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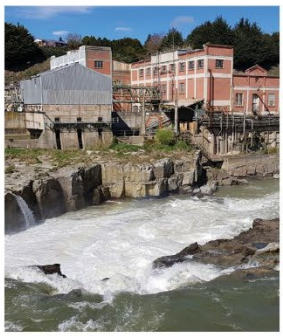

March 2024

Barrytown Mineral Sand Mine
Avian Management Plan

Submitted to:
TiGa Minerals and Metals Limited

water fauna flora land

Quality Assurance

This report has been prepared and reviewed by the following:

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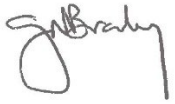
Senior Terrestrial Ecologist



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CONSENT (NUMBER) - REFERENCES

Condition	Matter	Page reference within this Plan
7.1	Mine boundary marking to achieve 100m setback during the breeding season	

12.1	Hours of operation	
13.2	Colours for buildings	
13.4	WCP without windows	
15.1	Truck movements must occur to the south	
15.2	Truck movements during daylight hours	
15.3	Staff transport	
15.4	Limit on light vehicle movements	
15.9	Transport Management Plan	
15.10	Contents of Transport Mangement Plan	
15.12	Review of Traffic Management Plan	
16.1	Lighting at boundary	
16.2	Adherence to Light Pollution Guidelines	
16.3	Lighting Management Plan	
16.4	Contents of Lighting Management Plan	
16.5	Confirming compliance of lighting plan	
18.1	Breeding season setback	
18.2	Nest protection in mining area	
18.3	Dogs excluded	
18.4	Predator control	
18.5	Wildlife camera deployment	
18.6	Reporting interactions	
18.7	Tāiko interactions	
18.8	Mine shutdown	
18.9	Kororā surveys	
18.10	Kororā fence	
18.11	Avian Management Plan	
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18.14	Suitably qualified experts	
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1.1 Overview

TiGa Minerals and Metals Limited ('TiGa') proposes a mineral sand mine located on farmland near Barrytown, approximately 36km north of Greymouth. The mining area is proximate to wetland areas, including natural coastal lagoons which provide habitat for a range of indigenous bird species, some of which are considered to be threatened or at risk (Robertson et al. 2021). The proposed mine is located outside PUN-W034, which is mapped as a Significant Natural Area (SNA) in the draft proposed Te Tai o Poutini District Plan. The proposed mine is also located near the only known breeding colony of tāiko (Westland petrel, *Procellaria westlandica*).

This management plan has been prepared to address potential effects on 'threatened' and 'at risk' birds using the area to be mined and immediate surrounds. This plan provides for detection and monitoring of breeding birds within the mining area, protection of any nests from human disturbance and introduced predators, restrictions on lighting and traffic movements during darkness to avoid effects on tāiko and other birds, detection of kororā and tāiko near the mining area, management of any grounded tāiko found and monitoring of birds using the site and the adjoining lagoon area to inform operational decisions and species management.

The data collected will be compiled and presented in weekly, monthly and annual bird monitoring reports to be used in adaptively managing the operations to protect the birds at the site and provided to Greymouth District Council, Te Runanga o Ngāti Waewae, Paparoa Wildlife Trust, the Community Liaison Group for the project, West Coast Penguin Trust and the Buller/Kawatiri Department of Conservation office in Westport.

1.2 Background

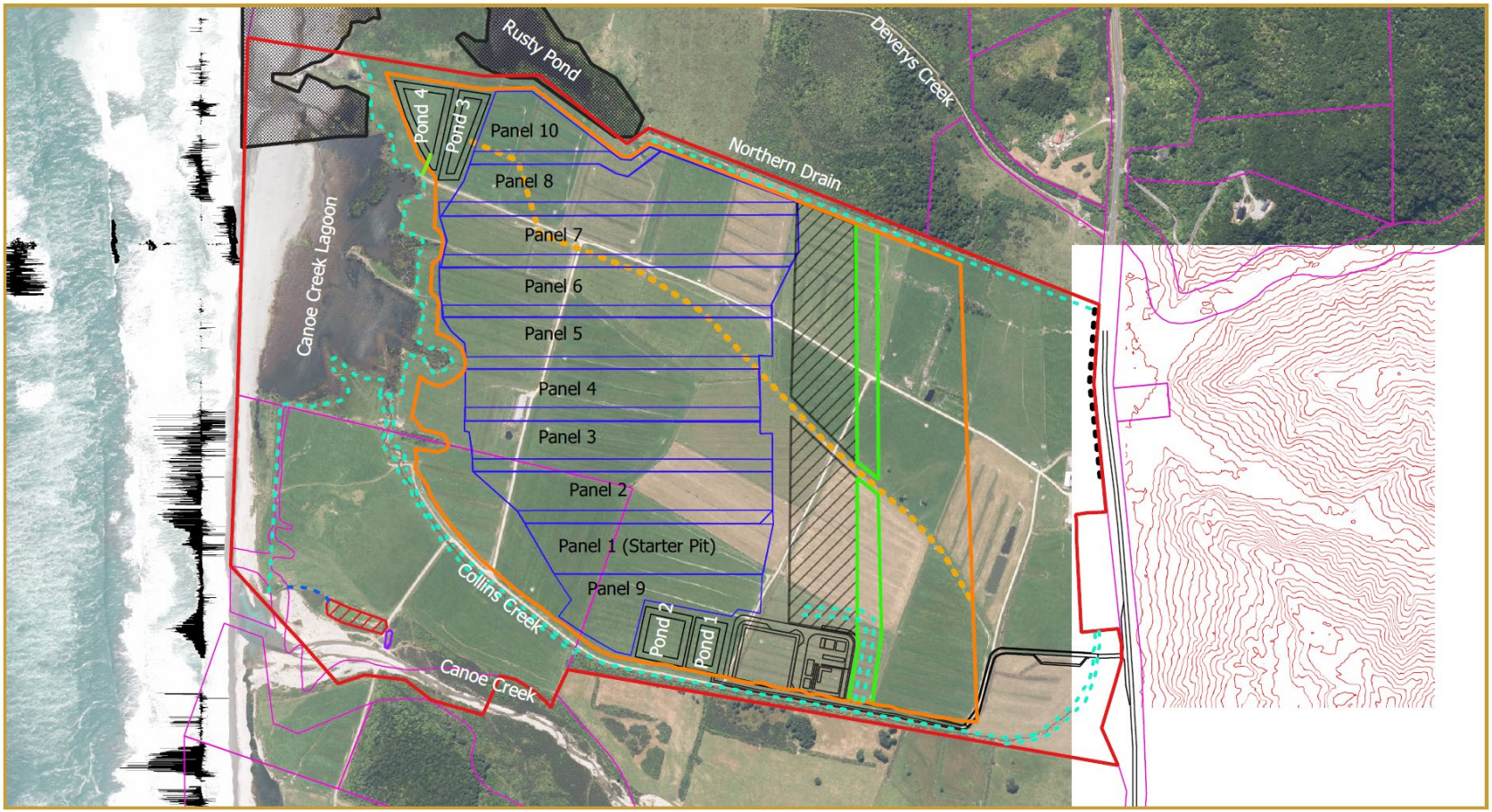
TiGa proposes to construct and operate a mineral sand mine located north of Canoe Creek and west of State Highway 6 on the Barrytown flats approximately 36 km north of Greymouth. The location of the proposed mine is shown in Figure 1.

The mine would be set back from State Highway 6 and the property at 3261 Coast Road. TiGa also proposes a setback of 20m from Collins Creek, the property boundaries and the coastal lagoon. Vegetation throughout the area to be mined comprises farm pasture growing on land which has previously been 'humped and hollowed' to improve drainage for farming.

The proposal is to undertake progressive strip mining across the site moving from west to east and south to north. Each open strip would be approximately 75m x 100m wide and no more than 8ha would be "open" at any one time[1]. The indicative mining approach is shown in Figure 2. No mining or trucking would occur outside daylight hours[2].

Seasonal bird surveys including five-minute counts and the use of acoustic recorders were undertaken at the site between April 2022 and January 2024 and this was combined with walkthrough surveys, incidental observations and database records in eBird to identify the species likely to be present at the site. Seasonal bird surveys will continue until mining commences, throughout mine life and for at least one year following the conclusion of mining at the site.

[1] This includes rehabilitated areas and the Processing Plant area.
[2] The period outside daylight hours is defined as the period between 30 minutes after sunset and 30 minutes before sunrise. Sunrise and Sunset times will differ throughout the year, and are determined by sunrise and sunset times at Greymouth which can be found at the following website: https://www.timeanddate.com/sun/new-zealand/greymouth



Tai Poutini RESOURCES

TiGa
Consent Application

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Produced for: TiGa
by Luke McNeish on 18/01/2024

0 125 250 m

1:8,000 @ A3

Projection: WSG84 / NZTM2000
Background Imagery: ESRI Satellite
Data Sources: LINZ, Client and or TPRL Data

Legend:

- Planting
- Stockpile Area
- Mining Disturbance Area
- TiGa Application Area
- Bund
- Gallery Water Take
- Premining ore stockpile
- Overflow Channel
- Canoe Creek Infiltration Basin
- Bund and Planting
- Central Drain
- SNA
- Property Boundaries
- Mine Infrastructure
- Overflow Path

Note: Refer to Landscape Mitigation Plan for detailed information on planting and bunds.

Figure 1: Location and features of the proposed mineral sand mine at Barrytown (from Tai Poutini Resources.

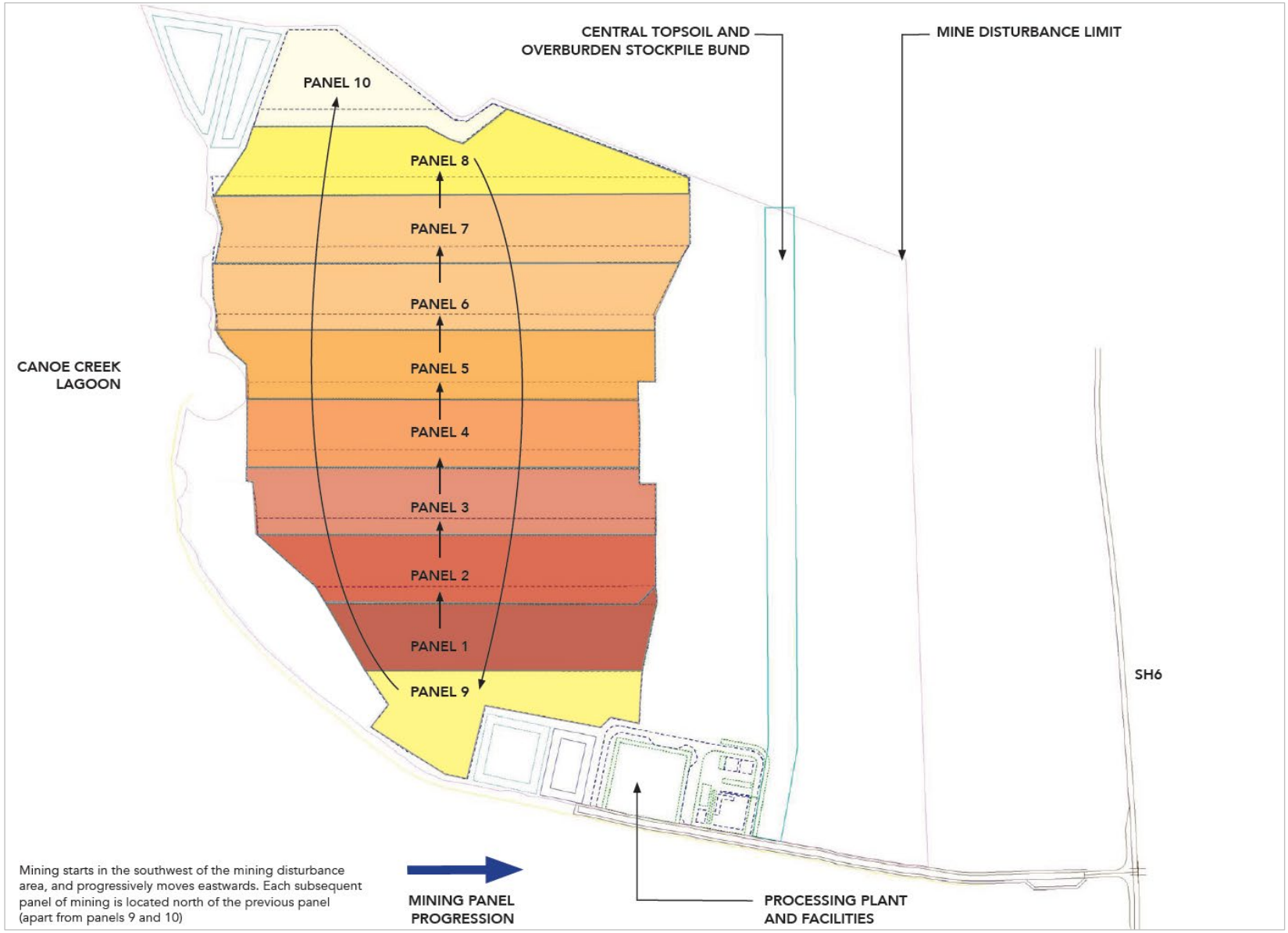

Figure 2: Indicative mining approach at TiGa mineral sand mine, Barrytown (From Glasson Huxtable Landscape Architects).

Species present were generally exotic or common native species. A total of 41 species were confirmed using the site surroundings including 15 species of conservation concern as shown in Table 1.

Table 1: Birds of Conservation Interest confirmed within or near the proposed mining area.

Common name	Scientific name	Conservation status
Black shag	*Phalacrocorax carbo*	At Risk (Relict)
Little shag	*Microcarbo leucocephalus*	At Risk (Relict)
Black-billed gull	*Chroicocephalus bulleri*	At Risk (Declining)
Caspian tern	*Hydroprogne caspia*	Threatened (Nationally Vulnerable)
Grey duck	*Anas superciliosa*	Threatened (Nationally Vulnerable)
Kororā, little blue penguin	*Eudyptula minor*	At Risk (Declining)
Kotuku, white heron	*Ardea alba*	Threatened (Nationally critical)
Pacific Reef heron	*Egretta sancta*	Threatened (Nationally Endangered)
Red-billed gull	*Chroicocephalus novaehollandiae*	At Risk (Declining)
Royal spoonbill	*Platalea regia*	At Risk (Naturally uncommon)
South Island fernbird	*Poodytes punctatus*	At Risk (Declining)
South Island Pied Oystercatcher	*Haematopus finschi*	At Risk (Declining)
Tāiko/Westland petrel	Procellaria westlandica	At Risk (Naturally Uncommon)
Variable oystercatcher	*Haematopus unicolor*	At Risk (Recovering)
White fronted tern	Sterna striata	At Risk (Declining)

In addition, a bird which may have been a marsh crake (*Zapornia pusilla*) was heard in September 2022 and October 2023. Marsh crake are considered “At Risk (Declining)” by Robertson et al. (2021). Assuming marsh crake are present, this brings the number of threatened or at-risk bird species near the site to 16. The locations where these birds were detected during seasonal surveys are shown in Figure 3. In addition to the ten species shown in Figure 3, a pair of Pacific reef heron were observed using the coastal lagoon, a dead kororā was observed on the beach at the end of Burke Road and a single kōtuku was also observed at the site. Tāiko have not been observed within the Application site.

Birds of conservation concern identified as being present within 10km of the site from eBird records, but not confirmed as present during the surveys of the site include rōroa (*Apteryx haastii*), tūturiwhatu (banded dotterel, *Charadrius bicinctus*), New Zealand pipit (*Anthus novaeseelandiae*) and Australasian bittern (*Botaurus poiciloptilus*).

Of the species listed in Table 1, none are likely to rely on the pasture habitat within the site, but some species (such as gulls and oystercatchers) may visit pasture areas (particularly where soils have been turned over) for feeding or loafing. Tāiko will fly past the site and could be affected by lighting or other activities there. Pipit do use pasture as habitat, but prefer rough open habitats from the coastline to alpine shrublands at c. 1900 m.

Figure 3: Location of threatened and at risk birds detected during seasonal surveys 2022 – 2023.

1.3 Relevant Resource Consent Conditions

Grey District Council and West Coast Regional Council have granted TiGa resource consents (NUMBER) to construct and operate the mine subject to conditions, which includes the following conditions associated with the land use consents from the Grey District Council:

7.1	The mine boundaries must be clearly marked on the ground before any earthworks take place, with a 20m setback from the northern property boundary and Collins Creek, the coastal lagoon and any wetland. The extent of the wetlands within the site must be delineated by a suitably qualified and experienced ecologist at least 20 working days prior to the site boundary being marked to determine the location of the setback and the coastal lagoon edge of the planting required by condition 19.0. A map showing the extent of delineated wetlands must be provided to the Consent Authority, at least 10 days prior to the boundaries being marked. *Advice note: Condition 18.1 requires a setback of 100m from the edge of the coastal lagoon during the bird breeding season.*

12.1	Trucking, mining, overburden and topsoil stripping, bund development and any related activities must not operate during the hours of darkness. For the purpose of this condition, hours of darkness are considered to be between 30 minutes after sunset to 30 minutes before sunrise. *Advice Note:* sunrise and sunset times can be found here *https://www.sunrise-and-sunset.com/en/sun/new-zealand/westport/2023/june* *Advice Note: In addition to condition 12.1, further restrictions on transport operations are contained in Condition 15.0 Transport, and further noise restrictions are contained in Condition 16.0 Noise.*

13.2	The colours to be used for all buildings and structures must be recessive and non-reflective and have a light reflectance value (LRV) of less than 20%, including but not limited to Colorcote colours Mudstone (LRV 16%), Rivergum (18%), Permanent Green (LRV 10%) or Ironsand (9.5%).
13.4	The processing plant building must be constructed without windows, to avoid light spill from the building.

15.1	Truck movements to or from the site associated with removal of heavy mineral concentrate must only travel south of the site, and must be limited to 50 per day and 5 per hour and must only occur during the hours of daylight. For the purpose of this condition, hours of daylight are considered to be between 30 minutes before sunrise and 30 minutes after sunset. *Advice Note: For the purpose of the Transport conditions, a movement is defined as being a movement either to or from the site. A truck and trailer unit entering and leaving the site is*

	therefore 2 movements. *Advice Note: Refer to Condition 12.0 for further restrictions on hours/days of operation.*
15.2	Truck movements associated with the activity must be limited to no more than 3 per hour between 0500 and 0700 each day so long as those hours are during the hours of daylight. *Advice Note: For the purpose of the Transport conditions, a movement is defined as being a movement either to or from the site. A truck and trailer unit entering and leaving the site is therefore 2 movements.*

15.3	The Consent Holder must operate a transport service for mining and processing plant staff shift workers, and require all shift workers to use this transport service during the hours of darkness. For the purpose of this condition, hours of darkness are considered to be between 30 minutes after sunset to 30 minutes before sunrise. The transport service must provide for staff living both north and south of the site, by running separate passenger vehicles in each direction. If there are less than 5 staff who arrive at site from either direction on any given shift, a passenger transport service is not required, provided that all staff arriving from that direction arrive and leave in the same vehicle. At least 10 working days prior to mining commencing, the Consent Holder must confirm to the Consent Authority how many staff are on each shift, their direction of travel, and what vehicles are proposed to cater for these staff movements. *Advice note: The purpose of this condition to is minimise the number of vehicles arriving at and leaving the site, especially during hours of darkness, to avoid transport associated effects on the Westland Petrel. Some flexibility in the configuration of these vehicles is required, because it is not possible to know where future staff will live, and how this may change. It is intended that the company will run 1-2 mini van vehicles in each direction per shift, as required to ensure no staff are arriving by private passenger vehicle for shift work.*
15.4	Notwithstanding Condition 15.3, light vehicle movements must be limited to 140 light vehicles per day. *Advice Note: For the purpose of the Transport conditions, a movement is defined as being a movement either to or from the site. A truck and trailer unit entering and leaving the site is therefore 2 movements.*

15.9	The consent holder must conduct transport activities in general accordance a Transport Management Plan. The objectives of the Transport Management Plan is to ensure all drivers operating vehicles associated with the mining activity demonstrate considerate and safe driver behaviour to: • contribute to the safe and efficient operation of the road transport network between the Site and the Port of Greymouth • avoid adverse effects on wildlife along the trucking route; • avoid adverse effects on pedestrian and cycle safety along the trucking route. *Advice Note: All Management Plans are required to adhere to the requirements of*

	Condition 6.0.
15.10	The Transport Management Plan must include: • A method of reporting encounters with taiko and other wildlife; • A method of reporting crashes involving a vehicle associated with the activity and any other road user and road defects, to the Council and the relevant Road Controlling Authority (where this is not the Council); • Hours of operation of various vehicle types to avoid adverse noise and traffic safety effects as dictated in the conditions of consent; • Procedures to avoid heavy vehicles leaving or arriving at the site between the hours of 0800-0900 and 14:45-1600; • A method for the Consent Holder to record any complaints received about driver behaviour, and to provide this record to the Consent Authority when requested. • A description of "locations of care" where drivers will need to take additional care, i.e. areas of tight road geometry, areas of greater pedestrian and cyclist concentration, areas near schools. • Methods to minimise amenity disturbance for residents i.e. locations where use of air brakes should be avoided, including the Cargill Road intersection. • A method of real time communication within the trucking fleet to avoid trucks passing at areas of tight geometry, and to alert other fleet drivers to the presence of a cyclist, pedestrian or other emerging safety hazards to minimise risks to other road users. • Staff induction procedures, including regular briefing of drivers regarding considerate and safe driving behaviour around pedestrians and cyclists, identified locations of care, being alert for tourist drivers, and any other pertinent requirements regarding driver behaviour. • A requirement to regularly report to the West Coast Regional Land Transport Committee on any particular areas of concern with State Highway 6 (including those raised by the CLG); • Procedures to notify drivers when alterations are made to the TMP have occurred.
15.12	The Consent Holder must review the Transport Management Plan once every 12 months, and within 5 working days of any near miss or wildlife incident, and communicate updates to staff. The review must be provided to the Consent Authority within 10 working days of the incident occurring, and the management plan amendment process in Condition 6.0 must be followed. -

16.0 Lighting	
16.1	Lighting must not exceed 2.0 lux spill (horizontal and vertical) of light onto any adjoining property, measured at any point more than 2m inside the boundary of the adjoining property or the closest window on the adjoining property whichever is the closest.
16.2	Lighting must be designed, installed and operated in a manner which adheres to the Australian Government's National Light Pollution Guidelines for Wildlife January 2020 (or subsequent revision); including but not limited to:

	• Utilising the Seabird Light Mitigation Toolbox in Appendix G – Seabirds (Schedule 4); • All fixed lighting must be directed downward, shielded to avoid light spill, with a lighting temperature of no more than 2000K, and be filtered to reduce blue and violet wavelengths; • Lights must only illuminate the object or area intended; • Fixed lights must be mounted as close to the ground as practicable while still achieving site lighting requirements; • External lighting must be minimised on the seaward side of buildings to minimise light spill toward the coast; • External lighting must use the lowest intensity lighting possible, while ensuring compliance with workplace health and safety requirements • External lighting should be equipped with light minimising technology, including motion sensors and timers where practicable • Any windows must have blackout blinds fitted to avoid any light spill from internal lighting within buildings, • Where practicable, the consent holder should make efforts to ensure mobile lighting within the mine site adheres to the above principles, including dipping headlights of vehicles operating on site.
16.3	The consent holder must manage lighting on the site in accordance with a Lighting Management Plan (LMP), which has been prepared by a suitably qualified ecologist, and provided to the Department of Conservation for comment prior to certification. The objectives of the LMP are: iv. To ensure adverse effects of artificial lighting on wildlife (specifically tāiko) are avoided. v. To ensure fixed and mobile artificial lighting at the proposed mine is managed in accordance with best-practice guidelines[2]. vi. To ensure ongoing use of the site and its environs by the birds which currently occur in the area. *Advice Note: All Management Plans are required to adhere to the requirements of Condition 6.0.*
16.4	As a minimum, the LMP must include: h. A description of the wildlife that may be present on or around the site that may be sensitive to lighting i. A description of the potential lighting effects on identified wildlife j. Specific lighting management actions to protect identified wildlife k. Reporting requirements to enable consent authorities to confirm compliance with associated consent conditions, and keep wildlife stakeholders informed l. Best practice lighting design principles to avoid lighting effects on wildlife m. A description of the proposed exterior and mobile lighting associated with the activity (including vehicle movements to and from the site) n. Auditing requirements to ensure that lighting is installed and operated appropriately

[2] National Light Pollution Guidelines for Wildlife (Australian Government, 2023).

16.5	The Consent Holder must provide a detailed lighting plan to Grey District Council and the Department of Conservation at least 20 working days prior to the commissioning of the processing plant, with an accompanying design statement, prepared by a suitably qualified lighting professional, confirming compliance with conditions 16.1 and 16.2. If the Department of Conservation considers that for any reason the detailed lighting plan does not comply with Condition 16.2, the Consent Holder must consider any reasons and recommendations provided by the Department of Conservation, amend the management plan accordingly, and resubmit the management plan to the Grey District Council and the Department of Conservation.
16.6	Within 20 working days of the processing plant being commissioned, the Consent Holder must engage a suitably qualified lighting professional to carry out a lighting audit, to confirm that the lighting has been installed as per the detailed lighting plan required by Condition 16.3. The results and confirmation of compliance with conditions 16.1 and 16.2 must be submitted to the Consent Authority and the Department of Conservation within 10 working days of receipt of the audit.
16.5	If the lighting audit establishes compliance with conditions 16.1 and 16.2 is not achieved, the Consent Holder must investigate and implement additional mitigation required to achieve compliance. The Consent Holder must submit a report to Consent Authority within 10 working days of the audit detailing the mitigation measures that will be implemented and must undertake a further compliance monitoring report within 10 working days of any mitigation measure being implemented to demonstrate the effectiveness of that mitigation.

18.0 Avian Management	
18.1	Mining, topsoil and overburden stripping and rehabilitation activities must not take place within 100m of the Canoe Creek Lagoon (as delineated in Condition 7.1) or Rusty Pond wetland between the months of August and December each year to maintain separation from the lagoon during the peak bird breeding season.
18.2	If a nest of a threatened or at risk bird species is detected within an area to be mined during the breeding detection surveys, the nest must be protected by establishing, physically marking and maintaining aa 50m buffer between the nest and any works so as to minimise the risk of nest abandonment. All vehicles, machinery and people must be excluded from the area and local pest control implemented until either the nest is abandoned or the any chicks fledge in accordance with the management set out in the Avian Management Plan (AMP). *Advice Note: Conditions relating to the AMP are Conditions 18.11-18.14.*
18.3	Staff, contractors and visitors associated with the mining activity must not be permitted to bring dogs to the site at any time, except for conservation purposes.
18.4	The Consent Holder must establish a ring of traps and/or bait stations targeting rats and mustelids placed around the perimeter of the property and the coastal lagoon in accordance with the AMP. The network of traps must be installed prior to mining commencing and serviced as required.
18.5	The consent holder must deploy wildlife cameras around the coastal perimeter of the

	mine disturbance area and other suitable locations as required to monitor for Korora, and around the processing plant area and the access road to monitor for *Procellaria westlandica* (Westland Petrel). The cameras must be equipped with motion sensors, and be installed by a suitably qualified ecologist. 10 cameras to detect Korora must be placed at suitable locations and set to record for at least 10 nights every month, with the location to be determined by the ecologist. 10 Cameras to detect Westland Petrel must be installed around the processing plant and the length of the access road, operating during the hours of darkness each night, with the location to be determined by the ecologist. Imagery must be reviewed for wildlife interactions at least weekly, retained for a minimum of 6 months, and be made available to the Consent Authority or the Department of Conservation on request.
18.6	Any interactions with wildlife recorded as a result of the monitoring requirements in the AMP including the wildlife cameras required by Condition 18.5, must be reported to the Consent Authority and the Department of Conservation on a weekly basis from 01 November to 31 January each year, and on a monthly basis from 01 February to 31 October. Footage must be made available to the Department of Conservation and the consenting authority as set out in Condition 18.5.
18.7	If a Westland Petrel interaction is detected, the consent holder must follow the procedure set out in the AMP, which must include a review of the AMP and Lighting Management Plan by a suitably qualified ecologist to determine what additional measures can be taken to avoid any further interactions with Westland Petrel. *Advice note: An interaction is defined as the presence of a bird or birds within close proximity to the mining infrastructure, including buildings, vehicles and plant where they are or could be put at risk.*
18.8	If two Westland Petrel interactions are detected within a four week period, all activities during the hours of darkness must cease until a further review of the AMP and Lighting Management Plan by a suitably qualified ecologist has been carried out, in consultation with the Department of Conservation, to determine the possible causes and mitigation measures that can be employed to avoid further interactions with Westland Petrel. Mining and processing activities may only recommence following the completion of investigations and the implementation of further mitigation measures recommended by the ecologist. *Advice note: Any amendment to the AMP will be required to comply with the certification process under Condition 6.0, and any Wildlife Act Authority requirements.*
18.9	The Consent Holder must engage a suitably qualified expert to carry out annual penguin surveys of Pakiroa beach and the mine area using a certified conservation dog within 500m of the mining disturbance area to detect the presence of Korora. The first survey must be conducted within the first 12 months of the commencement date of the resource consent, and at least two annual surveys must be completed before mining commences. If penguins or burrows are detected the location must ~~be~~ mapped and the following management actions are to apply: i) If penguins are detected using the mining area to access other habitats, any existing access ways must be maintained and/or works affecting that accessway must be completed in the period March – June (outside the breeding and moult period). ii) Any potential penguin burrows identified must be investigated,

	including use of a burrowscope, to determine whether Korora are using them. iii) Where any penguin burrows are compromised by mining (i.e., direct effects), replacement artificial burrows/nest boxes must be installed at a rate of 2:1. Any additional nest boxes provided must be located within the vegetated coastal foreshore habitat associated with any identified accessways. iv) If penguins are found within the mine site, a specific Penguin Management Plan must be developed by a suitably qualified and experienced ecologist on behalf of the applicant in consultation with the West Coast Penguin Trust. The West Coast Penguin Trust must be reimbursed for reasonable time and expenses associated with consultation on the Penguin Management Plan. v) Any deceased penguins found on or near the mine site must be provided to the Department of Conservation for necropsy.
18.10	A penguin fence must -be erected along the length of the Canoe Creek Lagoon boundary, from Collins Creek to the northern boundary of the mine disturbance area, on the landward side of the coastal lagoon planting so as to exclude Korora from entering the mine disturbance area: • if Korora are detected within 500m of the mine disturbance area; and • no Korora are detected within the mine disturbance area; and • no access tracks are detected beyond the coastal margin in the pre-mining surveys required by Condition 18.9. The penguin fence must be comprised of geosynthetic mesh to a height of at least 1m above ground and buried at least 1m below the ground and with posts no greater than 4m apart. The fence installation must be certified as preventing the ingress of Korora to the mine disturbance area by a suitably qualified ecologist. This certification must be supplied to the Consent Authority prior to mining commencing. *Advice note: The requirement to erect a penguin fence only applies if Korora are detected within 500m proximity of the mine disturbance area, but are not within the site. If no Korora are detected near the mine disturbance area, a penguin fence is deemed unnecessary.*
18.11	The consent holder must conduct activities on site in general accordance with an Avian Management Plan (AMP) prepared by a suitably qualified ecologist/ornithologist.The objectives of the AMP are: • To ensure adverse effects on the threatened and at risk birds present in the vicinity of the site and any other threatened and at risk species detected by subsequent monitoring are avoided. • To ensure adverse effects on the rushland, flaxland and other important bird habitats adjoining the mining site including Canoe Creek Lagoon, Rusty Pond and the coastal margin are avoided during the breeding season and minimised at other times of the year during mining. • To ensure ongoing use of the site and its environs by the birds which currently occur in the area.

	Advice Note: All Management Plans are required to adhere to the requirements of Condition 6.0. *Advice Note: Threatened or at-risk bird species refers to the Conservation Status according to the Department of Conservation's Threatened Classification System*
18.12	The AMP must detail: 1. A description of the site and surrounding avian habitats 2. A description of the threatened and at risk birds likely to be present in these habitats and which species require specific management within the AMP 3. A description of the management and mitigation measures that are required to be implemented to avoid effects on these species; 4. A procedure for managing and responding to Taiko or other wildlife being found on the mine site; 5. A description of the monitoring requirements to assess the effectiveness of the AMP
18.13	The AMP must be reviewed annually by the Consent Holder. Any proposed amendments to the AMP must be submitted to Council and must: 1. achieve the AMP's purpose of avoiding effects on any threatened or at-risk indigenous bird species (including specifically the Westland Petrel); 2. comply with the conditions of this resource consent; and 3. have been reviewed by an appropriately qualified and experienced ecologist/ornithologist; 4. have been provided in advance to Te Runanga o Ngāti Waewae and the Buller/Kawatiri office of the Department of Conservation for comment (and feedback received collated and submitted with the amendments to be provided to Council). 5. follow the certification process set out in Condition 6.0. *Advice note: any disturbance or relocation of avifauna may require a permit from the Department of Conservation under the Wildlife Act (1953).*
18.14	The Consent Holder must engage a suitably qualified expert(s) to undertake all monitoring of avian species from the commencement of consent until at least one year following the cessation of mining activities on this site. The monitoring must be carried out in accordance with the monitoring requirements in the AMP.
18.15	An annual bird management report must be provided to Environmental Planning Team Leader Grey District Council, Te Runanga o Ngāti Waewae, the Buller/Kawatiri office of the Department of Conservation in Westport, the West Coast Penguin Trust, Paparoa Wildlife Trust, the Community Liaison Group and Waka Kotahi NZ Transport Agency Environment and Sustainability Team (via:environment@nzta.govt.nz), no later than 30 June each year. The report must include the following matters: ○ The timing and duration of any mining within 100m of the coastal lagoon

	vegetation and the SNA; ○ Results of seasonal bird surveys at the site; ○ Timing of nest detection surveys and observations relating to nesting or other behaviours observed within the area to be mined; ○ Efforts to deter any attempts at nesting within the area to be mined and the outcome of those efforts; ○ Species attempting to nest within the area to be mined (including threatened and at risk species); ○ Date of first nesting attempts (if any) for threatened and at risk species within the area to be mined; ○ Number and location of nesting attempts by threatened and at risk species within the area to be mined; ○ Species attempting to nest within the area to be mined (including threatened and at risk species); ○ Date any predator control commenced, the location of traps and bait stations, the number of captures, the amount of bait consumed and any relevant observations; ○ Outcome of individual nesting attempts by threatened and at risk species within the area to be mined; ○ Results of annual kororā surveys on Pakiroa Beach, the implications for mine operations and any management actions undertaken; ○ Number and location of any grounded Westland Petrel and any birds found dead on site; ○ Management undertaken and the outcome for any grounded Westland Petrel collected; ○ Autopsy outcomes for any dead Westland Petrel or Korora collected; ○ The number, dates and location of any near misses with vehicles for any native species; ○ The findings of any lighting audits undertaken during the year and steps taken to resolve any issues identified. ○ A summary of any revisions made to this management plan and the reasons for the changes; ○ The date and duration of any operational shut-downs; The results of the quarterly walk-through surveys of birds using the lagoon area.

19.1	As soon as practicable following the commencement date of this consent, and prior to the commencement of mining, the consent holder must construct bunds and complete planting and fencing ~~of~~ in accordance with the attached "Landscape Mitigation Planting Plans" prepared by Glasson Huxtable Landscape Architects dated January 2024(Schedule 5); including: (a) a 1.8m high, 13.0m wide permanent bund with planting along the bund's crest and eastern side, parallel to the State Highway for visual screening;

	(b) a 6.0m wide planting strip with fencing adjacent to the coastal lagoon edge; (c) a 10.0m wide band of planting along the open coastline with fencing in the south-west corner; (d) planting of the western and northern edges of the Clean Water Facility, between the coastal lagoon and ponds, so far as is operationally feasible to enable the Clean Water Facility to operate and be maintained throughout the course of the mining activity; (e) a minimum 3.0m wide strip of planting with fencing along the edge of each side of Collins Creek (except planting is only required on the true right side where riparian vegetation already exists on the true left side of the Creek in the mid section of the site); (f) a 3.0m wide strip of planting with fencing along the southern bank of the northern drain; (g) a planted strip along the north-eastern boundary of the site and adjacent to neighbouring properties at 3323 Coast Road. For the avoidance of doubt, all planting must be fenced to exclude livestock from the planted areas. Temporary fencing may be erected around the planting in (d) for the duration of mining, and stock must be permanently excluded when the additional planting is undertaken under Condition 19.4.

27.2	Vehicles must not exceed 15 km/hr on site at all times to avoid dust generation, and effects on wildlife.

1.4 Goals, Scope and Objectives

The goals of this Avian Management Plan ('AMP') are:

i) To ensure adverse effects on the threatened and at risk birds present in the vicinity of the site including those listed in Table 1 and any other threatened and at risk species detected by subsequent monitoring are avoided.

ii) To ensure adverse effects on the rushland, flaxland and other important bird habitats adjoining the mining site including Canoe Creek Lagoon, Rusty Pond and the coastal margin are avoided during the breeding season and minimised at other times of the year during mining.

iii) To ensure ongoing use of the site and its environs by the birds which currently occur in the area.

This will be achieved by operating so as to avoid effects on birds and important habitats identified, monitoring of birds to confirm occupancy and inform operational decisions and

species management and regular review of monitoring data to inform any operational changes required to address any unanticipated effects.

This AMP also sets out the monitoring that will be undertaken to detect threatened and at-risk species at the site, actions to be taken to protect those birds as well as record keeping and reporting.

1.5 Updates

This plan will be updated in the event of tāiko being detected using the site as set out in Section 5.3. If a new record of a threatened or at-risk species is made during monitoring, then this plan will also be updated as required. Otherwise, the plan will be updated annually by a suitably qualified and experienced ecologist/ornithologist taking into account the mining proposed for the coming year, as well as the results of the previous year's avian monitoring and the outcome of any management actions undertaken to protect birds in the preceding year.

1.6 Permits

All birds, with the exception of those listed in Schedules 1, 2, 3 and 5 of the Wildlife Act (1953) are absolutely protected under the Wildlife Act (1953). Any activity that involves the disturbance of absolutely protected species requires authorisation under this Act.

Before this plan becomes operational, TiGA Minerals and Metals Limited will have obtained the necessary Wildlife Act permits to cover all activities outlined in this plan that involve the disturbance of any absolutely protected birds, including capture and handling and translocation.

1.7 Organisational Chart

[to come]

2.0 Background

2.1 Important Habitats

The site adjoins an area identified by Boffa Miskell (2006) on behalf of the Grey District Council as a potential Significant Natural Area ('SNA', Site PUN-W034) as shown in Figure 4. This SNA has been amended and included in the Te Tai o Poutini Proposed District Plan ('the TTPP'). This SNA, along with the part of the coastal lagoon to the south which is outside the SNA, but adjoins the mining area, is the location of the most important bird habitats in the immediate vicinity of the site as shown in Figure 4.

2.2 Threatened and At-Risk Birds Likely to be Present

A total of 41 species were confirmed using the site surroundings including 15 species of conservation concern as shown in Table 1. The species of birds which are considered to be "threatened" or "at-risk" and have been confirmed using the site and the adjoining SNA during the ecological assessments for the resource consent application are shown in Table 1 above.

Of the birds listed in Table 1, different species are expected to be affected by different activities. The majority of them would not use habitats within the site, rather using the adjoining beach, lagoon or wetland habitats and would therefore be affected by noise, human activities and vehicle movements near their habitats, particularly during the breeding

season. For these species the following management actions are proposed:

- Commencement of mining during the first year at least 100m from the edge of the mining area. Monitoring of birds prior to the commencement of mining and throughout mining so as to inform later management. Post-mining monitoring is also proposed for at least one year to confirm species are still present in the adjoining habitats.
- Maintenance of a 20m buffer from the edge of mining to the existing lagoon vegetation. This boundary is to be permanently marked so as to avoid crossing it inadvertently.
- Planting of parts of that buffer with flax and other native species set out in the planting plan for the site (required by Condition 19.1 of the relevant resource consents) so as to visually screen the mining activities from the lagoon.
- Avoidance of mining the parts of the strips closest to the highest quality habitats (the lagoon and provisional SNA area, Panels 4-8 and 10) between the months of August and December (inclusive) in order to provide separation from activities. The purpose of this avoidance is to provide spatial separation of at least 100m for breeding birds from the mining activities.

Monitoring for these birds is described in Section 3.0.

Figure 4: Location of SNA PUN-W034 at Barrytown.

2.3 Bird Species to be Managed

2.3.1 Introduction

For a small subset of the birds known to occur in the area, i.e., those which are known to occur within the mine footprint, or are likely to visit the mining area and may attempt to nest there in future, specific management activities are proposed. The five species for which specific management actions will be provided are shown in Table 2. Specific management actions are set out in Section 3.0 (for tūturiwhatu and tōrea/tōrea tai if they are detected at the site during ongoing monitoring), Section 4.0 for kororā and Section 5.0 for tāiko.

Table 2: Threatened and at-risk birds to be managed at the Barrytown Site.

Common name	Scientific name	Threat classification
tūturiwhatu, banded dotterel	*Charadrius bicinctus bicinctus*	Threatened – Nationally Vulnerable
kororā, little blue penguin	*Eudyptula minor*	At Risk – Declining
tōrea, South Island pied oystercatcher	*Haematopus finschi*	At Risk – Declining
tōrea tai, variable oystercatcher	*Haemotopus bicolor*	At Risk - Recovering
tāiko, Westland petrel	*Procellaria westlandica*	At Risk – Naturally Uncommon

2.3.2 Tūturiwhatu/New Zealand Banded Dotterel

Tūturiwhatu (banded dotterel) are the most common small plover of New Zealand seashores, estuaries and riverbeds. Their plumage varies seasonally, but they are readily identified by their brown upperparts and complete or partial chestnut breast band, which is quite obvious in breeding plumage. Like other plovers, the body is held erect and they have a characteristic run-stop-peck-run foraging behaviour in their pursuit of small invertebrates.

Typical breeding habitat for banded dotterels comprises lightly vegetated riverbeds, outwash fans, herb fields, beaches and farmland. The composition of vegetation varies regionally and particularly with altitude. Banded dotterels are often attracted to earth worked areas for breeding.

Banded dotterel pairs are solitary and territorial, but there can be high concentrations of birds in good habitat. Birds begin to arrive on the breeding grounds and set up territories in July. First eggs are laid in August to early November, in shallow scrapes in gravel, sand or soil,

usually lined with tiny stones, occasionally shell. The clutch-size is nearly always three eggs, which are coloured grey to pale-green or olive with small dark spots. Incubation is performed by both adults for c. 4 weeks and chicks fledge after another 5–6 weeks.

During the West Coast Penguin Trust survey of Pakiroa/Barrytown Beach in 2014, 33 banded dotterels were recorded (I. Perkins, West Coast Penguin Trust, pers. comm.).

Management of tūturiwhatu is discussed in more detail in Section 3.0 below.

2.3.3 Oystercatchers

Tōrea (South Island pied oystercatchers) and tōrea tai (variable oystercatchers) have both been recorded using the coastal area adjoining the site and the pasture within the farm as shown in Figure 3. Tōrea have conspicuous black and white plumage whilst mature tōrea tai's plumage is black. Both species have a long red bill. Tōrea are found on most estuaries and many coastal locations, with numbers greatest during the period December to July. Fewer tōrea remain in coastal areas during the rest of the year, with most of the population moving to inland South Island riverbeds and farmland to breed. Tōrea tai are site attached in coastal areas throughout the year.

Tōrea and tōrea tai breed in spring and summer. Nests are unlined scrapes on a mound or raised area of sand, gravel or soil with good visibility all around. Both members of the pair incubate the 1-3 eggs and care for the young. Incubation takes 24-28 days, and the young fledge 28–42 days after hatching. Tōrea have a conservation status of At Risk (Declining), whilst tōrea tai have a status of At Risk (Recovering).

During the West Coast Penguin Trust survey of Pakiroa/Barrytown Beach in 2014, five variable oystercatchers were recorded (I. Perkins, West Coast Penguin Trust, pers. comm.). Both tōrea and tōrea tai have been recorded during seasonal surveys at the site.

There is a possibility that oystercatchers of either species may choose to nest within the mining area on newly excavated soils or stockpiles. Management of oystercatchers will focus on monitoring and then deterrence from nesting in areas to be mined within the breeding season.

Management of tōrea, tōrea tai and other threatened or at-risk species that may (though not expected to) be found breeding on site is discussed in more detail in Section 3.0 below.

2.3.4 Kororā/Little Blue Penguin

Kororā occur throughout New Zealand and are thought to have a large, but declining population. One dead kororā was detected at Barrytown near the end of Burke Road as part of the ecological surveys to inform the resource consent application. West Coast Penguin Trust records confirm that kororā are resident in the Barrytown flats area with both breeding and mortality records (I. Perkins, West Coast Penguin Trust, pers. comm.). The population is thought to be a small number of birds (I. Perkins, West Coast Penguin Trust, pers. comm.).

West Coast Penguin Trust kororā survey data include 14 kororā tracks crossing Pakiroa/Barrytown Beach in 2013, 16 tracks recorded in 2014 and 17 tracks recorded in 2015. This survey has not been repeated since. The approximate location of the known penguin deaths near the site between 2007 and 2020 is shown in Figure 5.

Suitable nesting habitat for kororā is present between the coast and the mining area, although no burrows have been confirmed there during field surveys. It is possible kororā visit or use the coastal lagoon area or may come to use it in future, or that they may cross the farm to habitats further inland, although this is considered unlikely.

Kororā are nocturnal on land and typically breed in small colonies numbering from a few up to 20-30 pairs, sometimes semi-colonially, or sometimes as isolated pairs. Penguins commonly nest in dunes, coastal forest, farmland and rocky areas up to 200m inland or up to 500m upstream from river mouths. (Marchant and Higgins 1990). Birds nest in a burrow, sometimes digging their own, sometimes adopting burrows of other birds, and sometimes making use of small crevices or gaps in the substrate. They also make use of small spaces under buildings and dense vegetation and nest boxes where these are provided. Penguin burrows are used throughout the year and the same site is often used for nesting over many years. Chicks often return to their natal area to breed themselves.

If kororā are subject to undue stress, it can lead to mortality as they may not feed effectively or rest enough to survive moulting or breeding. Kororā are particularly vulnerable during moulting as they cannot swim, instead they will stay in or close to the burrow.. Activities after moulting are uncertain, some birds continue to use burrows year-round, but many disappear for weeks or months until the next breeding season.

The main threats to penguins while on land are predators (including dogs, stoats, cats and rats), road mortality and habitat loss and/or disturbance either due to humans or natural causes. Kororā are active ashore at all times of the year, with the breeding season being the most active period. They can be found walking across the beach, returning to their nest from the sea any time after dusk and generally leaving for the sea some time before dawn.

For the Hokitika area the breeding season through to moulting is approximately June – February (I Perkins, West Coast Penguin Trust, pers. comm.). This is likely to be similar at Barrytown. Management of kororā is discussed in more detail in Section 4.0 below.

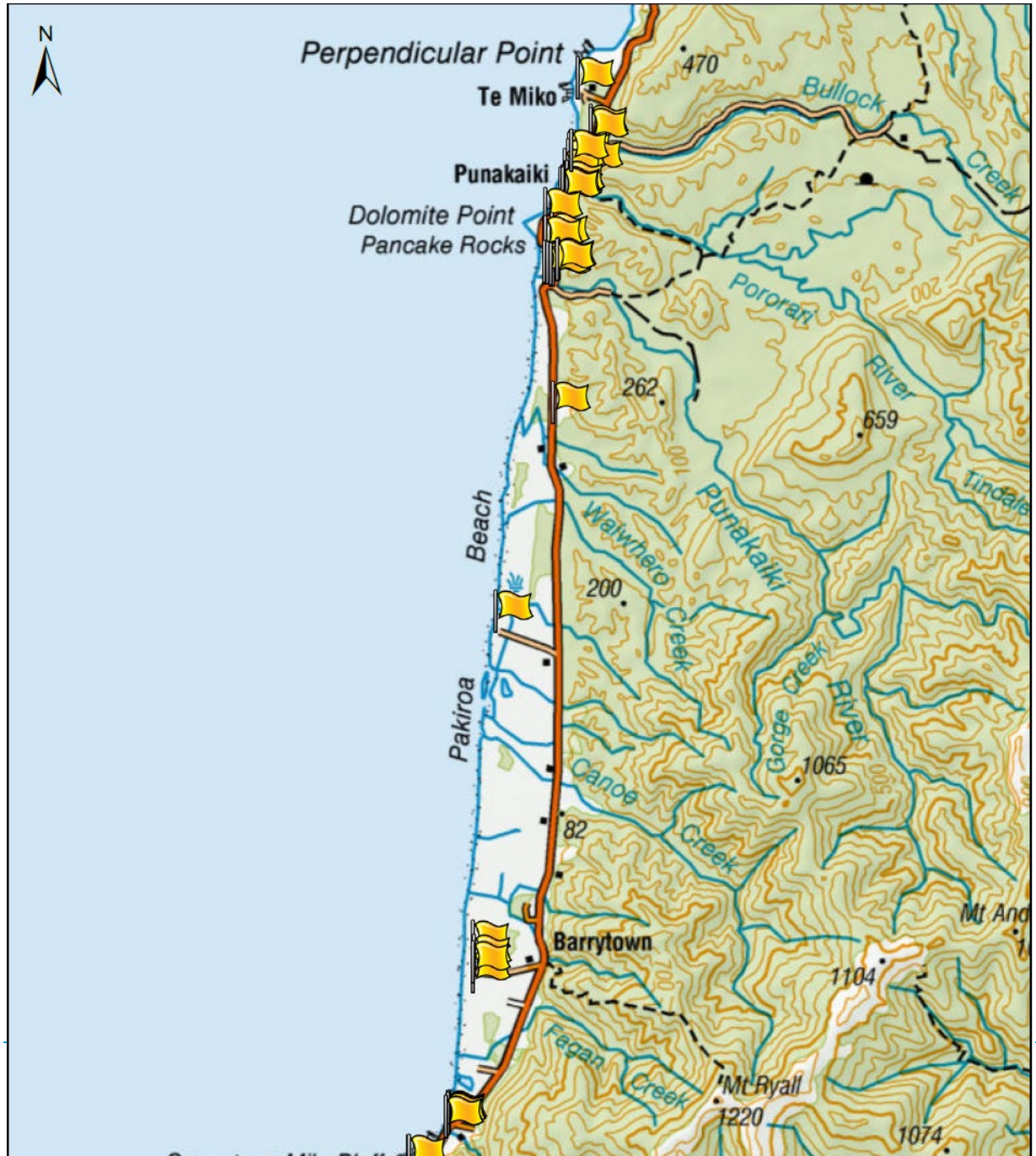
N
Perpendicular Point
Te Miko
Punakaiki
Dolomite Point
Pancake Rocks
Beach
Pakiroa
Barrytown
Bullock
Creek
Pororari
River
Tindale
Punakaiki
Creek
Waiwhero
Creek
Gorge
River
Canoe
Creek
Fegan
Creek
Mt Ryall
Mt Ano
470
262
659
200
82
1065
1104
1220
1074

Figure 5: Known location of little blue penguin deathss near Barrytown between 2007 and 2020 (Image and data from West Coast Penguin Trust).

2.3.5 Fernbird

South Island fernbird (*Poodytes punctatus punctatus*) have been detected near the coastal lagoon as shown in Figure 3. In the first instance, protection of fernbird will rely on maintaining 100m separation from mining activities during the breeding season.

In order to inform the location and number of fernbirds present and confirm they continue to persist in similar numbers throughout the project and beyond, territory mapping of South Island fernbird will take place in advance of mining commencing in Panel 4.

2.3.6 Tāiko/Westland Petrel

Tāiko/Westland Petrel belong to the same family of seabirds as albatrosses, shearwaters, prions, storm petrels and diving petrels. They are classified as “at-risk – naturally uncommon” by Robertson et al. (2021). They are nocturnal on land, returning at dusk to their nests before departing again at dawn to feed.

No Westland Petrel have been found during the seasonal surveys, however the only known colony in New Zealand is located just 3.6km north of the site in the coastal ranges near Punakaiki. The colony is made up of approximately 30 sub-colonies where an estimated 4–6,000 pairs breed annually between February and December. Westland Petrel are highly unlikely to nest at the site given the lack of suitable haitat.

The main threat to Westland Petrel is fishery bycatch as they regularly follow fishing vessels and are agile divers. Grounding of adults and fledglings around exposed lights around the district has been recorded by the Department of Conservation as well, although this has been considered to be low-risk, mostly due to the extent of mortality being unknown (Waugh & Wilson, 2017).

Westland petrels form long-term, monogamous pair bonds, with shared incubation and chick care. A single egg is laid in May or June at the end of a long (1–2 m) burrow. Eggs hatch in July, and the chicks begin fledging between November and January.

Management of tāiko is discussed in Section 5.0 below.

3.0 Species Management

3.1 Detecting Breeding

Birds which might breed in the areas of pasture or areas of bare soil created by mining include tūturiwhatu and oystercatchers. New Zealand pipit may also nest in undisturbed pasture areas. The breeding season for most seasonally breeding birds in New Zealand starts between June and September with most breeding being undertaken between September and December. Some birds will attempt second clutches and breeding can extend through until February or March. Site works and other activity is likely to deter birds (except dotterel) from establishing

nests near that activity, forcing them to nest elsewhere.

In advance of each breeding season, a general detection route will be devised across the area to be mined within the coming breeding season and adjoining areas (within 50m) which will be used to detect birds using the site to be mined during the upcoming season. The route will be identified by a suitably qualified and experienced ecologist experienced in the detection of breeding birds.

Fortnightly detection surveys will take place between 1 August and the onset of breeding (or the 14th September, whichever is the earlier) and weekly detection surveys between the commencement of breeding and 25 December.

During these detection surveys, suitably qualified and experienced observers will walk over the predetermined route which will cover areas intended to be mined within the forthcoming breeding season and adjoining areas in order to detect breeding behaviour or nesting that indicates species management should begin. Species management comprises discouraging nesting before it occurs and managing any established nests once they are discovered. Each of these actions is discussed further below.

This frequency of detection survey was chosen so that:

(i) There is a high probability that birds will be detected soon after their arrival at the site.

(ii) The behaviour of birds can be observed regularly, and if necessary, they can be discouraged from nesting where the presence of nests or dependent young would either put them at risk or obstruct mining activity.

(iii) The probability of detecting nest attempts (at least those that persist two weeks or more) is increased.

(iv) Nests which are abandoned or vacated (and isolated from other nests) will be detected quickly so as to minimise disruption to mining.

(v) The fate of nesting attempts and nestlings can be monitored so as to determine whether this management plan is effective at protecting the target species.

During detection surveys all birds (including non-target species) seen or heard will be recorded, and their approximate location will be marked using a GPS. The number of birds observed and their behaviour will be recorded, and if behaviours are consistent with breeding (e.g., calling, displaying, defending areas or other behaviour), then individuals will be observed from a distance for a period of at least five minutes to see if a nest can be located. All nest attempts, including locations, date and time of nest observations and the outcome (where known) will be recorded. Non-target species will be recorded so that a record of all species using the site can be compiled and any threatened or at-risk species not identified in this plan can be identified and a management strategy developed to protect them from mining. A report will be prepared after each survey to inform site management as set out in Section 6.3.

3.2 Discouraging Nesting

To reduce the need to disrupt mining activities by having to place a 50m buffer around any nests identified during monitoring, birds prospecting for nests will be discouraged from settling each prospecting season. This method is only to be used prior to the establishment of

any nesting activity, and will involve the use of one or more of the following methods:

(i) Completing disruptive site walkovers regularly between the 1st August and the onset of breeding. A disruptive site walkover would involve one or more people walking through the area with a dog on a lead. No dogs, other than those required for conservation purposes, are allowed on the site (Condition 18.3).

(ii) Installing streamers/tapes that flutter in breeding habitats (farmland, herb fields, gravel, burrows, earthworked areas) to deter birds from nesting. Note that this method is effective over the short term (up to 3 weeks) but decreases over time as birds become accustomed to it.

(iii) Parking earthworks machinery in future stage locations, starting the engine from time to time, but not moving equipment.

3.3 Management of Nest Sites

Any nests of threatened or at-risk species located will be subject to protection and management until such time as the chicks have successfully fledged.

A minimum separation distance of 50m will be maintained between any works and existing nest sites so as to minimise the risk of nest abandonment. All vehicles, machinery and people will be excluded from the area until either the nest is abandoned or any chicks fledge.

If a nest of any threatened or at-risk species (including those listed in Table 1) is discovered within the area to be mined, the following plan would be implemented:

(i) Minimise time spent near the nest to avoid attracting ground predators such as rats and stoats and aerial predators such as gulls.

(ii) Establish a “no go” zone approximately 50m radius around the nest using tape and markers.

(iii) If it is the first nest of the season, alert the appropriate supervisor to initiate a predator control plan immediately.

(iv) If a predator control plan is in place, adapt it as required to ensure bait stations or baited traps are located just outside the “no go” zone.

(v) Monitor the area at least twice weekly from outside the “no go” area in order to assist in estimating the time of fledging. Maintain the “no go” zone until after the chicks have fledged. This monitoring is described in more detail in Section 6.0 below.

3.4 Pest Control

Predator control will consist of a ring of traps and/or bait stations targeting rats and mustelids placed around the perimeter of the property and the lagoon. This network of traps will be installed prior to mining commencing and serviced at least 12 times per year.

In addition, if nest attempts are recorded, a second ring of traps and/or bait stations will be installed around the 50m “no go” zone associated

with a particular nest. The exact layout of traps and/or bait stations will be determined by the project ecologist at the time the predator control is initiated and will be in accordance with recognised best practice, including with respect to design and construction. In addition, traps and bait stations must be designed and deployed so as to exclude weka.

4.0 Species Management for Kororā

4.1 Overview

Because kororā are unique in their biology[3], management actions specific to kororā are proposed. By providing a unique subset of management actions for kororā, the effects of the mine on kororā using the area will be avoided. Any management involving handling of kororā will take place outside the breeding and moulting period (April – June inclusive).

Given that kororā are nocturnal on land, only undertaking mining and trucking during daylight hours and avoiding shift changes during darkness will avoid the potential for mortality and reduce the potential for disturbance of kororā due to mining at the site. Although kororā are known to burrow/nest under buildings, the processing plant would be constructed on a concrete slab and would not allow for penguin access. This reduces the potential for birds coming in contact with humans and vehicles at the processing plant.

No active kororā burrows (as indicated by guano, smell, tracks or the presence of cavities) have been detected either within the farmland or in adjoining habitats, and no kororā have been detected by the acoustic recorder monitoring at the site. We note that the habitats adjoining the mining area have not been comprehensively searched, but do appear suitable for kororā. We have assumed the adjoining habitats are where any penguin using the area currently reside.

Kororā are expected to be present at relatively low densities at Barrytown and are also considered unlikely to cross the open farmland for significant distances, instead preferring to use denser vegetation and waterways (such as Canoe Creek) to access inland habitats. Thus, it is considered unlikely that penguin access ways to areas inland occur across the farmland to be mined.

4.2 Monitoring of Kororā

Annual monitoring of Pakiroa Beach, the coastal lagoon, Collins Creek and Canoe Creek and suitable vegetation within 500m of the mining area using a conservation dog is proposed to detect penguins commencing prior to the start of mining.

As well as conservation dog monitoring, ten trail cameras will be used along the coastal edge of the site covering the area between Canoe Creek and Deverys Creek lagoon so as to detect penguins entering the coastal vegetation from the sea and surrounding areas. Cameras will

[3] Biology refers to the behaviours, feeding habits, breeding requirements and habitat use of kororā.

be established by a suitably qualified and experienced ecologist and set to record for at least ten nights per month.

In addition, quarterly footprint surveys and searches for dead penguins will be used to assist in detecting potential penguin presence. Surveys will be timed to coincide with the seasonal bird surveys when a low tide occurs in the morning and involve a suitably qualified and experienced person slowly walking a planned survey route in the late afternoon. Early the following morning, during low tide, the same route will be walked looking for faeces, feathers, new tracks or other penguin sign and investigating any cavities.

4.3 Detecting Kororā

If penguins are detected, the location would be mapped and the following management actions are to apply as per condition 18.9:

i) Any potential penguin burrows identified are to be investigated by a suitably qualified and experienced ecologist to confirm whether kororā are using them. This will include the use of a burrowscope. If active burrows are confirmed, consideration will be given as to how best protect them (e.g. via predator control).

ii) If penguins are detected using the mining area to access other habitats, any existing access ways are to be maintained and/or works affecting that accessway are to be completed in the period April – June (outside the breeding and moult period).

iii) Where any penguin burrows may be compromised by mining (i.e., direct effects), replacement artificial burrows/nest boxes are to be installed at a rate of 2:1 and a specific response plan (which may include relocation) would be developed for each burrow and any resident birds. Any additional nest boxes provided are to be located within the vegetated coastal foreshore habitat associated with any identified accessways.

iv) If penguins are found within the mine site, a specific Penguin Management Plan must be developed by a suitably qualified and experienced ecologist.

v) Any deceased penguins found on or near the mine site must be provided to the Department of Conservation for necropsy. If kororā are detected within the mining area at the site, a specific penguin management plan may be produced at the discretion of the project ecologist. Any kororā subject to a specific response plan will be microchipped and monitored by a suitably qualified and experienced ecologist to assist in management of the species at the site.

5.0 Species Management for Tāiko

5.1 Potential Effects on Tāiko

5.1.1 Background

The area to be mined is located approximately 3.6km south of the only known colony of tāiko/Westland petrel. Tāiko breeding occurs between February and December. Adult birds entering and departing the colony, and at sea close to shore, are known to be disoriented and attracted by artificial lighting and can be grounded. Young tāiko are known to be disoriented by lights when leaving the breeding colony and this can also result in birds being grounded. Groundings are most likely to occur between November and January, with a peak in December as shown in Figure 6. Note that the specific cause of each of the groundings summarised in Figure 6 remains unknown.

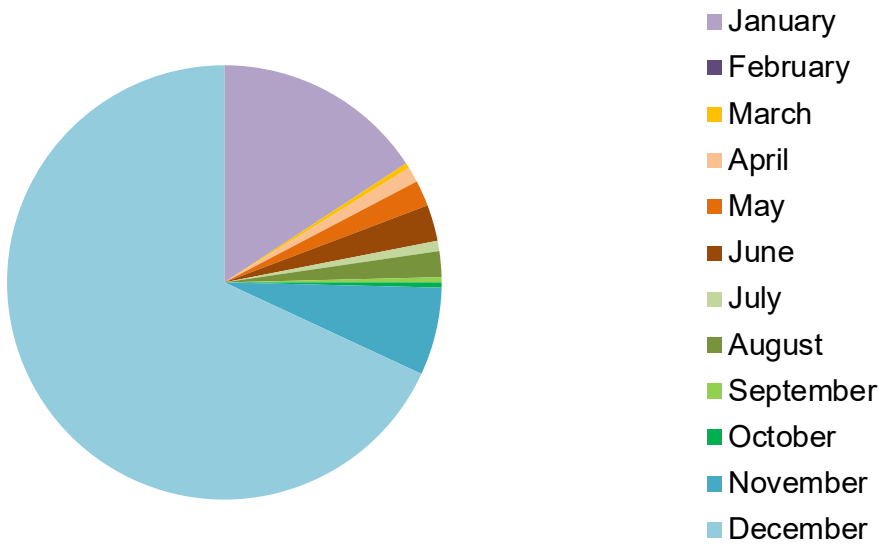

Figure 6: Records of grounded tāiko recorded between 2007 and 2022 categorised by month of occurrence (Data from Department of Conservation).

5.1.2 Fixed Lighting

In order to avoid any effects of lighting at the mine during night time operations, no mining and no trucking will occur outside daylight hours[4], other vehicle movements will be restricted and lighting will be managed in accordance with the Lighting Management Plan for the site.

Processing will occur at night inside the processing plant. This building has been designed with minimal exterior fixed lighting and no windows. . All doors can be closed to avoid light spill when not needed for entry or exit. Furthermore, the processing plant site will be bunded on the eastern and part of the northern sides with a 4.5m bund, the top of which will be planted with trees.

Some lighting will be required at the processing plant to allow safe work conditions. Condition 16 (particularly 16.2) of the Greymouth District Council land use consents requires minimisation of the amount of light at the site. This is to be achieved at the processing plant and loadout area via adherence to the Australian Government's National Light Pollution Guidelines for Wildlife January 2020 (or subsequent revision), including but not limited to pointing all fixed lighting downward, shielding to avoid light spill and use of the yellow-orange spectrum. In addition, lights should only illuminate the object or area intended and be mounted as close to the ground as possible.

In addition, the following actions will be deployed as appropriate at the site as set out in the Lighting Management Plan for the site[5]:

- The use of motion detectors, timing switches or similar methods to limit lighting to when it is required;
- Lighting will be used to light only the object or area intended;
- Lights will be deployed close to the ground, directed and shielded to avoid light spill as required;
- The lowest intensity lighting appropriate for the task will be used; and
- Non-reflective, dark-coloured surfaces will be used in preference to light or reflective surfaces.

Random lighting audits will be undertaken at least annually making reference to the Australian Government Lighting Guidelines for Wildlife.

5.1.3 Pit Lighting

Mining will take not take place at night as set out above. Removal of topsoil and overburden is restricted to daylight hours by Condition 12.2. It is possible that minor, temporary lighting (such as a headlamp or similar) may be required to be used in the pit at night to maintain equipment such as pumps. If so, the following actions will be deployed as required by Condition 16.2:

[4] Daylight hours are defined as the period between 30 minutes before sunrise and 30 minutes after sunset. Sunrise and Sunset times will differ throughout the year, and are determined by sunrise and sunset times at Greymouth which can be found at the following website: https://www.timeanddate.com/sun/new-zealand/greymouth

[5] These are based on best practice lighting design, Appendix A of the Australian Government Light Pollution Guidelines available at http://www.environment.gov.au/system/files/resources/2eb379de-931b-4547-8bcc-f96c73065f54/files/national-light-pollution-guidelines-wildlife.pdf

- Utilising the Seabird Light Mitigation Toolbox in Appendix G – Seabirds (Schedule 4);
- All fixed lighting must be directed downward, shielded to avoid light spill, with a lighting temperature of no more than 2000K, and be filtered to reduce blue and violet wavelengths;
- Lights must only illuminate the object or area intended;
- Fixed lights must be mounted as close to the ground as practicable while still achieving site lighting requirements;
- External lighting must be minimised on the seaward side of buildings to minimise light spill toward the coast;
- External lighting must use the lowest intensity lighting possible, while ensuring compliance with workplace health and safety requirements
- External lighting should be equipped with light minimising technology, including motion sensors and timers where practicable
- Any windows must have blackout blinds fitted to avoid any light spill from internal lighting within buildings,
- Where practicable, the consent holder should make efforts to ensure mobile lighting within the mine site adheres to the above principles, including dipping headlights of vehicles operating on site.

5.1.4 Vehicle Headlights

No trucking movements are proposed outside daylight hours. Shift changes and other light vehicle movements relating to infrequent maintenance requirements on the site would be subject to the management requirements set out in this AMP, the Lighting Management Plan and the Traffic Management Plan for the site including speed limits as required by condition 27.2, a requirement to dip headlights as required by condition 16.2 and a requirement to report all near misses with wildlife as required by conditions 15.10 and 18.6.

In addition to avoiding night time mining at the site, other actions intended to protect tāiko, kororā and other species from accidental death due to collision with vehicles on the State Highway include:

- Monitoring and reporting of all encounters with tāiko and other wildlife by all mine related vehicles throughout the year. In the event that a mine related vehicle collides with any native wildlife,this management plan will be reviewed with a view to avoiding any further mortality. This monitoring includes self-reporting and monitoring using trail cameras as described in Section 5.2.

Moving vehicles within the site

In addition, the lights of vehicles travelling around the site at night, such as from the highway to the loadout, might also affect wildlife. Given that mining and trucking will not occur at night, the number of movements between the processing plant and pit would be very small and limited to those required to maintain equipment, the risk posed by these movements is very low. Actions intended to protect tāiko from accidental death due to collision with vehicles within the site include:

- Limiting the speed of vehicles to 15km per hour while on site as required by Condition 27.2 of the West Coast Regional Council consents.

- Requiring headlights to be dipped at all times within the site. The effectiveness of this action in avoiding birds remains unknown, but it may assist. This practice will be trialled for at least three months. In the event that it proves unhelpful (e.g., if it becomes difficult to see wildlife at the site) this practice will be discontinued.
- Monitoring and reporting of all encounters with wildlife by all site vehicles throughout the year. In the event that a bird has a near miss or collides with a vehicle within the site this management plan will be reviewed (including consideration of banning night time vehicle movements) with a view to avoiding any further mortality.

5.2 Monitoring Tāiko

The most likely locations for tāiko to encounter lighting or humans are in the vicinity of the processing plant, near or within the pit and along the access road. Ten trail cameras are proposed to be used at these locations and around the site boundary to record any birds that may be grounded or otherwise come in contact with the mining operation. Cameras are proposed to be installed at suitable locations to ensure coverage of the area and set to record continuously at night. Footage will be reviewed weekly and used to inform the weekly and monthly tāiko monitoring reports described in Section 6.2.

5.3 Detecting Grounded Tāiko

Mining will take place during daylight hours throughout the year, but there may be occasional vehicle movements across the site at night if required as described above. The most likely location for tāiko to be grounded is near any area where lights are being used (the processing plant and load out area and the internal road within the site).

It is the responsibility of TiGa to provide training so as to ensure staff are appropriately informed and able to implement the accidental discovery protocol set out below. It is the responsibility of all employees based at the site to be alert to the possibility that they might encounter a grounded tāiko and to know how to respond appropriately. In addition, the specific location, date and time any grounded birds are detected is to be recorded by the personnel who discover the bird(s), and this information is to be provided to the Mine Manager.

[NOTE an authority under the Wildlife Act 1953 will be required to handle absolutely protected wildlife (including tāiko and most other native birds and their young). A Wildlife Act Authority will be required to handle any tāiko which are recovered and to implement other aspects of this Management Plan including the disturbance of prospecting birds described in Section 3.2. This is a separate process administered by the Department of Conservation and can take some months to work through. A copy of the permit should be attached to this plan as Appendix A.]

All trucking and other contractors and staff leaving the site (including those travelling to and from work past the colony) are required to report any vehicle strike of birds, as well as near misses, to the Mine Manager as soon as practicable after they occur.

Reports are to include the date, time, approximate location and number of birds (if known). The Mine Manager will be responsible for

maintaining an incident log and upon receiving a report of a bird strike will notify the Department of Conservation as soon as practicable.

Data relating to trail camera footage (hours reviewed, any tāiko records), near misses and groundings or other tāiko detections will be included in the weekly and monthly tāiko monitoring reports set out in Section 6.2. Any detection of a tāiko using these methods will result in a review of this Avian Management Plan in order to determine whether any changes to operations are required to protect tāiko.

The occurrence of one incidents[6] will prompt a review to this plan. Two interactions within four weeks of each other, or a grounding, will result in operations being suspended at the site during the hours of darkness until this management plan has been reviewed and any actions necessary to protect tāiko incorporated into mine operations as required by Condition 18.8.

Live birds seen on the road at any time of day/night, should be reported to 0800 DOC HOT as soon as possible and encouraged off the road if safe to do so.

5.4 Accidental Discovery

5.4.1 Equipment required to be kept on site

A sturdy net suitable for catching grounded birds, leather gloves for handling birds and a suitable enclosure (lined box, crate or cage) will be held on site and all staff will be informed of their location and trained in their safe use to ensure bird welfare.

5.4.2 Discovery of a Tāiko

In the event that a live grounded tāiko is discovered within the site, the bird will be caught with the minimum amount of disturbance and placed in the suitable enclosure in a cool place. The person undertaking capture of any wildlife will be suitably trained to undertake that task humanely and will call on a suitably qualified and experienced ecologist or the Department of Conservation as required. If the bird is heavily waterlogged then it should be dried using towels/paper towels and left in a warm, dark ventilated place. In such situations birds should be monitored regularly as once dry they can overheat. Birds should be transferred as quickly as practicable to the local Department of Conservation, who will determine if it is fit for release, undertake the release and inform the Mine Manager of the outcome. If injured the local Department of Conservation office will take responsibility for the bird and keep the Mine Manager up to date with progress.

In the event that a tāiko (either alive or dead) is recovered from within 50m of the pit, internal roads or the processing plant and loadout area, the following steps will be instigated immediately:

- An attempt to identify the potential reason(s) for grounding should be undertaken immediately. If the likely cause can be identified and the reason can be modified or eliminated immediately, this will be done.

[6] An incident is defined as a video record, a sighting, or a record from a mine vehicle.

- The incident must be logged, the rationale behind the identification of the likely cause and steps taken to reduce/eliminate the risk must be documented and authorised by the Mine Manager. These steps and the outcomes should be included in the weekly, monthly and annual reports set out in Sections 5.2 and 5.3.
- If the cause of grounding is identified as a light source which cannot be modified or eliminated, TiGa will seek advice as soon as possible (within 24hrs) from a suitably qualified and experienced ecologist and the Buller/Kawatiri office of the Department of Conservation in Westport.
- A lighting audit will be undertaken to ensure lighting at the site complies with the requirements set out in this Avian Management Plan and the latest version of Lighting Management Plan for the site as well as the Australian Government National Light Pollution Guidelines for Wildlife including marine turtles, seabirds and migratory shore birds.
- This management plan will be reviewed by a suitably qualified and experienced ecologist in consultation with the Buller/Kawatiri office of Department of Conservation and any other changes to management protocols including, but not limited to, changes to light colour, intensity or timing, additional bunding or planting, the use of black out curtains, tinted windows or other methods to reduce light spill and the risk of grounding will be considered with a view to implementing them as required.
- Any potential management protocol changes identified as likely to contribute to reducing the risk of grounding during the review of this management plan will be implemented as soon as practicable.

5.4.3 Discovery of dead birds

In the event of any dead native birds (including tāiko) being located within the mining area, the Buller/Kawatiri Department of Conservation office in Westport and Te Rūnanga o Ngāti Waewae will be informed and collection by or delivery to the Department of Conservation will be arranged.

6.0 Monitoring and Reporting

6.1 Monitoring Proposed

Seasonal bird surveys at the site commenced in April 2022 and will continue until 12 months after completion of mining at the site. Seasonal bird surveys will be undertaken four times each year, once each in spring, summer, autumn and winter using five-minute bird counts and acoustic recorders at the locations shown in Figure 7. These surveys are intended to detect species using the parts of the lagoons and Rusty Pond closest to the mining area and other adjoining habitats where effects beyond the site are most likely, and may need to be avoided or managed.

In addition to the seasonal surveys, as set out above, detection of “threatened” and “at risk” species using the mining area (including

tūturiwhatu, tōrea, tōrea tai and pipits), will rely on fortnightly and/or weekly detection surveys and close (twice weekly) monitoring of any nesting attempts. The number, location and outcome of all nesting attempts will be recorded, along with the number, dates and times of monitoring visits. This data will be summarised into a report at the completion of each monitoring round and used to inform site management.

For kororā an annual survey of Pakiroa Beach using a conservation dog and other surveys as described in Section 3.4 are proposed.

For tāiko, the location, date and time of any groundings will be recorded, along with any vehicle strikes and near misses and any detections from the wildlife cameras. This information will be included in the weekly and monthly tāiko reports described in Section 6.2 and the annual bird monitoring report described in Section 6.3.

In order to have the best chance of detecting Australasian bittern, acoustic surveys must be undertaken at least once annually between September and November.

For South Island fernbird, territory mapping using playback of fernbird calls will be undertaken in advance of mining commencing in Panel 4 so that the number and location of fernbirds can be confirmed.

Monitoring to quantify noise levels at the site boundary adjoining the SNA and coastal lagoon habitats will be undertaken to inform management decisions with respect to noise levels in natural habitats adjoining the site.

Figure 7: Location of bird monitoring sites at Barrytown.

All bird monitoring should be undertaken by suitably qualified and experienced ecologists/ornithologists to ensure all species observations are accurately captured.

This information will be compiled into regular bird monitoring reports as set out in Sections 6.2 and 6.3. At the conclusion of the breeding season (March) the reports covering the previous 12-month period will be summarised and provided to the consent authorities and others no later than 30 June each year as discussed in Section 6.4.

6.2 Reporting Tāiko and Kororā within the Mining Area

Between 1 November and 31 January each year a weekly report setting out the number and nature of any tāiko or kororā interactions at the site is to be prepared by the project ecologist and provided to the Grey District Council, Te Runanga o Ngāti Waewae, Paparoa Wildlife Trust, the Community Liaison Group for the project, West Coast Penguin Trust and the Buller/Kawatiri office of the Department of Conservation in Westport.

Between 1 February and 31 October this report shall be provided monthly. In the event that tāiko are detected by these methods this management plan will be reviewed and any changes necessary to protect tāiko included as required.

6.3 Reporting Species Management in the Mining Area

Following the weekly and fortnightly surveys described in Section 3.1 a short report is to be prepared setting out the findings of the latest survey and making any recommendations to manage and protect birds using the mining area. These reports are to be summarised in the annual Bird Management Report described in Section 6.4 below.

6.4 Annual Bird Management Report

An annual bird management report will be prepared which details the following matters:

- The timing and duration of any mining within 100m of the coastal lagoon vegetation and the SNA;
- Results of seasonal bird surveys at the site;
- Timing of nest detection surveys and observations relating to nesting or other behaviours observed within the area to be mined;
- Efforts to deter any attempts at nesting within the area to be mined and the outcome of those efforts;
- Species attempting to nest within the area to be mined (including threatened and at risk species);
- Date of first nesting attempts (if any) for threatened and at risk species within the area to be mined;
- Number and location of nesting attempts by threatened and at risk species within the area to be mined;
- Date any predator control commenced, the location of traps and bait stations, the number of captures, the amount of bait consumed and any relevant observations;
- Outcome of individual nesting attempts by threatened and at risk species within the area to be mined;
- Results of annual and seasonal kororā surveys on Pakiroa Beach and the results of trail camera monitoring as well as the implications for mine operations and any

management actions undertaken;

- The number, dates and location of any near misses or camera records of tāiko, any grounded tāiko and any birds found dead at the site;
- Management undertaken and the outcome for any grounded tāiko collected;
- Autopsy outcomes for any dead tāiko collected;
- The number, dates and location of any near misses with vehicles for any native species;
- The findings of any lighting audits undertaken during the year and steps taken to resolve any issues identified.
- A summary of any revisions made to this management plan and the reasons for the changes;
- The date and duration of any operational shut-downs;
- The results of the quarterly walk-through surveys of birds using the lagoon area.

The annual bird management report will summarise the above information, identify any trends or patterns and compile any relevant maps. This report will be reviewed by a suitably qualified and experienced independent ecologist/ornithologist who will evaluate the findings and provide any recommendations considered necessary to improve bird management at the site.

The annual bird management report and any updates to this management plan will be provided to the Grey District Council, Te Runanga o Ngāti Waewae, Paparoa Wildlife Trust, the Community Liaison Group for the project, West Coast Penguin Trust and the Buller/Kawatiri office of the Department of Conservation in Westport no later than 30 June each year.

7.0 Mitigation

Mitigation for species using the habitats surrounding the mining area is based on physical separation during the breeding season, the use of screening planting and the limited duration of mining in the near vicinity outside the breeding season. Specific management responses will be developed if ongoing monitoring at the site indicates that they are required if bird presence, abundance or local distribution changes (e.g., for kororā which are not known to use the mining area, but are present in the wider area).

Wildlife would be protected from vehicles within the site by:

- Limiting speed within the site.
- Avoiding traffic movements during the hours of darkness.
- Requiring headlights to be dipped within the site for necessary vehicle movements during darkness. The effectiveness of this action in avoiding birds remains unknown, but it may assist. This practice will be trialled for at least three months. In the event that it proves unhelpful (e.g., if it becomes difficult to see wildlife at the site) this practice will be discontinued.
- Reporting of all encounters with wildlife by all site vehicles throughout the year to inform ongoing management.

Monitoring and reporting of all encounters with tāiko and other wildlife by all mine related vehicles throughout the year on the State Highway is also required.

Monitoring includes self-reporting and monitoring using trail cameras for kororā and tāiko, breeding detection surveys for species using the mining area (tūturiwhatu, oystercatchers and pipit), conservation dog surveys (for kororā) and seasonal surveys as described in Section 4.2 and 5.2.

With respect to lighting, Table 3 outlines management actions proposed.

Table 3: Light management for seabirds at TiGa's Barrytown Site.

Management Action	Specific Approach
Implement management actions during the breeding season	Tāiko breeding occurs between February and December. Lighting management actions would be continuous at the site.
Maintain a dark zone between the rookery and the light sources	The tāiko colony is 3.6km north of the site. Outdoor lighting will be used only as required and managed to reduce the risk of groundings. The presence of tāiko at the site would result in a lighting audit as set out in Sections 4.3 and 4.4 of the lighting management plan.
Turn off lights during the fledging season	No trucking or mining will occur outside daylight hours. Dimming options and light spectra will be managed in accordance with the lighting management plan.
Use curfews to manage lighting	No trucking or mining will occur outside daylight hours.
Aim lights downwards and direct them away from nesting areas	No trucking or mining will occur outside daylight hours. Lighting will be directed and shielded in accordance with the lighting management plan.
Prevent indoor lighting reaching outdoor environment.	No windows or skylights are proposed on the WCP building. Doors will have seals to prevent light escaping. Light will be contained inside the building.
Use luminaires with spectral content appropriate for the species present.	The specific wavelengths problematic for tāiko remain unknown. Lights rich in blue would be avoided and ongoing monitoring and lighting audits will be used to update the Lighting Management Plan and this plan as required. It is proposed to use lights with a 2000k temperature as installed previously at Punakaiki.
Avoid high intensity light of any colour.	Low intensity lighting is proposed in accordance with the lighting management plan.
In facilities requiring intermittent night-time inspections, turn on lights only during the time operators are moving around the facility.	Appropriate wavelength light at low intensity, directed and shielded is proposed to be used as required for night time maintenance and movements around the site. This lighting will not be used/be turned off when not required.
Ensure industrial site/plant operators use head torches.	Head torches will be available for use.
Supplement facility perimeter security lighting with computer monitored infrared detection systems.	No perimeter lighting is proposed. Night vision detection will be used for monitoring the pit pump.
Design and implement a rescue program for grounded birds.	A response programme for grounded birds is set out in this plan (section 5.4). All interactions with seabirds will be documented and reported to regulatory authorities.

8.0 Summary

TiGa proposes a mineral sand mine located on farmland near Barrytown, approximately 36km north of Greymouth. The mining area adjoins wetland areas which provide important habitat for a range of indigenous bird species, some of which are considered to be

threatened or at risk. The proposed mine is also located near the only known breeding colony of tāiko (Westland petrel, *Procellaria westlandica*).

Fifteen threatened and at-risk bird species have been identified using the habitats adjoining the site. The majority of these species would not use the pastoral habitats within the site, but would be affected by noise, human activities and vehicle movements near their habitats, particularly during the breeding season. A number of management activities (e.g., maintaining buffers from key areas of habitat, planting, avoidance of mining strips adjacent to high quality habitat during breeding season) will be undertaken to minimise impacts on these species.

Specific management actions for threatened and at-risk species if they are detected at the site during ongoing monitoring include: detection surveys to identify birds prospecting for nest sites, discouraging birds from establishing nests in the work site, managing established nest sites (including establishing no-go zones within 50m and initiating predator control) and monitoring identified nests twice weekly.

Annual conservation dog surveys will be undertaken to locate kororā using Pakiroa Beach, the coastal lagoon, watercourses and suitable habitat within 500m of the mining area as well as monthly wildlife camera footage and seasonal footprint surveys and this information will be used to plan kororā management.

The area to be mined is located approximately 3.6km south of the only known colony of tāiko/Westland petrel. Both adult and young birds are known to be disoriented and attracted by artificial lighting and can be grounded. In order to avoid the effects of lighting at the mine during night time operations no mining or trucking movements outside daylight hours are proposed. Processing would occur at night within the processing plant, which will require some lighting to maintain a safe workplace. The building has been designed to avoid light spill where possible and adherence to the Australian Government's National Light Pollution Guidelines or Wildlife, January 2020 (or subsequent revision) is proposed in relation to that lighting. Minimisation techniques will include (but not be limited to) pointing all fixed lighting downward, shielding to avoid light spill and use of the yellow-orange spectrum. In addition, lights should only illuminate the object or area intended and be mounted as close to the ground as possible. Night time traffic movements to and from the site relating to shift changes will also be avoided.

TiGa will also provide training so as to ensure staff are appropriately informed and able to implement an 'accidental discovery protocol' in the event a grounded tāiko is identified. Wildlife cameras will also be used to detect tāiko at key locations across the mining site and any detections will be reported on a weekly basis between 1 November and 31 January and a monthly basis between 1 February and 31 October. Any detection will result in a review of this management plan to ensure tāiko are protected. Two near misses or groundings within four weeks of each other will result in a cessation of operations during the hours of darkness and a review of this plan to address the cause of the incident.

In the event any dead bird is identified within the site, the Department of Conservation office in Westport and Te Rūnanga o Ngāti Waewae will be informed, and collection or delivery of the bird arranged. In the event the dead bird is a tāiko and it is discovered within the mining site, a detailed information gathering and logging process will be followed.

Bird monitoring will include detection of "threatened" and "at risk" species using the site and adjoining areas. Given the small size of the mining area in relation to the wider site, birds using the area to be mined during any upcoming breeding season would be detected via fortnightly and/or weekly detection surveys and close (twice weekly) monitoring of any nesting attempts. Monitoring of birds using the parts of the lagoons, Rusty Pond and other adjoining habitats will be undertaken during seasonal bird surveys (four times each year in spring, summer, autumn and winter) using five-minute bird counts and acoustic recorders at 15 locations. At least one of those surveys each year will be undertaken at the appropriate

time to detect Australasian bittern. Territory mapping of South Island fernbird will also take place in advance of mining commencing in Panel 4 in order to inform fernbird management.

The data collected will be compiled and presented in weekly, monthly and annual bird monitoring reports to be used in adaptively managing the operations to protect the birds at the site and provided to Greymouth District Council, Te Runanga o Ngāti Waewae, Paparoa Wildlife Trust, the Community Liaison Group for the Project, West Coast Penguin Trust and the Buller/Kawatiri Department of Conservation office in Westport.

9.0 References

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APPENDIX A

Wildlife Act (1953) Authority to Handle Absolutely Protected Wildlife