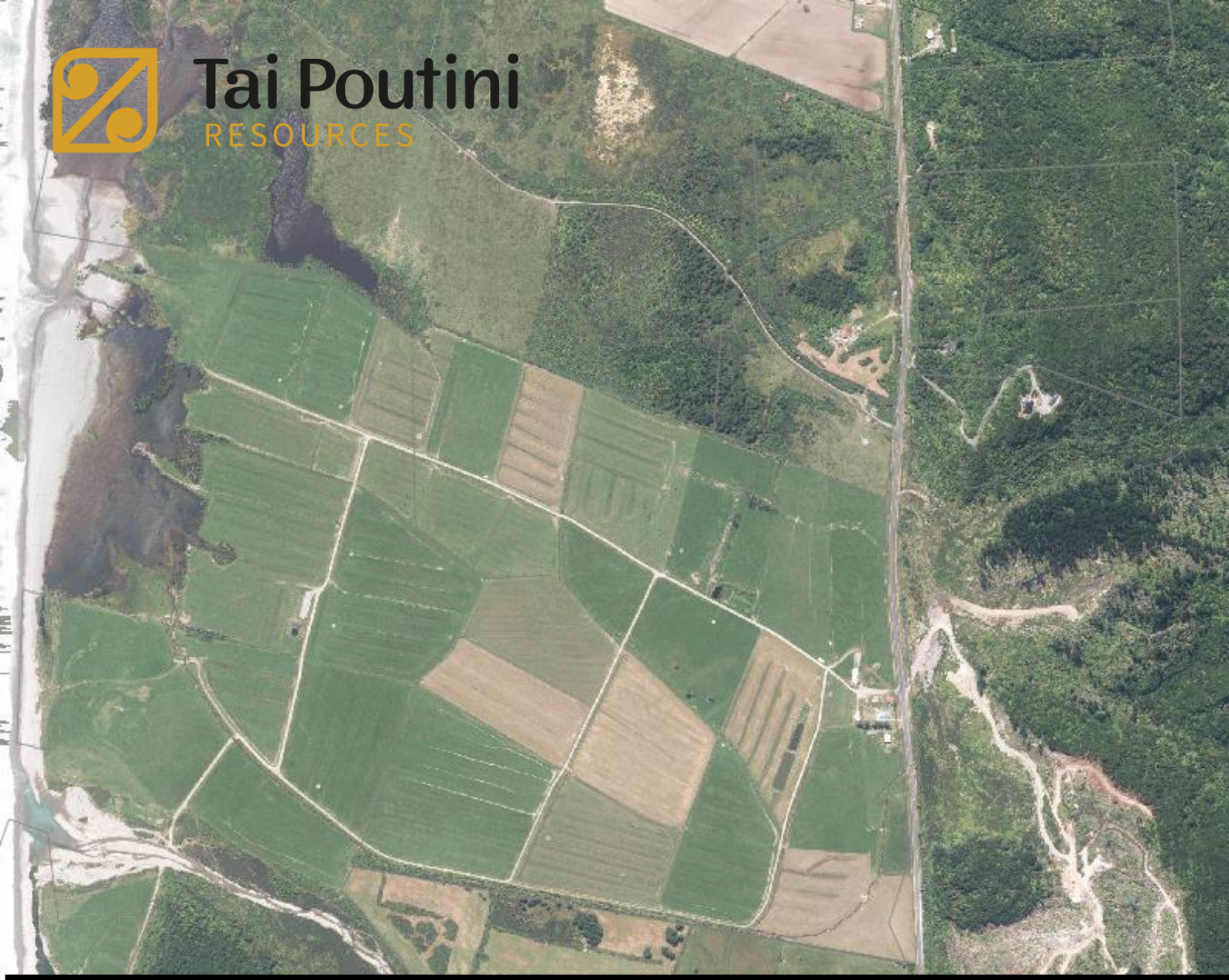
Tai Poutini
RESOURCES



TIGA MINERALS AND METALS LTD

APPLICATION FOR RESOURCE CONSENT TO GREY DISTRICT COUNCIL AND WEST COAST REGIONAL COUNCIL

MINERAL SAND MINING ACTIVITIES AT BARRYTOWN

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TIGA MINERALS AND METALS LTD

APPLICATION FOR RESOURCE CONSENT TO GREY DISTRICT COUNCIL AND WEST COAST REGIONAL COUNCIL - MINERAL SAND MINING ACTIVITIES AT BARRYTOWN

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Reviewed by:	Jorja Hunt		18/04/2023
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Contents

Executive Summary

1.1 TiGa Minerals and Metals Limited (TiGa) currently holds a Mining Permit MP60785 at the Barrytown flats over approximately 800ha of land. Resource consent is sought to undertake mineral sands mining and processing to obtain ilmenite, garnet and other minerals over an area of approximately 63ha (covered by Mining Permit MP 60785) at Nikau Deer Farm Ltd owned land, and to construct necessary infrastructure.

1.2 The mining activity is seeking to produce a Heavy Mineral Concentrate (HMC) for export, with the activity only involving primary processing of the mineral sand deposit previously identified within the application area.

1.3 The site is currently used for dairy/dairy support and is a highly modified humped and hollowed parcel of farmland located adjacent to State Highway 6, with manmade and other wetlands bordering the site to the south and west, a small unnamed modified drainage channel on the northern boundary, and Collins Creek on the southern boundary.

1.4 The application area is located within the Rural Environmental Area as defined by the Grey District Plan and the activity is classified as a Non-Rural Activity.

1.5 The application area is proposed to be zoned Minerals Extraction Zone under the proposed Te Tai o Poutini Plan.

1.6 The mining operation involves extracting mineral sand ore from a mining strip area, pumping the ore to a processing plant located in the southwest of the site, extracting Heavy Mineral Concentrate and returning the un-mineralised sand to the mining void. Mining will progress in strips across the site, from west to east, starting in the south west and progressing northward. Heavy Mineral Concentrate will then be transported off the site either toward Westport or Greymouth, either for direct export or further processing into the composite parts of the Heavy Mineral Concentrate.

1.7 The applicant estimates that approximately 47 full time equivalent positions will be created as a result of this proposed mining operation, which represents significant positive effects for the West Coast region.

1.8 This application is informed by specialised technical reports completed by experts including the following:

- Hydrological assessment and Water Management Plan
- Landscape assessment
- Acoustic assessment
- Traffic assessment
- Mine planning and rehabilitation information

- Ecological impact assessment

1.9 Where practicable the recommendations set out within these reports have been adopted and volunteered as resource consent conditions.

1.10 This Assessment of Environmental Effects (**AEE**) report considers the effects of the proposal and determines that the proposal will have no more than minor adverse effects on the environment while having positive effects in terms of economic growth and local employment opportunities. The proposal involves substantial mitigation measures to reduce the effects on the environment, such as effects on landscape and visual amenity, noise effects, traffic effects, indigenous flora and fauna and water bodies. The effects management hierarchy has been applied in relation to potential effects which have been identified, particularly in relation to effects on waterbodies and wetlands surrounding the site. An assessment against the objectives and policies of the Grey District Plan, the West Coast Regional Land and Water Plan, the proposed Te Tai o Poutini Plan, the Regional Policy Statement 2019, the National Policy Statement for Freshwater Management and the New Zealand Coastal Policy Statement 2010 concludes that the proposal is consistent with the relevant provisions of each plan.

1.11 TiGa has undertaken consultation with iwi, local residents and landowners, and agencies with an interest in the application and this consultation is ongoing.

1.12 Pursuant to section 95A of the Resource Management Act 1991, TiGa requests that the application be publicly notified.

1.13 The proposal accords with the purpose and principles of the Resource Management Act 1991 (RMA) and accords with the definition of sustainable management.

1. Details of Applicant

Applicant

TiGa Minerals and Metals Ltd
C/- 100 Mackay Street
Greymouth 7805

E: john.berry@tigamm.com
P: +61 439 953 624

Agent

Tai Poutini Professional Services Ltd
100 Mackay Street
Greymouth 7805
Attn: Kate McKenzie
M: 027 600 3586
E: kate.mckenzie@tprl.co.nz

All correspondence should be sent to the agent in the first instance.

2. Application Site and Surrounding Environment

Site Details

2.1 The site for the proposed activity is located at the Barrytown Flats on the South Island's West Coast. The Flats lay approximately 9km south of the Punakaiki Township and 36km north of Greymouth and lay to the West of State Highway 6 which is the main stretch of highway between Greymouth and Westport. Although the Flats are located in the Grey District the closest township is Punakaiki which is located in the Buller District.

2.2 The application site is legally described as Lot 1 DP 412689 and Rural Section 2847 contained in Record of Title 447182 (93.9ha) and Section 4-6 Block V Waiwhero Survey District contained in Record of Title WS2D/1035 (21.4ha). Lot 1 DP 412689 is subject to a Consent Notice issued pursuant to Section 221 of the Resource Management Act 1991, which states that the site has not been proven suitable for building development, and contains requirements relating to the construction of future dwellings on the site. Copies of the Records of Title and Consent Notice for the site are enclosed in **Attachment A**. The site plan is enclosed as **Attachment B** and shown in **Figure 1** below. The site is owned by Nikau Deer Farm Ltd. The applicant has an access agreement in place with the landowner, which will allow the mining to occur.

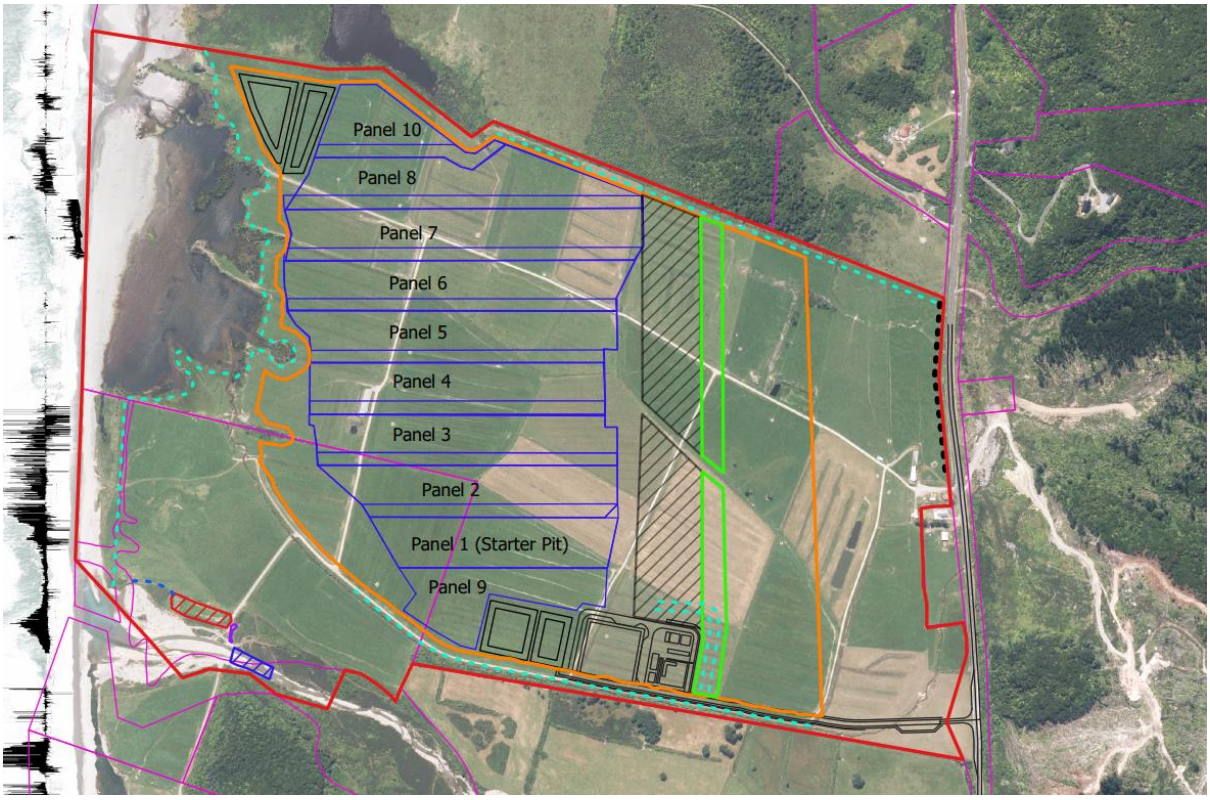

Figure 1: Site Plan

2.3 The site is currently used for dairy/dairy support and is a highly modified humped and hollowed parcel of farmland located adjacent to State Highway 6, with wetlands bordering the site to the south and west, a small modified drainage channel on the northern boundary, and Collins Creek on the southern boundary. There are springs on the property to the south of the site utilised for domestic and stock water supply. The only vegetation other than pasture on the site is a small area of flax which has been planted as a wind break around a stock run off pad in the middle of the site, and several individual mature kahikatea trees. Drains and waterbodies bordering the site have not been fenced from stock and other than limited riparian planting for a small section of Collins Creek, the banks of waterbodies are unstable and subject to erosion due to stock access and lack of vegetation

2.4 The property is actively farmed by the landowners and currently contributes to the local economy via employment and food production as a result of livestock farming and grazing.

2.5 The application area is bordered by State Highway 6 to the east past which lies privately owned land then the Paparoa National Park. To the south the application area is bounded by Collins Creek. To the west is the Tasman Sea. Much of the surrounding land is lowland pastoral farmland modified by early 20th century gold mining activities, with remnants of coastal lagoons and coastal lowland forest.

2.6 To the north lies another parcel of privately owned land that has been identified by the Grey District Council and the West Coast Regional Council as a potential Significant Natural Area (SNA),

which extends to the 'Canoe Creek Lagoon' that lies within the land parcel that is the subject of this application.

2.7 The pastureland has been subject to a number of improvements works over a period of time that has sought to modify land drainage to improve pasture growth. The majority of the application site is humped and hollowed.

2.8 State Highway 6 is the national route that provides access to the Westland region and forms the road link between Barrytown and Greymouth to the south and Westport to the north. The road is sealed and has a width of between 6.8 metres (m) and 7.0 m except for several sections on the Barrytown flats where the width decreases to between 5.6 m and 6.0 m. The farm currently has access to the State Highway via an existing farm entrance just north of 3261 Coast Road which previously served the milking shed on the site when this was operational.

2.9 In the past the application site has been subject to logging and other gold mining activities. The earliest known mining dates back to 1867 when the first rush occurred within the Canoe Creek area. Later from the 1930's onwards company exploration began to be conducted by NZ Gold Options (1931-32), NZ Prospecting and Mining Ltd (1935-37), Whites Electric Dredging Company (1936-41), and Barrytown Dredging Company Ltd (1937-45); and the Flats were mined by dredging up until the 1940s in the southern part of the permit area. The remnants of dredging can be seen across the Barrytown flats with a number of dredge ponds remaining, including the pond to the immediate north of the application site, and the Canoe Creek lagoon itself.

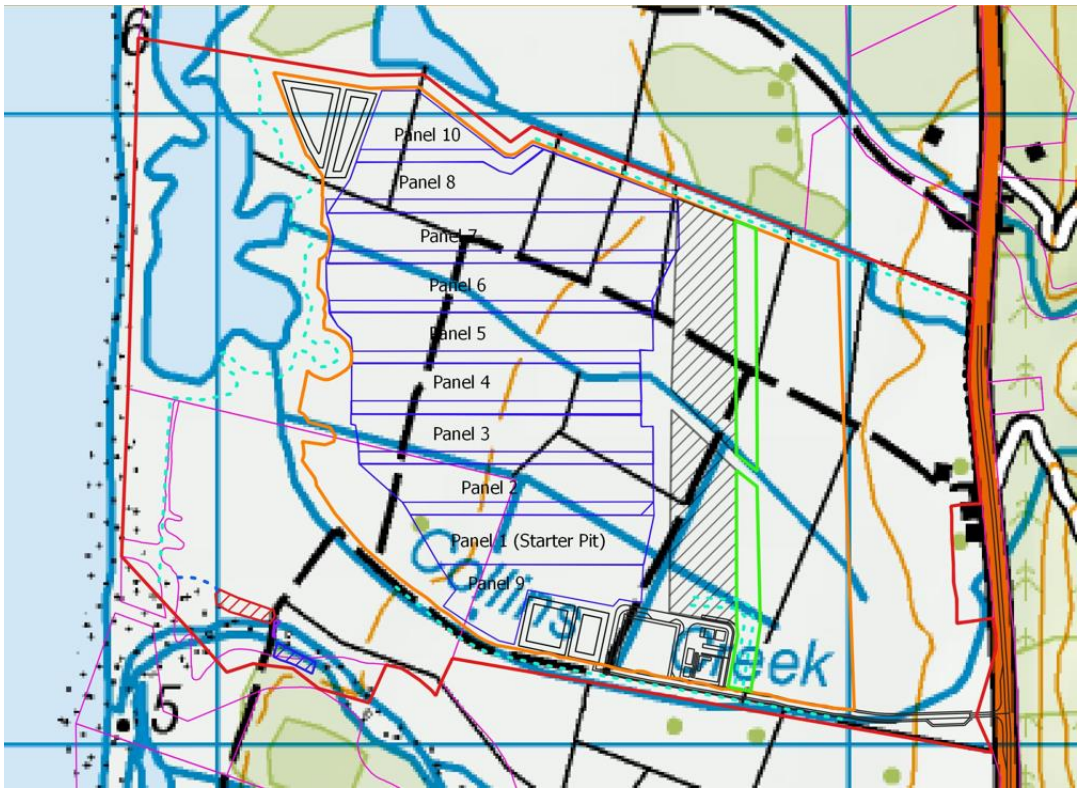

Figure 2: Topographic map of application area

2.10 The site is separated from the coastline by the Canoe Creek coastal lagoon which physically and visually separates the application area from the coastal environment. The mining area is to be located on the farmland and 20m mining setbacks will apply to the northern and southern property boundaries, Collins Creek and the coastal lagoon area. The area south and west of Collins Creek is also excluded from the mining area.

2.11 The site is part of a former deer farm and is currently utilised as a dairy runoff for cattle grazing. Most of the site is covered in established pasture, with minimal pockets of native vegetation throughout and more vegetation fringing the inland boundary. The Canoe Creek Lagoon runs adjacent to the west of the application area. A number of other drains also run through the application area before eventually draining into the lagoon.

2.12 Residential lifestyle development has occurred to the east and north of the site, although this is largely physically separated from the site by native vegetation which screens a majority of the residential sites in the surrounding area. Farmland surrounds the site to the south and east with pockets of native vegetation and two wetlands interspersed with developed pasture to the north and east.

2.13 Archsite records three archaeological records in the area. Two are located near Burke Road (K31/169 and K31/99; and one is located on the Langridge property to the south of the site (K31/101). There are no known archaeological features within the application site. The site records are enclosed in **Attachment C**.

Geology, hydrology and climate

2.14 Two thirds of the Barrytown Flats are underlain by O'Keefe Formation muddy sandstone and the southern third is underlain by Karamea granitic basement. Granite Creek and Little Granite Creek have their headwaters in the Karamea granitic batholith rocks while the Barrytown creeks north of Canoe Creek have their headwaters in softer, more erodible O'Keefe Formation sandstones.

2.15 The proposed mining area between Canoe Creek and Burke Road comprises a 1.2 km wide series of post-glacial strand lines extending from the foot of a Late Pleistocene sea cliff coincident with SH6 and a staircase of up to four terraces prograding westward to the present-day coastline. These terraces and coastal gravelly sands are stratigraphically grouped within the Nine Mile Formation of Holocene to 14,000 years Before Present (BP) age.

2.16 The mineral sands which will be the focus of the mining activity comprise of post-glacial coastal sand and gravel deposits. These mineral sands are believed to have been set down in a series of north – south trending prograding strand lines. The sediment supply for deposition of the sands is inferred to have been long-shore drift from the south. During the formation of strand lines,

heavy minerals were concentrated within the surf-washed zone into lenticular black sand leads. These leads contain concentrations of ilmenite, gold and associated heavy minerals (epidote, garnet, titano-magnetite, zircon and trace monazite).

2.17 A 2022 drilling programme defined the existence of a continuous horizon of medium-grained ilmenite-garnet-rich sand, which sits below a drape of mud, silts, and gravel. Within the eastern portion of the drilled area, the sand layer is variably overlain by, or intercalated with, several draping fans of gravel-dominated talus. These alluvial fans taper seaward as they prograde into finer silts and sands. Several buried, isolated lenses of silts, and debris (wood and vegetation) also exist within, and on top of the sands.[1]

2.18 Drilling has confirmed presence of three broad, north-south trending zones of concentrated heavy minerals. These strandlines contain concentrations of ilmenite, garnet, zircon, gold, and associated heavy minerals deposited in a marine placer environment.

2.19 The hill backdrop to the Barrytown Flats is dissected by 17 individual streams and creek catchments with Canoe Creek being the largest. Canoe Creek has headwaters at the Paparoa Range crest to an elevation of 1220m. The remaining smaller creek catchments to the north of Canoe Creek share an interfluvial spur with the lower Punakaiki River.

2.20 There are several springs along the southern boundary of the proposed mining area which are used by the neighbouring landowner for stock water and for water tank top-up in dry weather. Anecdotal information indicates that flows from these springs vary in accordance with the hydrology of Canoe Creek.

2.21 The site is bordered to the north by a modified watercourse which has been channelised along the northern boundary of the farm paddocks. Collins Creek runs to the south of the site, and Canoe Creek which is the major waterway in the area flows further south of the site. A number of farm drains carrying runoff from the farm paddocks intersect the site. The watercourses and drains are shown in **Figure 3** below.

[1] Coates South Block Mineral Resource Estimate, RSC Mining and Mineral Exploration, February 2023

Figure 3: Watercourses and Drains within and surrounding application area (Source: Ecological Solutions Ltd)

2.22 The northern drain is ephemeral at the upper extent, and is a highly modified soft-bottomed watercourse, with sluggish flows, weed growth and no riparian vegetation. This drain has been assessed as having poor quality aquatic habitat. Collins Creek borders the site to the south, and has a cobble, gravel and sandy bottom with significant bank instability and limited riparian vegetation. Collins Creek has been assessed as having moderate-poor quality aquatic habitat. Canoe Creek is a swiftly flowing creek with a steep channel and is highly disturbed due to continual avulsion of channels across the river bed. Canoe Creek has been assessed as having a high quality aquatic environment[2]

2.23 The climate at the Barrytown Flats where the proposed activity will take place is warm and temperate with high rainfall even in the driest month. The Köppen-Geiger climate classification system classifies its climate as oceanic with the average temperature being 11.3°C. Rainfall is around 2800 millimetres (mm) per year with February being the driest month[3].

Existing Resource Consents

2.24 In July 2022, Nikau Deer Farm Ltd sought a Certificate of Compliance from Grey District Council for the erection of two large farm sheds within the application area. The Certificate of Compliance was granted on 15 August, and authorises the construction of 1 30m x 20m (600m^2) shed and 1

[2] Barrytown Sand Mine Ecological Assessment dated April 2023 – Ecological Solutions Ltd
[3] Barrytown Mineral Sand Operation Erosion and Sediment Control Plan dated April 2023 – Ridley Dunphy Environmental Ltd

25m x 30m shed (700m^2) both with building heights of 9.5m at the apex of the gable. The application and certificate are enclosed as **Attachment D.**

2.25 In December 2020, a resource consent application was made for a mineral sand mining activity by Barrytown JV Ltd (the former company name of TiGa). This application was not successful. The current application by TiGa is similar in nature, and has been informed by to the previous application but it is not the same. Information from this application has not been relied on in the preparation of this current application.

3. The Proposal

Overview

3.1 TiGa seeks all resource consents necessary to construct, operate and maintain a mineral sand mine, including associated infrastructure, over an area of approximately 63 ha (covered by Mining Permit 60785) and Nikau Deer Farm Ltd owned land on the Barrytown Flats. A site plan showing the application area and notable features is contained in **Attachment B**.

3.2 Mining will target strandlines formed by longshore drift, which resulted in accumulations of heavy metallic minerals. These strandlines run north – south through the application area. The thickness of the mineral deposit has been shown to be consistent throughout the application area. Overburden thickness varies from 0.5 metres along the western edge of the application up to 8 metres in the east of the application area.

3.3 Mining will progress in strips, or panels, with a dimensions of 100m wide (strip width) and 300m long. The panel sequence is shown in **Figure 4** below.

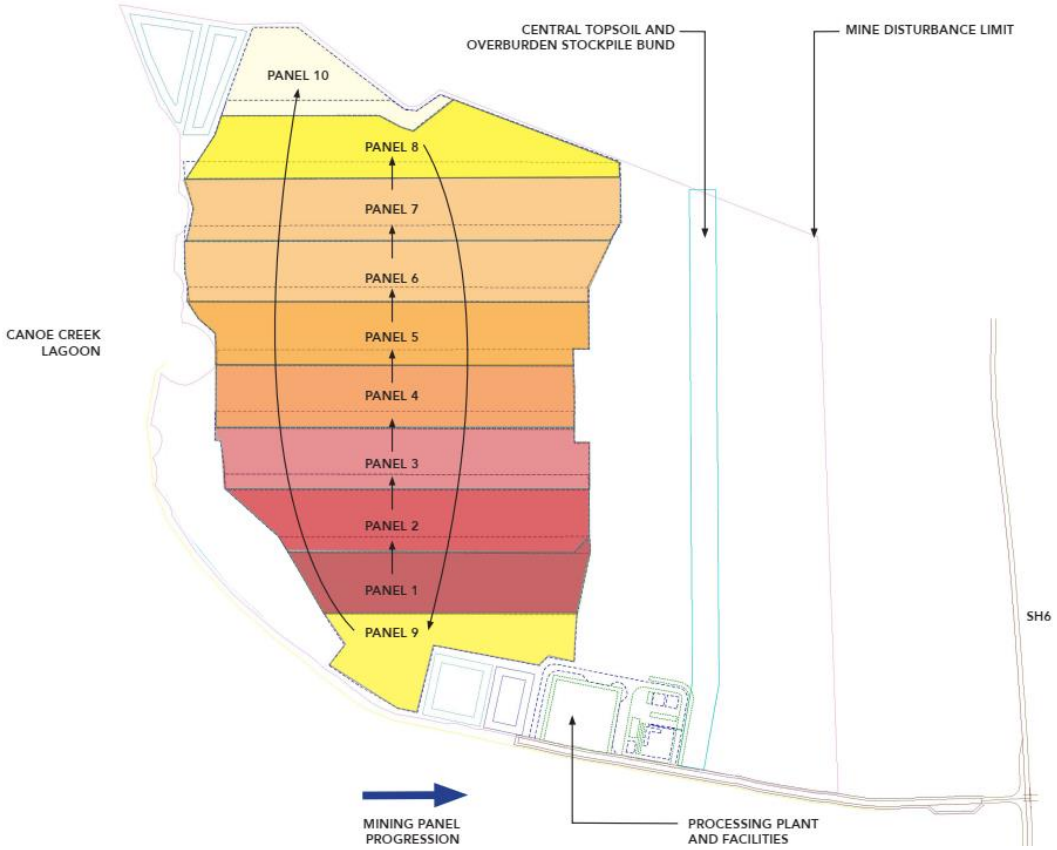

Figure 4: Mining sequence (Source: Glasson Huxtable Landscape Architects)

3.4 The mine pit area will be 3ha, including 0.5ha of stripping occurring ahead of the mine pit and 0.5ha of active rehabilitation occurring behind the mine pit. The processing plant area will be 3.5ha in area including the mine access road and all settling pond infrastructure. The total disturbed area of the mine is approximately 6.5 ha in area, however a total disturbed area of 8ha is sought to allow for a contingency area for progressive rehabilitation following mining to take into account weather and seasonal impacts on vegetation establishment. The maximum mining depth will be 9m. A schematic showing a typical mining strip area during extraction is shown in **Figure 5** below.

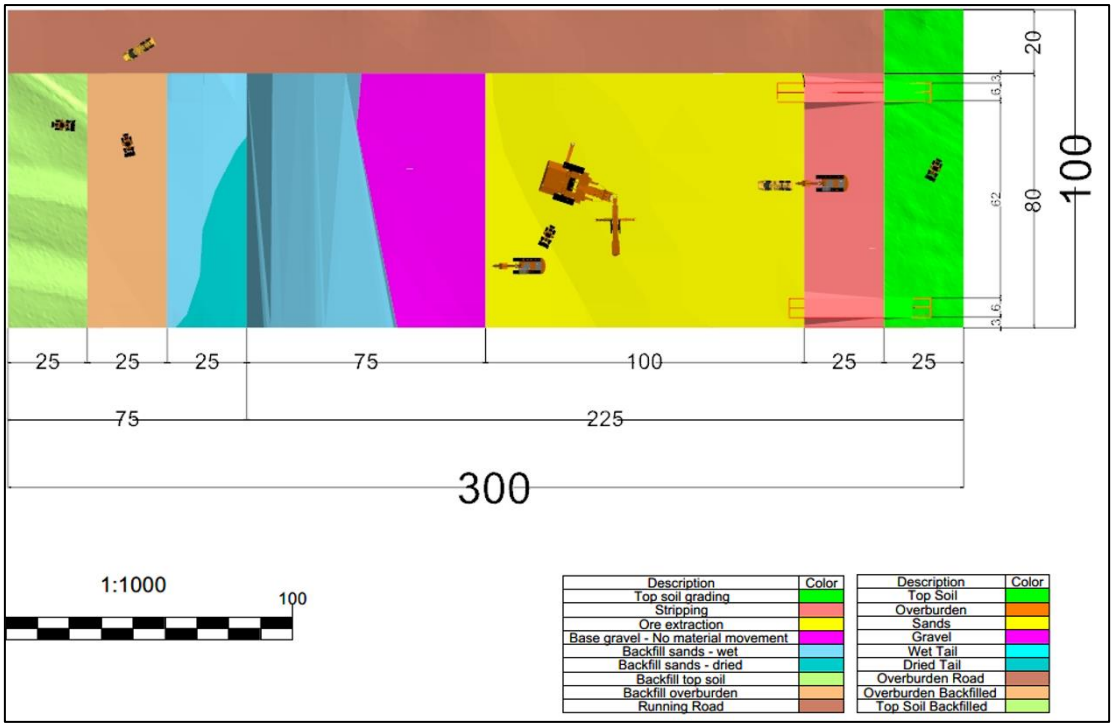

Figure 5: Mining strip schematic

3.5 The resulting HMC will be trucked offsite (via heavy vehicle containing 30 tonnes per truck) either towards Westport or Greymouth. HMC may be shipped from either port or railed to Lyttelton in containers.

Pre -Mining Sequence

3.6 The pre mining sequence will commence with the construction of proposed screening bunds on the eastern boundary of the block adjacent to the state highway. These bunds will be created using an excavator to pull material up into the bund and then the bund will be contoured and planted. This is expected to take approximately 1 month.

3.7 A temporary electric fence will be installed along the eastern limit of the planned working area, and all internal fences will be removed in the mine active area.

3.8 A central drain will be installed (following the contour of an existing drain running through the site with an excavator). The installation of this drain will include sediment traps along the length of the drain as described in the Erosion and Sediment Control Plan (ESCP). Limestone weirs/rip rap will also be installed as detailed in the ESCP at this time. This work is expected to take approximately 1 week to complete.

3.9 The construction of the mine settling pond and water management infrastructure will take approximately 6 months, as follows:

a) The Mine Water Facility adjacent to the processing plant will be constructed with an excavator and trucks, which will involve removing approximately 135,000m^3 of material from this area. Topsoil and waste will be carted to the southern end of the bund at the eastern mine limit. The bund will be approximately 125 metres wide, 280 metres long and 4.5 metres maximum height, which will be progressively re-grassed as it is constructed.

b) The Clean Water Facility will be constructed with an excavator and trucks, which will involve removing approximately 150,000m^3 of material from this area. Waste and topsoil will be carted to the northern end of the bund at the eastern mine limit. The bund will be approximately 125 metres wide, 360 metres long and 4.5 metres maximum height, which will be progressively re-grassed as it is constructed.

c) All mineralised sand from the water management infrastructure excavations will be carted by truck to the ore stockpile located inside the Eastern bund at the Northern end of the mine active area, which is estimated to be approximately 4.5hectares in area.

3.10 The Wet Concentrator Plant site and office area plus access road topsoil will be cleared and any excess waste carted to the south end of the bund on the eastern mine limit. This is expected to take 2 months.

3.11 The construction of an access road from State Highway 6 to the plant site including the installation of the culvert over Collins Creek will take approximately 1 month.

3.12 The mine starter pit area (100m x 300m) will be constructed in Panel 1 with topsoil and waste carted to the southern end of the bund at the eastern mine limit and ore will be stockpiled at the ore stockpile. This will take approximately 2 months duration, which will occur during the final 2 months of the construction of the plant. This involves the removal of approx. 180,000m^3 of material from the starter pit.

a) Approximately 150 metres of the 300m length of the mining void will be completely excavated. This will allow for tailings to be deposited in the mine void once mining commences.
b) Approximately 150 metres of the length of the mining void will be in various stages of excavation, with ore pre stripped for mining commencement.

3.13 The Wet Concentrator Plant construction and associated infrastructure will take approximately 6 months to complete.

Mining Sequence

3.14 The proposed mining activity once established will involve the removal and preserving of topsoil, hydraulic excavation of mineral sands which will be pumped to the onsite processing plant. The mining strip is shown in **Figure 5**. Mining will progress in this sequence at a rate of approximately 5m per day, or 35m per week. The sequence is as follows:

a) Topsoil, approximately 0.2- 0.6m thick, and overburden will be removed and preserved (stockpiled) for rehabilitation using a 85 tonne excavator, and 40tonne articulated trucks. This area will be approximately 0.5ha. Once in mining sequence, top soil will be removed ahead of mining and placed straight onto rehabilitated ground behind the mining pit.

b) The sand ore will be mined via excavator and deposited onto a mining bench of approximately 1 ha in area. The ore will then be picked up by front end loader directly to the in-pit mining hopper. The slurry will pass through a trommel and desliming circuit before being pumped to the Wet Concentrator Plant (**Processing Plant**). The in pit mine infrastructure is shown in **Attachment E**.

c) Reject large material from the trommel and slimes (small particles such as clay, mixed with water) will be returned to the mine pit.

d) Mining will occur at a faster rate (approximately 350 tonnes per hour of sand ore) than processing (approximately 165 tonnes per hour), and the excess ore will be stored at the processing plant and used overnight to ensure the processing plant can run 24/7.

e) Excavated material will be processed at the Processing Plant to extract the Heavy Mineral Concentrate (**HMC**). Heavy minerals will be separated from the ore using a water and gravity circuit, drained of excess moisture and stored at the Processing Plant in a farm implement building with a concrete floor.

f) Un-mineralised sands will be pumped back to the pit cavity, which will be progressively filled as the mine pit progresses. Pumped tailings will be spread across an approximate 1 hectare area of the mining void. Tailings are dewatered and discharged to the mining void via cyclone. The tailings will be allowed to naturally beach out (spread out). The cyclone will be moved as required to distribute the tailings as necessary. Tailings will be levelled and contoured with the use of excavators and bulldozers ready to receive the pre stripped overburden and soil. The mining void will be progressively rehabilitated as the mining void advances. Vegetative cover (sowing of grass) is established, and the area is removed from the disturbed area once stabilised.

3.15 The resource estimates for the proposed mining activity indicate that there is approximately 4,800,000 tonnes of recoverable sand ore within the mining area, with a yearly extraction rate of 1,100,000 tonnes, yielding approximately 250,000 tonnes of Heavy Mineral Concentrate per year. Actual mining is expected to take approximately 5-7 years to complete, based on an extraction rate of 1,100,000 tonnes per year, and allowing for operational contingencies.

3.16 Each mining panel will take between 4 and 6 months to be mined and rehabilitated. Depending on volume of ore and weather conditions during rehabilitation.

3.17 Panels 9, 10 and the stockpiled ore will be dry mined, whereby material will be trucked to the Mining Field Unit which will be located in panels 8 and 10. Reject material from the mining field unit will be directed to into panel 8 and 10 for use in rehabilitation along with tailings from the processing plant.

3.18 Topsoil and overburden will be recovered from the Eastern Bund and used in the rehabilitation and final contour of panels 8 , 9 and 10. Material will also be sourced from the area east of the bund to the mine disturbance limit (200m from the State Highway), to blend the final land contour with the existing surrounding land.

Plant and Machinery

3.19 In order to carry out the mining and processing operation, the following machinery itemised in Table 1 will be required:

Type	Supplier	Model	Number
Dozer	Komatsu	D71PX-24	2
Grader	Komatsu	GD655-7	1
Front End Loader	Hitachi	ZW370-5	3
Integrated Tool Carrier	Hitachi	ZW220-5	4
Artic 6wd 45 Truck	Hitachi	B45E	3
Excavator (Long stick)	Hitachi	ZX890LCH	2

Table 1: Mining machinery list

3.20 All of the machinery except one front end loader and one integrated tool carrier will be based at the mining area. These two machines will be at the processing plant. When mining ceases at night, an additional front end loader will be utilised at the processing plant.

3.21 It should be noted that the exact supplier/model may differ when mining operations commence, but this machinery list is indicative of what is required.

3.22 Additional mining equipment and vehicles will be used on site, including a variety of pumps (including land based, floating and submersible) and light 4-wheel drive vehicles for the transport of mining personnel.

On-site processing, buildings and facilities

3.23 The Processing Plant and mineral storage facilities area will be housed primarily in large farm implement style buildings. The Processing Plant and associated facilities will cover an area of approximately 2.0 hectares.

3.24 Buildings and structures will be painted in recessive colours such as Colorcote Mudstone, Rivergum or Permanent Green and will not exceed 15m in height. Power will be provided by way of overhead powerlines installed from the highway to the Processing Plant. In the short term, or if electricity line capacity remains insufficient, diesel generators will be used.

3.25 The following buildings will be located at the Processing Plant area:

- Processing Plant Building - 73m x 25m (1825m^2) and 15m in height;
- HMC Stockpile Building adjoining the Processing Plant - 45m x 22m and 10m in height (990m^2);
- 2 x Staff amenities buildings - 6m x 3m (36m^2 total);
- 2 x Showers and toilets 3.6m x 3m (21.6m^2 total);
- Site offices 6m x 3m (18m^2);
- Stores 12m x 3m (36m^2);
- 2 Thickener Overflow tanks with a diameter of 18m and height of 5.3m (508m^2 total);
- Maintenance shelter – 200m^2
- Fire water tank with a diameter of 10.5m and height of 6.5m (86m^2).

3.26 Building plans and elevations for the processing plant are provided in **Attachment F** and in **Figures 6 and 7** below. The exact nature of each of the smaller buildings is not yet known, but will generally be small portacom style buildings, with the exception of the maintenance shelter which is constructed of sea containers with a tunnel shelter canopy between the sea containers. The total gross floor area of buildings and structures anticipated for the Processing Plant area is 3,720.6m^2, however allowance is sought for up to 3,800m^2, to enable small additional portable buildings which would be no more than 3.5m in height to be located on site should the operational need arise.

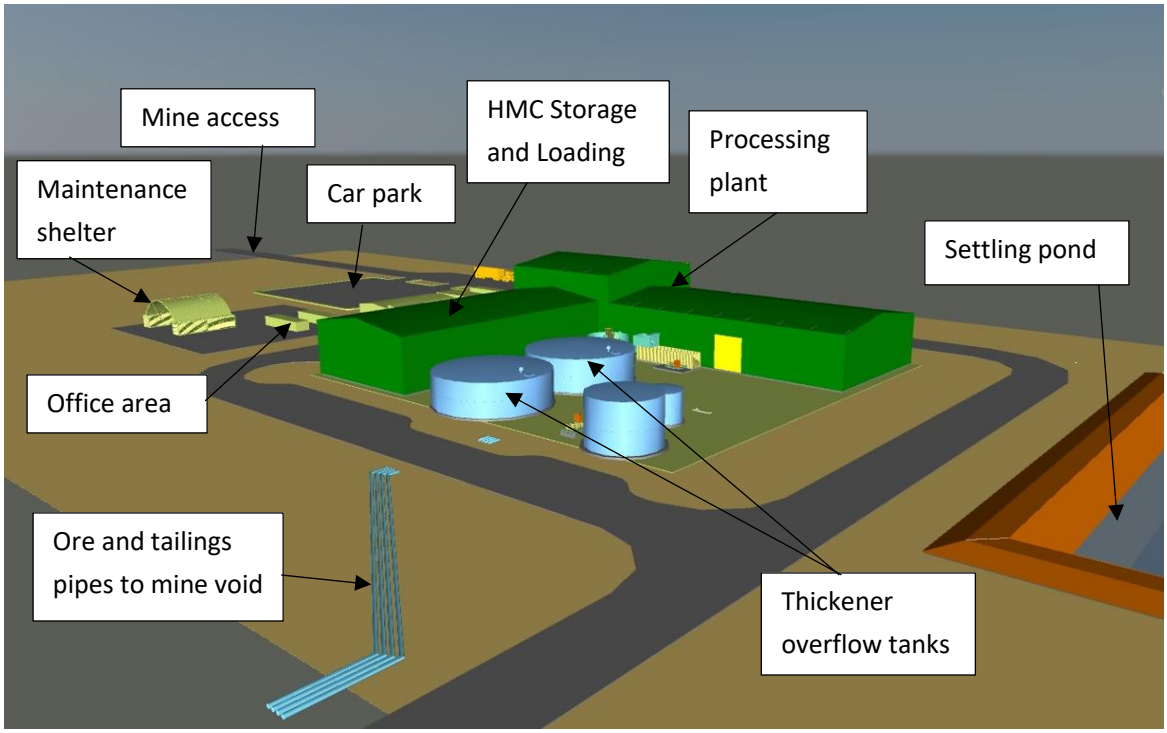

Figure 6: Schematic of Processing Plant, office and maintenance area looking south-east (Source: IHC Robbins)

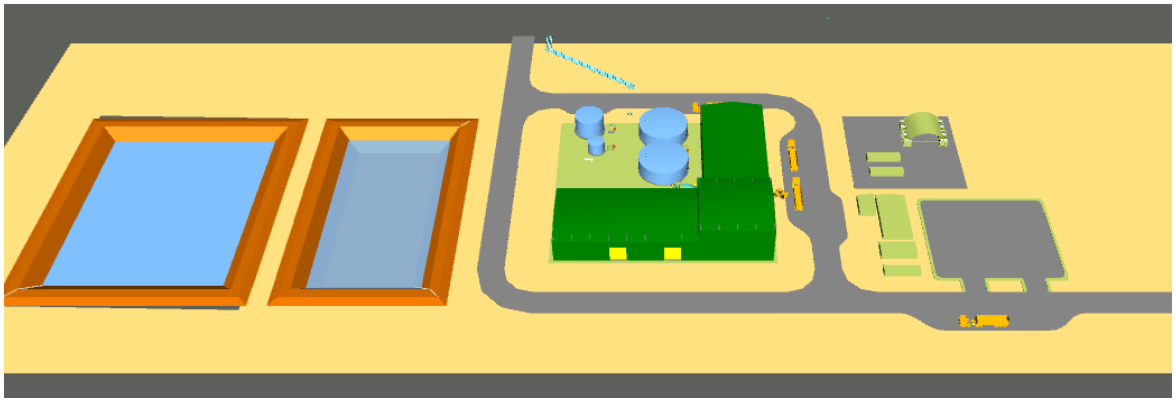

Figure 7: Schematic of Processing Plant, office and maintenance area looking north (Source: IHC Robbins)

3.27 All buildings and plant will be removed from the site at the completion of mining operations, with the exception of the HMC storage and loading building which will be retained on site and used for farming purposes.

Lighting

3.28 Lighting will 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). All lighting on site will adhere to the

Australian Government's National Light Pollution Guidelines for Wildlife January 2020 (or subsequent revision), including but not limited to:

(a) All fixed lighting on the site shall be pointed downward, shielded to avoid light spill and operate primarily in the yellow-orange spectrum and be filtered to reduce light in the blue wavelength;

(b) Lights shall only illuminate the object or area intended;

(c) Lights shall be mounted as close to the ground as possible;

(d) External lighting shall be minimised on the seaward side of buildings to minimise light spill toward the coast;

(e) external lighting shall be minimised and use the lowest intensity lighting possible, while ensuring compliance with workplace health and safety requirements.

3.29 There will be limited fixed lighting in the mine area, which may include lighting around the pump to allow for the pump circuit to be checked overnight. Any fixed lighting in the mine area will be shrouded, and adhere to the principles outlined above.

3.30 Adhering to the above standards will assist with preserving the natural character of the coastal environment in terms of reducing light pollution and preserving the dark night sky, as well as avoiding adverse effects on the Westland Petrel Colony located approximately 4km north of the site.

Hours of Operation

3.31 The proposed mining operation will occur during the hours of 0700 – 2200 7 days a week, while the Processing Plant has an operational requirement to run 24 hours a day, 7 days a week. During the period 01 December to 31 January , the mining may commence at 0630 and finish at 2130 which is the peak fledgling period for the Westland Petrel when birds are said to be at most risk of being disoriented by lighting. Starting 30 minutes earlier and finishing 30 minutes earlier ensures all mining occurs during the daytime during this elevated risk period for the Westland Petrel.

3.32 Trucking of Heavy Mineral concentrate will occur during the hours of 0500-2200, with additional restrictions on the northbound route. On the northbound route trucking will only occur during daylight hours to avoid any adverse effects on the Westland Petrel Colony.

Site Access

3.33 Site access will be via a newly constructed entranceway off State Highway 6 in the southern corner of the site, which will be constructed in accordance with the Novo Group recommended access diagram. A gravelled road will be constructed from the highway to the Processing Plant site adjacent to the existing farm track which runs adjacent to Collins Creek. It is not possible to utilise

the existing farm track due to ongoing erosion and bank instability along the creek. This access road will carry road capable heavy vehicle traffic and light vehicles associated with staff movements. Car parking will be required for approximately 50 vehicles. The proposed entranceway and carpark is shown on the plan enclosed within the Integrated Transport Assessment, attached as **Attachment G**.

3.34 Access tracks will be required within the mining area, and these will be formed to provide light vehicle and machinery access to the preparation, mining and rehabilitation areas. These access tracks will move as the mine progresses.

3.35 It is proposed to retain the existing farm access for farming activities for the duration of the mining activity, to separate any ongoing farming activity traffic from the mine traffic.

Traffic

3.36 The site will be accessed by light vehicles for 49 staff daily plus occasional visitors and service vehicles. Heavy vehicles will be used during the construction and establishment of the site. Once the plant has been commissioned, the site will generate approximately 50 heavy vehicle movements a day, and up to 140 light vehicle movements. This equates to 390 equivalent car movements per day. The applicant intends to run passenger vans to provide transport to the mine, which will mean that actual light vehicle movements will be less, however the exact nature of the impact on vehicle movements isn't known at this time because it is not clear where workers will be driving to/from, so this has not been taken into account when assessing vehicle movements.

3.37 Processed materials (HMC) will be trucked from the site either towards Westport (northern route) or Greymouth (southern route). The exact method of exporting the HMC has not yet been confirmed, and could either be shipped out of a West Coast port or railed to a port on the East Coast. In any case, there is industrial zoned land in both locations where the HMC could be loaded to rail or ship as a permitted activity, and the final loading option is outside of the scope of this application.

3.38 The applicant proposes to undertake trucking activity between the hours of 0500 – 2200 7 days per week. At 50 vehicle movements per day, this would equate to approximately 3 movements per hour, however additional mitigations are proposed which will result in 5 movements in peak hours.

3.39 The applicant is proposing to restrict heavy vehicle movements to no more than 3 per hour between 0500 and 0700 to minimise "night time" heavy vehicle movements for both routes. In addition, if the northern route is selected, heavy vehicle movements will only occur during daylight hours to avoid trucking past the Westland Petrel Colony during hours of darkness. The average number of daily heavy vehicle movements will remain steady throughout the year. The

daylight hours vary throughout the year, meaning that hourly trucking rates will be higher in winter when daily daylight hours are at the lowest, and hourly trucking rates will be lower in summer when the daily daylight hours are at the highest.

3.40 Conditions of consent are proposed to limit the vehicle movements based on a one week average, to allow for additional trucking movements in circumstances where there has been a road closure, or other event which has prevented trucking to allow operational contingency and ensure a consistent volume of HMC is able to be supplied to the market as proposed.

3.41 In order to support this application, the applicant has commissioned an integrated transport assessment. This was completed by Novo Group Ltd and is attached to this document as **Attachment G**.

Noise

3.42 Noise will be generated from the processing plant area, trucking movements, and the mining field unit, as well as during the pre-mining and post-mining construction activities.

3.43 The following noise limits will apply at or within the notional boundary of any dwelling existing at the date consent is granted on any other site except 3261 Coast Road:

i. Daytime (0700-2200): 55 dB L_{Aeq} (15 min)

ii. Night-time (2200-0700): 45 dB L_{Aeq} (15 min) and 75 dB L_{AFmax}

when measured and assessed in accordance with the latest New Zealand noise standards: NZS 6801:2008 “Acoustics – Measurement of environmental sound” and NZS 6802:2008 “Acoustics -Environmental Noise”. In order to achieve these limits, based on current noise projections the processing plant will be approximately 600m away from dwellings, whilst mining would be approximately 200m away from dwellings. Affected party approval will be obtained from 3261 Coast Road to mine within the 200m limit.

3.44 The applicant has considered the potential for noise generation in the design of the project, including locating the processing plant away from sensitive receptors, and minimising earthworks near dwellings. Bunding around the processing plant and across the eastern mine limit will also assist in reducing noise levels for the majority of operations. Conditions of consent are proposed to ensure that appropriate noise limits are adhered to, and that noise monitoring occurs to demonstrate that compliance is being achieved.

3.45 In order to support this application, the applicant has commissioned an acoustic assessment of the proposed mining and processing activities. This was completed by Marshall Day Acoustics Ltd and is attached to this document as **Attachment H**. The site will operate in accordance with a Noise Management Plan which is enclosed with the acoustic assessment. The Noise Management

Plan sets out the management techniques which will be applied to ensure that the site operates in accordance with best practice and unnecessary noise generation is minimised.

Mine water management

3.46 A Hydrological Assessment and associated Water Management Plan have been completed by Kōmanawa Solutions Ltd for the proposal, which sets out in detail the hydrology of the site, and proposed water management in order to avoid adverse effects on water quality and quantity in the area. The hydrological assessment and Water Management Plan are enclosed in **Attachment I**. The Hydrological Assessment and Water Management Plan are informed by an extensive network of piezometers which have been installed on the site, as well as flow and water quality monitoring and the Ecological Assessment prepared by Eco Logical Solutions Ltd. The primary objective of the Water Management Plan is to avoid hydrological effects on surrounding surface water bodies and wetlands. This has informed the design development of the water management infrastructure for the site.

3.47 The Processing Plant may require an initial water take from Canoe Creek which will be located adjacent to the existing farm access track near the coast with a maximum rate of 63 litres/second to fill up the Processing Plant circuit. The approximate water take location is indicated on the site plan in **Attachment B**. At this stage, the applicant has not determined whether the water take would be by way of a surface water intake in the bed of the creek, or a gallery abstracting groundwater from the gravels directly adjacent to the creek. It is possible that a direct surface water take may not be feasible due to frequent rainfall events causing turbidity in the creek which may make the water unsuitable. The intake structure will be designed to comply with permitted activity provisions for such structures, and the water take will include a water metering device to provide information to the West Coast Regional Council required by the Resource Management (Measurement and Reporting of Water Takes) Regulations 2010.

3.48 The water take from Canoe Creek may be required sporadically during mining to top up the water circuit, however generally the processing plant will use water recovered from pit dewatering or mechanically from the HMC product and un-mineralised sands via a series of cyclones which will be recirculated for reuse. Some of the process water will be retained in the HMC and some will be pumped back to the pit cavity with the unmineralized sand slurry. Any excess water from the processing plant area will be directed to the Mine Water Facility, west of the processing plant area. The Mine Water Facility will be comprised of two large pond areas, which may have multiple cells. Flocculent may be used in the Mine Water Facility to enhance the settlement of sediments.

3.49 Stormwater generated in the Processing Plant area will also be captured and directed to the Mine Water Facility.

3.50 A central drain will be established which will carry discharged water from the Mine Water Facility (Pond 2) overland to a Clean Water Facility in the north western corner of the property. The central

drain will have rip rap and limestone rock weirs installed to slow water velocity and increase water hardness as part of the water treatment train. The Clean Water Facility is comprised of two ponds, one of which will be partially planted in wetland species at the commencement of mining. Excess water from this facility will overflow into an existing drain on the farm from Pond 4, which will eventually discharge into the Coastal Lagoon.

3.51 The management of stormwater within the mining area is an integral part of the overall management of the operation given the relatively high rainfall that the application area receives and disturbance of ground associated with the mining activity. An Erosion and Sediment Control Plan has been developed for the site, setting out the high level control measures for the site. This Erosion and Sediment Control Plan is enclosed as **Attachment J**, and contains further detail of the water management features outlined above.

3.52 The full details of stormwater management practices and controls is proposed to be included in a Site Specific Erosion and Sediment Control Plan as part of the Annual Work Programme that will be provided to the consent authority each year.

3.53 The maximum depth of mining is approximately 9m. As mining will be occurring below the water table, water depletion may occur. The Hydrological Assessment and Water Management Plan outline the potential for surface water depletion in Canoe Creek and the Northern Boundary Drain as a result of this dewatering. The Water Management Plan sets out a comprehensive suite of options for avoiding this surface water depletion, and if depletion occurs, what management techniques will be employed to manage and rectify this depletion. The water management can be described as a cascading set of interventions as follows:

(a) In order to maintain water levels in the adjacent creeks, excess water from Pond 4 will be directed to infiltration trenches around the perimeter of the mine area in the first instance to recharge groundwater and avoid surface water depletion.

(b) Whatever excess water cannot be directed to infiltration trenches will be discharged from the finishing pond (Pond 4) into the drain which discharges to Canoe Creek Lagoon if water quality and clarity allows.

(c) If the rate of water discharge to the infiltration trenches is insufficient to avoid surface water depletion, the Pond 4 water will be used to directly augment surface water flows in Collins Creek or the northern drain if required, if it meets water quality and clarity requirements. Water quality parameters will be sampled and monitored at various points along the treatment train and in the various receiving environments in order to ensure adverse effects on receiving environments are avoided.

(d) If the water quality or clarity parameters are not met to allow discharge to Collins Creek, Canoe Creek Lagoon or the northern drain, the discharge water will be managed, in order of preference,

- The water will be recirculated into the processing plant and mine water facility if there is capacity in the system;
- Excess water will be pumped to the Canoe Creek infiltration basin (a former cattle stand off pad constructed adjacent to Canoe Creek). Any water that does not infiltrate through the basin will be discharged to a swale, which discharges to the floodplain of Canoe Creek at the river mouth.
- If infiltration trenches are not sufficient to recharge groundwater and avoid surface water depletion, and water quality or clarity parameters exclude the use of the Pond 4 for augmentation, then the Canoe Creek water take will be utilised to augment surface water flows in Collins Creek and the northern drain as required to replenish surface water flows with clean water.
- Recharge barrier wells may also be employed as a fallback option to maintain groundwater levels.
- As a last resort, or in extreme weather events, processing can cease and the mine pit can be flooded to provide significant additional containment and settling capacity and allow groundwater levels and stream flows to recover. This would provide time to resolve issues before recommencing discharge.

3.54 The most likely outcome is that water can be used from Pond 4 to fill infiltration trenches, augment surface flows and discharge to the drain in the north west corner of the site which ultimately discharges to the Canoe Creek Lagoon. The Water Management Plan and Hydrological Assessment are highly conservative, and identify a cascading set of options for managing the water quantity and quality of Collins Creek and the northern drain in a worst case scenario under which the proposed discharge water quality standards cannot be achieved by the proposed treatment system. This provides certainty that water can be managed on site to avoid adverse hydrological and ecological effects.

3.55 Monitoring will continuously record flows in Collins Creek and water levels in Canoe Creek, as well as piezometers established around the perimeter of the mine site, to quickly identify any reduction in water levels which would require the interventions listed above to be implemented. Water quality conditions are proposed to identify any issues early in the treatment train in order to allow for quick intervention and management actions to be implemented if a problem with water treatment is detected prior to any discharge to the environment. Full details of the proposed water quantity and quality monitoring regime can be found in the Water Management Plan and Erosion and Sediment Control Plan.

Dust Management

3.56 The application site is within a high rainfall area, however there are periods of dry weather, which necessitate careful site management to avoid dust discharges beyond the boundary. The applicant has installed both dust and radiation monitors on the perimeter of the mine site since late 2022, and these monitoring stations will remain in place for the duration of mining activities on site.

3.57 The West Coast Regional Air Quality Plan provides for mining and stockpiling activities as permitted activities, however the thresholds for dust management are different. The rules for stockpiling require that there is no dust beyond the property boundary, whereas the mining rules require no offensive or objectionable dust emissions beyond the property boundary. Because it is difficult to distinguish between the two activities, and while every effort will be made to avoid dust discharges, consent is sought as a precaution in case of any dust emissions occurring.

3.58 Dust management measures include installing a meteorological station to provide constant monitoring of wind and rainfall conditions to identify when dust may occur, visual inspections, stabilisation of surfaces as soon as practicable, progressive rehabilitation to minimise the disturbed area, use of water carts and other dust suppression techniques.

3.59 A Dust Management Plan has been prepared, outlining the proposed dust management measures which will be employed at the site to avoid dust emissions beyond the property boundary. The Dust Management Plan is enclosed in **Attachment K**.

Hazardous substances use, storage and management

3.60 Currently the site cannot be sufficiently powered from the existing electricity supply along State Highway 6, and a line upgrade would be required to run the processing plant. The applicant is currently actively investigating the requirements for this line upgrade, and hopes to progress this. In the interim generators will be required to run the processing plant requiring additional diesel storage. Machinery will also be refuelled on site using a mobile fuel tanker, and a centralised fuel store will be located at the Processing Plant which will contain up to 40,000 Litres of diesel. The proposed above ground diesel storage tank will have full secondary containment as part of the design. An indicative design is enclosed in **Attachment L**. It is possible that the large fuel tank will not be required if the electricity line upgrade is completed.

3.61 It is expected that as part of a contract for fuel supply, the fuel company will install and own the fuel tank. The fuel tank will be required to comply with the requirements of the Hazardous Substances and New Organisms Act 1996, including obtaining a Location Test Certificate, and have ongoing regular inspections under this legislation.

3.62 Re-fuelling will be completed under direct supervision of the machine operator to minimise the risk of spills occurring. Refuelling will occur away from waterbodies.

3.63 Mechanical repairs and servicing will occur on site at the Processing Plant area. In the event of major mechanical break downs, machines may be taken to workshops off site. Spill kits and procedures will be available on site in the event of a fuel or oil spill occurring.

3.64 All waste oil and fuel containers will be removed from the site promptly.

Ecological Values

3.65 The site is located adjacent to two small streams, Collins Creek and the Northern Boundary Drain (an unnamed watercourse carrying primarily groundwater from the farm area). All waterbodies in the vicinity of the site have been assessed to determine the current condition of these waterbodies, and identify ways in which the project can improve water quality and aquatic habitat outcomes in these catchments.

3.66 In addition, the site is bordered by the Canoe Creek Lagoon, and other artificial and natural wetlands on surrounding properties. Access has not been able to be obtained to these wetland areas on surrounding private property.

3.67 The applicant has engaged EcoLogical Solutions Ltd to carry out extensive baseline data collection, both in terms of freshwater ecological values and avian species occupying the area in and around the application site. An Ecological Assessment setting out the details of the baseline data collection, results, and potential ecological effects and how they have been addressed in order to avoid adverse effects on the ecological values of the area is enclosed as **Attachment M**.

3.68 The ecological assessment has identified a number of mitigation measures to avoid adverse effects, particularly on avian species occupying surrounding wetland areas. The ecological assessment also recommends extensive riparian planting of the creeks and lagoon area, which will provide long term positive ecological outcomes in terms of stream health.

3.69 Accompanying the Ecological Assessment is an Avian Management Plan, which has been developed based on ongoing consultation and feedback from the Department of Conservation; and a Wetland and Riparian Planting Plan to ensure the riparian planting has the intended ecological benefits.

3.70 The Ecological Assessment outlines how ecological effects on waterbodies and wetlands have been firstly avoided, and where this is not possible, demonstrates that the Effects Management Hierarchy has been applied to the ecological effects of the proposal.

Visual and Ecological Planting

3.71 The applicant has engaged Glasson Huxtable Landscape Architects to assess the potential landscape and visual amenity effects of the proposal. The Landscape Assessment and accompanying Graphic Supplement are enclosed as **Attachment N**. The Landscape Assessment identifies areas where additional planting and bunding would be beneficial to ameliorate

potential visual effects from surrounding properties and public viewpoints. The planting has been designed both for visual and ecological mitigation for the project, and will have long term ecological benefits in terms of stream health and habitat for wetland species.

3.72 As part of preliminary site works, a number of planted and bunded areas will be developed, as both visual and ecological mitigation for the proposal. These areas include:

(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) utilisation of the 4.5m high temporary stockpile bund plus a small extension of it, wrapping around the northern-eastern side of the processing plant area. In this particular location, the bund will be planted (as opposed to hydroseeded) to provide visual screening and softening of built form behind it;

(c) a 6.0m wide planting strip adjacent to the coastal lagoon edge for visual screening and enhancing the habitat of indigenous fauna;

(d) a 10.0m wide band of planting along the open coastline in the south-west corner for visual screening, erosion control and enhancing the habitat of indigenous fauna;

(e) an additional planted wetland/pond area on the north-western edge of the Clean Water Facility, between the coastal lagoon and ponds. The ponds will form part of the water management for the site during mining activity and will be retained and planted following cessation of the mining activity;

(f) a 3.0m wide strip of planting with fencing along the edge of Collins Creek from the eastern edge of the application site until parallel with the western-most edge of mining panel 9. This is for visual screening and to support stream health.

(g) a 3.0m wide strip of planting with fencing along the southern bank of the northern drain;

(h) a planted strip along the north-eastern boundary of the site and adjacent to neighbouring properties at 3323 Coast Road for visual screening.

3.73 Full details of the planting can be found in the Landscape Assessment and Graphic Supplement contained in **Attachment N**. Riparian and wetland planting is also addressed in the Wetland and Riparian Planting Plan enclosed with the Ecological Assessment in **Attachment M**.

Rehabilitation

3.74 The application area is part of a dairy/dairy support farm. The owners of the block have been consulted around rehabilitation and it is likely that humping and hollowing will still be required in the final land contour to ensure the productive area is maintained. The current land contour

has been accurately mapped with recent LiDAR data, which is shown in **Figure 7** below. The site has a complex hump/hollow topography based around the development of the land for farming purposes with small scale machinery.

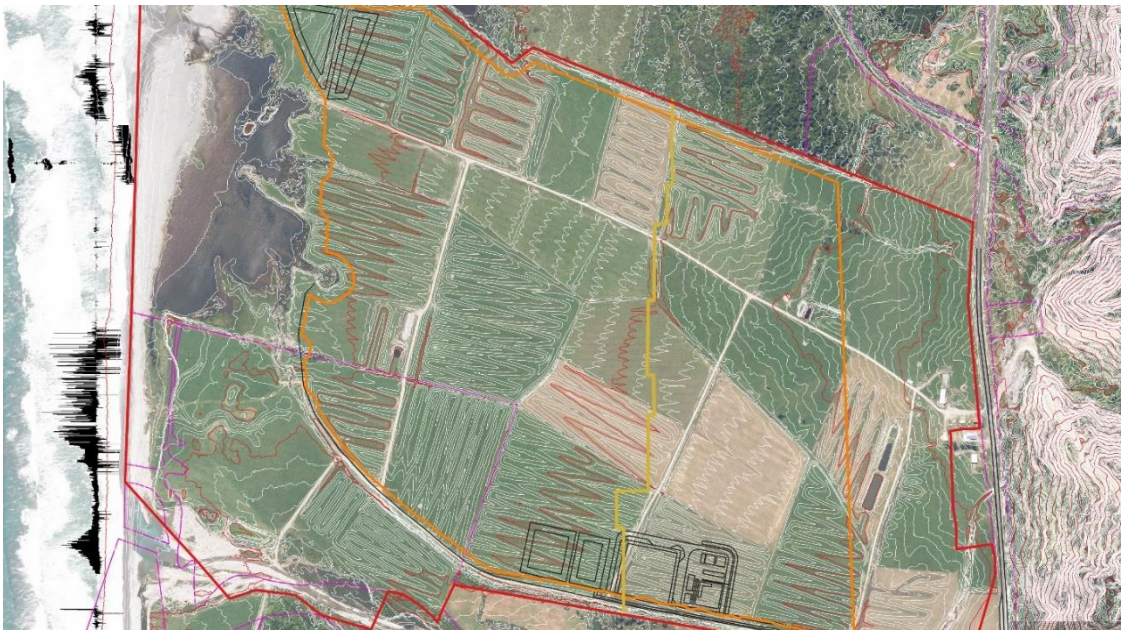

Figure 7: Current site topography (Source: TiGa Minerals and Metals Ltd)

3.75 Rehabilitation works will occur on a progressive basis to minimise the area disturbed at any one time as operations move through the mining area. In order to achieve a consistent topography, some overburden material may be pushed from outside of the eastern extent of mining at the completion of mining, up to 200M from the State Highway (within the mine disturbance limit shown on the Site Plan in **Attachment B**). This will assist to blend the final rehabilitated land contour into the surrounding land.

3.76 Once waste material from the WCP and MUP are sufficiently dried, wide rack "swampy" dozers will shape material to fit with final landform design. Overburden waste and topsoil will be placed on top prior to final seeding and soil stabilisation.

3.77 Rehabilitated land will be returned into the farming area as soon as possible to allow for the landowner to have input into the continued redevelopment of the land and to regain soil fertility. Mining will also allow for improvement to be made to the farmland during the rehabilitation process.

3.78 During the mining operation the farmland will be restored to pasture in both its formation and landcover for pastoral farming to continue. The final land contour will resemble the current contour, and previous drainage catchment areas will be reinstated to ensure that post-mining runoff is similar to existing runoff patterns. While the site will be humped and hollowed, the contour of these humps and hollows will be less pronounced than the current humps and hollows. This will assist in raising current drains out of the water table, and reducing runoff in rainfall

events, which is expected to improve water quality by reducing sediment and nutrient runoff from the farming activity, and is expected to have long term ecological benefits as a result.

Figure 8: Final rehabilitated landform (Source: TiGa Minerals and Metals Ltd)

3.79 The removal of HMC from the site will result in an overall reduction in ground levels, however the site will be rehabilitated to ensure that the lower lying western paddocks are not reduced in ground level, by utilising material from the upper part of the mine area and beyond the mine area within the disturbance limit. This will ensure that the groundwater table is not encountered, and a successful rehabilitation to dairy support farmland following mining.

3.80 The Annual Work Programme will include details around the proposed rehabilitation to be completed in each 12-month period, as well as a summary of the rehabilitation completed during the previous 12 months.

3.81 A Rehabilitation Plan has been prepared, setting out the anticipated final land contour for the site, and is enclosed in **Attachment O**.

Closure sequence

3.82 The closure of the mine following progressive rehabilitation will be undertaken as follows:

a) Topsoil and Waste from the eastern bund will be returned to fill water treatment ponds, which is expected to take approximately 2 months.

b) The clean water facility (Pond 4) will be reworked and converted to a wetland in accordance with the Wetland and Riparian Planting Plan, which is expected to take approximately 1 month.

c) The Wet Concentrator Plant and offices will be deconstructed and removed from site, leaving infrastructure as agreed with landowner. This is expected to take 2 months.

d) Final contouring/blending of the site will be undertaken above the eastern bund area to the edge of the mining disturbance area. Blending the unmined area with the mined area will occur in 3-hectare strips, with approximately 20 hectares total to be contoured. This is expected to take 8-12 Months, and will be undertaken progressively to keep within the maximum disturbed area of 8 Hectares.

e) Land will be reinstated to former dairy support farming activity by reinstating fences, internal farm roads and culverts which is expected to take 1-2 months.

Proposed conditions of consent

3.83 In order to give effect to the various mitigation measures proposed throughout the application, and to provide parameters for the consent, a volunteered set of proposed consent conditions are contained in **Attachment P**.

3.84 It is expected that these conditions of consent may evolve over the course of the processing of the application, and the conditions should be treated as preliminary and subject to change.

Lapse date and term of consent

3.85 Mining is proposed to take approximately 5 - 7 years to complete to full site rehabilitation. TiGa seek a 12-year consent term, to allow for contingencies and to provide operational certainty given the level of investment.

3.86 A standard lapse date of 5 years is sought for the application.

4. Statutory framework

4.1 The following section sets out our assessment of the resource consents required to authorise the activity, however TiGa seeks all consents necessary to authorise the mining activity, associated processing and transportation of the resulting Heavy Minerals Concentrate as described in this application. This includes any consents required as a result of changes to National Policy Statements, National Environmental Standards and other planning documents that come into effect during the course of processing of this application.

Grey District Plan

4.2 The site is located within the Rural Zone under the Grey District Plan. A full assessment compliance assessment against potentially relevant rules is attached as **Attachment Q**. Consents are required as a discretionary activity under the following rules:

- Rule 19.7.8 (iii), because the height of buildings exceeds 10m;
- Rule 19.7.12(iii), because the volume of diesel proposed to be stored on site exceeds 5,000L;
- Rule 19.7.13(iii) because the car parking will not meet minimum numbers required under 24.2.1, and will not be laid out in accordance with Rule 24.2.3; the access design does not comply with Rule 24.3.1, and vehicle movements onto a Strategic Route outlined in Rule 24.3.4 are exceeded.
- Rule 19.7.16(iii) , because the activity is considered a Non-Rural Activity, which will breach floor area, noise and vehicle movement limits.

Proposed Te Tai o Poutini Plan

4.3 The proposed Te Tai o Poutini Plan (Proposed Plan) was notified in July 2022, and at the time of writing this application, submission period has closed, but summarising of submissions and the further submission period had not yet been completed.

4.4 The site is located within the Mineral Extraction Zone under the Proposed Plan, and is within the Coastal Environment and Pounamu Management overlays. Mining activities are therefore anticipated by the Proposed Plan. A full assessment compliance assessment against potentially relevant rules is attached as **Attachment Q**, however the majority of these rules do not have immediate legal effect. Consents are required under the following rules with immediate legal effect:

- ECO R5 – Indigenous Vegetation Clearance because ECO R2 relating to the clearance of indigenous vegetation in the coastal environment is not complied with. This rule restricts the clearance of vegetation to certain activities (ECO-R2.1), with parameters (ECO-R2.2-4). This means that unless the activity is listed within ECO-R2.1, there is no indigenous

vegetation clearance permitted within the coastal environment. It is, however our understanding that the intention of this rule was that there was to be a 500m2 allowance for vegetation clearance for any activity within the coastal environment, but this is not how the rule is currently drafted. This rule applies to the clearance of a small stand of flaxes surrounding a dairy stand-off pad in the middle of the extraction area, which is likely to be utilised where practicable for the boundary planting proposed for the site. The activity is a restricted discretionary activity under ECO-R5.

- NC – R3 – Indigenous Vegetation Clearance and Earthworks within riparian margins, because earthworks and vegetation clearance are required to reinstate the existing basin for use as an infiltration basin, parts of which may be within the riparian margin of Canoe Creek. This is a discretionary activity.
- NC – R4 – Buildings and Structures within riparian margins, because the infiltration basin is a structure, parts of which may be within the riparian margin of Canoe Creek. This is a discretionary activity.

4.5 The proposal is a **discretionary activity** under the Proposed TTPP. A full compliance assessment of the rules in the TTPP which would apply is enclosed as **Attachment Q**, including those which do not have immediate legal effect.

West Coast Regional Land and Water Plan

4.6 A full compliance assessment against potentially relevant rules is attached as **Attachment Q**. Consents are required under the following rules:

- Earthworks and vegetation clearance that do not comply with permitted activity rules are discretionary under Rule 16. Specifically, earthworks and weed clearance for the infiltration basin may be within 10m of Canoe Creek, which breaches riparian margin and Coastal Marine Area setbacks, and the earthworks volume limits are exceeded;
- The take and use of ground water for the purposes of mineral sand mining and processing, pit dewatering and well-point pumping is a restricted discretionary activity under Rule 56;
- The take and use of surface water from Canoe Creek for the purposes of mineral sand mining is a restricted discretionary activity under Rule 55;
- The discharge of clean dewatering water, treated mine, process and stormwater to land, and/or Collins Creek, the Northern Boundary Drain and Canoe Creek is a discretionary activity under Rule 71 (discharge to water) and Rule 91 (discharge to land);

4.7 Resource consent is required as a **discretionary activity** due to the activity not complying with the permitted activities listed within the West Coast Regional Land and Water Plan. It should be noted that any discharge from a drain to a surface water body is permitted under Rule 64. This applies to any discharge from Pond 4 to the drain entering the Canoe Creek Lagoon, and the discharge from the Canoe Creek infiltration basin to the swale which may enter Canoe Creek.

These discharges are classified as a discharge to land in the West Coast Regional Land and Water Plan, not a discharge to water.

Regional Air Quality Plan

4.8 Under the West Coast Regional Air Quality Plan, the discharge of dust to air from stockpiling activities is permitted under Rule 3, and from mining activities is permitted under Rule 5; however consent is being sought as a discretionary activity under Rule 16 as a precautionary measure to authorise unanticipated dust emissions.

National Environmental Standard for Freshwater Management

4.9 The National Environmental Standards for Freshwater Management (NESFM) were amended as of January 5 2023, providing a new pathway for mineral extraction activities. For completeness it is noted that the previous resource consent application made for a similar activity on the application site was processed under the previous regulatory regime which resulted in a non-complying activity status.

4.10 These regulations apply to natural inland wetlands. The Canoe Creek Lagoon is within the coastal marine area and is therefore not governed by these regulations (although it is noted that the National Policy Statement for Freshwater Management does apply to wetlands within the coastal marine area). Wetlands, both manmade and natural, have been identified on the land to the north of the application site – the NESFM applies to these wetlands, however access has not been provided to determine the exact extent of these wetlands.

4.11 The mining activity will be within 100 metres of wetlands therefore the new Regulation 45D applies, specifically:

- The activity will involve earthworks within 100m of a wetland;
- The activity will involve the taking of water from the mine pit within 100m of a wetland.
- The activity will involve the discharge of water (within the mine pit and from the settling ponds) within 100m of a wetland.

4.12 While the applicant's intention is to maintain the hydrological function and not drain any of these wetlands, consent is being sought under Regulation 45D as a discretionary activity as a precaution. This will allow for temporary partial reduction in water levels, which is intended to be immediately rectified through mine water management practices outlined in the hydrological assessment.

4.13 Further assessment of the restrictions upon grant of consent under Regulation 45D is included in section 7 of this AEE.

Regional Coastal Plan

4.14 The Regional Coastal Plan states in relation to discharges:

"There are two main types of discharges that can affect water quality. These are generally called point and non-point source discharges. Point source discharges are those discharges that discharge through a pipe or recognisable and definitive point (eg rubbish dumping). Non-point source discharges are those discharges that enter the coastal marine area from a diffuse source, such as land runoff.

This Plan considers only the point source discharge of contaminants into land or water within the coastal marine area. Other Plans that deal with point source and non point source discharges outside the coastal marine area must consider the downstream effects on water quality in the coastal marine area. This is because land based activities affect surface runoff which enters the coastal marine area."

4.15 The proposed discharge of water is occurring inland of the coastal marine area boundary to land, and is therefore a non-point source discharge and is not covered by the proposed Regional Coastal Plan. No other activities are occurring within the coastal marine area and the Regional Coastal Plan does not apply to this activity. Canoe Creek and Canoe Creek lagoon are both within the coastal marine area, and the effects on these water bodies have been considered in relation to the discharge of mine water to the drains inland of the coastal marine area.

Proposed Regional Coastal Plan

4.16 The proposed Regional Coastal Plan was notified in January 2016. The plan review has been placed on hold pending current legislative changes, and has not yet been made operative. The proposed Regional Coastal Plan states in relation to discharges:

"There are two types of discharges that can affect coastal water quality: point and non-point source discharges. Point source discharges are those that discharge through a pipe or recognisable and definitive point into coastal water. Non-point source discharges are those that enter the coastal marine area from a diffuse source, such as land runoff or contaminants in creeks and rivers.
This Chapter considers only point source discharges of contaminants into the coastal marine area. The Land and Water Plan deals with point source and non point source discharges on land or into freshwater above the coastal marine area, which can have downstream effects on coastal water quality."

The proposed discharge of water is occurring inland of the coastal marine area boundary, and is therefore a non-point source discharge and is not covered by the proposed Regional Coastal Plan. No other activities are occurring within the coastal marine area and the Regional Coastal Plan does not apply to this activity. As noted above Canoe Creek and Canoe Creek lagoon are both within the coastal marine area, and the effects on these water bodies have been considered in relation to the discharge of mine water to the drains inland of the coastal marine area.

Overall activity status

4.17 The proposed mining activity is overall a **discretionary** activity under the West Coast Regional Land and Water Plan, Regional Air Quality Plan and Grey District Plan, a **discretionary** activity under the proposed Te Tai o Poutini Plan, and a **discretionary** activity under the National Environmental Standards for Freshwater Management.

5. Assessment of effects on the environment

5.1 Section 88 of the RMA requires that the Applicant undertake an assessment of any actual or potential effects on the environment that may arise from the proposal, and the ways in which any adverse effects may be avoided, remedied, or mitigated.

5.2 This section discusses the effects of the proposal in the following sequence:

- Permitted baseline and existing environment
- Positive effects
- Landscape and visual amenity
- Noise
- Traffic
- Heritage/Archaeology
- Land stability
- Waterbodies and groundwater
- Ecology
- Cultural effects
- Dust
- Radiation
- Hazardous substance storage
- Assessment of Alternatives
- Application of the Effects Management Hierarchy

Permitted Baseline and Existing Environment

5.3 Section 95D(b) of the Resource Management Act 1991 (RMA), allows the consent authority to disregard an adverse effect if a rule or national environmental standard permits an activity with that effect – often referred to as the 'permitted baseline'. The permitted baseline is entirely relevant to determining the acceptability and level of effects generated by this proposal.

5.4 The West Coast Regional Council Land and Water Plan permits earthworks and disturbance activities, such as allowing up to 5 hectares of humping and hollowing and 10 hectares of v-blading per year. The applicant proposes a disturbed area of no more than 8 hectares at any one time, meaning that the area of disturbed land and associated visual effects are comparable to permitted

rural activities. It is relevant to factor this permitted baseline into any assessment of effects, however it should be noted that the experts assessing the effects of the proposal have not relied on the permitted baseline.

5.5 Table 2 below sets out a list of rules in the relevant operative plans which permit activities with a similar level of effect. In addition to those activities specifically listed below, it should be noted that the operative Grey District Plan does not control earthworks activities, nor shelterbelt planting. Therefore, activities which may affect viewshafts from neighbouring properties such as boundary planting and bunding can feasibly be carried out as a permitted rural activity under the Grey District Plan, and therefore existing views are not protected by the rules in the District Plan.

Planning Document	Rule	Activity	Comments
West Coast Regional Air Quality Plan	3 – Stockpiling, conveying and handling	Discharge of contaminant into air arising from stockpiling, conveying or handling	Stockpiling of gravel, sand and soil will occur throughout the proposed activity.
West Coast Regional Air Quality Plan	5 – Earthworks, Quarrying, Mining and Cleanfill Operations	Discharge of any contaminant into air arising from earthworks, quarrying operations, mining or cleanfill operations	Relevant due to mining and earthworks provisions.
West Coast Regional Land and Water Plan	10 – Vegetation disturbance in the Non Erosion Prone Area	Vegetation disturbance in Non Erosion Prone Area.	Any vegetation present in the application area will be removed during the course of the proposed activity.
West Coast Regional Land and Water Plan	51 – Diversion of natural runoff – contaminated and uncontaminated	Diversion of stormwater runoff	Diversion of both contaminated and uncontaminated stormwater runoff will occur during the activity.
Grey District Plan	19.7.3 and 19.7.7	Building setbacks and Coverage	Rural buildings are permitted if they comply with setbacks, height and site coverage rules. The buildings will comply with setback and coverage rules.
Grey District Plan	19.7.3 Non-Rural Activities	Heavy Vehicle Movements	The District Plan permits 20 heavy vehicle movements per day and 100 other vehicles per day – there is no restriction on the time of day which these movements apply.
Grey District Plan	19.7.3	Noise	The District Plan permits noise levels of 55 dBA L_{10} during the daytime and 45 dBA L_{10} during night time hours and on Sundays. Noise limits do not

Planning Document	Rule	Activity	Comments
			apply to vehicle noise on roads, as they only apply to the site itself. Vehicle noise on roads is therefore permitted.

Table 2: Relevant Permitted Activities

5.6 In addition to the permitted baseline set out above, Nikau Deer Farm Ltd have obtained as Certificate of Compliance for the construction of two farm buildings on the application site for the purpose of storing farm equipment, fertiliser etc. The buildings are 1300m^2 in total, and provide an indication of what permitted rural activities can occur on the site. The Certificate of Compliance and application are contained in **Attachment D**. As the certificate has been granted, these farm buildings form part of the existing environment against which the effects of the proposal should be assessed. The Certificate of Compliance provides for a similar sized building to that which is proposed to be retained at the end of mining.

5.7 The Proposed Te Tai o Poutini Plan provides for mineral extraction as a controlled activity within the Mineral Extraction Zone. While these zone rules do not have immediate legal effect, when considering the effects of the proposal in light of the objectives and policies of the Proposed Plan, the enabling zone framework which applies to this site needs to be taken into consideration.

Positive Effects

5.8 The proposed Barrytown mining project is stage one of TiGa's wider plans for mineral sand mining on the Barrytown flats. The wider operation will bring significant social benefits to the West Coast region.

5.9 The currently proposed activity at Barrytown will bring significant economic benefits to the West Coast region. The operation will employ up to 47 staff members, as well as contractors and other services in association with the activity. The flow on economic effects of such a large-scale project will be substantial and make a noticeable difference in the community.

5.10 The consenting of this operation may also contribute to the viability of a regional processing facility to enable the further processing of the heavy mineral concentrate into its constituent parts, improving the value of the extracted minerals and providing further employment opportunities in this facility. Such a facility would service mineral extraction across the heavy mineral deposits which span from Buller to Westland in extent. This will only occur if there are a sufficient number of local mineral extraction activities to justify the expenditure on the plant.

5.11 The proposed activity will also create social and community benefits as a flow on effect of job creation and economic activity. Flow on effects will benefit things like schools, sports and other clubs and activities.

5.12 An economic assessment, confirming the significant regional economic benefits of the proposal is enclosed in **Attachment R**.

5.13 In addition to the significant regional economic benefits associated with this project, the project provides the opportunity for enhancement of riparian and coastal vegetation, and the construction of an additional wetland area which will provide enhanced connectivity between the coastal lagoon and wetland ponds to the north of the application site. The riparian planting will in the longer term have a positive impact on stream health and aquatic ecology, and reduce nutrient runoff from the dairy support activities which will re-establish on the site post-mining, as will the recontouring of the land which will raise drains out of the water table and improve water quality in the post mining farm runoff. The ecological benefits of this planting are discussed further in the Ecological Impact Assessment (**Attachment M**).

Landscape and visual amenity

5.14 The application area is located adjacent to State Highway 6 at Barrytown in a wider area that is characterised by pastoral farming activities, areas of native vegetation and rural residential housing. The site itself is highly modified and is primarily grass covered farmland, with some with minimal pockets of native vegetation throughout and more vegetation fringing the inland boundary. The Canoe Creek Lagoon runs adjacent to the west of the application area. A number of other manmade drains also run through the application area before eventually draining into the lagoon.

5.15 The Landscape Assessment (Attachment N) sets out the context of the site, and confirms that the site itself is not part of an Outstanding Natural Landscape, but identifies that the hills behind the site are.

5.16 The assessment considers the effects on coastal natural character, landscapes and the visual effects on immediate neighbours. The level of effects experienced are identified in Table 3 below.

Viewpoint/Property	Nature of Effect	Level of Effect	Comments
SH6 – Users of the Highway	Visibility of the project varies across the State Highway Frontage. Fleeting views while driving past the site.	Low/Less than minor	1.8m visual bund and planting is proposed to mitigate effect on users of SH6, and will reduce over time as planting establishes.
Pakiroa Beach and Foreshore	Visibility of project varies across the site due to the topography of the beach and the site.	Low/Less than minor	The beach and foreshore adjacent to the site is privately owned property.

Viewpoint/Property	Nature of Effect	Level of Effect	Comments
Paparoa Ranges/Paparoa Track	Distant views of the site, from approx. 8km away	Negligible/Less than minor	
Wider Barrytown Area	Burke Road site selected as representative of distant views of site	Negligible/Less than minor	
3261 Coast Road (B O'Neill and J Costello)	Immediately adjacent neigbour looking down on site	Not assessed – approval will be provided	Effects can be disregarded if property owners provide written approval
3323 Coast Road (S Langridge and R Wildbore)	Adjacent neighbour, separated by one property between the site. Partially obscured views of site.	Initially low temporary/Less than minor, changing to very Low/Less than minor as planting establishes	Bunding along the boundary to increase effectiveness of planting was offered but not preferred by neighbouring property owners.
3323 Coast Road (R Langridge and D Van den Berg)	Views from temporary dwelling (bus) across site. Partially obscured by vegetation.	Initially low to moderate temporary/minor, changing to very low/less than minor as planting establishes	Bunding along the boundary to increase effectiveness of planting was offered but not preferred by neighbouring property owners.
3195 Coast Road (G and G Langridge)	Most of site visible, parts of processing plant. Partially obscured by vegetation	Initially low to moderate temporary/minor, changing to very low/less than minor as planting establishes	
3316 Coast Road (R Mirza and S Hillerby)	Site partially visible between large trees on the property, site visible from elevated position at a distance.	Initially low temporary/ minor, changing to very low/less than minor once project is complete.	
RS 6674 (C Cowan)	Currently no dwelling on site. Site visible from property at an elevated position at a distance.	Not assessed – approval will be provided	Effects can be disregarded if property owners provide written approval
3172 Coast Road (M Morgan and R Radford)	Site partly visible at an elevated position, at a distance.	Very low temporary/less than minor	
Overall	**Varies**	**Low/minor during project, very low/less than minor at completion**	

Table Three: Summary of Landscape and Visual Effects

5.17 The Landscape Assessment, in conjunction with the Ecological Assessment, sets out a landscape mitigation planting plan. This planting plan is comprised entirely of native species and includes boundary planting and bunding, coastal planting, lagoon edge planting and riparian planting along Collins Creek and the Northern Drain, which has the dual benefits of providing visual mitigation and valuable ecological benefits in terms of stream health, aquatic ecology and avian habitat.

5.18 The Landscape Assessment considers the potential effects on landscape and residential amenity for the surrounding environment, and considers that the effects of the proposal are **low/minor during the project, and very low/less than minor upon completion** subject to successful remediation.

Noise

5.19 Noise will be generated by the processing plant and associated equipment and vehicle and machinery operation. A number of mitigation measures have been considered and will be undertaken to ensure acceptable noise levels can be met. These include the positioning of the plant as far away from dwellings as practicably possible and enclosing some noise generating equipment (such as pumps, trommel) and parts of the plant as required.

5.20 The Grey District Plan sets out compliance limits for noise in Rule 19.7.16 and states that shall be measured in accordance with NZS 6801:1999 "Acoustics – Measurement of Environmental Sound" and assessed in accordance with NZS 6802:1991"Assessment of Environmental Sound". Construction noise shall be measured and assessed in accordance with NZS 6803:1999 "Acoustics – Construction Noise". In addition, national noise standards (NZS 6802:2008 Acoustics – Environmental Noise) are published by Standards New Zealand and the World Health Organisation Guidelines for Community Noise provide guidelines for noise exposure. These standards and guidelines are commonly utilised as a guide for acceptable levels of noise.

5.21 The applicant has commissioned a full acoustic assessment undertaken by Marshall Day Acoustics to assess the effects of noise generated as a result of the proposed activities (see **Attachment H**). Marshall Day Acoustics have also assisted the applicant to prepare a draft Noise Management Plan, setting out the management methods and techniques which will be employed during construction and operation to minimise noise emissions at source.

5.22 The Acoustic Assessment outlines that the Grey District Plan noise limits will not be adhered to, because there is a night-time noise limit applied to non-rural activities on Sundays. The Proposed Te Tai o Poutini Plan does not include this reduced noise limit on Sundays, and instead adopts a 55 dB L_{Aeq} daytime noise limit and a 45 dB L_{Aeq} night-time limit. The project proposes to comply

with these noise levels, which is consistent with World Health Organisation guidelines and the National Planning Standards 2019. The operative Grey District Plan contains outdated noise limits, and should not be relied upon to set standards for operations.

5.23 The Acoustic Assessment notes that in order to avoid effects on the Westland Petrel, mining operations may occur from 0630 some mornings over the period 01 December-31 January to avoid mining in hours of darkness. This will only occur provided that the noise levels proposed will be complied with (i.e. 45 dBA L_{Aeq}), and additional monitoring is proposed to ensure that if the mining occurs prior to 0700, the night time noise limit will be complied with.

5.24 The Acoustic Assessment also evaluates the effects of heavy vehicle movements. The applicant has offered to cease trucking between 2200 and 0500 to avoid residential amenity effects during hours when the State Highway 6 is at its quietest. The applicant proposes to commence trucking at 0500, which the Acoustic Assessment notes is night-time for the purpose of setting noise limits for the activity. The assessment accordingly recommends that trucking is limited to only 3 movements per hour during the 0500-0700 period. The applicant has volunteered this as a condition of consent in Attachment P.

5.25 The applicant also proposes a suite of conditions (**Attachment P**) relating to noise, including the trucking limits noted above, requirement to comply with noise levels, noise monitoring and implementing the Noise Management Plan.

5.26 Ultimately the Acoustics Assessment concludes that the effects of the proposal are acceptable. Given the proposed compliance with the Proposed Te Tai o Poutini Plan noise limits, we consider the noise effects to be **less than minor** in nature.

Traffic

5.27 Traffic will access the site from the existing entranceway off State Highway 6. The entranceway will be upgraded to a design previously discussed with, and agreed to, by Waka Kotahi. In order to construct this access, a small amount of roadside vegetation will be removed to comply with sight distance requirements.

5.28 Consent is sought for a maximum average of 50 truck movements (25 each way) to and from the site per day, and an average maximum of 5 trucks per hour. Trucks may travel either to and from the north towards Westport, or to and from the site towards Greymouth. The Integrated Transport Assessment (**Attachment G**) has considered both options.

5.29 The applicant has held initial discussions with a select group of residents, and has agreed to a night-time trucking exclusion period from 2200-0500 to ameliorate the potential night time sleep disturbance effects associated with trucking of the heavy mineral concentrate.

5.30 The Integrated Transport Assessment has assessed the effects of the proposal on the wider road network, and the immediate transport environment and has concluded that:

- The site will be self-sufficient with regards to car parking and loading, such that there will be no on-street parking / loading occurring;
- The proposed access is anticipated to operate safely and efficiently. The low passing volumes and good visibility mean that vehicles exiting the site will be able to do so safely; and
- The effects on the wider road network are considered to be acceptable.

5.31 Overall, the Integrated Transport Assessment concludes that the effects of the proposal are **less than minor**.

Archaeology

5.32 A search of the Archsite records indicates that the only known archaeological sites within the vicinity of the application area are well removed from the disturbance area. These records are enclosed in **Attachment C**. To avoid any adverse effects on any unknown archaeological sites, conditions requiring the adoption of an Accidental Discovery Protocol have been proposed. However, it is noted that almost the entire area has previously been humped and hollowed, such that the discovery of any archaeological sites is unlikely. Accordingly, the archaeological effects of the proposal are considered to be **negligible**.

Land Stability

5.33 Land disturbance activities have the potential to cause land instability effects on adjoining properties, if not appropriately managed. The applicant has engaged RDCL to undertake a geotechnical assessment of the proposed mining activity. This assessment is included in **Attachment S**.

5.34 The application proposes 20m setbacks from all internal boundaries and water features surrounding the site, as well as a 200m setback from the State Highway boundary (with the exception of the construction of the access and roadside bund). The geotechnical assessment sets out that the pit slope geometry will be 65 degrees. Any displacement which occurs would only affect land within approximately 10m of the pit. The safety assessment includes assessing slope failure under seismic conditions. The geotechnical assessment covers off the Health and Safety at Work Act requirements to ensure that geotechnical hazards are appropriately managed on site to avoid such hazards affecting the workforce on site, which by extension will avoid land instability effects on surrounding properties.

5.35 The applicant proposes conditions of consent which require that there is no erosion or slope instability outside of the application area, and also volunteers a condition requiring a pre-mining

survey to be carried out on the two nearest properties. This will enable the applicant and adjacent landowners to determine whether there is any mining induced settlement on the properties and allow for civil remedies to be pursued in the unlikely event that differential settlement is present. The potential land instability effects of the proposal are therefore **less than minor** in nature.

Water bodies and groundwater

5.36 The proposed activity has the potential to interact with groundwater, surface water and surrounding wetlands in the vicinity of the application area. Effects associated with this interaction can be broadly categorised into water quality and water quantity effects.

Water quantity effects

5.37 The proposal involves pumping of groundwater from the mine pit in order to excavate the ROM. This has the potential to reduce water quantity/levels in Collins Creek, the Northern Drain, and adjacent wetlands to the north of the property and the springs to the south of the property. It could also potentially result in saline intrusion into the aquifer. The hydrological assessment and the associated Water Management Plan (**Attachment I**) sets out in detail how water will be managed to ensure that water levels and flows will be maintained in the wetlands and waterbodies.

5.38 To summarise, water will be recharged to the aquifer by a series of infiltration trenches around the perimeter of the mine area. If a lowering of groundwater levels at the site perimeter or a reduction in surface water flows/levels is detected, and it is determined that infiltration trenches are insufficient to maintain water levels, surface water flows will be augmented by either using the treated mine water or water from the Canoe Creek water take (discussed below), if the treated mine water is not of sufficient quality to be used. Short term fluctuations may occur in surrounding water bodies, which if detected should be immediately rectified by augmentation. The hydrological assessment also considers the potential for saline intrusion resulting from the drawdown of groundwater, and concludes that saline intrusion should be precluded by the recharge of groundwater through infiltration trenches. The hydrological effects associated with temporarily reduced water levels are considered to be no more than minor in nature.

5.39 The proposal also involves a water take from Canoe Creek at a maximum rate of 63Litres/second. This water take will be used to fill the processing plant water circuit at the commencement of processing, sporadically during mining to top up the circuit, and also potentially for surface water augmentation of Collins Creek and the Northern Drain (if required). This water take will either be via a direct surface water take with an appropriate fish screen, or through a gallery in the gravels adjacent to the creek which will draw surface water from the creek, albeit technically via a groundwater take. The hydrological assessment has determined that the Mean Annual Low Flow (MALF) of Canoe Creek is 630 Litres/second, and therefore the potential take is approximately 10% of this MALF value. There are no other surface water takes consented in the Canoe Creek catchment. The water take will be sporadic and intermittent, except when required for surface

water augmentation in which case the take may be continuous for the period it is required to augment flows.

5.40 A suite of consent conditions are proposed which require monitoring of groundwater and surface water levels and flows, to ensure that these are not adversely affected and to protect springs and wetlands on neighbouring land.

5.41 The ecological assessment determines that the proposed Canoe Creek water take will maintain instream conditions, and therefore the effects of this water take are considered to be **less than minor**.

5.42 Following mining, the land will be recontoured to largely mirror pre-mining drainage patterns, with a no more than 15% change in catchment drainage patterns within the site boundary proposed, to ensure that post-mining runoff is similar to the current situation.

Water quality effects

5.43 The proposal has the potential to adversely affect water quality in surrounding water bodies and wetlands. The potential water quality effects include changes to the water chemistry, turbidity and associated ecological effects. The potential effects and mitigations proposed to avoid and minimise effects are described in the hydrological assessment and Water Management Plan (**Attachment I**), the Erosion and Sediment Control Plan (**Attachment J**), and the ecological assessment, Avian Management Plan and Wetland and Riparian Planting Plan (**Attachment M**). The water chemistry effects and associated ecological effects are addressed further below. The hydrological assessment focuses on the potential for increased metal loading, whereas the Erosion and Sediment Control Plan focuses on the potential for increased sediment and turbidity. The ecological assessment considers the potential ecological effects of potential changes in water quality.

5.44 There are naturally occurring metals present in the groundwater beneath the site. Elevated concentrations (above ANZG 95% species protection guidelines) of aluminium, arsenic, chromium, copper, nickel and zinc are present and have been recorded in water quality samples taken from the piezometer network established around the perimeter of the site.

5.45 The mine process has the potential to mobilise these metals, and suspended sediment, which could affect surface water quality. There are no downstream users of groundwater, so the effects of the proposal are limited to surface water quality in the receiving environment. The various streams of material following processing have been analysed, including the HMC, tailings and slimes to determine the concentrations of metals in each of these materials. HMC will be extracted and removed from site, and the contribution of metal loading from this source has been described in the hydrological assessment as negligible. Tails will be pumped back to the pit following processing, where slimes are discharged directly back to the pit without entering the processing

plant. The combination of tails and slimes have the potential to affect groundwater which may discharge to the Canoe Creek Lagoon, however the hydrological assessment concludes that any such effects will be less than the ANZG 95% species protection guideline limits, assuming that all groundwater ends up in Canoe Creek Lagoon, which is unlikely. The effects associated with the throughflow of mine influenced groundwater in the receiving environment are therefore considered to be **less than minor** in nature.

5.46 In addition to groundwater flows, the proposal has the potential to affect surface water quality as a result of treated mine water discharging to land, which will ultimately discharge to water. Depending on water quality at the Pond 4 discharge location and the need for surface water augmentation, this water will be discharged to infiltration trenches, a drain which connects to Canoe Creek Lagoon, Collins Creek, the Northern Drain, or an infiltration trench with a swale outlet that connects to the Canoe Creek floodplain.

5.47 Water quality is proposed to be frequently monitored to determine whether water quality parameters are met at the various receiving environments. As there will at times be limited dilution in Collins Creek, the Northern Drain and the drain leading to Canoe Creek Lagoon, Pond 4 water quality must be of a high standard, or this will have an unacceptable effect on the ecological values and water clarity in these receiving environments. In circumstances where water quality parameters cannot be met, an additional treatment step is proposed, by pumping the water to the Canoe Creek Infiltration Basin, with an overland flow which would ultimately discharge to the floodplain of Canoe Creek near the river mouth. This provides additional treatment – a further settling pond and discharge of water through river gravels which will further remove fine sediments. In addition, any incidental discharge to the floodplain of Canoe Creek will be to a water body which has a higher flow than the smaller waterbodies adjacent to the mine area, with significant dilution which will ensure that any adverse effects on stream ecology are avoided.

5.48 A suite of consent conditions are proposed, including frequent water quality monitoring in the receiving environment, at various points along the treatment train, and in groundwater piezometers. These consent conditions will ensure that the potential water quality effects are monitored, and mitigations put in place should any issues be detected.

5.49 Following mining, the land will be recontoured to largely mirror pre-mining drainage patterns, with a no more than 15% change in catchment drainage patterns within the site boundary proposed. The land contour will be lower, however the recontouring will allow the flattening of the current hump and hollow pattern and enable hollows to be lifted out of the groundwater table. This is expected to reduce the nutrient loading in the receiving environment due to reduced runoff, increased soil uptake and increased infiltration to groundwater. In addition to proposed riparian planting, this is expected to have a positive long term effect on water quality in the surrounding surface water bodies and wetlands.

5.50 The Water Management Plan and proposed consent conditions are aimed at maintaining water quality at or above the existing National Policy Statement for Freshwater Management 2020 attribute bands for all water quality indicators, and will not exceed ANZG 95% species protection guidelines for metals and metalloids. Overall, the effects on water quality are considered to be **no more than minor**.

Ecology

5.51 The applicant has commissioned EcoLogical Solutions to prepare an ecological assessment which is enclosed as **Attachment M**. Accompanying this assessment is an Avian Management Plan and Wetland and Riparian Planting Plan to provide additional support surrounding the mitigation measures proposed to avoid ecological effects. The ecological assessment is closely related to both the hydrological assessment (**Attachment I**) and Erosion and Sediment Control Plan (**Attachment J**), particularly in relation to effects on freshwater ecology.

5.52 The ecological effects of the proposal can broadly be categorised into the following effects:

- Effects associated with vegetation clearance
- Effects on Avifauna
- Effects on wetlands
- Effects on stream ecology, water quality and quantity

Vegetation clearance

5.53 In relation to vegetation clearance, the dominant vegetation in the application area is exotic pasture, with only a small amount of planted indigenous vegetation surrounding a feed pad, and a few mature kahikateas. The ecological assessment confirms that the effects of the removal of this vegetation is **negligible**.

Effects on avifauna

5.54 The ecological assessment has been informed by four seasonal bird counts conducted on the site, and a review of the eBird database. Ten species of conservation interest have been identified as using the site or potentially at risk of adverse effects. These species are black shag (At Risk (relict)), black-billed gull (At Risk (declining)), Caspian tern (Threatened (Nationally vulnerable)), grey duck (Threatened (nationally vulnerable)), red-billed gull (At Risk (declining)), South Island pied oystercatcher (At Risk (declining)), white fronted tern (At Risk (declining)), Pacific reef heron (Threatened (nationally endangered)), variable oystercatcher (At Risk (recovering)) and tāiko (At Risk (naturally uncommon)).

5.55 The majority of these species occupy the Canoe Creek Lagoon area, with the exception of the tāiko, and effects on these species primarily relate to An Avian Management Plan has been developed for the site, which has previously been reviewed by, and discussed with, the Department of Conservation. The pasture is of limited habitat value, except for some that may

use pasture for feeding. The Avian Management Plan sets out management methods for avoiding adverse effects on threatened and at risk species. Key management methods include:

- Commencement of mining at least 100 m from the edge of the coastal lagoon which is achieved via starting in Panel 1 (the starter pit) and monitoring of birds during mining to inform later management.
- Maintenance of a 20 m buffer from the edge of mining to the lagoon area. This boundary is to be permanently marked so as to avoid crossing it inadvertently.
- Planting of a 5 m wide buffer with flax and other native species set out in the planting plan for the site so as to visually screen the mining activities from the lagoon and contribute to reducing noise levels.
- Avoidance of mining the parts of the strips closest to the highest quality habitats (the lagoon and provisional SNA area, strips 5 – 7 and 10) between the months of September and December (inclusive) in order to provide separation from activities.

5.56 One of the key focus areas of the Avian Management Plan is to avoid effects on the tāiko. The tāiko colony is located approx 4km north of the site, and biards can become disoriented by artificial lighting. The processing plant building has been designed to avoid light spill towards the north and the coastline, and all lighting on site will adhere to the Commonwealth of Australia National Light Pollution Guidelines for Wildlife, to ensure that lighting is kept to an absolute minimum necessary to operate, and will avoid effects on the tāiko. A protocol for responding to a tāiko found grounded at the application site is included in the Avian Management Plan. In addition, one of the key risks identified has been driving at night in the area, particularly past the colony where disoriented birds can be struck by vehicles and injured or killed. For this reason, it is proposed to limit trucking to daylight hours only on the northbound route. While this is difficult operationally to achieve while managing to remove the required amount of HMC from the site, the applicant has agreed to this restriction. The key risk period is when fledglings leave the colony for the first time, and this is when most groundings are recorded. Over the period 1 December to 31 January, the proposed mining shift will commence 30 mins earlier at 0630 to coincide with daylight hours, to avoid risk of lighting from the mining activity interfering with the fledgling season.

5.57 Overall, the ecological assessment concludes that with the avoidance and mitigation methods applied to the proposal, the effects on avifauna, including tāiko, will be low, or **no more than minor** in nature, with adverse effects being avoided on threatened and at risk species.

Effects on wetlands

5.58 The effects on wetland ecology (avifauna effects are covered above) could arise due to changes in the water table associated with the mining activity. This could potentially affect the flax wetlands around Rusty Lagoon and the kahikatea wetland area north of the site. The proposed water management strategy includes groundwater recharge at the boundaries of the mine area through the installation of infiltration trenches, and if necessary recharge barrier wells. An extensive

groundwater and surface water level monitoring regime will ensure that any changes in water levels are identified and if linked to the mining activity (i.e. not seasonal fluctuations) can be immediately rectified through surface water augmentation and additional groundwater recharge, such that declining water levels can be reversed quickly. The ecological assessment confirms that the wetland vegetation will be able to withstand short term temporary reductions in water levels. As water levels and hydrological function will be maintained, so too will the extent and ecological values of these areas. The effects on wetlands are primarily avoided through the maintenance of water levels, therefore considered to be **less than minor** in nature.

Effects on stream ecology, water quality and quantity

5.59 The proposal has the potential to alter water quality (visual clarity, sedimentation and increased metal loads) in surrounding waterbodies, namely Collins Creek, the Northern Drain, Canoe Creek and Canoe Creek Lagoon. The Northern drain also feeds Rusty Lagoon to the north of the site, so these water quality effects could extend to this environment also.

5.60 The addition of fine sediment to stream environments has the potential to alter water chemistry, increase turbidity and decrease light penetration, which in turn affects primary production and feeding for some fish species. The deposition of sediment can also smother instream surfaces, decrease interstitial spaces and decrease the amount of suitable habitat available for benthic invertebrates. Increased metal loading could result in water in the receiving environments becoming toxic to various aquatic species.

5.61 The hydrological assessment and the Erosion and Sediment Control Plan extensively cover the management methods proposed to avoid sedimentation and increased metal loading in the various receiving environments. This is also covered in the water quality section of the AEE above.

5.62 The ecological assessment concludes that the proposed water management strategy, which includes extensive settling infrastructure, a discharge hierarchy for Pond 4 excess water based on water quality at the discharge point, lime dosing or limestone rock check dams to alter water hardness (reducing metal toxicity), and an extensive monitoring regime, will ensure that the potential effects on water quality are avoided.

5.63 The key water quality risk for the project is the discharge of excess water from Pond 4 following an extensive treatment train, and where this discharge occurs. Under an ideal operational scenario, this water would be used to augment surface water flows when required and discharge directly to the drain which enters the Canoe Creek Lagoon, however this can only occur provided that strict water quality parameters are adhered to. Conditions of consent are proposed to stipulate the maximum limits for key water quality parameters such as clarity, turbidity, sediment, metals and other stream quality indicators, which will be monitored both upstream and downstream within the various receiving environments. This is in order to achieve the ANZG 95% species protection guidelines. If the water quality parameters cannot be met, the discharge

contingency is to pump excess Pond 4 water to the Canoe Creek infiltration basin, with any overflows directed to land which may ultimately discharge to the mouth of Canoe Creek. At this location, there is sufficient dilution that any increased sedimentation and/or metal loading will be able to meet ANZG 95% species guidelines. The discharge contingency gives rise to the need to find an alternative surface water augmentation source, which can be supplied from the Canoe Creek water take. In this contingency scenario, water quality effects are also avoided by the use of clean water for surface water augmentation.

5.64 In summary, the robust water management methods proposed ensure that effects on water quality can be avoided, therefore ensuring that effects on stream ecology are also avoided. Some changes in water chemistry will occur, however the effects of these changes with all mitigations outlined above employed will result in **no more than minor** ecological effects on the surrounding receiving environments.

Cultural effects

5.65 The site is within the rohe of Te Runanga o Ngati Waewae. In addition to the potential for unknown archaeological sites being encountered, the proposal has the potential to give rise to effects on taonga species and affect the mauri of water in the identified receiving environments. It should be noted that none of the known archaeological sites are associated with previous maori occupation.

5.66 Canoe Creek is identified in the Regional Land and Water Plan as having waahi taonga, cultural materials and traditional campsite cultural values. Collins Creek and the Northern Drain are not identified in this schedule, however the waters have historically mixed between these three creeks because of the Canoe Creek lagoon where Collins Creek and the Northern Drain currently terminate, and where Canoe Creek has also previously discharged.

5.67 The proposal identifies extensive measures to avoid and minimise any potential effects on the waterbodies surrounding the mine area. The proposed infiltration basin is in proximity to Canoe Creek, but utilises an existing basin and will not involve further disturbance in the vicinity of Canoe Creek. The assessment of water quality indicates that a potential overflow from the basin to Canoe Creek will have sufficient dilution that the mauri of the water will not be affected.

5.68 Taonga species are identified in the Ngai Tahu Claims Settlement Act 1998, and those potentially effected by the proposal identified in the ecological assessment include: Kōau (black shag), Tara (Caspian tern and white fronted tern), Pārera (Grey Duck), Matuku moana (Pacific Reef Heron), Tāiko (Westland Petrel), and harakeke (flax). The proposed measures in the ecological assessment and accompanying Avian Management Plan and Wetland and Riparian Planting Plan will ensure that adverse effects on these taonga species are avoided, as outlined in the ecological effects section above.

5.69 The site is located within the Pounamu Management Overlay in the Proposed Te Tai o Poutini Plan. The proposal will not involve the extraction of pounamu which will be returned immediately to the mine pit with other oversized material. There are therefore not considered to be any effects on any pounamu resource located within the site.

5.70 The applicant has frequently engaged with Te Runanga o Ngati Waewae throughout the development of this application, and continues to do so.

Dust

5.71 The applicant has sought consent for a discharge of dust to air, as a precaution due to the differing permitted activity status for mining and stockpiling and the difficulty in determining the origin of dust emissions. To reiterate, dust emissions from stockpiling are not permitted beyond the boundary of the property, but dust emissions from mining are permitted provided that the dust is not noxious, dangerous, offensive or objectionable beyond the boundary of the property. Dust emissions may arise primarily from topsoil stripping, access road, bund and stockpile construction and vehicle movements.

5.72 The applicant has developed a Dust Management Plan (**Attachment K**), setting out how the site will be managed in order to avoid fugitive dust emissions associated with the project. Given the frequent rainfall and wet nature of the mining, dust emissions are not expected to be a problem, however the Dust Management Plan sets out management methods in order to ensure that dust emissions will be avoided, and will not reach noxious, dangerous, offensive or objectionable levels.

5.73 The applicant has installed dust deposition gauges on the boundary of the application site to measure background dust levels. These dust deposition gauges have captured variable weather conditions, including an exceptionally dry period during January and February. The dust deposition gauges have measured background levels at around 0.4 g/m^2/30 days. The location of the gauges and results are recorded in the Dust Management Plan.

5.74 The Ministry for the Environment's Good Practice Guide for Assessing and Managing Dust recommends that dust deposition does not exceed 4g/m^2/30 days above background levels. By the time mining commences, 12 months of baseline data will be obtained which will determine the background levels of dust deposition at the site, and conditions have been proposed requiring the ongoing monitoring of dust at the boundaries for the duration of mining to ensure that this dust limit is not exceeded. The effects associated with potential dust emissions are therefore expected to be **less than minor** in nature.

Hazardous substance storage

5.75 The proposal potentially involves the storage of up to 40,000 litres of diesel on site to power generators and earthmoving machinery. This storage will only be required if the electricity network is unable to be upgraded to cater for the mines electricity consumption.

5.76 The indicative fuel tank design is enclosed in **Attachment L**. The tank has full secondary containment and will be located within the processing plant hardstand area. Any spills can be contained by removal of any contaminated hardfill and appropriate disposal, and as a worst case scenario would be captured in the mine settling pond system which would allow significant detention and the ability to contain any spills to avoid discharge to the environment.

5.77 The storage of diesel is occurring well within the property boundaries and away from any residential activities, which will avoid any human health risk associated with such storage. The fuel storage will likely be managed by the fuel delivery company in terms of ensuring that the fuel storage tank is appropriately certified under the Hazardous Substances and New Organisms Act 2006.

5.78 The potential environmental effects associated with the storage of diesel are considered to be **less than minor** in nature. Conditions of consent associated with this storage, and subsequent use are included in **Attachment P**.

Radiation

5.79 The site has naturally occurring radionuclides, mostly contained within the heavy mineral fraction of the material to be excavated on site. Previous representative samples have been analysed by the Environmental Science and Research Institute, and the applicant has now undertaken an extensive drilling programme across the application area. The drill cores were aggregated and a bulk sample of high grade material was shipped to Australia to be assessed by IHC Robbins, who are designing the Processing Plant.

5.80 The assessment of the radioactivity of the Run of Mine (ROM) material extracted from the pit, and the processed streams undertaken by IHC Robbins is included in **Attachment T**. The assessment indicates that the majority of radioactive material is captured in the Heavy Mineral Concentrate, which is removed from the site, however also confirms that the HMC produced is well below the concentrations which would classify the material as radioactive, and therefore the Radiation Safety Act 2016 does not apply to the production/transportation of this material.

5.81 In addition, the applicant has installed radiation dosimeters at two locations on the boundary of the property to determine background levels of radiation exposure. The preliminary

results are enclosed in **Attachment U**. It is expected that further data may be available before any hearing occurs for the proposal. Unfortunately, the data was corrupted in one of the dosimeters, however the other dosimeter confirms that for approximately 4 months, the background radiation levels are 0.127 millisieverts, which would equate to well less than the recommended level of 1 millisievert per year for public exposure outlined in Schedule 3 of the Radiation Safety Act 2016. Conditions of consent are proposed to monitor radiation levels at the boundary of the application site for the duration of mining to confirm that public exposure levels are not exceeded as a result of this activity.

5.82 On the basis that the radiation assessment confirms that the HMC is not radioactive in terms of the Radiation Safety Act 2016, and conditions are proposed to ensure public exposure limits in the Act are not exceeded, the effects associated with the disturbance of naturally occurring radionuclides is considered to be **negligible**.

Assessment of Alternatives

5.83 During the minerals sands processing activity there will be discharges of wash water and stormwater to land and water. Schedule 4 of the RMA (and Section 105 of the RMA) state that if an activity involves the discharge of any contaminant, the AEE is required to include a description of:
"(i) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and
(ii) any possible alternative methods of discharge, including discharge into any other receiving environment"

5.84 The nature of the discharge and the sensitivity of the receiving environment are discussed earlier and in extensive detail in the hydrological and ecological assessments.

5.85 Discharges are always directed to land (drains) in the first instance, rather than directly discharging to waterways, which is considered to be best practice. The Hydrological Assessment and Water Management Plan outline an extensive water management proposal with a cascading set of interventions to ensure that water quality is acceptable in the various receiving environments. Where water quality parameters cannot be met by the preferred method of discharge, alternative solutions are proffered.

5.86 The applicant has also considered a variety of other alternatives in regard to the wider proposal, particularly in relation to truck movements and hours of operation which have been discussed earlier. The current proposal is considered to provide for efficient operation of the mineral sands operation while taking into account any potential effects for nearby residents. It is considered that the effects overall are no more than minor and that the activity will be managed to minimise and mitigate adverse effects.

Application of the effects management hierarchy

5.87 The proposed mineral sands project has been informed and shaped by the application of the effects management hierarchy – as defined in the National Policy Statement for Freshwater Management (NPS-FM). The application of the effects management hierarchy is important with respect to adverse effects on freshwater, including natural inland wetlands. The NPSFM requires the effects management hierarchy to be applied to rivers and natural inland wetlands. In addition, the NESFM requires the effects management hierarchy to be applied in order for the activity to be considered a discretionary activity under Regulation 45D which relates specifically to activities within or adjacent to wetlands. The New Zealand Coastal Policy Statement 2010 also requires avoidance of adverse effects on threatened and at risk species in the coastal environment. The project has been extensively refined over a number of years to primarily avoid adverse effects on surrounding waterbodies and wetlands, as well as threatened and at risk species, and the consent authorities can have confidence that the effects management hierarchy has been employed in every aspect of the project, not just in relation to freshwater ecosystems.

5.88 Adverse effects have first been avoided in the following ways:

- Refinement of the project area to provide setbacks from boundaries, waterbodies, wetlands;
- Avoidance of diversion of Collins Creek (this was initially proposed, but has since been removed from the application area);
- Avoiding night-time trucking past the Westland Petrel Colony and for residential amenity;
- Designing plant and buildings and operating parameters to avoid light spill towards the coast and adhering to the Australian wildlife light pollution guidelines where lighting is required on site to avoid effects on Westland Petrels;
- Avoiding mining adjacent to the coastal lagoon and wetland areas in key breeding periods for avian fauna;
- Removing slimes at source to avoid fine particles entering the settling pond system, enhancing the effectiveness of this system;
- Treating all water to a high standard before discharge to the environment, avoiding sedimentation and increased metal loadings in the receiving environments;
- Establishing substantial setbacks for the processing plant from residents and sensitive ecological areas, avoiding noise effects;

5.89 Adverse effects that cannot be avoided have been minimised in the following ways:

- Where water quality parameters cannot be achieved, water will go through a further treatment process (Canoe Creek infiltration basin), and any discharge will occur to a receiving environment which provides for significantly higher dilution to minimise the effects of the discharge of mine water;
- Where possible, planted natives within the mine area will be transplanted to planting/bunding areas to minimise habitat loss;

- Where mobilisation of metals cannot be avoided, the effects are minimised by applying hardness adjustments and changing the discharge location to a receiving environment capable of assimilating the change in water chemistry.

5.90 The hydrological assessment and ecological assessment both confirm that the adverse effects of the proposal have largely been avoided, and if not avoided, minimised, such that there is no need to employ any further steps in the effects management hierarchy. In addition, significant positive ecological benefits will arise from some of the mitigation measures proposed that will endure beyond the life of the mine.

Conclusion

5.91 On the basis of the above assessment, it is considered that the proposal overall will have no more than minor adverse effects on the environment, while having substantial positive effects in terms of economic growth and prosperity for the West Coast region as well as long term ecological benefits in terms of riparian and wetland planting.

6. Statutory Assessment

Objectives and Policies

6.1 Section 104 of the RMA requires that the relevant provisions of the relevant operative and/or proposed plan(s), or any other matter the consent authority considers relevant and reasonably necessary, to be considered when assessing an application. In this instance, the most relevant planning documents that require consideration are:

- The National Policy Statement for Freshwater Management 2020 (NPSFM)
- The New Zealand Coastal Policy Statement 2010 (CPS)
- The West Coast Regional Policy Statement (RPS)
- The West Coast Land and Water Plan
- The West Coast Regional Air Quality Plan
- The Grey District Plan 2005 (District Plan)
- Proposed Te Tai o Poutini Plan (Proposed Plan)

6.2 The relevant specific objectives and policies in the key planning documents have been identified and evaluated and the proposal is considered be entirely consistent with the relevant plans. The full assessment of the planning documents is attached as **Attachment V**.

6.3 The National Policy Statement for Freshwater Management 2020 (NPS-FM) provides a nationwide policy directive to manage freshwater in accordance with the fundamental concept of Te Mana o Te Wai. Considerable thought has been given by the applicant and the technical assessments to the appropriate management of freshwater to avoid adverse effects on, and to preserve the health of, freshwater in the receiving environment of this application site. The proposal gives effect to the hierarchy of obligations set out in Objective 2.1. The proposal is consistent with policies 6 and 13, which seek to promote restoration of wetlands and reversal of degradation of freshwater

ecosystems – this is achieved through the provision of substantial riparian planting and the creation of an additional wetland area which will increase habitat and provide for enhanced connectedness between existing water bodies. The proposal also seeks to protect river extent and values (Policy 7), and habitats of indigenous freshwater species (Policy 9) and trout (Policy 10). Overall the proposal is considered to manage water quantity and quality effects in a way that gives effect to Te Mana o Te Wai for the reasons outlined above.

6.4 The RPS was made operative in February 2020, and sets the framework for all of the regional and district plans which follow. Many of the regional and district plans on the West Coast were made operative many years before, and as the RPS is more current, weight should be attributed to the objectives and policies in this plan.

6.5 The RPS seeks to provide for resilient and sustainable communities (Objective 4.1), recognising the contribution of resource use to the local economy (Objective 5.1) enabling economic use and employment opportunities in a sustainable manner (Objective 4.2). The overarching policy intent of the RPS is to enable activities, provided that the adverse effects of the activities are avoided, remedied or mitigated. The proposal is considered to be entirely consistent with the RPS. As outlined above, the focus of the entire project has been to avoid adverse effects on the surrounding environment, and there are a suite of mitigation measures to ensure there are no significant adverse effects on water quality and quantity, residential amenity, natural character, indigenous biodiversity. The economic assessment highlights the regionally significant positive economic effects of the proposal.

6.6 The RPS seeks to give effect to the CPS through the Coastal Environment Chapter, and specifically notes that where the effects on the coastal environment arise from land use activities on the landward side of Mean High Water Springs, that these effects are managed through district and regional plans. In this respect, the proposal observes the earthworks setbacks of 50m from the open coastline and 20m from the coastal lagoon contained in the LWRP, and the effects of discharges will be managed through the implementation of the draft Water Management Plan.

6.7 The CPS contains objectives and policies which relate to the coastal environment, and the site has been identified in the Proposed Plan as being entirely within the coastal environment. The policy intent of the CPS as relevant to this application focuses on avoiding adverse effects on threatened and at risk indigenous vegetation and fauna, and protecting outstanding landscapes, coastal natural character, public access and recreation. The assessment of effects above and the accompanying technical reports confirm that adverse effects have been avoided and minimised as appropriate in the policy context of the CPS.

6.8 The Regional Land and Water Plan (RLWP) seeks to sustainably manage the West Coast's natural and physical resources. The objectives and policies relating to land management, surface water quality and quantity and groundwater are most relevant to the proposal. In general terms these policies seek to avoid, remedy or mitigate adverse effects on the life supporting capacity of

ecosystems, natural character and values of fresh water bodies, protection of existing water uses. The hydrological effects of the proposal and Water Management Plan set out methods to primarily avoid hydrological effects and the associated ecological effects. The ecological assessment confirms that adverse ecological effects are avoided, and are no more than minor in nature.

6.9 The Grey District Plan (the District Plan) was made operative in 2005. The District Plan has a particularly enabling policy framework and generally seeks to provide for activities, subject to avoiding, remedying or mitigating the adverse effects of such activities. The Rural Environmental Area covers every part of the Grey District outside of townships, and extractive activities are an anticipated part of the rural environment. I consider the proposal is consistent with the objectives and policies of the District Plan, including those relating to indigenous biodiversity, the coastal environment and landscapes.

6.10 The Regional Air Quality Plan is broken into chapters based on the nature of the air discharges. In this case, the relevant chapter is Chapter 7 – Dust. The objectives and policies of this chapter seek to protect human health and ecosystems, and avoid adverse effects associated with dust emissions. The proposal is consistent with these objectives and policies as a Dust Management Plan is proposed to be required as a condition of consent. This will ensure that during infrequent dry/windy periods, dust will be adequately managed such that human health, property, structures and ecosystems are protected.

6.11 The applicant intends to employ standard dust mitigation measures following an assessment of the detailed design of the mine to minimise any potential discharges of dust beyond the application site such that the effects are not deemed offensive or objectionable. It is intended that the permitted activity rule for dust emissions associated with earthworks is complied with at all times, and consent is only sought as a precautionary measure in case of unusual conditions which may result in a discharge occurring. Dust deposition monitoring at the boundary of the site will confirm compliance with consent conditions, ensuring effects are avoided.

6.12 The Te Tai o Poutini Plan was notified in August 2022, and some rules with immediate legal effect apply to this proposal. At the time of writing this AEE, the submission process had not yet been completed (further submissions had not been called for). The applicant has made an extensive submission on a number of areas of the plan, along with a significant number of other submissions. It is not clear which provisions will be deemed operative following the close of further submissions, and as the Proposed Plan has not been subject to independent decision making, limited weighting should be applied to the objectives and policies in this document. However it is also recognised that as the Grey District Plan was made operative in 2005, and does not give effect to higher order documents, including the National Policy Statement for Freshwater Management, the New Zealand Coastal Policy Statement 2010 and the West Coast Regional Policy Statement 2020. Where provisions are significantly out of date, or where the Proposed Plan more appropriately reflect higher order documents, more weight should be applied.

6.13 The West Coast Regional Policy Statement gives effect to the New Zealand Coastal Policy Statement but predates the NPSFM, and needs to be considered in this context. The key policy direction in both the National Policy Statement for Freshwater Management and the New Zealand Coastal Policy Statement is to avoid adverse effects on natural character, wetland and river extent and values, water quality, and threatened and at risk indigenous species in waterbodies and the coastal environment. The proposal is considered to be consistent with the higher order document policy direction, as these adverse effects have been avoided through project design, water management and erosion and sediment control methods, and operational parameters.

6.14 For completeness it is noted that the previous application for mining this area was considered as a non-complying activity, and the NESFM has now been revised to provide a discretionary activity pathway specifically for mining activities within and adjacent to wetlands. The application of this regulation is discussed in further detail below. Accordingly, the section 104D "gateway" test no longer applies to this application.

Regulation 45D – National Environmental Standards for Freshwater 2020

6.15 Regulation 45D of the freshwater regulations restrict the grant of resource consent unless the consent authority has first;

- satisfied itself that the extraction of the minerals will provide significant national or regional benefits; and
- satisfied itself that there is a functional need for the extraction of minerals and ancillary activities in that location; and
- applied the effects management hierarchy.

6.16 The discussion of positive effects above and the Economic Assessment (**Attachment R**) demonstrates the significant economic and social benefits this mineral extraction activity would have for the Grey District and the wider West Coast region. The consent authority can be satisfied on this basis that this activity will have significant regional benefits.

6.17 The minerals extraction activities have a functional need to occur within the location specified in the application, which includes earthworks within 100m of a wetland and discharge of water which may enter wetlands. The heavy mineral deposits are located underneath and adjacent to the surrounding wetlands, and the applicant has limited operations and imposed setbacks and sterilised mineral resources as a result, but must maximise the extraction area within environmentally appropriate limits. The water management has been designed to avoid the operational impacts on wetlands as far as practically possible, and avoid discharges to natural inland wetlands except where to achieve water balance within these environments.

6.18 The applicant has carefully designed the activities to have minimal impact on the surrounding wetlands, and has limited operations in extent and designed water management to primarily avoid effects on natural inland wetlands. The functional need to locate the ancillary activities,

such as water management infrastructure is inextricably linked to the application of the effects management hierarchy, especially with respect to ecological and hydrological effects. The water management infrastructure has been located at the furthest downstream extent of the site, enabling all mine water to be captured and treated to a high degree before discharge to the receiving environment.

6.19 The application of the effects management hierarchy has been discussed in Section 5 of this report. The applicant has applied the effects management to every aspect of its operations, not just those which may impact surrounding wetlands and waterbodies.

6.20 The technical assessments demonstrate that the consent authority can be satisfied that the three tests set out in Regulation 45D have been met (significant regional benefit, functional need, and application of the effects management hierarchy), and the proposal is a discretionary activity under this regulation.

Section 107, RMA

6.21 Section 107 of the RMA restricts a consent authority from granting a discharge permit for discharge to water or land in circumstances where the contaminant will enter water if it would result in the following outcomes (after reasonable mixing):

- the production of any conspicuous oil or grease films, scums or foams, or floatable or suspended materials:
- any conspicuous change in the colour or visual clarity:
- any emission of objectionable odour:
- the rendering of fresh water unsuitable for consumption by farm animals:
- any significant adverse effects on aquatic life.

6.22 The hydrological assessment and ecological impact assessment both confirm that the proposed activity will not result in these outcomes, and therefore there are no restrictions on the grant of consent under this section of the Act. A condition of consent has been volunteered to this effect.

Section 95, RMA

6.23 Section 95A of the RMA states that a consent authority must publicly notify an application if:

- The council decides under section 95D that the activity will have or is likely to have adverse effects on the environment that are more than minor; or
- If the applicant requests it; or
- If a rule or national environmental standard requires it; or
- If special circumstances exist in relation to the application.

6.24 The applicant has recognised the significant community interest in the proposal, and despite the application not meeting the tests for public notification, formally requests that the proposal be **publicly notified**.

Consultation

6.25 TiGa has undertaken consultation with a number of neighbours and other parties in relation to the proposal. To date this has included a letter mailed to immediate neighbours and a meeting, a meeting held with residents and interested parties at the Barrytown Hall, and consultation and engagement with Te Rūnanga o Ngāti Waewae, Waka Kotahi, Department of Conservation, the West Coast Penguin Trust, and community representatives. Consultation and engagement is ongoing and the applicant is committed to establishing an ongoing dialogue with interested parties throughout the application process, as appropriate.

Purpose and Principles of the Resource Management Act

6.26 The purpose of the RMA, as set out under section 5 (2) is to promote the sustainable management of natural and physical resources. The relevant matters in Sections 6, 7 and 8 of the RMA also require consideration.

6.27 Section 5 provides the purpose of the Act, which is sustainable management of natural and physical resources. Sustainable management is then defined as the following:

"sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—

- *sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
- *safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
- *avoiding, remedying, or mitigating any adverse effects of activities on the environment."*

6.28 Minerals are not required to be sustainably managed, however the natural and physical resources associated with the mining of minerals are.

6.29 This application demonstrates, through the assessment of environmental effects, that it is consistent with the purpose of the RMA (1991) as outlined in Section 5 above. This application proposes measures to avoid, remedy or mitigate any actual or potential adverse effects that may arise as a result of the proposed activity.

6.30 The proposed mineral sands activity will have positive effects in the Grey District and wider West Coast region, including employment and associated flow on benefits.

6.31 Section 6 of the RMA (1991) outlines matters of national importance that all persons shall recognise and provide for when exercising functions and powers under the Act in relation to managing the use, development and protection of natural and physical resources.

6.32 The following matters are considered relevant to this application:

(a) the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use and development.

6.33 The proposed mineral sands activity has been assessed as having no more than minor effects on the coastal environment and imposes adequate setbacks from wetlands and rivers. As such the natural character of the area is considered to be protected from inappropriate use and development.

6.34 Section 7 outlines other matters that all persons exercising powers and functions under the RMA (1991) shall have particular regard to. The following matters have been identified as relevant to this application:

(b) the efficient use and development of natural and physical resources:

(c) the maintenance and enhancement of amenity values:

(d) intrinsic value of ecosystems

(f) maintenance and enhancement of the quality of the environment:

6.35 On the whole, the proposal is considered to efficiently use the natural (land) resource of the site. The site is already developed to a highly modified state through farming activity, the mining activity will be of limited duration and the site will be returned to improved pasture allowing for ongoing productive farming. The extraction of mineral sands will provide significant economic benefits derived from the use of the land for this purpose. The assessment of effects outlines how the operation will avoid, remedy and mitigate adverse effects on the surrounding receiving environments, protecting the intrinsic value of ecosystems. The proposal will have minor or less than minor effects on amenity values, and minor effects on the landscape. The quality of the environment will be maintained during the activity, and will be enhanced by extensive riparian and coastal vegetation and land recontouring which will improve farm runoff going forward. The proposal is therefore considered to be consistent with section 7 of the RMA (1991).

6.36 Section 8 outlines the requirements for the principles of the Treaty of Waitangi to be taken into account when exercising functions under the act. Broadly the principles of the Treaty of Waitangi can be defined as:

- Partnership
- Protection
- Participation

6.37 The relevant statutory planning documents that govern this proposed activity have been compiled through a robust public notification process with input from relevant iwi in each of the plans, and agencies representing iwi have provided their written approval to this proposal. Therefore, it is considered that the application is consistent with section 8 of the RMA (1991).

6.38 In summary, this application demonstrates that Part 2 of the RMA (1991) has been given effect to when considering the proposed application. Specific reference is provided throughout the application to the relevant sections and subsections where necessary. The proposal is therefore consistent with the purpose and principles of the Act and accords with the definition of sustainable management.

Other relevant matters

Minerals and Petroleum Resource Strategy in November 2019

6.39 The New Zealand Government published a Minerals and Petroleum Resource Strategy in November 2019 (the Strategy). The Strategy seeks to support New Zealand's transition to a carbon neutral economy by 2050, and recognises the importance of titanium in relation to clean-tech uses such as electric vehicles.

6.40 The activity involves the extraction of minerals which will be used for clean/green technologies which could support New Zealand's transition to a carbon neutral economy, includes a significant number of mitigation measures and has provided substantial information to ensure that the potential effects on the environment, ecosystems and biodiversity will be minor in nature, which is consistent with this Strategy.

Te Whanaketanga

6.41 Development West Coast has recently published "Te Whanaketanga Te Tai Poutini West Coast Strategy 2050" (Te Whanaketanga). The document states:

> *"Te Tai Poutini has an abundance of natural resources that form the backbone of our regional economy. To secure our long term economic prosperity and resilience, we need to actively support the growth of emerging industries and strengthen our economic drivers by focusing on adding value. By focusing on a more circular economic approach, we are able to increase the value of our products and deliver better outcomes for the environment. Our economic activity must actively protect and give back to the natural environment that supports our prosperity. Te Tai Poutini has untapped potential in the green economy space – from the unrealised value of our natural resources to the knowledge economy potential that exists from our strengths in conservation and biodiversity restoration." In addition, the strategy seeks "Enabled and connected resilient and sustainable fit for purpose infrastructure network (transport, energy and digital) that supports increased productivity, strengthens our resilience, and provides growth opportunities."*

6.42 The mineral sands industry is an emerging industry on the West Coast, and it could have significance in terms of the retention and revitalisation of port infrastructure. The proposed

mine is part of a wider mining permit area, and the applicant has intentions to mine other parts of the permit as resources and land access dictates. There are significant growth opportunities in the local mining sector which have significant regional economic benefits as outlined in the Economic Assessment (**Attachment R**). The company's intentions are consistent with the aspirations of Te Whanaketanga, which include investigating the construction of a secondary mineral separation plant which would increase the number of people employed and add significant value to the HMC before it is exported.

Iwi management plans

6.43 There are no relevant iwi management plans relating to this area. A Te Rūnanga o Ngāti Waewae Pounamu Management Plan is in place, which solely deals with the management of pounamu in the takiwā of Ngāti Waewae. Pounamu will not be extracted during the mineral sand process, and will be returned to the pit as oversized material and returned directly to the pit.

7. Conclusion

8.1 Tiga are seeking resource consent from both WCRC and GDC for a mineral sands operation at Coast Road, Barrytown. The proposed activity includes the excavation of sand ore and processing to obtain a Heavy Mineral Concentrate. Extracted Heavy Mineral Concentrate will be transported by truck either north or south to a port or rail load out facilities. Consent is sought for a term of 12 years.

8.2 TiGa has consulted with a number of parties who are potentially affected by or have an interest in the proposal. TiGa requests the application be publicly notified, due to the clear public interest in the application.

8.3 We consider with the mitigation proposed for the activity as outlined in this application and the imposition of appropriate conditions of consent the effects of the proposed activity will be adequately addressed, such that they are no more than minor in nature and relevant statutory tests have been met. Accordingly, consent is able to be granted for the proposal.

Attachment A: Records of Title and Consent Notice

Attachment B: Site Plan

Attachment C: Archaeological Site Records

Attachment D: Nikau Deer Farm Ltd Certificate of Compliance – Farm Building

Attachment E: Building Plans

Attachment F: Process, Layout & Plant Diagrams

Attachment G: Integrated Transport Assessment – Novogroup Ltd

Attachment H: Acoustic Assessment | Noise Management Plan – Marshall Day Ltd

Attachment I: Hydrological Assessment | Water Management Plan – Kōmanawa Solutions Ltd

Attachment J: Erosion and Sediment Control Plan – Ridley Dunphy Environmental Ltd

Attachment K: Dust Management Plan – TiGa Minerals and Metals Ltd

Attachment L: Fuel Storage Design

Attachment M: Ecological Impact Assessment, Avian Management Plan and Wetland and Riparian Planting Plan – Ecological Solutions Ltd

Attachment M: Ecological Assessment | Avian Management Plan | Wetland and Riparian Planting Plan – EcoLogical Solutions

Attachment N: Landscape Assessment | Graphic Supplement – Glasson Huxtable Landscape Architects Ltd

Attachment O: Rehabilitation Plan – TiGa Minerals and Metals Ltd

Attachment P: Proposed Conditions of Consent

Attachment Q: Compliance Assessment of Relevant Planning Documents

Attachment R: Economic Assessment – Sense Partners Ltd

Attachment S: Geotechnical Report - RDCL

Attachment T: Radiation Assessment – IHC Robbins

Attachment U: Radiation Dosimeter Results – Radiation Protection Services Ltd

Attachment V: Objectives and Policies Assessment