

APPENDIX K: ECOLOGICAL EFFECTS SUMMARY

Ecological Feature	Effect	Effects Management
<i>WUG/Area 1</i>		
Wharekirauponga / Coromandel Forest Park	Temporary loss of vegetation / habitat (0.66 ha).	<p>Site selection processes to avoid high quality habitats from a range of options.</p> <p>Fauna and habitat salvage within the footprint of all clearance areas. Translocation of salvaged animals to an intensively pest-controlled, prepared release site.</p> <p>Remediation for each drill site will occur when work has finished on each site. This will include removing drill platforms, ventilation shafts and exclusion fences, weed control, returning wood debris and fern stumps to cleared area.</p> <p>Replanting and facilitating natural regeneration (enhancement planting) of a 21 ha area on the north-east ridge of Willows Road Farm and buffer planting on the edge of Coromandel Forest Park 5.5 ha.</p>
	A low (but uncertain) risk of adverse effects on Archey's and Hochstetter's frogs. The potential areas of habitat include 314 ha for Archey's frogs and up to 1.5 km of stream in the Edmonds Catchment for Hochstetter's frogs.	<p>Variable mining methods to minimise vibration related impacts on the surface and potential disturbance to fauna above the WUG.</p> <p>The primary offsetting measure to address these potential residual effects on frogs and other fauna, is wide scale intensive pest control over an area of 632ha, including 314 ha exposed to vibration levels greater than 2mm/s and 318 ha immediately adjacent for a period of 15 years.</p> <p>Compensation as research funding is proposed to undertake investigative work above WUG and within the wider Wharekirauponga Animal Pest Management Area to assess efficacy of pest control regimes for frog recovery</p>
Wharekirauponga warm spring	Total loss of warm spring (7 m / 9m ²)	<p>Aquatic fauna salvage and relocation.</p> <p>Fencing and planting of 85 m of headwater springs and seepage gullies of Tributary 3 at Willows SFA - amounting to 80 m length of watercourse (approx. 51 m² of freshwater habitat), which is a 12:1 enhancement ratio.</p>
Wharekirauponga Stream	No effect likely but potential for stream reductions associated with dewatering	Because of the uncertainty in whether effects associated with groundwater will occur, and also to aid in the detection of effects, monitoring of streams and wetlands assessed as most at risk, as well as control or reference wetland/s, is proposed to be undertaken.

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Wharekirauponga Tributary Streams	No effect likely but potential for stream reductions associated with dewatering	If effects of dewatering are detected, it is proposed that remedial actions such as provision of supplementary water, grouting of fissures which drain shallow groundwater and/ or reinjection of water into aquifers may occur to augment flows. If these measures are unsuccessful, inadequate or otherwise unable to be undertaken, an offsetting or compensation package will be developed to address any residual effects and ensure that the project results in no net loss of habitat or ecological value.
Waiharakeke Stream	No effect likely but potential for stream reductions associated with dewatering	
Wetlands	Potential for dewatering	
Willows Site I Area 2		
Vegetation/ Habitat	Vegetation habitat/ clearance, primarily in the rock stack footprint (2,500 m2)	Revegetation and remediation of rock stack area at mine closure Fence riparian margin to protect vegetation to be retained. The proposed area of revegetation of riparian margin is 56,619 m² (stream enhancement to tributary 1 and tributary 3 described below). Vegetation clearance protocols to ensure there are no active bird nests and lizards present
Tributary 2	Reclamation of 558 m of stream habitat, reduced aquatic connectivity and instream works	Reinstatement of stream after the removal of rock stack (longterm / approximately 10 years). Aquatic fauna salvage and relocation. Erosion and sediment controls. Offset ecological effects with stream enhancement (tributary 1 and tributary 3-total enhancement extent of 1,863 m).
Mataura Stream	Earthworks and sediment discharge & contaminant water management	Earthworks - settlement and treatment prior to discharge. contaminant water management-treatment at WTP.
Mataura wetland	Potential partial dewatering of the Mataura wetland	Avoid works within or near the wetland. Enhance the Mataura wetland (0.28 ha) by 10 m fenced buffer, remove stock, weed & pest management, and planting programme.

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Gladstone Open Pit / Area 5

Planted native trees	1 ha vegetation removal	Timing of vegetation removal to avoid the main bird breeding season (or preclearance nesting surveys). Implementation of a lizard management plan. Adoption of bat-tree felling protocol.
Naturally occurring native trees	0.4 ha vegetation removal	Site wide 20 ha of offset restoration planting (for loss of 10.1 ha of sitewide vegetation).
Pine trees	5.1 ha vegetation removal	Compensation for copper skink habitat removed (6.5 ha removed). Including 11.2 ha of revegetation with pest control and 4.45 ha of pest control in the existing habitat.
Headwater gully	Loss of 47 m of intermittent stream length (~79.4 m ² of surface area) through reclamation Loss of 0.14 ha of riparian vegetation	Aquatic fauna salvage and relocation. For sediment discharges, settlement and treatment prior to discharge. Compensation package for GOP / NRS and TSF3: For the 47 m of stream reclaimed and the residual 644 m of stream not replaced by diversions, and to address time lags in functional restoration of diversions, restore 7,646 m of stream margins along the Mataura Stream and Ohinemuri River catchment.
Gladstone Wetland	Sediment intrusions	Settlement and treatment prior to discharge.

Northern Rock Stack / Area 6

Planted natives	8.1 ha of vegetation removal	Timing of vegetation removal to avoid the main bird breeding season (or preclearance nesting surveys). Implementation of a lizard management plan. Adoption of bat-tree felling protocol
Pine trees	1 ha of vegetation removal	Site wide 20 ha of offset restoration planting (for loss of 10.1 ha of sitewide vegetation).
TB1	Diversion of 1,389 m length of stream, reduced aquatic connectivity and sediment intrusion	Aquatic fauna salvage and relocation. Creation of a stream diversion channel (695 m in length) that is ecologically functional. For managing sediment, settlement and treatment prior to discharge Compensation package for GOP / NRS and TSF3: For the 47 m of stream reclaimed and the residual 644 m of stream not replaced by diversions, and to address time lags in functional restoration of diversions, restore 7,646

Ecological Feature

Effect

Effects Management

m of stream margins along the Mataura Stream and Ohinemuri River catchment.

Tailing Storage Facility 3 / Area 7

Naturally occurring natives (SNA 166)	8.3 ha of vegetation removal	Mitigation: Timing of vegetation removal to avoid the main bird breeding season (or preclearance nesting surveys). Implementation of a lizard management plan. Buffer plant new SNA edge.
Naturally occurring natives (non-SNA western fragment)	1.2 ha of vegetation removal	Offset: 17.5 ha of offset restoration plantings with an additional 20ha of the SNA to be enhanced.
Naturally occurring natives (non-SNA eastern fragment)	0.3 ha of vegetation removal	Timing of vegetation removal to avoid the main bird breeding season (or preclearance nesting surveys). Implementation of a lizard management plan. Adoption of bat tree felling protocols.
Southern planted fragment	0.3 ha of vegetation removal	Site wide 20 ha of offset restoration planting (for loss of 10.1 ha of sitewide vegetation).
Ruahorehore Stream	Diversion of 2,118 m of stream length, reduced aquatic connectivity and sediment intrusion	<p>Aquatic fauna salvage and relocation prior to works.</p> <p>Creation of a stream diversion channel (2,503 m in length) that is ecologically functional.</p> <p>For managing sediment, settlement and treatment prior to discharge</p> <p>Compensation package for GOP / NRS and TSF3: For the 47 m of stream reclaimed and the residual 644 m of stream not replaced by diversions, and to address time lags in functional restoration of diversions, restore 7,646 m of stream margins along the Mataura Stream and Ohinemuri River catchment.</p>
Farm detention pond	Loss of pond habitat	Aquatic fauna salvage and relocation prior to works occurring.
