

Table 12: Groundwater connectivity status of natural wetlands to be retained

Wetland - Groundwater Interaction ⁶	Wetlands (SLR Numbering)	Wetlands (WWLA Numbering) ⁷
Groundwater fed wetlands (i.e. groundwater is <1 mBGL).	Lake Piopio Wetland	83 ⁸
	Lake Shore Wetlands	57
	Lake Shore Wetlands	71
	Lake Shore Wetlands	76
	Wainui Stream Wetlands	65
	Wainui Stream Wetlands	61
	Wainui Stream Wetlands	58
	Wainui Stream Wetlands	63
	Wainui Stream Wetlands	68
	Wetland 7	85
	Wetland 8	74
	Wetland 5	82
	Wetland 10	69
	Wetland 12	62
	Wetland 13	60
	Wetland 14	59
	Wetland 19	86 ⁸
	Wetland 21	75
	Wetland 22	64
	N/A	40 ⁹
	N/A	42
Potentially groundwater fed wetlands (i.e. groundwater is 1 - 3 mBGL)	Site 27	72
	Wetland 6	81
	Wetland 9	67
	Wetland 11	70
	Wetland 15	80
	Wetland 16	66
	Wetland 20	84
	Wetland 21	73

⁶ 90th percentile (extreme wet conditions) as per Figure 17 in WWLA 2025.

⁷ As per Figure 17 in WWLA 2025.

⁸ Although shown as groundwater connected these wetlands have been shown by WWLA to be predominantly surface fed features and not vulnerable to groundwater drawdown.

⁹ Outside 0.2m drawdown contour and unlikely to be affected in any way.



Wetland - Groundwater Interaction ⁶	Wetlands (SLR Numbering)	Wetlands (WWLA Numbering) ⁷
	Wetland 25	79
Surface fed wetlands (i.e. groundwater is > 3 mBGL)	Site 1	52
	Site 3	55
	Site 4	54
	Site 24	78
	Site 26	47
	Site 28	48
	Site 29	49
	Wetland 17	87
	Wetland 18	88
	Wetland 23	77
	N/A	46
	N/A	50
	N/A	53



Table 13: Summary of unmitigated effects on terrestrial habitat

Ecological feature	Ecological Value	Ecological Effect	Removal of all vegetation in mining footprint		Potential damage to dune vegetation		Pest plant invasion	
		Description of effects	Magnitude	Level	Magnitude	Level	Magnitude	Level
Escarpment vegetation	Moderate	Unlikely to be directly removed by mining activity because of the underlying geology (rock rather than sand). May be subjected to higher levels of disturbance and introduction of pest plants by machinery					Low	Low
Mined/built up areas	Low	Ongoing earthwork and extraction of sand. High levels of noise and light disturbance. Constant change of landform but very little deviation from previous state	Moderate	Low			Negligible	Very Low
Plantation pine forest	Moderate	Complete removal of this habitat type prior to mining including removal of a valuable bat foraging area. This effect will be medium to long term	Moderate	Moderate			Low	Low
Grassland, shrubland, and terrestrial rushland	Moderate	Complete removal of vegetation and long-term removal of habitat for indigenous flora and fauna including pipit (At Risk – Declining). Short to medium term light and sound disturbance for areas bounding active mine site	Moderate	Moderate			Moderate	Moderate
Stable dune system	High	Potential damage to edges of this habitat. Additional weed invasion due to mine machinery and pest plant populations allowed to grow in active mine areas and waste places			Negligible	Very Low	Moderate	High
Active dune system	Very High	Potential damage to edges of this habitat. Additional weed invasion due to mine machinery and pest plant populations allowed to grow in active mine areas and waste places			Negligible	Low	Moderate	High
Kānuka forest	Moderate	Edge damage or removal of vegetation. Light and noise disturbance. Increased edge effects due to loss of adjacent pine forest	Low	Low			Low	Low



Table 14: Summary of unmitigated effects on wetland habitat

		Ecological Effect	Loss of wetlands		Hydrological changes to wetlands		Reduction in wetland water quality		Pest plant invasion	
Ecological feature	Ecological Value	Description of effects	Magnitude	Level	Magnitude	Level	Magnitude	Level	Magnitude	Level
Lakes and Wainui Stream (Lake Shore Wetlands, Wetland 8, Wetland 22 & Wainui Stream Wetlands)	Very High	These wetlands are and will be all protected by a 30 m buffer zone however there is potential for discharge of sediment laden water or other pollutants into these areas as a result of mining operations. Any such effect would be accidental and short in duration. Pest plant invasion potential could be increased as a result of mining moving closer to these wetlands. Potential for adverse effects on lake margin wetlands due to change in water take regime and potential for increased fluctuations in lake water level	-	-	Low	Moderate	Negligible	Low	Negligible	Low
Wetland 18, Wetland 19, Lake Piopio	Very High	These wetlands are and will be all protected by a 30 m buffer zone however there is potential for discharge of sediment laden water or other pollutants into these areas as a result of mining operations. Any such effect would be accidental and short in duration. Pest plant invasion potential could be increased as a result of mining moving closer to these wetlands. Potential for significant adverse effects on wetlands due to groundwater drawdown, change in water take regime and potential for increased fluctuations in lake water level	-	-	Low	Moderate	Negligible	Low	Low	Moderate
Southern wetlands	Moderate	Complete loss of up to 4.25 ha of freshwater wetland (all wetlands in this group apart from Wetland 15) and	Very high	High	High	Moderate				



		Ecological Effect	Loss of wetlands		Hydrological changes to wetlands		Reduction in wetland water quality		Pest plant invasion	
		potentially significant drawdown effects on Wetland 15								
Eastern wetlands	Low	Potential for alteration of hydrology from groundwater drawdown which could result in loss or degradation of up to 0.29 ha of freshwater wetland. Incidence of pest plants could increase. Physical damage could occur if 30 m buffer is not applied and enforced	-	-	High	Low	Negligible	Very low	Low	Very low
Wetland 21	Moderate	Impact on vegetation due to rapid water level changes from pumping of water, although this is an established regime and the effect would be minimal. Potential for damage to hydrology from significant drawdown of groundwater, introduction of additional pest plants, and degradation of habitat through light and noise disturbance			High	Moderate	Negligible	Very low	Low	Low
East Wainui Stream wetlands	Moderate	Potential for alteration of hydrology due to significant groundwater drawdown which could result in loss or degradation of up to 0.81 ha of freshwater wetland. Incidence of pest plants could increase. Physical damage could occur if 30m buffer is not applied and enforced			High	Moderate	Negligible	Very low	Low	Low



Table 16: Level of effects on terrestrial vegetation after mitigation

		Removal of all vegetation in mining footprint		Potential damage to dune vegetation		Pest plant invasion	
Summary of mitigation measures:		Include suitable habitat (incl for pipit) in rehabilitation methodology. Progressively rehabilitate cells as mining progresses		Continue dune fencing, or clearly delineate the 100m dune buffer which has been proposed		Ensure machinery arriving to site is clean. Develop pest plant management plan for protected areas	
Ecological feature	Ecological Value	Magnitude of effect	Level of effect	Magnitude of effect	Level of effect	Magnitude of effect	Level of effect
Escarpment vegetation	Moderate					Negligible	Very low
Mined/built up areas	Negligible	Negligible	Very low			Negligible	Very low
Plantation pine forest	Moderate	Impact management for the pine plantation has been dealt with in the separate fauna report as its value is derived primarily from the presence of long-tailed bats.				Negligible	Very low
Grassland, shrubland, and terrestrial rushland	Moderate	Low	Low			Negligible	Very low
Stable dune system	High			Negligible	Very Low	Negligible	Very low
Active dune system	Very High			Negligible	Low	Negligible	Very low
Kānuka forest	Moderate	Low	Low			Negligible	Very Low



Table 17: Level of effects on wetlands after mitigation

		Loss of wetlands		Hydrological changes to wetlands		Reduction in wetland water quality		Pest plant invasion	
Summary of mitigation measures:		Destruction of these wetlands cannot be avoided, and no measures are available to minimise the impact of habitat loss. Remediation is not possible because the landform and hydrology will be different after mining in the area is complete.		Planting of appropriate buffers. Lake margin monitoring programme. Lake trigger level. Wetland water supplementation.		Buffer planting and appropriate sediment controls		Ensure machinery arriving to site is clean. Develop pest plant management plan	
Ecological feature	Ecological Value	Magnitude of effect	Level of effect	Magnitude of effect	Level of effect	Magnitude of effect	Level of effect	Magnitude of effect	Level of effect
Lakes and Wainui Stream	Very High			Negligible	Low	Negligible	Low	Negligible	Low
Wetland 18, Wetland 19, Lake Piopio	Very High			Negligible	Low	Negligible	Low	Negligible	Low
Southern wetlands	Moderate	Very high	High	Low (Wetland 15)	Low				
Eastern wetlands	Low			Low	Low	Negligible	Very low	Negligible	Very low
Wetland 21	Moderate			Low	Low	Negligible	Very low	Negligible	Very low
East Wainui Stream wetlands	Moderate			Low	Low	Negligible	Very low	Negligible	Very low

