

7. MANAGEMENT AND MONITORING OF ENVIRONMENTAL EFFECTS

7.1 APPROACH TAKEN

Section 6 of this AEE provides an assessment of the actual and potential effects of the WNP, which is based on

- > Engagement with iwi regarding cultural effects; and
- > The various technical assessments commissioned by OGNZL.

Many of the technical assessments have recommended the implementation of measures to avoid, remedy or mitigate potential adverse effects on the environment. These recommendations have shaped the development of a robust suite of proposed conditions which is provided in **Part D** of these application documents. Notably many of these conditions are similar to those which are already adhered to by OGNZL under approvals already held for mining activities at Waihi.

OGNZL will also undertake the WNP in accordance with a number of management plans (provided in **Part H** of these application documents) to ensure that measures to properly manage effects and minimise potential adverse effects are employed.

OGNZL recognises that it will not be possible to completely avoid all potential environmental effects associated with the WNP. As such, there will be residual ecological effects requiring further management, including effects associated with the removal of indigenous vegetation (including from within an SNA), the potential loss of small areas of lizard habitat and there may be effects on native frogs that are difficult to quantify. In addition, there will be residual adverse effects associated with the unavoidable loss of a warm spring, and potential (but unlikely) effects on flow regimes within certain Natural State Water Bodies and natural inland wetlands in response to mine dewatering with the commensurate potential for reduction of stream extent and ecological functioning.

These matters require offsetting or compensation. OGNZL is therefore proposing a series of measures to manage the residual adverse effects on terrestrial, wetland and freshwater ecology values in and around Waihi and the Coromandel Forest Park. These measures have been designed to provide substantive positive biodiversity effects and will achieve a long-term net gain in ecological values within the Region. It should be noted that the offsetting and compensation of effects is independent of the Waihi North Biodiversity Project – an additional \$8.4 million predator control and ecological enhancement project intended to achieve long-term (inter-generational) positive ecological outcomes for the area.



Overall, OGNZL and its expert advisers consider that the WNP can be undertaken in a manner that will appropriately address any unavoidable adverse environmental effects. Where residual effects remain, they will be managed to achieve an overall net gain in ecological values within the Waikato Region, while also achieving the purpose of the Act – to deliver a project with significant regional and national benefits.

7.2 MEASURES PROPOSED

The key measures proposed by OGNZL to manage identified effects are set out in Table 7-1 below. They include:

- > Ongoing engagement of iwi, including the establishment of a dedicated project forum;
- > Precautionary measures to mitigate, offset and compensate for effects on Archey's frogs, including:
 - > The implementation of firm vibration limits above WUG;
 - > Intensive pest control over an area of at least 632 hectares in the Wharekirauponga Pest Management Area; and
 - > Funding to support research into the efficacy of pest control regimes for frog recovery and surveys of the broader Coromandel Peninsula to better understand the distribution and habitat preferences of native frogs;
- > Adherence to multidisciplinary siting protocols to guide the selection of drill sites, pumping test sites and sites suitable for the construction of ventilation shafts;
- > Employment of measures to minimise the effects of the construction of drill sites, pumping test sites, and ventilation easé on flora and fauna and to adhere to accepted practices for the relocation of animals and plants that have significant ecological value;
- > Limits on the generation of noise, vibration and light spill;
- > Limits on discharges to air and management protocols for protecting amenity from the effects of dust and discharges associated with the processing of ore;
- > Provision of planting and screening to ensure that visual amenity is protected and that the effect of the project on landscape values is suitably mitigated;
- > Upgrades to the existing road network;
- > Implementation of, and adherence to a WUG Water Management Plan which details how potential effects on Natural State Water Bodies and natural inland wetlands above and in close proximity to the WUG will be managed and monitored;



- > Updates to the existing Dewatering and Settlement Monitoring and Management Plan which details how potential effects associated with dewatering and settlement in other areas of the proposed WNP works will be managed and monitored;
- > Implementation of best practice erosion and sediment control measures during site establishment works;
- > Separation and collection of clean and mine impacted water and ensuring each is subject to appropriate treatment consistent with achieving the best practicable option;
- > Diversion of clean water around the footprint of disturbed areas;
- > Management of direct effects of important fish species and offsetting all residual effects on aquatic ecology;
- > Replacement planting for loss of vegetated areas (including within an SNA);
- > Preparing and adhering to a number of environmental management plans, including management plans for managing effects on bats, birds and lizards; and
- > A rehabilitation and closure plan secured by rehabilitation and capitalisation bonds.

In addition to these management measures, OGNZL will provide further compensation to potentially affected landowners by:

- > Continuation and extension of an existing Amenity Effect Programme which makes six monthly payments to the owners of occupied residences affected by vibration based on the number and level of vibration and number of blast events they experience; and
- > Offering an ex-gratia payment to the registered proprietor of any residence the Wharekirauponga Access Tunnel passes directly beneath which is equal to 5% of the that property's market value.



Table 7-1: Summary of Key Management and Monitoring Measures for the WNP

Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action	Additional Measures Proposed by OGNZL
Cultural Matters			
Potential effects on matters of importance to the iwi of Waihi, and their relationship with ancestral lands and water.	Establishment of the Iwi Advisory Group Involvement of the Iwi Advisory Group in the development, implementation and monitoring of a suite of environmental management plans Development and implementation of a Cultural Practices Plan Development and implementation of a Cultural Awareness Programme Identification and promotion of employment and training opportunities Application of and accidental discovery protocol and other protocols and practices as described in this Table under the Heritage heading.	Development of cultural monitoring indicators Inclusion of tangata whenua indicators in the Social Impact Management Plan and the Waihi Skills Development and Training Action Plan	None
Landscape, Natural Character and Visual Amenity			
Loss of a single warm spring in the Coromandel Forest Park with low ecological value.	See Surface Water section below.	See Surface Water section below.	See Surface Water section below.
Visibility of ventilation easé and associated temporary activities from within the Coromandel Forest Park and Te Wharekirauponga Walk.	Sensitive design of temporary buildings and structures including neutral colours which relate to their natural setting. Use of site selection protocols to ensure the shaft raises and associated temporary activities are not highly visible from Te Wharekirauponga Walk.	Rehabilitation of disturbed areas to ensure reestablishment of nature conservation and recreation values.	None.
Alteration of existing landform at the Willows SFA and temporary landscape character and visual effects.	Implement additional screen planting to screen the Willows SFA from neighbouring properties. Retain existing shelterbelts, trees and hedges at the Willows SFA outside disturbed areas where practicable. Vegetate or seed bunds as soon as practicable after construction. Finish exposed batters on all access roads with rounded edges to integrate within the adjoining landform and then scarify the exposed soil on these batters and seed with pasture and / or native vegetation to assimilate within the surrounding land cover. Seed proposed earth mounding associated with the explosive magazine as soon as practicable after construction to reduce visibility of buildings. Minimise lighting throughout the project, as far as practicable, so it meets the permitted standards of the zone, with the exception of any streetlight installed for safety purposes at the intersection between the public section of Willows Road and Area 2 insofar as it causes light spill on the public road.	None.	None.
Landscape effects during establishment of the GOP through modification of round elevated landforms (Gladstone Hill and the northern flank of Winner Hill).	Where practicable, work from east to west to ensure any activity associated with the removal of landform remains concealed from wider views to the south-east of Waihi. Undertake landscape planting in accordance with the ELMP-WA.	None.	None.



Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action	Additional Measures Proposed by OGNZL
Gradual modification of a localised rural area within the Martha Mineral Zone due to the construction of the NRS.	Screen planting along the periphery and margins of Golden Valley Road. Temporary topsoil stockpiles will be developed along the margins of Golden Valley Road which will be seeded in grass and enclose the area where the NRS is formed. Reinstatement of riparian and terrestrial vegetation along the margins of diverted streams and reinforcing existing vegetation along the Ohinemuri River. At completion, much of the rock will be reused and the resultant landform will be recontoured and grassed to support adjoining rural landuse through rehabilitation. The Northern Uphill Diversion Drain is to be retained permanently as it will provide the outlet channel for TSF2 in closure. The NRS Collection Pond will be converted to wetlands and will be rehabilitated. Restoration, riparian and wetland edge planting, and provision of recreational trails will be undertaken at closure to mitigate any long term effects.	None.	None.
Localised landscape effects within the rural working area associated with the development of TSF3.	Temporary seeding of stockpiles with pasture to resemble adjoining rural areas during operation. Progressive rehabilitation of the TSF3 embankment surface as areas of a practical working size become available. Enhancement of native vegetation and habitats within the adjoining SNA and riparian planting along the Ruahorehore Stream and the Ohinemuri River. Reinstatement of pasture, restoration, riparian and wetland edge planting, and provision of recreational trails will be undertaken at closure to mitigate any long-term effects.	None.	None.
Recreation			
Effects of the ventilation easé on tramping and pig hunting in the Coromandel Forest Park during construction and operation.	No drilling or helicopter activity to service drill sites within 400 m of the Wharekirauponga Track from 1 December to 28 February (inclusive), when the track is open. Provide clear signage or markers around ventilation easé sites to avoid members of the public accidentally accessing the site during construction. Track notices to be placed at the entrance of Te Wharekirauponga Track and at the Kauaeranga Visitor Centre prior to the commencement of construction activities. Aircraft land / hovering zones are to be maintained to ensure public safety. Aircraft idle times on the ground are kept to a practicable minimum. Locate ventilation easé away from tramway formations.	None.	None.
The GOP will displace mountain biking from Winner Hill and affect access to the Black Hill Motoross Track.	Subject to agreement of the Waihi Mountain Bike Club and HDC, a MOU to be established between these parties and OGNZL pertaining to the provision of land currently owned by OGNZL and funding to support the reestablishment of a mountain bike trail. (A MOU is already in place for the motocross track).	None.	None.



Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action	Additional Measures Proposed by OGNZL
The NRS will affect a small section of the Nugget annual multisport events, but it is on private land, so the effect is not considered adverse.	OGNZL will engage with organisers about new development opportunities.	None.	None.
Lighting			
Lighting impacts on neighbours.	Except for the street lighting installed for safety purposes at the intersection between the public section of Willows Road and Willows SFA, shade night lighting installed so that the level of light measured at the boundary of any site not owned by OGNZL is no greater than 8.0 lux, unless there is an agreement with that landowner. Where luminaires are visible from external locations or are high output floodlights, they will be: > Installed such that their light producing faces are horizontal to the ground; > Aimed away from external locations; i.e. into the site; or > Of luminous intensity not exceeding the limits set out in AS/NZS 4282 for the applicable environmental zone.	None.	None.
Lighting impacts on wildlife	Lighting within the Coromandel Forest Park will be designed and installed in accordance with the National Light Pollution Guidelines for Wildlife published by the Australian Government’s Department of Climate Change, Energy, the Environment and Water, version 2.0, May 2023.	None.	None.
Vibration			
Effects of vibration on amenity values during development of the WUG Dual Tunnel and during development of the WUG.	None required	None required.	None.
Effects of vibration on fauna in the Coromandel Forest Park.	For all blasting within the Coromandel Forest Park associated with the establishment of ventilation shafts and underground tunnels the peak particle velocity (vector sum) at the surface shall be no more than 15 mm/s for 95% of blast events.	Vibration monitoring is proposed.	See terrestrial ecology section below.
Effects of vibration on amenity values.	For all blasting associated with the establishment of portals and underground tunnels, vibration limits measured at the boundary of the nearest non-company owned property of: > Vibration at the surface must be no more than 5 mm/s for 95% of blast events between the hours of 0700 and 2000, Monday to Saturday (excluding public holidays); and > Vibration at the surface must be no more than 1 mm/s for 95% of blast events at all other times. For all surface blasting at the GOP and borrow areas, vibration limits measured at the boundary of the nearest non-company owned property of: > Vibration at the surface must be no more than 5 mm/s for 95% of blast events between the hours of 0700 and 1800, Monday to Saturday (excluding public holidays); and > Vibration at the surface must be no more than 1 mm/s for 95% of blast events at all other times; and > A maximum overpressure limit of 120 dBL at all times.	Monitoring will be undertaken as required by the Vibration Management Plan. Requirement to monitor impulsive vibration from all blast events. Deployment of a roving monitor to record vibrations in locations where complaints regarding vibration have been made.	Continuation of the Amenity Effect Programme which has been used on previous OGNZL projects in Waihi. Ex-gratia payments offered to the proprietors of residences beneath which the WUG Access Tunnel directly passes.



Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action	Additional Measures Proposed by OGNZL
	Preparation and implementation of a certified Vibration Management Plan which sets out how the impacts of blasting on the community will be minimised to the extent practicable. Monitoring results will be made available to the public on the OGNZL website. Establishment of a complaints procedure.		
Effects of vibration on property	In addition to the measures identified above to address effects on amenity, structural condition surveys will be undertaken for all non-OGNZL owned permanent dwellings and associated structures within 50 m of the Wharekirauponga Access Tunnel. Upon receipt of a complaint about property damage, OGNZL will respond to that complaint in accordance with protocols utilised for existing blasting activities by OGNZL in Waihi.	Complete structural condition surveys for at least five representative properties (non-company owned) located in the vicinity of vibration monitors and at ‘control’ properties removed from the influence of any potential vibration effects from mining. .	Implementation of ‘we break, we pay’ property damage policy.
Noise			
Excessive noise creating nuisance impacts.	Compliance with NZS6803:1999 for construction noise. Compliance with the following operational noise limits at neighbouring properties not owned by OGNZL: > 0700 - 2200, Monday to Saturday: 50 dB L_{Aeq} > All other times: 40 dB L_{Aeq} > 2200 - 0700 (the following day): 70 dB L_{AFmax} Preparation and implementation of a CNMP and ONMP for each Area. Establishment of a complaints register.	Noise monitoring at weekly intervals during construction, and six-monthly during operation. Monitoring requirements are to be detailed in the CNMP and ONMP.	None.
Transport			
Effects on the safe and efficient operation of the Willows Road / SH25 intersection.	Upgrade a section of Willows Road and its intersection with SH25 in consultation with Waka Kotahi NZTA. The upgrade will include: > Provide a right turn bay on SH25 meeting the minimum requirements of the Waka Kotahi Manual of Traffic Signs and Markings Figure 3.25 and meeting Waka Kotahi NZTA requirements for forward visibility; and > Widen the left turn into Willows Road shoulder to 3.0 m to provide a left turn lane to meet the requirements of GRD Part 4a, Figure 8.4 for 100 km/h design speed using maximum deceleration rate; unless NZTA advise that one or both upgrades are not required.	None.	None.
Increased traffic on Willows Road.	The development of the Wharekirauponga Access Tunnel and bussing of underground mine shift workers to Area 2 will minimise to a significant extent the volume of traffic required to enter and exit Area 2 using Willows Road.	Monitor the performance of Willows Road pavement over the project duration and maintain as necessary.	None.



Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action	Additional Measures Proposed by OGNZL
	Further mitigation will include upgrading Willows Road in consultation with HDC including: > Mark a road centreline over full length of road, in particular those sections with limited forward visibility i.e. at curves in the alignment; > Design and construct curve seal widening where necessary to ensure the design vehicle is able to negotiate all curves within its lane; > Upgrade the single lane bridge approaches in accordance with the Manual of Traffic Signs and Markings for single lane bridge approaches and controls (which will require some minor widening); > Constructing a 6.0m wide sealed road extension between the end of the existing two-way section of the road and the proposed site access in accordance with the HDC Engineering Manual; > Installing a roadside barrier system on both sides of the road at the culvert located 0.4 km from the Willows Road / SH 25 intersection (labelled no. 40) or, alternative safety measures installed to the satisfaction of the HDC's Transportation Manager; and > Constructing a turning head at the end of the northern end of the existing two-lane section or at the proposed access location to allow the public to turn around.		
Transport impacts during construction and operation of GOP, NRS and TSF3.	No road upgrades needed. Develop and implement a CTMP which describes how traffic to and from the Mine Site at Waihi will be managed to protect public safety and minimise delays to road users. This includes an adaptive management approach to monitoring and managing traffic distribution and performance at the intersection of intersection of Baxter Road and SH2 during periods of high traffic volume.	Monitoring of traffic distribution and performance at the intersection of Baxter Road and SH2 during periods of high traffic volume.	None.
Deterioration of the existing surface of Baxter Road.	Reimburse HDC for cost of road maintenance on Baxter Road during construction period. Return Baxter Road to the pavement condition agreed with HDC at the completion of construction works at Area 5, 6 and 7.	Record the condition of the pavement and bridge on Baxter Road prior to the commencement of and following the completion of construction activities in either Areas 5, 6 or 7.	None.
Parking in public areas due to inadequate parking facilities.	OGNZL to provide sufficient parking to accommodate all expected staff, contractors and visitors entering the Mine Site at Waihi.	Develop and communicate a parking plan with staff, contractors, and visitors.	None.
Social Impacts			
Increased demand for workforce and associated accommodation requirements	OGNZL to develop and implement a Social Impact Management Plan to assess social effects of mining activities and to identify and monitor social indicators and trends.	Continue to review and update the plan to ensure consideration of the WNP and inclusion of any additional monitoring requirements relevant to the project.	None.



Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action	Additional Measures Proposed by OGNZL
Dewatering and Ground Settlement			
Effects associated with the abstraction of groundwater / dewatering of the WUG.	Implement the WUG Water Management Plan (refer to Part H). If / when effects develop, implement measures required by the WUG Water Management Plan. These may include: > Provision of supplementary water to maintain stream flows and / or wetlands; > Grouting to seal cracks / fissures within the WUG; and > Reinjecting WUG groundwater into affected overlying aquifers. Periodic reporting to WRC and the Expert Panel on tunnel progress, key monitoring data and the effectiveness of the grouting and other mitigation employed to manage groundwater ingress.	Baseline water level monitoring at Natural State Water Bodies and control sites. Baseline water level monitoring at wetlands and one control wetland. Installation of near stream piezometers adjacent to the Wharekirauponga Stream to monitor shallow groundwater.	None.
Ground settlement due to the WUG.	No measures which are additional to those required to manage dewatering and effects on surface water.	None.	None.
Discharge of contaminated groundwater into the environment due to the WUG	Groundwater which impacts on workings will be collected and either used underground for drilling or pipe to the WTP for treatment.	None.	None.
Effects on ground settlement: > During construction of the Willows Access Tunnel; > During construction of the Wharekirauponga Access Tunnel; and > From relocating the existing Favona Portal and associated decline to accommodate GOP and during mining activities.	Update the existing Dewatering and Settlement Monitoring and Management Plan, which sets out how OGNZL manage and monitor effects of its activities on land settlement and the groundwater hydraulic regime. Updates will include additional settlement monitoring to reflect the proposed activities.	Extension of town settlement monitoring networks to the privately-owned dwellings located at the end of Willows Road and Highland Road. The existing Dewatering and Settlement Monitoring Plan will be updated to capture additional groundwater level and surface tilt monitoring locations recommended in the Ground Settlement Assessment prepared by EGL (2025f) provided in Part B of these application documents.	Implementation of the ‘we break, we pay’ property damage policy.
Geotechnical Matters			
Instability of the walls of the GOP	The conditions require adherence to a defined pit rim footprint. Detailed design of the pit will be undertaken such that the pit is safe and stable within that footprint, noting that the internal stability of the pit does not present a risk to land not owned by OGNZL.	None.	None.
Natural Hazards			



Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action	Additional Measures Proposed by OGNZL
GOP TSF or TSF3 dam breach.	Design, construct, operate and maintain the GOP TSF and TSF3 in general accordance with NZSOLD Dam Safety Guidelines and ANCOLD Guidelines on Tailings Dams. This will include peer review of the detailed design and construction, as required, by an appropriately qualified independent party. Obtain building consent for TSF3 classified as large dams in the Building Act 2004 (“Building Act”). Maintain a minimum freeboard above all material in GOP TSF and TSF3 sufficient to impound runoff from PMP event without overtopping, plus 1.0 m. Update the Waihi Operation Emergency Management Plan, which covers the entire site, to reflect the emergency requirements for GOP TSF and TSF3.	Monitoring in accordance with the requirements for a High PIC dam for the TSF3 and a Low PIC dam for the GOP TSF (as per NZSOLD).	None.
NRS Collection Pond and TSF3 Collection Ponds S6 and S7 failure.	Design, construct, operate and maintain the NRS Collection Pond and TSF3 Collection Ponds S6 and S7 in general accordance with NZSOLD Dam Safety Guidelines. This will include peer review of the detailed design and construction, as required by an appropriately qualified independent party. Obtain building consent for the NRS Collection Pond and TSF3 Collection Ponds S6 and S7 classified as a large dams in the Building Act.	Monitoring in accordance with the requirements for the NRS Collection Pond as a Low PIC dam, and the TSF3 Collection Ponds S6 and S7 as Low or Medium PIC dams (as per NZSOLD).	None.
Subsidence at the Kenny Street carpark.	The design of the carpark avoids the high hazard zone. The associated bus stop, where staff will congregate, is located within the low hazard zone. The public will be excluded from the car parking area, OGNZL will prepare a Kenny Street Carpark Subsidence Hazard Zone Management Plan. The Plan will include monitoring, trigger levels, warning systems, Standard Operating Procedures and emergency action plans to ensure the safety of people.	Monitoring to detect and any ground movement in the car park or surrounding area, in accordance with the Kenny Street Carpark Subsidence Hazard Zone Management Plan.	None.
Geochemistry			
Effects on groundwater / surface water from the placement of rock material in the WRS and NRS.	The WRS and NRS have been designed and will be constructed and operated in a manner consistent with that which currently occurs at OGNZL’s existing facilities, and which has been demonstrated to have been successful for managing and monitoring potential effects. The design of each rock stack will include a range of measures to encapsulate and / or neutralise PAF material, and to contain, collect and treat seepage and runoff from PAF rock. Peer review of the detailed design is required by an appropriately qualified independent party. A Monitoring and Management Plan will be prepared and implemented for each rock stack to monitor and assess the effects of the rock stack on the land, ground and groundwater resources and to trigger the implementation of contingency measures where necessary. For the WRS, it will include: > Details of groundwater monitoring to detect seepage escaping the underdrainage system; > Details of the scan monitoring in both shallow and deep aquifer systems, of water levels, pH, and conductivity; > Trigger levels for pH, conductivity and water levels to provide an early warning indicator of potential changes of groundwater quality as a result of the activities associated with the WRS; and	Monitoring details will be included in each Monitoring and Management Plan in accordance with current practice at OGNZL’s existing Waihi TSFs.	None.



Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action	Additional Measures Proposed by OGNZL
	> A contingency plan in the event a trigger level is breached over two consecutive readings, and which is sufficient to assess the source of the change, and to determine what, if any, mitigation measures are needed. For the NRS, it will include the matters set out above, and: > A Risk Management Plan, as defined in the Australian / New Zealand Standards for Risk Management (AS/NZS 4360:1999); > Details of the proposed structural integrity monitoring programme for the embankment of NRS; and > Measurement and monitoring of the liner and cover system integrity in order to verify the “as built” structure is achieving predicted design performance objectives.		
Effects on soil and groundwater from stockpiling overburden associated with TSF3.	Continued implementation of proven overburden management approach, including amending overburden placed in temporary stockpiles with limestones.	None.	None.
Discharge of contaminants to groundwater and surface water associated with TSF3, impacting upon water quality and potentially affecting users of water.	TSF3 has been designed and will be constructed and operated in a manner consistent with that which currently occurs at OGNZL’s existing facilities, and which has been demonstrated to have been successful for managing and monitoring potential effects. Further peer review of the detailed design is required by an appropriately qualified independent party. This includes a range of design elements to encapsulate and / or neutralise PAF material, and to contain, collect and treat seepage and runoff from PAF rock and tailings. No additional mitigation measures are expected to be required. However, a TSF3 Monitoring and Management Plan will be prepared and implemented to monitor the effects of TSF3 on the land, ground and groundwater resources and to trigger the implementation of contingency measures where necessary. It includes: > A Risk Management Plan, as defined in the Australian / New Zealand Standards for Risk Management (AS/NZS 4360:1999); > A structural integrity monitoring programme for the embankment of TSF3 which conforms with the requirements of the current New Zealand Dam Safety Guidelines; > Groundwater monitoring to detect seepage escaping the underdrainage system; and > Trigger levels for pH, conductivity and water levels to provide an early warning indicator of potential changes of groundwater quality as a result of the activities associated with TSF3.	Monitoring details will be included in the TSF3 Monitoring and Management Plan in accordance with current practice at OGNZL’s existing Waihi TSFs.	None.
Effects on groundwater / surface water from placement of rock material to GOP during the development of a TSF within the GOP and then during operation as a TSF.	The GOP TSF has been designed and will be constructed and operated in a manner consistent with that which currently occurs at OGNZL’s existing TSFs, and which has been demonstrated to have been successful for managing and monitoring potential effects. The design will include a range of measures to encapsulate and / or neutralise PAF material, and to contain, collect and treat seepage and runoff from PAF rock and tailings. A peer review of the detailed design is required by an appropriately qualified independent party. A GOP TSF Monitoring and Management Plan will be prepared and implemented to monitor and assess the effects of the tailing’s storage facility on the land, ground and groundwater resources and to trigger the implementation of contingency measures where necessary to ensure the recommended conditions are complied with. It includes: > A Risk Management Plan, as defined in the Australian / New Zealand Standards for Risk Management (AS/NZS 4360:1999);	Monitoring details will be included in the GOP TSF Monitoring and Management Plan in accordance with current practice at OGNZLs existing Waihi TSFs.	None.



Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action	Additional Measures Proposed by OGNZL
	> A structural integrity monitoring programme for the GOP TSF; > Groundwater monitoring to detect seepage escaping the underdrainage system; > Details of the “scan monitoring” in both shallow and deep aquifer systems; > Trigger levels for pH, conductivity and water levels to provide an early warning indicator of potential changes of groundwater quality as a result of the activities associated with the GOP TSF; and > The measurement and monitoring of the liner and cover system integrity (by measuring drainage quality and flow from all underdrainage and surface collection systems) in order to verify the "as built" structure is achieving predicted design performance objectives.		
Groundwater			
Groundwater dewatering at Willows Access Tunnel resulting in minor reduction of flows to Mataura Stream and depletion of water resources which may affect users of water.	Monitoring of shallow groundwater using the existing network of piezometers to ensure sustained lowering of groundwater levels does not occur and that there is no potential for long term stream loss. If dewatering activities adversely affect existing stock, domestic or other water supplies, OGNZL will be required to provide an alternative supply within 12 hours. See Dewatering and Ground Settlement section.	See Dewatering and Ground Settlement section.	None.
Groundwater drawdown effect on domestic and stock bores within reasonable proximity to the Wharekirauponga Access Tunnel.	Monitoring of shallow groundwater using the existing network of piezometers to ensure sustained lowering of groundwater levels does not occur and that there is no potential for long term stream loss. If dewatering activities adversely affect existing stock, domestic or other water supplies, OGNZL will be required to provide an alternative supply within 12 hours. See Dewatering and Ground Settlement section.	See Dewatering and Ground Settlement section.	None.
Discharge of contaminated groundwater into the environment during tunnelling.	Groundwater collected during tunnelling will be sent to the WTP for treatment.	None.	None.
Effects on groundwater quality.	See Geochemistry section.	See Geochemistry section.	
Surface Water			
Effects on the warm spring in the Coromandel Forest Park.	Offset the loss of ecological value by completing habitat enhancement of six spring and gully headwaters (at least 85 m in length in total) at Area 2.	None.	None.
Effects on other surface waters within the Coromandel Forest Park.	Manage all activities to ensure that flows remain within the bounds of natural variability with any significant changes in flow avoided, other than that caused by the loss of the warm spring.	See Dewatering and Ground Settlement Section.	None.
Impacts to water quality from runoff from the WUG Portal, access roads, WRS haul road, and	To reduce potentially contaminated runoff, clean water diversion drains will be installed above these elements. Potentially contaminated runoff from these areas will be collected from the WRS haul road, WUG Portal access road and lower access roadside drains and conveyed to the Willows Collection Pond, where it will be pumped to the WTP for treatment.	See Geochemistry section.	None.



Actual or Potential Effect	Recommended Mitigation / Management	Recommended Monitoring / Future Action	Additional Measures Proposed by OGNZL
lower access roadside drains at the Willows SFA.			
Impacts to water quality from other developed areas (i.e. areas excluding the WRS, WUG Portal, access road and lower access roadside drains) at the Willows SFA.	Stormwater runoff from developed areas (excluding areas going to the Willows Collection Pond) will drain via pipes and swales to the Willows SFA silt pond where practical. For these areas, swales will provide the primary source of water quality treatment for surface runoff, with extended detention at the Willows SFA silt pond to provide some additional treatment. Elements of the Willows SFA which are expected to be higher generators of contaminants will be assessed to provide additional and specific treatment methods where required, i.e. oily water separators at workshops, wheel wash catchpits.	None.	None.
Impacts to water quality during the construction phase as a result of the discharge of sediment from earthworks during both rain events and stream works.	Prepare and adhere to comprehensive Site-Specific Erosion and Sediment Control Plans, which are: > Consistent with Waikato Regional Council Technical Report No. 2009/02 Erosion and Sediment Control Guidelines for Soil Disturbing Activities, January 2009; and > In general accordance with Erosion and Sediment Control Assessment Report by Southern Skies dated 2025 which is provided in Part B of these application documents. It will include diversion of clean water around worksites, and the capture and treatment of all stormwater from work areas in appropriately designed sediment retention devices prior to discharge to adjacent waterbodies.	Routine monitoring of erosion and sediment control measures to identify maintenance requirements. Routine monitoring of the discharge from sediment retention ponds and decanting earth bunds during high rainfall events to confirm they are operating effectively and meeting performance targets.	None.
Willows Access Tunnel groundwater dewatering reducing flows to Mataura Stream.	See Groundwater section.	See Groundwater section.	None.
Effects of WTP discharge on Ohinemuri River.	Retain the discharge limits and instream standards which are included on the existing consent and have been proven successful in protecting the health and wellbeing of the Ohinemuri River. The capacity of the current WTP facilities will be upgraded throughout the project's lifetime to cope with the expected volume of water requiring treatment. The reverse osmosis plant can be used to remove additional contaminant flux if required to meet instream limits.	Monitoring of discharge quality and water quality and aquatic habitat within the Ohinemuri River as per existing WTP discharge consent.	None.
Dewatering and loss of surface water catchment, which includes the lowering of groundwater levels, reduction in flow to surface water and depletion of water resources which may affect users of water, associated with the GOP.	If dewatering activities adversely affect existing stock, domestic or other water supplies, OGLNZ will be required to provide an alternative supply within 12 hours. Closure of the GOP TSF will include installation of a capping layer, which will provide separation of stormwater from the tailings and be contoured to allow stormwater flow to Gladstone Wetland.	The existing Dewatering and Settlement Monitoring Plan will be updated to capture additional groundwater level monitoring locations around the GOP.	None.
Ruahorehore Stream and Ohinemuri River flow reduction from dewatering.	None.	None.	None.
Impacts on surface water quality in Ruahorehore Stream during operation.	None expected to be required. The design of TSF3 incorporates measures to contain, collect, capture and treat any contaminated runoff or seepage. Note the design is more conservative than that which has been demonstrated as successful at the existing TSFs.	Intensive groundwater monitoring to detect any seepage which does occur and trigger timely mitigation action to ensure adverse effects on	



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	Contingency measures will be set in the TSF3 Monitoring and Management Plan to address any unexpected effects observed.	Ruahorehore Stream do not materialise.	
Air Quality			
Dust discharge impacting the amenity of surrounding neighbours.	Preparation and implementation of an Air Quality Management Plan, including the use of water carts, and wind speed trigger levels for reviewing and ceasing work during conditions susceptible to dust generation.	An ambient air quality monitoring programme for deposited particulate matter and total suspended particulate.	None.
Increased emissions of metals to air from the processing plant as a result of an increasing ore processing rate.	Installation of a retort oven prior to processing ore from GOP or the Wharekirauponga Underground Mine. Limit the total amount of ore processed at the Processing Plant to 2.25 million tonnes per annum, with no more than 0.611 million tonnes of that ore being from the GOP (which has higher levels of mercury than other ore sources).	Emission testing of the discharges for mercury, arsenic, cadmium, chromium, nickel and lead: > Twice per year for the first five years, and then annually thereafter; and > Within one month of commencing processing ore from any new source, including the GOP or WUG.	None.
Terrestrial Ecology			
Impacts to fauna and flora associated with the establishment and operation of drill sites, pumping test sites, and construction of ventilation easé.	Adherence to the site selection protocols to evaluate potential sites against ecological criteria designed to: > Avoid the loss of ‘At Risk’ or ‘Threatened’ herpetofauna, terrestrial invertebrates and flora; > Avoid the removal of trees where bats are roosting, or birds are nesting; > Minimise the loss of mature trees where practicable; > Preference trimming or tying back trees over felling; and > Minimise the loss of riparian vegetation. Requirements to: > Salvage and move / translocate ‘At Risk’ or ‘Threatened’ fauna and flora, based on the recommendation of suitably qualified ecological experts; > Have a suitably qualified and experience ecologist present on site during any vegetation clearance; > Undertake pre-clearance avifauna checks; > Adhere to the Department of Conservation endorsed Bat Roost Protocols during vegetation clearance; > Develop and adhere to a Coromandel Forest Park Kauri Dieback Management Plan;	None.	None.



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	> Limit the area of vegetation clearance to 900 m² per site; > Retain topsoil, felled trees, slash and other leafy material to assist in restoring any areas which are disturbed during construction; > Rehabilitate any areas that were disturbed during construction; and > Adhere to the national Frog Hygiene Protocol to minimise the possible spread of chytrid fungus and other pathogens to, and within the Coromandel Forest Park.		
Vegetation loss at drill sites, pumping test sites, and ventilation easé.	Offset the loss of 0.66 ha of forest area within the Coromandel Forest Park by revegetating 21 ha on the north-east ridge of Area 2 to connect the Coromandel Forest Park with a forest fragment on that site. Further replanting of approximately 55,000 m² on the boundary of the Coromandel Forest Park and Willows SFA is also proposed as part of the additional ecological benefit.	Annual monitoring and maintenance of the offset site.	None.
Spread of weeds and pests during establishment and operation of drill sites, pumping test sites, and construction of ventilation easé.	All equipment to be used for drilling and ventilation easé construction activities is to be clean and free of any exotic weed and seed material prior to entry to the site. Control exotic weeds present within any sites within the Coromandel Forest Park which have been cleared as part of the WNP for a period of two years following the completion of WNP activities at that site.	Regular weed surveillance.	None.
Spread of Kauri Dieback disease within the Coromandel Forest Park during establishment and operation of drill sites, pumping test sites, and construction of ventilation easé.	A Kauri Dieback Management Plan will be prepared that sets out the procedures to be used to prevent the proposed activities causing the introduction and / or spread of Kauri Dieback Disease in the Coromandel Forest Park.	Surveillance methods for detecting Kauri dieback at a worksite before it manifests in trees will be included in the Kauri Dieback Management Plan.	None.
Spread of Chytrid fungus during establishment and operation of drill sites, pumping test sites, and construction of ventilation easé.	Adhere to the national Frog Hygiene Protocol to minimise the possible spread of chytrid fungus and other pathogens to, and within, the Kauri Dieback Management Plan.	As required in the Frog Hygiene Protocol.	None.
Increased fire risk during establishment and operation of drill sites, pumping test sites, and construction of ventilation easé.	A fire extinguisher must be available at all times during drilling and / or ventilation easé construction. The fire extinguisher must be suitable for the type and magnitude of construction activities being undertaken.	None.	None.
Vibration impact on leiopelmatid frogs	Implementation of firm vibration limits above the mine site. OGNZL to establish a fund to provide financial support for researchers to undertake investigations into the efficacy of different predator control strategies and techniques to improve populations of leiopelmatid frogs, and for the further development of methods to assess the efficacy for frogs of predator control generally. Conditions requiring OGNZL undertake pest management over an area of at least 632 hectares in the Wharekirauponga Pest Management Area.	Vibration monitoring as per the Vibration Management Plan. Monitoring of frog populations. Monitoring of pest animals to determine if targets are being achieved.	None.
Impacts to bats during vegetation clearance associated with the development of GOP, NRS and TSF3.	Adherence with Bat Management Plan (part of the ELMP-WA, provided in Part H) during vegetation removal which includes pre-clearance surveys by a suitably experienced and qualified ecologist and vegetation removal protocols.	As required in the Bat Management Plan.	None.



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Impacts to birds during vegetation clearance associated with the development of GOP, NRS and TSF3.	Adherence with Avifauna Management Plan (part of the ELMP-WA, provided in Part H) which includes vegetation removal protocols during peak native bird breeding season.	As required in the Avifauna Management Plan.	None.
Impacts to lizards during vegetation clearance associated with the development of GOP, NRS and TSF3.	Adherence with Lizard Management Plan (part of the ELMP-WA, provided in Part H) prior to vegetation removal which details capture, habitat enhancement and relocation of potentially present native lizards.	Post release monitoring of the Lizard Habitat Enhancement Area in accordance with the Lizard Management Plan.	None.
Accidental vegetation loss associated with the development of GOP, NRS and TSF3.	Measures to avoid or minimise vegetation and habitat loss through on-site management. This will include avoidance of unnecessary vegetation clearance through the physical delineation of the footprint boundary.	None.	None.
Loss of 0.4 ha of naturally occurring native vegetation, 1 ha of planted native vegetation and 5.1 ha of pine associated with the development of GOP. Loss of 8.1 ha of planted native vegetation and 1 ha of pine associated with the development of NRS. Loss of 8.3 ha of SNA 166, and 1.8 ha of low value vegetation from three smaller fragments associated with the development of TSF3.	20 ha of restoration plantings to offset loss of 10.1 ha site-wide indigenous vegetation (excluding SNA). 17.5 ha of restoration plantings to offset loss of 8.3 ha of SNA 166. Implementation of Residual Effects Offset Plan (part of the ELMP-WA, provided in Part H) which outlines how the above will be implemented, monitored, and maintained to deliver the biodiversity offset proposed.	Monitoring as detailed in the Residual Effects Offset Plan.	None.
Wetland and Freshwater Ecology			
Native fish and kōura loss during: > Reclamation of headwater gully associated with the GOP; > Diversion of 1,388 m of TB1 associated with the NRS; and > Diversion of Ruahorehore Stream.	Fish salvage and relocation in accordance with the Aquatic Fauna Salvage and Relocation Plan (part of the ELMP-WA, provided in Part H).	Baseline surveys for fish and kōura in affected waterbodies. Recording the number, species and size of fish and kōura relocated.	None.
Loss of headwater gully, including loss of 0.14 ha of riparian vegetation and reduced aquatic connectivity associated with the GOP. Diversion of 1,388 m of TB1 and reduced aquatic connectivity associated with the NRS.	Offset residual adverse effects on freshwater ecology to result in no net loss of ecological function by undertaking extensive riparian restoration planting and developing a new ecological functioning stream channel to replace TB1 and developing a new ecological functioning stream channel which connects Ruahorehore Stream to the upper tributaries within the SNA above TSF3. Implementation of an Instream Work Aquatic Ecology Management Plan (part of the ELMP-WA, provided in Part H) which outlines how the above will be implemented, monitored and maintained to deliver the biodiversity offset proposed.	As required in the Instream Work Aquatic Ecology Management Plan. As a minimum, this will include monitoring of offset measures to ensure it is delivering the ecological	None.



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Diversion of 2,118 m of Ruahorehore Stream and reduced aquatic connectivity associated with TSF3.		outcomes expected and to trigger any maintenance actions required.	
Sediment intrusions on Gladstone Wetland, TB1 and Ruahorehore Stream.	See erosion and sediment control requirements in the surface water section above.	See surface water section.	None.
Potential aquatic ecology effects as a result of the WTP plant discharge Ohinemuri River.	Continue to treat water to the standards required in the existing consent which have been shown to protect aquatic habitat.	See surface water section.	None.
Loss of pond habitat from farm detention pond associated with TSF3.	Fish salvage and relocation in accordance with the Aquatic Fauna Salvage and Relocation Plan (part of the ELMP-WA, provided in Part H).	None.	None.
Hazardous Substances			
Risk to ecosystems from a spill of diesel during tank filling or equipment refuelling and from a spill of packaged goods during unloading to site.	All hazardous substances will be stored in approved and bunded containment in accordance with the relevant New Zealand Standards and Codes of Practice and the Hazardous Substances and New Organisms Act 1996 and Regulations. Management controls will be set out in a Hazardous Substances Use and Storage Management Plan	None.	None.
Development and operation of Class 1 Hazardous Substances Storage Facility at Willows SFA and the Waste Disposal Area. Development and operation of a Class 5 (ammonium nitrate emulsion) Hazardous Substance Storage Facility.	All hazardous substances will be stored in approved and bunded containment in accordance with the relevant New Zealand Standards and Codes of Practice and the Hazardous Substances and New Organisms Act 1996 and Regulations. Management controls will be set out in the Hazardous Substances Use and Storage Management Plan.	None.	None.
Spill of the ecotoxic liquid hazardous substances stored and used at the Processing Plant and WTP, which includes diesel, corrosive substances (hydrochloric acid, caustic soda), oxidisers (hydrogen peroxide), cyanide and mercury.	All hazardous substances are to be stored in approved and bunded containment in accordance with the relevant New Zealand Standards and Codes of Practice and the Hazardous Substances and New Organisms Act 1996 and Regulations. Management controls will be set out in the Hazardous Substances Use and Storage Management Plan.	None.	None.
Heritage			
Accidental impacts on the archaeological remains / features associated with the: > Royal Standard Battery and Mining Complex (T12/681); > Mataura Water Race (T13/961);	Install protection so that additional archaeological remains / features are not inadvertently impacted upon. The Gladstone Battery and its associated shaft, Feature c) (HAU245 Cat C), are located outside the footprint of the proposed GOP and should not be affected. However, they are located in close proximity, and measures (i.e. fencing) will be put in place to ensure they are protected from inadvertent damage.	None.	None.



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> Willows Timber Tramway alignment (T13/962); > High-Level Walmsley Timber Tramway (T13/963); and > Gladstone Battery and its associated shaft (HAU245 Cat C).			
Removal of part of the Mataura Water Race (T13/961).	A general Heritage NZ Archaeological Authority will be applied for under the HNZPT Act 2014 to cover all aspects of the WNP, except the proposed works within Area 4 (which comprises the Services Trench and does not form part of this application) and Area 2. A separate Archaeological Authority has already been granted for the Area 2 works outside of the fast-track process (reference number 2025/359). Imposition of an appropriate accidental discovery protocol under the HNZPT Act 2014 with regards to archaeology. Implementation of an Archaeological Management Plan to manage potential archaeological / heritage effects. This will include: - Pre-start requirements; - Investigation and recording measures (relating to confirmation of pre-1900 archaeological remains, in situ archaeological deposits or features, photographing of any pre-1900 workings intersected, and potential retrieval of items if safe to do so); - Monitoring (relating to preliminary excavations in the vicinity of known / recorded archaeological sites, in situ archaeological features or deposits identified during monitoring, and the associated notification of appropriate iwi representatives should these relate to Māori occupation); - Implementation of koiwi tangata (human remains) protocols (including the ceasing of works in the immediate vicinity of any identified koiwi tangata, assessment of the remains, notification of appropriate iwi representatives, HNZPT, and the NZ Police, securing of remains from any further damage, and implementation of appropriate process / protocol in accordance with tikanga, HNZPT, and the NZ Police); and - Implementation of taonga (Māori artefacts) protocols (including securing of the area containing the taonga, and notification of appropriate iwi representatives and HNZPT so that appropriate actions can be determined).	Monitoring will be undertaken as required by the Heritage NZ Archaeological Authority, and in accordance with the proposed Archaeological Management Plan.	None.
Removal of part of the Willows Timber Tramway alignment (T13/962).			
Removal of one or two of the branches of the High-Level Walmsley Timber Tramway (T13/963).			
Removal of a substantial part of the Gladstone Hill gold mining complex (T13/821).			
The already impacted Low Level Water Race (T13/817) will be destroyed.			
Destruction of unknown archaeological items associated with Winner Hill (T13/820).			
Infill and capping Queen of Waihi Shaft.			
Accidental discovery of historical and archaeological items, including unknown archaeological items.			
Accidental discovery of koiwi tangata (human remains).	In the event of koiwi tangata (human remains) being uncovered, work should cease immediately in the vicinity of the remains and tangata whenua, HNZPT, the NZ Police and HDC should be contacted so that appropriate arrangements can be made.	None.	None.
Contaminated Land			
Disturbance of contaminated land.	Preparation and implementation of a Site Management Plan win accordance with Contaminated Land Management Guideline No.1: Reporting on Contaminated Sites in New Zealand, Ministry for the Environment (revised 2021).	Targeted sampling and analysis as required in the Site Management Plan.	None.
Post-Closure Effects			



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Risk of OGNZL defaulting on its rehabilitation obligations.	The combination of the rehabilitation and closure concept plan and the bonds ensures that rehabilitation and closure of the site will occur under all circumstances, and that the costs associated with both the rehabilitation of the land and its long-term management will be met.	None.	None.