench testing undertaken to date demonstrating that very low dose rates are required in some soil types.

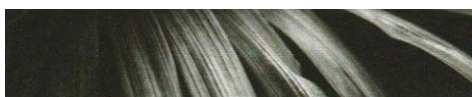
The soil type and bench test analysis, the duration of works, the nature of the works themselves, the vicinity of water bodies and the slope length and angle of the catchments all assist with risk determination and through the SEMP process will be documented to allow a risk profile to be understood and as part of this the need or otherwise for chemical treatment of DEBs.

It is assessed that the SEMP process remains as the best practice and most appropriate place for this determination.

54. Section 5.2.1 of the ESCP Report states that geotechnical assessment may be required in the construction of SRPs, however there is no 'trigger' for when this might be required. There is also no mention of whether this is required for the HDEBs and DEBs. Please provide further information on how a geotechnical assessment will be used in the design and construction of all sediment retention devices, including any geotechnical sign off required.

It is proposed to undertake a geotechnical assessment of the location of the SRPs to ensure that the location is suitable from a structural perspective for the purpose of a functional SRP device. On reflection it is assessed that all SRPs will be subject to this requirement due to the longer duration and the larger volumes of these devices. It does not apply to other control measures. If geotechnical constraints occur with the location of the SRPs then alternative locations will be determined and / or geotechnical solutions established for the SRP in question. This detail will all be provided for within the SEMP documentation.

The process will be based on undertaking such geotechnical assessments prior to construction occurring. While no ongoing geotechnical advice during the SRP construction itself is assessed as necessary this step may also occur as part of the wider geotechnical project advice.



55. Section 6.2 of the ESCP Report states “...earthworks themselves will progress no more than 24 hours in advance of the stabilised surface.” This cut and cover approach is sensible in that it reduces the time of exposure, however given the size of some of the cut and fills on site, how is this proposed to work in a practical sense?

The cut and cover will be based on ongoing stabilisation utilising the recognised methods as specified within the CWMR. The 24hr period is designed to ensure that stabilisation occurs in a progressive manner.

Importantly as per Section 6.2 of the CWMR this provision applies to roading corridors and the CWMR specifies as follows: “The road formation will be staged such that as the road is formed, a cover of aggregate can be placed over the track surface to achieve a stabilised area. This is referred to as a “cut and cover” methodology and earthworks themselves will progress no more than 24 hours in advance of the stabilised surface. This has the effect of reducing sediment generation and also associated risk.”

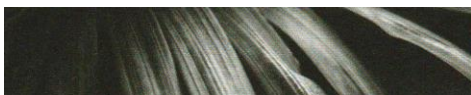
56. The level of sediment control for topsoil stockpiles is lower than that proposed for the main earthworks (silt fence or filter sock) given the temporary nature and lower risk. These are less effective than the SRP/HDEB/DEB controls proposed for the balance of the works. Please provide further information on the temporary nature of topsoil stockpiles, stabilisation proposed, and further justification for the controls proposed.

As with all erosion and sediment control measures the final determination of the specific measures to be implemented for each area of works will be made at the time of the SEMP development. For topsoil stockpiles these will likely fall within the catchment areas of the main sediment control measures used however silt fences and filter socks can assist with managing these stockpile locations in an effective manner.

As per the CWMR, all super silt fences, silt fences and filter socks will be based upon the design criteria within the GWRC Guideline. SSF fabric will be installed with 200mm of fabric upslope at the base of the trench. Further to this the stockpiles themselves will be subject to the progressive stabilisation provisions and in particular the 14-day stabilisation criteria as detailed above.

57. It is assumed that subsoil drainage will be required for turbine excavations, effectively providing drainage for the turbine excavation and completed foundations. If this assumption is correct, how is subsoil drainage from turbine excavations going to be managed from an ESC perspective?

The detailed design of the turbine excavations and platforms is not yet available. As noted, it is likely the subsoil drainage will form part of this design. The specific erosion and sediment control, methodology will be documented within a SEMP at the time however it is expected that this will likely include ensuring that subsoils discharge to appropriate sediment control measures and also that the subsoils themselves will be wrapped in cloth and have an aggregate drainage layer surrounding the subsoil drain. This specific detail cannot be determined at this time and will be turbine specific.



58. Section 6.4 of the ESCP Report states “ESC measures for this site compound will include a super silt fence and as soon as possible stabilising the area with aggregate as part of the site compound formation.” As discussed at the site visit, the site compound remains for the duration of the proposed works and can be at risk of generating sediment runoff through the breakdown of stabilised surfaces. Has an SRP been considered for this area as a more robust and longer-term ESC measure?

It is confirmed that a SRP was originally considered for the site compound location however based on the site visits and associated analysis and the proposed site compound surface, it was assessed that the use of a super silt fence was more appropriate. This is due to allowing laminar flows from the compound area to discharge through the super silt fence rather than concentrating flows to one specific discharge location.

It is also important to recognise that the ESCP that supports the CWMR for this location has a primary purpose of demonstrating that there is a viable and effective erosion and sediment control approach to the area. A detailed SEMP will be established for the compound and as part of that, specific measures confirmed.

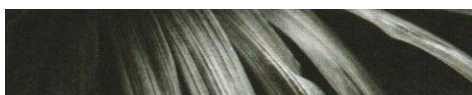
With respect to the breakdown of the stabilised surface this is recognised and if an ongoing stabilised surface forms an integral part of the methodology adopted then this will need to be achieved through the ongoing placement of new aggregate as required over time.

59. Section 6.4 of the ESCP Report states that “...one concrete batching plant to be located within the Turbine Envelope Zone or the Turbine Exclusion Zone.” Section 2.12 of the Ecological Assessment states “The site will include two concrete batching plants to be located within the Turbine Envelope or Turbine Exclusion Zone.” Please provide further information around the number and location of batching plants and proposed erosion controls.

Please refer to the response to Question 59 within the primary s92 response which clarifies this matter.

60. Section 6.5 of the ESCP Report details a cut and cover methodology for cable installation, however provides no details on the timing of this other than if a forecast rain event occurs. Please provide further details around the timing of the stabilisation for the cabling methodology.

As per Section 6.5 of the CWMR the primary erosion and sediment control is based on a progressive stabilisation with the trench area open able to be stabilised quickly if a forecast rain event occurs. In addition, filter socks will be utilised around all drainage systems and stream channels to ensure there is no direct discharge to these environments. It is assessed that the implementation of stabilisation can easily occur and with respect to timing of this stabilisation it is expected that this will occur on a daily basis however this can only be determined and specifically outlined within a SEMP process once detailed design and location is confirmed.



61. Section 6.7 of the ESCP Report states “...it is assessed that the key methodology to be employed will be based on a dam and pump process.” Two of the proposed culverts are of significant length and require significant works to construct. The methodology that proposes pumping upstream flows around the works area can create an element of risk over longer construction periods as the pump is unlikely to cater for anything above minimum flows. How is this risk going to be mitigated?

a. A specific ESC methodology for two of the longer culverts along with associated bulk earthworks may assist in understanding the proposed construction methodology and thereby addressing this query.

The location of the culverts and streamworks are identified within the overarching s92 response. These locations have all been viewed on the ground and have been assessed based on the ability to install structures and methodologies in accordance with the CWMR. It remains our assessment that the methodologies outlined are appropriate and that only when detailed design and specific location is confirmed can we then determine the specific ESC approach and supporting plan. This will be provided to Council for full review (and further feedback if required) through the SEMP process.

62. The ESCP Report details “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.” What are the water quality monitoring processes, standards, and triggers used for this project? There is discussion around the use of turbidity, however no discussion on levels.

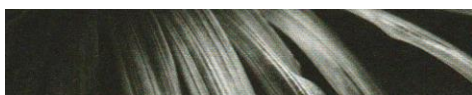
63. Consent conditions offered contain no discharge monitoring requirements or standards. These should be considered in relation to the sensitivity of receiving catchments. Are you proposing a discharge standard to protect the values of the receiving environments?

Questions 62 and 63 are responded to as below.

We have reviewed the construction related monitoring further and confirm that qualitative monitoring will be undertaken as per Section 8.1.1, 8.1.2 and 8.1.3 of the CWMR. With respect to quantitative monitoring, please refer Section 8.2 of the CWMR.

With respect to triggers for monitoring please refer to the ecological s92 response. In addition, as per the CWMR (with slight amendments to reflect ecological considerations further), triggered monitoring will result from activities or events that may trigger:

- Activities observed to be happening on-site that are likely to compromise the effectiveness or integrity of that site’s erosion and sediment controls;
- Taking into account antecedent climatic conditions, a conspicuous change of water colour at the downstream receiving environment that is very different to the colour that



is normally associated with conditions at the same site, and with such change in colour not evident at upstream locations above the construction zone;

- Obvious accumulation of sediment in the vicinity of the discharge points, or anywhere else within or in proximity to the active construction zones;
- Streambank collapse or obvious signs of channel erosion / instability in the immediate receiving environments;
- Visual reports / evidence of uncharacteristic changes to downstream substrate composition, increased macrophyte bed cover in stream or discolouration of instream plant communities; and
- Spillage / accident reports by site personnel.

In the event of a trigger as above the erosion and sediment control management will be investigated to determine whether there has been a discharge from the devices. If there has been a discharge, manual water quality monitoring from the discharges and receiving environment will occur and a detailed response undertaken including full review of the ESC measures and processes associated with that specific trigger.



Graeme Ridley
Ridley Dunphy Environmental Limited



APPENDIX 12
ECOLOGY MEMO

Memorandum

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Attention: Tom Anderson, Nick Bowmar, Lynley Fletcher

Company: Incite, Meridian Energy

Date: 29.08.2023

From: Dr Vaughan Keesing

Message Ref: Mt Munro Windfarm section 92 responses

Dear all please find below the ecological responses to the various ecological Section 92 requests and several of the Erosion and Sediment control queries also.

Erosion and Sediment control	
<p>63. Consent conditions offered contain no discharge monitoring requirements or standards. These should be considered in relation to the sensitivity of receiving catchments. Are you proposing a discharge standard to protect the values of the receiving environments?</p>	<p>We note from the ecological perspective the likely receiving environments are the small headwater tributaries which are currently all in unfenced farmlands and are well adapted to regular sediment and nutrient inputs and are not comprised of overly sensitive macroinvertebrates (see figure 5 AEE). The majority of benthic invertebrate abundances are diptera and Mollusca in the Kopuaranga and Bruce and all but the Makakahi 2 and 4 (least affected). The one affected Mangaroa tributary has low mayfly but some caddis but a low MCI and QMCI - not sensitive. Therefore we have suggested that these data be used as an effects baseline but that there is no need for a calendar monitoring regime but rather an event based system whereby the erosion and sediment monitoring system on site be a trigger such that potential effects (measured by monitoring discharge) are related directly to a project event and not the effect of the ongoing farming (natural) events.</p>
<p>65. Table 31 of the Ecological Assessment provides a summary of the overall level of adverse effects from a substantive sediment discharge event. This table indicates a low magnitude of effects and a low to very low level of effect from a substantive sediment discharge event. Please clarify how this is measured (both the substantive sediment discharge event and level of effect). It is unclear how the potential sediment discharge has been estimated and how this then impacts on the freshwater environment. Further</p>	<p>The assumption that an event even if discharging substantive sediment will be temporary, flushed and is within the experience of these systems. It comes from a long-gained understanding at construction sites such as West Wind, Mill Creek and Transmission Gully, where earthwork management failures did not collapse the benthic community but altered proportions of taxa for short periods. Indeed at the</p>

<p>understanding of this may assist in determining discharge monitoring standards and requirements.</p>	<p>Westwind wind farm the management regime resulted in better outcomes than the original farming practices. So the expectation is a low magnitude of effect for what might be very occasional event discharges that overwhelm the defences. As to a measure, a substantial discharge would be one that causes deposition that is across the stream (say 70% of the wetted width), is over 10 cm deep, lasts more than a further rain event, and is over 20% of the receiving habitats downstream linear length. These are somewhat arbitrary measures, but ones we have found to be effective, measurable and telling. The SAM 2 (Clapcott et al. 2011) processes are sufficient protocol to measure these factors.</p>
<p>Aquatic Ecology</p>	
<p>66. In relation to the stream classification method, the hydroclasses of waterways have been classed as either permanent, intermittent, or ephemeral, however the method undertaken to define these hydroclasses is not stated and is unclear. For instance, page 41 of the Ecology Assessment states that perennial and intermittent reaches were determined based on having a defined channel and flowing water, however we note that by definition intermittent reaches might not always contain flowing water. Additionally, Map 14 appears not to display intermittent reaches. The boundary between intermittent and ephemeral is particularly important as this determines whether the waterbody is a 'river' in terms of the RMA. Existing methods are available, such as the Auckland Unitary Plan (AUP) Practice and Guidance Note River/Stream Classification. Please provide information to demonstrate the stream classifications in accordance with the Guidance Note River/Stream Classification method.</p>	<p>The following methodology outlines how waterways on site were classed as either perennial, intermittent or ephemeral:</p> <p>Each waterway was walked on site by two qualified freshwater ecologists. Site observations and notes were recorded of the stream system, including presence of surface water, the flow, signs of aquatic life and the presence of an active bed.</p> <p>Subsequently, using aerial imagery the site notes were cross-referenced with the aerial imagery and each waterway was marked with the boundary between perennial / intermittent / ephemeral, accepting that those zones are fluid and dependent on the time of year and amount of preceding rain. This is in reality an abridged version of the AUP method. I.e. evidence of natural pools, well defined channels, and a distinguishable bank and bed, surface water presence, rooted terrestrial vegetation, flood plain evidence of organic debris and evidence of substrate sorting processes (in an active bed) bed relative to the ground water table.</p> <p>However, considering no interactions are proposed of the project in the intermittent areas, the top end of perennial or lower ephemeral, the accurate depiction of the intermittent zone is not crucial to an effects decision. We supply a new map which illustrates this point (Appendix 2) and that the only interactions are with top of the gully ephemeral systems.</p>

67.

In relation to ecological values, the assessment of rarity contained in Appendix 6 incorrectly labels the status of longfin eel to be not threatened, when it does in fact have a threatened status. There is no science basis for this, and the position taken has been used to justify a low rarity value for all waterways assessed. A more appropriate valuation would be moderate rarity for all waterways where longfin eel occurs due to its threatened classification. Please provide justification on why this classification has been used.

Diversity for all streams has been rated as low. However, in contrast the macroinvertebrate results (Figure 6) show good water quality being indicated at most sites monitored at least once, and four sites have returned >50% %EPT taxa richness. This data provides evidence that diversity is greater than low in a number of instances, and this is not reflected in the ecological valuation. Please provide justification as to why this classification has been used.

Table 6 of EIANZ (2018) states that an area has Moderate value if it rates Moderate for two or more assessment matters and Low or Very Low for the remainder. A review consistent with the above would likely result in changes from low to moderate value, which has implications for the overall level of effect. Please review the ecological valuation considering these points or justify why the ecological valuation shows the area as having a low value.

The Appendix correctly labels long fin eel as At Risk - Declining (Appendix 6, page 1, rarity and distinctiveness”).

However, it then goes on to explain why long fin eel, in this catchment and indeed in most catchments around New Zealand, are not considered “rare” for the purposes of value.

This is because rarity is a function of numeric abundance and / or frequency of presence. Long fin eel is one of the most ubiquitous species in the fish records and one of the most abundant and therefore regardless of its threat classification it is not rare.

Given ecological value is not a statutory assessment the assessor is entitled to provide evidence-based decisions as to the fit or not of a species to a value criteria - we have done that.

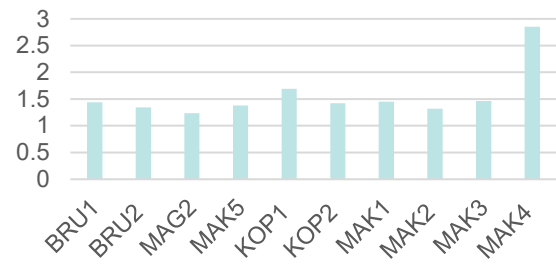
The presence of long fin eel in any stream does not, in our opinion, render the stream habitat as of moderate habitat or as “moderate rarity” under rarity.

In regard to Diversity. The assessment of diversity, we see, has been solely with regard to the physical habitat and its complexity. We agree that consideration of the faunal and flora diversities is also a component.

We concur that the benthic macroinvertebrate fauna surveyed are now (they were much poorer in 20911), of an average species richness for pastural hard bottomed streams (an average of 28 taxa (21-33)). As a comparison we have collected data on the upper Whakamoekau Stream, a stream south of the site, near Masterton, which is similar in form and condition in the same land use and had a species richness ranging 28-44 and averaged 35 taxa. So the Mt Munro streams in general are a little below average in diversity in terms of benthic macroinvertebrates.

To assist in terms diversity we have undertaken a Shannon diversity indices score (a commonly used diversity indices for invertebrate assemblage samples). The scores for the data collected are all between 1.35 and 1.7 except MAK4 which had a diversity indices of 2.8. The Whakamoekau stream examples averages 2.4.

Shannon diveristy Indices



We suggest that an average SW diversity for similar hard bottomed rural streams is around 2. Thus it is perhaps fair to say the majority of the tributaries have a low, not moderate diversity while the MAK4 site has a moderate or better diversity, although the physical conditions are still limited. The one moderate MK tributary site does not change the averaged condition. We note that the MAK4 site is not likely to be affected its only interaction is that the transmission line passes over it and that will not require any disturbance. We note also that the MAK1 interaction is well above the stream, involving the upper riparian and not the bed. We note that the MAG2 sites macroinvertebrate fauna will influence the SEV outcome related to the culverting.

68.

In relation to your proposal to culvert 210m of the Mangaroa tributary, we note that your evaluation of the magnitude of effect has not considered the duration of effect. The culvert installation would be permanent (i.e., c. 25 yrs + as per EIANZ 2018 Table 9). The character of the zone of influence would be partially changed, which is in line with a moderate magnitude of effect. Please review the proposed magnitude of effect in line with best practice guidance for ecological impact assessment as outlined here and detailed in EIANZ (2018), and also the corresponding overall level of effect for these proposed culverting works (following review of value and magnitude as above). As a result of the review, please provide any amendments or provide justification as to why the provided magnitude of effect and corresponding overall level of effect for the culverting works are appropriate.

We agree that the effect can be viewed as permeant. We also note that the effect is nevertheless reversable. While the culverts will change the aquatic habitat over 210 or so meters, two (culverts 1 & 2 in T&T response, Appendix A) are in a tributary of at least 3000m, we consider that the magnitude of effect in this instance is far more a spatial scale issues than a temporal one and that the view in the initial assessment was not that the aquatic habitat "lost" was only a temporary effect, it was always considered a "permanent" effect and the magnitude assessment undertaken with that accounted for. The third culvert (Culvert C7 is a replacement of an existing culvert), is a 30 m culvert in a 1500m tributary (2%), spatially and at a permanent temporal consideration, a low magnitude effect . The value of the MAG2 tributary and the tributary at large remains, from our assessment, low (of average to low macroinvertebrate assemblage and low habitat condition despite a generally hard substrate and the magnitude of effect 210 m of permeant loss of a 3000-meter tributary remains, in our opinion a low magnitude of

	effect – the resultant level of effect remains very low (less than minor).
<p>69 In line with requirements of the National Policy Statement for Freshwater Management 2020 (NPS-FM), please provide an assessment of alternatives to avoid the proposed 210m of culverting of the Mangaroa tributary. Please also describe how the mitigation hierarchy has been applied in the decision making to culvert the Mangaroa tributary. These assessments should consider both alternative alignments and alternative methods of stream crossings (e.g., stream simulation culverts) as means of reducing freshwater habitat loss and loss of freshwater values.</p>	<p>It is not possible to divert or create a new stream section that does not involve some loss. Following the engineering requirements to place culverts (at those lengths) not arches or bridging, the instream structures that replace 210m of stream cannot be minimised, except to ensure that the culvert effects do not include armouring of the stream bed above and below the headwalls and that the installation is as per the NES permitted activity guidance in so far as the headwalls and culvert bed are set below the natural stream bed and the sizing is appropriate, such that fish passage is fully facilitated (which is expressed in the AEE). It is also likely under that regime that the bed of the culvert will accumulate gravels and that too will assist fish passage. The stream habitat lost to the culverts cannot be remedied. We assessed the level of effect of culverting 210m of the 3000m of tributary as very low, we consider that this equates to a minor or less than minor level of effect, not more than minor. The NPS FM (3.21. 1.(d)) states that more than minor residual adverse effects are offset and that lesser effects receive no further management.</p> <p>As a precautionary approach (and also we note that it covers the discussion above about the overall level of effect being low or moderate) we have recommended to Meridian that there be an offset nevertheless, and in part to ensure all less than minor potential effects are accounted for (ephemeral reaches, riparian effects and fish passage). We consider that this approach is a more than fair and responsible undertaking in a farmed small stream catchment.</p>
<p>70 Please describe specific treatments to ensure fish passage would be achievable through the 210m of culverting in the Mangaroa tributary.</p>	<p>The recommended approach is to ensure that the bed of the culvert and headwalls are sufficiently sunk into the bed such that there is no lip or barrier to a benthic traveling fish; that there be no armouring of the bed above or below the headwalls; and that the culvert is sufficiently sized (be it a pipe or box) that the natural stream width (bank to bank) is accommodated such that there is no velocity change within the culvert. These three considerations will ensure the same fish passage ability as is currently available. We note that in terms of</p>

	length of culvert, it is Inanga that suffer most in terms of travel through darkened areas, but there are no Inanga this far up the catchment.
<p>71</p> <p>Please provide a full set of Stream Ecological Valuation data and offset calculations to demonstrate a no-net loss position for the affected waterways for each of the main activities/effects. The formula and steps to be followed can be found on page 56 of the document below:</p> <p>https://knowledgeauckland.org.nz/media/1397/tr2011-009-streamecological-valuation.pdf</p> <p>The offset calculation must include the standard multiplier for risk and time lag as the positive effects from the restoration treatment (riparian restoration) will lag behind the time of culverting by about 5-10 years (+) and planting native trees is uncertain regarding weather, pests and other factors beyond your control.</p>	<p>Arguably with a residual effect outcome that is less than minor there is no offset requirement for the culverting of the Mangaroa (2) tributary. However, and because we have encouraged a precautionary approach, an offset (such that there is net aquatic gain) has been offered that involves the fencing from stock and the revegetation of the riparian zone (as well as instream habitat enhancement). Currently the AEE recommends a 3:1 ratio (enhancement to effect area (Ca. 240m)) - this is a reasonable ratio not uncommon or even a little generous as compared to other projects given that the level of effect does not, in our opinion, direct Meridian to offset for this level of effect. The proposed offset ratio means around 720m (but that will depend on the final total length of culvert/s) of stream would receive enhancements (those enhancements would mean a 0.3 SEV gain/m if that model was to be used). There is around 1000m of stream available in the catchment beyond the culverts and we promote the use of all of this area, but 720m active revegetation (both sides to 10m)). If we used the SEV ECR system the ratio would hinge upon what the predicted SEV of the enhanced stream would be. If, for example we accept that the current SEV is 0.4 (and 0.5 for SEVI-P) and that the resultant new forested stream could be 0.7 (a conservative outcome), then the ECR would be 2.5. We suggest that there is little need (and nothing to gain) in actually undertaking an SEV analysis, but rather to agree on the likely current condition and the possible future condition with the safety net that regardless of the ECR the proposed 720m stream enhancement and protection of most of the upper tributary in this valley will produce a net gain that exceeds the likely SEV out come if we were to use the SEV model approach.</p>
<p>72</p> <p>In tandem with the above point, please clarify what corresponding structures are required (such as concrete aprons, bed armouring, etc) in addition to the culverts. Please describe and quantify the effects if there are any additional structures and determine the quantity of restoration required to address these effects.</p>	<p>To our knowledge the installation method and the other structures associated with the culvert have not as yet been designed. We have recommended that there be no additional armouring and that the headwall and apron will be set in the stream bed along with the culvert such that there will not be an un-natural gradient change or</p>

	<p>surface (gravels and sediments will cover the bed), that the culvert be the same gradient as the current stream bed and no flow velocity change and so no additional effects related to ancillary culvert infrastructure or installation with regard to fish passage and flow.</p>
<p>73 Please provide a protocol in accordance with best practice for managing effects to instream values during instream works (e.g. culvert installation), including temporary diversions, so that works can be undertaken in the dry and provide for fish salvage. This may be included within the site specific erosion sediment control plan for the culverts.</p>	<p>Again the detail from the engineers is not as yet published. We have recommended that a standard fish / koura salvage and relocation process be in place, which BML have successfully carried out on numerous projects in the last 10 years. We have also recommended an offline installation to minimise sediment and time of stream disturbance. Salvage, given the small stream size, will involve reach isolation by way of a mesh fencing above and below the works and then repeated EFM fishing. Our MPI accepted protocol (we hold a range of national permits to salvage and translocate fish) is to fish a reach until our catch is 10% or less of the numeric averaged first two catch abundances, and that there are no threatened or at risk species in the catch. The sediment control plans and management is developed and co-ordinated by Mr Ridley.</p>
<p>74 Please provide a method for monitoring the effects of sediment released from the site. During the site visit, the ecologists discussed using existing instream survey sites as baseline sites that erosion and sediment events could be monitored at when triggered at the earthworks site. Please provide details of this monitoring including confirming sites, methods, duration, frequency, and any discharge standards.</p>	<p>We do not anticipate there being any measurable sediment discharges from earthworks for turbine installation and consider the road development has a low risk discharge profile that could reach any intermittent or perennial stream habitat. The primary risk relates to the three culvert installations and establishment of a bridge abutments. It is not possible to avoid all sediment discharge when installing culverts, but the process usually requires a brief period of turbidity.</p> <p>The existing benthic macroinvertebrate data at MAG 2 and MAK sites are baseline measures (including the 2011 samples) against which comparisons can be undertaken and SAM¹ methods employed. However, while some of the streams are stony bottomed all receive season rain event sediments yearly and the level of deposited sediments is highly variable. We do not consider a calendar monitoring regime is required.</p> <p>The first component of sediment management sits with those experts (see</p>

¹ Joanne Clapcott et al., *Sediment Assessment Methods: Protocols and Guidelines for Assessing the Effects of Deposited Fine Sediment on in-Stream Values* (Nelson: Cawthron Institute, 2011).

	<p>Mr G Ridley) and the indication of stream effects will rest first on the earthworks sediment management team alerting of discharge and location and amount and receiving environment. From that alert an ecological survey using SAM and then benthic macroinvertebrates can be undertaken in the identified receiving habitat to establish if a lasting adverse effect has occurred (or is likely).</p>
<p>75 In tandem with the above point, please describe possible remediation measures that can be adopted in the event of a sediment release to freshwater.</p>	<p>In these farmed stream environments sediment discharge is a frequent event, although rarely on a large scale. The benthic fauna usually recovers rapidly. While there have been exploratory uses of sediment vacuums (in urban sites) and one example we monitored through TG in the Ration catchment, it is unlikely a discharge event will be of such a scale as to affected 100's of meters of intermittent / perennial stream. We feel it is that magnitude of a discharge that, in these streams would warrant active cleaning. If such a magnitude of effect was to occur in the Mangaroa or Makakahi tributaries then a vacuum truck may be an option if truck access is available.</p>
<p>76 Regarding the proposed freshwater offsetting, please provide the following information:</p> <p>b. The location, area (ha) and timing of the freshwater offset.</p> <p>c. The proposed planted species composition and spacing.</p> <p>d. A description and quantification of what is meant in the ecological assessment as “improvements to substrate and flow heterogeneity” at the offset site. What would these restoration treatments constitute?</p> <p>e. The proposed mechanism of legal protection (conservation covenant) of the freshwater offset site to ensure the positive effects are protected in perpetuity.</p> <p>f. The width of riparian planting. On site your ecologist stated that riparian planting would be 20m either side of the stream. Please confirm.</p> <p>g. Please describe and detail the proposed methodology of determining the proposed offset and if it's successful (such as using SEV monitoring).</p>	<p>Appendix 1 illustrates the area considered appropriate as the offset with (for stream effects (250m)) a near 900m linear reach of the main Mangaroa tributary, with a 10m either side revegetation programme, a range of woody weirs installed to cause flow heterogeneity and increase retention, and the deposition of a large amount of small woody debris in stream.</p> <p>The precise treatment we consider better put into an offset design report post consent rather than as notes to a section 92, but the essence will be a seral broadleaf revegetation focused on woody species (makomako, karamu, heketara, tarata, mahoe, kamahi, kanono and mapou) planted at a 1m spacing and planted as 1L plants, with guards and a weed mat and maintained until an 80% canopy cover and absence of serious ecological weeds.</p> <p>In terms of legal protection we envisage a covenant in favour of perhaps Regional Counsel, which is in force while the culverts remain in stream.</p> <p>We consider that 10m either side of this small stream is sufficient to provide all the instream functions and support required,</p>

	<p>and at those dimensions it will be self sustaining².</p> <p>Success, we suggest can be monitored through site inspection to warrant successful riparian development and a post woody installation stream physical habitat assessment. To expect an improvement in macroinvertebrate or fish taxa in anything but a very long time is unrealistic since the source of any new EPT taxa, for example, is very distant and may not in reality ever be able to colonise this stream.</p>
<p>Terrestrial Ecology</p>	
<p>77</p> <p>There is no general section or comment on terrestrial invertebrates. We note that indigenous vegetation that is likely to be habitat for threatened or at-risk invertebrate species is avoided. Therefore, there are unlikely to be any impacts. We also note the extensive survey undertaken for lizards and birds which could also have resulted in the discovery of invertebrates should they have been present and so we are comfortable that the risks to threatened or at-risk invertebrates is low. However, it would be useful if you could please confirm that the assumption of low risk is valid and provide an explanation as to why.</p>	<p>We confirm that the ecology team on the project also considered the risk to indigenous invertebrate assemblages or taxa was low to extremely low (so low as to be non-existent) because there is no habitat of these taxa in the wind farm envelope. The most likely habitats are in the southern lower-mid gully forest remnants which are untouched by the project.</p>
<p>78</p> <p>We note and agree that the wetlands within Horizons' region that are likely to be lost are not those that the One Plan 2022 seeks to protect. We also note and agree that the NPS-FM identifies these sites as "wetlands" and therefore the effects management hierarchy is to be followed and, if these wetlands are lost, then some kind of offset or compensatory response is warranted. There is one of these such (non-indigenous dominated boggy ground) "wetlands" that is earmarked as "partially within" the effects envelope in the Greater Wellington Region. We note that the intent is to avoid the "partially within" wetlands. However, the application in general has taken an effects envelope approach to provide flexibility in design and that these approaches usually assume total loss of the values within. There is a condition for 1:1 wetland loss offset/compensation with no upper limit/maximum area for the loss, and no condition specifically specifying avoidance of wetlands in the first instance. Therefore, the loss of the partial extent of "partially within" wetlands remains in scope and avoidance is not the inherent</p>	<p>We have advised, and Meridian have acknowledged, that it is preferable to avoid all and any adverse effects to natural inland wetland regardless of their quality and we identified those habitats within the construction foot print and within 100m of earthworks for that purpose. To that end we can confirm that all of those wetland features identified in the GWRC region, because all of these features only just in or adjacent to the road / tower envelope will be actively avoided, i.e. the actual roading and works are shifted so as to not affect these wetland. Therefore, no wetland identified in the GWRC jurisdiction will be affected. However, the road cannot in all circumstances avoid several of the long narrow features in the Horizons jurisdiction. It remains uncertain how much will be affected until full design and the designs for the road, in particular, we understand will not be concluded until advanced site survey and hence an envelope approach.</p>

² Stephanie Parkyn, W. B. Shaw, and Philip A. Eades, "Review of Information on Riparian Buffer Widths Necessary to Support Sustainable Vegetation and Meet Aquatic Functions," Auckland Regional Council Technical Publication (Hamilton: National Institute of Water & Atmospheric Research for Auckland Regional Council, 2000).

<p>strategy. In this way, the application does not clearly show an intent to follow the effects hierarchy with regard to potential wetland loss. Please provide further details on how the hierarchy is followed.</p> <p>The proposal is to compensate for the loss of wetland extent by replacing the wetlands with 1:1 ratio of vastly improved wetland habitat value. This does not seek to limit the total loss of wetland extent, but does seek to adequately compensate for loss of ecological value. This is consistent with the pathway available for specified infrastructure, although this could put the proposal at odds with the Greater Wellington Regional Plan (GWRP) with respect to avoiding loss of extent.</p> <p>We note that the one wetland in the Greater Wellington Region is in the Pahiatua Ecological District, but the proposed wetland restoration sites are on the boundary of the Pahiatua/Woodville ecological District or just inside the Woodville Ecological District. This would also put the proposal at odds with the wetlands effects hierarchy within the GWRP. Please provide justification as to why this has been selected and detail as to why it's included.</p> <p>Please confirm whether it is possible to specifically identify and exclude the "partially within" (and possibly one of the "within") wetlands with a slight adjustment to the effects envelopes (see figures below). If it is possible, the issue with adhering to the GRWP goes away as there would be no potential loss of wetland extent in the Greater Wellington Region, and there would also be a more obvious intent to follow the effects hierarchy to avoid wetlands in the first instance. Has this been considered?</p>	<p>Thus we propose a tally of wetland area affected through construction. The quality (exotic grazed) and complexity of the features likely affected is low and simple and so loss of habitat minimal but more to the point the risk of offset failure low and the "lag" time to recovery low. Any improvement on the other similar features on the farm is a simple matter of revegetation (indigenous) and fencing and management.</p> <p>We have "pointed" to three areas for wetland restoration as the offset which we consider contribute best to the wider landscape.</p> <p>Appendix 1 has a figure showing where and what these features are. The first is the stream-wetland complex that passes from several small catchment tributaries downstream past the stock yards and could form an offset of 0.78 ha. The second is a long small gully (0.13 ha) which feeds into the dammed wetland with fragmented riparian bush and the third is the upper section of a spring feed gully that while having reasonable lower riparian woody cover has an open expanded "wetland" area (0.12 ha). All three of these features require indigenous vegetation and fencing and management. The current "bank" of wetland offers just over 1 ha. The current identified possibly affected wetland sums to less than 0.3 ha. At the 1:1 offset ratio (see below)(this is sufficient offset for even the worse case.</p>
<p>79</p> <p>With regard to the 1:1 wetland loss compensation approach and reference to previous examples (cited in Appendix C of the Consent Application, Section 9.2, paragraph 4), have the previous examples been backed by a model or other objective approach to establish that this is a fair ratio? If so, please provide that evidence which may include details of the models.</p>	<p>If adverse effects do occur and cannot be avoided, then we have recommend a 1:1 ratio of offset based on the size and condition of the affected wetland.</p> <p>In other examples we have been involved in such as M2PP, we used a 3:1 ratio because the wetlands being lost were largely indigenous and somewhat representative of dune slacks, a naturally rare system. That is those losses were of wetlands with much greater ecological value. Those examples where not offsets based on modelling. We use (in the Wellington office) a standard set of compensation / offset ratios which are 1:1 for early seral and highly degraded examples, 3:1 for young seral and good condition examples, 6:1 for middle to older seral and high integrity examples and 12:1 for old complex systems in good condition. We have found that these ratios are</p>

	<p>reasonable and when we have had to model an offset using for example the DoC model ³ that our ratios stand up well.</p> <p>We consider that taking a linear “drainage” wetland with perhaps 1 native species and causing an equal linear length (or area) of wetland to be revegetated in dense plantings of numerous indigenous species: several rush taxa, several sedge taxa, raupo, Eleocharis, and Machaerina (where appropriate) as well as edge protection from harakeke, Ti koura and pukatea, then that is more than sufficient and well in advance of anything these exotic small sediment wetlands could achieve without assistance even if farming patterns and effects substantially changed.</p> <p>The referenced successes have been most recently related to the Mackays to Pekapeka motorway where we caused through offset the creation of 4 ha of various types of wetland to offset 1.8 ha which was infilled or lost to the road.</p>
<p>80 Please confirm whether the wetland offsets/compensation sites involve any other third party other than the landowner/occupier of the land that the windfarm is on (i.e., does it require the permission of the neighbouring properties?).</p>	<p>They do not, all are on the property on which the windfarm is proposed and on the same landowner. However, there remains scope to reorganise which wetland features are the focus of an offset as there are a number of potential features in close proximity that for the requirements.</p>
<p>81 The effect on pipits is identified as “low” (Appendix C of the Consent Application, end of par 4, Section 8.5.2, pg. 83), whereas Table 36 identifies the effects as “very low”. Mr James Lambie is of the view that “very low” is the correct assessment using the EIANZ framework and therefore it is understandable that you have not suggested a condition requiring pre-clearance surveys even though farmland tracks are prime real estate for this high value species. However, disturbance of nesting pipit may be avoidable in the first instance through a condition that requires the grass to be maintained (through grazing or mowing) at a low height and for pre-clearance checks if the grass is suitably tall. Have you considered this as a possible methodology?</p>	<p>We accept and concur that so long as the grassed landscape remains well managed and grazed including the tracks then the opportunity for pipit to be nesting is remote. The inclusion of a condition requiring appropriate pasture management within the proposed construction envelope to remove the potential for pipit nesting prior to construction is recommended.</p>
<p>82 The application states that the effect on lizards is likely to be very low (Appendix C of the Consent Application,</p>	<p>We accept that an accidental discovery protocol is at least advisable even while</p>

³ F. J. F Maseyk et al., “A Disaggregated Biodiversity Offset Accounting Model to Improve Estimation of Ecological Equivalency and No Net Loss,” *Biological Conservation* 204 (2016): 322–32.

<p>Section 8.4.1) and that mitigation is not warranted (Section 9.4). Nevertheless, a permit under the Wildlife Act is likely to be required, and that permit may have conditions (Section 9.4). Have you considered whether it may be appropriate for the Regional Councils to view this permit prior to commencing construction activity? Please also advise if you have considered whether an accidental discovery protocol should be included in order to reduce effects on lizards even further.</p>	<p>considering the risk of discovery and effect is remote.</p> <p>As to the need for the Regional Councils to cite a Wildlife Act permit, we are unsure of the need for this, but cannot see an issue with such a curtesy, but we do not see that it needs to be a condition of consent.</p> <p>A permit will be required if, once detailed design is complete, areas identified as lizard habitat (as per the AEE) are affected, but that may not be the case.</p>
<p>83 With regard to the proposed Regional Council Ecological Condition 16 – it would be in keeping with the effects hierarchy that the total anticipated unavoidable effect of 0.32 hectares of wetland loss be specified here as the upper limit. The condition could also specify that a lesser amount of replacement is anticipated if there is a lesser loss of extent. Have you considered setting limits to manage the potential effects based on the envelope approach?</p>	<p>If through this process the engineering aspect cannot form a solid opinion as to which wetlands are to be avoided then we agree that an upper limit of 0.32 ha of natural inland wetland to be affected be set by way of condition and that the condition be written to enable a sum of affect to be made through construction such that at the end the total that is actually affected be then the offset target. It is possible that through detailed design post consent more or all of the natural wetlands are avoided.</p>
<p>84 Please clarify what is meant by “...for 5 years...” in proposed Condition 19 in terms of the frequency of inspection and maintenance in any given year. We note that the site is likely going to require at least a spring and autumn inspection for weed clearance. It also would aid certainty if the wetland vegetation restoration condition specified a target (such as 80% indigenous canopy cover) as a logical, reasonable, and measurable extension of the “net gain” principle of offsetting to demonstrate fulfilment of a compensation outcome.</p>	<p>Condition 19 states that the management (required by condition 17) of the offsets wetlands must be for 5 years (in condition 17), not that 5 years is the frequency of inspection and maintenance. That is management will be for 5 years, but the condition should also say ...or until the wetland revegetation succeeds in forming an 80% cover as viewed from above.</p> <p>Re the wetland offset and stream riparian revegetation, we agree and as noted above for the stream offset, a programme of planting and maintenance would be established by way of a management plan (required by the condition?) and that should contain measures of success, one of which would be a suitable cover target for revegetation. For a wetland rehabilitation however, this may not be of canopy cover, but rather of plant cover as the cover may be a low growing wetland species.</p>
<p>85 In terms of proposed Condition 21, have you considered the inclusion of a mechanism that would show that the plantings are not being counted twice given that the wetland planting is to be conjunction with stream planting (perhaps through reporting on areal extent of wetland loss and wetland planted)?</p>	<p>We concur with that requirement and had envisaged that the stream in Mangaroa tributary valley and the wetlands in the small catchments westward where distinct and shown as separated in the AEE. A condition clarification to that end is supported.</p>

<p>86 Please provide clarification on the conclusion presented in Appendix C, Consent Application, Section 9.1. It appears that the assertion that there is “...unlikely to be any adverse effects...” only refers to the loss of indigenous terrestrial vegetation and not fauna or wetlands (which are listed later). Is this the correct interpretation?</p>	<p>That is correct – there will be no adverse effects to any terrestrial vegetation / habitat, all other aspects have effects or potential effects which are addressed.</p>
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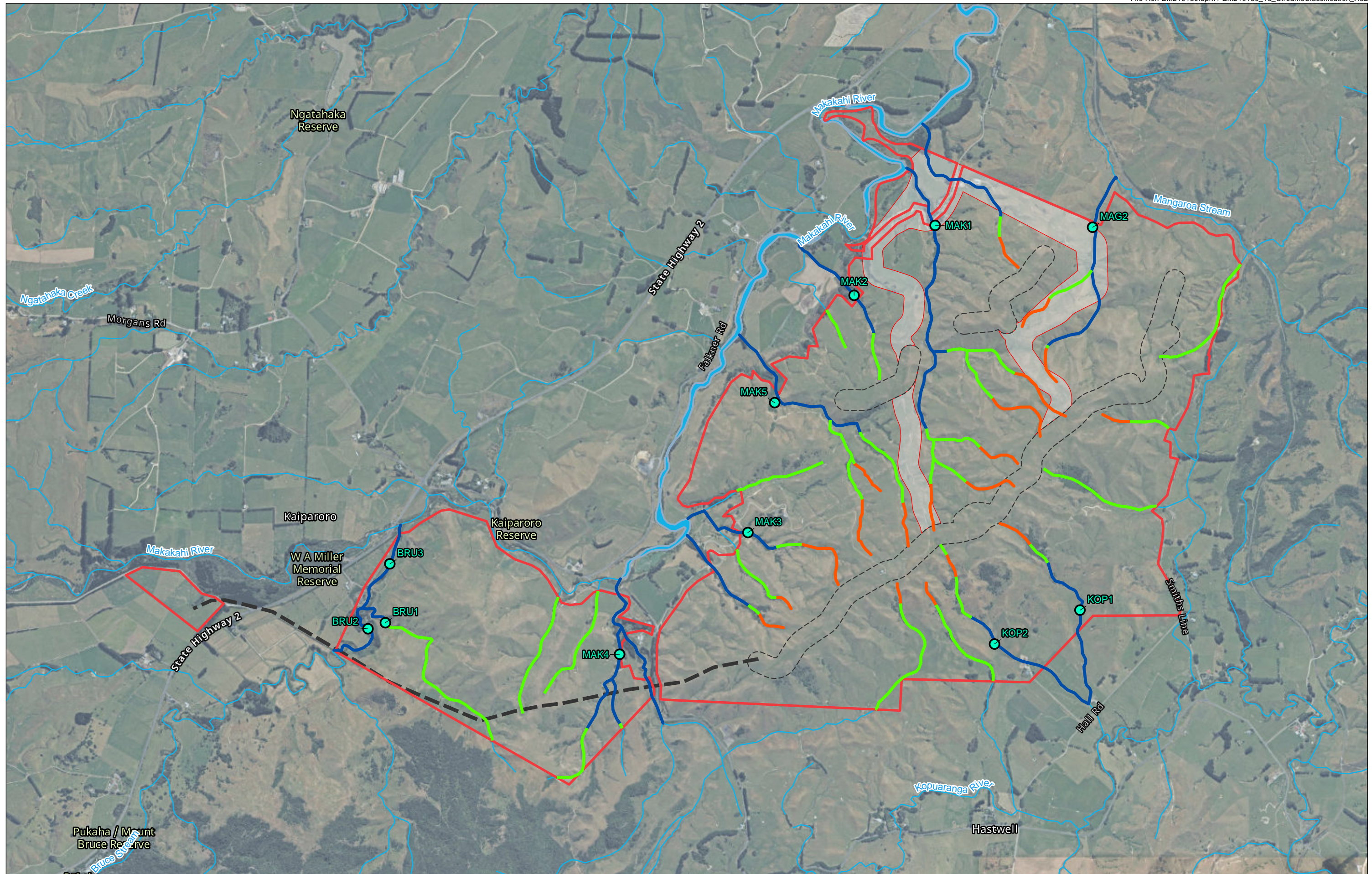
Appendix 1. Stream and wetland offsetting locations

The basic Stream “offset” approach, 900m with 10m either side, fenced and revegetated in seral broadleaf woody species (makomako, karamu, heketara, tarata, mahoe, kamahi, kanono and mapou). In addition a range of small wood weirs installed to create flow heterogeneity and supply a large biomass of instream woody debris.



The white areas are the set of wetland areas that would form the offset where and depending on how much of the natural wetlands identified are in fact affected by the final road alignment and installation works (we understand that many identified in the envelope will be avoided).

Appendix 2 Aquatic hydro-class map





APPENDIX 13

STORMWATER QUALITY AND HYDROLOGY MEMO

Memo

To:	Gene Sams, Nick Bowmar, Lynley Fletcher (Meridian Energy)	Job No:	1016884.1000
From:	Pushpaka Rabel (T+T)	Date:	7 September 2023
cc:	Maurice Mills (T+T), Nick Peters (T+T), Hayden Sander (T+T), Tom Anderson (Incite)		
Subject:	Mt Munro Wind Farm Stormwater S92 Responses		

1 Introduction

The purpose of this memorandum is to provide responses to the S92 additional information requests and intended stormwater design philosophy. Please refer to the Mt Munro Wind Farm Civil Engineering Report (T+T ref: 1016884.1000 v6 dated May 2023) for the site description.

2 Responses to S92 Additional Information Requests

2.1 Request 87

"87. We note that no technical or planning assessment has been undertaken regarding the long term effects of the discharge of contaminants. Much of the infrastructure (i.e. the roads, substation and some of the laydown areas) will remain on site after the construction phase has been completed, yet an assessment of the water quality effects of this infrastructure on the receiving environment has not been undertaken. Ongoing maintenance activities, vehicles on the roads, and the roads and associated hardstand areas all have the ability to negatively affect the quality of stormwater discharges in the long term. Additionally, since the road pavement will be an unsealed granular pavement, ongoing discharge of sediments could occur. Furthermore, the creation of table drains in cut areas could concentrate flows and it is unclear if any of these table drains would discharge directly to streams within the site.

- a. Please provide an assessment of the effect on water quality from impervious surfaces which will be created by the project, along with a description of and design information for the necessary mitigation measures (e.g. stormwater treatment devices) to manage these effects.*
- b. Please also demonstrate how the proposal meets the Regional Council rules as a Permitted Activity, or alternatively apply for a resource consent and assess against the relevant planning documents (including the potential for the proposal to support Te Mana o te Wai in the long term, as required in the NPS-FM)."*

An assessment of the water quality effects of the new unsealed, granular surfaces will be carried out during the detailed design stage of this project. It is expected that construction areas typically comprising access roads and laydown areas will comprise of unsealed gravels and are likely to generate suspended sediment from run-off. While this has the potential to discharge into existing watercourses, it will be managed through the design by incorporating measures such as table drains to collect the run-off, scour protection within the drains, and treatment devices to treat sediment

prior to discharge. The sediment from these unpaved areas can be further minimised through maintenance of these surfaces and drainage systems during construction and over their design life.

Regarding cut slopes, it is expected that table drains will be provided at the toe of the cut slopes. The table drains will have velocity control devices and treatment devices installed if required before discharging to natural watercourses within the site. A design specific to each location will be required for these (and other areas where concentrated flows are expected) which will consider aspects such as erosion risk, water quality, and effects on the downstream watercourses. These items will be resolved during the detailed design stage. It is assumed that these roads will be used sparsely by maintenance vehicles once construction has been completed and the roads are fully operational. Therefore, the contaminants will predominantly comprise of suspended sediment due to run-off from the unsealed gravel road. The majority of the roads and hardstand areas are on the ridges at the upstream end of catchments, which means that there will be minimal upstream flow to divert around developed areas reducing the potential for water contamination, and providing adequate level space to install treatment devices where required.

During detailed design, options to treat the sediment to minimise its discharge will be considered using primarily GWRC guidelines supplemented by NZTA standards, and Auckland Council standards where required to ensure the design solution is appropriate for the site conditions and frequency of traffic expected on a rural maintenance access road. Options for treatment include (but are not limited to): planted swales, vegetated filter strips, and sediment retention ponds.

Nonetheless, a preliminary qualitative assessment of the changes in pervious areas within the project area was undertaken which is summarised in Table 1 below to help quantify potential effects to water quality and peak flows after development. Based on this high level assessment, the total area impacted by a change in imperviousness per catchment ranges from 3% to 7%. The additional run-off generated from these unpaved areas will be accommodated by the design of new treatment and velocity control devices where required.

The following assumptions were made in relation to this assessment:

- The five catchments are representative of the site wind turbine access road and hardstand areas (i.e., within the project area);
- Only permanent works have been considered at this stage;
- Fill embankments will be constructed using permeable materials and cut slopes will be stabilised post construction;
- Access roads are 10m wide;
- Assumes all hardstand areas are approximately 5000m² in area;
- Where the unsealed areas replace existing pervious surfaces, the run-off co-efficient (when assessing peak flows using the Rational Method) is assumed to change from 0.35 to 0.55.

Table 1: Summary of changes to catchment areas in project area

Catchment	Catchment Area (km ²)	Increase in impervious areas (gravel) from access road (km ²)	Increase in impervious areas (gravels) from hardstand areas (km ²)	Total increase in impervious areas (km ²)	Approximate percentage reduction in pervious areas (grassed) in overall catchment (%)
1	0.976	2.72km*10m = 0.0272	0.005sq.km*7 = 0.035	= 0.0272 + 0.035 = 0.0622	= (0.976 – 0.0622) – 0.976 / 0.976 = 6%
2	0.734	2.63km*10m = 0.0263	0.005sq.km*5 = 0.025	= 0.0263 + 0.025 = 0.0513	= (0.734 – 0.0513) – 0.734 / 0.734 = 7%
3	0.194	0.9km*10m = 0.009	0 (no hardstand areas located in this catchment)	= 0.009	= (0.194 – 0.009) – 0.194 / 0.194 = 5%
4	0.254	0.3km*10m = 0.003	0.005sq.km*1 = 0.005	= 0.003 + 0.005 = 0.008	= (0.254 – 0.008) – 0.254 / 0.254 = 3%
5	0.255	0.8km*10m = 0.008	0.005sq.km*1 = 0.005	= 0.008 + 0.005 = 0.013	= (0.255 – 0.013) – 0.255 / 0.255 = 5%

The project Planner is currently preparing a response to Request 87b.

2.2 Request 88

“88. Please provide an assessment of the efficacy of the proposed mitigation measures to reduce increased pH levels which could result from discharges from the concrete batching plant. We note that sediment retention ponds are generally not effective at mitigating the effects of pH on downstream freshwater receiving environments.”

A CBP (concrete batching plant) management plan will be developed and approved prior to construction activities containing further details as part of an overall CEMP (Construction Environmental Management Plan). At this stage, it is anticipated that the plan may consider strategies such as:

1. Designing the CBP such that all water generated within the site is confined and re-used on-site. Water shall be treated for sediment and pH prior to re-use or discharge.
2. Standards for pH and suspended sediment for any water that may require discharge to land or water.
3. Design of erosion and sediment control measures.
4. No operations during a severe weather event (to be agreed with Council).
5. Design of the drainage system to dissipate any water flow.
6. The requirement to provide monitoring reports.
7. The requirement to provide pH analysis of water discharge.

2.3 Request 89

"89. No technical or planning assessment has been undertaken regarding effects related to stormwater quantity, including flooding, overland flow paths and erosion (both erosion arising from concentrated discharges as well as channelized stream erosion). Please provide an assessment of effects in relation to the risks indicated below, and associated stormwater quantity mitigation systems proposed to manage these risks:

- a. Increased peak flows;*
- b. Increased runoff volumes;*
- c. Punctual / concentrated discharges;*
- d. Channelized stream erosion risks;*
- e. Modifications to natural flow patterns and overland flow paths, including flow diversions resulting from the construction of road corridors and other works; and*
- f. Impact of the proposed works on downstream floodplains including the Makākahi River and Bruce Stream."*

A full assessment of the stormwater quantities including assessment of peak flows and volumes, erosion risk, flow paths, and downstream effects will be undertaken during detailed design. This assessment will be undertaken in line with GWRC guidelines and Wellington Water standards.

As discussed earlier in our response to RFI #87, peak flows are expected to increase albeit minimally due to the small increase in imperviousness of the project area. Attenuation devices will be considered to minimize the impact on the downstream receiving environment where required. An overall pre – and post-development assessment will be undertaken, that will consider potential changes to existing flow paths (both channelised and overland), and appropriate measures will be considered to ensure that these are maintained (such as level spreaders to disperse concentrated flows and maintain the original flow regimes) in detailed design.

The suite of erosion and sediment control, treatment, and velocity control devices is expected to include (but is not limited to):

- Check dams
- Vegetated or lined swales/table drains
- Silt fences and socks
- Silt traps and bunding
- Sediment retention ponds
- Riprap aprons, linings and basins and,
- Level spreaders.

Furthermore, diversion bunds and/or table drains will be proposed at the top of the cut slopes to convey run-off that is obstructed by the proposed road alignment and minimize the number of culverts required across the project. It is likely that there may be some inter sub-catchment transfer as a result of these diversions. However, they will not be proposed where there may be a scour risk to an existing stream. Catchment transfer across the wider catchment will be avoided where possible. These items will be developed further during detailed design.

It is also expected that some areas of existing stream will need to be re-aligned where conflicting with the proposed road alignment, in order to maintain existing flow paths, and minimize culvert lengths.

Concentrated discharges and channelized erosion may occur at culvert inlet and outlet locations, table drains and piped reticulation. Appropriate erosion and scour protection measures will be provided where required as outlined in our response to RFI #92 below (riprap aprons).

2.4 Request 90

"90. Based on observation on site and a desktop review of the available LiDAR information, there is likely to be a number of additional culvert crossings which are not indicated in the application. For example, east of Culvert 3, there appears to be an additional stream crossing that hasn't been mentioned in the application (as indicated with the red circle in the screenshot below). More detailed maps should be provided showing the topography with contours and identifying any other culvert crossings that may be required for the project, within the road alignments or other areas where land modification is proposed."

Appendix A contains a map which shows the main catchments within the project area, ground contours at 10m intervals, flow paths, the proposed road design alignment along with associated areas of cut and fill, the location of a potential bridge, the locations of the major culverts (Culvert 1, 2 and 3) and locations of potential additional smaller culverts. These are indicative only at this stage of the design and are to be confirmed during detailed design.

Note the following:

- A bridge may be required at the north-west area and be suitably sized to service the large catchment area anticipated and satisfy structural and fish passage requirements;
- Culverts 1, 2, and 3 are expected to service large catchments and maintain existing stream flows and/or flow paths and fish passage;
- The rest of the culverts identified service relatively small to medium-sized catchments (refer our response to RFI #91 below) and maintain existing stream flows and/or flow paths and fish passage, or are required to maintain overland flow paths.

2.5 Request 91

"91. Please provide hydrological and hydraulic calculations to understand the flows generated within the various sub catchments that will be affected by the works, both for a pre and post development"

A preliminary assessment of the hydrology and culvert sizing for culverts 1, 2, 3 and a typical "small" and "medium" sized culverts was undertaken and summarised in Table 2 and Table 3 below. An indicative pre- and post-development peak flow comparison is provided for information in Table 4 below.

Please note the following:

- The hydrological and hydraulic design and associated design requirements are to be progressed and confirmed during the detail design stage;
- The small and medium sized culverts have not been designed at this stage, however an estimation of peak flow and culvert size was carried out based on catchment size.
- Peak flows for the 10% AEP CC (Annual Exceedance Probability adjusting for climate change) were assessed using the Rational Method ($Q = CiA / 360$):
 - C = run-off co-efficient = 0.35 based on the guidance from the Building Code Clause E1 for Surface Water
 - I = rainfall intensity based on NIWA HIRDS V4 rainfall data accounting for climate change (upscaled by 20% as per guidance from Wellington Water Reference Guide for Design Storm Hydrology) based on a time of concentration of 10 minutes.
 - A = catchment area, as delineated for each culvert.
- Culvert sizes were estimated using the HY-8 Culvert Hydraulic Analysis Program.
- Culverts with catchment areas between 0 – 1 hectares were considered a "small culvert", culverts with catchment areas 1 – 5 hectares were considered a "medium culvert", and culverts with catchment areas > 5 hectares were considered a "large culvert". The culverts along with associated size are shown in Appendix A.

- For the small and medium culverts – the largest catchment area from each of these categories was used when assessing peak flows (taken as 0.8 hectares for “small” culverts and 4.6 hectares for “medium” culverts).
- A 1% stream bed slope was assumed for the small and medium culverts. If installed steeper, a smaller culvert may suffice.
- No fish passage assessment has been completed for the smaller culverts but is expected to be completed during the detailed design as required.
- It is anticipated that there may be a bridge to the south-west of Culvert 3, which will be further understood and designed during the detailed design stage.
- A 300mm diameter and a 600mm diameter culvert was deemed to be sufficient for small and medium catchments respectively based on achieving a minimum freeboard of 0.5m to the access track which the culvert crosses.

Table 2: Summary of Culvert Catchment Hydrology – 10% AEP CC pre-development scenario

Culvert	Run-off coefficient [C]	Time of concentration (mins)	Rainfall intensity ¹ , I (mm/hr)	Catchment Area, A (ha)
1	0.35	19	50.3	66.1
2	0.35	14	74.0	41.8
3	0.35	18	64.9	25.3
4 (Small)	0.35	10	83.0	0.8
5 (Medium)	0.35	10	83.0	4.6

Notes

1: Historical rainfall intensity was multiplied by 1.2 to allow for climate change as recommended by WWL Reference Guide for Design Storm Hydrology.

Table 3: Summary of Culvert Hydraulics – 10% AEP CC pre-development scenario

Culvert	Peak Flow (m ³ /s) [=CiA/360]	Indicative Required Culvert Diameter (mm)	Culvert length (m)	Culvert slope (%)	Surcharge above soffit ¹ (mm)
1	3.9	1200	110	4.4	1100
2	3.0	1050	100	7.0	1200
3	1.6	900	30	12.5	500
4 (Small)	0.06	300	30 - 100	1.0	0
5 (Medium)	0.37	600	25 - 80	1.0	50

Notes

1: Where the upstream water level is above the top of the pipe, this is measured as the distance between the upstream water level of the culvert (headwater level) to the top of the pipe. If the upstream water level is below the top of the pipe, this is zero. In all cases, the headwater level is expected to be contained below the crest level of the access track and achieve at least 0.5m freeboard.

Table 4: Comparison of pre and post development peak flows in 10% AEP CC design storm event

Culvert	Pre-development catchment run-off coefficient	Pre-development Peak Flow (m ³ /s)	Post-development weighted run-off coefficient	Post-development Peak Flow (m ³ /s)
1	0.35	3.9	0.36	4.0
2	0.35	3.0	0.36	3.1
3	0.35	1.6	0.36	1.6
4 (Small)	0.35	0.06	0.36	0.07
5 (Medium)	0.35	0.37	0.36	0.38

2.6 Request 92

92 *Similarly, please provide information (calculations and details) on proposed scour and erosion protection measures where concentrated discharges will be generated (e.g. culvert outlets or other piped or channelled outlets or runoff diversion drains).*

- Design of proposed scour and erosion protection measures will be developed further during detailed design. At this stage, it is expected that the design will follow local and regional council guidelines in the first instance to be in line with industry best practice. For the purposes of the consent design, the culvert rip rap aprons were sized using the guidance from HEC-14.
- For the detailed design - we will consider the requirements of Wellington Water, Auckland Council, and GWRC's "Stormwater Management" and "Erosion and Sediment Control Guide for Land Disturbing Activities in the Wellington Region" and other supplementary guidance such as HEC-14 to select the most appropriate erosion protection measures and will be designed for the 10% AEP + CC (Annual Exceedance Probability adjusted for climate change). Requirements for fish passage will be included during detailed design and incorporate NES-FM requirements.
- Erosion protection is expected to comprise either grass or planted surfaces, and rip rap, concrete, and erosion protection mattresses where velocities are expected to be high (i.e., exceed the maximum permissible velocities of the existing stream bed / bank material).
- It is expected that erosion protection will be provided for all concentrated discharges from culvert outlets, piped reticulation, and channelised flows due to the steep topography of the site. Wing walls and headwall flow transition structures, and erosion protection / energy dissipation will be provided at the inlet and outlet of culverts and piped reticulation. Channelised flows may need specific erosion protection measures such as grassed / planted surfaces, rip rap lining, and/or erosion protection mattresses.

Where rip rap is proposed, the interstitial voids between inlet and outlet rip rap clasts will be filled with finer substrate material (matched to the existing stream bed material where appropriate) to minimize loss of flow and increase low flow depths to provide for fish passage.

2.7 Request 93

"93. We note that no information has been provided on proposed operation and maintenance or other plans during the operational phase of the project to ensure that the proposed primary and secondary drainage systems and any associated mitigation systems are regularly inspected, monitored and maintained to ensure they remain effective for the life of the project. Please provide this."

An Operations and Maintenance (O&M) plan has not been completed for this stage of design. It is envisaged that the O&M plan be developed during the construction phase of the project. O&M requirements may include the following:

- Undertaking visual inspections at an agreed frequency;
- Undertaking visual inspections after large storms;
- Maintenance of access roads;
- Maintenance of laydown areas as part of the permanent works, and any which are to be de-commissioned following the completion of construction works; and
- Unblocking drains and culverts when required, clearing out ponds and drains of sediment, correctly maintaining any stormwater treatment devices, and maintaining stormwater drains and culverts.

The requirements will be further investigated based on drainage infrastructure specified during detailed design.

2.8 Request 94

"94. Section 11 of the Tonkin & Taylor engineering report indicates that there will be surplus fill arising from the works, which will be disposed within the Turbine Envelope, and Turbine Exclusion Zones. It mentions that fill sites will be identified where catchment areas above them are minimised, however there is no information provided in the application on where these sites will be located. Please provide information to show how any potential impact of the fill sites on local catchments will be managed to ensure that natural drainage patterns are unchanged wherever possible and overland flow paths and natural floodplains are protected."

The final locations of the fill disposal areas will be confirmed at detailed design stage. The fill disposal areas will be located as much as possible long the tops of ridges where there are no catchment areas above the fill sites. Where fill disposal areas are not located at the tops of ridges and surface water flows are anticipated above the fill disposal area, a cut off / perimeter drain will be constructed around the fill area to allow surface water to pass around the fill site and return to its natural overland flow path immediately downslope of the fill area. The natural overland drainage pattern will therefore only be altered around the footprint of the fill disposal area. This fill sites will be stabilised and maintained as required by the regional councils. This may include water quality monitoring and visual inspection of the fill site to ensure the impacts on the natural flow paths and water quality are minimised.

2.9 Request 95

"95. Please also demonstrate how the proposal meets the Regional Council rules as a Permitted Activity, or alternatively apply for a resource consent and assess against the relevant planning documents."

The project planner is currently preparing a response to this request.

3 References used

Table 5 below contains examples of references which are anticipated to be used during detailed design:

Table 5: Summary of references

Standard or Guideline	Source	Version
Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region GD05	Auckland Council	June 2016
Stormwater Management Devices in the Auckland Region	Auckland Council	Dec 2017
Hydraulic Design of Energy Dissipators for Culverts and Channels, Hydraulic Engineering Circular No. 14 (HEC-14)	Federal Highway Administration	Oct 2012
Erosion and Sediment Control Guide for Land Disturbing Activities in the Wellington Region	Greater Wellington Regional Council	Feb 2021
Acceptable Solution and Verification Methods for New Zealand Building Code Clause E1 Surface Water	Ministry of Business, Innovation and Employment	Jan 2017
Erosion and Sediment Control Guidelines for State Highway Infrastructure	Waka Kotahi	Sep 2014
Stormwater Treatment for State Highway Infrastructure	Waka Kotahi	May 2010
Wellington Water Regional Standard for Water Services	Wellington Water	Dec 2021
Reference Guide for Design Storm Hydrology	Wellington Water	Apr 2019

4 Applicability

We understand and agree that our client Meridian Energy Limited will submit this memorandum as part of an application for resource consent and that Masterton District Council, Tararua District Council, Greater Wellington Regional Council and Horizons Regional Council as the consenting authorities, will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:

Pushpaka Rabel
Civil Engineer

Authorised for Tonkin & Taylor Ltd by:

PP

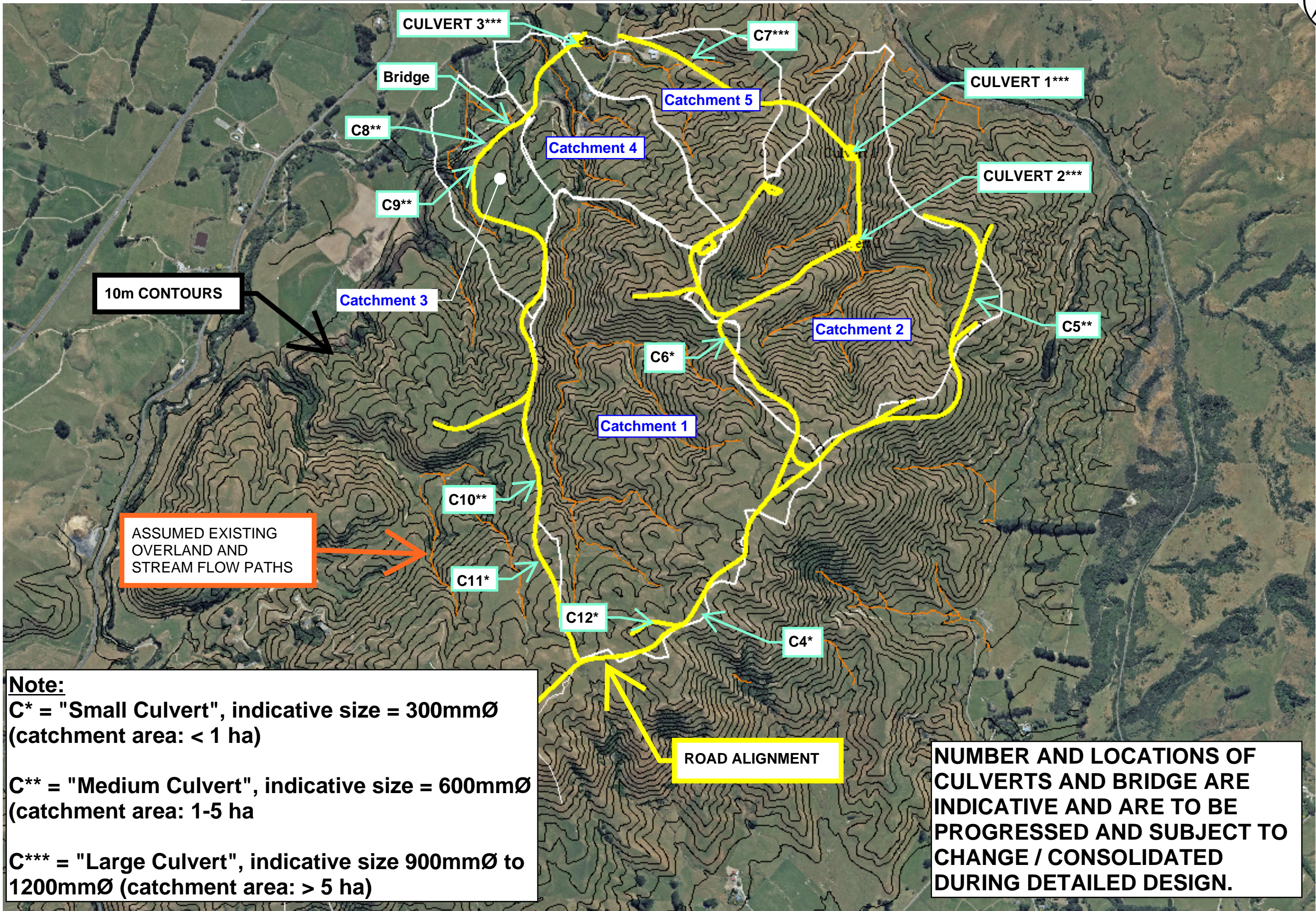
Nick Peters
Project Director
(PP'd by Maurice Mills)

7-Sep-23

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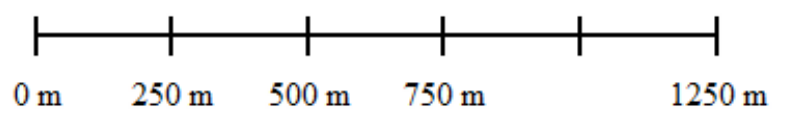
Appendix A – Request 90: Plan

MOUNT MUNRO CONCEPT DESIGN POTENTIAL CULVERT LOCATIONS



Note:
C* = "Small Culvert", indicative size = 300mmØ (catchment area: < 1 ha)
C** = "Medium Culvert", indicative size = 600mmØ (catchment area: 1-5 ha)
C*** = "Large Culvert", indicative size 900mmØ to 1200mmØ (catchment area: > 5 ha)

NUMBER AND LOCATIONS OF CULVERTS AND BRIDGE ARE INDICATIVE AND ARE TO BE PROGRESSED AND SUBJECT TO CHANGE / CONSOLIDATED DURING DETAILED DESIGN.





APPENDIX 14

HARAPAKI CONCRETE BATCHING PLANT MANAGEMENT PLAN



PREPARED BY HICK GROUP
& SPARTAN CONSTRUCTION




Meridian.

Harapaki Windfarm Concrete Batching Plant Management Plan

Document Number: HRP-210-000-PL-04-03

Approved by

Name	Position on Project	Signature	Date
James Bilkey	Civil Construction Manager		29/05/2020

Document History

Version	Details	Author	Reviewer	Approver
1.0	Final for Council approval Council Approved 14/09/2020	Campbell Stewart (CPESC 7630)	Tom Gaddum	James Bilkey
1.1	Stormwater Management Update Update post consent award Council Approved 13.04.2022	Amendments to V1.0 Made by Peter Ralph	Tom Gaddum	James Bilkey

Note: Any additions or alterations to the Plan arising during the course of the Project are to be documented and attached to this Plan. This Plan will be reviewed annually or sooner as required.

Table of Contents

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APPENDIX A: Site Laydown Area

1.0 INTRODUCTION

Construction of the Harapaki Wind Farm will require the establishment of a Concrete Batching Plant (CBP) for the production of concrete associated primarily with the construction of foundations for structures including turbine bases. The CBP will be located in the project main laydown area where it will be shared with laydown zones for wind turbine components and infrastructure – see Appendix A.

This CBP Management Plan outlines operation and maintenance details for the batching plant along with contingency plan to manage spills and/or discharges. This also includes mitigation measures to avoid any adverse effects of dust.

The procedures set out in this plan will be followed for the duration of the operational period of the plant to ensure that any environmental effects are minimised resulting from the operation.

2.0 CONCRETE BATCHING PLANT LOCATION AND LAYOUT

The CBP for the Harapaki Wind Farm is proposed to be located upon the relatively flat area of ground at R1-CH2250. Establishment of the laydown area, including the batching plant site will require initial earthworks activities to recontour the existing land contour to create a large, level platform for establishment of the batching plant platform along with the adjacent laydown area. The total laydown area is approximately 20,000m² in size (this may be enlarged depending on actual turbine component laydown configuration), of which the CBP area will comprise approximately 4,000m².

The location of the plant has been determined taking into account a number of factors including:

- Site topography to minimise earthworks required to establish a level surface for installation of the batching plant;
- Avoidance of any areas of ecological value;
- Avoidance of elevated, exposed ridgelines and maximisation of shelter from prevailing winds to minimise potential dust issues; and
- Proximity to the main site access road to minimise travel distances within the site for delivery vehicles.

A plan showing the layout of the laydown area, including the CBP area, is attached as Appendix A.

The CBP facility will include two batch plant set ups in order to produce the required concrete volumes during the turbine foundation pours.

The structures and facilities required for CBP operation include:

- Prefabricated office and amenities structure;
- Two mobile batching plant units which include hoppers, aggregate storage bins, compressor, cement silos and conveyors;

- Water tanks (4 x 30000 litres);
- Aggregate stockpile area;
- Sand stockpile area; and
- The expected area required for the plant and supporting structures is expected to be in the order of 4000m².

An indicative CBP set up and site layout are shown below in Figure 1 and Figure 2.



Figure 1: Two bin plant set up. Note: project will require two plants.

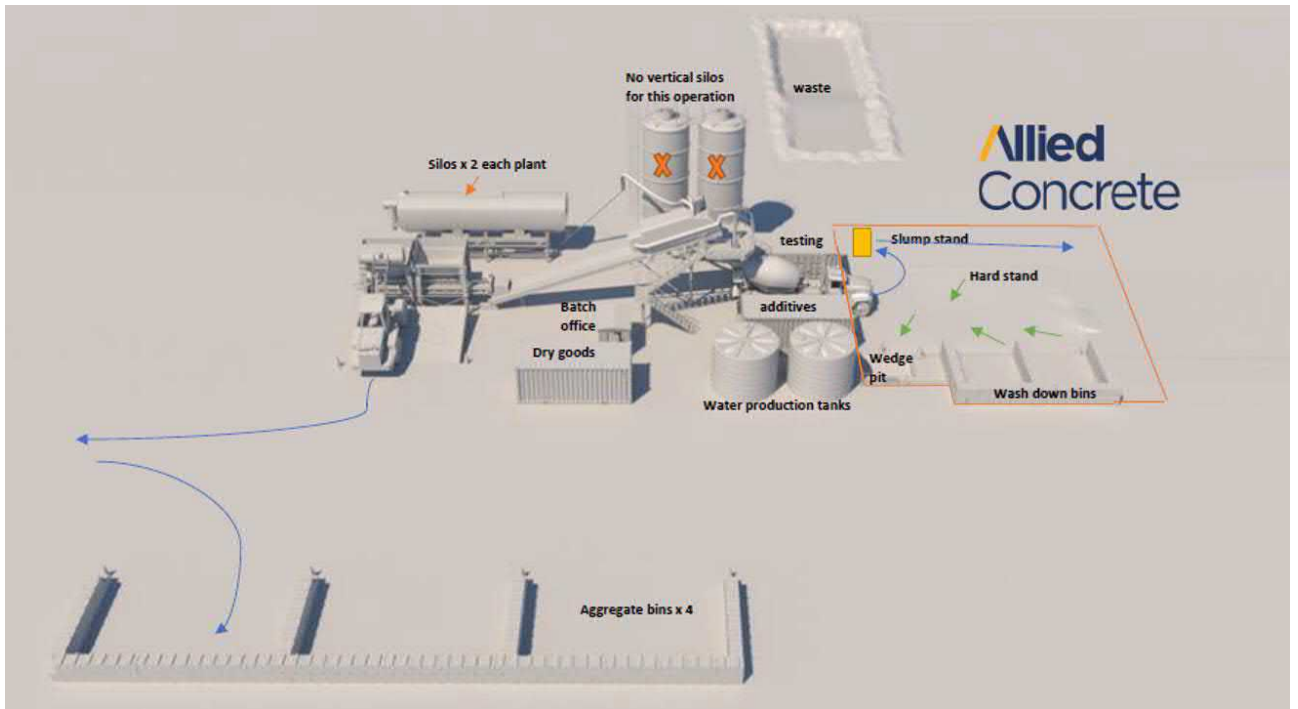


Figure 2: Indicative Concrete Batching Plant Layout (Note: project will require be two plants.) Orange lines indicate bund to separate wash down area and the rest of the CBP area.

A photo of a typical CBP operation from a previous Meridian windfarm project is shown below for information purposes.



Figure 3: Concrete Batching Plant

3.0 CONCRETE BATCHING PLANT OPERATION

The CBP utilises four different raw materials in the production of concrete for site construction activities including aggregate, sand, cement and water.

Crushed aggregate will be transported in trucks from an off-site quarry and stockpiled within the designated areas prior to use within the concrete production process. Aggregate material is inert and of large particle size and thus will not cause any potential runoff or dust problems.

Sand will be imported from off site and again will be stockpiled within designated areas within the CBP. The sand material is also inert and will not cause any runoff issues. During dry, windy conditions fine sand particulates may pose a potential source of wind generated dust. Sprinklers will be utilised to wet down sand if dust from sand becomes an issue.

Cement and fly ash will be imported to site with enclosed tankers and upon reaching the site, the cement will be transferred from the tanker through a closed pneumatic system into the cement storage silos thus eliminating the potential for any cement to be released into the environment.

Chemical additives will be delivered in drums and stored in a bunded area.

Water supply will be required at the site for both concrete production as well as dust management. It is proposed to establish approximately 120,000 litres of water storage within tanks at the site which will be filled with water sourced from on-site authorised water take locations.

During concrete production, aggregate and sand will be loaded directly into the batching plant for blending with the cement, fly ash and admixtures prior to loading into the concrete trucks. Water will be added into the truck with the dry cement mix for blending within the truck bowls as the concrete is despatched around the site.

4.0 ENVIRONMENTAL MANAGEMENT

4.1 Construction

The initial construction activities associated with establishment of the laydown area, including the CBP area, will involve the stripping of topsoil followed by cut to fill earthworks to level the CBP area. Refer to SEMP 1 Drawing HRP-210-000-PL-04-21.

Stripped topsoil may be utilised to form a perimeter diversion bund around the laydown area earthworks area. These perimeter bunds will prevent any upslope runoff from entering the exposed areas of works to ensure that the catchment area that can contribute to erosion during construction of the yard is limited to the site itself, and minimise the catchment of the sediment control device required to treat runoff. The perimeter bunds will be stabilised with grass to ensure that the clean water diversions do not contribute to sediment generation.

Site runoff from within the platform during construction will be managed within the perimeter bunds and swales and directed to the Sediment Retention Pond (SRP) (refer to Refer to SEMP 1 Drawing HRP-210-000-PL-05-21).

SRP-R700-CH4500 will be retained over the course of the laydown area and CBP operation as a secondary retention/treatment device should any unforeseen flooding/overtopping of the washdown interceptor wedge pits (described below) occur as

well as a nearby water supply option for dust control/wash down activities should it be required.

The CBP area will be covered with aggregate and therefore will be considered established from an erosion and sediment control perspective.

4.2 Operation

The CPB area will be isolated from the rest of the laydown area with an internal isolation bund to provide a clear delineation from the CBP and the rest of the yard. This will protect the batch plant from day-to-day laydown area operations and provide an opportunity for the CPB area to be isolated and contained should a spill incident occur within the plant.

Upon completion of the batching plant construction, all runoff from the plant area, excluding the wash down area, will be directed to a culvert in the southeaster corner of the CBP area. Water will flow through the culvert from east to west underneath laydown area access road into an approximately 20m long open channel before entering another culvert that will direct the water from north to south underneath road 700 into an overland flow path where it will join the main valley stormwater flow path. See Appendix A.

The wash down area (shown in Figure 2) will be separated from the rest of the CBP area with another bund. All runoff from this area will be directed to one of two interceptor wedge pits. The interceptor wedge pits will comprise a 3m x 3m x 0.7m concrete lined pit that will provide a watertight area for collection of site drainage and where the concrete trucks will be washed down. The pits will be fitted with a weir. The washdown water will flow over the weir into a secondary pit where the remaining cement contaminants will be allowed to settle out. The resulting water will be recycled for use in the concrete production. This is a closed-loop system.

Should large volumes of water accumulate within the wedge pits requiring de-watering (i.e. following a large rain event), surplus water can be dewatered into SRP-R1-CH2400 (with the T-bars lifted, to ensure no discharge until pH confirmed at an acceptable level of 6.5-8.5). Should reaching an acceptable water quality level be unachievable, the SRP will be pumped out into a tanker for off-site disposal.

Should any significant spillage of concrete occur outside the washdown area but within the CBP area which results in concrete runoff, the internal isolation bund outlet can be blocked to contain all runoff within the CBP area. Aggregate and sand from the onsite stockpile areas would be used to immediately seal the entrance area into to the CBP area by sealing off the internal isolation bund. Depending on the nature of the event, any effected water can then either be directed to SRP-R1-CH2400 (with the T-bars lifted, to ensure no discharge until pH confirmed at an acceptable level of 6.5-8.5) or pumped out into a tanker for off site disposal.

Sludge from the interceptor wedge pits will be removed regularly and stored on site within a separate bunded off area to dry. Once dry the material becomes inert and will be disposed of in one of the overburden disposal areas. Any waste concrete will be poured into forms and made into large blocks.

At each turbine platform location, a washout sump will be excavated to allow for staff tools to be washed at the end of each day and for the concrete trucks to wash out before driving back to the CBP if the drive back to the batching plant is greater than 15 minutes. For the turbines within a 15-minute drive to the CBP the concrete trucks will washout back at the plant in the wash down area.

The location of the washout sumps will be confirmed onsite by the Construction Manager and will be located within the erosion and sediment controls measures for the area. The water volume required to wash out the tools and concrete trucks will be minor. The water will be allowed to soak to ground within the sump.

4.3 Dust Management

Potential dust issues could arise at the plant from dry sand stockpiles or potential cement and fly ash spillages during dry, windy conditions.

To avoid dust from sand stockpiles becoming a nuisance during these conditions they will be wetted down with a sprinkler system, hose or by a water truck and shall be continuously monitored and wetted down until windy conditions subside. Alternatively, stockpiles may be covered with secured geotextile, polythene or similar fabric.

The closed cement and fly ash system (pneumatic transfer from tanker to silo) will minimise the potential for dry cement or fly ash material becoming a dust nuisance. Furthermore, the cement silos will be fitted with an automatic level control alarm to warn contractors of overfilling and reduce the potential for any spillage during transfer from tanker to silo. In the event that any spillages occur, spilt material will be immediately dampened with water to prevent it becoming airborne and scraped off the ground surfaces for disposal in an appropriate contained area i.e. within the interceptor pond or within a covered area.

The CBP area comprises a low speed environment due to the confined area and site configuration including the batching plant machinery, interceptor pond and stockpile areas. At all times vehicles within the CBP area will be required to maintain speeds below 5km/hour. For these reasons, vehicle generated dust effects are not anticipated.

5.0 MONITORING AND MAINTENANCE

The CBP will be closely monitored and maintained over the life of its operation to ensure potential environmental effects are appropriately managed. A monitoring inspection of the plant will be carried out by the site contractor on a weekly basis with specific monitoring items and maintenance requirements as follows:

- Inspect perimeter bund and washdown area bund for any potential failures or damage. If any failures identified immediately reinstate bund;
- Inspect interceptor wedge pits for accumulated concrete sludges. If observations/ measurement of accumulated materials identifies greater than 20% full with sludge, remove material to a contained, banded area within perimeter bund to allow drying and disposal;
- Inspect ground surface within CBP area for any evidence of concrete spillage/runoff;
- Dust nuisance to be monitored on a daily basis. When dry windy conditions are forecast, sand stockpile areas to be wet down or covered with secured geotextile or similar;

- Inspect all CBP components including silos and hoppers to check for any defects or leakage which could result in loss of cement/concrete during production; and
- Closely observe cement transfer system during delivery of cement to silos to ensure closed system is working and no loss of cement occurs.
- Monitor pH and general condition of SRP-R1-CH2400.

6.0 SITE RECORDS/LOGS

The Project will maintain a monitoring and maintenance log for the CBP which records the findings of all monitoring inspections carried out and details of any maintenance works undertaken. The monitoring and maintenance log shall be kept at the CBP and shall be made available to Hastings District Council (HDC) and Hawke's Bay Regional Council (HBRC) if so requested. An example weekly inspection form is shown in Appendix B.

Records of trucks delivering raw materials to the site will be collected at both the main site entry point as well as at the CBP. Records will include date/time of delivery as well as details of products being delivered. Similarly, records will be kept at the CBP of concrete truck despatches to construction areas on site.

Any incidents, spillages or discharges will be managed and recorded in accordance with Section 3.16.4 of the CEMP, Hazardous Substances Spill Response.

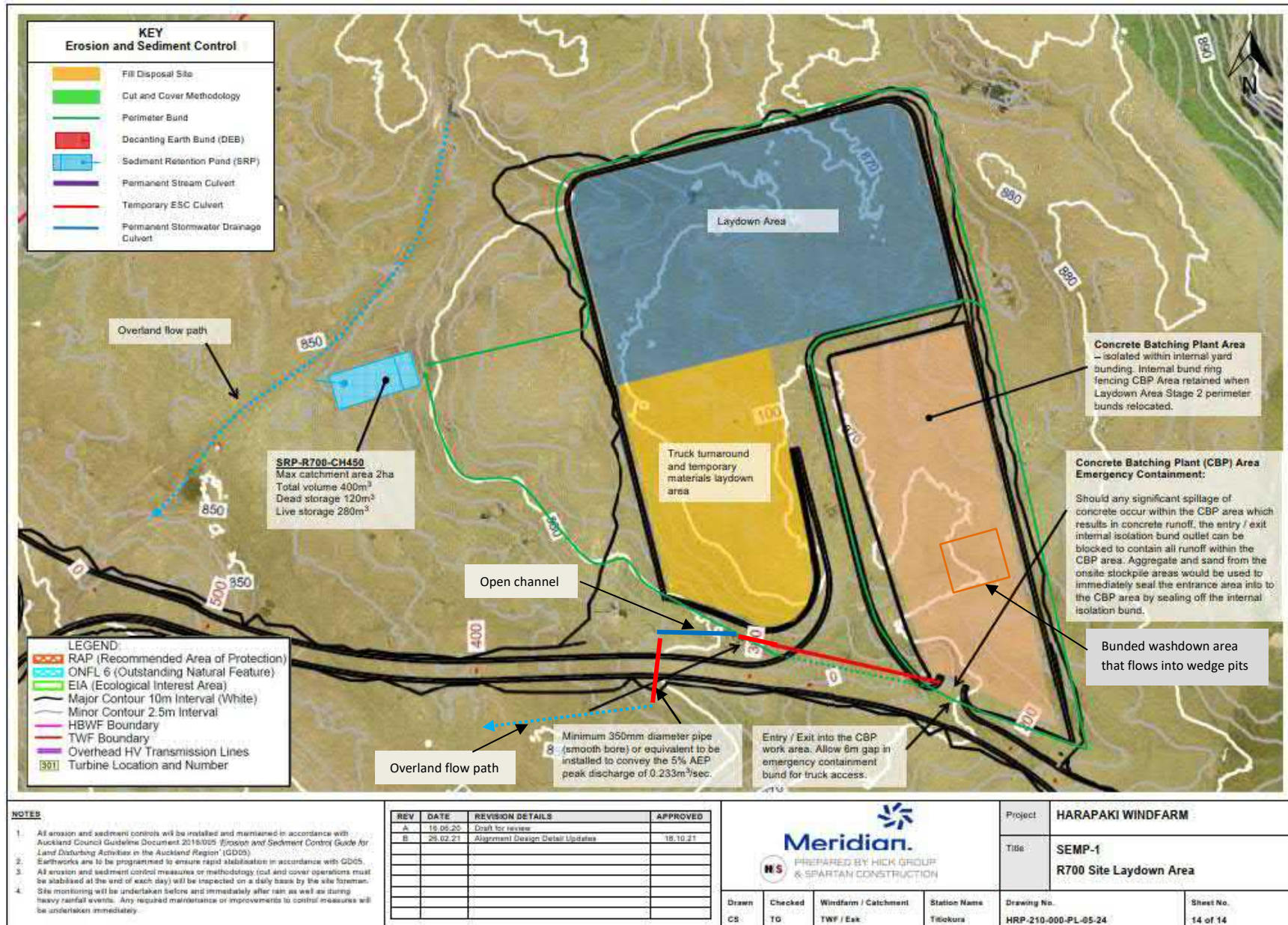
This includes, in the event of a spill the Meridian's Project Environmental and Compliance Advisor or Duty Manager will be notified immediately. The Project Environmental and Compliance Advisor will inform the HDC and HBRC (if enters a water course) as soon as practicable, and as a minimum requirement within 12 hours of becoming aware of the spill.

7.0 DECOMMISSIONING OF BATCHING PLAN

Upon completion of the foundation construction, the CBP will be decommissioned and the site utilised for the storage of turbine components (particularly blades) during the turbine installation phase of the programme. Once the windfarm is complete the site will be rehabilitated and returned to pasture. The interceptor wedge pits will be decommissioned by progressively decanting the water from the pits. The remaining sludge will be dried and disposed of in one of the overburden disposal areas.

The SRP constructed in association with the laydown area and the CBP pad will remain until the area has been contoured, topsoiled and re-vegetated.

APPENDIX A: Site Laydown Area



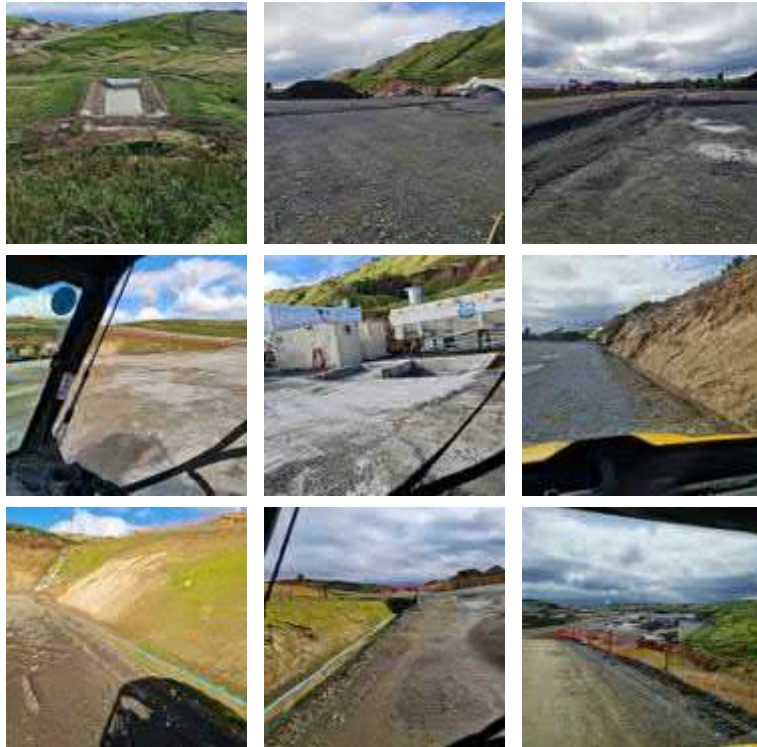
APPENDIX B: Example Weekly Inspection Form

Concrete Batching Plant Weekly In...

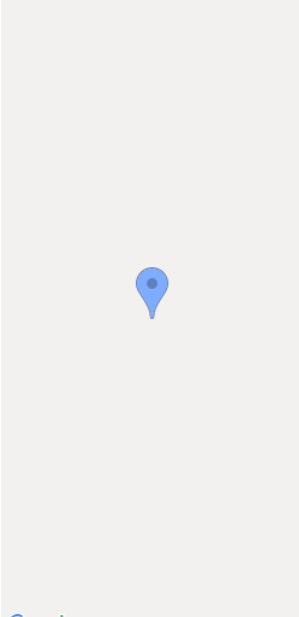
Pete Ralph
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Date	Tue, 19 Apr 2022, 2:37 pm		
Yes/No	Perimeter bund/swale functional/culverts?	Yes	:
Yes/No	Wedpits functional with <20% sludge?	Yes	:
Yes/No	Emergency SRP ready?	Yes	:
Yes/No	Ground surface in good condition with no evidence of concrete runoff?	Yes	:
Yes/No	Concrete batching plant components functional?	Yes	:

Photos



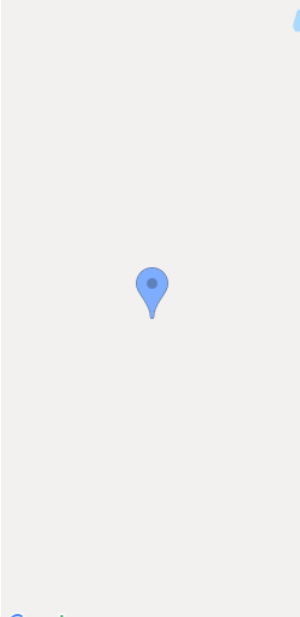
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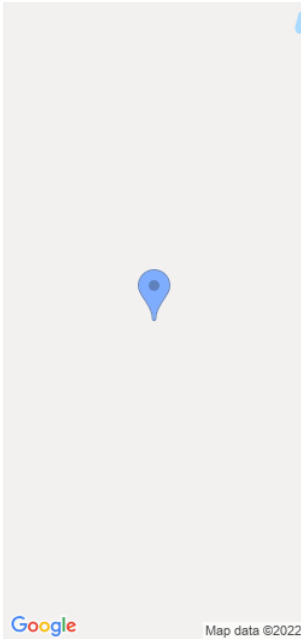




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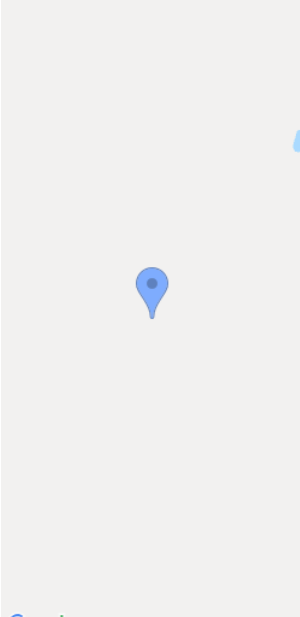
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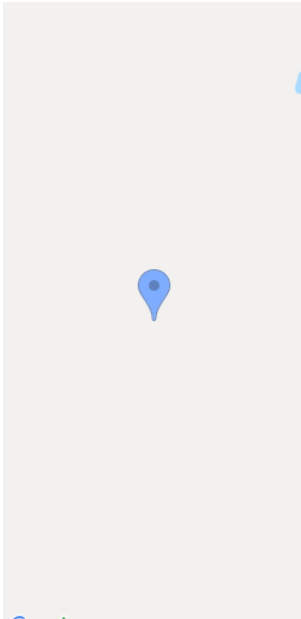


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Harapaki Windfarm



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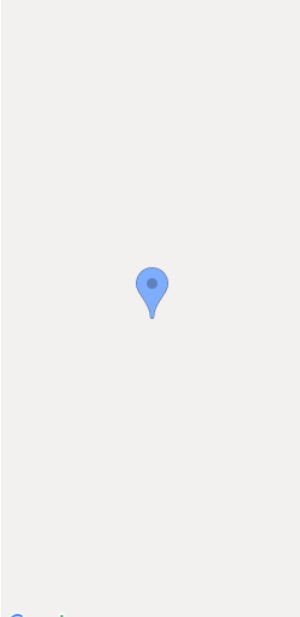
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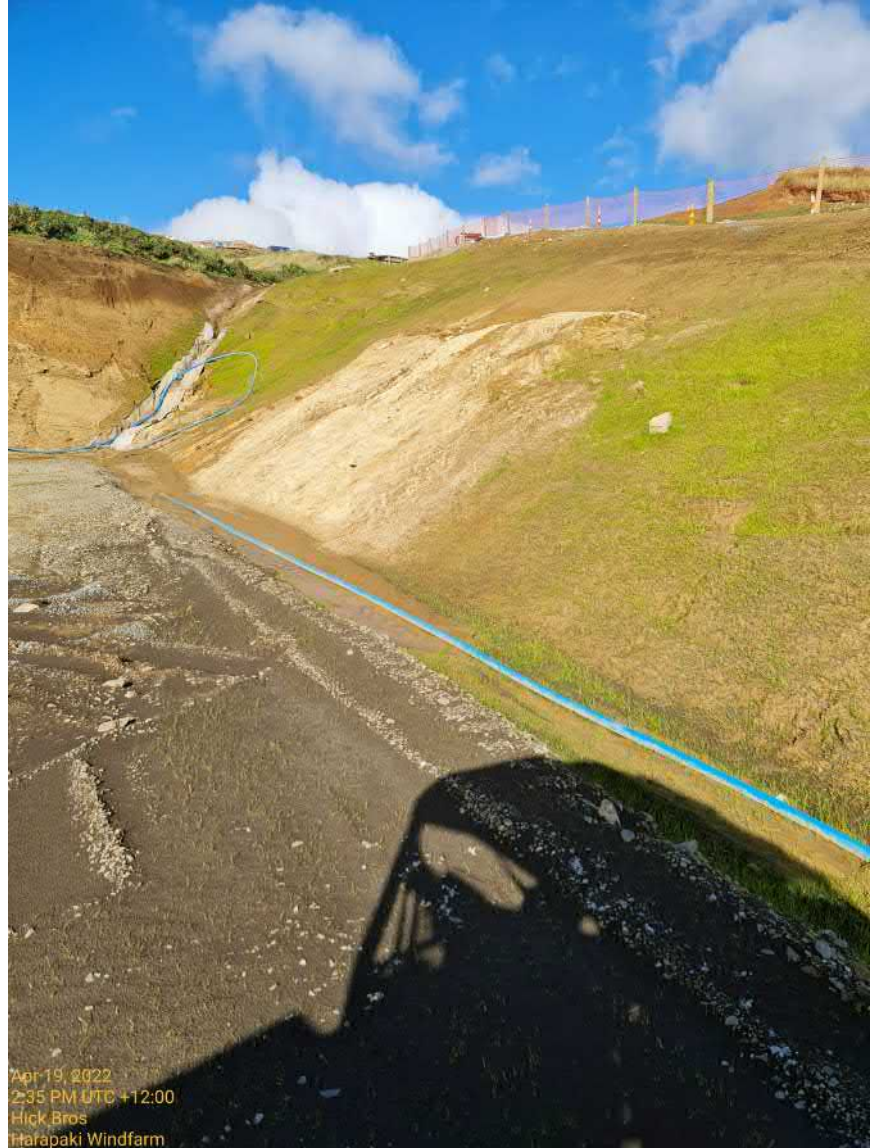


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APPENDIX 15
GEOTECHNICAL AND LAND STABILITY MEMO

7 September 2023
Job No: 1016884.1000

Meridian Energy Limited
Level 2, 55 Lady Elizabeth Lane
Queens Wharf
Wellington 6011

Attention: Nick Bowmar

Dear Nick

Mount Munro Section 92 Response to Items 96 - 109

1 Background

The purpose of this letter is to provide responses to the Section 92 additional information request for items 96 – 109, received by Meridian Energy Limited (Meridian) in response to their Resource Consent application for a new Wind Farm at Mount Munro.

Item numbers used in this letter correspond to the section 92 request letter, with the request for information in italics, followed by our response.

2 Geotechnical/Land Stability

2.1 Item 96a

The following requests relate to more specific information on related geotechnical influences on the corridor widths (including cut slopes, roading/culvert fill area and fill disposal areas):

Have fill disposal areas (footprints) been used to inform the proposed corridor widths?

No - proposed corridor widths for the turbine envelope zones and turbine exclusion zones are nominally 120m wide. In some areas they are wider than this to accommodate turbine platforms which are offset from the road alignment, or where more flexibility is required for the road alignment. Fill disposal areas will be accommodated within these corridors, but have not dictated the widths.

2.2 Item 96b

What assumed cut slope angle, roading/culvert fill batter and excess fill batter angles have been used to inform the proposed corridor widths i.e., the maximum cut and fill slope angles, or has lower slope angle contingency been added? Noting that the Civil Engineering Report states maximum cut slope and fill batter angles have been used as a basis for preliminary civil design to assess environmental effects and to provide an indicative earthworks volume.

Maximum cut and fill angles have been used to inform the proposed corridor widths.

2.3 Item 96c

What geotechnical aspects have influenced the wider corridor width in roading zone section R01?

Where R01 crosses the stream and heads upslope in a south westerly direction (see red circled area in Figure 2.1), the corridor width is driven by the maximum preferred road gradient and also potential slope instability on the eastern slopes above the proposed R01 road. A wider corridor in this area will allow for shallower batter slope angles where slope instability is encountered or is expected to occur and no stabilisation measures are constructed.

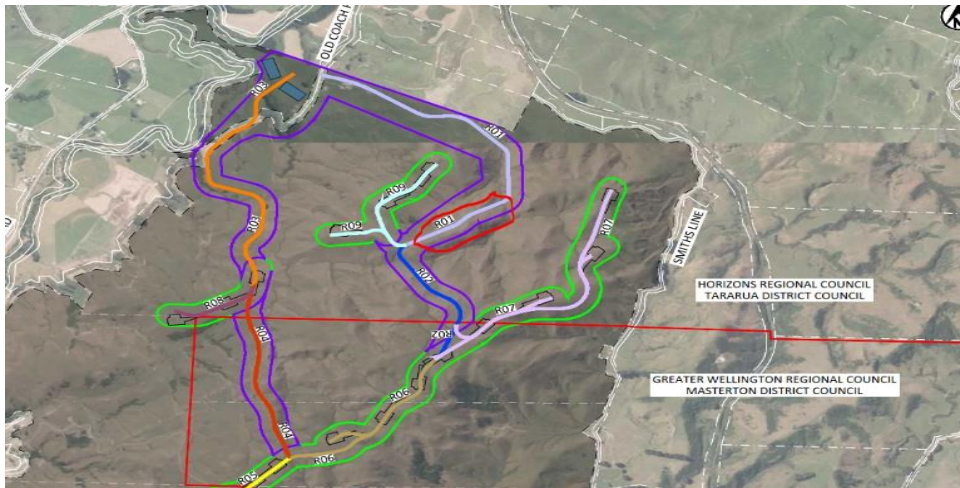


Figure 2.1: Road R01 Corridor Width

2.4 Item 96d

Can all batter cuts and fill embankments/disposal areas be contained within the turbine exclusion and turbine envelope zone corridors either with or without mitigation works to ensure long term stability?

Yes, we confirm that all batter cuts and fill embankments/disposal areas be contained within the turbine exclusion and turbine envelope zone corridors. 3d modelling of the road alignment and turbine platforms has informed the turbine exclusion and turbine envelope zone corridors.

2.5 Item 96e

Please provide a plan showing the indicative road alignment and cut slope footprint with respect to the corridor boundaries.

A plan showing the earthworks footprints is provided with this response. Refer to drawing 1016884.1000-016.

2.6 Item 96f

Please provide the range of mitigation measures that can be adopted to maintain a stable cut slope within the project corridors should poor ground/adverse groundwater conditions be encountered including at any fault zones.

Refer Section 5.4 and 5.5 of the Geotechnical report which states a range of measures that can be implemented including material clearance, slope batter reprofiling, localised drainage controls or localised slope stabilisation measures. These stabilisation measures could include retaining walls like anchored mesh faces, timber pole or geogrid reinforced walls. The wall type at any location will be

governed by the slope height, profile and materials that need stabilising and will be confirmed during detailed design and reviewed during construction.

3 Total Earthworks Volumes

3.1 Item 97a

There are inconsistencies in the total earthworks volumes in the various references. For example, the summary in the AEE states 1,672,100m³ of cut volume and 477,000m³ of fill volume (which infers 1,195,100m³ of excess fill volume requiring disposal). The Civil Engineering Report Table 10.1 states 1,756,900m³ of cut volume and 539,700m³ of fill volume (which infers 1,217,200m³ of excess fill volume requiring disposal). The Construction Water Management Plan and Effects Assessment Report Table 1 has a total volume of fill for disposal of 1,166,300m³. In relation to the earthworks volumes:

Volume Figures: Which table/set of earthworks volume figures is correct and a breakdown of the figures is requested?

Breakdown of earthworks volumes:

1. Volumes for the internal wind farm roads and wind turbine platforms were assessed by creating a 3d design model in OpenRoads Designer. This allowed the extraction cut and fill volumes, topsoil stripping and pavement quantities directly from the model.
2. The turbine foundation volumes were assessed on the basis that all foundations would be in cut. Volumes for the turbine foundations are based on an octagonal foundation of approximately 23m width (approximately 450m²), and a 3.5m excavation depth with a 1V:1H cut slope. The initial excavation volume for each turbine foundation is approximately 42,000m³ with a backfill volume over the completed foundation of approximately 21,000m³.
3. The concrete batching plant will have a footprint of approximately 6,000m³. As the final location of the concrete batching plant is subject to the Contractors methodology, a preferred location has not been identified at this stage. For the proposes of assessing earthworks quantities we have allowed for an average depth of 250mm topsoil stripping, 1m of cut and 1m of fill over the concrete batching plant site.
4. The Construction compound and laydown area has an approximate area of 14,000m³. For the proposes of assessing earthworks quantities we have allowed for an average depth of 250mm topsoil stripping, 0.5m of cut and 0.5m of fill over the concrete batching plant site. The reason why we have assumed a smaller average cut and fill depth than what was assumed for the concrete batching plan site is that this site is expected to be a lot flatter.
5. The sub-station site has an approximate area of 10,000m³. For the proposes of assessing earthworks quantities we have allowed for an average depth of 250mm topsoil stripping, 0.5m of cut and 0.5m of fill over the concrete batching plant site. The reason why we have assumed a smaller average cut and fill depth than what was assumed for the concrete batching plan site is that this site is expected to be a lot flatter.
6. Cut and fill volumes for cabling have been based and a total trench length and cross section area provided to us by Meridian Energy Limited (Meridian).

Please refer to Table 3.1 below for a summary of the earthworks volumes.

3.2 Item 97b

What bulking factor has been used for the fill volumes provided?

Bulking and compaction factors have not been used in assessing the earthworks quantities as it has been assumed that there will be negligible difference in the volume of cut material and the compacted fill.

3.3 Item 97c

The Construction Water Management Plan and Effects Assessment Report Table 1 mentions earthworks volumes include a 10% contingency whereas there is no mention of a contingency in the Civil Engineering Report – what factors have been used to inform the contingency?

Approximately 96% of the cut volume and 90% of the fill volume for the Site are generated from the internal wind farm roads and turbine platforms. To provide a level of conservatism to the volumes in the unlikely event that they increase during future stages of the design, and to avoid a potential situation where Meridian may need to apply for a variation to the consent for additional earthworks, a 10% contingency has been applied to the quantities for the internal wind farm roads and turbine platform when assessing the maximum earthworks volume.

3.4 Item 97d

Cut Volume

The Civil Engineering Report states maximum cut slope angles have been used as a basis for preliminary civil design to assess environmental effects and to provide an indicative earthworks volume. Is it correct to assume that these cut slope angles have been used to estimate total cut volume available for road embankment filling as well as the volume of excess fill requiring disposal i.e. there is no allowance for shallower cut slope angles where actual ground conditions require this for stability reasons? Note: The potential for shallower cut slope angles being required is stated in the Civil Engineering Report as being due to rock/soil conditions encountered and whether any stabilisation measures are to be constructed.

Earthworks quantities have been based on the maximum cut and fill angles. As discussed in Item 97c, a contingency has been provided to allow for any variations in the cut and fill slope angles. In some areas where there is excess material to be disposed of, the fill slope may be increased within the turbine exclusion and turbine envelope zone corridors as required.

3.5 Item 97e

What excavation configuration is assumed for the turbine foundations for the cut volume calculation? The largest foundation type noted in the AEE is an octagonal gravity pad with a width of approximately 23 m and a depth of approximately 3.5 m.

The turbine foundation volumes were assessed on the basis that all foundations would be in cut. Volumes for the turbine foundations are based on an octagonal foundation of approximately 23m width (approximately 450m²), and a 3.5m excavation depth with a 1V:1H cut slope. The initial excavation volume for each turbine foundation is approximately 42,000m³ with a backfill volume over the completed foundation of approximately 21,000m³.

3.6 Item 97f

Please provide an indicative range of earthworks cut volumes (minimum and maximum) based on the above possible scenarios in order for us to better understand the range of fill volumes that will be generated.

It is our expectation that during future stages of the design, the overall cut and fill volumes for the wind farm roads and turbine platforms will reduce by approximately 10% as the design is refined. We also expect that some site won material will be suitable for road base construction, and have conservatively estimated that approximately 5% of cut material would be suitable. This has formed the basis of assessing the minimum earthworks volume in Table 3.1.

3.7 Item 97Gg

Fill Embankment Volume

Similar to point d. above, in the Civil Engineering Report the maximum roading/culvert embankment fill batter angle (26 degrees) has been used to provide an indicative earthworks volume (for embankment use vs fill disposal) but it is also stated that optimisation of fill slopes to 18.5 degrees or flatter could be considered and adopted. However, it is noted that the Construction Water Management Plan and Effects Assessment Report states that all batter slopes will be kept to less than 20 degrees to maintain a lower erosion risk. Which of these batter slope angles is envisaged for fill embankment slopes?

The batter slopes will be assessed in detailed design but the batter slopes throughout the project will range between 18 and 26 degrees. Slope angles will be assessed based on slope stability, earthworks, environmental and ecological considerations at every fill site.

3.8 Item 97h

Please provide an indicative range of fill (minimum and maximum) that will be used in fill embankments based on the above possible information/scenarios in order for us to better understand the fill volumes that will require disposal.

Please refer to Table 3.1

3.9 Item 97i

Fill Volume for Disposal

Leading on from Point h. above, please provide an indicative range of fill volume requiring disposal in order for us to better understand the requirements for onsite fill disposal sites.

Please refer to Table 3.1 and our response to Items 98a and 98b below.

Table 3.1: Earthworks Summary

Earthworks source	Earthworks volumes - Current Design (m3)			Contingency (m3)		Maximum Earthworks Volume (m3)		Minimum Earthworks Volume (m3)	
	Topsoil stripping	Cut	Fill	10% Cut Contingency	10% Fill Contingency	Cut (Current design + 10% contingency ***)	Fill (Current design + 10% contingency ***)	Cut (Current design less 10%)	Fill (Current design less 10%)
Internal wind farm roads	47000	850,300	305,200	85000	30500	935,300	335,700	765300	274700
Cabling	(incl. in wind farm roads)	13,200	12,700			13,200	12,700	13,200	12,700
Turbine platforms	39600	651,500	109,400	65100	10900	716,600	120,300	586400	98500
Turbine foundation excavation	(incl. in turbine platforms)	42,000	21,000			42,000	21,000	42,000	21,000
Concrete batching plant	1500	6,000	6,000			6,000	6,000	6,000	6,000
Construction compound/laydown area	3500	5000	5000			5,000	5,000	5,000	5,000
Sub station	2500	5000	5000			5,000	5,000	5,000	5,000
Site won road base material (assume 5% of total cut volume)									71,100
Total (m3)	94,100.00	1,573,000	464,300			1,723,100	505,700	1,422,900	494,000
Fill disposal volume							1,217,400		928,900

*** Contingency only applied to internal wind farm roads and turbine platforms

4 Fill Disposal Sites

4.1 Item 98a

There is a paucity of information on the indicative locations of roading/culvert related embankment fills and separately excess fill disposal areas. This information is required to check the feasibility of disposing of the indicated fill volume range within the corridors (and would also better inform potential effects associated with the sites). Current information appears to be limited to a plan (including a table) in the Construction Water Management Plan and Effects Assessment Report showing an aerial image with the general roading network plus blue areas assumed to be a combination of roading/culvert fill areas and excess fill disposal areas and red areas assumed to be cuts slopes. The plan does not show the project corridor boundaries. The accompanying table sets out topsoil stripping, cut volumes and fill volumes per roading section. The only other plans with mention of soil disposal areas appears to be the Site Investigation Location Site Plans in the Geotechnical Factual Report. These plans have a limited number of soil disposal areas marked with some extending outside the corridor boundaries. In relation to the above:

Are the soil disposal areas on the Site Investigation Location Site Plans in the Geotechnical Factual Report valid?

The final location of the soil disposal areas will be confirmed during detailed design once the road alignments and associated cuts and fills within the envelope have been confirmed. Fill disposal areas will be positioned to minimise haulage distances and to reduce environmental effects from transporting excavated soils within the site area during construction.

From the table 3.1 above, the maximum on-site fill disposal volume is approximately 1,217,400m³. Fill disposal locations identified within the turbine envelope and turbine exclusion zones indicate that the maximum earthworks balance can be accommodated within these locations.

Refer to Drawing 1016884.1000-16 for indicative fill disposal locations and volumes of fill disposal within the Site.

4.2 Item 98b

Please provide plans showing indicative footprint areas of roading/culvert related embankment fills and excess fill disposal areas with respect to the roads and the corridor boundaries. This should include indicative fill volumes by roading sector and colour coded on the plan accompanied by a table outlining the *location, footprint and volume for each fill site*. *The plans should differentiate the fill areas required to accommodate the minimum fill volume range and the maximum fill volume range (refer above for request for a range) at the assumed minimum fill batter angle. The indicative fill disposal sites should be based on the range of fill location criteria provided in Section 11 of the Civil Engineering Report.*

Refer to Drawing 1016884.1000-16 for indicative fill disposal locations and volumes of fill disposal within the Site.

A breakdown of earthworks volumes for each road alignment, based on maximum cut and fill angles, inclusive of a 10% contingency has been provided in Table 10.3 of the Civil Engineering Report

5 Transmission Corridor

5.1 Item 99

Will any excess fill requiring disposal be generated from the terminal substation, internal transmission line access tracks, the transmission line route (access and pole installation)? If yes, where will the fill be disposed of?

It is noted that a cut/fill balance is proposed for the site substation earthworks in Table 10.1 of the Civil Engineering Report.

As noted in section 3.1 above, earthworks volumes for the substation have been estimated based on assumed plan areas. A platform design has not yet been undertaken for the substation. The estimated earthworks volumes for the substation are based on a proposed footprint area of approximately 10,000m². Subject to confirmation during further design phases, any excess cut material will be disposed of in the adjacent land surrounding the substation or within the wind farm site, in accordance with any requirements of the CWMP and EAS Report.

6 Turbine Foundations

6.1 Item 100

What range of rock improvement/mitigation/drainage methods would be used to ensure suitable foundations are achieved for the turbines if unsuitable ground/ground water conditions are encountered?

As per Mill Creek windfarm construction in Greywacke Rock, where groundwater is encountered at the foundation subgrade level, perimeter drains around the foundation, and if required, within the foundation footprint, will be installed and will drain groundwater away from the turbine foundation and away from the crane hardstand area.

Rock strength and stiffness will be investigated and assessed at detailed design stage and a foundation design will be prepared to accommodate the range of rock parameters expected. If during construction the rock stiffness / strength etc is lower than allowed for, then as per Mill Creek windfarm construction in Greywacke Rock, there will be localised undercutting and replacement of insitu rock with cement stabilised hardfill. This was undertaken at approximately 3 turbines of 26 at Mill Creek at short notice and immediately after the subgrade inspection was completed.

7 Public Roads

7.1 Item 101

Section 2.4.5 of the AEE notes various earthworks will be carried out to upgrade Old Coach Road to facilitate construction traffic. Will there be excess fill from these works requiring disposal and if so, where will it be disposed?

The detailed design of these works is yet to be completed but the intention is that any excess material from these works will be disposed of within the wind farm site at approved fill disposal locations.

8 Temporary Concrete Batching Plants(s)

8.1 Item 102

Is there to be 1 or 2 batching plants? This is not clear in the Civil Engineering Report, Section 8.

The intention is that there will only be one concrete batching plant.

8.2 Item 103

The location of the concrete batching plant(s) has not been finalised but it is noted it/they could be located in the Main Storage Laydown Area, Turbine Envelope or the Turbine Exclusion Zones. Given the required area (100m x 60 m), is there a suitable location in either of the latter two options for the plant(s) and if so, has this been considered when setting the corridor widths at these locations?

The final decision of this location will be based on the preference and construction methodology of the Contractor, once appointed.

The concrete batching plant area is approximately 6,000m². Turbine exclusion zones are typically 120m wide which provides a number of suitable locations for a concrete batching plant on top of the ridgeline as per the examples in Figure 8.1 below.



Figure 8.1: Potential Concrete Batching Plant Sites

8.3 Item 104

What is the conceptual design (e.g., lined/unlined/embedded/elevated), footprint and volume of the decanting pond and settlement pond for the concrete batching plant(s)?

It is noted a cut/fill balance is proposed for the overall batching plant(s) earthworks in Table 10.1 of the Civil Engineering Report.

This will ultimately depend on site - typically would be unlined and excavate/embedded in the existing ground with a decant structure outfalling to a natural drainage path. Any cut resulting from formation of the pond and batching plant would be stockpiled adjacent to the batching plant site for reinstatement once the batching plant is decommissioned.

9 Main Storage Laydown Area

9.1 Item 105

How many ponds will be constructed for in the laydown area? Note: The Civil Engineering Report does not mention ponds, but a pond is mentioned in the AEE Section 2.4.6 and two pond locations are shown on various site plans.

Two potential pond locations have been identified for the laydown area; however it is intended that only one pond is constructed, with the location to be confirmed as part of the detailed design process.

9.2 Item 106

What is the conceptual design (e.g., lined/unlined/embedded/elevated), footprint and volume of any such pond?

The detailed design of the pond is yet to be completed; however the pond size allows for buffer storage to balance out the peak demands versus the overall daily supply rate via carting to allow for high water demand periods over summer when water supply may be restricted.

The approximate footprint of the pond is 100m long x 50m wide x 4m deep with 2H:1V side slopes, providing a total volume of 17,200m³ and a working volume of 13,200m³.

9.3 Item 107

Will the pond(s) be classifiable in terms of the Dam Safety regulations?

No, as the storage volume is less than 20,000m³.

10 Seismic Considerations

10.1 Item 108

It is noted in Section 6.2 of the Geological and Geotechnical Information to Support Civil Engineering Report, founding conditions for the turbines, main storage laydown area and earthworks and infrastructure areas across the site are to be determined prior to construction to confirm assumed sub soil classes. Will further investigations be carried out as part of windfarm design to determine liquefaction potential at the main storage laydown area and terminal substation?

Yes further investigations will be undertaken to determine liquefaction potential at the main storage laydown area and terminal substation. Based on the geotechnical work completed to date, the risk of liquefaction affecting these two structures is considered to be low.

11 Indicative further Geotechnical Investigations for detailed Windfarm design

11.1 Item 109

Please provide a list of infrastructure (e.g., turbines, substations, culverts, ponds etc.) and earthworks (e.g., roads, cut slopes, fill areas etc) sites where further geotechnical investigations are anticipated. This includes the proposed scope and type of investigation.

Key infrastructure will be investigated at detailed design stage once locations have been confirmed. The scope and type of investigation will be confirmed at detailed design stage, however investigations are likely to comprise combinations of geological mapping, test pitting, boreholes, downhole geophysics, laboratory testing and other methods like cone penetration testing if required.

12 Applicability.

We understand and agree that our client Meridian Energy Limited will submit this memorandum as part of an application for resource consent and that Masterton District Council, Tararua District Council, Greater Wellington Regional Council and Horizons Regional Council as the consenting authorities, will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd

Report prepared by:



.....
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Senior Civil Engineer

Authorised for Tonkin & Taylor Ltd by:



.....
Nick Peters
Project Director

7-Sep-23

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APPENDIX 16
CONTAMINATED LAND PRELIMINARY SITE INVESTIGATION



Preliminary Site Investigation

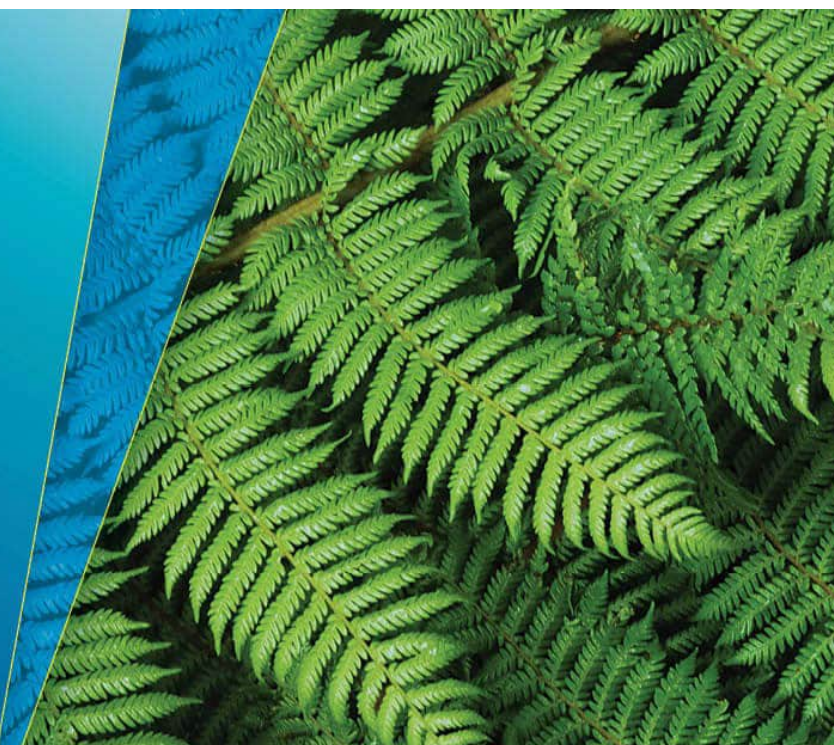
Mount Munro Proposed Windfarm

Prepared for
Meridian Energy Limited

Prepared by
Tonkin & Taylor Ltd

Date
September 2023

Job Number
1016884.1000 v1.1



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Document control

Title: Preliminary Site Investigation					
Date	Version	Description	Prepared by:	Reviewed by:	Authorised by:
11/08/23	1	Preliminary Site Investigation, Mount Munro Proposed Windfarm	K.Pitt	S.Marquardt	N.Peters
05/09/23	1.1	Final Preliminary Site Investigation, Mount Munro Proposed Windfarm. <i>NB: Includes limited sampling for proposed northern access track.</i>	K.Pitt	A.Pearson	M.Dawson

Distribution:

Meridian Energy Limited

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1 Introduction

Tonkin & Taylor Ltd (T+T) has been commissioned by Meridian Energy Limited to undertake a Preliminary Site Investigation (PSI) for the Mount Munro Proposed Windfarm (referred to below as the site). The location of the site is presented in Figure 1.1 below.

This report has been prepared in general accordance with the requirements for a PSI referred to in the NESCS regulations, and as outlined in the MfE's Contaminated Land Management Guidelines¹.

The persons undertaking, managing reviewing and certifying this investigation are suitably qualified and experienced practitioners (SQEP), as required by the NESCS and defined in the NESCS Users' Guide (April 2012).

This report was undertaken in accordance with our variation (VO5) of 21 July 2023 and the additional variation (VO7) for the subsequent soil sampling near to the disused spray sheep dip.

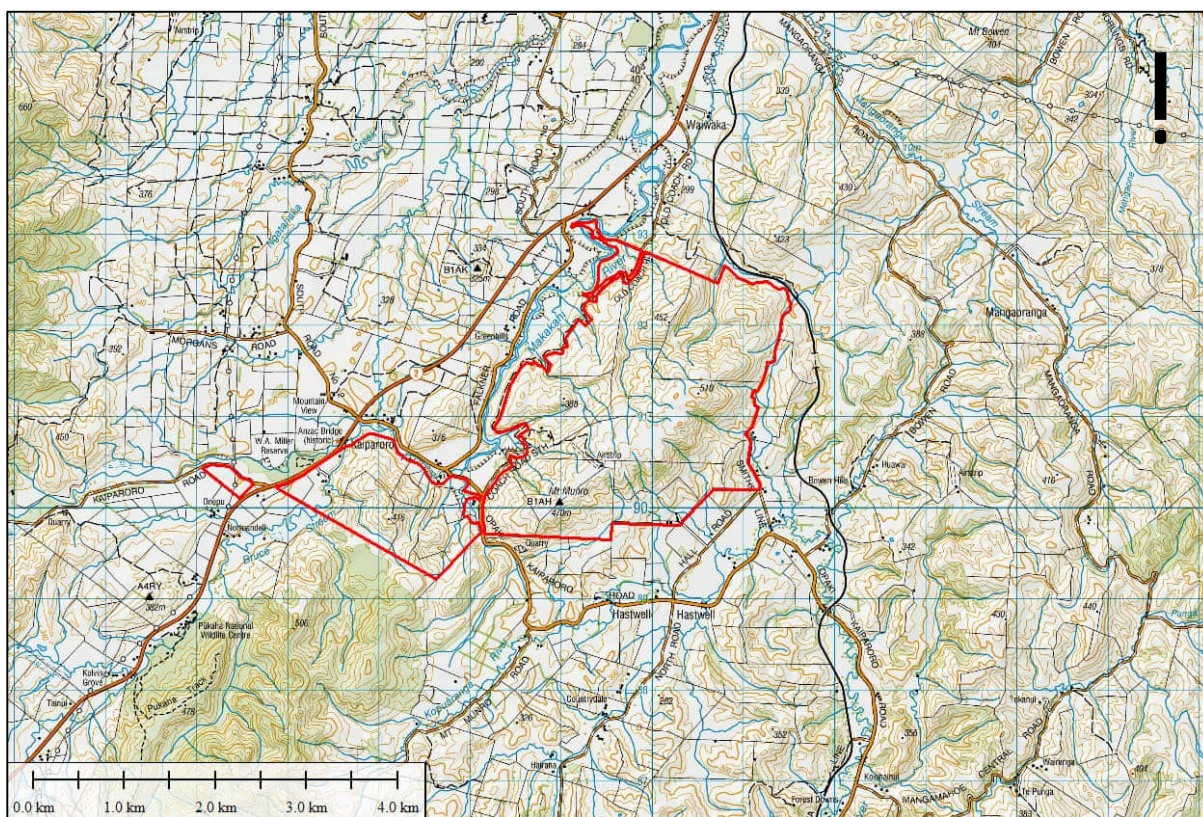


Figure 1.1 Site location (Topomap sourced from Land Information New Zealand (crown copyright reserved))

1.1 Background

We understand Meridian Energy Limited (Meridian) proposes to construct a windfarm along the ridgeline of Mount Munro with supporting structures such as, a substation, transmission line and laydown area, to be located on nearby properties, within the wider site area.

An application for consent for the windfarm development was submitted to the four relevant councils; Horizons Regional Council, Greater Wellington Regional Council, Tararua District Council

¹ Ministry for the Environment, 2021. Contaminated Land Management Guidelines No 1 – Reporting on Contaminated Sites in New Zealand.

and Masterton District Council. Following submission of the application, the councils requested further information via a s92 Additional Information Request².

Given HAIL³ activities were identified within the site boundary, the councils requested undertaking a PSI to assess any additional consenting requirements under the NESCS for the development.

We have completed this PSI by assessing the potential HAIL activities within the proposed Mount Munro Windfarm development area, particularly within areas where construction activities will be undertaken during the development.

1.2 Scope of work

The scope of work for this investigation comprised the following:

- Review Tararua and Masterton District Council property files;
- Review of a "Site Contamination Enquiry" from both Greater Wellington Regional Council and Horizons Regional Council;
- Review of selected historical aerial photographs;
- Review of current and historical certificates of title;
- A site walkover inspection;
- Review of ground contamination related environmental regulations and planning documents to identify relevant resource consent requirements;
- Collection of up to four soil samples in the area of the proposed northern access track, near to the disused spray sheep dip;
- Interpretation of the soil sampling results against relevant environmental and human health guidelines; and
- Preparation of this report.

This report documents our findings and comments on the potential for ground contamination at the site, in the context of the proposed windfarm project, including potential resource consent implications with regard to ground contamination.

² Letter to Meridian Energy Ltd, 6 July 2023. Additional Information Request for Application APP-2022203902.00. Sent by Horizons Regional Council, Greater Wellington Regional Council, Tararua District Council and Masterton District Council.

³ Ministry for the Environment - Hazardous Activities and Industries List

2 Site description

2.1 Location and legal description

The site is located along the hill tops approximately halfway between Mauriceville and Eketāhuna on the northern Wairarapa and southern Manawatū boundary. The site is approximately 2 km southeast of State Highway 2 and straddles the regional boundary between the Wellington and Manawatū-Whanganui Regions. The site is located between the Mākāhahi River and the Wairarapa Rail Line.

Table 2.1: Property description

Address	Legal Description	Certificate of Title	Area (m ²)
168 Coach Road	Section 147 Block IX Mangaone Survey District	WN47/208	157,827
	Section 133 Block IX Mangaone Survey District	WN89/188	2,565,707
	Section 161 Block X Mangaone Survey District	WNB2/2	9,915
	Section 149 Block X Mangaone Survey District		20,841
85 Coach Road South	Section 129 Block XIII Mangaone Survey District	WN85/199	1,157,401
124 Opaki Kaiparoro Road	Lot 1 Deposited Plan 665	WN31D/706	796,421
85151 State Highway 2	Section 186 Block XIII Mangaone Survey District	WN58A/971	609
	Lot 1 Deposited Plan 90879		420,052
85274 State Highway 2	Section 1 and part of Section 62 Block XIV Tararua Survey District	WN25C/219	95,101

2.2 Site condition

A site walkover inspection was undertaken on 9 August 2023 by a contaminated land specialist. The purpose of the walkover (and interviews) was to gather general information on topography and land use (both on site and the surrounding area) as well as making observations for evidence of potential ground contamination. Relevant observations made at the time of the inspection (and interviews) are summarised below. Key site features are shown on Figure 2.1 in Appendix A and selected photographs are included as Photographs 1-13 in Appendix A.

The T+T staff member was accompanied by Mr Gene Sams of Meridian Energy Ltd during the walkover and the following summary includes their comments.

The properties within the site are currently used for agricultural and residential purposes and contain the following features:

- The site encompasses a large agricultural area containing sheep and beef farming activities, and also rural residential dwellings.

- The topography of the site is undulating with one large and two smaller ridges and various gullies across the site.
- Site surfaces were predominantly pasture with gravelled access tracks. Coverage around the residential dwelling at 85 Coach Road South observed, was gravelled with some hardstanding closer to the house.
- The proposed substation area is relatively flat and currently in pasture, the eastern boundary of the area is bounded by a pine tree shelter belt.
- The proposed transmission line is to extend from an existing line present to the west of the proposed substation area. It is to extend east, across State Highway 2 and through 815151 State Highway 2 to the southern base of the larger ridge where the turbines are to be constructed. See photograph 1.
- The proposed laydown area is currently planted with brassicas (likely stock fodder) with wrapped silage bails in rows through the area. Signage for pest traps containing brodifacoum and cyanide, last loaded on 23/03/23, was observed on the northern boundary fence. See photograph 2.
- A large wool shed, and a covered stock yard is present to the east of Old Coach Road. Both are constructed of timber frames with corrugated iron cladding and roofing. See photograph 3.
- To the rear of the wool shed, is a disused spray sheep dip and tank (now filled with rainwater). See photograph 3.
- A large storage tank (approximately 20,000 L) that appears to be a former underground fuel storage tank, is present to the north-east of the woolshed and sheep dip, and in a rusted condition. The tank has previously been used as a water tank; however, the fittings and hose are no longer connected to the tank. No hydrocarbon odours or staining were observed near to the tank. See photograph 4 and 5.
- South of the large woolshed is an ancillary shed (containing a small bulldozer, an all-terrain vehicle, refrigerated unit, wool bags, etc.) and stockyards which are adjacent to Old Coach Road. See photographs 6 and 7.
- A ~900 L aboveground storage tank (AST) was observed to the south of the shed, it appears to be a split tank containing petrol and diesel. Specifications on the tank state that the date of manufacture was 26/01/2022 and holds a maximum of 636 L and 293 L (supposedly maximum capacity of each compartment within tank). See photograph 8.
- An ephemeral stream is present between the access track and the ancillary shed containing farm equipment extending from the site westwards to the Mākākahi River.
- A second small AST (450 L) was observed whilst driving past the dwelling at 85 Coach Road South.
- The access track up to the large ridge from the dwelling at 85 Coach Road South is steep and gravelled. The track leads up to the 'super bin' and cattle yards at top of the ridge.
- This access track is proposed to be used as an emergency track only during construction, to evacuate or remove injured persons from the site. It will remain as the main access for the dwelling and is not to be improved for the proposed development.
- The 'super bin' is constructed of corrugated iron and concrete and was empty of fertiliser at the time of the visit. The structure has a concrete base and has concrete dividers creating separate storage areas. See photographs 9 and 10.
- A second large storage tank (appears to be a former underground fuel storage tank) was observed, adjacent to the northern portion of the 'super bin' in an average condition with some rust discolouration noted. The base of the tank was buried and not able to be observed. The tank is in use as a water tank and is filled with rainwater from the roof of the 'super bin'.

The tank was completely full, and water was overflowing from the open cover on top. No hydrocarbon odour or staining was observed within the vicinity of the tank. See photograph 11.

- Cattle yards are present at top of large ridge, to the east of the 'super bin'. The yards are constructed of timber with metal gates. Some empty containers (with no labels) were seen within the yards. See photograph 12.
- The former landfill to the south of the site, on Hall Road, was able to be seen from the top of the larger ridge, by the 'super bin'. See photograph 13.
- No rubbish or filling was observed within the areas visited during the site walkover.
- All grazed pasture and vegetation appeared healthy across the site, in areas observed.

The client has confirmed that areas including the woolshed, ancillary shed, sheep dip, current fuel storage tanks and repurposed storage tanks, and the 'super bin' are not to be disturbed during the proposed development.

A second site visit was undertaken on 30 August 2023 by a contaminated land specialist. The purpose of this site visit was to collect surface soil samples from the area of the northern access track which is to be constructed immediately north of the disused spray sheep dip. While on site, a conversation was had with the current farm manager whose family have been long standing owners of the property, the following observations includes their comments.

The following observations were made during the surface sample site visit;

- The spray sheep dip has not been used for over 20 years, sheep were brought through from the yards (by the woolshed), went through the spray dip, then onto the concrete pad on the eastern side of the structure.
- The AST in the adjacent paddock was used only as a water tank for mixing chemical and flowed via gravity to the mixing tank on the southern side of the dip.
- The sheep dip has a concrete base (covered with a layer of sediment and patchy moss and grass cover) with pipework on the ground surface. The base is sloped towards a collection sump where excess product was likely pumped into the mixing tank and reused. There is a concrete curb bund surrounding the circular dip structure with an opening to the sump. See photographs 14 to 15.
- The topography of the area is sloping north to south, away from the location of the proposed northern access track.

2.3 Surrounding land use and environment

The Mount Munro Windfarm development area is located between Eketāhuna and the Pūkaha/Mount Bruce Reserve, land uses in the area surrounding the site include:

- North – State Highway 2 with agricultural land and rural residential properties until the Eketāhuna urban area begins approximately 2.4 km from the northern site boundary;
- South – agricultural land and rural residential properties with Pūkaha/Mount Bruce Reserve beyond;
- East – northern portion of the Wairarapa Rail Line with agricultural land and rural residential properties beyond; and
- West – Mākāhahi River and State Highway 2 with agricultural land and rural residential properties beyond.

2.4 Geology and hydrology

A summary of available geological information for the area is presented in this Section.

2.4.1 Published geology

The published geology beneath the site is described by Lee and Begg⁴ as Older Greywacke rock and is shown in dark grey. Younger Tertiary aged rock is shown in beige and recent alluvium deposits are shown in yellow and white, as seen below in Figure 2.1.

Further information regarding the geology on site can be found within the geotechnical report⁵, completed prior to this PSI investigation.

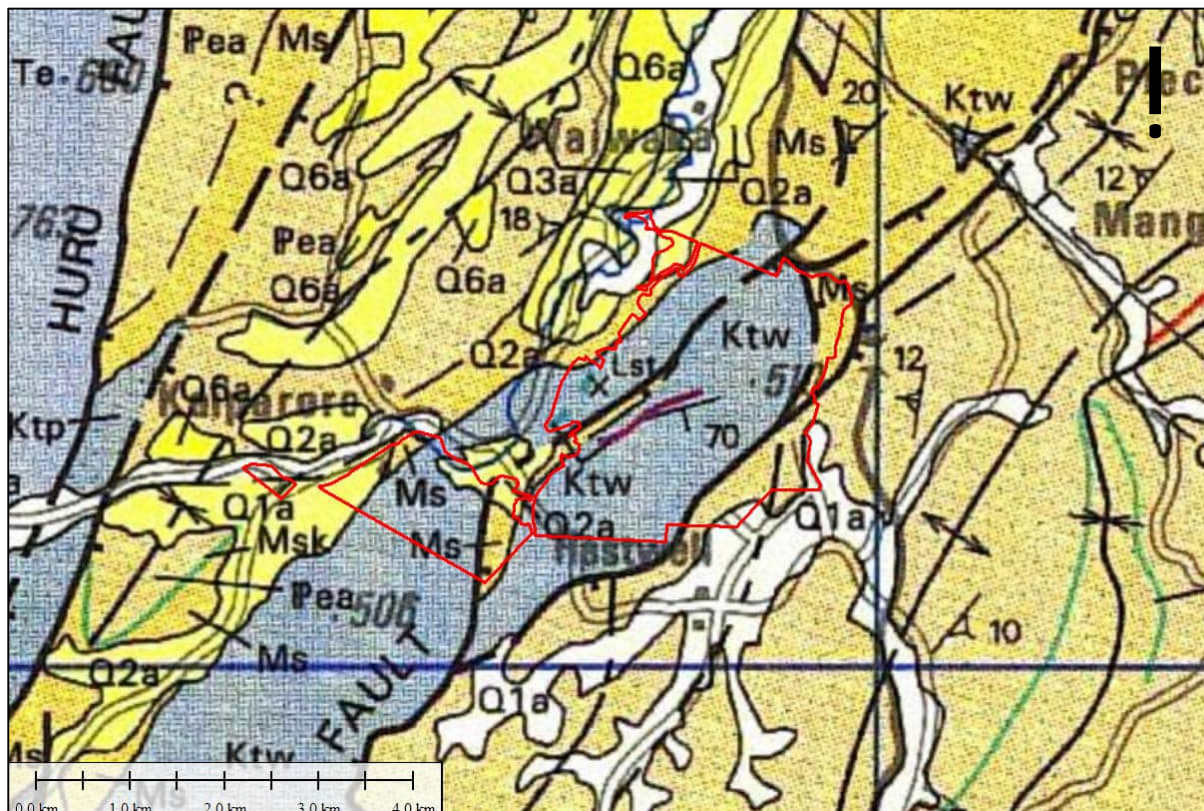


Figure 2.1 Published geology of the site (identified by the red boundary) and surrounding area (source: Lee and Begg as per footnote⁴)

2.4.2 Hydrogeology and hydrology

Groundwater was encountered during the geotechnical test pitting investigation in all but two of the excavated pits. Groundwater seepage was observed in the test pits, ranging from slow seepage to rapid inflow through the colluvium or rock defects. Depths to groundwater within the pits ranged between 0.4-3.7 m bgl⁶.

⁴ Lee, J.M., Begg, J.G. (compilers) 2002. Geology of the Wairarapa area. Institute of Geological and Nuclear Sciences 1:250000 geological map 11. 1 sheet + 66 p. Lower Hutt, New Zealand: Institute of Geological and Nuclear Sciences Limited.

⁵ Tonkin & Taylor Ltd, May 2023. Mount Munro Windfarm, Geological and geotechnical information to support civil engineering report. Prepared for Meridian Energy Limited, T+T ref 1016884.1000 v2.

⁶ Tonkin & Taylor Ltd, February 2022. Mount Munro Windfarm, Geotechnical Factual Report. Prepared for Meridian Energy Limited, T+T ref 1016884.1000 v1.

Groundwater seepages and springs were observed, during the 2022 geotechnical investigation, within gullies and on lower slopes throughout the site. Some of which had been dammed by farmers to form stock ponds.

Based on previous investigations and the site topography, groundwater is expected to occur at around 0.4-3.7 m bgl and predicted to flow in a west to south-westerly direction.

Groundwater is anticipated to discharge to the Mākākahi and Kōpuaranga Rivers.

3 Site history

Historical information relating to the site has been collected from a variety of sources including the Masterton District Council and Tararua District Council property files and contamination enquiries to the regional councils, historic aerial photographs and current and historical certificates of title. The information presented documents past and present on site activities, except for the aerial photograph review where comments are also provided on observable surrounding land use. The information that has been reviewed is summarised in this section. A more detailed review of the available information is included in Appendix B.

Based on the historical site information reviewed as part of this investigation, the site has been occupied by rural and rural residential since prior to the early 1940s. Historical aerial photographs show developments including rural dwellings and farm buildings and structures throughout the site's history.

The site has generally been occupied by sheep farming activities; a disused spray sheep dip is present within the site boundary as part of these activities. Historically, sheep dipping was required by law to control external parasites. Plunge and bath dips were used from the early to mid-1800s until the 1980s to apply preventative treatments externally to stock, the practice of direct pour on methods has replaced the former chemical bath dipping activity.

The proposed laydown area is proposed to be established on the northern portion of the site. The area is currently planted with fodder crop for feeding stock. Previous aerial images of the site show the area predominantly in grazing pasture, including the Google Earth image from September 2022 (included as Figure 3.1 below), with only one other occurrence of crop being present in 2010, confirming that the area is grazing pasture that is planted with crop only on occasion (likely to be in a rotation as part of farming practices) and has not been used historically as a market garden.



Figure 3.1 Google Earth image from September 2022 showing area currently planted with crop previously in grazing pasture.

Storage of diesel and petrol in aboveground storage tanks has been identified during the site walkover and within the district council information received from Tararua District Council. The two

observed aboveground tanks that were in use for storage of fuels appeared to be new (installed 2020 and 2022) and in a good condition.

Two large storage tanks (approximately 20,000 L), likely to be former underground fuel storage tanks, have been, or are currently, in use as water storage tanks.

All areas containing identified HAIL activities across the wider site are not to be disturbed during the proposed development of the Mount Munro Windfarm. All farming infrastructure is to remain as is and will continue to be used for the current purposes following the development.

Existing access tracks on site will be utilised, where possible, to gain access to the construction areas. A secondary track is to be established from the southern end of Old Coach Road to an existing farm track on the smaller northern ridge. No HAIL activities have been identified in the proposed Turbine Exclusion Envelopes within which the roads will be located.

A planned new section of roading is to be constructed to the North of the woolshed and disused spray sheep dip to avoid interrupting farming operations. Soil sampling of this area was undertaken to confirm if this area had been impacted from spill-over of the spray sheep dip.

4 Soil sampling

Surface soil sampling was undertaken at four locations near to, and within the former sheep dip structure. The objective of the soil sampling was to undertake a preliminary assessment of potential contaminant concentrations in soils that are to be disturbed as part of the development of the northern access track.

The sampling plan showing the sampling locations and nearby features is included in Appendix A and Figure A.2.

4.1 Soil sampling procedure

Sampling was undertaken on 30 August 2023 by T+T in general accordance with the requirements of the NESCS⁷ and CLMG No. 5⁸, using the following procedure:

- Freshly gloved hands and a hand-trowel were used to collect samples directly from the surface soils (from a depth of approximately 0.1 to 0.2 m bgl).
- Samples were placed into laboratory supplied sample containers.
- The trowel was decontaminated between sample locations using clean water and Decon 90 (a phosphate-free detergent).
- Samples were delivered to IANZ accredited Hill Laboratories under chain of custody documentation for analysis.
- Surface samples collected from 0.0-0.1 m bgl were selected for initial analysis. Based on the results of these samples, no further analysis has been required to complete the assessment.

4.2 Analytical results

The assessment criteria were selected in accordance with the requirements of the regulatory framework, in particular, in accordance with the MfE Methodology⁹. Residential land use criteria were used to provide a conservative screening assessment. Predicted background concentrations specific to the area have been used to assess environmental risk¹⁰.

A summary table of the analytical results for the tested samples is included as Table 1 in Appendix D and full laboratory transcripts are included in Appendix E. The results indicate:

- Arsenic and copper concentrations were found to be below the predicted background concentrations in all samples analysed.
- No organochlorine pesticides were detected above laboratory detection limit, in any of the analysed samples.

⁷ Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.

⁸ Ministry for the Environment. Updated 2021. Contaminated Land Management Guidelines No. 5: Site investigation and Analysis of Soils. Ministry for the Environment, Wellington.

⁹ Ministry for the Environment, 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment. Criteria for residential (25% produce) land use used.

¹⁰ Landcare Research Limited, 2016. PBC - Predicted Background Soil Concentrations, New Zealand, <https://iris.scinfo.org.nz/layer/48470-pbc-predicted-background-soil-concentrations-new-zealand/>

5 Site characterisation

This section characterises the likely and potential contamination status of the site based on the available information as presented in Section 3 and Appendix C of this report.

5.1 Potential for contamination

This investigation has identified that HAIL activities were (or are likely to have been) undertaken within the wider site. The activities, potential contaminants and an assessment of the likelihood, potential magnitude and possible extent of contamination are presented in Table 5.1.

The inferred locations of these activities are presented on Figure 2.1 within Appendix A.

Table 5.1: Potentially contaminating activities, Mount Munro

Land use/activity	Potential contaminants	Magnitude, possible extent and likelihood of contamination	HAIL reference
Fuel storage in aboveground and underground tanks	Petroleum hydrocarbons.	A 450 L aboveground storage tank (AST) containing diesel has been confirmed by documents within the TDC property file. The tank was installed in 2020 as part of a boiler heating system and is near to the dwelling at 85 Coach Road South. A second AST was observed near to the ancillary shed on the northern portion of the wider site. The tank was installed in 2022 and has a capacity of approximately 900 L. The tanks were observed to be in good condition during the site walkover and are not in areas to be disturbed during the proposed development. Two former storage tanks, unknown if they originated from the site or contained fuels historically, have been repurposed as water tanks. The tank by the woolshed is currently empty and disused, while the tank by the 'super bin' is in use and rainwater fed by the roof of the 'super bin' structure.	A17

Land use/activity	Potential contaminants	Magnitude, possible extent and likelihood of contamination	HAIL reference
Sheep dip	Arsenic, organochlorines (e.g., aldrin, dieldrin, DDT, lindane) and organophosphates, carbamates, and synthetic pyrethroids.	<p>A spray sheep dip was observed near to the large woolshed and yards on the northern portion of the site.</p> <p>It is possible that contaminants from the sheep dipping activities are not only localised to the immediate area surrounding the dip, but also throughout the area previously used to hold the sheep after dipping while they were drying.</p> <p>The holding paddock by the sheep dip is to the north of the dip, where the proposed northern access track is to be developed.</p> <p>Surface sample collection in the area of the proposed access track was undertaken to assess if there have been any impacts from the adjacent sheep dip. Results of the samples indicate that there has been no migration of the persistent contaminants from the sheep dip to the adjacent area where the track is to be constructed. More modern sheep dip chemicals (organophosphate and pyrethroids) would not be present given their limited persistence and the period of time in which the dip has been decommissioned.</p> <p>It is important to note that only a limited area to the north of the sheep dip has been investigated and if any further areas surrounding the sheep dip are to be disturbed, further assessment will be required.</p>	A8
Cropping in proposed laydown area.	Arsenic, lead, copper, mercury; wide range of organic compounds including acidic herbicides, organophosphates, and organochlorines.	<p>Crop fodder (brassica) for stock were observed in the laydown area during the site walkover.</p> <p>The review of historical aerial images (including an image from September 2022) shows this area in grazing pasture. Therefore, it is unlikely that persistent pesticides (such as those used for market gardening) have been used for intensive cropping activities within this area and the profile does not differ from the rest of the productive land in the development.</p> <p>It is assessed as not likely that an activity described on HAIL is being, or has been, undertaken on this piece of land.</p>	
Storage of fertiliser within the 'super bin'	Calcium phosphate, calcium sulphate, copper chloride, sulphur, sulphuric and phosphoric acid, molybdenum, selenium, iron, cadmium, nitrates, and ammonia	A 'super bin' for the storage of fertiliser was observed near to the top of the larger ridge, off the access track from 85 Coach Road South. At the time of the site visit the bin was empty and had a concrete floor. The proposed development of the windfarm will not result in disturbance of the 'super bin' structure or surrounding area.	

5.2 Preliminary conceptual site model

A conceptual model as defined by the Ministry for the Environment in the contaminated land management guidelines¹¹, sets out known and potential sources of contamination, potential exposure pathways, and potential receptors. For there to be an effect from the proposed activity there has to be a contamination source and a mechanism (pathway) for contamination to affect human health or the environment (receptor).

A preliminary conceptual site model has been developed for the proposed activity which takes into account the available information about the site, and our understanding of the potential effects on human health and the environment. The model is presented in Table 5.2 below.

¹¹ Ministry for the Environment, 2021. Contaminated Land Management Guidelines No. 1 Reporting on Contaminated Sites in New Zealand.

Table 5.2: Preliminary conceptual site model, Mount Munro

Source	Pathway	Receptor	Risk assessment
Soil contaminated as a result of sheep dipping activities.	Ingestion of soil	Current site users	Incomplete: Soil concentrations for arsenic, copper and OCPs were below the most conservative human health criteria in the area of the proposed access track. Based on these results, the source of contamination in the area of the access track is incomplete. However, contamination may exist in soils in other areas surrounding the sheep dip, the proposed development will not result in disturbance of soils in this area and therefore the pathway to receptors is incomplete.
	Inhalation of vapours	Future site users	
	Dermal contact		
	Ingestion of soil	Maintenance/excavation workers	
	Inhalation of vapours		
	Dermal contact		
	Passive discharge of contaminants	Environmental receptors (groundwater, surface water)	
	Runoff		
Soil contaminated as a result of the storage of fertilisers within the 'super bin'.	Ingestion of soil	Current site users	Incomplete: While there may be source of contamination, and contamination may exist in soils surrounding the 'super bin', the proposed development will not result in disturbance of soils in this area and therefore the pathway to receptors is incomplete.
	Inhalation of vapours	Future site users	
	Dermal contact		
	Ingestion of soil	Maintenance / excavation workers	
	Inhalation of vapours		
	Dermal contact		
	Passive discharge of contaminants	Off site and nearby receptors	
	Ingestion of soil		
Soil contaminated as a result of the storage of fuels in underground storage tanks.	Ingestion of soil	Current site users	Incomplete: While the source of contamination has been confirmed, and contamination may exist in soils surrounding the storage tanks, the proposed development will not result in disturbance of soils in this area and therefore the pathway to receptors is incomplete.
	Inhalation of vapours	Future site users	
	Dermal contact		
	Ingestion of soil	Maintenance / excavation workers	
	Inhalation of vapours		
	Dermal contact		
	Passive discharge of contaminants	Environmental receptors (groundwater, surface water)	

The preliminary conceptual site model indicates that, while HAIL activities are present within the wider site, no disturbance of soil or change of land use is proposed within these areas and therefore the pathway to receptors, during the construction of the windfarm is incomplete.

However, as there have been HAIL activities identified on the wider site there is a potential for contamination to exist in surface and underlying soils and groundwater which, if future developments propose soil disturbance or changing the use of the site, there may be a risk to site users, maintenance / excavation workers and downgradient environmental and human receptors. If future developments are proposed in areas containing HAIL activities, it would be prudent to reassess the site and complete additional investigations that are targeted to the proposed developments.

6 Regulatory implications

6.1 Regulatory framework

The rules and associated assessment criteria relating to the control of contaminated sites in the Wellington and Horizons regions are specified in the following documents:

- National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS)¹²;
- The Greater Wellington Regional Council's Natural Resources Plan¹³;
- The Horizons Regional Council's Regional Plan (HRC One Plan)¹⁴;
- The operative Tararua District Council's District Plan¹⁵; and
- The Wairarapa Combined District Plan¹⁶.

The NESCS and District Plans consider issues relating to land use and the protection of human health while the Regional Plans have regard to issues relating to the protection of the general environment, including ecological receptors. The need, or otherwise, for contamination related resource consents for the development of the windfarm has been evaluated against these regulatory requirements.

6.2 NESCS

6.2.1 Applicability

The NESCS came into effect on 1 January 2012. This legislation sets out nationally consistent planning controls appropriate to district and city councils for assessing contaminants in soil with regard to human health. As a result, the NESCS prevails over the rules in the District Plan, except where the rules permit or restrict effects that are not dealt with in the NESCS.

The NESCS applies to specific activities on land where a HAIL activity has, or is more likely than not, to have occurred. Activities covered under the NESCS include soil disturbance, soil sampling, fuel systems removal, subdivision and land use change.

The following Table 6.1, as provided in the NESCS Users Guide (April 2012), confirms the NESCS does not apply to the development of the proposed Mount Munro Windfarm.

Table 6.1: PSI checklist

NESCS Requirement	Applicable to site?
Is an activity described on the HAIL currently being undertaken on the piece of land to which this application applies?	Yes
Has an activity described on the HAIL ever been undertaken on the piece of land to which this application applies?	Yes
Is it more likely than not that an activity described on HAIL is being or has been undertaken on the piece of land to which this application applies?	Yes

¹² Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011.

¹³ Greater Wellington Regional Council, 2022. Proposed Natural Resources Plan – Appeals version.

¹⁴ Horizons Regional Council, 2014. One Plan - The Consolidated Regional Policy Statement, Regional Plan and Regional Coastal Plan for the Manawatu-Wanganui Region.

¹⁵ Tararua District Council, 2012. Operative District Plan Review No. 1.

¹⁶ Masterton, Carterton and South Wairarapa District Councils, 2022. Draft Wairarapa Combined District Plan.

NESCS Requirement	Applicable to site?
If 'Yes' to any of the above, then the NESCS may apply. The five activities to which the NES applies are:	
Is the activity you propose to undertake removing or replacing a fuel storage system or parts of it?	No
Is the activity you propose to undertake sampling soil?	No
Is the activity you propose to undertake disturbing soil?	No
Is the activity you propose to undertake subdividing land?	No
Is the activity you propose to undertake changing the use of the land?	No
Conclusion: The NESCS does not apply to the Mount Munro Windfarm development.	

While HAIL activities have been undertaken on the wider site, no disturbance of soil or changing land use is proposed within the pieces of land occupied by the HAIL activities and therefore, the NESCS does not apply to the development of the Mount Munro Windfarm.

If future developments are proposed in areas containing HAIL activities, it would be prudent to reassess the applicability of the NESCS, in the context of the future development.

6.3 Regional Plans

6.3.1 Greater Wellington Regional Council's Natural Resources Plan

GWRC is responsible for the management of discharges of contaminants to land, air and water. This includes the discharge of contaminants from existing contaminated land.

The GWRC Operative Natural Resources Plan (NRP) contains Rules R81-R83 that relate to contaminated land and hazardous substances.

As the proposed Mount Munro Windfarm development will not be completed within areas containing potentially contaminating activities on site, further assessment of the applicability of the contaminated land rules within this plan has not been completed during this investigation.

6.3.2 Horizons Regional Council's One Plan

The Horizons Regional Council's One Plan sets out rules relating to the discharge of contaminants to land and water which will need to be considered once the redevelopment plans have been finalised.

The Horizons Regional Council's One Plan sets out rules to manage the use of natural resources and to maintain the health of the environment including soil and water. Development of sites has potential for regional consents to be required under the plan. Rules 14-18 and 14-27 within this plan relate to the discharge of contaminants onto or into land or surface water receptors.

As the proposed Mount Munro Windfarm development will not be completed within areas containing potentially contaminating activities on site, further assessment of the applicability of the contaminated land rules within this plan has not been completed during this investigation.

6.4 District Plan applicability

6.4.1 Masterton District Council's District Plan

The Wairarapa Combined District Plan includes the Masterton District and as noted in Section 6.2.1 the NESCS now prevails over the rules in the District Plan, except where the rules permit or restrict effects that are not dealt with in the NESCS.

The draft District Plan was released for a Community Feedback period on 25 October 2022-6 December 2022. The contaminated land section of the draft Plan states that 'there are no rules in the District Plan with respect to contaminated land. The NESCS manages subdivision, use, and development of potentially contaminated land and may require resource consent for these activities separately'.

6.4.2 Tararua District Council's District Plan

The Operative Tararua District Plan does not contain rules regarding contaminated land more restrictive than the NESCS. The Plan defers to the NESCS for regulations for managing contaminated land.

6.5 Implications for site development

The presence of HAIL activities outside of areas of the proposed development, as identified during this PSI investigation, indicates that ground contamination is unlikely to present a significant constraint to the proposed Mount Munro Windfarm development.

While no farm waste pits have been identified during the desktop or site walkover portion of this investigation, there is a potential for waste pits to be present due to the nature of farming and the long-running farming history of this site. If waste pits, or any other visual or olfactory observations of contaminants, are identified during construction works, we recommend further investigation is undertaken to assess risk and advise on disposal options.

If development plans for the Mount Munro Windfarm are to change and additional areas incorporated, this report must be reviewed and updated to reflect the and updates to proposed development plans i.e., changes to access route locations, turbine locations etc.

7 Conclusions

Tonkin & Taylor Ltd (T+T) has been commissioned by Meridian Energy Limited to undertake a Preliminary Site Investigation for Mount Munro Proposed Windfarm. As a result of the HAIL activities on site, a PSI report is required to support the resource consent application for the development of the windfarm.

A summary of the findings is below:

- The site has been occupied by agricultural use, including sheep and beef farming, since at least the 1940s.
- Potentially contaminating activities included in the MfE's HAIL have been undertaken on site including; sheep dipping, bulk storage of fuel in aboveground storage tanks and the bulk storage of fertilisers.
- The results of surface soil samples collected from the location of the proposed northern access track show arsenic and copper concentrations were below the predicted background concentrations and no organochlorine pesticides detected above laboratory detection limit, in any of the analysed samples.
- Construction works for the proposed development of the Mount Munro Windfarm will not include areas where HAIL activities have been identified.

A summary of potential regulatory implications for earthworks of the site is presented below:

- The NESCS does not apply to the proposed development of the Mount Munro Windfarm. While HAIL activities have been identified on the wider site, the proposed development will not result in disturbance to these areas or the changing of land use. The site will remain in farming use following the development of the windfarm and no structures are to be disturbed.
- If future developments are proposed in areas containing HAIL activities, it would be prudent to reassess the applicability of the NESCS, targeted to the proposed developments.
- As the development of the proposed windfarm will not be completed within areas containing potentially contaminating activities on site, further assessment of the applicability of the contaminated land rules within the GWRC and HRC Regional Plans has not been completed during this investigation; and
- The District Plans for the Masterton District Council and Tararua Council's do not include rules relating to contaminated land and refers to the NESCS for the framework for contaminated land rules.

8 Applicability

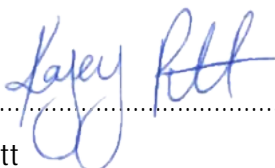
This report has been prepared for the exclusive use of our client Meridian Energy Limited, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for resource consent and that Horizons Regional Council, Greater Wellington Regional Council, Tararua District Council and Masterton District Council as the consenting authorities will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:

Authorised for Tonkin & Taylor Ltd by:



.....
Kasey Pitt
Contaminated Land Consultant



.....
Nick Peters
Project Director

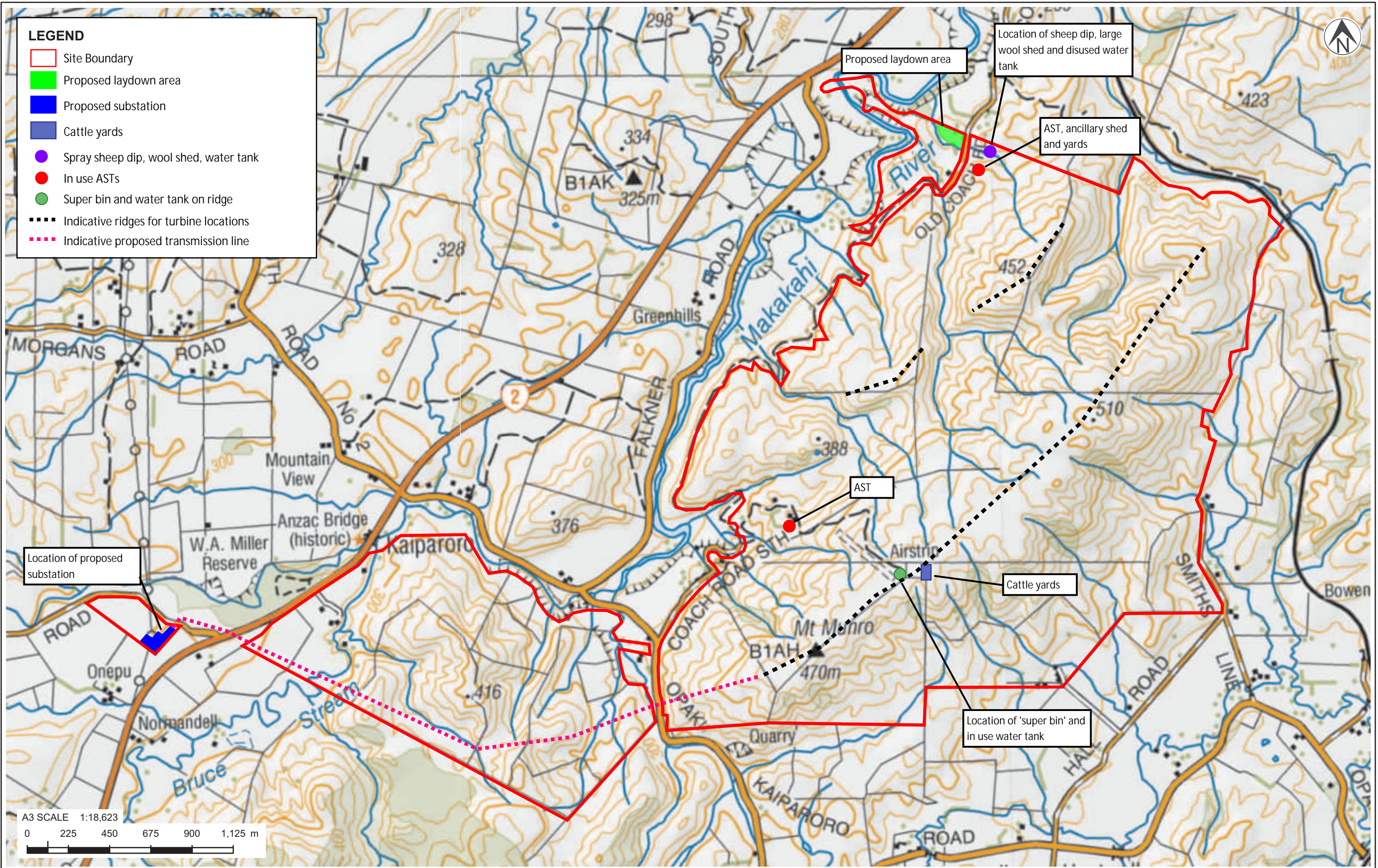
Report certified by a suitably qualified and experienced practitioner as prescribed under the NES (Soil) Users Guide (April 2012).



.....
Andrew Pearson
Senior Environmental Scientist

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Appendix A Figure



NOTES:

CRS: NZGD 2000 New Zealand Transverse Mercator Credits: Eagle Technology, Land Information New Zealand, Earthstar Geographics

PROJECT No. 1016884.1000

CLIENT MERIDIAN ENERGY LIMITED

DESIGNED	KAPI	AUG.23
DRAWN	KAPI	AUG.23
CHECKED	ANPE	AUG.23

PROJECT MOUNT MUNRO WINDFARM PSI

TITLE KEY SITE FEATURES



Exceptional thinking together www.tonkintaylor.co.nz

LOCATION PLAN

APPROVED

DATE

SCALE (A3) 1:18,623

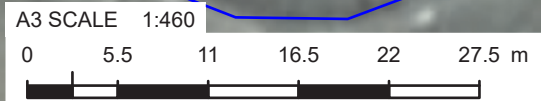
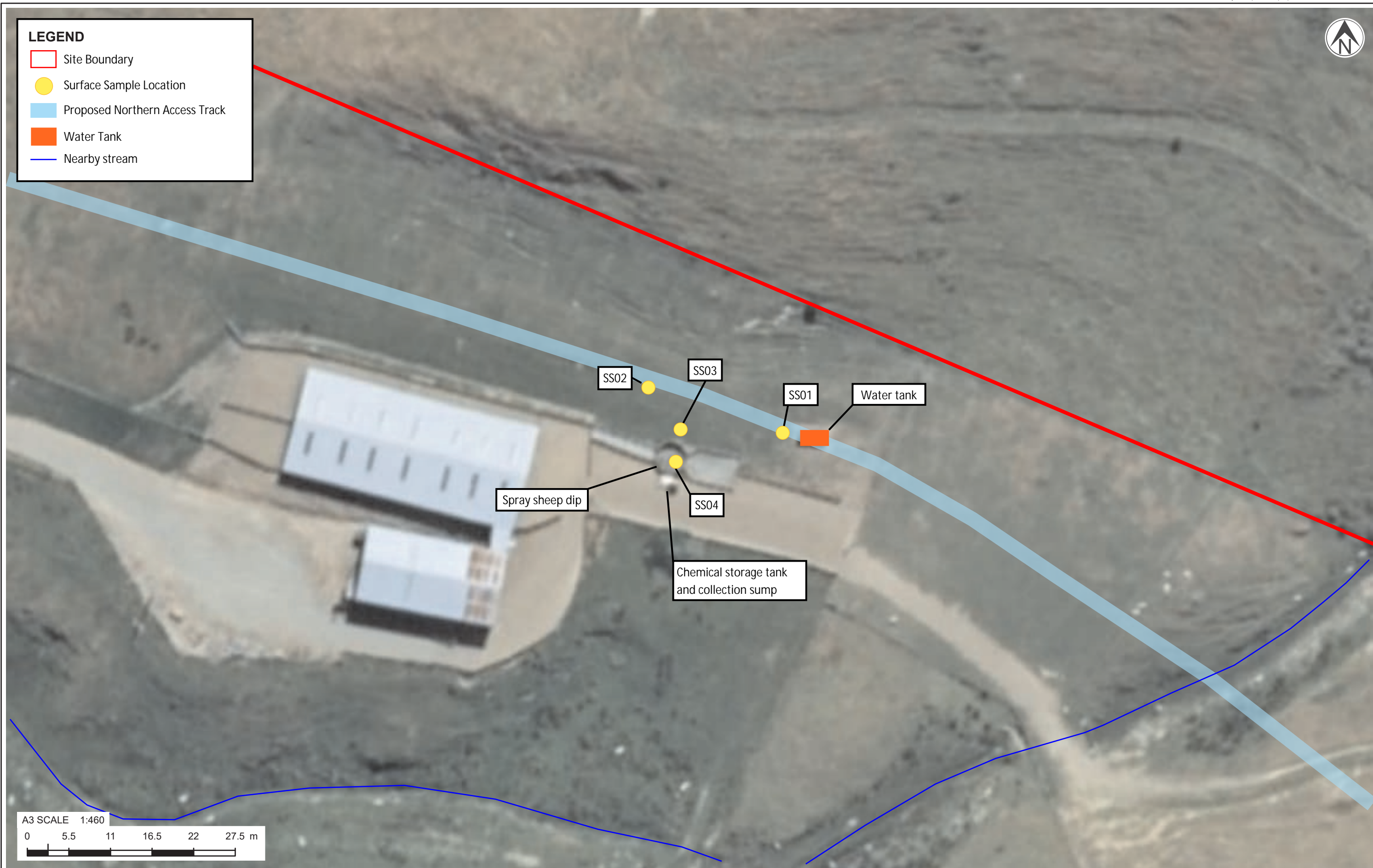
FIG No. FIGURE A.1

REV 0



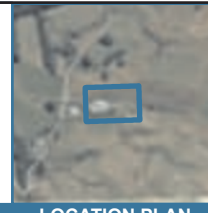
LEGEND

- Site Boundary
- Surface Sample Location
- Proposed Northern Access Track
- Water Tank
- Nearby stream



NOTES:

CRS: NZGD 2000 New Zealand Transverse Mercator Credits: Greater Wellington RC, Manawatu-Whanganui LASS, Earthstar Geographics, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community



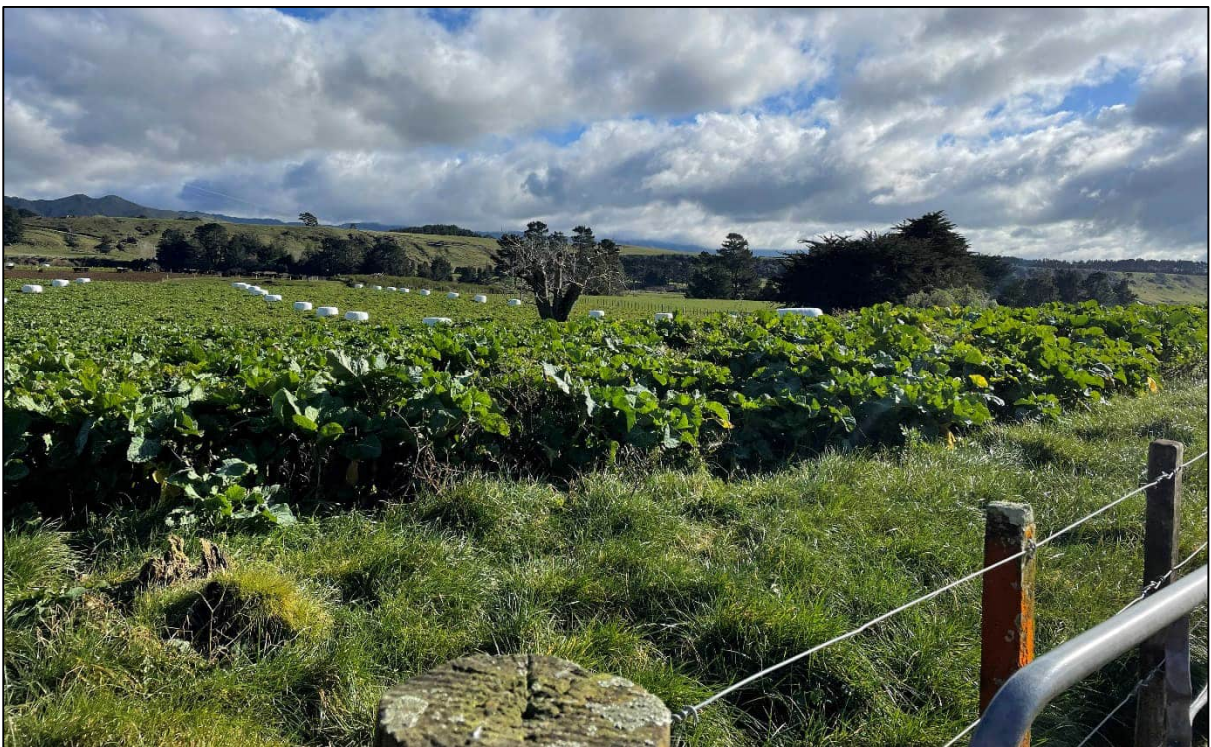
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DESIGNED	KAPI	SEP.23
DRAWN	KAPI	SEP.23
CHECKED	ANPE	SEP.23
APPROVED	DATE	

CLIENT	MERIDIAN ENERGY LIMITED
PROJECT	MOUNT MUNRO WINDFARM PSI
TITLE	SAMPLE LOCATION PLAN
SCALE (A3)	1:460
FIG No.	FIGURE A.2
REV	0

Appendix B Site photographs



Photograph Appendix B.1: Proposed substation area, looking south from Kaiparoro Road



Photograph Appendix B.2: Proposed laydown area, looking north-west from Old Coach Road. Brassica plants and silage bails currently occupy the area.



Photograph Appendix B.3: Woolsheds, stock yards and disused spray sheep dip and tank, looking south-west towards Old Coach Road.



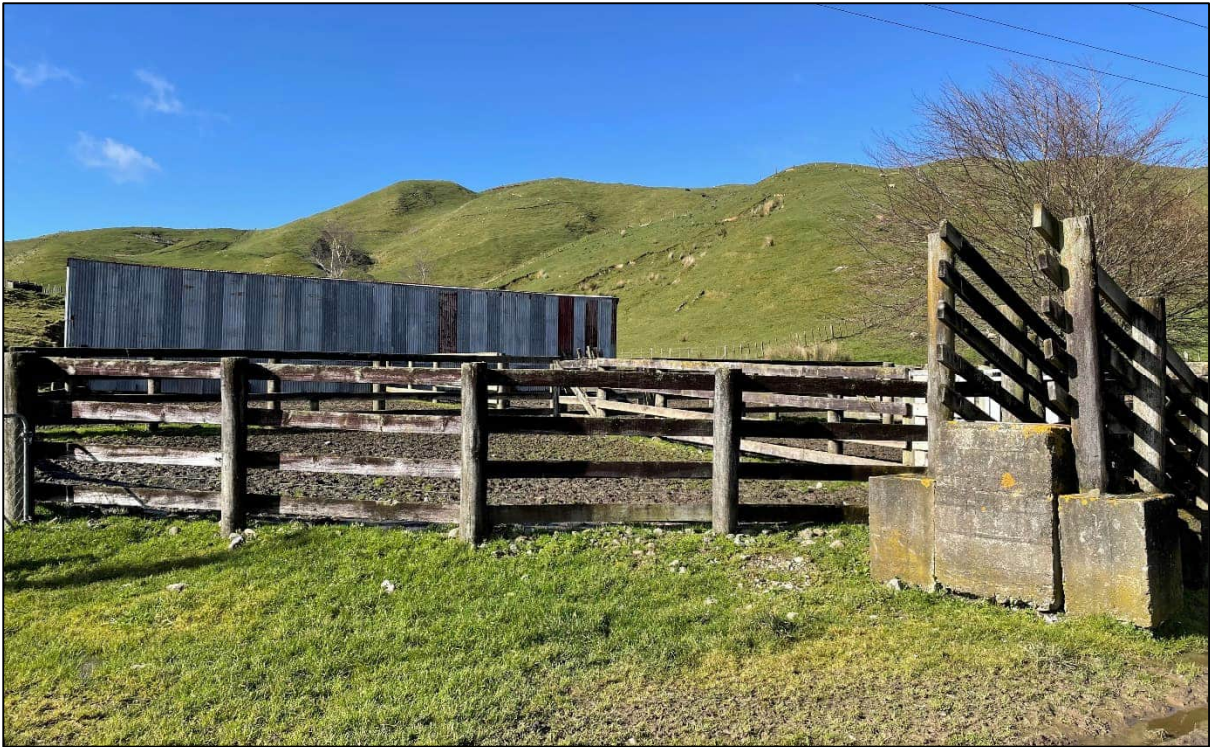
Photograph Appendix B.4: Aboveground storage tank, previously used for water storage present by northern woolshed.



Photograph Appendix B.5: Fittings no longer connected to storage tank, hole at base of tank is rusted.



Photograph Appendix B.6: Ancillary shed south of larger woolshed containing ATV, bulldozer. Aboveground storage tank adjacent to south wall of shed.



Photograph Appendix B.7: Stockyard and loading ramp adjacent to Old Coach Road. Rear of ancillary shed beyond.



Photograph Appendix B.8: Aboveground storage tank adjacent to south wall of shed. Split tank containing both petrol and diesel.



Photograph Appendix B.9: Super bin at top of large ridge, looking north west.



Photograph Appendix B.10: Interior view of super bin at top of large ridge



Photograph Appendix B.11: Storage tank used as a water tank, with pipe connected from the roof of the super bin to the tank.



Photograph Appendix B.12: Cattle yards at the top of the ridge, to the east of the super bin.



Photograph Appendix B.13: View looking south east from the top of the large ridge, in the area of the 'super bin'. The former landfill can be seen in the centre of the image (square shaped planted area).



Photograph Appendix B.14: Concrete base of spray sheep dip with pipework, with a layer of sediment and patchy moss and grass cover .



Photograph Appendix B.15: Southern side of sheep dip showing collection sum (with pump) and small mixing tank. The concrete curb bund that surrounds the tank can be seen to the left of the image.

Appendix C Historical information review

- Certificates of title
- Historical aerial photographs
- Relevant Council property file documents
- Contamination enquiry

Historical information relating to the site has been collected from a variety of sources. The information presented documents on site activities, except for the aerial photograph review where comments are also provided on readily observable surrounding land use. The information that has been reviewed is summarised in this appendix.

C1 Records of title

Current and historical certificates of titles for the site have been reviewed. A summary of the information reviewed is presented in Appendix C Table 1 below. A copy of the selected certificates of title are provided in Appendix D.

Appendix C Table 1: Summary of records of title review

Property	Current CT	Historical CT
Section 131 Block XIII Mangaone Survey District	<ul style="list-style-type: none"> WN24C/895: Issued 1983 <i>Private ownership</i> Subject to Mining Act 1971. Subject to Coal Mines Act 1979. Caveat by Meridian Energy in 2011. 	<ul style="list-style-type: none"> WN24C/895: Issued 1983 <i>Various private owners until transfer to current owners in 2021.</i> Prior reference: WNC1/349
Section 1 and Section 62 Block XIV Taranua Survey District	<ul style="list-style-type: none"> WN25C/219: Issued 1984 <i>Weymore Awarua Co. Limited</i> Subject to Land Act 1948. Subject to Mining Act 1971. Subject to Coal Mines Act 1925. Subject to telecommunications rights in favour of Chorus New Zealand 1996. Caveat by Meridian Energy in 2012. 	<ul style="list-style-type: none"> WN25C/219: Issued 1984, <i>Various private owners until transfer to current owners in 2018.</i> Prior reference: WN25C/218 Prior reference: WN677/50
Lot 1 DP 665	<ul style="list-style-type: none"> WN31D/706: Issued 1988 <i>Rocky Hills Farming Company Limited</i> Caveat by Meridian Energy in 2010. Includes a historic subdivision plan, dated 1894, creating three properties between Smiths Line and 'Main Road' (SH2). 	<ul style="list-style-type: none"> WN31D/706: Issued 1988, <i>Various private owners until transfer to current owners in 2006.</i> Prior reference: WN74/145
Lot 2-3 DP 665	<ul style="list-style-type: none"> WN31D/709: Issued 1988 <i>Rocky Hills Farming Company Limited</i> Caveat by Meridian Energy in 2010. Includes a historic subdivision plan, dated 1894, creating three properties between Smiths Line and 'Main Road' (SH2). 	<ul style="list-style-type: none"> WN31D/709: Issued 1988 <i>Previous private owners listed as farmers, transfer to current owner in 2006.</i> Prior reference: WN74/145
Section 147 Block IX Mangaone Survey District	<ul style="list-style-type: none"> WN47/208: Issued 1888, current. <i>Rocky Hills Farming Company Limited</i> <i>Previous private owners listed as farmers and sheep farmers.</i> Caveat by Meridian Energy in 2012. Transfer to current owner in 2019. Prior reference: WA/152. 	
Part Lot DP 1263	<ul style="list-style-type: none"> WN56A/365: Issued 2000 <i>Rocky Hills Farming Company Limited</i> 	<ul style="list-style-type: none"> WN56A/365: Issued 2000

	<i>Caveat by Meridian Energy in 2012.</i>	<i>Previous private owners listed as farmers, transfer to current owner in 2006.</i> <ul style="list-style-type: none"> • Prior reference: WN33A/249
Section 186 XIII Mangaone Survey District and Lot 1 DP 90879	<ul style="list-style-type: none"> • WN58A/971: Issued 2001 <i>Fusion Limited</i> <i>Caveat by Meridian Energy in 2012.</i> 	<ul style="list-style-type: none"> • WN58A/971: Issued 2001 <i>Various private owners until transfer to current owner in 2021.</i> • Prior reference: WN26B/974
Section 129 Block XIII Mangaone Survey District	<ul style="list-style-type: none"> • WN85/199: Issued 1896 <i>Rocky Hills Farming Company Limited</i> <i>Caveat by Meridian Energy in 2010.</i> <i>Caveat by Meridian Energy in 2012.</i> <i>Previous private owners listed as farmers and sheepfarmers. 1896 landowner listed as 'Settler'.</i> <i>Transfer to current owner in 2006.</i> Prior reference: PR5065, WA2/222. 	
Section 133 Block IX Mangaone Survey	<ul style="list-style-type: none"> • WN89/188: Issued 1897 <i>Dalmeny Agriculture Limited</i> <i>Caveat by Meridian Energy in 2010.</i> <i>Previous private owners listed as farmers. 1896 landowner listed as 'Settler'.</i> <i>Transfer to current owner in 2007.</i> Prior reference: WA2/246, WNPR5238. 	

A copy of the current records of title is also provided in Appendix C.

C2 Historical aerial photographs

Historical aerial photographs from the T+T library and other sources have been reviewed as stated in Appendix C Table 2. Relevant features of the site and surrounding land are summarised from each aerial photograph in Appendix C Table 2. Copies of the aerial photographs are included in Appendix G.

Appendix C Table 2: Summary of aerial photograph review

Date, run number and source	Key site features	Surrounding land features
1944 Retrolens	<ul style="list-style-type: none"> • The 1944 aerials capture majority of the site, except for the eastern most portion and a small portion on the south-east. • The visible areas of site are generally in agricultural use with few dwellings and structures present. • A shed like building and potential sheep dip, or stock yards, structure is present along Coach Road, at the northern portion of the site. • The site has an undulating topography with a number of gullies and streams visible between larger ridges. • Trees and vegetation have been cleared from majority of the site and tree trunks can be seen scattered across the northern and central portion of the site. Pockets of vegetation remain in the gullies and low-lying areas. 	<ul style="list-style-type: none"> • The surrounding area is occupied by agricultural and rural residential land uses. • The Mākākahi River extends along the western site boundary from the north to south of the site. Ephemeral streams within the site flow west and meet river. • The Bruce Stream is visible to the south-east of the southern portion of the site.
1961 Retrolens	<ul style="list-style-type: none"> • The 1961 aerial captures a small portion of the site, near to where the Bruce Stream splits from the Mākākahi River. • No significant changes to visible areas on site. 	<ul style="list-style-type: none"> • No significant changes to the surrounding area. • There is a slight change to the flow path of the Mākākahi River, near the intersection of SH2 and Kaiparoro Road, moving the river away from the roadway.
1968 Retrolens	<ul style="list-style-type: none"> • The 1968 aerial image captures the central and southern portions of the site. • No significant changes to areas visible in the previous image. • The remainder of the site visible is occupied by farmland with an undulating topography and large ridges and gullies. • One dwelling, with ancillary buildings, is visible within the property at 73 Hall Road. 	<ul style="list-style-type: none"> • The former landfill to the southeast of the site is covered in what appears to be established pine trees. • The surrounding area is occupied by farmland and rural residential land uses. • No significant changes to the surrounding area.

Date, run number and source	Key site features	Surrounding land features
1977 Retrolens	<ul style="list-style-type: none"> • Majority of the site can be seen in the 1977 aerial image, except for a small area on the eastern most portion of the site. This image also has good resolution allowing buildings and structures to be seen more clearly. • The shed and sheep dip/stock yard structure remains on the northern property, along Coach Road. A secondary shed and stock yard area are now present just east of the existing shed. • Additional access tracks have been established along the ridgelines within the site. • Pockets of vegetation remain in some gullies within the site. • The property at 85151 SH2 contains a dwelling with three ancillary buildings to the rear, on the northern side of the driveway. There is what appears to be two square ponds east of the buildings. 	<ul style="list-style-type: none"> • Some development has occurred in the surrounding area with additional dwellings and ancillary buildings now present, and some former buildings now longer present. • The Wairarapa Rail Line is visible to the northeast of the site. • Stockyards are visible on the site boundary, just south of the Opaki Kaiparoro Road, Falkner Road intersection.
1995 Retrolens	<ul style="list-style-type: none"> • A dwelling has been constructed at 168 Old Coach Road. • A dwelling has been constructed at 85 Coach Road South. • Areas of soil disturbance are visible within the eastern portion of the site near to the Smiths Line and Hall Road intersection. 	<ul style="list-style-type: none"> • A section of SH2 has been constructed between the Opaki Kaiparoro Road, South Road No 2 intersection (near to 85151 SH2) and Faulkner Road at the northern portion of the site. • A shed has been constructed by the stockyards, near to site boundary, just south of the Opaki Kaiparoro Road, Falkner Road intersection. • Additional dwelling and ancillary buildings have been constructed in the surrounding area.
2010 Land Information New Zealand	<ul style="list-style-type: none"> • Significant development has been completed at 85151 State Highway 2 with a new dwelling and sheds now present. • Paddocks within the smaller northern portion of the site have recently been tilled and planted with crop. 	<ul style="list-style-type: none"> • No significant changes to the surrounding area.
Recent Aerials (2016-2021) Land Information New Zealand	<ul style="list-style-type: none"> • The site remains largely unchanged from the previous images. • A shed and stock yard are visible at the top of the ridge at the end of the access track from 85 Coach Road. 	<ul style="list-style-type: none"> • Quarrying activities are present to the west of the site, off Falkner Road, in line with the dwelling at 85 Coach Road South.

Date, run number and source	Key site features	Surrounding land features
	<ul style="list-style-type: none"> • A stock yard is present on the eastern most portion of the site, near to the northern end of Smiths Line. 	<ul style="list-style-type: none"> • Quarrying activities are also present just south of the site on Opaki Kaiparoro Road. • A spray sheep dip is visible at 114 Falkner Road, west of the northern portion of the site, beyond the Mākākahi River. • Farming and rural residential activities are continuing in the area surrounding the site.

Readily available aerial images from Retrolens, Google Earth and Land Information New Zealand have been used in this assessment.

C3 Council property files

Relevant information relating to contaminated land from within property files from Masterton District Council and Tararua District Council was received 24 July 2023. The Councils provided the following documents:

Masterton District Council:

- 73 Hall Road, Eketāhuna –Section 131 BLK XIII Mangaone SD
 - A 2010 application to install a new wood burner.
 - A 2005 letter from GT Environmental Services Ltd regarding an assessment of the septic tank prior to the connection of the addition. The septic system was found to be adequate.
 - A 2004 Building consent application for an addition to an existing dwelling. The additions included updates to the plumbing and drain systems. Building materials included; weatherboards, a, exposed rafter soffit, corrugated iron roofing and aluminium window frames.
 - A 2000 Building consent application to alter interior walls, install a shower and remove a wood burner.
 - A 1995 Building consent application to re-pile the dwelling by replacing the existing wooden piles with new wooden piles that were to be concreted in.

Tararua District Council:

- 168 Old Coach Road, Eketāhuna
 - No documents provided.
- 85 Old Coach Road, Eketāhuna
 - A 2020 Building consent application to install a diesel boiler, a 450 L diesel tank (plans show an above ground tank) to run 10 radiators and a heated towel rail within a dwelling. The diesel tank was to be installed on the south side of the dwelling.
- 124 Opaki Kaiparoro Road, Eketāhuna
 - No documents provided.
- 85151 State Highway 2, Eketāhuna

- No documents provided.
- 85274 State Highway 2, Eketāhuna
 - No documents provided.

C4 Council contamination enquiry

A contamination enquiry was placed with Greater Wellington Regional Council (GWRC) on 17 July 2023. The information provided by both GWRC and HRC is included in Appendix I. and states that the site is not included on the GWRC Selected Land Use Register (SLUR), or the HRC Sites Associated with Hazardous Substances (SAHS) databases.

There is a GWRC SLUR entry (SN/06/041/02) approximately 920 m south-east of the site. This site is a former landfill site and is categorised as 'Contamination Confirmed'. Information from GWRC states that the site was previously a gravel reserve that was used as a landfill for general refuse. A 1998 investigation by GWRC¹⁷ included the collection of surface water samples from the nearby Kōpuaranga River, the results of which showed a low-level discharge of contaminants found in leachate, below the ANZECC criteria (% species protection level not defined) for the protection of aquatic ecosystems and stock water. Further sampling was recommended, however no information relating to additional sampling was provided.

No detailed site investigation for the former landfill site is held on the GWRC file, and therefore the extent of contamination (if any) is currently unknown.

C5 On site and nearby consents

Resource consents related to the site or properties immediately surrounding the site (including existing, superseded and surrendered consents) are summarised in Appendix C Table 3 below.

The consents identified in Appendix C Table 3 are considered unlikely to have resulted in soil contamination at the Mount Munro site. This is because of their location, nature and likely extent of the contaminants at those locations.

¹⁷ Wellington Regional Council, 1998. Landfills in the Wellington Region.

Appendix C Table 3: Ground contamination-related resource consents

Location	Consent ID	Type of consent	Activity description	Issuing Authority	Status/Expiry
Onsite					
85 Coach Road South, 124 Opaki Kaiparoro Road, 59 Coach Road South, 171 Opaki Kaiparoro Road	304143	Building Consent	Installation of a diesel boiler and a 450 litre diesel tank.	Taranua District Council	2020
	8664	Building Permit	Relocate cottage from within farm.		1989
	8605	Building Permit	Additions to existing shed.		1988
	8606	Building Permit	Install custom built woolshed.		1988
85151 SH2	100107	Building Consent	Install woodfire.		1993
	100321	Building Consent	Alter carport and changing area.		1993
	102592	Building Consent	Erect workshop/implement shed.		1996
	200621	Building Consent	Relocate house.		1998
	203481	Building Consent	Relocate workshop/implement shed ,addition of an extra bay.		2001
	205477	Building Consent	New carport/porch, covered deck, take out wall between living and bedroom.		2003
	209270	Building Consent	New residence and swimming pool.		2008
	209894	Building Consent	Construct a new five bay calf shed		2009
	204	Subdivision Consent	Cut out Lot 1 of 1.9 ha from title		1998
	1720	Building Permit	Cowshed alterations.		1975
	1721	Building Permit	Construct hayshed.		1979
1722	Building Permit	Construct deer shed.	1981		
85354 SH 2, 85274 SH2, 85274A SH2	693	Subdivision Consent	Subdivision consent to subdivide Section 3 Block XIV Taranua SD.	1996	
	259	Land Use Consent	Enable Pratt Contractors to excavate pit metal.	1994	
	100262	Building Consent	Erect covered sheep yards.	1993	

Location	Consent ID	Type of consent	Activity description	Issuing Authority	Status/Expiry
Sec: 161 Blk: X SD: MANGAONE	208645	Building Consent	Extend lounge and front deck.		2007
	100262	Building Consent	Erect covered wool shed.		1993
	8478	Building Permit	Wool shed.		1966
	8544	Building Permit	Construct new hay shed.		1977
	8614	Building Permit	Construct new slaughterhouse.		1983
168 Old Coach Road	8589	Building Permit	Construct new dwelling.		1978
	8558	Building Permit	Construct car shed.		1988
85151 SH2	ATH-2015200187.01	Land Use Consent	Change consent conditions to operate 85 hectares of land to milk 220 dairy cattle for existing seasonal supply, irrigated dairy farming purposes at 61 Parkville Central Road, Eketāhuna, following the partial surrender of the 42-hectare support block at 85151 State Highway 2, Eketāhuna.	Horizons Regional Council	Current Expiry: 01/07/2023
Adjacent consents (within 1km of the site) - Current					
Makirikiri No 2 B Block Corner of Opaki Kaiparoro Rd/North Road ~1,000 m S of site	WAR060004	Discharge Permit <i>Landfill discharge to land</i>	To discharge stormwater to land.	Greater Wellington Regional Council	Granted Expiry: 30/09/2041
		Discharge Permit <i>Landfill discharge to water</i>	To discharge stormwater to water.		
		Discharge Permit <i>Landfill discharge to land</i>	To discharge contaminants to land.		
		Discharge Permit <i>Landfill discharge to water</i>	To discharge contaminants to land.		
85237 SH2 Adjacent to SW boundary of 85151 SH2	ATH-2015200253.00	Land Use Consent	Nutrient management for land utilised within a target catchment for dairy farming purposes at 54 Morgans Road, Eketāhuna.	Horizons Regional Council	Current Expiry: 1/07/2023

Location	Consent ID	Type of consent	Activity description	Issuing Authority	Status/Expiry
Mākāhahi Riverbed ~20 m W of site (proposed laydown area)	ATH-1995002973.00	Land Use Consent	To excavate within the bed of tributaries & of the Mākāhahi River.		Current Expiry: 8/02/2030
43 South Road ~120 m NW of 85151 SH2	ATH-2001009155.00	Land Use Consent	To excavate disturb and place structures in the bed of the Mākāhahi River during the placement of rock protection works and to use and maintain the structures and associated diversion of surface water of the Mākāhahi River.		Current Expiry: 27/03/2031
136 Falkner Road ~120 m NW of 85151 SH2	ATH-2012014615.00	Water Permit	Abstract (combined maximum) 70 m ³ /Day of surface water from the Mākāhahi River & tributary for general dairy shed (including washdown) & stock water purposes at 136 Falkner Road, Eketāhuna.		Current Expiry: 1/07/2030
136 Falkner Road ~200 m W/NW of site	ATH-2016200820.00	Land Use Consent	Utilise land within a target catchment for dairy farming purposes at 136 Falkner Road, Eketāhuna.		Current Expiry: 1/07/2030
136 Falkner Road ~200 m W/NW of site	ATH-2012014614.00	Discharge Permit	Discharge 72 m ³ /day of Dairy Farm Animal Effluent from 450 Cows into and onto Land at 136 Falkner Road, Eketāhuna.		Current Expiry: 1/07/2030
51 Falkner Road ~160 m W of northern portion of site	ATH-2003010255.01	Discharge Permit	To discharge dairy shed effluent and wash water into and onto land.		Current Expiry: 30/04/2028
Proposed activities adjacent to site (as of 11 August 2023)					
51 Falkner Road ~45 m W of northern portion of site	APP-2016200762.00	Land Use Consent	Manage nutrients discharged to land utilised (within a target catchment) for dairy farming purposes at Falkner Road, Eketāhuna.	Horizons Regional Council	Active application

Location	Consent ID	Type of consent	Activity description	Issuing Authority	Status/Expiry
SECS 2A 3A BLK XIV TARARUA SD -900 m SW of proposed substation site.	APP- 2000008532.03	Water Permit	Abstract 655 m ³ /Day of surface water from the Mākākahi River for Municipal Water Supply purposes at Kaiparoro Road, Eketāhuna.	Horizons Regional Council	On hold

Appendix D Results Summary Table

Table 1: Soil Samples Results - Mount Munro Northern Access Track ¹

Sample ID	SS01 0-0.1	SS02 0-0.1	SS03 0-0.1	Maximum Concentration	Predicted Background Soil Concentrations for a Conglomerate Soil Type (U95) ²	Soil Contaminant Standard for Residential 25% produce land use ^{3, 4}	Class A Landfill Screening Criteria ⁵
Laboratory Reference	3353803.1	3353803.3	3353803.5				
Date	30/08/2023	30/08/2023	30/08/2023				
Depth (m)	0-0.1	0-0.1	0-0.1				
Geological unit	SILT	SILT	SILT				
Heavy Metals							
Arsenic	5	3	3	5	9.54	17	45
Copper	8	5	6	8	24.95	NL ⁴	NL
No Organochlorine Pesticides recorded above laboratory levels of detection							

Notes:

1. All results in mg/kg
2. Upper limit of background concentrations from Landcare Research, 2016. Predicted background soil concentrations for conglomerate soil type.
3. Criteria from MfE, 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health (unless otherwise stated).
4. NL = No limit. Derived value exceeds 10,000 mg/kg
5. Criteria from MfE, 2004. Landfill Waste Acceptance Criteria and Landfill Classification.

Appendix E Laboratory Transcripts

Certificate of Analysis

Page 1 of 2

Client: Tonkin & Taylor	Lab No: 3353803	SPV1
Contact: Kasey Pitt	Date Received: 31-Aug-2023	
C/- Tonkin & Taylor	Date Reported: 01-Sep-2023	
PO Box 2083	Quote No: 126074	
Wellington 6140	Order No: 1016884.1000	
	Client Reference: 1016884.1000	
	Submitted By: Kasey Pitt	

Sample Type: Soil

Sample Name:	SS01 0-0.1 30-Aug-2023	SS02 0-0.1 30-Aug-2023	SS03 0-0.1 30-Aug-2023
Lab Number:	3353803.1	3353803.3	3353803.5

Individual Tests

Test	Unit	SS01 0-0.1 30-Aug-2023	SS02 0-0.1 30-Aug-2023	SS03 0-0.1 30-Aug-2023
Dry Matter	g/100g as rcvd	64	61	66
Total Recoverable Arsenic	mg/kg dry wt	5	3	3
Total Recoverable Copper	mg/kg dry wt	8	5	6

Organochlorine Pesticides Screening in Soil

Test	Unit	SS01 0-0.1 30-Aug-2023	SS02 0-0.1 30-Aug-2023	SS03 0-0.1 30-Aug-2023
Aldrin	mg/kg dry wt	< 0.016	< 0.017	< 0.015
alpha-BHC	mg/kg dry wt	< 0.016	< 0.017	< 0.015
beta-BHC	mg/kg dry wt	< 0.016	< 0.017	< 0.015
delta-BHC	mg/kg dry wt	< 0.016	< 0.017	< 0.015
gamma-BHC (Lindane)	mg/kg dry wt	< 0.016	< 0.017	< 0.015
cis-Chlordane	mg/kg dry wt	< 0.016	< 0.017	< 0.015
trans-Chlordane	mg/kg dry wt	< 0.016	< 0.017	< 0.015
2,4'-DDD	mg/kg dry wt	< 0.016	< 0.017	< 0.015
4,4'-DDD	mg/kg dry wt	< 0.016	< 0.017	< 0.015
2,4'-DDE	mg/kg dry wt	< 0.016	< 0.017	< 0.015
4,4'-DDE	mg/kg dry wt	< 0.016	< 0.017	< 0.015
2,4'-DDT	mg/kg dry wt	< 0.016	< 0.017	< 0.015
4,4'-DDT	mg/kg dry wt	< 0.016	< 0.017	< 0.015
Total DDT Isomers	mg/kg dry wt	< 0.10	< 0.10	< 0.09
Dieldrin	mg/kg dry wt	< 0.016	< 0.017	< 0.015
Endosulfan I	mg/kg dry wt	< 0.016	< 0.017	< 0.015
Endosulfan II	mg/kg dry wt	< 0.016	< 0.017	< 0.015
Endosulfan sulphate	mg/kg dry wt	< 0.016	< 0.017	< 0.015
Endrin	mg/kg dry wt	< 0.016	< 0.017	< 0.015
Endrin aldehyde	mg/kg dry wt	< 0.016	< 0.017	< 0.015
Endrin ketone	mg/kg dry wt	< 0.016	< 0.017	< 0.015
Heptachlor	mg/kg dry wt	< 0.016	< 0.017	< 0.015
Heptachlor epoxide	mg/kg dry wt	< 0.016	< 0.017	< 0.015
Hexachlorobenzene	mg/kg dry wt	< 0.016	< 0.017	< 0.015
Methoxychlor	mg/kg dry wt	< 0.016	< 0.017	< 0.015

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
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This Laboratory is accredited by International Accreditation New Zealand (IANZ), which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC). Through the ILAC Mutual Recognition Arrangement (ILAC-MRA) this accreditation is internationally recognised. The tests reported herein have been performed in accordance with the terms of accreditation, with the exception of tests marked * or any comments and interpretations, which are not accredited.

Sample Type: Soil			
Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Rapid Sample Preparation*	Dried at 103°C (removes 3-5% more water than air dry) for a minimum of 2hr, gravimetry. Replaces Environmental Solids Sample Prep under certain circumstances.	-	1, 3, 5
Environmental Solids Sample Drying*	Dried at 103°C (removes 3-5% more water than air dry) for a minimum of 2hr, gravimetry. Replaces Environmental Solids Sample Prep under certain circumstances.	-	1, 3, 5
Organochlorine Pesticides Screening in Soil	Sonication extraction, GC-ECD analysis. Tested on as received sample. In-house based on US EPA 8081.	0.010 - 0.06 mg/kg dry wt	1, 3, 5
Dry Matter	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	1, 3, 5
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	1, 3, 5
Total Recoverable Arsenic	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	1, 3, 5
Total Recoverable Copper	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	1, 3, 5

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed between 31-Aug-2023 and 01-Sep-2023. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.

Martin Cowell - BSc
Client Services Manager - Environmental

Appendix F Records of Title



**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Historical Search Copy**



Constituted as a Record of Title pursuant to Sections 7 and 12 of the Land Transfer Act 2017 - 12 November 2018

Identifier **WN47/208**
Land Registration District **Wellington**
Date Issued 04 June 1888

Prior References

WA 152

Estate Fee Simple
Area 15.7827 hectares more or less
Legal Description Section 147 Block IX Mangaone Survey
District

Original Registered Owners

Alexander Wilkie Anderson

Interests

580144.1 Mortgage to Westpac Banking Corporation - 7.9.1983 at 2:28 pm
B189527.4 Mortgage to AMP Bank Limited - 23.8.1991 at 11:20 am
5393087.1 Discharge of Mortgage 580144.1 - 5.11.2002 at 11:55 am
5393087.3 Transfer of a 1/2 share to Diane Marie Anderson - 5.11.2002 at 11:55 am
5667529.1 Transfer of Mortgage B189527.4 to Rabobank New Zealand Limited - 23.7.2003 at 9:00 am
6653544.1 Discharge of Mortgage B189527.4 - 18.11.2005 at 9:00 am
8971538.1 Transfer to Home Block Holdings Limited - 28.2.2012 at 2:38 pm
9122989.1 CAVEAT BY MERIDIAN ENERGY LIMITED - 11.7.2012 at 10:14 am
11364018.1 Withdrawal of Caveat 9122989.1 - 20.2.2019 at 9:43 am
11422762.1 Transfer to Rocky Hills Farming Company Limited - 3.5.2019 at 12:54 pm
11422762.2 Mortgage to Westpac New Zealand Limited - 3.5.2019 at 12:54 pm
12392517.4 Variation of Mortgage 11422762.2 - 9.3.2022 at 1:40 pm

NEW ZEALAND.



Register-book,

Vol. 47, folio 208.

Reference: Warrant No. 152
P.R. folio 2716

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT.



This Certificate, dated the Fourth day of June, one thousand eight hundred and eighty-eight, under the hand and seal of the District Land Registrar of the Land Registration District of Wellington, being a Certificate in lieu of Grant, under Warrant of His Excellency the Governor, in exercise of the powers enabling him in that behalf, attesting that

Henry Stewart of Eketahuna Farmer

is seized of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial under-written or indorsed hereon; subject also to any existing right of the Crown to take and lay off roads under any Act of the General Assembly of New Zealand) in the land hereinafter described; as the same is delineated by the plan drawn hereon, bordered red, be the several admeasurements a little more or less, which said land is in the said Warrant expressed to have been originally acquired by the said Henry Stewart as from the Eighteenth day of November, one thousand eight hundred and eighty-seven, under The Lands Act 1885, that is to say: All that parcel of land containing Thirty nine acres situated in the Provincial District of Wellington being Section One hundred and forty seven Block IX Mangahone Survey District.



J. D. [Signature]

T80141
M80759 - Transfer 80141 produced 10th April 1911 at 4 p.m. Henry Stewart to Clara Osborne wife of Alfred Osborne of Eketahuna Farmer. J. D. [Signature]

DISCHARGED MORTGAGE 80759 produced 10th April 1911 at 4 p.m. Clara Osborne to Henry Stewart of Eketahuna Farmer. J. D. [Signature]

Transfer 122165 produced by Deeds Registrar to Clara Osborne to John Oliver Millie Anderson of Eketahuna Farmer. J. D. [Signature]

DISCHARGED MORTGAGE 118539 John Oliver Millie Anderson to Clara Osborne produced by Deeds Registrar. J. D. [Signature]

Memorandum carrying the terms and conditions of Loan No. 80759 produced on 17th day of February 1908 with reference to Mortgage under Memorandum of Mortgage No. 118539. W. J. [Signature]

DISCHARGED MORTGAGE 20759 produced on August 19th 1904. J. D. [Signature]

DISCHARGED MORTGAGE 80759 produced on 28th May 1908 at 5.52 a.m. J. D. [Signature]

CONTINUED

Image Quality due to Condition of Original



Scale, 20 Ch. to 1 Inch

EQUIVALENT METRIC AREA IS 15.7827 ha

DISCHARGE 12132 Certificate of Change by The
Produce of Taxes produced 27th April 1932
Produced 17th & 31st [unclear] Hillwood
A.L.R.

DISCHARGE Variation of Mortgage 80759 produced
20th April 1936 at 2:41 pm Hillwood
A.L.R.

DISCHARGE Extension of Mortgage 80759 produced
15th April 1942 at 11:20 pm Hillwood
A.L.R.

DISCHARGE Transmission 39626 of Mortgage 80759 to Walter
Higginbotham as executor, entered 25th June 1948
at 11:45 am
A.L.R.

Transmission 504207 to Florence Hillwood
Mary Anderson widows Edward Barrie
Anderson sheepfarmer Victor Maxwell
Anderson sheepfarmer all of Eketahuna
and Henry McMillan Alvas Major of
Hawkeston solicitor as executors entered
17.8.1961 at 2:15L
A.L.R.

THIS REPRODUCTION (ON A REDUCED SCALE)
CERTIFIED TO BE A TRUE COPY OF THE
ORIGINAL REGISTER FOR THE PURPOSES OF
SECTION 215A LAND TRANSFER ACT 1952
A.L.R.

Transmission 953243 of the share of Florence
Hilwood Mary Anderson to Victor Maxwell
Anderson, Edward Barrie Anderson and Henry
McMillan Alvas Major, all abovenamed as
survivors - 18.12.1972 at 12.05 p.m.
A.L.R.

Transfer 262764.1 to Edward Barrie
Anderson abovenamed - 27.9.1978 at
11.24 a.m.
A.L.R.

Transfer 262764.2 to Alexander Wilkie
Anderson of Eketahuna, Farmer
27.9.1978 at 11.24 a.m.
A.L.R.

Mortgage 262764.3 to Rural Banking
and Finance Corporation 18.12.1978
at 11.24 a.m.
A.L.R.

No. 262764.4 Variation of the terms
of Mortgage 262764.3 - 27.9.1978 at
11.24 a.m.
A.L.R.

Mortgage 321843.1 to South Wales
Savings Bank (N.Z.) Limited 14.3.1979 at
11.50 a.m.
A.L.R.

321843.2 Memorandum of Priority making
Mortgages 321843.1 and 262764.3 first and
second mortgages respectively - 14.3.1979
at 11.50 a.m.
A.L.R.

47/208
Mortgage 321843.3 to Edward Barrie
DISCHARGED 14.3.1979 at 11.50 a.m.
A.L.R.

Mortgage 419866.1 to Rural Banking
and Finance Corporation - 28.11.1980
at 2.22 p.m.
A.L.R.

Mortgage 580144.1 to Westpac Banking
Corporation - 7.9.1983 at 2.28 p.m.
A.L.R.

B.189527.4 Mortgage to The Australian
Mutual Provident Society - 23.8.1991 at
11.20 a.m.
A.L.R.

B825861.1 Change of name of the Mortgagee
in Mortgage B189527.4 to AMP Life Limited

B825861.2 Transfer of Mortgage B189527.4
to AMP Bank Limited
all 13.3.2001 at 9.00.

CERTIFICATE OF TITLE,

Vol. , folio





**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy**



Identifier **WN47/208**
Land Registration District **Wellington**
Date Issued 04 June 1888

Prior References

WA 152

Estate	Fee Simple
Area	15.7827 hectares more or less
Legal Description	Section 147 Block IX Mangaone Survey District

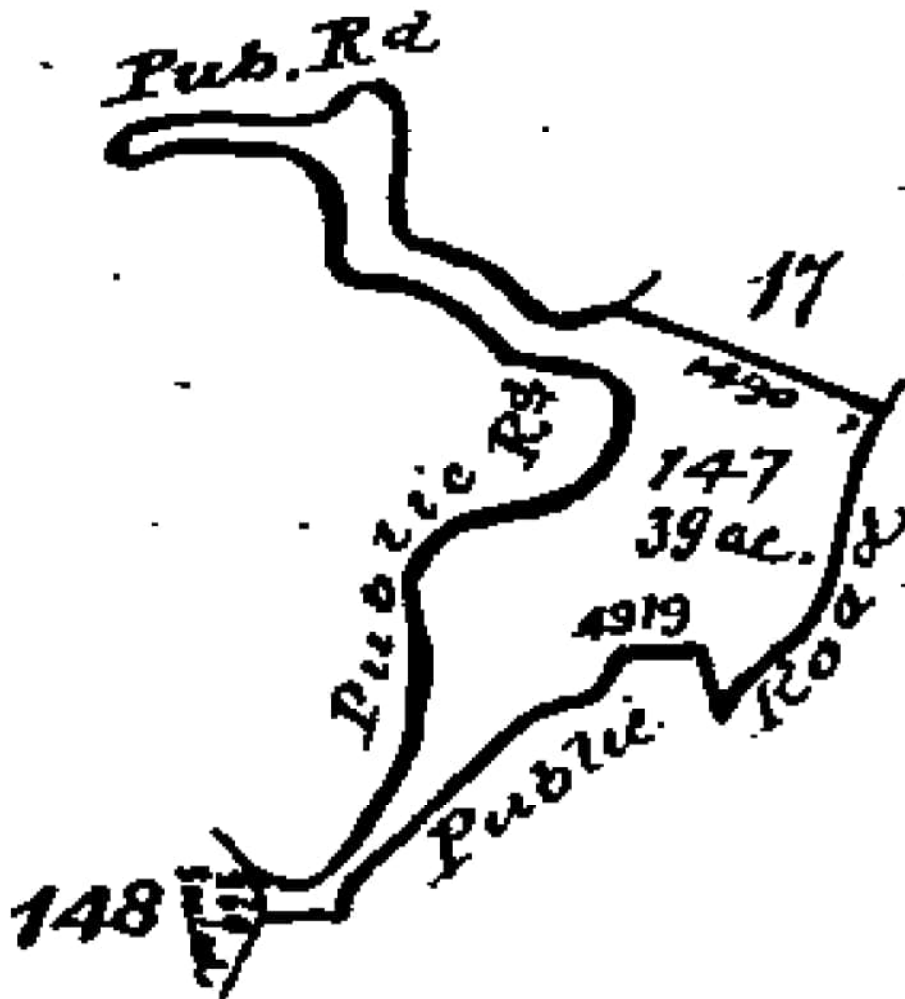
Registered Owners

Rocky Hills Farming Company Limited

Interests

11422762.2 Mortgage to Westpac New Zealand Limited - 3.5.2019 at 12:54 pm
12392517.4 Variation of Mortgage 11422762.2 - 9.3.2022 at 1:40 pm

Image Quality due to Condition of Original





**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Historical Search Copy**




R. W. Muir
Registrar-General
of Land

Constituted as a Record of Title pursuant to Sections 7 and 12 of the Land Transfer Act 2017 - 12 November 2018

Identifier **WN56A/365**
Land Registration District **Wellington**
Date Issued 05 January 2000

Prior References

WN33A/249

Estate Fee Simple
Area 137.4858 hectares more or less
Legal Description Part Lot 1 Deposited Plan 1263

Original Registered Owners

Hamish Barrie Anderson as to a 1/2 share
Jennifer Margaret Anderson as to a 1/2 share

Interests

B772806.4 Mortgage to Westpac Banking Corporation - 9.3.2000 at 11:28 am
5525052.3 Variation of Mortgage B772806.4 - 19.3.2003 at 9:00 am
7095691.1 Application pursuant to Section 99A Land Transfer Act 1952 vesting Mortgage B772806.4 in Westpac New Zealand Limited - 2.11.2006 at 9:00 am
7152071.2 Discharge of Mortgage B772806.4 - 8.12.2006 at 9:00 am
7152071.5 Transfer to Rocky Hills Farming Company Limited - 8.12.2006 at 9:00 am
7152071.6 Mortgage to Westpac New Zealand Limited - 8.12.2006 at 9:00 am
8970581.1 CAVEAT BY MERIDIAN ENERGY LIMITED - 2.2.2012 at 10:02 am
9870211.1 Departmental dealing correcting the area from 137.4858 hectares to 136.2373 hectares - 16.10.2014 at 2:40 pm
12392517.2 Variation of Mortgage 7152071.6 - 9.3.2022 at 1:40 pm

Reference:
Prior CT: 33A/249
Document No.: B762930.1


PART - CANCELLED
REGISTER
PART TAKEN BY GAZETTE
 CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT 1952
NOTICE

This Certificate dated the 5th day of January Two Thousand under the seal of the Registrar-General of Land, New Zealand, for the Land Registration District of WELLINGTON

WITNESSETH that KEVIN WYLES INDER and SHONA PEGGY INDER in equal shares are seized of an estate in fee simple (subject to such reservations, restrictions, encumbrances and interests as are notified by memorial endorsed hereon) in the land hereinafter described, delineated on the plan hereon, be the several admeasurements a little more or less, that is to say: All that parcel of land containing 137.4858 hectares, more or less being PART LOT 1 DEPOSITED PLAN 1263 and SECTION 3 SURVEY OFFICE PLAN 38145



DISCHARGED
9/3/2000

800752.8 Mortgage to Westpac Banking Corporation - for RGL - 3.9.1986 at 9.52

DISCHARGED
9/3/2000

914485.1 Mortgage to The Rural Banking and Finance Corporation - 12.4.1988 at 2.31 and varied B062949 (20.2.1990 at 10.50) for RGL

914485.2 Memorandum of Priority making Mortgages 914485.1 and 800752.8, first and second mortgages respectively - 12.4.1988 at 2.31

Pursuant to Section 126(9) Public Works Act 1981, mortgages 800752.8 and 914485.1 are deemed to extend to Section 3 SO 38145

PART CANCELLED

BALANCE REMAINING
AREA: 136.2373 ha
DESCRIPTION: part Lot 1 DP 1263

Observed
Observed

[Signature]
For RGL

B772806.3 Transfer to Hamish Barrie Anderson and Jennifer Margaret Anderson in equal shares

B772806.4 Mortgage to Westpac Banking Corporation all 9.3.2000 at 11.28

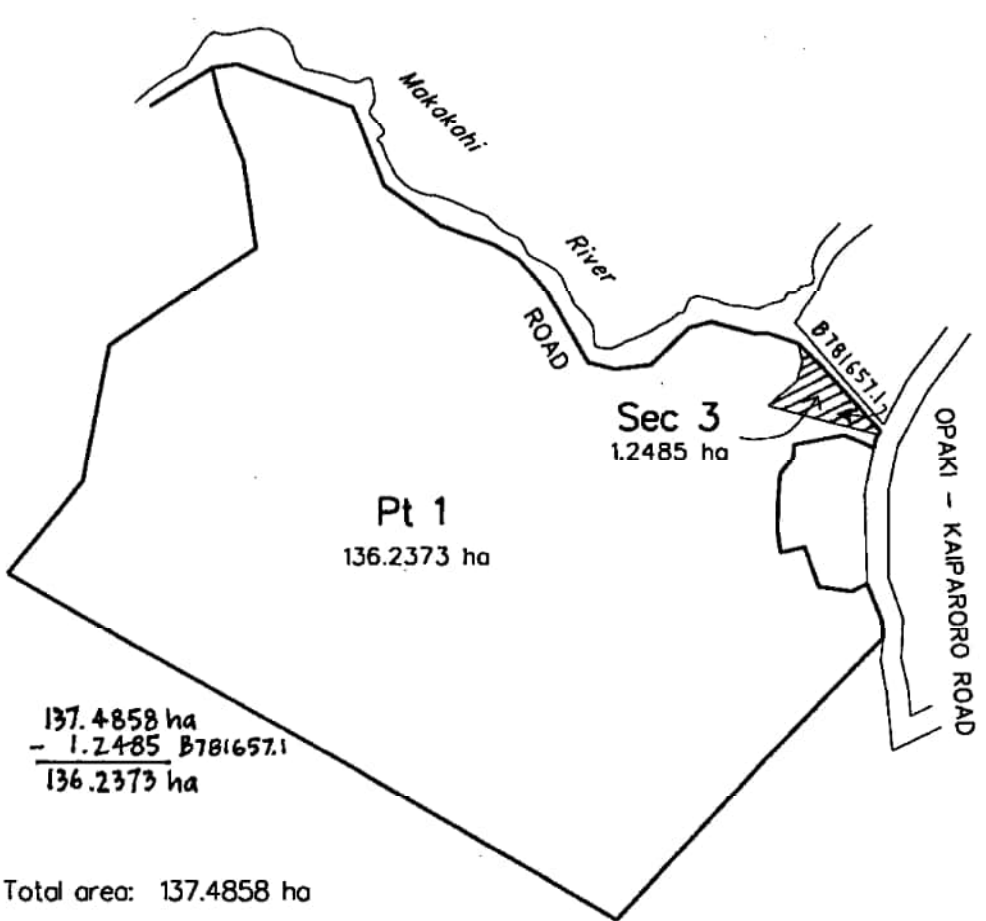
[Signature]
For RGL

B781657.1 Gazette Notice (2000/p952)

1. declaring Section 3 SO Plan 38145 herein to be road and vested in The Tararua District Council on 20.4.2000 and
2. declaring portion of the road adjoining the within land being Section 3 SO Plan 38145 to be stopped and shall remain vested in The Tararua District Council

5.5.2000 at 9.00

[Signature]
for RGL



Road 137.4858 ha
 - 1.2485 B781657.1
 136.2373 ha

Total area: 137.4858 ha





**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy**



Identifier **WN56A/365**
Land Registration District **Wellington**
Date Issued 05 January 2000

Prior References

WN33A/249

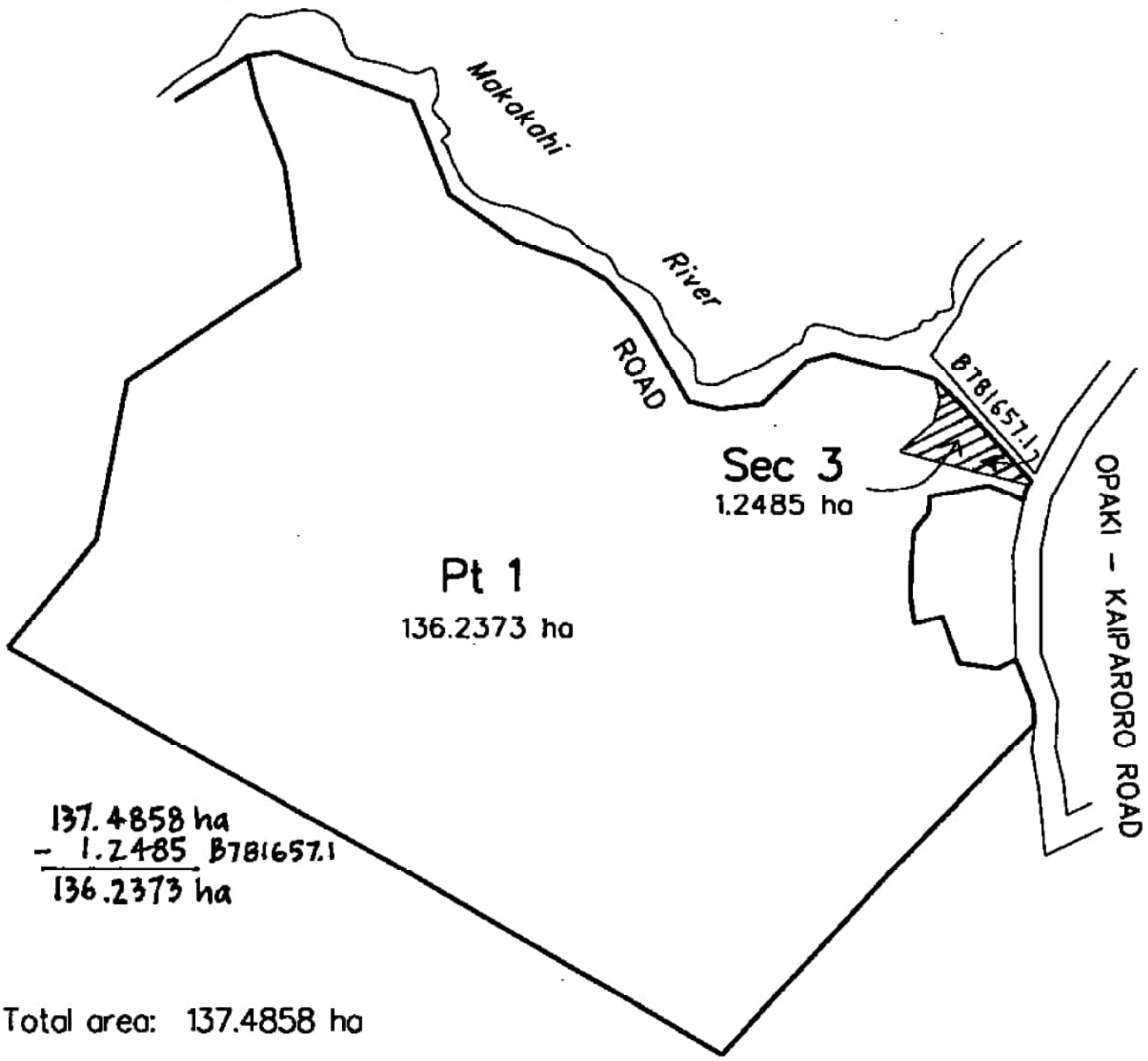
Estate Fee Simple
Area 136.2373 hectares more or less
Legal Description Part Lot 1 Deposited Plan 1263

Registered Owners

Rocky Hills Farming Company Limited

Interests

7152071.6 Mortgage to Westpac New Zealand Limited - 8.12.2006 at 9:00 am
8970581.1 CAVEAT BY MERIDIAN ENERGY LIMITED - 2.2.2012 at 10:02 am
12392517.2 Variation of Mortgage 7152071.6 - 9.3.2022 at 1:40 pm



137.4858 ha
 - 1.2485 B781657.1

 136.2373 ha

Total area: 137.4858 ha



**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Historical Search Copy**



Constituted as a Record of Title pursuant to Sections 7 and 12 of the Land Transfer Act 2017 - 12 November 2018

Identifier **WN58A/971**
Land Registration District **Wellington**
Date Issued 19 February 2001

Prior References

WN26B/974

Estate Fee Simple
Area 42.0661 hectares more or less
Legal Description Section 186 Block XIII Mangaone Survey
District and Lot 1 Deposited Plan 90879

Original Registered Owners

Barry Edward Smith and Raewyn Lee Smith

Interests

152661.1 Compensation Certificate pursuant to Section 17 Public Works Amendment Act 1948 - 16.7.1976 at 1.51 pm
282773.1 Gazette Notice declaring portion of State Highway No.2 to be a limited access road - 1.8.1979 at 12.20 pm
581129.1 Compensation Certificate pursuant to Section 19 Public Works Act 1981 - 13.9.1983 at 11.03 am
859693.1 Gazette Notice declaring portion of State Highway No.2 (Eketahuna - Raumahanga River) to be a limited access road - 26.6.1987 at 10.35 am
B839667.2 Mortgage to Westpac Banking Corporation - 18.6.2001 at 2.06 pm
5255768.1 Discharge of Mortgage B839667.2 - 17.6.2002 at 9:02 am
5255768.2 Transfer to Scott Hallows Tyree and Colleen Adale Tyree - 17.6.2002 at 9:02 am
5255768.3 Mortgage to ASB Bank Limited - 17.6.2002 at 9:02 am
6768311.1 Discharge of Mortgage 5255768.3 - 1.3.2006 at 2:49 pm
6786893.1 Transfer to Douglas Howard Phillips, Glenys Maree Phillips and Clive Jackson Trustee Limited - 14.3.2006 at 9:00 am
6786893.2 Mortgage to ANZ National Bank Limited - 14.3.2006 at 9:00 am
7815166.2 Discharge of Mortgage 6786893.2 - 30.5.2008 at 1:15 pm
8431530.1 Mortgage to ANZ National Bank Limited - 23.3.2010 at 9:58 am
8970581.2 CAVEAT BY MERIDIAN ENERGY LIMITED - 2.2.2012 at 10:02 am
10069635.1 Discharge of Mortgage 8431530.1 - 3.6.2015 at 9:15 am
10069635.2 Transfer to Gray Douglas Beagley, Andrea Kathleen Beagley and Alison Ann Turner - 3.6.2015 at 9:15 am
10069635.3 Mortgage to Bank of New Zealand - 3.6.2015 at 9:15 am
12040610.1 Discharge of Mortgage 10069635.3 - 26.3.2021 at 4:31 pm
12040610.2 Transfer to Fusion Limited - 26.3.2021 at 4:31 pm
12040610.3 Mortgage to Westpac New Zealand Limited - 26.3.2021 at 4:31 pm

Reference:
 Prior CT: 26B/974
 Document No.: B822664.2



REGISTER

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT 1952

This Certificate dated the 19th day of February Two Thousand and One under the seal of the Registrar-General of Land, New Zealand, for the Land Registration District of WELLINGTON

WITNESSETH that **BARRY EDWARD SMITH and RAEWYN LEE SMITH**

are seised of an estate in **fee simple** (subject to such reservations, restrictions, encumbrances and interests as are notified by memorial endorsed hereon) in the land hereinafter described, delineated on the plan hereon, be the several admeasurements a little more or less, that is to say: All that parcel of land containing 42.0661 hectares, more or less being **SECTION 186 BLOCK XIII MANGAONE SURVEY DISTRICT and LOT 1 DEPOSITED PLAN 90879**



152661.1 Compensation Certificate under Section 17 Public Works Amendment Act 1948 – 16.7.1976 at 1.51

282773.1 Gazette Notice declaring portion of State Highway No.2 to be a limited access road – 1.8.1979 at 12.20

581129.1 Compensation Certificate under Section 19 Public Works Act 1981- 13.9.1983 at 11.03

859693.1 Gazette Notice declaring portion of State Highway No.2 (Eketahuna- Raumahanga River) to be a limited access road – 26.6.1987 at 10.35

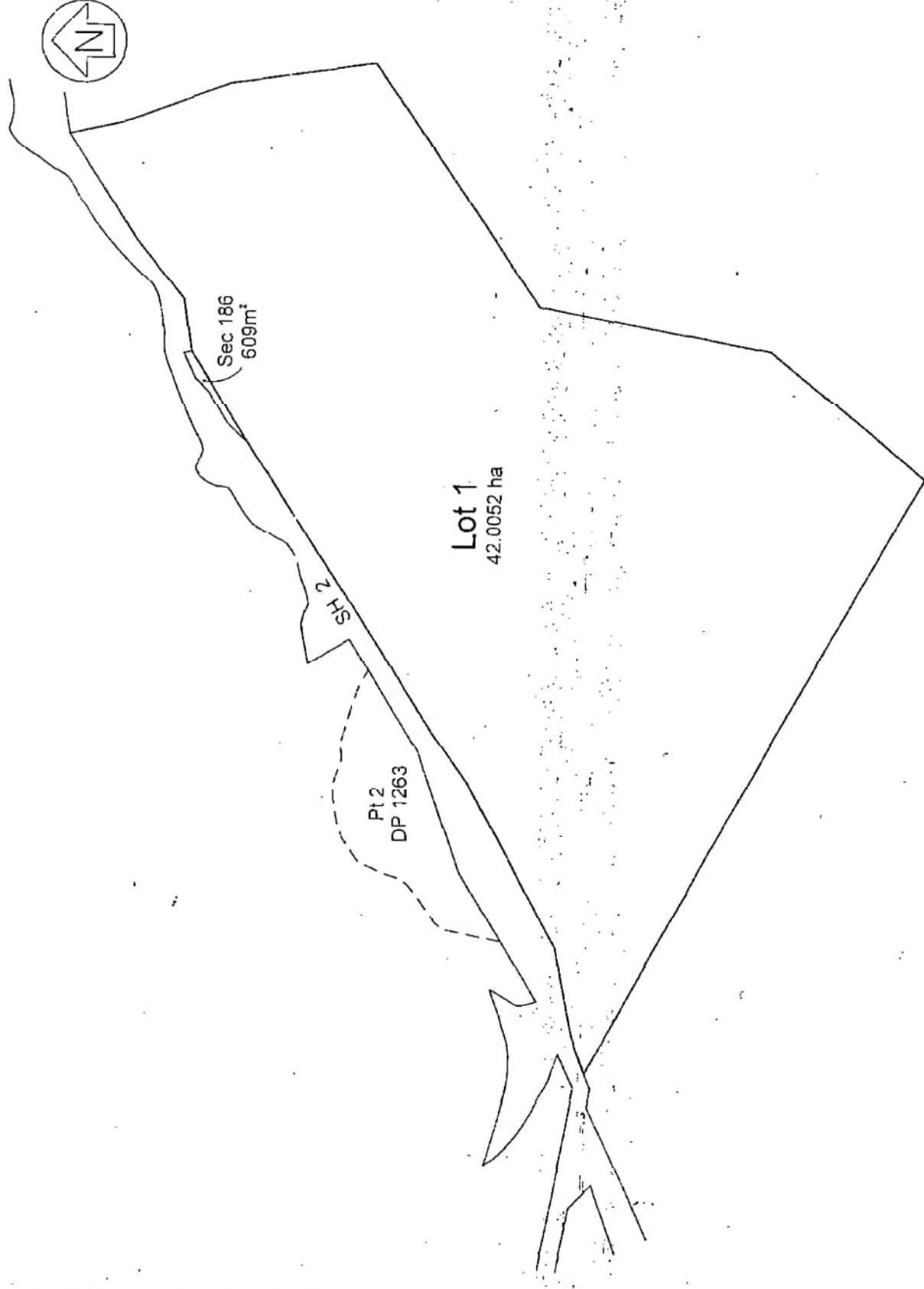
B365590.2 Mortgage to ~~Bank of New Zealand~~ ^{Discontinued} New Zealand – 16.6.1994 at 9.33

18/6/01
 for RGL

B839667.2 Mortgage to Westpac Banking Corporation

For RGL
 for RGL

18.6.2001 at 2.06



PARCEL	FORMERLY	CT REF
Lot 1	Part Lot 2 DP 1263	268/974
NEW CT ALLOCATED BEING Lot 1 hereon and Sec 186 Bk XIII Mangonui SD 58A/971		
TOTAL DEDUCED AREA 42.0661 ha		
APPROVED FOR CT DIAGRAM PURPOSES ONLY		
Deposited by: 11/10/01 01 03 2291		90879
Checked by: ...		

LAND DISTRICT WELLINGTON
 Survey Bk. & Dist. XIII Mangonui SD
 NZMS 261 SHT SHEET No

PLAN OF LOT 1
 FOR CT DIAGRAM PURPOSES

TERRITORIAL AUTHORITY Tararua District
 Prepared by TERRALINK LIMITLD
 SCALE : Proportional DATE : 28 February 2001





**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy**



Identifier **WN58A/971**
Land Registration District **Wellington**
Date Issued 19 February 2001

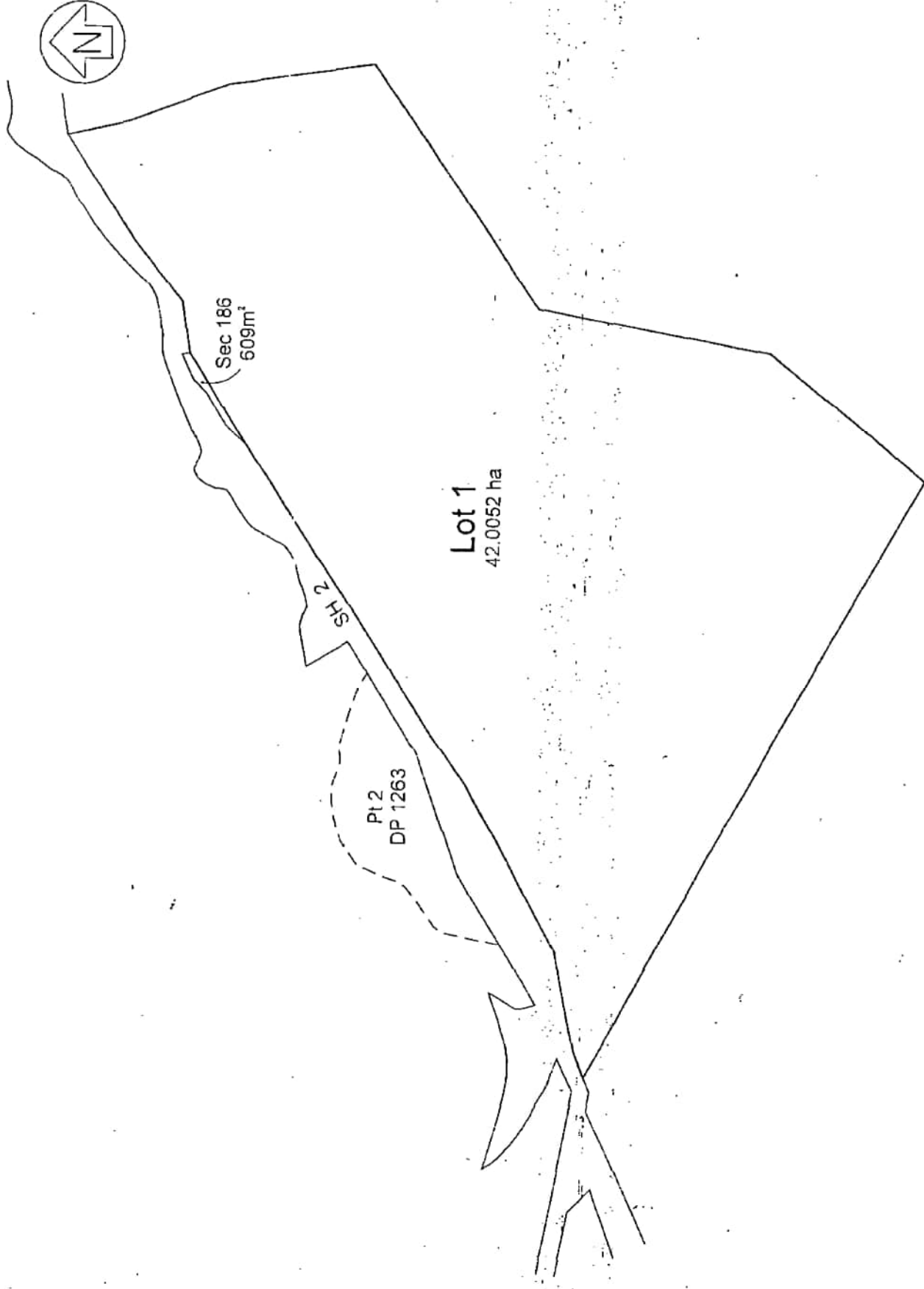
Prior References
WN26B/974

Estate	Fee Simple
Area	42.0661 hectares more or less
Legal Description	Section 186 Block XIII Mangaone Survey District and Lot 1 Deposited Plan 90879

Registered Owners
Fusion Limited

Interests

152661.1 Compensation Certificate pursuant to Section 17 Public Works Amendment Act 1948 - 16.7.1976 at 1.51 pm
282773.1 Gazette Notice declaring portion of State Highway No.2 to be a limited access road - 1.8.1979 at 12.20 pm
581129.1 Compensation Certificate pursuant to Section 19 Public Works Act 1981 - 13.9.1983 at 11.03 am
859693.1 Gazette Notice declaring portion of State Highway No.2 (Eketahuna - Raumahanga River) to be a limited access road - 26.6.1987 at 10.35 am
8970581.2 CAVEAT BY MERIDIAN ENERGY LIMITED - 2.2.2012 at 10:02 am
12040610.3 Mortgage to Westpac New Zealand Limited - 26.3.2021 at 4:31 pm



PARCEL	FORMERLY	CT REF
Lot 1	Part Lot 2 DP 1263	26B/974
NEW CT ALLOCATED BEING Lot 1 hereon and Sec 186 Blk XIII Manganona SD 58A/971		
TOTAL DEDUCED AREA 42.0661 ha		
APPROVED FOR CT DIAGRAM PURPOSES ONLY		
DEPOSITED FOR CT DIAGRAM PURPOSES ONLY		
19/2/2001 Checked by: [Signature] Chief Surveyor		
19/2/2001 Checked by: [Signature] Registrar-General of Land		
		90879

TERRITORIAL AUTHORITY Tararua District
 Prepared by TERRALINK LIMITED
 SCALE : Proportional DATE : 28 February 2001

PLAN OF LOT 1
 FOR CT DIAGRAM PURPOSES

LAND DISTRICT WELLINGTON
 Survey Trk. & Dist XIII Manganona SD
 NZMS 261 SHT SHEET No



**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Historical Search Copy**




R. W. Muir
Registrar-General
of Land

Constituted as a Record of Title pursuant to Sections 7 and 12 of the Land Transfer Act 2017 - 12 November 2018

Identifier **WN85/199**
Land Registration District **Wellington**
Date Issued 20 June 1896

Prior References

PR5065 WA 2/222

Estate Fee Simple
Area 115.7401 hectares more or less
Legal Description Section 129 Block XIII Mangaone Survey
District

Original Registered Owners

Hamish Barrie Anderson as to a 1/2 share
Jennifer Margaret Anderson as to a 1/2 share

Interests

B242743.2 Mortgage to Westpac Banking Corporation - 9.7.1992 at 11.30 am
B772868.1 Variation of Mortgage B242743.2 - 10.3.2000 at 9:00 am
5525052.4 Variation of Mortgage B242743.2 - 19.3.2003 at 9:00 am
7095691.1 Application pursuant to Section 99A Land Transfer Act 1952 vesting Mortgage B242743.2 in
Westpac New Zealand Limited - 2.11.2006 at 9:00 am
7152071.3 Discharge of Mortgage B242743.2 - 8.12.2006 at 9:00 am
7152071.5 Transfer to Rocky Hills Farming Company Limited - 8.12.2006 at 9:00 am
7152071.7 Mortgage to Westpac New Zealand Limited - 8.12.2006 at 9:00 am
8544331.1 CAVEAT BY MERIDIAN ENERGY LIMITED - 15.7.2010 at 10:34 am
8970581.1 CAVEAT BY MERIDIAN ENERGY LIMITED - 2.2.2012 at 10:02 am
12392517.1 Variation of Mortgage 7152071.7 - 9.3.2022 at 1:40 pm

REGISTER NEW ZEALAND.

[SCHEDULE 1.]



Register-book,
Vol. 85, folio 199

Reference: Warrant No. 2/222
P.R. folio 5065

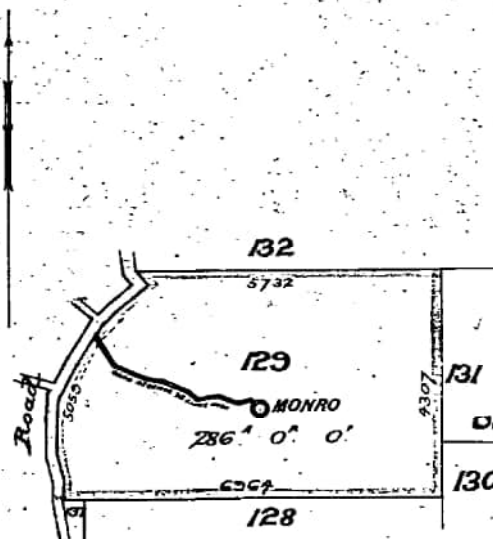
CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT.

This Certificate, dated the Twenty-sixth day of June, one thousand eight hundred and ninety-~~two~~, under the hand and seal of the District Land Registrar of the Land Registration District of Wellington, being a Certificate in lieu of Grant, under Warrant of His Excellency the Governor, in exercise of the powers enabling him in that behalf, ~~Witnesseth~~ that Thomas Gunnick of Carterton Settler

is seized of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial under-written or indorsed hereon; subject also to any existing right of the Crown to take and lay off roads under any Act of the General Assembly of New Zealand) in the land hereinafter described, as the same is delineated by the plan drawn hereon, bordered by, be the several admeasurements a little more or less, which said land is in the said Warrant expressed to have been originally acquired by him as from the Twenty-eighth day of February, one thousand eight hundred and ninety-~~two~~; under His Land Sale that is to say: All that parcel of land containing Five hundred and eighty six acres situated in the Provincial District of Wellington being Section 129 Block VII Mangaroa Survey District

Wm Bullen

District Land Registrar



Scale 20 Chains to an inch

Mortgage 20125 Registered 14th March
DISCHARGED Thomas Gunnick to
William Hasey and Edward
Wm Bullen
Transmission 2590 Probate of Will of
Thomas Gunnick who died 16th July 1897
granted to Alexander Mitchell Esq of
Metaphoria Papers produced at 23rd July
1898 at 11.55 am N. Tennant Esq
Transfer 31337 Produced 23rd July 1898 at
11.55 am Alexander M. Harlow & James
Duncan of Auckland and John Duncan
of Porirua Partners as N. Tennant Esq
tenants in common
DISCHARGED Mortgage 26157 Produced 23rd July 1898
DISCHARGED James Duncan and John
Duncan to David James Esq
W. Tennant Esq
DISCHARGED Transfer of Mortgage 26151 Produced 8th
October 1898 at 11.40 am J. A. Gunnick
John to William Hasey and
W. Tennant Esq
Transmission 2701 Administration of
Estate of John Duncan who died on
the 9th January 1901 granted to Charles
Sharp Duncan of Porirua Settler
produced 9th December 1901 at 2.50 pm
W. Milroy Esq

CONTINUED

EQUIVALENT METRIC
AREA IS 115.7401 ha

Transfer 40109 produced 9th December 1901 at 2.50 pm Charles Sharp Duncan to the above named James Duncan of his interest
M. Wilgona A.S.R.

Mortgage 3587 produced 25th February 1902 at 11 am Charles Sharp Duncan to William Carrigan
M. Wilgona A.S.R.

DISCHARGE

Mortgage 4964 produced 14 September 1906 at 2.40 pm Charles Sharp Duncan to Frederick Mowbray
M. Wilgona A.S.R.

DISCHARGE

Transfer 61668 produced 27th March 1907 at 3 pm James Duncan to Benny Pike of Masterton sheepfarm
M. Wilgona A.S.R.

Mortgage 572 produced 27th March 1907 at 11 am James Duncan to James Duncan
M. Wilgona A.S.R.

DISCHARGE

Transfer of Mortgage 57286 produced 16th March 1907 at 11 am John Duncan to Mary Jane Sheehy
M. Wilgona A.S.R.

DISCHARGE

A-7126
DN54604
57286
J102488
M126443
M126444
M126445

Transmission 7121 produced 5th May 1910 at 11 am to the executors of the will of Frederick Mowbray
M. Wilgona A.S.R.
Mortgage 57286 produced 16th March 1907 at 11 am John Duncan to Mary Jane Sheehy
M. Wilgona A.S.R.
Transfer 132418 produced 23rd August 1920 at 11 am Henry Pike to Florence Mildred Anderson wil. of John Oliver Wilkie, Anderson of Eketahuna farm
M. Wilgona A.S.R.

Transfer 132418 produced 23rd August 1920 at 11 am Henry Pike to Florence Mildred Anderson wil. of John Oliver Wilkie, Anderson of Eketahuna farm
M. Wilgona A.S.R.

Mortgage 126443 produced 23rd August 1920 at 11 am Florence Mildred Anderson to Henry Pike
M. Wilgona A.S.R.

Mortgage 126441 produced 23rd August 1920 at 11 am Florence Mildred Anderson to James and Frances McGregor in unequal shares affects Mortgage 126443
M. Wilgona A.S.R.

Mortgage 126445 produced 23rd August 1920 at 11 am Florence Mildred Anderson to Edward Thomas Waters
M. Wilgona A.S.R.

Mortgage 12775 produced 6th February 1922 at 11 am Edward Thomas Waters to Taligalath Learline Meartha
M. Wilgona A.S.R.

Extension of Mortgage 126445 reduction of principal and increase of interest produced 2nd July 1925 at 11.50 am
M. Wilgona A.S.R.

Extension of Mortgage 126449 produced 19th March 1925 at 11.50 am
M. Wilgona A.S.R.

Transmission No 28911 of Mortgage No 126443 to Ernest Henry Pike and Robert McKenzie as executors entered 16th November 1925 at 10.35
DISCHARGED
M. Wilgona A.S.R.

Variation of Mortgage 126443 produced 21st March 1927 at 9.50 am
DISCHARGED
M. Wilgona A.S.R.

Variation of Mortgage 126443 produced 21st March 1927 at 10.25 am
DISCHARGED
M. Wilgona A.S.R.

Transfer 549555 to Victor Maxwell Anderson and Edward Barrie Anderson both of Eketahuna sheepfarmers as tenants in common in equal shares - 4.2.1963 at 9.35 a.m.
M. Wilgona A.S.R.

THIS REPRODUCTION IS A REDUCED SIZE CERTIFIED TO BE A TRUE COPY OF THE ORIGINAL REGISTER FOR THE PURPOSES OF SECTION 215A LAND TRANSFER ACT 1952.
M. Wilgona A.S.R. D.L.R.

Transfer 262764.1 to Edward Barrie Anderson above named - 27.9.1978 at 11.24 a.m.
M. Wilgona A.S.R.

Mortgage 262764.3 to Rural Banking and Finance Corporation - 27.9.1978 at 11.24 a.m.
M. Wilgona A.S.R.

No. 262764.4 Variation of the terms of Mortgage 262764.3 - 27.9.1978 at 11.24 a.m.
M. Wilgona A.S.R.

Transfer 297475.1 to Hamish Barrie Anderson of Eketahuna, Farmer - 23.1.1980 at 2.05 p.m.
M. Wilgona A.S.R.

Mortgage 297475.2 to Rural Banking and Finance Corporation - 23.1.1980 at 2.05 p.m.
M. Wilgona A.S.R.

No. 297475.3 Memorandum of Priority making Mortgages 297475.2 and 262764.3 first and second mortgages respectively - 23.1.1980 at 2.05 p.m.
M. Wilgona A.S.R.

Mortgage 297475.4 to Edward Barrie Anderson - 23.1.1980 at 2.05 p.m.
M. Wilgona A.S.R.

Variation of the terms of Mortgage 297475.2 - 29.1.1982 at 1.34 p.m.
M. Wilgona A.S.R.

Mortgage 471197.2 to Bank of New South Wales Savings Bank (N.Z.) Limited - 29.1.1982 at 1.34 p.m.
M. Wilgona A.S.R.

649526.1 Variation of the terms of mortgage
297475.2 - 8.10.1984 at 2.59 p.m.

M. S. Gyan
A.L.R.

649526.2 Mortgage to Westpac Banking Corporation
- 8.10.1984 at 2.59 p.m.

*B.242743.1
DISCHARGED
9/7/92
R.J.S. ml*

M. S. Gyan
A.L.R.

783723.4 Variation of the terms of
Mortgage 297475.2 - 11.6.1986 at 2.50 p.m.

M. S. Gyan
A.L.R.

*PROCESSED
DISCHARGED*

915136.1 Mortgage to Rural Banking and
Finance Corporation 15.4.1988 at 1.59 p.m.

RR

[Signature]
A.L.R.

915136.2 Memorandum of Priority making
Mortgages 915136.1, 262764.3 and 649526.2
second, third and fourth mortgages
respectively - 15.4.1988 at 1.59 p.m.

[Signature]
A.L.R.

B.158784.1 Transfer of an undivided 1/2
share to Jennifer Margaret Anderson of
Eketahuna, Farmer - 9.5.1991 at 10.49 a.m.

[Signature]
A.L.R.

B.242743.2 Mortgage to Westpac Banking
Corporation - 9.7.1992 at 11.30 a.m.

R.J.S.
A.L.R.

B772868.1 Variation of Mortgage B242743.2
10.03.2000 at 9.00

[Signature]
FOR RGL



**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy**



Identifier **WN85/199**
Land Registration District **Wellington**
Date Issued 20 June 1896

Prior References

PR5065 WA 2/222

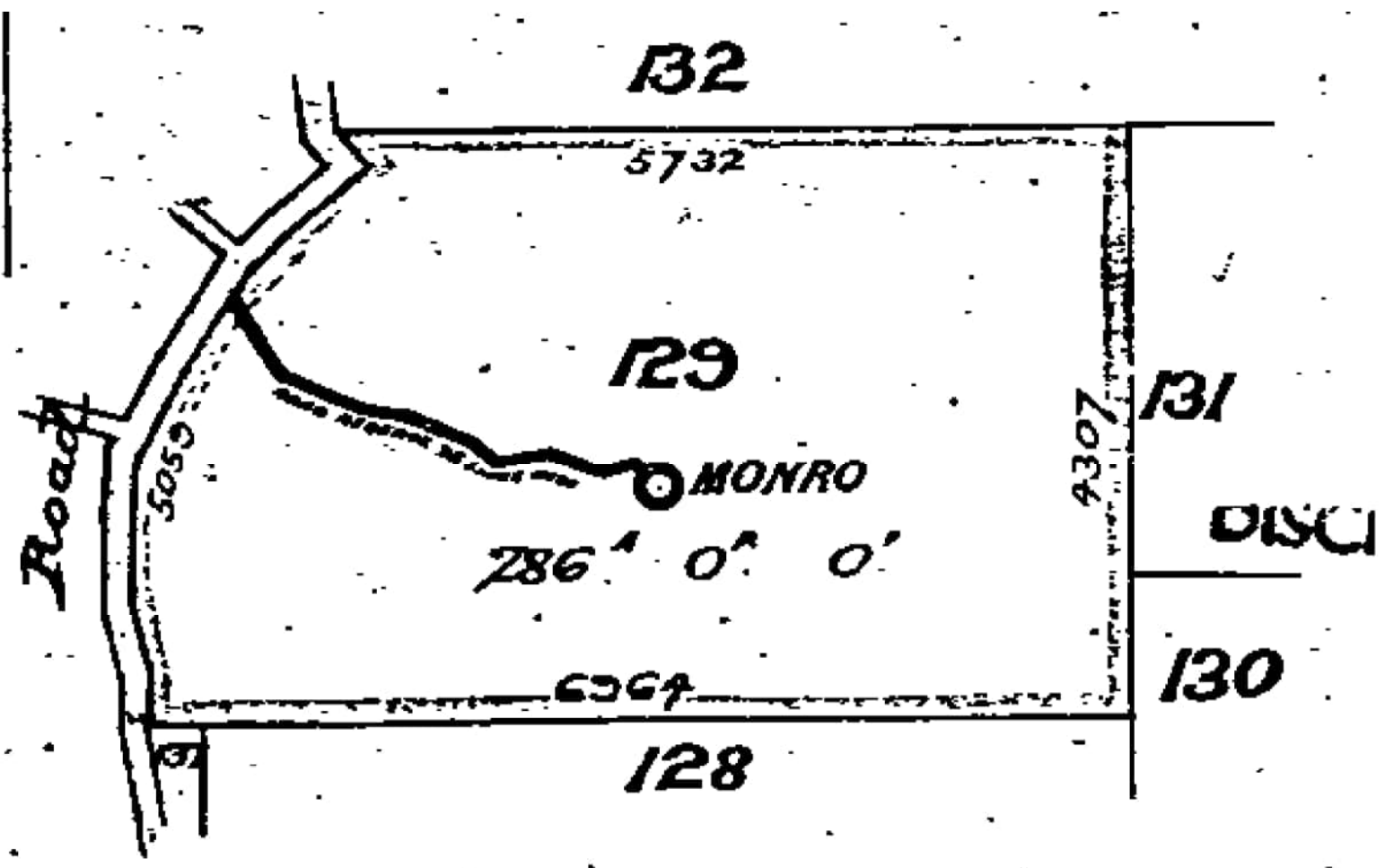
Estate Fee Simple
Area 115.7401 hectares more or less
Legal Description Section 129 Block XIII Mangaone Survey
District

Registered Owners

Rocky Hills Farming Company Limited

Interests

7152071.7 Mortgage to Westpac New Zealand Limited - 8.12.2006 at 9:00 am
8544331.1 CAVEAT BY MERIDIAN ENERGY LIMITED - 15.7.2010 at 10:34 am
8970581.1 CAVEAT BY MERIDIAN ENERGY LIMITED - 2.2.2012 at 10:02 am
12392517.1 Variation of Mortgage 7152071.7 - 9.3.2022 at 1:40 pm





**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Historical Search Copy**



Constituted as a Record of Title pursuant to Sections 7 and 12 of the Land Transfer Act 2017 - 12 November 2018

Identifier **WN89/188**
Land Registration District **Wellington**
Date Issued 29 January 1897

Prior References

WA 2/246 WNPR5238

Estate Fee Simple
Area 256.5707 hectares more or less
Legal Description Section 133 Block IX Mangaone Survey
 District

Original Registered Owners

Alexander Wilkie Anderson

Interests

646233.1 Mortgage to Westpac Banking Corporation - 19.9.1984 at 2:30 pm
B189527.4 Mortgage to AMP Bank Limited - 23.8.1991 at 11:20 am
B189527.5 Memorandum of Priority making Mortgages B189527.4 and 646233.1 first and second mortgages
respectively - 23.8.1991 at 11:20 am
5393087.2 Discharge of Mortgage 646233.1 - 5.11.2002 at 11:55 am
5393087.3 Transfer of a 1/2 share to Diane Marie Anderson - 5.11.2002 at 11:55 am
5667529.1 Transfer of Mortgage B189527.4 to Rabobank New Zealand Limited - 23.7.2003 at 9:00 am
6653544.1 Discharge of Mortgage B189527.4 - 18.11.2005 at 9:00 am
6653544.2 Mortgage to ASB Bank Limited - 18.11.2005 at 9:00 am
7293536.1 Transfer to Dalmeny Agriculture Limited - 27.3.2007 at 9:00 am
7328833.1 Discharge of Mortgage 6653544.2 - 19.4.2007 at 9:00 am
7359662.1 Mortgage to ASB Bank Limited - 8.5.2007 at 11:05 am
8544332.1 CAVEAT BY MERIDIAN ENERGY LIMITED - 15.7.2010 at 10:35 am
8772811.1 Discharge of Mortgage 7359662.1 - 4.7.2011 at 11:28 am
8772811.2 Mortgage to Rabobank New Zealand Limited - 4.7.2011 at 11:28 am
12425443.1 Variation of Mortgage 8772811.2 - 31.5.2022 at 2:30 pm

REGISTER

NEW ZEALAND.

[SCHEDULE 1.]



Register-book, 89 185.
Vol. 77, folio 111

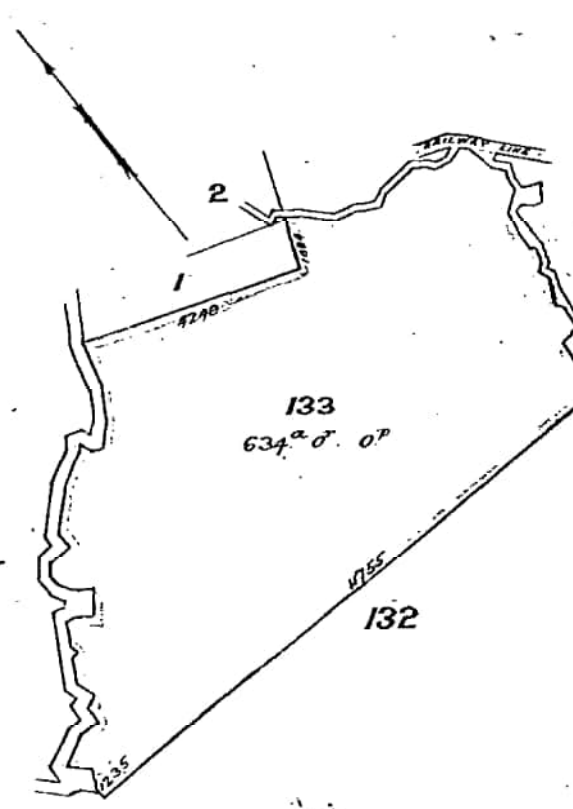
Reference: Warrant No. 2/216
P.R. folio 5238

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT

This Certificate, dated the Twenty ninth day of January, one thousand eight hundred and ninety-seven, under the hand and seal of the District Land Registrar of the Land Registration District of Huttleston, being a Certificate in lieu of Grant, under Warrant of His Excellency the Governor, in exercise of the powers enabling him in that behalf, Witnesseth that Anders Anderson of Ekotuna Hill

is seized of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or indorsed hereon; subject also to any existing right of the Crown to take and lay off roads under any Act of the General Assembly of New Zealand) in the land hereinafter described, as the same is delineated by the plan hereon, bordered Ad, be the several admeasurements a little more or less, which said land is in the said Warrant expressed to have been originally acquired by the said Anders Anderson as from the Thirtieth day of September, one thousand eight hundred and ninety-seven, under The Land Act, that is to say: All that parcel of land containing Six hundred and thirty four acres being Section 133 Block IX Mangawhai Survey District

Ja



Scale 20 Chains to an inch

W. McInnon
District Land Registrar

Mortgage 25188 produced 3rd October 1896 at 10 a.m. Anders Anderson to The Government Advances Office Superintendent 200 Richmond St. Wellington N.Z. P. P. Transmission 12068 to collect & sign affidavits and John Oliver Wilkie Anderson and Matilla Anderson, Executors entered 30th June 1924 at 12 noon W. Richmond

DISCHARGED

1317 Certificate of Charge by The Mortgagee of 200 Richmond St. Wellington N.Z. P. P. PRODUCED 22.12.39 at 11.15 a.m. W. Wood

DISCHARGED

1215 Certificate of Charge by The Mortgagee of 200 Richmond St. Wellington N.Z. P. P. PRODUCED 17.12.31 at 3.15 p.m. W. Wood

DISCHARGED

2210 Certificate of Charge by The Mortgagee of 200 Richmond St. Wellington N.Z. P. P. PRODUCED 9.5.39 at 4.15 p.m. W. Wood

DISCHARGED

Transmission 45968 to John Oliver Wilkie Anderson and Matilla Anderson as Survivors entered 10th September 1928 at 11.17 a.m. W. Wood

DISCHARGED

CONTINUED

EQUIVALENT METRIC AREA IS 256.5701 ha

39/188

Transfer 389727 the registered proprietor to John Oliver Wilkie Anderson Edward Barrie Anderson and Victor Maxwell Anderson all of Eketahuna Farmers as tenants in common in equal shares Approved 28th November 1955 at 2.6 p.m. *J. Anderson A.L.R.*

Commissioner secretary of the estate of John Oliver Wilkie Anderson to Florence Mildred Mary Anderson widow Edward Barrie Anderson sheep farmer Victor Maxwell Anderson sheep farmer and Henry McMillan Alves Major of Masterton solicitors as executors entered 12.12.1972 at 2.5 p.m. *W. Anderson*

THIS REPRODUCTION (ON A REDUCED SCALE) CERTIFIED TO BE A TRUE COPY OF THE ORIGINAL REGISTER FOR THE PURPOSES OF SECTION 215A LAND TRANSFER ACT 1952. *W. Anderson D.L.R.*

Transmission 953243 of the share of Florence Mildred Mary Anderson, Edward Barrie Anderson, Victor Maxwell Anderson and Henry McMillan Alves Major, to Edward Barrie Anderson, Victor Maxwell Anderson and Henry McMillan Alves Major as survivors - 18.12.1972 at 12.05 p.m. *J.P. Phelan A.L.R.*

453707.1 DISCHARGED Mortgage A024621 to Johnson Dry Cleaners Limited 28.2.1978 at 11.35 p.m. *J.P. Phelan A.L.R.*

Transfer 262764.1 of the share acquired by Transmission 504207 to Edward Barrie Anderson abovenamed - 27.9.1978 at 11.24 a.m. *J. Anderson A.L.R.*

Transfer 262764.1 of the share of Victor Maxwell Anderson to Edward Barrie Anderson abovenamed - 27.9.1978 at 11.24 a.m. *J. Anderson A.L.R.*

Transfer 262764.2 to Alexander Wilkie Anderson of Eketahuna, Farmer - 27.9.1978 at 11.24 a.m. *J. Anderson A.L.R.*

8189527.3 DISCHARGED Mortgage 262764.3 Rural Banking and Finance Corporation - 27.9.1978 at 11.24 a.m. *J. Anderson A.L.R.*

No. 262764.4 Variation of the terms of Mortgage 262764.3 - 27.9.1978 at 11.24 a.m. *J. Anderson A.L.R.*

691655.1 DISCHARGED Mortgage 419866.1 to Rural Banking and Finance Corporation - 28.11.1980 at 2.22 p.m. *J.P. Phelan*

8189527.3 DISCHARGED Mortgage 453707.2 to Australian Mutual Provident Society - 28.10.1981 at 1.43 p.m. *J.P. Phelan A.L.R.*

453707.3 Memorandum of Priority making Mortgages 453707.2, 262764.3 and 419860.1 first, second and third mortgages respectively - 28.10.1981 at 1.43 p.m. *J.P. Phelan A.L.R.*

646233.1 Mortgage to Westpac Banking Corporation - 19.9.1984 at 2.30 p.m. *M.B. Egan A.L.R.*

B.189527.4 Mortgage to The Australian Mutual Provident Society - 23.8.1991 at 11.20 a.m. *J. Anderson A.L.R.*

CERTIFICATE OF TITLE,

Vol. , folio B.189527.5 Memorandum of Priority making Mortgages B.189527.4 and 646233.1, first and second mortgages respectively - 23.8.1991 at 11.20 a.m. *J. Anderson A.L.R.*

B825861.1 Change of name of the Mortgagee in Mortgage B189527.4 to AMP Life Limited

B825861.2 Transfer of Mortgage B189527.4 to AMP Bank Limited all 13.3.2001 at 9.00. *for RGL.*





**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy**



Identifier **WN89/188**
Land Registration District **Wellington**
Date Issued 29 January 1897

Prior References

WA 2/246 WNPR5238

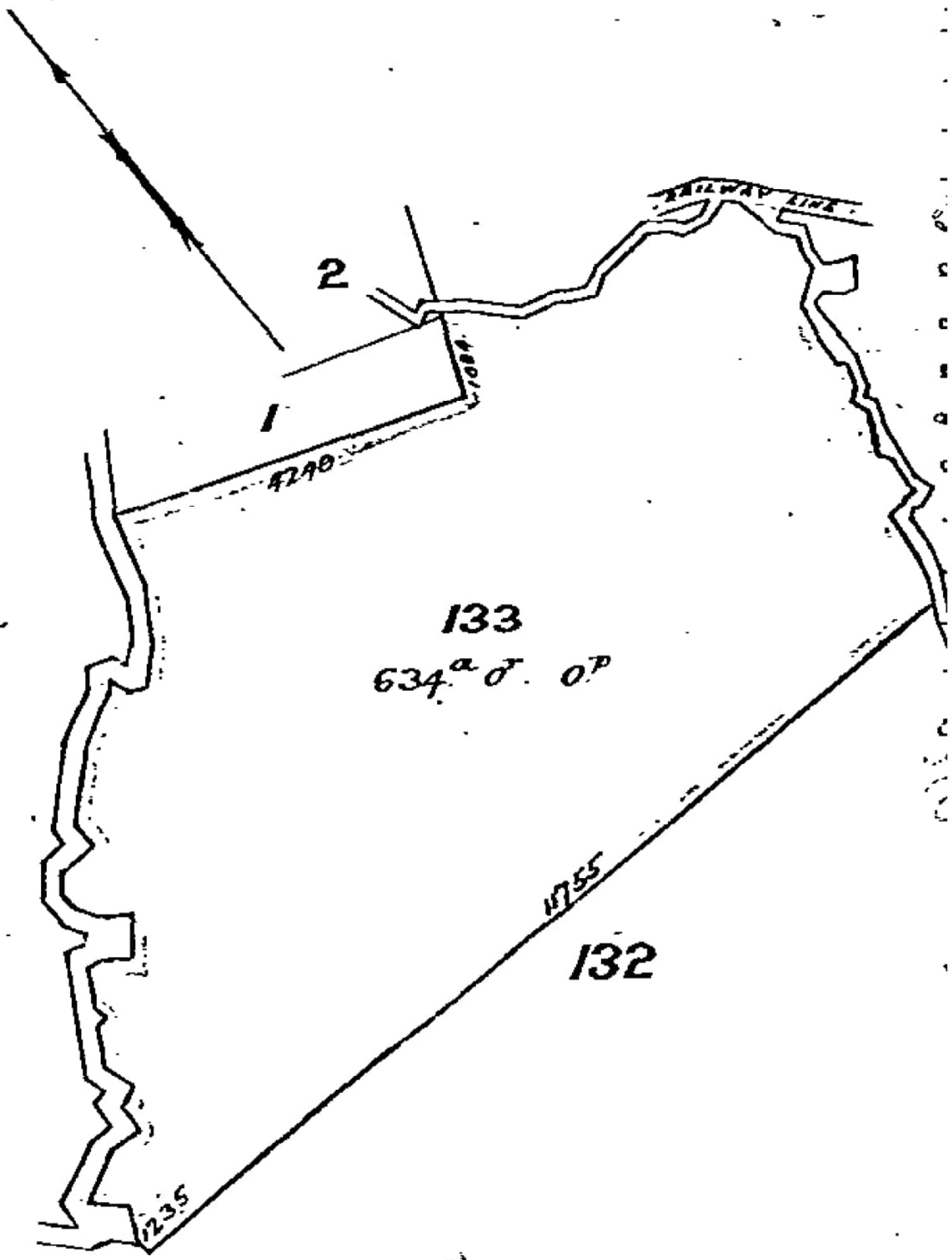
Estate Fee Simple
Area 256.5707 hectares more or less
Legal Description Section 133 Block IX Mangaone Survey
 District

Registered Owners

Dalmeny Agriculture Limited

Interests

8544332.1 CAVEAT BY MERIDIAN ENERGY LIMITED - 15.7.2010 at 10:35 am
8772811.2 Mortgage to Rabobank New Zealand Limited - 4.7.2011 at 11:28 am
12425443.1 Variation of Mortgage 8772811.2 - 31.5.2022 at 2:30 pm





**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Historical Search Copy**



Constituted as a Record of Title pursuant to Sections 7 and 12 of the Land Transfer Act 2017 - 12 November 2018

Identifier **WN24C/895**
Land Registration District **Wellington**
Date Issued 06 September 1983

Prior References
WNC1/349

Estate Fee Simple
Area 78.1043 hectares more or less
Legal Description Section 131 Block XIII Mangaone Survey
District

Original Registered Owners
Denbigh Elmo Cheetham, Stephen Patrick Kerr and Alan Wallace Gawith

Interests

Subject to Section 8 Mining Act 1971
Subject to Section 5 Coal Mines Act 1979
462573.3 Mortgage to Denbigh Elmo Cheetham - 4.12.1981 at 2.14 pm
5073585.1 Transfer to Graeme William Cheetham (1/2 share) and Lisa Jane Cheetham (1/2 share) - 22.8.2001 at 9:00 am
5073585.2 Mortgage to Rabobank New Zealand Limited - 22.8.2001 at 9:00 am
5073585.3 Mortgage to Denbigh Elmo Cheetham, Richard Gibbons Hall and Stephen Patrick Kerr - 22.8.2001 at 9:00 am
5085926.1 Discharge of Mortgage 462573.3 - 24.9.2001 at 9:00 am
6601111.1 Transfer of Mortgage 5073585.3 to Denbigh Elmo Cheetham, Gawith Trustees Limited and Stephen Patrick Kerr - 7.10.2005 at 9:00 am
7180366.1 Transfer to Graeme William Cheetham - 3.1.2007 at 9:00 am
7180366.2 Mortgage to Lisa Jane Cheetham - 3.1.2007 at 9:00 am
7464675.1 Discharge of Mortgage 5073585.2 - 18.7.2007 at 9:06 am
7468159.1 Mortgage to Rabobank New Zealand Limited - 19.7.2007 at 9:00 am
7830442.2 Discharge of Mortgage 7180366.2 - 30.5.2008 at 3:44 pm
8268453.1 Variation of Mortgage 7468159.1 - 17.9.2009 at 2:30 pm
8674960.1 Variation of Mortgage 7468159.1 - 24.2.2011 at 9:32 am
8898631.1 CAVEAT BY MERIDIAN ENERGY LIMITED - 28.10.2011 at 8:09 am
10707462.1 Variation of Mortgage 7468159.1 - 16.5.2017 at 11:02 am
12164333.1 Transmission of Mortgage 5073585.3 to Stephen Patrick Kerr and Gawith Trustees Limited as survivor(s) - 1.7.2021 at 5:02 pm
12164333.2 Transfer of Mortgage 5073585.3 to Judith Ann Slone, Selwyn David Cheetham and Graeme William Cheetham - 1.7.2021 at 5:02 pm
12164333.3 Discharge of Mortgage 5073585.3 - 1.7.2021 at 5:02 pm
12164333.6 Discharge of Mortgage 7468159.1 - 1.7.2021 at 5:02 pm

Identifier

WN24C/895

12164333.7 Transfer to Graeme William Cheetham and Leah Burns Cheetham - 1.7.2021 at 5:02 pm

12164333.8 Mortgage to Rabobank New Zealand Limited - 1.7.2021 at 5:02 pm

No. 24C / 895

Reference:
Certificate No. 579874.1



REGISTER

AR. Vol. C1 Folio 349
Transfer No.

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT

This Certificate dated the 6th day of September one thousand nine hundred and Eighty-three under the seal of the District Land Registrar of the Land Registration District of WELLINGTON being a Certificate in lieu of Grant, WITNESSETH that DENBIGH ELMO CHEETHAM, Farmer, STEPHEN PATRICK KERR, Chartered Accountant and ALAN WALLACE GAWITH, Solicitor all of Masterton are

seised of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorials underwritten or endorsed hereon) in the land hereinafter described, delineated with bold black lines on the plan hereon, be the several admeasurements a little more or less, which said land was originally acquired by the abovenamed

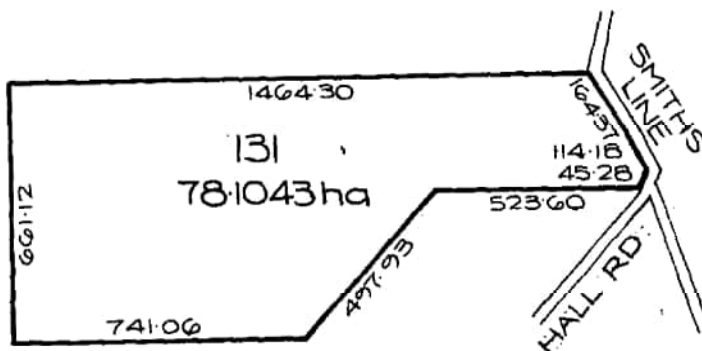
as from the 3rd day of May one thousand nine hundred and Eighty-three under Section 124A Land Act 1948 that is to say: All that parcel of land containing 78.1043 Hectares more or less situate in Block XIII Mangaone Survey District being Section 131 of the said Block

Stiles
Assistant Land Registrar

Interests at date of Issue:-

- 1. Subject to Section 8 of the Mining Act 1971 and Section 5 of the Coal Mines Act 1979
- 2. Mortgage 881885 to ^{DISCHARGED} (now) Rural Banking and Finance Corporation - 2-8-1971 at 12.08 p.m. for RGL
- 3. Mortgage 462573.3 to Denbigh Elmo Cheetham - 4-12-1981 at 2.14 p.m.
- 4. No. 462573.4 Variation of the terms of Mortgage 881885 - 4-12-1981 at 2.14 p.m.

Stiles
A.L.R.



SO 12707

Measurements are Metric.

No. 24C / 895

WTT

CERTIFICATE OF TITLE





**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy**



Identifier **WN24C/895**
Land Registration District **Wellington**
Date Issued 06 September 1983

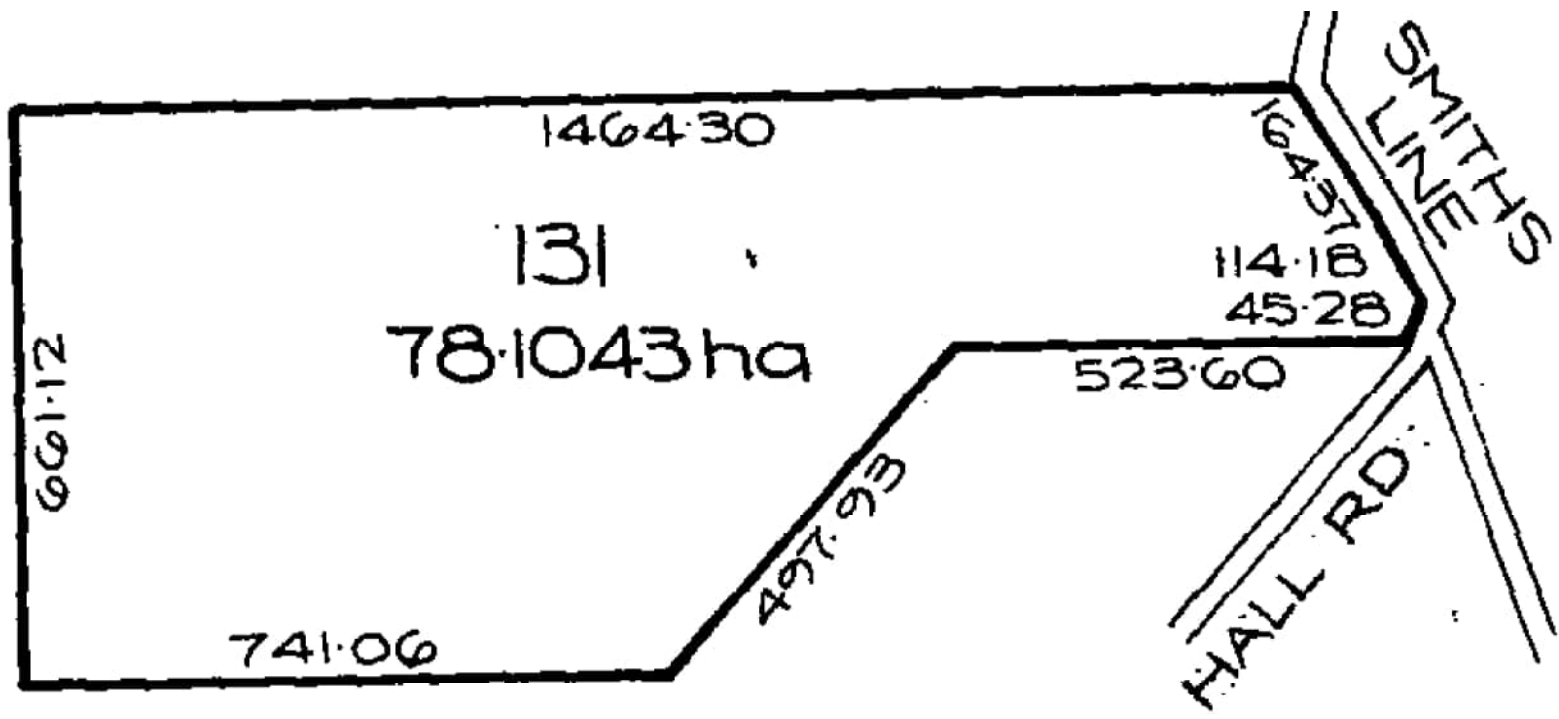
Prior References
WNC1/349

Estate	Fee Simple
Area	78.1043 hectares more or less
Legal Description	Section 131 Block XIII Mangaone Survey District

Registered Owners
Graeme William Cheetham and Leah Burns Cheetham

Interests

Subject to Section 8 Mining Act 1971
Subject to Section 5 Coal Mines Act 1979
8898631.1 CAVEAT BY MERIDIAN ENERGY LIMITED - 28.10.2011 at 8:09 am
12164333.8 Mortgage to Rabobank New Zealand Limited - 1.7.2021 at 5:02 pm



1464.30

131

78.1043 ha

661.12

741.06

497.93

523.60

114.18
45.28

164.37

SMITHS
LINE

HALL RD.



**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Historical Search Copy**



Constituted as a Record of Title pursuant to Sections 7 and 12 of the Land Transfer Act 2017 - 12 November 2018

Identifier **WN25C/219**
Land Registration District **Wellington**
Date Issued 28 February 1984

Prior References

WN25C/218 WN677/50

Estate Fee Simple
Area 11.1328 hectares more or less
Legal Description Section 1 and Section 62 Block XIV
Tararua Survey District

Original Registered Owners

Janice Patricia Taplin

Interests

- Subject to Section 59 Land Act 1948 (affects the land formerly in CT WN677/50)
- Subject to Section 8 Mining Act 1971 (affects the land formerly in CT WN25C/218)
- Subject to Section 168A Coal Mines Act 1925 (affects the land formerly in CT WN25C/218)
- 859693.1 Gazette Notice declaring portion of State Highway No. 2 (Eketahuna - Raumahanga River) to be a limited access road - 26.6.1987 at 10:35 am
- Subject to telecommunication rights (in gross) over part marked A on DP 76677 in favour of Telecom New Zealand Limited created by Transfer B513051.1 - 12.4.1996 at 9:49 am
- B735995.4 Mortgage to Southland Building Society - 27.7.1999 at 9:00 am
- B735995.5 Mortgage to Graham Donald Hansen - 27.7.1999 at 9:00 am
- 6383941.1 Variation of Mortgage B735995.4 - 15.4.2005 at 9:00 am
- 6383941.2 Discharge of Mortgage B735995.5 - 15.4.2005 at 9:00 am
- 8896058.28 Transfer of the easement created by Transfer B513051.1 to Chorus New Zealand Limited - 30.11.2011 at 6:08 pm
- 8970581.3 CAVEAT BY MERIDIAN ENERGY LIMITED - 2.2.2012 at 10:02 am
- 11142544.1 Departmental dealing correcting the title diagram image linked to the title - 11.6.2018 at 12:35 pm
- 11165281.1 Discharge of Mortgage B735995.4 - 9.7.2018 at 3:54 pm
- 11165281.2 Transfer to Weymore Awarua Co. Limited - 9.7.2018 at 3:54 pm
- 11165281.3 Mortgage to Rabobank New Zealand Limited - 9.7.2018 at 3:54 pm

References

Prior C/T 677/50, 25C/218

Land and Deeds 69

Transfer No.

N/C. Order No. 609619.2



REGISTER

No. 25C/219

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT

This Certificate dated the 28th day of February one thousand nine hundred and eighty-four under the seal of the District Land Registrar of the Land Registration District of WELLINGTON

WITNESSETH that GRAHAM DONALD HANSEN of Kaiparoro, Farmer

is seized of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or endorsed hereon) in the land hereinafter described, delineated with bold black lines on the plan hereon, be the several admeasurements a little more or less, that is to say: All that parcel of land containing 11.1328 Hectares more or less situate in Block XIV Tararua Survey District being Sections 1 and 62 of the said Block

M. S. Egan

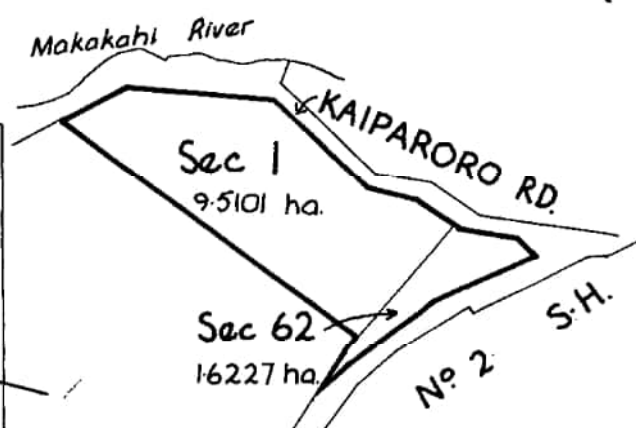
Assistant Land Registrar

Interests at date of issue:

1. Subject to the reservations and conditions imposed by Section 59 Land Act 1948 (affects the land formerly in CT 677/50)
2. Subject to Section 8 of the Mining Act 1971 and Section 168A of the Coal Mines Act 1925 (affects the land formerly in CT 25C/218)
3. 272858.1 Mortgage **DISCHARGED** of the part formerly in CT 677/50 to Bank of New Zealand - 9.2.1979 at 11.40 a.m. *13/06/79*
4. 446421.1 Mortgage **DISCHARGE** of the part formerly in CT 677/50 to The Rural Banking and Finance Corporation - 16.9.1981 at 12.10 p.m. *15/9/81*
5. 446421.2 Memorandum of Priority making Mortgages 446421.1 and 272858.1 first and second mortgages respectively - 16.9.1981 at 12.10 p.m. *M. S. Egan*

No. 859693.1 Gazette Notice declaring portion of S.P. No 2 (Ekekahurangi - Raumahanga Drive) to be a limited access road 36.6.1987 at 10.35am

ALB



Measurements are Metric
SO's 12776, 32261
Total Area = 11.1328

No. 25C/219

No. *R.C. 4*

OBREV

CERTIFICATE OF TITLE No. 25C/219

B.513051.1 Transfer grant of
Telecommunication Rights (in gross) over
the part herein marked "A" on Deposited
Plan 76677 in favour of Telecom New
Zealand Limited - 12.4.1996 at 9.49 a.m.

withdrawn
A.L.R.

B.601152.1 Caveat by Southern Cross
Building Society *19.6.1997* at 10.26
a.m.

James R. R. J. J.
A.L.R.

B735995.3 Transfer to Janice Patricia
Taplin

B735995.4 Mortgage to Southland
Building Society

B735995.5 Mortgage to Graham Donald
Hansen
all 27.7.1999 at 9.00.

Co. Dan
for RGL





**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy**



Identifier **WN25C/219**
Land Registration District **Wellington**
Date Issued 28 February 1984

Prior References

WN25C/218 WN677/50

Estate Fee Simple
Area 11.1328 hectares more or less
Legal Description Section 1 and Section 62 Block XIV
 Tararua Survey District

Registered Owners

Weymore Awarua Co. Limited

Interests

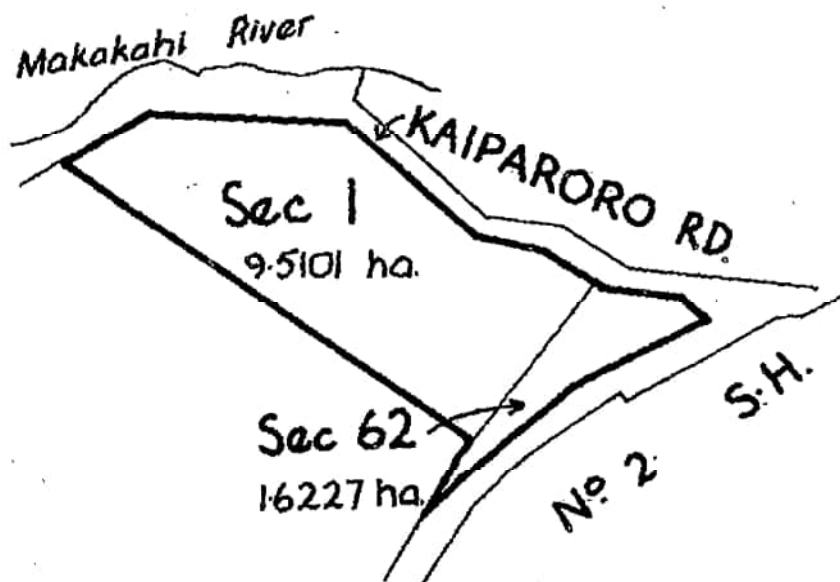
Subject to Section 59 Land Act 1948 (affects the land formerly in CT WN677/50)
Subject to Section 8 Mining Act 1971 (affects the land formerly in CT WN25C/218)
Subject to Section 168A Coal Mines Act 1925 (affects the land formerly in CT WN25C/218)
859693.1 Gazette Notice declaring portion of State Highway No. 2 (Eketahuna - Raumahanga River) to be a limited access road - 26.6.1987 at 10:35 am
Subject to telecommunication rights (in gross) over part marked A on DP 76677 in favour of (now) Chorus New Zealand Limited created by Transfer B513051.1 - 12.4.1996 at 9:49 am
8970581.3 CAVEAT BY MERIDIAN ENERGY LIMITED - 2.2.2012 at 10:02 am
11165281.3 Mortgage to Rabobank New Zealand Limited - 9.7.2018 at 3:54 pm

Title Diagram WN25C/21

Cpy 01/01, Pgs - 001, 11/06/18, 12:36



DocId: 511522241



Measurements are Metric
SO's 12776, 32261
Total Area = 11.1328



**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Historical Search Copy**



Constituted as a Record of Title pursuant to Sections 7 and 12 of the Land Transfer Act 2017 - 12 November 2018

Identifier **WN31D/706**
Land Registration District **Wellington**
Date Issued 15 April 1988

Prior References

WN74/145

Estate Fee Simple
Area 79.6421 hectares more or less
Legal Description Lot 1 Deposited Plan 665

Original Registered Owners

Hamish Barrie Anderson as to a 1/2 share
Jennifer Margaret Anderson as to a 1/2 share

Interests

B242743.2 Mortgage to Westpac Banking Corporation - 9.7.1992 at 11.30 am
B772868.1 Variation of Mortgage B242743.2 - 10.3.2000 at 9:00 am
5525052.4 Variation of Mortgage B242743.2 - 19.3.2003 at 9:00 am
7095691.1 Application pursuant to Section 99A Land Transfer Act 1952 vesting Mortgage B242743.2 in Westpac New Zealand Limited - 2.11.2006 at 9:00 am
7152071.3 Discharge of Mortgage B242743.2 - 8.12.2006 at 9:00 am
7152071.5 Transfer to Rocky Hills Farming Company Limited - 8.12.2006 at 9:00 am
7152071.7 Mortgage to Westpac New Zealand Limited - 8.12.2006 at 9:00 am
8544331.1 CAVEAT BY MERIDIAN ENERGY LIMITED - 15.7.2010 at 10:34 am
12392517.1 Variation of Mortgage 7152071.7 - 9.3.2022 at 1:40 pm

References

Prior C/T 74/145

Land and Deeds 69

Transfer No.

N/C. Order No. 915136.3



REGISTER

No. 310 / 706

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT

This Certificate dated the 15th day of April one thousand nine hundred and eighty-eight under the seal of the District Land Registrar of the Land Registration District of WELLINGTON

WITNESSETH that PAMISH BARRIE ANDERSON of Eketahuna, Farmer

is seized of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or endorsed hereon) in the land hereinafter described, delineated with bold black lines on the plan hereon, be the several admeasurements a little more or less, that is to say: All that parcel of land containing 79.6421 hectares more or less situate in the County of Eketahuna being Lot 1 on Deposited Plan 665.

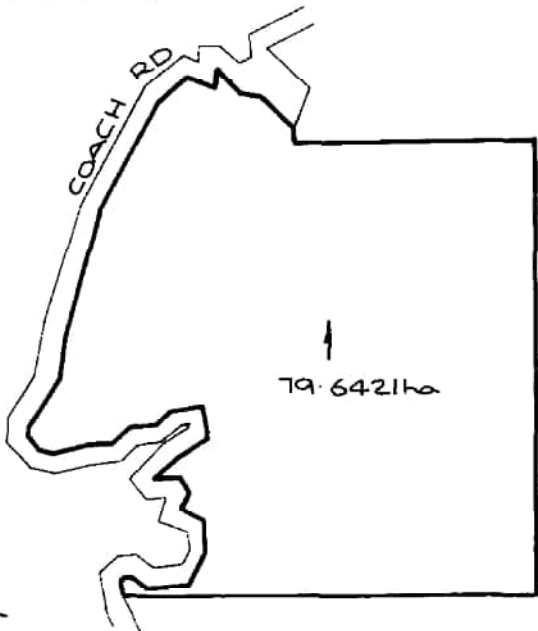


Assistant Land Registrar

Interests at date of Issue

- 1. 262764.3 Mortgage to Rural Banking and Finance Corporation - 29.1.1978 at 11.24 am. *DISCHARGED 2074584-1 11.4.1990*
- 2. 262764.4 Variation of the terms of mortgage 262764.3.
- 3. 297475.2 Mortgage to Rural Banking and Finance Corporation - 23.1.1980 at 2.05 pm. *DISCHARGED 2626172-1 11.4.1990*
- 4. 297475.3 Memorandum of Priority making mortgages 297475.2 and 262764.3 first and second mortgages respectively - 23.1.1980 at 2.05 p.m.

- 5. 471197.1 Variation of the terms of mortgage 297475.2 - 29.1.1982 at 1.34 p.m.
- 6. 649526.1 Variation of the terms of mortgage 297475.2 - 8.10.1984 at 2.59 p.m.
- 7. 649526.2 Mortgage to Westpac Banking Corporation - 9.7.1992 at 11.30 a.m. *DISCHARGED 242743-1 21.11.1992*
- 8. 783723.4 Variation of the terms of mortgage 297475.2 - 11.6.1986 at 2.50 p.m.
- 9. 915136.1 Mortgage to Rural Banking and Finance Corporation - 15.4.1988 at 1.59 p.m. *DISCHARGED BC52276-1 11.4.1991*
- 10. 915136.2 Memorandum of Priority making mortgages 915136.1, 262764.3 and 649526.2 second, third and fourth mortgages respectively - 15.4.1988 at 1.59 p.m.



Measurements are Metric

B.158784.1 Transfer of an undivided 1/2 share to Jennifer Margaret Anderson of Eketahuna, Farmer - 9.5.1991 at 10.49 a.m.

[Signature] A.L.R.

B.242743.2 Mortgage to Westpac Banking Corporation - 9.7.1992 at 11.30 a.m.

[Signature] A.L.R.


No. 310 / 706

M.K. Au.

[Signature]

CERTIFICATE OF TITLE No. 310 / 706

B772868.1 Variation of Mortgage B242743.2
10.03.2000 at 9.00


FOI RGL





**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy**



Identifier **WN31D/706**
Land Registration District **Wellington**
Date Issued 15 April 1988

Prior References

WN74/145

Estate Fee Simple
Area 79.6421 hectares more or less
Legal Description Lot 1 Deposited Plan 665

Registered Owners

Rocky Hills Farming Company Limited

Interests

7152071.7 Mortgage to Westpac New Zealand Limited - 8.12.2006 at 9:00 am
8544331.1 CAVEAT BY MERIDIAN ENERGY LIMITED - 15.7.2010 at 10:34 am
12392517.1 Variation of Mortgage 7152071.7 - 9.3.2022 at 1:40 pm

N^o 665

General Survey Department of New Zealand.
Survey under Section 171 of the Land Transfer Act.

Received for deposit the
27th July 1894

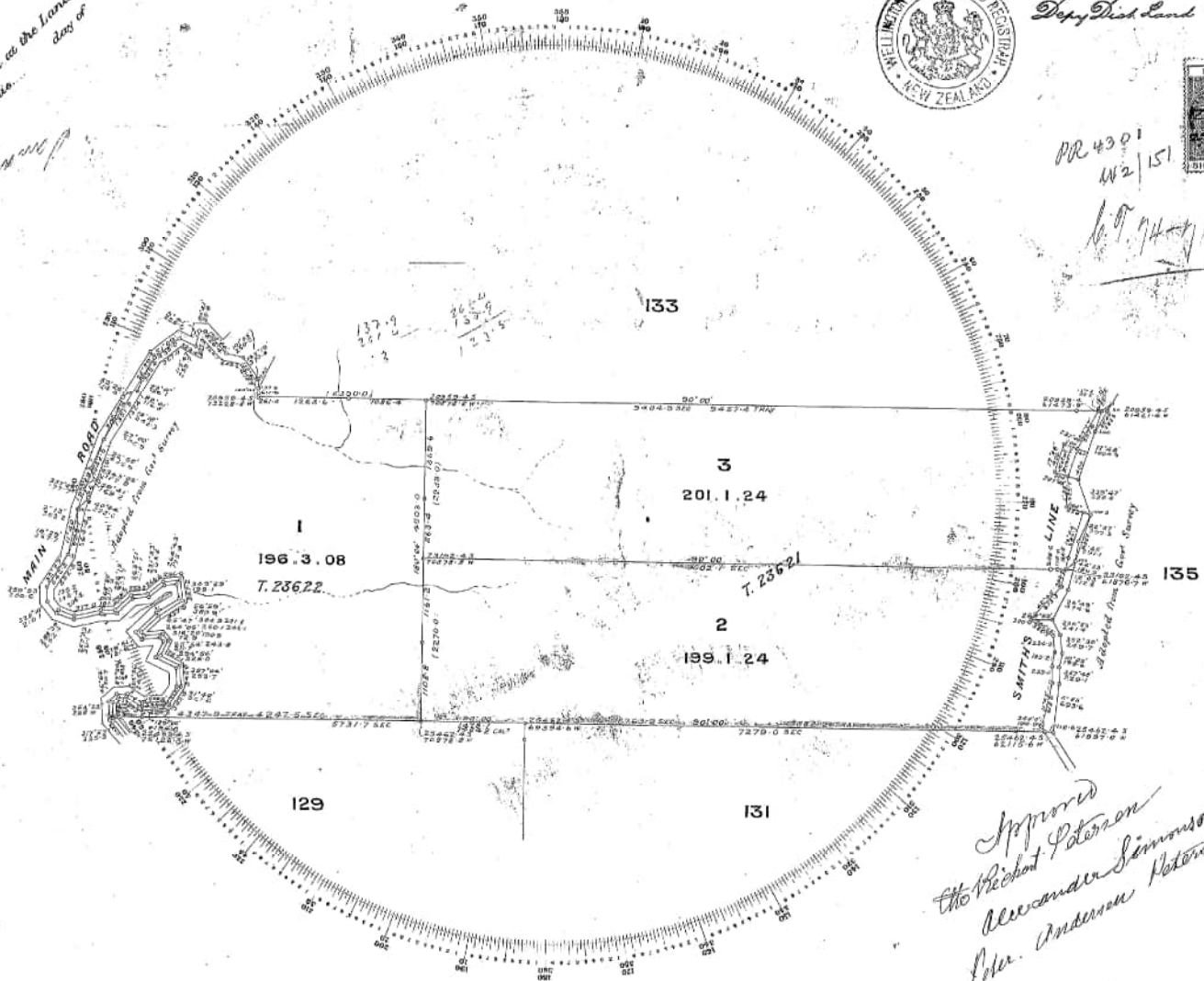
M. Han
Deputy Dist. Land Reg.



PR 430
W2/151

6.9.94

Received at the Land Transfer Survey Office
this ... day of ... 18...



Approved
The Richard Petersen
Alexander Simonsen
Peter Anderson Petersen

Approved
A. David
District Land Registrar
26th July 1894

Plan of Subdivision of Section 132 Block XIII Mangaone S.D.
Surveyed for Messrs. Petersen & Co.
By John King O'Connell Surveyor.
April 11 1894
Scale 10 Chains to an Inch.

xxxiii p 18
Book I
2. 10. 94



**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Historical Search Copy**




R. W. Muir
Registrar-General
of Land

Constituted as a Record of Title pursuant to Sections 7 and 12 of the Land Transfer Act 2017 - 12 November 2018

Identifier **WN31D/709**
Land Registration District **Wellington**
Date Issued 15 April 1988

Prior References

WN74/145

Estate Fee Simple
Area 162.1980 hectares more or less
Legal Description Lot 2-3 Deposited Plan 665

Original Registered Owners

Hamish Barrie Anderson as to a 1/2 share
Jennifer Margaret Anderson as to a 1/2 share

Interests

B242743.2 Mortgage to Westpac Banking Corporation - 9.7.1992 at 11.30 am
B772868.1 Variation of Mortgage B242743.2 - 10.3.2000 at 9:00 am
5525052.4 Variation of Mortgage B242743.2 - 19.3.2003 at 9:00 am
7095691.1 Application pursuant to Section 99A Land Transfer Act 1952 vesting Mortgage B242743.2 in Westpac New Zealand Limited - 2.11.2006 at 9:00 am
7152071.3 Discharge of Mortgage B242743.2 - 8.12.2006 at 9:00 am
7152071.5 Transfer to Rocky Hills Farming Company Limited - 8.12.2006 at 9:00 am
7152071.7 Mortgage to Westpac New Zealand Limited - 8.12.2006 at 9:00 am
8544331.1 CAVEAT BY MERIDIAN ENERGY LIMITED - 15.7.2010 at 10:34 am
12392517.1 Variation of Mortgage 7152071.7 - 9.3.2022 at 1:40 pm

References

Prior C/T 74/145

Land and Deeds 69

Transfer No.
N/C. Order No. 915136.3



REGISTER

No. 310 / 709

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT

This Certificate dated the 15th day of April one thousand nine hundred and eighty-eight under the seal of the District Land Registrar of the Land Registration District of WELLINGTON

WITNESSETH that HAMISH BARRIE ANDERSON of Eketahuna, Farmer

is seized of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or endorsed hereon) in the land hereinafter described, delineated with bold black lines on the plan hereon, be the several admeasurements a little more or less, that is to say: All that parcel of land containing 162.1980 hectares more or less situate in the County of Eketahuna being Lots 2 and 3 on Deposited Plan 665



Assistant Land Registrar

Interests at date of Issue

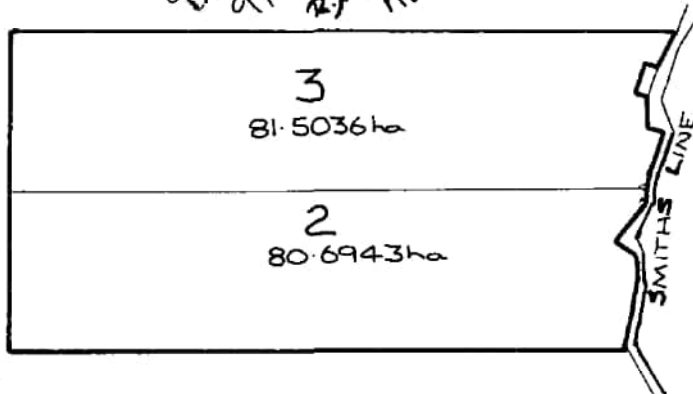
- 1. 262764.3 Mortgage to Rural Banking and Finance Corporation - 11.24.1980 at 11.24 a.m. *B074589.1 DISCHARGED*
- 2. 262764.4 Variation of the terms of mortgage 262764.3.
- 3. 297475.2 Mortgage to Rural Banking and Finance Corporation - 23.1.1980 at 2.05 p.m. *B026172.142 DISCHARGED*
- 4. 297475.3 Memorandum of Priority making mortgages 297475.2 and 262764.3 first and second mortgages respectively - 23.1.1980 at 2.05 p.m.
- 5. 471197.1 Variation of the terms of mortgage 297475.2 - 29.1.1982 at 1.34 p.m.
- 6. 649526.1 Variation of the terms of mortgage 297475.2 - 8.10.1984 at 2.59 p.m.
- 7. 649526.2 Mortgage to Westpac Banking Corporation - 9.7.1992 at 2.50 p.m. *B242743.1 DISCHARGED*

- 8. 783723.4 Variation of the terms of mortgage 297475.2 - 11.6.1986 at 2.50 p.m. *B032751 DISCHARGED*
- 9. 915136.1 Mortgage to Rural Banking and Finance Corporation - 15.4.1988 at 1.59 p.m.
- 10. 915136.2 Memorandum of Priority making mortgages 915136.1, 262764.3 and 649526.2 second, third and fourth mortgages respectively - 15.4.1988 at 1.59 p.m.

B.158784.1 Transfer of an undivided 1/2 share to Jennifer Margaret Anderson of Eketahuna, Farmer - 9.5.1991 at 10.49 a.m.

B.242743.2 Mortgage to Westpac Banking Corporation - 9.7.1992 at 11.30 a.m.

B772868.1 Variation of Mortgage B242743.2 10.03.2000 at 9.00



TOTAL AREA 162.1980ha
Measurements are Metric

No. 310 / 709

M.K.

CERTIFICATE OF TITLE No. 310 / 709





**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy**




R. W. Muir
Registrar-General
of Land

Identifier **WN31D/709**
Land Registration District **Wellington**
Date Issued 15 April 1988

Prior References

WN74/145

Estate Fee Simple
Area 162.1980 hectares more or less
Legal Description Lot 2-3 Deposited Plan 665

Registered Owners

Rocky Hills Farming Company Limited

Interests

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8544331.1 CAVEAT BY MERIDIAN ENERGY LIMITED - 15.7.2010 at 10:34 am
12392517.1 Variation of Mortgage 7152071.7 - 9.3.2022 at 1:40 pm

N^o 665

General Survey Department of New Zealand.
Survey under Section 171 of the Land Transfer Act.

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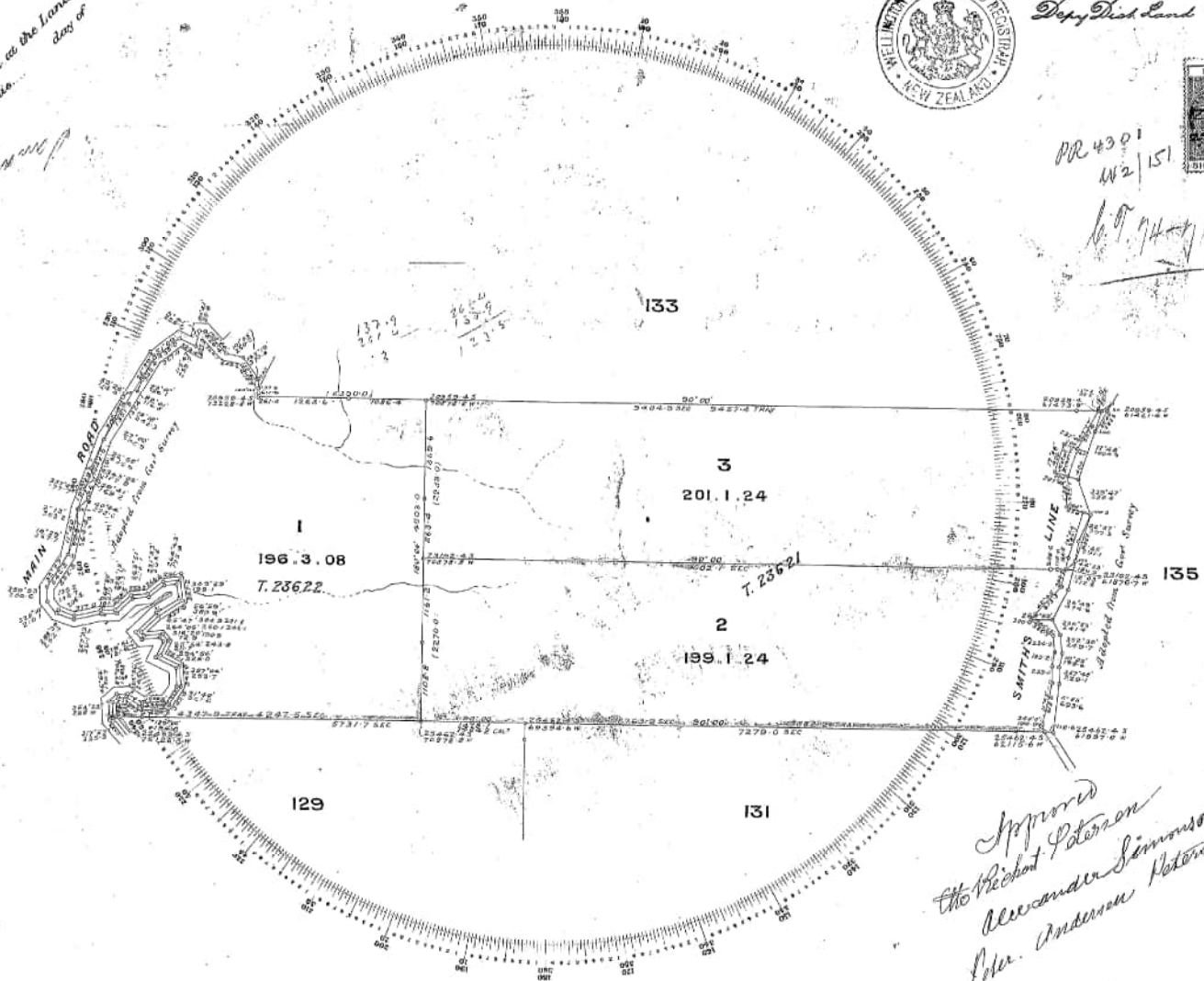
M. Han
Deputy Dist. Land Reg.



PR 430
W2/151

6.9.94

Received at the Land Transfer Survey Office
this ... day of ... 18...



Approved
The Richard Petersen
Alexander Simonsen
Peter Anderson Petersen

Approved
A. David
District Land Registrar
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Plan of Subdivision of Section 132 Block XIII Mangaone S.D.
Surveyed for Messrs. Petersen & Co.
By John King O'Connell Surveyor.
April 11 1894
Scale 10 Chains to an Inch.

xxxiii p 18
Book I
2. 10. 94

Appendix G Historic aerial photographs

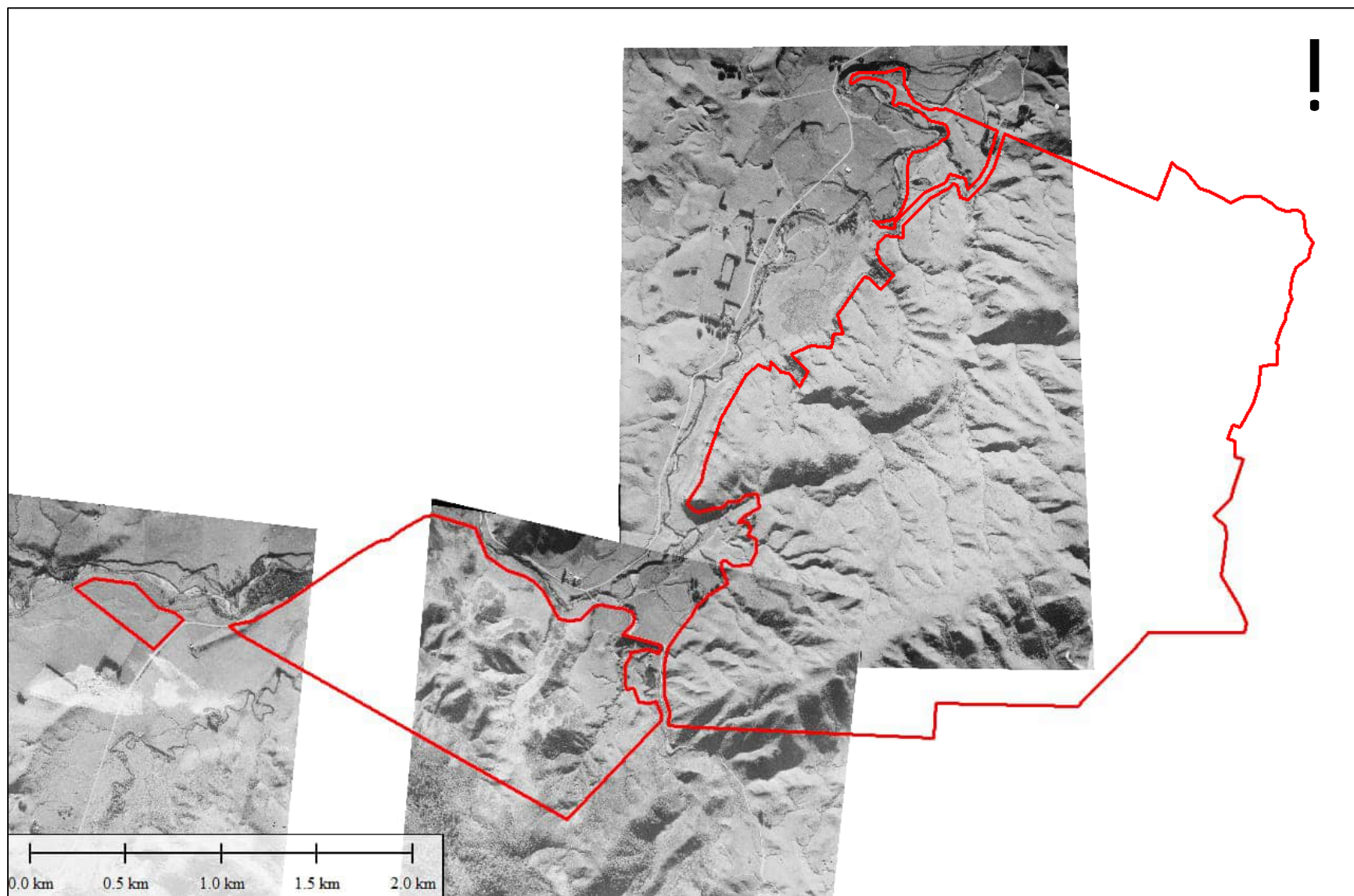


Figure Appendix G.1: 1944 Historic Aerial Image, sourced from Retrolens. Site boundary depicted by red line.

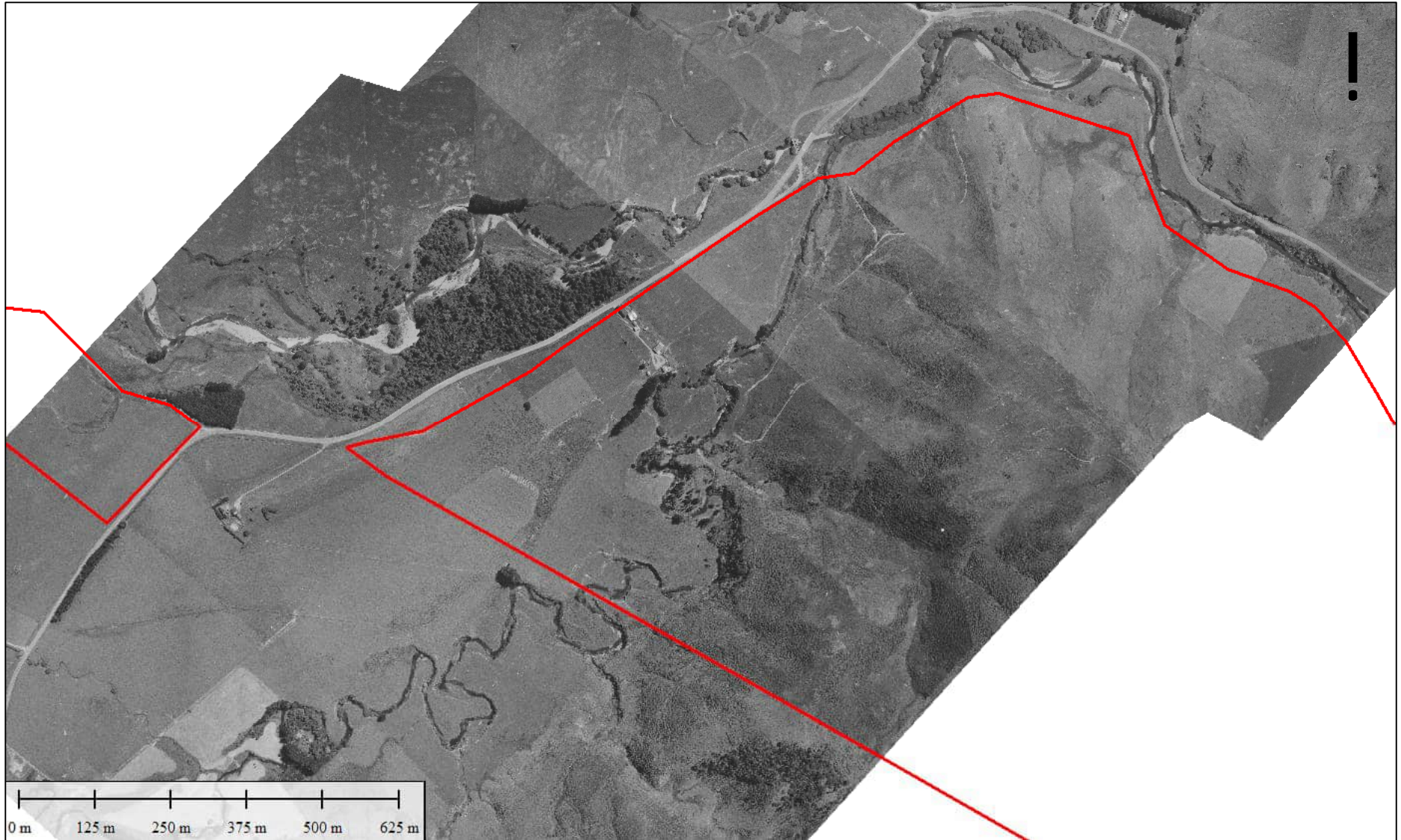


Figure Appendix G.2: 1961 Historic Aerial Image, sourced from Retrolens. Partial site boundary depicted by red line.

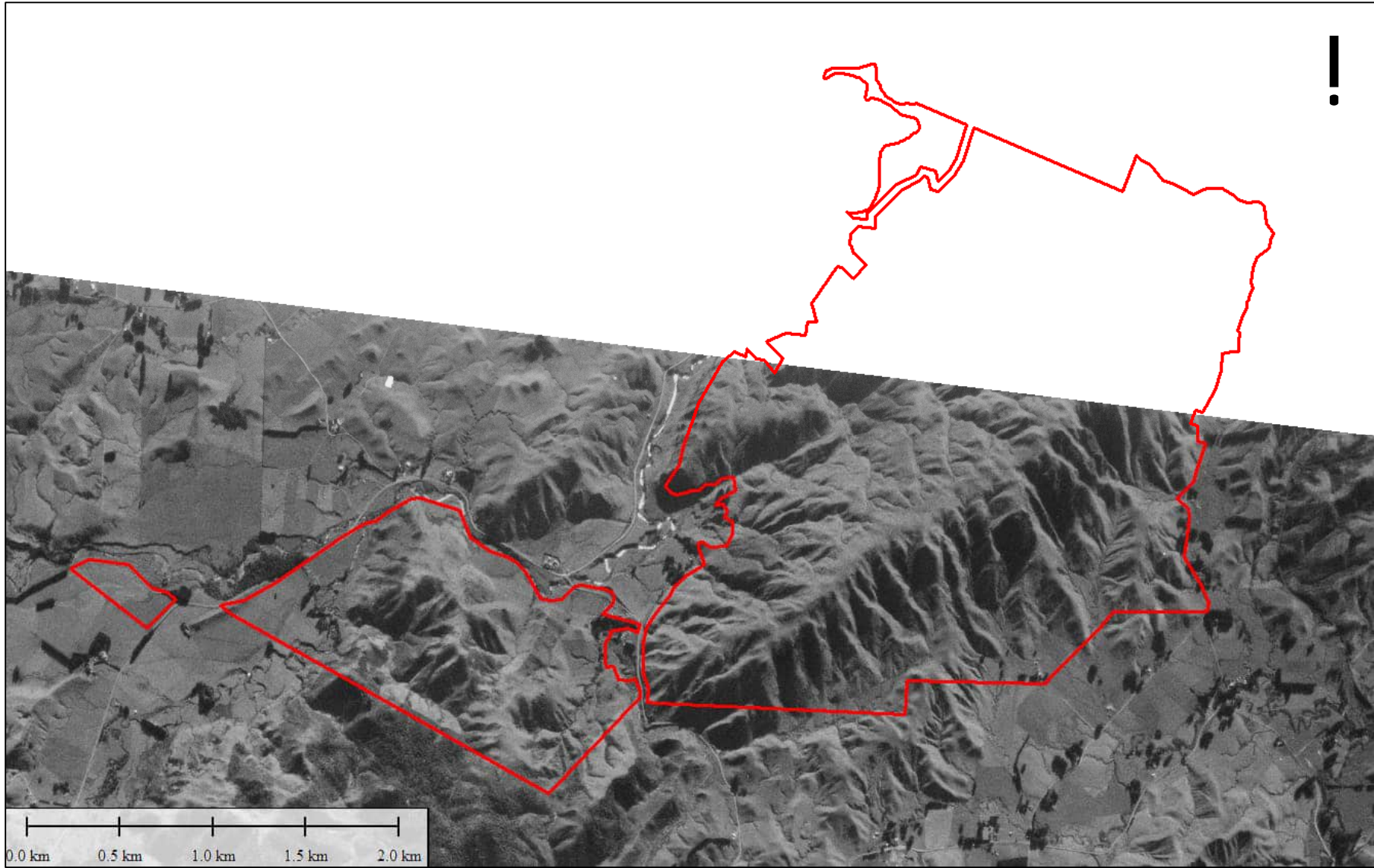


Figure Appendix G.3: 1968 Historic Aerial Image, sourced from Retrolens. Site boundary depicted by red line.

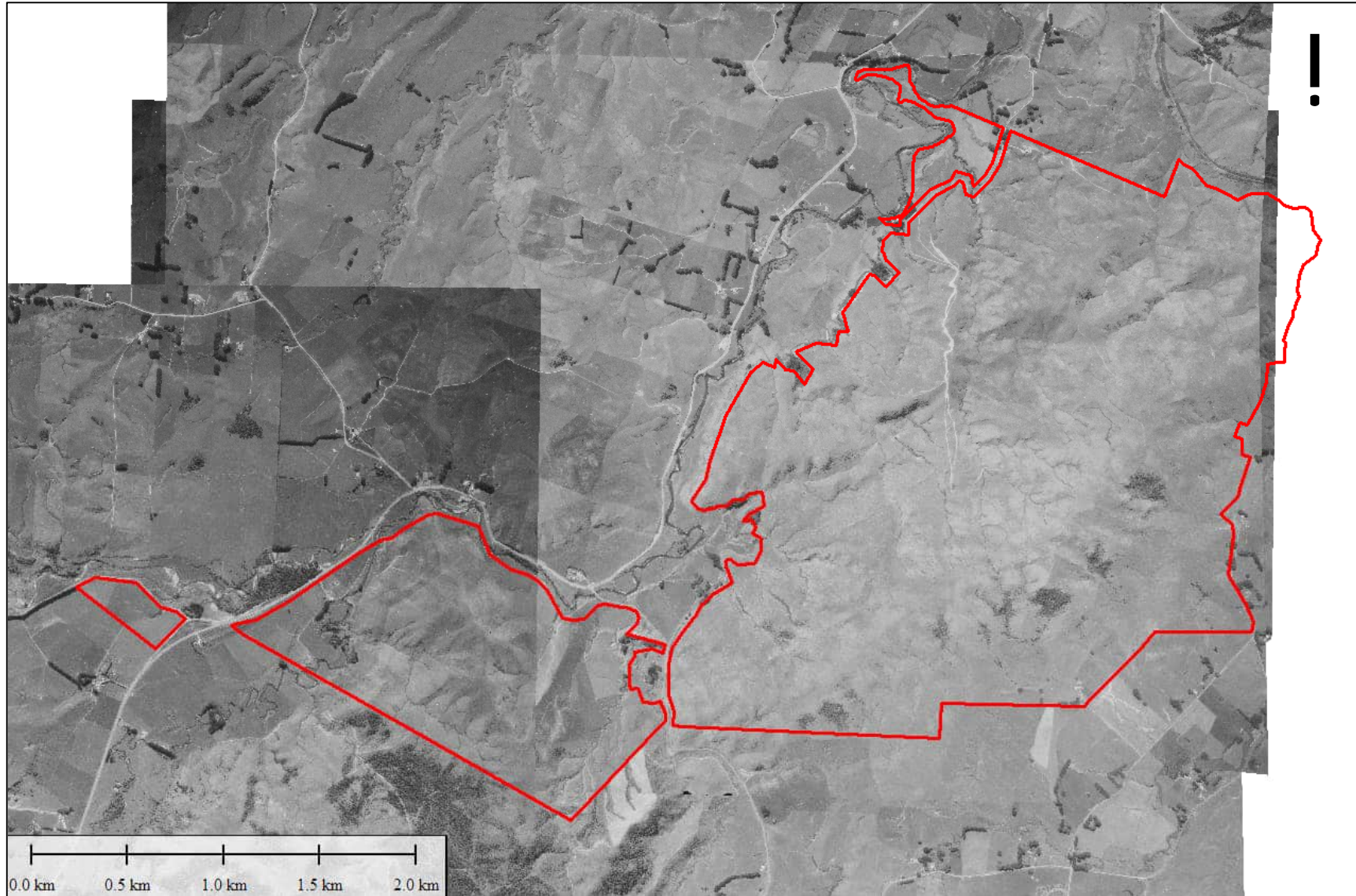


Figure Appendix G.4: 1977 Historic Aerial Image, sourced from Retrolens. Site boundary depicted by red line.

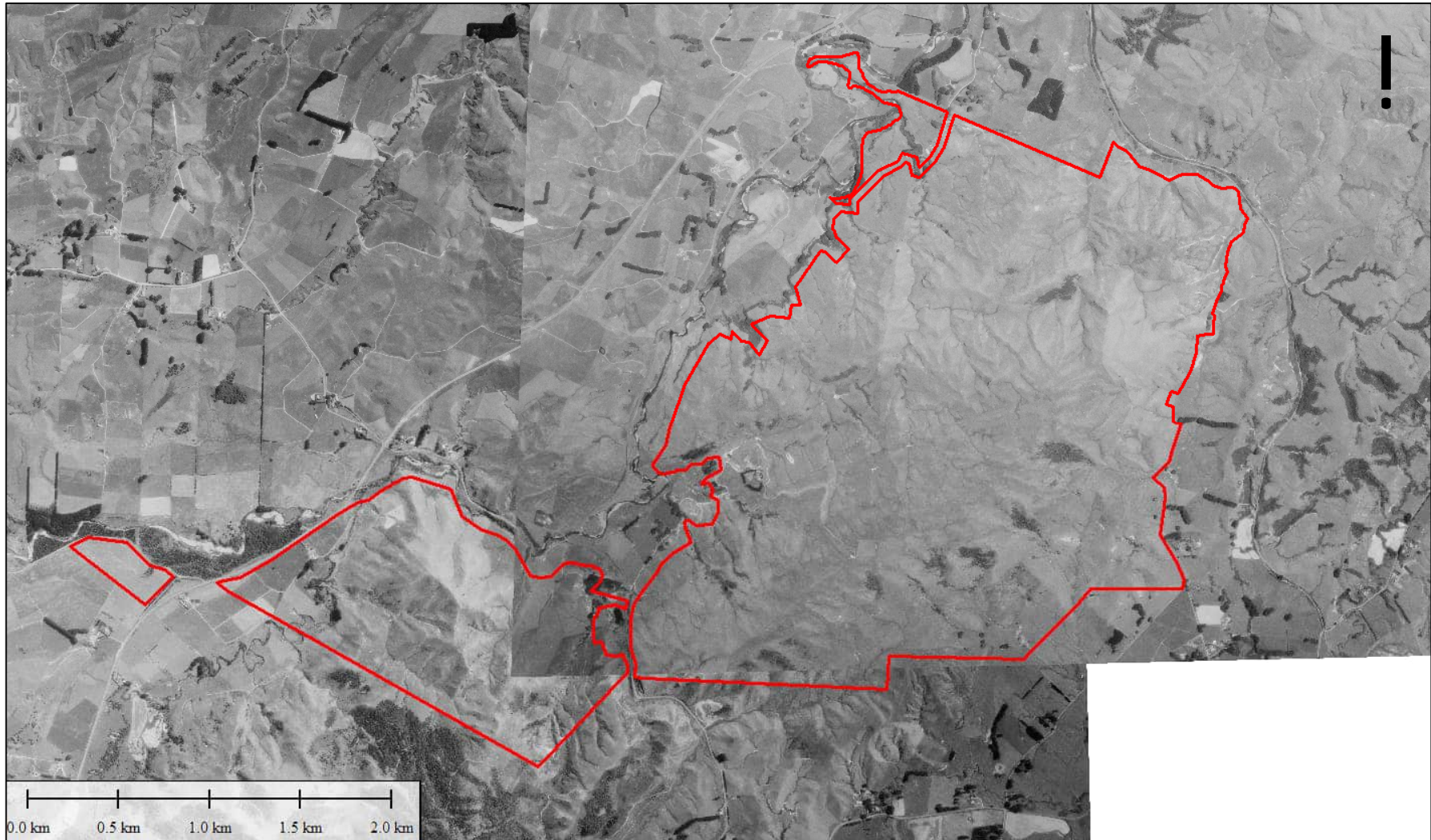


Figure Appendix G.5: 1995 Historic Aerial Image, sourced from Retrolens. Site boundary depicted by red line.

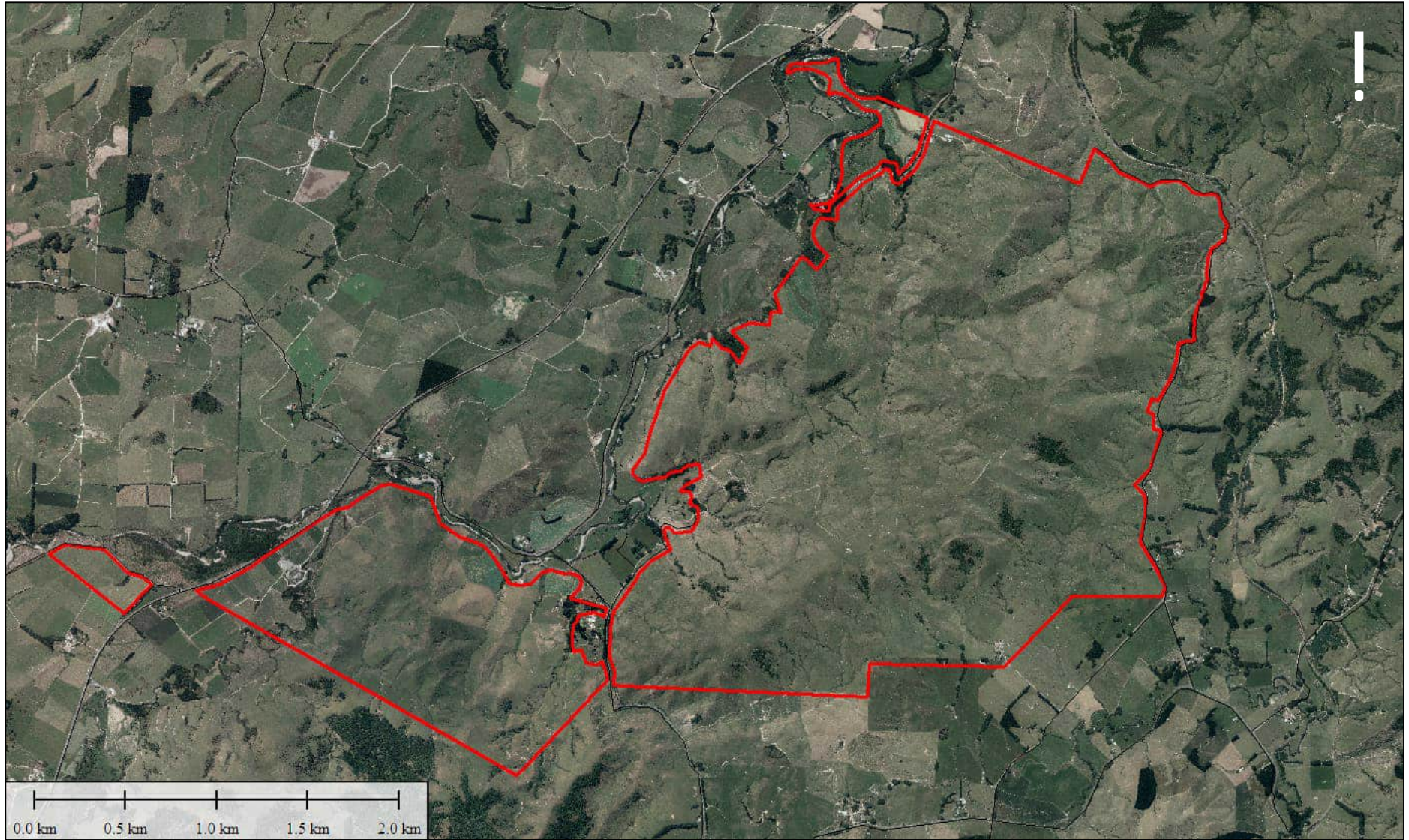


Figure Appendix G.6: 2010 Historic Aerial Image, sourced from Land Information New Zealand. Site boundary depicted by red line

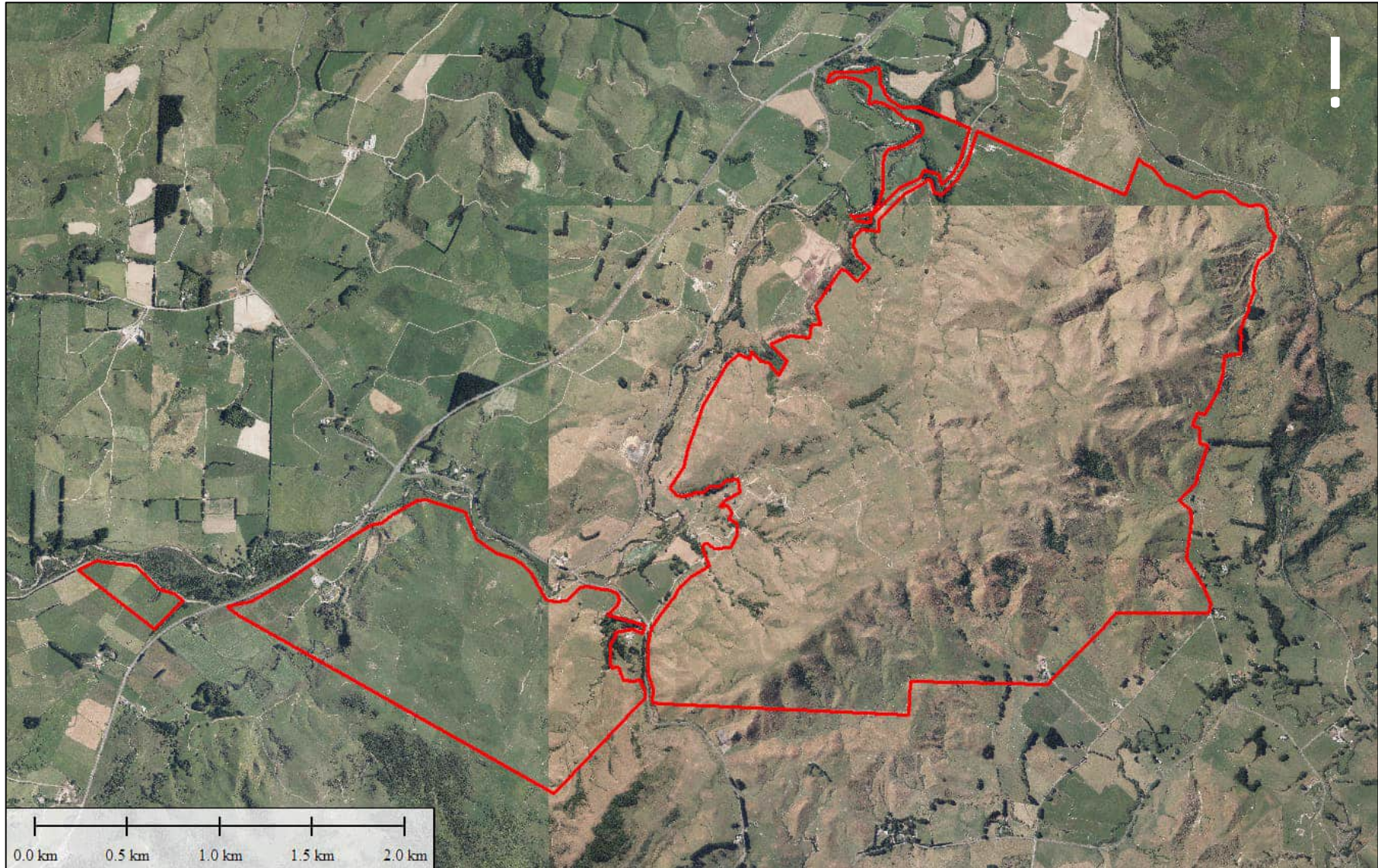


Figure Appendix G.7: 2021 Historic Aerial Image, sourced from Land Information New Zealand. Site boundary depicted by red line

Appendix H Relevant District Council property file
information

CODE COMPLIANCE CERTIFICATE

No. 304143

Section 95, Building Act 2004

Form 7



BUILDING

Street address of the building:	85 Coach Road, Eketahuna
Legal description of land where building is located:	Lot: 1 DP: 665
Building name:	
Location of building within site/block number:	
Current, lawfully, established use:	Housing - Detached Dwellings
Assessment number:	
Valuation number:	17700/511.00
Year first constructed	Unknown
Level Unit Number:	1
Description	Install a Viessmann 200 -T Diesel Boiler, 450 litre diesel tank, 10 Radiators and 1 Towel Rail

OWNER

Name of Owner:	Rocky Hills Farming Co Ltd
Mailing Address:	171 Opaki Kaiparoro Road, RD 2, Eketahuna 4994
Street Address/Registered Office:	
Phone number – Landline:	
Phone number – Mobile:	
Phone number – Daytime:	
Phone number – After hours:	
Email address:	bradandjacs@xtra.co.nz
Facsimile number:	
Website:	

First Point of Contact for Communications with the Council/Building Consent Authority

Name:	Verhaart and Laffey Plumbing Ltd
Contact:	
Mailing Address:	21 Villa Street, Masterton 5810
Phone number – Landline:	06 370 3200
Phone number – Mobile:	
Facsimile number:	
Email address:	

Building Work

Building Consent number: **304143**

Issued by: **Tararua District Council**

Code Compliance

The Building Consent Authority named below is satisfied, on reasonable grounds, that:

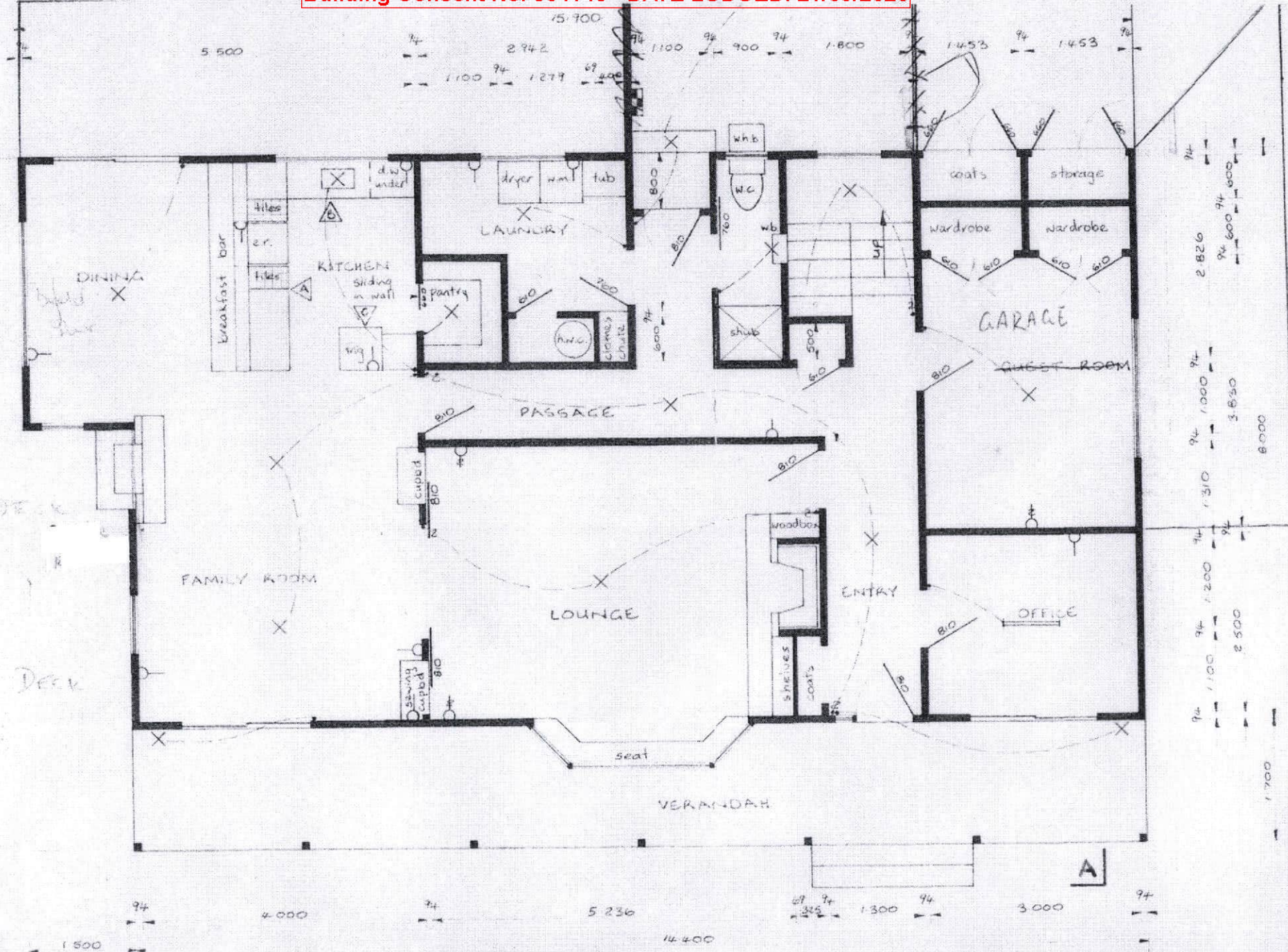
Building work complies with the building consent.



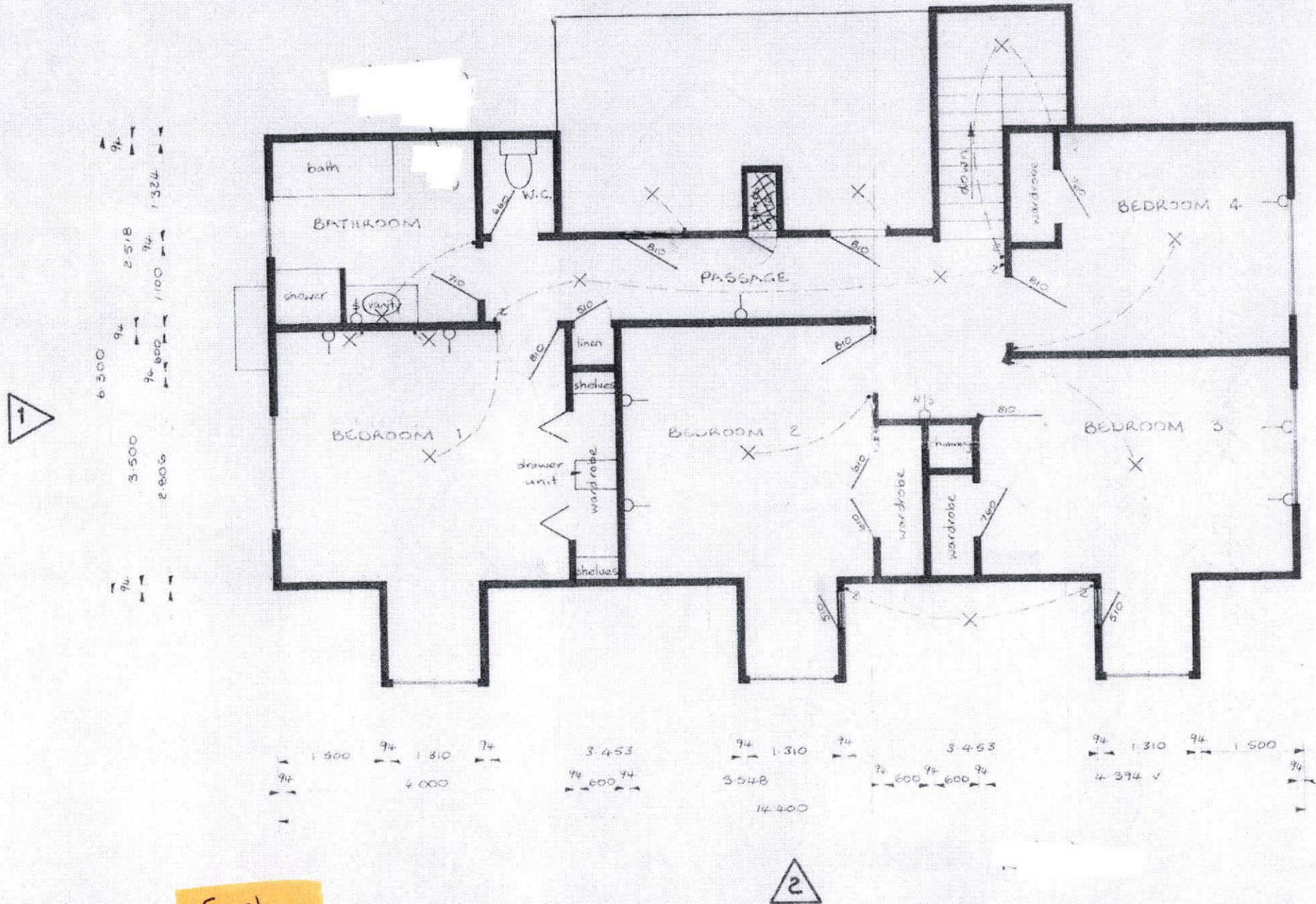
Trevor Burlace
Building Officer

On behalf of: Tararua District Council

Date: 27 October 2020

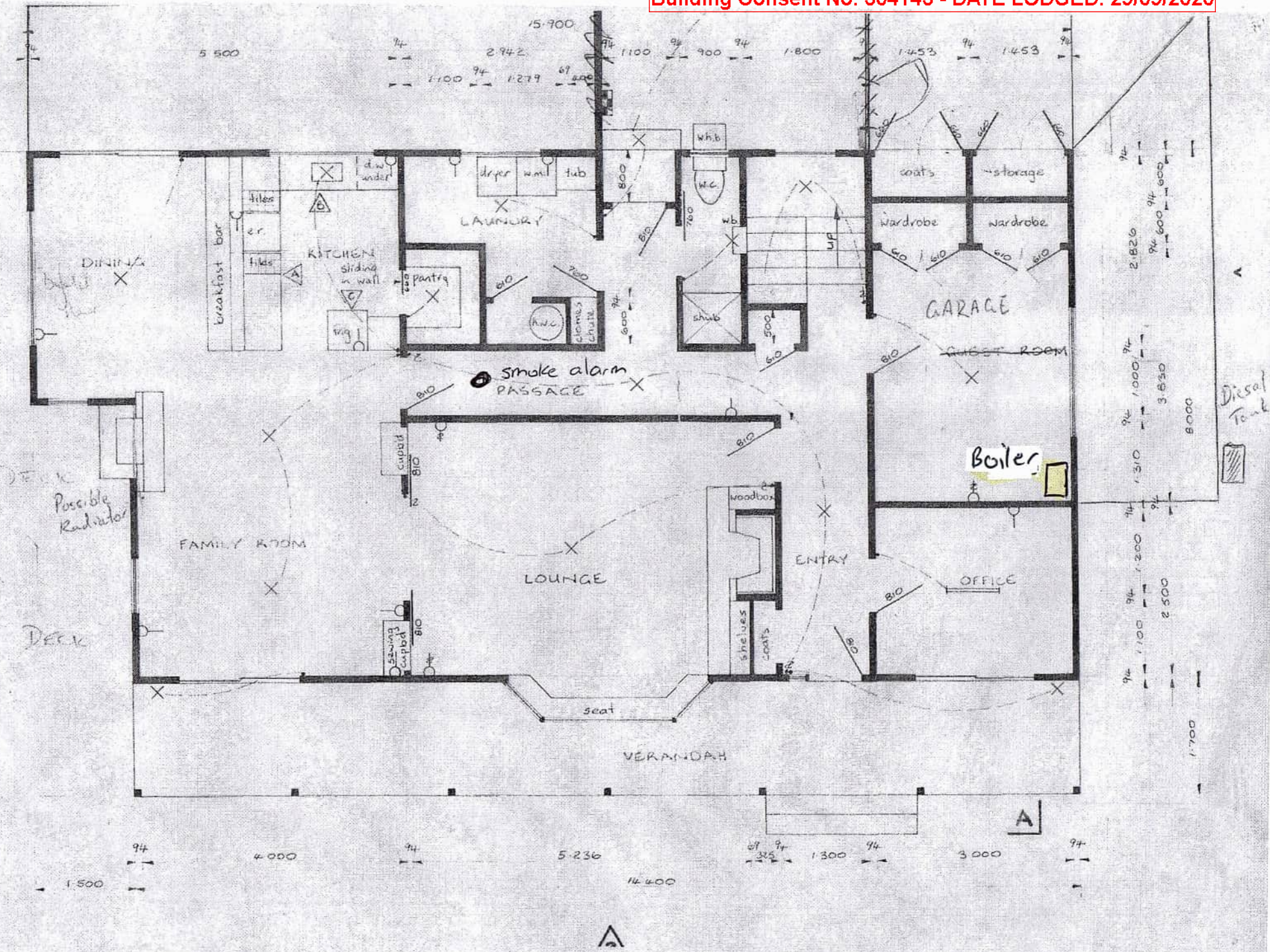


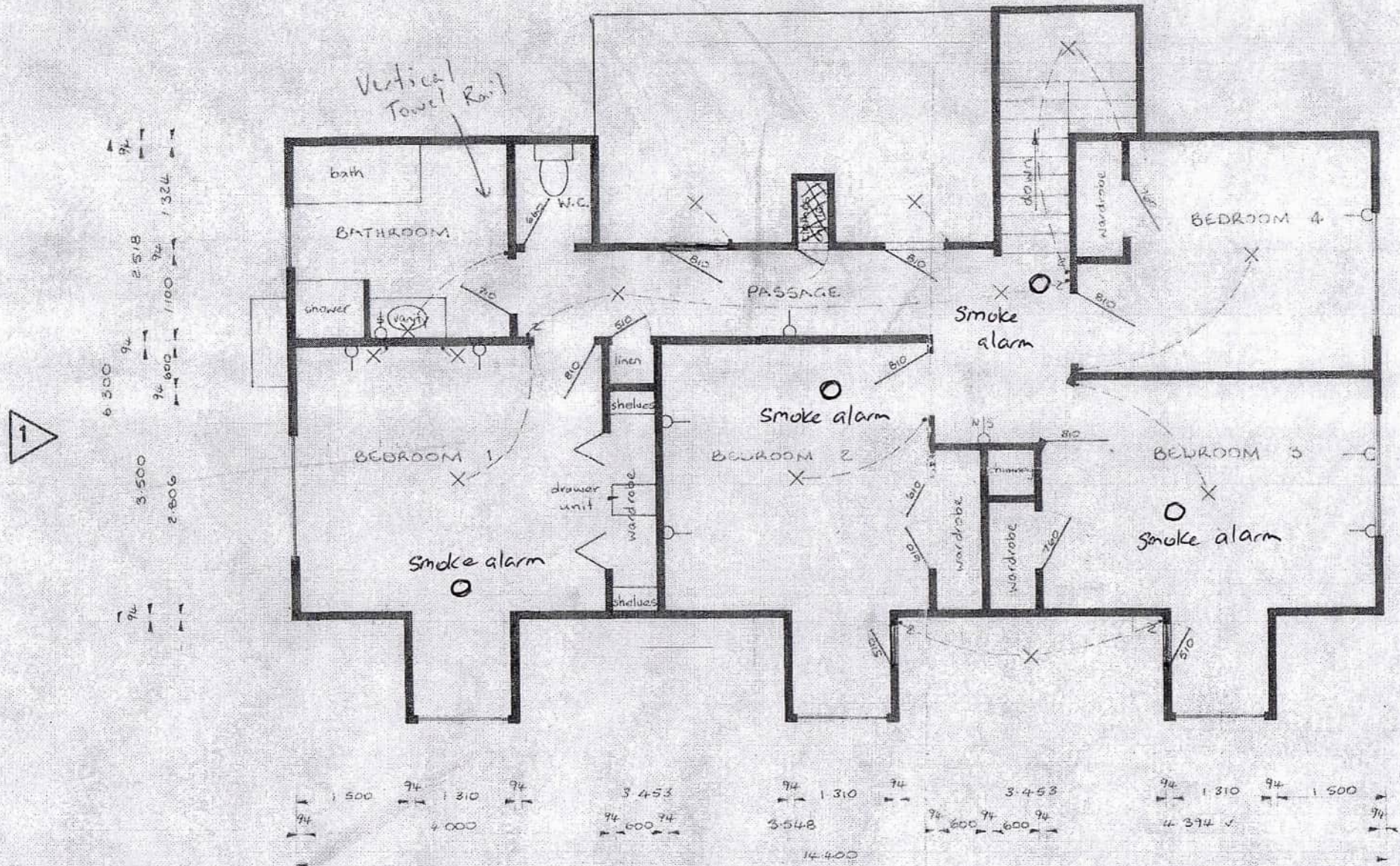
Existing Ground floor



Existing
UPPER FLOOR PLAN

Boiler location = smoke alarm
BC 304143

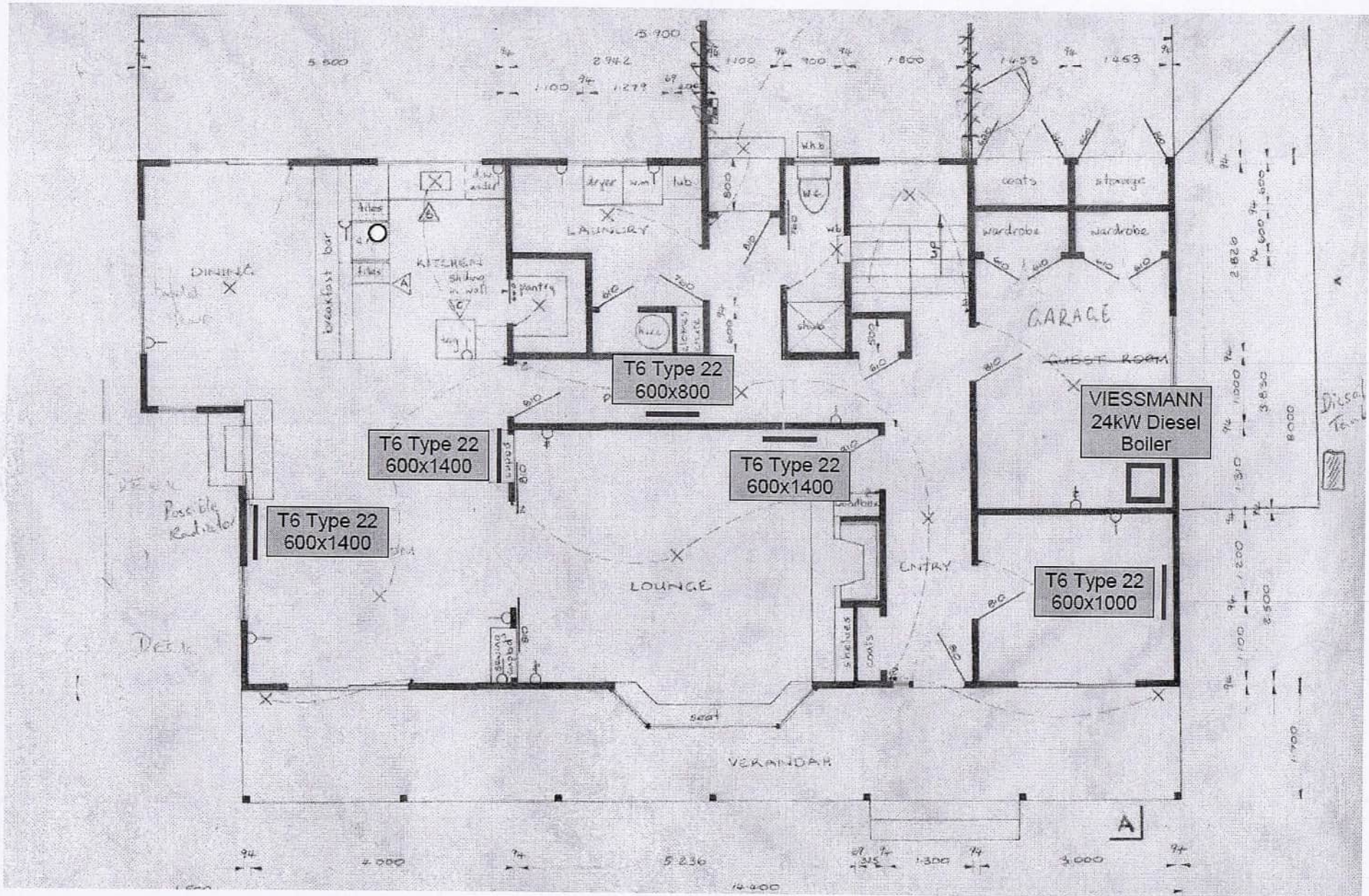




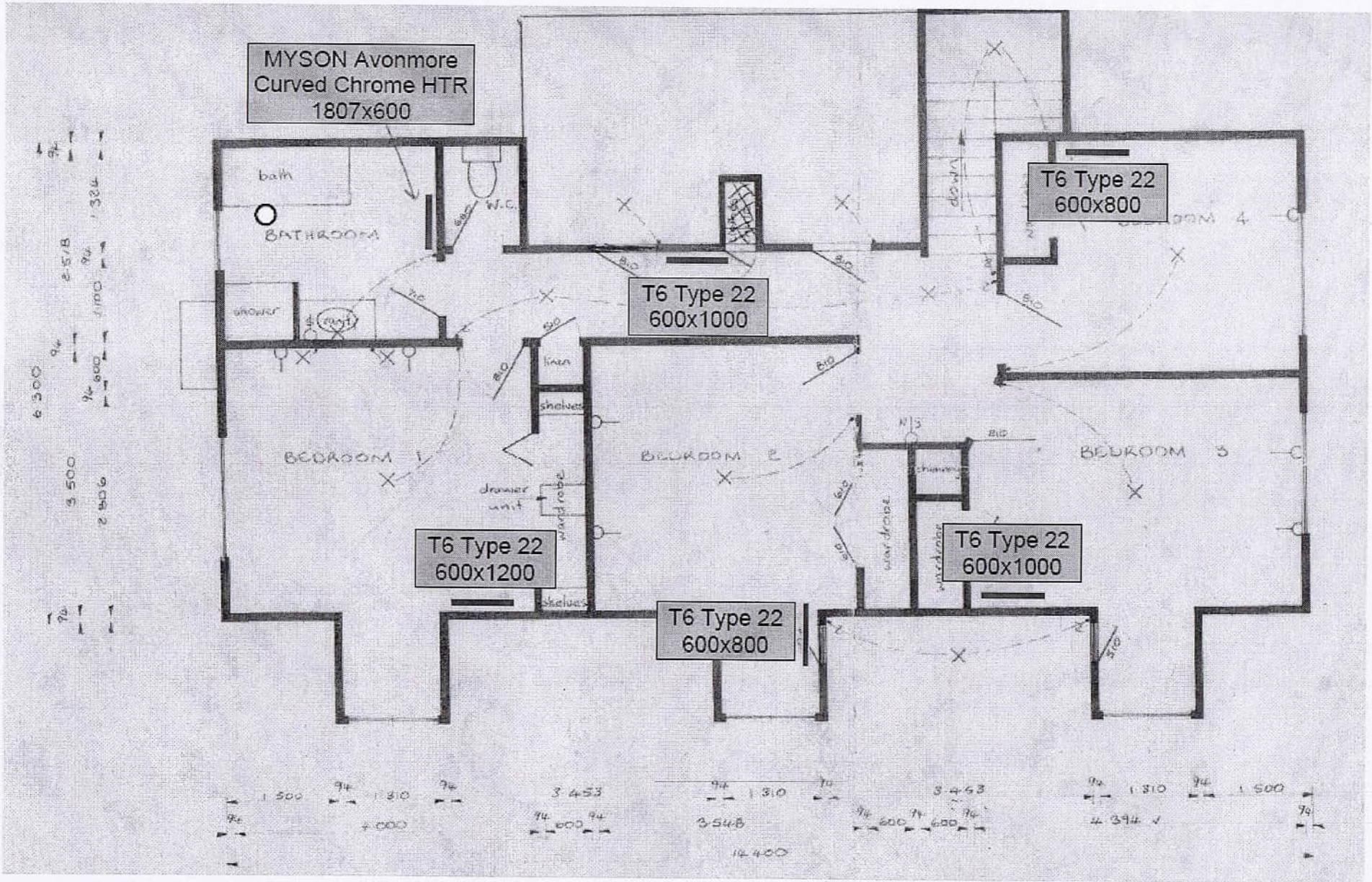
Smoke alarms BC 304143
UPPER FLOOR PLAN



Radiator



Boiler + Radiators



Radiators

Appendix I Regional Council contamination
enquiries

By email

18 July 2023

File No: SN/06/041/02

PO Box 11646
Shed 39
Wellington
New Zealand
T 04 384 5708
F 04 385 6960
www.gw.govt.nz

Kasey Pitt
Contaminated Land Consultant
Tonkin + Taylor
Level 4, 2 Hunter Street
Wellington 6011

For :<Kpitt@tonkintaylor.co.nz>

Dear Kasey Pitt

Notification of property recorded on the Selected Land Use Register

Thank you for your enquiry on the following property:

Property/site address: 0 North Rd, Masterton District

Legal description: SEC 177 BLOCK XIII MANGAONE SD SO 12777-GRAVEL RESERVE-TIMBER NOT VALUED

File site number: SN/06/041/02

This letter is to inform you that the property, or a portion of the property, identified above appears on the Greater Wellington Regional Council's Selected Land Use Register (SLUR).

The SLUR is a database of sites that have, or may have, been used for activities and industries from the Hazardous Activities and Industries List (HAIL) established by the Ministry for the Environment. Further explanation on the HAIL and each of the categories in the SLUR database are provided in the attached factsheet included with this letter.

The site is included on the SLUR because it is believed to have been, or has been, used for the following hazardous activity or industry listed on the HAIL:

HAIL category and activity – *Cemeteries and waste recycling, treatment and disposal - Landfill sites*

DOCUMENT1



The property identified above appears on the SLUR in the following category:

SLUR category – *Contamination Confirmed*

A summary of the information and site history currently available on the SLUR is as follows:

This site was an old gravel reserve which has been used as a landfill accepting general refuse. The site was assessed as part of 'Landfills in the Wellington Region' - A Wellington Regional Council Technical Report (1998). The results indicated a discharge of leachate into the Kopuaranga River (which is valued for fish). While in general the level of contaminants were below ANZECC criteria for both aquatic ecosystems protection and stock watering, some further sampling was considered warranted to adequately characterise the effects of the discharge on the environment. Greater Wellington does not hold results to suggest any further sampling has been done. The site is now used for hardfill.

We have derived the above information from the GWRC's SLUR and made it available to you under the Local Government Official Information and Meetings Act 1987.

GWRC has made every reasonable effort to provide current and accurate information in this letter. However, to the fullest extent permitted in law, GWRC, its officers, employees and agents accept no responsibility or liability for any inaccuracy in, or omission from, the information set out in this letter or liability for any loss or damage suffered by any person which may directly or indirectly result from any person acting or refraining from acting or as a result of reliance placed on such information.

The information set out in this letter has been prepared for the recipient to whom it is addressed and is intended for that recipient's use only. It is not intended to be relied on by any other party.

Yours sincerely
Nicole Blackie
Contaminated Land Analyst

slur@gw.govt.nz

Encl: SLUR and HAIL factsheet

Please note the following:

1. The information set out in this letter reflects GWRC's current understanding of this site and does not include information that may be held by the relevant territorial authority or by other organisations.
2. GWRC's records are not integrated with those of the territorial authorities. If you have not already done so, we recommend that you also contact the relevant territorial authority to complete your due diligence of the site and to obtain a copy of the property's LIM produced by the territorial authority.

In addition:

3. Pastoral farming is not specifically included on the HAIL (2011) and is not included in the SLUR. The HAIL includes typical farming activities of horticulture, sheep dipping and bulk chemical and fuel storage. These activities are more difficult to identify and may not be as well represented on the SLUR. If you are interested in purchasing pastoral land you should consider gathering further information from other sources about the former activities undertaken on the property.
4. It is also important to consider that lead-based paint and asbestos products may have been used in older buildings on the property and can, in some cases, pose a risk of contamination.
5. The use of lead-based paint is not recorded on the SLUR unless information has been received by GWRC to that effect, such as an investigation report, showing that contaminants in the soil are above the relevant guideline values.
6. Buildings containing asbestos in deteriorated condition can result in asbestos fibres in the soil; the use of asbestos in building materials is not recorded on the SLUR unless it is known to GWRC that a building (or former building) on the site contains (or has contained) asbestos in a deteriorated condition and GWRC has received information to that effect.



Selected Land Use Register (SLUR) factsheet

Sites that are registered on the Greater Wellington Regional Council's SLUR are known (or suspected) to have been involved (historically or currently) in the use, storage or disposal of substances from one or more hazardous activities/industries identified by the Ministry for the Environment. In some cases the sites on the SLUR will be "contaminated sites" and in others not.

The SLUR classifies sites under six categories:

Category I – Verified History of Hazardous Activity or Industry

A site classified as "Verified History of Hazardous Activity or Industry" is a site for which a past or present use has been confirmed as falling within one of the definitions on the Hazardous Activities and Industries List (HAIL). Assignment to this category does not imply the site is contaminated, but merely that hazardous substances have been used, stored or disposed of on the site and therefore there is a potential for site contamination to have occurred.

Category II – Unverified History of Hazardous Activity or Industry

A site classified as "Unverified History of Hazardous Activity or Industry" is a site for which its past or present use is the subject of an unconfirmed report that indicates that it falls within one of the definitions on the HAIL. Assignment to this category does not imply the site is contaminated, but merely that there is a possibility that hazardous substances have been used, stored or disposed of on the site and site contamination may have occurred. The reports could be from an external source or from a general information search carried out by the GWRC. A site remains under this category until further information is available that enables it to be transferred to another category.

Category III – Contamination Confirmed

A site classified as "Contamination Confirmed" is a site where there is evidence that hazardous substances exist above background concentrations AND it is a likely that adverse effects on human health (subject to exposure path) or the environment will occur based on the current or foreseeable site use. This category is for sites that the council holds information on, typically as a result of a site investigation that shows contaminants are present on the site at concentrations that exceed relevant guidelines. A site remains in this category until it is remediated or managed in such a way that it can be transferred to Category IV.

Category IV – Contamination Acceptable, Managed/Remediated

A site classified as "Contamination Acceptable, Managed/Remediated" is a site where there is clear evidence that residues of hazardous substances exist above background concentrations BUT the level of risk of adverse effects on human health or the environment is shown to be acceptable for the particular land use. Either the concentrations are below relevant guideline levels OR remedial or management action has been taken to reduce the risks to an acceptable level. Sites may be placed in this category either because an investigation report has been received that shows the site has contaminants present in environmental media but the concentrations are below relevant guideline values, or the site has previously been registered in Category I or III and further investigation or remediation has been undertaken.

Category V – No Identified Contamination

Sites are placed in the “No Identified Contamination” category when an investigation report has been received that demonstrates an absence of contaminants above background concentrations. The investigation will have considered contaminants that could have resulted from the past or present use. Sites would be placed in this category either because the site had not been previously registered on the SLUR, but an investigation report has been received, or the site had previously been registered as Category I or II and further investigation was undertaken.

Category VI – Entered on Register in Error

A site classified as “Entered on Register in Error” is a site that has been classified under any other category, but subsequent investigation has found that the site has never been associated with any of the uses on the HAIL and there is no possibility of contamination of the site. This category is used for sites entered onto the SLUR or into the initial registration category as a result of incorrect information. The site is not removed from the register; it remains on the SLUR to correctly record the site’s history. The reasons for the original entry and reasons for the change to this category are recorded

Ministry for the Environment’s Hazardous Activities and Industries List

The Hazardous Activities and Industries List (HAIL) is a compilation by the Ministry for the Environment of activities and industries that are considered likely to cause environmental contamination resulting from hazardous substance use, storage or disposal.

The HAIL was last updated in October 2011 and contains a range of activities/industries, including:

- a) Chemical manufacture, application and bulk storage
- b) Electrical and electronic works, power generation and transmission
- c) Explosives and ordnances production, storage and use
- d) Metal extraction, refining and reprocessing, storage and use
- e) Mineral extraction, refining and reprocessing, storage and use
- f) Vehicle refuelling, service and repair
- g) Cemeteries and waste recycling, treatment and disposal
- h) Any land that has been subject to the migration of hazardous substances from adjacent land in sufficient quantity that it could be a risk to human health or the environment
- i) Any other land that has been subject to the intentional or accidental release of a hazardous substance in sufficient quantity that it could be a risk to human health or the environment

Further information and the full HAIL list is available from:

<https://www.mfe.govt.nz/land/hazardous-activities-and-industries-list-hail>

Kasey Pitt

From: HAIL <Hail.Enquiries@horizons.govt.nz>
Sent: Thursday, 20 July 2023 9:19 am
To: Kasey Pitt
Cc: hail.enquiries@horizons.govt.nz
Subject: Re: [Request ID :##112542##] HAIL Info Request | Level 4, 2 Hunter Street

Categories: TT Archived

Hi K Pitt,

I have checked Horizons Regional Council Site's Associated with Hazardous Substances (SAHS) database and I can advise that 85 and 168 Old Coach Road, Eketahuna, 85151 State Highway 2 and 85274 State Highway 2 Eketahuna property's are not recorded on our SAHS database. There is Resource Consent attached to 85151 State Highway 2

I would recommend that you check with the Tararua District Council as they may have records relating to the aforementioned property's.

Please note Horizons Regional Council hold the information for Ruapehu District Council on our SAHS database, therefore their information is included in the above advice.
Yours faithfully

Campbell Dodds | Consents Monitoring Officer
Horizons Regional Council | 11-15 Victoria Avenue | Palmerston North 4410
Free Phone: 0508 800 800 | Mobile: 021 227 3363

Exclusion of Liability Arising from Supply of Information

Horizons Regional Council endeavours to provide useful and accurate information. Horizons Regional Council shall not, however be liable whether in contract, tort, equity or otherwise, for any loss or damage of any type (including consequential losses) arising directly or indirectly from the inadequacy, inaccuracy or any other deficiency in information supplied irrespective of the cause. Use of information supplied is entirely at the risk of the recipient and shall be deemed to be acceptance of this liability exclusion.



APPENDIX 17
HARAPAKI DUST MANAGEMENT PLAN.




Meridian.

Harapaki Wind Farm Dust Management Plan

Document Number: HRP- 210-000-PL-04-05

Revision Approved by

Name	Position on Project	Signature	Date
Robert Batters	Project Manager		29/05/2020

Document History

Version	Details	Author	Reviewer	Approver
1.0	Final for Council approval Council Approved 14/09/2020	Various	Chris Thomson	Robert Batters

Note: Any additions or alterations to the Plan arising during the course of the Project are to be documented and attached to this Plan. This Plan will be reviewed annually or sooner as required.

Minimum Document Register

1	Project Manager – Meridian Energy
2	Project Environmental and Compliance Advisor – Meridian Energy
3	Environmental Manager – Meridian Energy
4	Civil Engineer Site Representative – Meridian Energy
5	Project Manager – Civils Contractor
6	Environmental Consents Manager/ Environmental Compliance Manager – Hastings District Council
7	Team Leader Compliance – Hawkes Bay Regional Council

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1.0 INTRODUCTION

This Dust Management Plan (DMP) has been prepared on behalf of Meridian Energy Limited (MEL) to identify and outline specific dust management methods to be employed at the Harapaki Wind Farm (Wind Farm) during construction.

Preparation of this DMP is required by the conditions of the resource consents granted for the project. The Wind Farm is consented via two consents, these being the Titiokura Windfarm RMA20190212 (TWF) and Hawkes Bay Windfarm RMA20190211 (HBWF).

Both consents¹ require the preparation of and implementation of a DMP as part of the overall Construction Environmental Management Plan (CEMP) for the project.

The Hawkes Bay Regional Resource Management Plan (HBRRMP) also outlines policies and rules² relating to discharges to air from dust. This DMP accounts for the appropriate management to achieve compliance with the HBRRMP.

The overall objectives for this Dust Management Plan are:

- All practicable steps will be taken to identify and reduce potential sources of dust effects on site.
- Monitoring of all earthworks areas and site working conditions is carried out to ensure that the potential for adverse dust effects is minimised.
- Dust control measures will be implemented on site to suppress any dust effects and contain effects within the boundaries of the Wind Farm construction zone and Wind Farm site boundaries (including potential effects on SH5).
- Any dust effects that do arise will be effectively recorded, reported and mitigated to prevent ongoing occurrences.

Overall, the key objective of this plan is to ensure that no nuisance dust effects occur outside of the Wind Farm site boundaries over the course of the construction activities.

2.0 POTENTIAL DUST SOURCES AND DUST EFFECTS

Construction of the Wind Farm will require large scale earthworks activities associated with establishment of access roads and tracks, building platforms as well as 41 turbine pads and associated earthworks disposal fill areas.

The location of these activities on elevated and exposed ridgelines creates a potential for the mobilisation of dust into the atmosphere and associated effects over the Wind Farm construction period. The Wind Farm is generally isolated from residential dwellings, however, is located in a highly visible location to the surrounding countryside and users of State Highway 5.

Specific areas where dust generation effects could occur during dry, windy conditions include:

¹ Condition 6E (TWF) and 5E (HBWF)

² Policy 69 and Rule 25.

- Construction of access roads.
- Construction activity on access roads including transportation of wind turbine components and other plant for installation.
- Construction of turbine and building platforms.
- Fill disposal sites.
- Stockpiles.
- Mobile crushing plant; and
- Concrete batching plant.

2.1 Main Site Area

The bulk of the construction activities will occur upon elevated plateaus and isolated ridge tops within Meridian's landholding, of essentially a large-scale hill country farm property. Surrounding land is also of large-scale farm properties, including plantation forestry. While the exposed nature of the Wind Farm core construction area creates a high potential for mobilisation of dust particles into the atmosphere during the road construction and bulk earthworks period, potential effects/affected parties are largely mitigated by the isolated nature of the site and the minimal potential for dust clouds or deposits to occur on any distant dwellings.

However, adverse dust effects could occur to other site users including landowners (e.g. dust settlement on pasture/farm buildings/water supply systems etc) as well as potential visual effects if significant dust clouds are generated on ridge top areas over the course of the construction activities.

The closest property to the site is the Mohaka Rafting site located to the south. While the prevailing wind will generally mean dust effects on this property will be avoided, monitoring of dust generation in northerly winds should be undertaken.

Furthermore, involvement in previous Wind Farm construction projects have identified that the highest potential for dust effects over the bulk earthworks period is upon the health and safety of construction staff and thus it is primarily in the interest of Meridian and the chosen site contractors to ensure that effective dust management methods are implemented over the course of the construction earthworks period.

2.2 Concrete Batching Plant

The Wind Farm construction includes the operation of a concrete batching plant (CBP) on an elevated plateau that is relatively exposed. The nature of the DMP is that potential dust issues could arise at the plant from dry sand stockpiles or potential cement spillages during dry, windy conditions.

Should potential dust issues arise from sand stockpiles they will immediately be wetted down with a hose or by a sprinkler truck and shall be continuously monitored and wetted down until windy conditions subside. Alternatively, stockpiles can be covered with secured geotextile, polythene or similar fabric.

The closed cement system (pneumatic transfer from tanker to silo) will minimise the potential for dry cement material becoming a dust nuisance. Furthermore, the cement

silos will be fitted with an automatic level control alarm to warn contractors of overfilling and reduce the potential for any spillage during transfer from tanker to silo. In the event that any spillages occur, spilt material will be immediately dampened with water to prevent it becoming airborne and scraped off the ground surfaces for disposal in an appropriate contained area ie. within the interceptor pond or within a covered area.

The CBP area comprises a low speed environment due to the confined area and site configuration including the batching plant machinery, interceptor pond and stockpile areas. At all times vehicles within the CBP area will be required to maintain speeds below 5km/hour. For these reasons, vehicle generated dust effects are not anticipated.

2.3 Work in proximity to SH5

For the construction of the Operations and Maintenance Building and the Substation, substantial works are required to form the necessary building platforms. If works are not managed effectively, there is the potential for dust mobilisation to affect the users of State Highway 5 to the west of the site.

The mobilisation of sediments from the Wind Farm site via the main entry access point will also be monitored to ensure dust generation potential is avoided.

3.0 DUST MANAGEMENT

Dust management will be the responsibility of the main site contractor. It is a key principle of the project that the contractor will take a proactive approach to dust management on the site, rather than a reactive approach once any potential effects are evident.

General principles to be adopted to ensure that potential dust effects are avoided include:

- Staging of earthworks activities as much as possible and progressive stabilisation of completed surfaces to ensure that exposed areas at any one time are minimised.
- Managing the route and speed of vehicles traversing the site taking into account potential dust mobilisation and effects.
- Monitoring and maintenance of potential nuisance dust effects.
- Implementation of appropriate control measures to suppress dust generation effects to within the windfarm works zone should dry/windy conditions be encountered.

Further details of these proposed dust management methods are outlined as follows.

3.1 Earthworks Staging/Progressive Stabilisation

Typically, earthworks throughout the site will comprise stripping of topsoil, shaping of underlying loess and weathered limestone materials followed by spreading of aggregate on road surfaces or re-placement of topsoil on batters/fill areas. Where possible, a progressive approach to covering and stabilisation of earthworks surfaces will be undertaken with surfaces being covered with either aggregate or topsoil within 10 working days (as a maximum) of completion or as soon as practicable.

Once either an aggregate or topsoil cover is established on completed earthworks surfaces it is considered that the potential for dust effects will be significantly reduced and all efforts will be made to promote vegetation of completed surfaces as soon as possible once a topsoil cover is achieved.

Access road upgrades and new road construction will generally include a cut and cover approach with aggregate along with the wetting of surfaces to help the material bed in. Utilising water carts where necessary will also provide benefits in reducing dust mobilisation.

3.2 Vehicle/Machinery Use

Core Site Area

Within the core site area, the highest potential for dust effects is associated with construction vehicles traversing haul roads/site access tracks during dry, windy conditions. Specific site management requirements which will be implemented to minimise potential vehicle/traffic generated dust effects will include:

- Controlling all vehicle speed on site (max 30km/h).
- Location/use of haul routes to minimise dust generation taking into consideration current weather conditions.
- Ensuring all traffic leaving the site is in a clean condition to avoid tracking of fine sediments onto State Highway 5. This measure is considered appropriate to ensure that the tracking of sediment onto SH5 and creating potential dust effects, is avoided. However, if site monitoring identifies that sediment tracking is occurring, a contingency comprising immediate employment of a sweeper truck/power broom to clean the road surface and installation of a truck wash at the site exit point will be implemented to prevent any further effects; and
- Ensuring any dry material being carted by trucks is adequately covered/secured.

At least one water cart will be established on site at the start of the access road construction works to dampen down any potential dust generating surfaces during dry, windy conditions and will be kept on site at all times with additional water carts being available on call if required. One water cart (minimum 6000 litre capacity) is considered sufficient to dampen surfaces along the initial length of the access road works which will occur closest to SH5.

Additional water carts will be on call at all times, for immediate deployment when an increased risk of dust is identified through weather monitoring and daily works programming. It is anticipated that at least two water carts will be present over bulk site construction works within the core site to suppress dust from exposed works surfaces.

3.3 Monitoring and Maintenance/Dust Control

Education of site staff on potential dust sources, effects and management requirements will form part of the site induction procedures required to be undertaken by all staff working at the site.

Dust monitoring throughout the project will be the responsibility of all workers and plant operators at the site with overall responsibility lying with the main Contractor Project Manager. Dust monitoring methods will occur through daily monitoring of weather forecasts/conditions and active works areas and through visual observations to check dust for any mobilisation within the site over the course of daily construction activities.

Site weather conditions and operative works areas will be monitored each morning by the Main Contractor and discussed at toolbox meetings to identify any areas at risk of creating dust effects and the required management measures to prevent effects occurring. Wind strength, wind direction, type of works, soil conditions and proximity to affected parties will be taken into account in making these decisions. Ongoing monitoring will also be undertaken by site staff throughout the day as conditions will change.

Should a high potential for dust effects be identified through routine weather monitoring and site working conditions, the first response will be to deploy a water cart to wet down potential dust generating surfaces to prevent any dust effects from extending beyond the site boundary where it may impact neighbouring properties.

- Water supply for dust control will be obtained from strategic water cart filling locations on site to minimise cartage and transportation around the site. The locations will be supplied from consented water sources established at the site at the outset of construction. If required off-site tanker deliveries will also be available.

Storage of water abstracted from the consented sources within either tanks or ponds will ensure that sufficient water is available for dust control under all weather conditions (i.e. via low rates of take pumped to storage over an extended period).

While unlikely, should dust suppression through water cart deployment be unsuccessful, with ongoing adverse dust effects being experienced, contingency methods to control dust effects will be employed to ensure that the effects cease. Contingency methods will include:

- Deployment of additional water carts.
- Further limiting vehicle speed/numbers within the subject area.
- Covering of problematic dust generating surfaces with topsoil, aggregate, geotextile, hydroseeding as required.
- Ceasing works within problematic areas until wind speed decreases or changes direction; and
- The use of dust suppression agents (subject to resource consent, if required) for example, chloride salt additives or polymers.

3.4 Utilisation of Suppressant Agents

If required a dust suppressant product may be utilised and applied at recommended levels to help mitigate against dust effects over a longer time period than treating dust with water alone. Dust suppressant agents are typically a ligno-sulphonate based

product and the product selected will be based on low environmental toxicity and effects and best for project use.

The utilisation of dust suppressants assists reducing water use and demand especially through the dryer months when need for dust control increases.

4.0 COMPLAINTS RESPONSE

It is a core principle of the DMP that liaison with adjacent landowners is undertaken throughout the duration of works to provide for updates on construction activities that could lead to high levels of dust generation and/or in times of dry weather. Any concerns that neighbours have can be rapidly communicated to site management and addressed.

Any dust complaints received will be taken seriously and matters raised shall be investigated and responded to as quickly as possible. The standard procedure for responding to any complaints received will be as follows:

1. Dust complaint received.
2. Details of complaint/complainant will be immediately forwarded to the Meridian Office for the Project Administrator to enter into the Complaints and Compliments Register (see CEMP Section 2.4.4), and forward to the appropriate person on site for a report.
3. The Meridian Project Manager is responsible for liaison with complainants and will oversee the complaints assessment procedure. The Project Manager will contact complainant to discuss the issue and determine the need for any specific mitigation requirements.
4. The Project Environmental and Compliance Advisor will liaise directly with the Contractor's Project Manager to implement dust control measures on site immediately to prevent any ongoing effects (e.g. cease works, deploy additional water carts/road sweeper).
5. Any additional dust control measures required to prevent any ongoing effects from the works will be maintained until the risk of further effects is removed.
6. The incident will be communicated to site staff through toolbox meetings and within site management reporting to ensure awareness of the potential issues and that similar incidents do not occur throughout the site.
7. The incident report, actions undertaken and close out of the complaint will be logged within the Complaints and Compliments Register.
8. Complaints received and assessed indicating non-compliance with the conditions of the resource consent and /or permitted activity rules shall be forwarded to Council(s).