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RESPONSE TO RFI 11 – FAST TRACK APPROVALS APPLICATION FTA-2507-1089 – ITEM 9 ECOTOXICOLOGY

Dear Cheryl,

Geocontam Risk Management Limited (GRM) is pleased to provide additional information in response to the Request for Information 11 (RFI 11) – Item 9 raised by the Environmental Protection Authority (EPA) on 25 June 2026, following the conclusion of expert hearings held during 8 – 19 June 2026 with respect to Matakanui Gold Limited's (MGL) Bendigo-Ophir Gold Project (BOGP) Fast-Track Approval Application FTA-25 07-1089, which requests provision of:

"*An assessment of the risk of toxic effects to wildlife and humans arising from poor water quality in any surface water expression and how this will be managed, including but not exclusive to the pit lakes and tailings storage facility (TSF) wetland.*"

The following relevant surface water expressions have been considered in this RFI response:

- Pit Lakes – Rise and Shine (RAS), and Srex (SRX) pits.
- Constructed Wetlands – Shepherds tailings storage facility (TSF) wetland, Lower Shepherds wetland, and the Rise and Shine Creek wetland.
- The existing surface water expression (wetland), located in Shepherds Creek downstream of the proposed Process Plant and surface water monitoring station SC01 at the eastern extent of the valley fill. The Lower Shepherds Wetland will abut this feature on the upstream side.

SURFACE WATER EXPRESSION CHARACTERISTICS

Table 1 summarises the key characteristics of the existing and proposed surface water body characteristics (HGG, 2026a). The location of these features is presented in Figure 1.

Table 1: Characteristics of BOGP surface water expressions.

FEATURE	AREA (Ha)	CONDITION	CHARACTERISTICS
RAS Pit Lake	64	Predominantly steep sided, open water bodies.	Pit lake develops following cessation of dewatering.
SRX Pit Lake	15		Pit void floods in closure phase to develop pit lake and spills to Rise and Shine Creek.

FEATURE	AREA (Ha)	CONDITION	CHARACTERISTICS
TSF Wetland[1]	0.5	Open water aquatic habitat.	Proposed to be constructed atop the Shepherds TSF following rehabilitation of the landform. The standing water will be controlled by constructing a bund with a weir and spillway. The wetland will be constructed above the capped tailings material such that there is a physical separation between the wetland and the tailings. Specifically, the tailings impoundment will be covered with a minimum of 300 mm of weathered rock and 200 mm of site won topsoil material. Where required additional rockfill material will be placed beneath the weathered rock to provide profiling or access over the tailings. This design element aims specifically at preventing uptake of tailings contaminants into the revegetated surface by creating a vadose zone buffer.
	1.5	Permanently inundated vegetated swamp for 12months/annum at 0.1 - 0.5 m depth	
	4.5	Seasonally inundated swamp/marsh with swamp inundation at minimum 0.3 m depths 6-9 months/annum, and marsh inundation 4-6 months/annum at minimum 0.3 m.	
Lower Shepherds Wetland	1.5	Constructed	Offset wetland proposed to be located within the Shepherds Creek valley bottom approximately 250 m upstream of water monitoring site SC01, within a catchment area of approximately 1,200 Ha. Wetlands are required to be constructed in lower Shepherds Creek (between the gorge and the process plant) – 0.5 ha in Year 1, a further 0.5 ha by Year 3 and then another 0.5 ha in closure associated with the Water Treatment Plant.
Lower Shepherds Wetland	0.1	Existing surface seepage feature along Shepherds Creek downstream of monitoring location SC01.	Naturally occurring wetland.
RAS Wetland	~0.5	Induced wetlands currently exist in association with the sludge from historic sluicing activities predominantly in the reach below Battery Hill. Water quality within the existing wetland is currently represented by monitoring at RS01.	Overflow from the SRX pit lake along the spillway will report to this wetland and increase its pre-mining area.

1. *Theoretical condition described for wet year conditions, being the worst-case scenario for ecotoxicological exposure.*

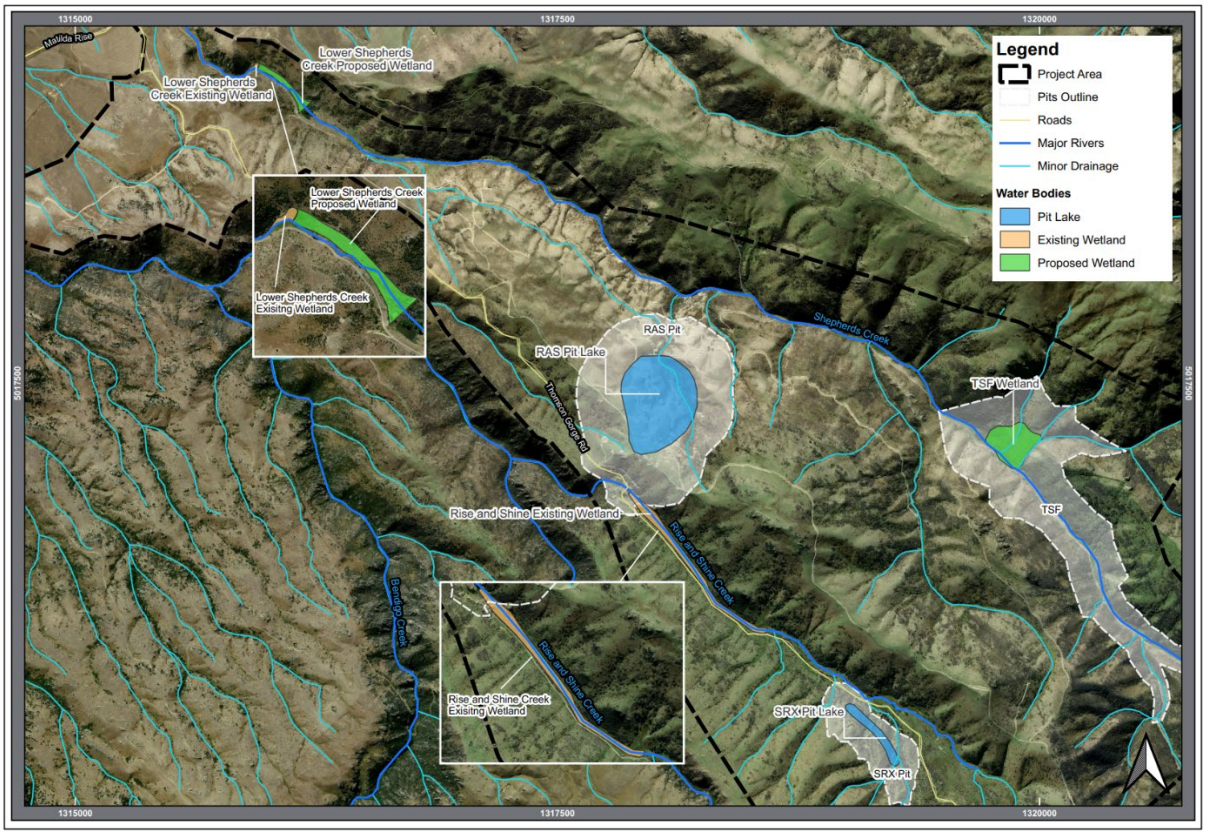

Figure 1: Location of BOGP surface water expressions.

ENVIRONMENTAL VALUES OF RECEIVING SURFACE WATER EXPRESSIONS

A consideration of ecological factors that will affect the environmental values of the water bodies has been undertaken in order to evaluate relevant ecotoxicological risks and applicable water quality guidelines for assessment of water quality in the open water bodies. Table 2 summarises the ecological values for the surface water expressions.

Table 2: Ecological values of the BOGP surface water features.

FEATURE	AQUATIC VALUES	AVIAN AND TERRESTRIAL VALUES	ECOSYSTEM PROTECTION LEVEL
RAS and SRX Pit Lakes	The RAS and SRX pit lakes will inherently be isolated from receiving water from natural rivers and wetlands in the Project Area. Aquatic species including phytoplankton and algae, zooplankton, and aquatic invertebrates may develop within the pit lakes as a result of introduction via birds, wind, flooding events or human introduction. The development of littoral (vegetation) habitats will be limited in the RAS pit lake due to the steep pit walls, however limited planting may occur along the haul road. A moderate potential for the development of littoral zones exists for the SRX pit lake, particularly in the presence of the spillway.	Physical controls will be in place to prevent livestock access to the pit lakes resulting in an incomplete exposure scenario for livestock. The steep pit walls will be a deterrent to pit lake access by lizards and other terrestrial fauna. Additionally, the steep pit walls will limit riparian growth will result in limited habitat for terrestrial invertebrate communities. Pit lake habitat values for these species is therefore considered to be low. Migratory birds are likely to be the dominant fauna accessing the pit lakes. For highly mobile avian species, a pit lake represents only one component of cumulative exposure across all habitats used by the bird. Given there are numerous natural water bodies within the region, it is likely that ingestion or dermal uptake of potential contaminants within a pit lake will represent only an intermittent exposure pathway. Pit lake habitat values for avian species are therefore considered to be moderate to low.	Under the ANZG (2018) ANZG Water Quality Management Framework, the BOGP pit lakes are considered “artificial” water bodies. As the steep walls of the pits will inhibit the development of mature and diverse aquatic ecosystems, and the pit lakes will not be accessible to livestock, the post-mining ecological value most closely reflects the definition of the 80% species protection level (SPL), on the basis that it will represent an artificial ecosystem with low potential to support a high-conservation-value aquatic community. This aligns with the closure objective of a safe, stable, and non-polluting water body rather than the restoration of a natural lake ecosystem. The 80% SPL recognises that ecosystem composition may differ substantially from natural reference conditions, while maintaining an acceptable level of ecological function.
TSF Wetland	The TSF wetland be constructed on top of the capped landform, post-closure and will be designed to support riparian vegetation, including Threatened sedge species and aquatic invertebrates. The construction is designed to ensure that leachate within the TSF does not interact with water within the TSF wetland and therefore water quality within the TSF is expected to reflect the upstream catchment conditions in Shepherds Creek.	Physical controls will be in place to limit livestock access to the TSF wetland resulting in an incomplete exposure scenario for livestock. One of the objectives of the wetland is to re-establish habitat for lizards and wetland birds, however it is noted that relatively limited existing avifauna values are currently present within the site and no wetland birds were detected in the ESA. Whilst creation of the TSF wetlands may attract additional avifauna, and in particular waterfowl, this would represent an increase in the value of the pre-mining habitat condition.	Under the ANZG (2018) Water Quality Management Framework, the TSF wetland is a constructed aquatic ecosystem; however, unlike the pit lakes, it is specifically designed to support ecological values, including riparian vegetation, threatened sedge species, aquatic invertebrates, reptiles, and wetland birds. The wetland is expected to possess habitat characteristics and water quality conditions more closely aligned with natural wetland environments. As the wetland is intended to support a functioning aquatic and riparian ecosystem and provide biodiversity benefits beyond the pre-mining condition, application of the 90% SPL is

FEATURE	AQUATIC VALUES	AVIAN AND TERRESTRIAL VALUES	ECOSYSTEM PROTECTION LEVEL
			considered appropriate. This level of protection is consistent with the ANZG objective for slightly to moderately disturbed ecosystems and reflects the desired ecological function of the wetland while recognising its constructed nature. Although access by livestock is not an intended function of the wetland, the 95% SPLs would protect downstream livestock values.
Lower Shepherds Creek Wetland (existing and proposed)	Based on the freshwater ecological effects assessment (KSL, 2025), the purpose of the diversion and associated wetland habitat is not to replicate the existing creek exactly, but to achieve no net loss of ecological values and stream function. No freshwater fish were detected in Shepherds Creek during field surveys. The highest value aquatic receptors are aquatic macroinvertebrates communities, perennial stream habitat, and aquatic vegetation that support food web function.	The wetland area within the creek may provide important habitat and resources for terrestrial fauna despite relatively low aquatic biodiversity. High value terrestrial receptors within the Lower Shepherds Creek wetland are expected to include riparian birds, lizards and other riparian fauna, and terrestrial invertebrates linked to the stream and wetland habitats. Access for livestock will be limited.	From an ANZG ecological value perspective, the primary objective of the Shepherds Creek constructed wetland is to protect and maintain macroinvertebrate communities, stream habitat function, riparian biodiversity, and ecosystem processes, rather than fish habitat. This is consistent with the project's use of a 90% SPL for freshwater ecosystem protection in Shepherds Creek. Although access by livestock is not an intended function of the wetland, the 90% SPLs would predominantly protect downstream livestock values.
Rise and Shine Creek Wetland	The Rise and Shine Creek wetland is located in the middle reaches of the creek is impacted by sludge from historical mining activities. Arsenic concentrations are elevated in sediments and surface water as a result of these historic activities. The Rise and Shine Creek wetland will receive overflow water from the SRX pit lake. The key ecological values of the Rise and Shine Creek catchment are primarily associated with its stream habitats and macroinvertebrate communities, rather than fish populations. Based on the outcomes of baseline assessments, macroinvertebrates are the principal freshwater ecological value of Rise and Shine Creek. Community condition varied across sites, ranging from relatively healthy to degraded depending on local habitat quality,	The wetland area within the creek may provide important habitat and resources for terrestrial fauna despite relatively low aquatic biodiversity. The creek corridor provides water sources in a semi-arid landscape, feeding habitat associated with aquatic invertebrates and riparian habitat for terrestrial bird species. Additionally vegetated riparian habitats associated with the wetlands are likely to be important for lizards. The wetlands are additionally likely to support terrestrial invertebrates linked to stream and wetland habitats. Access for livestock will be limited.	The most sensitive and ecologically important aquatic receptor in Rise and Shine Creek is the macroinvertebrate community, however given the historical mining land use and legacy tailings, the existing value of the Rise and Shine Creek does not meet the ANZG 99% or 95% species protection. As the wetland is intended to support a functioning aquatic and riparian ecosystem and provide biodiversity benefits within a catchment previously disturbed by historical mining activities, application of the 90% SPL for moderately to highly disturbed ecosystems is considered appropriate. This level of protection is consistent with the ANZG whereby the ecosystem is expected to retain its overall ecological function and biodiversity, although the species composition may differ from that of a less disturbed or higher-value ecosystem.

FEATURE	AQUATIC VALUES	AVIAN AND TERRESTRIAL VALUES	ECOSYSTEM PROTECTION LEVEL
	flow conditions, stock access, and substrate characteristics. No freshwater fish were detected in Rise and Shine Creek during field surveys.		Although access by livestock is not an intended function of the wetland, the 90% SPLs would predominantly protect downstream livestock values.

COMPARISON OF PREDICTED WATER QUALITY TO AQUATIC PROTECTION GUIDELINES

In order to assess potential ecotoxicological risks to terrestrial and aquatic species that may be exposed to the receiving water body surface water expressions, predicted water quality has been compared to the ANZG (2026) SPLs with ecotoxicological risks further considered for those elements that exceed relevant ecosystem protection levels as described in Table 2. This comparison is provided in Table 3 which presents the long-term modelled water quality statistics as derived in MWM (2025a) for:

- SRX and RAS Pit Lakes – relevant to the assessment of ecotoxicological risks associated with the pit lakes themselves.
- Rehabilitated TSF Runoff – relevant to the assessment of ecotoxicological risks associated with the TSF Wetland.
- Predicted water quality at SC01 and RS03 – relevant to the assessment of ecotoxicological risks associated with the wetlands within the Shepherds Creek and Rise and Shine Creek catchments, respectively.

It is important to note that an exceedance of an ANZG SPL does not necessarily indicate that adverse effects will occur. Rather, it indicates the potential for ecological risk and the need for further effects-based consideration. In this context, the following factors underpinning the derivation of the SPLs should be taken into account:

- The standard ANZG aquatic ecosystem guideline values for metals are effectively long-term (chronic) trigger values and assume that aquatic organisms may be exposed over a substantial proportion of their life cycle. They are not intended to represent acceptable concentrations for short-duration pulses such as stormwater surges, brief releases, or spill events.
- In this regard, maximum concentration exceedances of the SPLs need to be considered with respect to their frequency of occurrence and may represent acute risk events. Severity of acute risks can be assessed through the calculation of the hazard quotient (HQ), which is a simple screening-level metric used in environmental risk assessment to compare an exposure concentration against a benchmark concentration. A HQ ≥1 and <10 suggests a potential for effects to exist, whereas HQ values >10 are considered to represent a potentially substantial exceedance with a higher likelihood for acute exposure impacts.
- Exceedances of median concentrations better represent the potential for chronic risk, as they suggest a potentially complete exposure pathway exists at least 50% of the time and therefore is unlikely to represent an acute risk.
- When the mean and median values are similar this suggests an absence of episodic peaks or variation in the dataset.

The following sections discuss the key findings from the predicted water quality for each of the surface water expressions.

Table 3: Predicted water quality associated with surface water expressions with comparison to ANZG ecological protection criteria.

		ASSESSMENT CRITERIA			SRX PIT LAKE[A]			RAS PIT LAKE[A]			REHAB TSF RUNOFF	PREDICTED SC01 WQ[C]			PREDICTED RS03 WQ[D]		
ANALYTE	UNITS	ANZG 80%	ANZG 90%	ANZG 95%	Max	Mean	Median	Max	Mean	Median	Source Term	Max	Mean	Median	Max	Mean	Median
Al	µg/L	150	80	55	31.0	21.8	21.7	121	112	117	155	13.3	10.4	10.6	3.0	2.8	2.8
Alkalinity	mg/L	--	--	--	286	236	237	662	615	638	141	153	148	148	127	110	110
As	µg/L	140	42	13	113	86.6	86.2	436	404	421	20	7.5	4.5	4.5	0.3	0.3	0.3
B	µg/L	2500	1500	940	51.7	32.1	30.9	58.3	54.3	56.2	64	586	193	136	42.2	24.1	22.6
Ca	mg/L	--	--	--	73.7	59.3	59.3	211	196	204	15.68	154	104	103	42.8	38.2	38.1
Cd	µg/L	0.8	0.4	0.2	0.08	0.07	0.07	0.13	0.12	0.12	0.1	0.11	0.09	0.09	0.07	0.07	0.07
Cl	µg/L	--	--	--	11.6	9.23	9.19	19.3	18.0	18.6	3.1	237	117	112	7.12	5.19	5.09
Co	µg/L	1.4	1.4	1.4	2.34	0.45	0.24	0.58	0.54	0.56	0.5	1.1	0.4	0.2	0.04	0.01	<0.01
Cr	µg/L	40	6	1	0.51	0.45	0.45	0.68	0.63	0.65	0.5	0.30	0.25	0.25	0.01	0.01	0.01
Cu	µg/L	2.5	1.8	1.4	0.59	0.52	0.52	1.14	1.06	1.10	1	0.29	0.24	0.24	0.01	0.01	0.01
DOC	mg/L	--	--	--	1.19	0.82	0.81	0.32	0.09	0.09	2.01	0.95	0.79	0.79	1.72	1.33	1.34
F	µg/L	7400	3400	1700	577	299	266	269	251	260	340	2930	1490	1410	510	250	215
Fe	µg/L	730	430	280	677	538	541	72.6	67.4	70.1	140	76	67	67	119	102	101
Hg	µg/L	5.4	1.9	0.6	0.20	0.15	0.15	0.21	0.06	0.06	<0.01	0.1	0.1	0.1	0.2	0.2	0.2
K	mg/L	--	--	--	33.88	13.29	11.00	12.5	11.6	12.1	8.66	292	105	85	34	13.7	11.5
Mg	mg/L	--	--	--	55.4	39.1	38.9	200	186	193	1.95	38.3	29.5	29.4	11.2	9.59	9.55
Mn	µg/L	3600	2500	1900	44.1	19.7	17.0	16.7	15.6	16.1	11.5	62	27.4	23.4	5.5	2.3	2
Mo	µg/L	34	34	34	42.5	14.7	11.6	24.2	22.4	23.4	147	15.2	7.8	7	0.8	0.3	0.2
NO3-N	mg/L	--	--	--	9.24	4.68	4.64	36.2	4.43	3.66	0.4[B]	0.32	0.11	0.08	0.03	0.02	0.02
Na	mg/L	--	--	--	73.2	44.7	42.3	47.4	44.3	45.5	32.9	558	245	204	55.8	29.7	26.8
Ni	µg/L	17	13	11	0.71	0.46	0.44	1.03	0.96	1.00	0.5	4.2	2	2	0.02	0.01	0.01
Pb	µg/L	9.4	5.6	3.4	0.22	0.19	0.19	0.38	0.35	0.36	0.19	0.3	0.2	0.2	0.01	0.01	0.01
Sb	µg/L	17	13	9	142	50.6	40.4	8.50	7.88	8.21	49	27.4	11.1	9.5	2.8	1	0.8
Se	µg/L	34	18	11	8.62	3.87	3.35	1.92	0.77	0.77	25	2.4	1.5	1.4	0.2	0.1	0.1
SO4	mg/L	500	--	--	176	122	121	756	700	730	470	408	211	189	42.3	22.7	20.6
Sr	µg/L	--	--	--	1230	760	782	953	882	920	670	442	345	339	23.1	14.4	14.9
Tl	µg/L	--	--	--	0.30	0.24	0.24	0.35	0.33	0.34	0.25	0.18	0.16	0.16	0.2	0.18	0.18
TOC	mg/L	--	--	--	1.19	0.82	0.81	0.32	0.09	0.09	2.01	0.89	0.74	0.75	1.65	1.32	1.32
U	µg/L	0.5	0.5	0.5	13.3	5.6	4.8	11.4	10.6	11.0	53	34.6	12.6	9.9	3.2	1.3	1.1
V	µg/L	6	6	6	5.70	2.25	1.87	0.68	0.63	0.65	0.5	5.3	1.8	1.5	0.6	0.2	0.2
Zn	µg/L	31	15	8	2.30	2.00	2.00	5.70	5.29	5.50	1	0.7	0.6	0.6	0.003	0.003	0.003

A. Predicted water quality pre-treatment

B. Runoff source term expressed as NO_3-N+NH_4-N

C. Post-treatment predicted WQ as presented in the BOGP Water Load Balance Model Report (MWM, 2025). Relevant for the assessment of water quality in the Shepherds Creek existing and constructed wetlands.

D. Post-treatment predicted WQ as presented in the BOGP Water Load Balance Model Report (MWM, 2025). Relevant for the assessment of water quality in the Rise and Shine Creek existing wetland.

Pit Lakes

As discussed in Table 2, the RAS and SRX pit lakes are not natural ecological environments, and as such have environmental values best aligned to the ANZG 80% SPLs.

SRX Pit Lake

For the SRX pit lake, four metals, are predicted to potentially exceed the 80% SPL, as follows:

- Cobalt (Co) reported a maximum value of 2.34 μg/L compared to the 80% SPL (1.4 μg/L) resulting in a low HQ = 1.7. Both the mean and the median were substantially below the 80% SPL suggesting that Co exceedances are likely to be infrequent and therefore represent acute events that are unlikely to pose a detrimental risk to the ecological values within the SRX pit lake.
- Similarly, molybdenum (Mo) reported a maximum value of 42.5 μg/L that marginally exceeded the 80% SPL (34 μg/L) resulting in a low HQ = 1.25. Both the mean and the median were substantially below the 80% SPL suggesting that Mo exceedances are likely to be infrequent and therefore represent acute events that are unlikely to pose a detrimental risk to the ecological values within the SRX pit lake.
- The maximum, mean, and median values for antimony (Sb) exceeded the 80% SPL with the Sb maximum concentration HQ = 8. Antimony (Sb) concentrations exhibit geologically-related enrichment in association with the mineralised environment, and therefore it is expected that natural ecosystem species adaptation is present.
- The maximum, mean, and median values for uranium (U) exceeded the 80% SPL with the U maximum concentration HQ = 26.6 and the mean and median HQ ~10. While these exceedances are substantial, they are characteristic of the naturally mineralised setting and should not be interpreted as evidence that adverse ecological effects will occur. Rather, they indicate the potential for effects and the need to consider site-specific factors such as natural background concentrations, uranium bioavailability, exposure duration, and the degree to which local ecological communities may be adapted to elevated metal concentrations.

The maximum, mean and median concentrations for As and Fe additionally exceeded the 90% SPL, noting that this is a higher ecological value than has been assessed as appropriate for the pit lakes. The HQs for these metals are low (As HQ <2.7, Fe HQ <1.5) suggesting infrequent low toxicity risks to the pit lake ecosystem.

Concentrations of the remainder of the analytes were below the 95% SPLs, as applicable.

RAS Pit Lake

For the RAS pit lake, three metals are predicted to be present at concentrations above the 80% SPL:

- The maximum, mean and median values for As and SO_4 exceeded the 80% SPL, reporting maximum HQ values of 3.1 and 1.5, respectively. While these exceedances indicate the potential for ecological effects, the concentrations of As and SO_4 are only moderately above the guideline values and therefore suggest a potential rather than certain risk of adverse effects,

particularly in the context of the geological environment that is naturally enriched in these elements within the ore zones.

- The maximum, mean and median values for U also exceeded the 80% SPL reporting a maximum HQ = 22.8. Similar to the SRX pit lake, site-specific factors associated with U, such as natural background concentrations, bioavailability, and exposure duration, need to be taken into consideration to assess the degree to which local ecological communities may be adapted to elevated metal concentrations.

Additionally, the maximum, mean and median concentrations for Al exceeded the 90% SPL, noting that this is a higher ecological value than has been assessed as appropriate for the pit lakes. The HQ for Al is low (≤1.5) suggesting infrequent low toxicity risks to the pit lake ecosystem.

Concentrations of the remainder of the analytes were below the 95% SPLs, as applicable.

TSF Wetland

The TSF Wetland will receive overland runoff across the TSF surface. The source term for this water quality was derived in MWM (2025b). As the TSF wetland is intended to provide a replacement wetland habitat, it was assigned a higher ecological value (ANZG 90% SPL) than the pit lakes. The following metals were predicted to potentially exceed ANZG 90% SPLs:

- Metals including aluminium (Al) (HQ = 1.9), Mo (HQ = 4.3), Sb (HQ = 11.4), Se (HQ = 1.3) reported marginally elevated concentrations with low HQs indicative of the potential for ecological effects as opposed to a certainty of effects occurring.
- Uranium (U) was predicted to occur at a concentration up to 53 μg/L (HQ = 106). Similar to the pit lakes, site-specific factors associated with U, such as natural background concentrations, bioavailability, and exposure duration, need to be taken into consideration to assess the degree to which local ecological communities may be adapted to elevated U concentrations.

Concentrations of the remainder of the analytes were below the 95% SPLs, as applicable.

Existing and Constructed Wetlands

The existing wetlands within Shepherds Creek above monitoring location SC01 and within Rise and Shine Creek above RS01/RS03 are proposed to be enhanced to offset habitat loss in other areas of the mine footprint, and as a result of increased flow from the mining activities. Water received through these wetlands will undergo active and/or passive treatment prior to discharge to achieve environmental compliance outcomes at the compliance monitoring points.

As these wetlands are intended to offset the loss of other wetland habitats, they were assigned a high ecological value (ANZG 95% SPL).

<u>Shepherds Creek Existing and Constructed Wetlands</u>

The following metals are predicted to potentially exceed ANZG 90% SPLs:

- Antimony (Sb) reported a maximum concentration above the 90% SPL (13 μg/L) with the maximum concentration (27.4 μg/L) also exceeding the 80% SPL (17 μg/L). The HQ at 90%

SPL was low (2.1) indicative of the potential for ecological effects as opposed to a certainty of effects occurring.

- Uranium (U) was predicted to occur at a concentration up to 34.6 μg/L (HQ = 69). Similar to the other surface water expressions, site-specific factors associated with U, such as natural background concentrations, bioavailability, and exposure duration, need to be taken into consideration to assess the degree to which local ecological communities may be adapted to elevated U concentrations.

Concentrations of the remainder of the analytes were below the 95% SPLs, as applicable, suggesting that with the few exceptions noted above the wetland will meet the definition of a slightly to moderately disturbed ecosystem, consistent with the current values observed within Shepherds Creek.

Rise and Shine Creek Existing Wetland

Only uranium (U) was predicted to occur at a concentration that would exceed the 90% SPL with a concentration up to 3.2 μg/L (HQ = 6.4). The predicted concentrations in Rise and Shine Creek are substantially lower than that predicted for other surface water expressions in the project area and are indicative of the potential for ecological effects as opposed to a certainty of effects occurring.

Concentrations of the remainder of the analytes were below the 95% SPLs, as applicable, suggesting that with the exceptions noted above the wetland will meet the definition of a slightly to moderately disturbed ecosystem.

ECOTOXICITY RISK ASSESSMENT

Based on the evaluation of available water quality data, the following conclusions are drawn with respect to the ecotoxicity risks associated with the pit lakes, and wetland surface water expressions.

Pit Lake Ecotoxicity Risk Assessment

The predicted water quality in the SRX and RAS pit lakes presents a low ecological risk given the limited ecological values expected to be present within these systems. Both pit lakes will comprise closed, steep-walled waterbodies with restricted littoral habitat, limiting the diversity and abundance of aquatic biota. The principal ecological receptors are therefore expected to be opportunistic macroinvertebrates and migratory waterbirds. While some metals and metalloids exceed the 80% SPL, most exceedances are either minor (HQ <2 to 3) or are associated with naturally elevated background concentrations within the mineralised environment.

The higher HQs reported for Sb and U represent a potential for ecological effects; however, these results should be interpreted cautiously given the conservative nature of the ANZG guideline values, the naturally enriched geochemical setting, uncertainties regarding metal bioavailability, and the likelihood that exposure will be limited to a relatively simple ecological community with a broad habitat. These identified exceedances represent a screening-level indication of potential risk that should be considered in the context of the limited ecological values anticipated within the pit lake environments.

In particular, the relatively small size of the pit lakes, particularly the SRX pit lake (approximately 15 ha), limits their capacity to provide regionally significant aquatic habitat. Although the larger RAS pit lake (approximately 64 ha) may attract some waterbirds, neither pit lake is expected to provide the shallow littoral zones, extensive emergent vegetation, or productive wetland habitats typically favoured

by large numbers of resident or migratory waterbirds. Any use by migratory species is therefore expected to be opportunistic and transient rather than representing a key habitat resource. Consequently, the likelihood of population-level effects on migratory bird species arising from the predicted water quality is considered low.

On this basis, the available evidence suggests that the pit lakes are unlikely to support ecological communities of sufficient diversity, abundance or conservation significance for the predicted water quality exceedances to result in significant adverse ecological effects at either the local ecosystem scale or for migratory bird populations.

TSF Wetland Risk Assessment

The TSF wetland is predicted to present a moderate ecotoxicity risk, driven primarily by U, with low to moderate risks associated with Al, As, Mo, Sb and Se. At a screening level, the predicted elevated U concentration indicates the potential for adverse effects on sensitive aquatic organisms, including aquatic invertebrates and potentially wetland vegetation. However, as with the pit lakes, the significance of this risk remains uncertain and should be interpreted in the context of site-specific factors such as natural background concentrations, speciation and bioavailability, water chemistry conditions, and exposure duration. These factors may substantially influence actual toxicity and the capacity of local species to tolerate elevated U concentrations.

Given the size of the wetland and the range of habitat types expected to develop over time, localised effects on sensitive aquatic biota may occur, but these constituents are not considered likely to preclude establishment of the intended wetland ecosystem.

Potential risks to higher trophic level receptors (i.e. wetland birds, reptiles, predatory birds, and livestock) are considered limited. Physical controls will be implemented to prevent livestock access to the TSF Wetland, resulting in an incomplete exposure pathway and therefore negligible risk to livestock. While establishment of the TSF Wetland may attract additional bird species, particularly waterfowl and other wetland-dependent fauna, this would represent an ecological improvement relative to the existing and pre-mining habitat condition rather than creating a risk to an established high-value receptor community.

The relatively large size of the wetland (6.5 ha) has the potential to provide a diversity of habitat types and ecological niches that may support spatial variability in water quality and ecological exposure. This may reduce the likelihood that the entire wetland ecosystem would be uniformly affected by elevated constituent concentrations.

Consequently, while screening-level assessment identifies U as a potentially significant ecotoxicological stressor, the overall ecological risk to the intended wetland community is moderated by the artificial nature of the habitat, the currently low baseline wetland fauna values in the catchment, restricted livestock access, and the anticipated net biodiversity benefit associated with wetland creation.

Existing and Constructed Wetland Risk Assessment

The proposed constructed wetlands are intended to achieve no net loss of ecological values and stream function, consistent with the freshwater ecological effects assessment. The wetlands are expected to provide habitat for terrestrial fauna, including riparian birds, lizards, terrestrial invertebrates, and other wetland-dependent species. Livestock access will be limited, reducing the importance of livestock as a primary receptor.

From an ecotoxicological perspective, the Lower Shepherds Creek wetlands and the Rise and Shine Creek wetland are considered to have moderate ecological value, with the most important receptors being aquatic macroinvertebrate communities, aquatic vegetation, stream habitat, riparian fauna, and associated ecosystem processes, rather than fish populations. The water quality in the existing and proposed constructed wetlands in Shepherds and Rise and Shine Creeks is predicted to present a low ecological risk to potential terrestrial and aquatic receptors due to limited predicted water quality exceedances at the 90% SPLs.

While screening-level assessment identifies Sb and U as moderately significant ecotoxicological stressor in Shepherds Creek, the overall ecological risk to the intended wetland community is moderated by the artificial nature of the habitat, the currently low baseline wetland fauna values in the catchment, restricted livestock access, and the anticipated net biodiversity benefit associated with wetland creation. The principal ecological receptors are macroinvertebrates, aquatic vegetation, riparian fauna, and wetland ecosystem processes. Fluoride (F) and Sb may cause occasional or localised effects but are not predicted to result in major ecological degradation.

In Rise and Shine Creek, only U has been predicted to be elevated above 90% SPLs, consistent with water quality in all other catchments. The increased volume of water discharged into the catchment may help to moderate current As impacts present in the sediments and surface water in association with historical mining activities, as the additional flow introduced to the catchment may potentially dilute historically observed As concentrations.

COMPARISON OF CRITERIA TO HUMAN HEALTH RISK ASSESSMENT CRITERIA

In order to assess potential human risks that may be exposed to the receiving water body surface water expressions, predicted water quality has conservatively been screened against the New Zealand Drinking Water Maximum Allowable Values (DW MAVs) with human health risks further considered for those elements that exceed the DW MAVs as presented in Table 4. This is a conservative approach given that none of these surface water expressions represent a direct drinking water resource exposure pathway for humans.

Key findings of this assessment are summarised as follows:

- Maximum, mean, and median concentrations of As in both the SRX and RAS pit lakes is predicted to exceed DW MAV with a HQ >8 for the SRX pit lake and a HQ >40 for the RAS pit lake. Additionally, the maximum, mean, and median concentrations of Sb is predicted to exceed the DW MAV in the SRX pit lake with an HQ <7.
- The predicted water quality for the TSF runoff which represents potential water quality within the TSF wetland, marginally exceeded the DW MAV for As (HQ = 2), Sb (HQ = 2.5), and U (HQ = 1.7).
- The predicted water quality within the Shepherds Creek wetland reported maximum concentrations of fluoride (F) (HQ = 1.9), Sb (HQ = 1.4), and U (HQ = 2) marginally above the DW MAV.
- No DW MAV exceedances were reported for the wetlands in Rise and Shine Creek.

Table 4: Predicted water quality associated with surface water expressions with comparison to the NZ DW MAVs.

		HUMAN HEALTH ASSESSMENT CRITERIA	SRX PIT LAKE[A]			RAS PIT LAKE[A]			REHAB TSF RUNOFF	PREDICTED SC01 WQ[C]			PREDICTED RS03 WQ[D]		
ANALYTE	UNITS	DW MAV	Max	Mean	Median	Max	Mean	Median	Source Term	Max	Mean	Median	Max	Mean	Median
Al	µg/L	1000	31.0	21.8	21.7	121	112	117	155	13.3	10.4	10.6	3.0	2.8	2.8
Alkalinity	mg/L	--	286	236	237	662	615	638	141	153	148	148	127	110	110
As	µg/L	10	113	86.6	86.2	436	404	421	20	7.5	4.5	4.5	0.3	0.3	0.3
B	µg/L	2400	51.7	32.1	30.9	58.3	54.3	56.2	64	586	193	136	42.2	24.1	22.6
Ca	mg/L	--	73.7	59.3	59.3	211	196	204	15.68	154	104	103	42.8	38.2	38.1
Cd	µg/L	4	0.08	0.07	0.07	0.13	0.12	0.12	0.1	0.11	0.09	0.09	0.07	0.07	0.07
Cl	µg/L	--	11.6	9.23	9.19	19.3	18.0	18.6	3.1	237	117	112	7.12	5.19	5.09
Co	µg/L	--	2.34	0.45	0.24	0.58	0.54	0.56	0.5	1.1	0.4	0.2	0.04	0.01	<0.01
Cr	µg/L	50	0.51	0.45	0.45	0.68	0.63	0.65	0.5	0.30	0.25	0.25	0.01	0.01	0.01
Cu	µg/L	2000	0.59	0.52	0.52	1.14	1.06	1.10	1	0.29	0.24	0.24	0.01	0.01	0.01
DOC	mg/L	--	1.19	0.82	0.81	0.32	0.09	0.09	2.01	0.95	0.79	0.79	1.72	1.33	1.34
F	µg/L	1500	577	299	266	269	251	260	340	2930	1490	1410	510	250	215
Fe	µg/L	--	677	538	541	72.6	67.4	70.1	140	76	67	67	119	102	101
Hg	µg/L	7	0.20	0.15	0.15	0.21	0.06	0.06	<0.01	0.1	0.1	0.1	0.2	0.2	0.2
K	mg/L	--	33.88	13.29	11.00	12.5	11.6	12.1	8.66	292	105	85	34	13.7	11.5
Mg	mg/L	--	55.4	39.1	38.9	200	186	193	1.95	38.3	29.5	29.4	11.2	9.59	9.55
Mn	µg/L	400	44.1	19.7	17.0	16.7	15.6	16.1	11.5	62	27.4	23.4	5.5	2.3	2
Mo	µg/L	--	42.5	14.7	11.6	24.2	22.4	23.4	147	15.2	7.8	7	0.8	0.3	0.2
NO3-N	mg/L	11.3	9.24	4.68	4.64	36.2	4.43	3.66	0.4[B]	0.32	0.11	0.08	0.03	0.02	0.02
Na	mg/L	--	73.2	44.7	42.3	47.4	44.3	45.5	32.9	558	245	204	55.8	29.7	26.8
Ni	µg/L	80	0.71	0.46	0.44	1.03	0.96	1.00	0.5	4.2	2	2	0.02	0.01	0.01
Pb	µg/L	10	0.22	0.19	0.19	0.38	0.35	0.36	0.19	0.3	0.2	0.2	0.01	0.01	0.01
Sb	µg/L	20	142	50.6	40.4	8.50	7.88	8.21	49	27.4	11.1	9.5	2.8	1	0.8
Se	µg/L	40	8.62	3.87	3.35	1.92	0.77	0.77	25	2.4	1.5	1.4	0.2	0.1	0.1
SO4	mg/L	--	176	122	121	756	700	730	470	408	211	189	42.3	22.7	20.6
Sr	µg/L	--	1230	760	782	953	882	920	670	442	345	339	23.1	14.4	14.9
Tl	µg/L	--	0.30	0.24	0.24	0.35	0.33	0.34	0.25	0.18	0.16	0.16	0.2	0.18	0.18
TOC	mg/L	--	1.19	0.82	0.81	0.32	0.09	0.09	2.01	0.89	0.74	0.75	1.65	1.32	1.32
U	µg/L	30	13.3	5.6	4.8	11.4	10.6	11.0	53	34.6	12.6	9.9	3.2	1.3	1.1
V	µg/L	--	5.70	2.25	1.87	0.68	0.63	0.65	0.5	5.3	1.8	1.5	0.6	0.2	0.2
Zn	µg/L	--	2.30	2.00	2.00	5.70	5.29	5.50	1	0.7	0.6	0.6	0.003	0.003	0.003

A. Predicted water quality pre-treatment

B. Runoff source term expressed as NO_3-N+NH_4-N

C. Post-treatment predicted WQ as presented in the BOGP Water Load Balance Model Report (MWM, 2025). Relevant for the assessment of water quality in the Shepherds Creek existing and constructed wetlands.

D. Post-treatment predicted WQ as presented in the BOGP Water Load Balance Model Report (MWM, 2025). Relevant for the assessment of water quality in the Rise and Shine Creek existing wetland.

HUMAN HEALTH RISK ASSESSMENT

A human health screening assessment was undertaken by comparing predicted surface water quality against the New Zealand DW MAVs. This approach is inherently conservative because none of the assessed surface water expressions are intended for potable use, recreational contact, or other direct human exposure pathways. Consequently, exceedance of a DW MAV does not necessarily indicate an unacceptable human health risk, but rather identifies contaminants that warrant further consideration.

Potential human exposure pathways are therefore limited, and primarily relate to:

- Indirect contact by site workers during operational activities.
- Secondary consumption of wildlife (e.g. game birds or other fauna that may utilise the wetlands or pit lakes).
- Potential future unintended uses of the water resources.

Pit Lakes

The highest DW MAV exceedances were predicted in the SRX and RAS pit lakes. Arsenic concentrations exceeded the DW MAV in both pit lakes, with hazard quotients (HQs) exceeding 8 for the SRX pit lake and 40 for the RAS pit lake. Antimony concentrations also exceeded the DW MAV within the SRX pit lake (HQ < 7).

While these exceedances would be of concern if the pit lakes were used as a drinking water source, direct human exposure is not anticipated. The principal residual human health consideration is therefore the potential for bioaccumulation within wildlife that may utilise the pit lakes and subsequent ingestion of the wildlife (e.g. avifauna). Arsenic and antimony can accumulate in aquatic food webs; however, risks to humans via secondary consumption of wildlife are expected to be limited because:

- The pit lakes are not intended to support fisheries or food harvesting.
- Human consumption of wildlife associated with the site is expected to be infrequent.
- Bioaccumulation and biomagnification of As and Sb in wildlife are generally less pronounced than for contaminants such as mercury.

TSF Wetland

Predicted water quality within the TSF runoff wetland marginally exceeded the DW MAVs for arsenic (HQ = 2), antimony (HQ = 2.5), and uranium (HQ = 1.7).

These Sb and U exceedances identified in association with the TSF Wetland are relatively minor, with HQ values less than 3. Given the absence of a direct water consumption ingestion pathway, these exceedances are unlikely to pose a material human health risk. The wetland may provide habitat for birds and other fauna, but the modest exceedances and limited opportunity for human exposure suggest that risks associated with the secondary consumption of wildlife would be low. Uranium is not generally considered to significantly biomagnify through food webs, reducing the likelihood of meaningful exposure through consumption of wetland-associated fauna.

Shepherds Creek Wetlands

Within the Shepherds Creek wetland, maximum concentrations of fluoride (HQ = 1.9), antimony (HQ = 1.4), and uranium (HQ = 2) marginally exceeded DW MAVs.

These exceedances are small and occur within a wetland system that is not directly used for potable supply or recreation. Human exposure pathways are therefore highly restricted. Although birds and other terrestrial fauna may utilise the wetland, the predicted concentrations are unlikely to result in sufficient bioaccumulation to present a significant human health risk through secondary consumption of wildlife. Uranium (U) and F generally exhibit limited biomagnification potential, while Sb is not typically associated with significant trophic transfer within aquatic food webs. With respect to secondary consumption of wildlife, the predicted concentrations are unlikely to result in substantial bioaccumulation within birds or other terrestrial fauna using the wetland. Consequently, human exposure through the harvesting and consumption of wildlife is expected to remain low.

Unlike some the other surface water expressions within the BOGP, the Shepherds Creek wetland occurs in an area where surface water loses flow to the subsurface and contributes recharge to the underlying aquifer system, which is recognised as having drinking water value. A potential indirect human exposure pathway exists through the migration of constituents from the wetland to groundwater.

The relevance of this pathway may depend on several factors, including infiltration rates, attenuation within wetland sediments and the vadose zone, groundwater flow paths, dilution within the receiving aquifer, geochemical controls on contaminant mobility, and migration distance to any existing or future groundwater abstraction points. Noting that only maximum concentrations of F, Sb, U are predicted to exceed the DW MAVs, a continuously elevated source of these constituents is not expected, and given the large catchment area, the localised area of the wetland (i.e. <2 Ha) is unlikely to represent a meaningful source that could compromise the beneficial use of the aquifer for drinking water purposes.

Rise and Shine Creek Wetlands

No DW MAV exceedances were predicted for the Rise and Shine Creek wetlands. Consequently, no unacceptable human health risks are anticipated for any plausible exposure pathway, including secondary consumption of wildlife.

CONCLUSIONS

Based on this ecotoxicological assessment of the existing and proposed surface water expressions associated with the BOGP project area the following key conclusions are drawn with respect to ecotoxicological risks:

- Water quality within the pit lakes poses the highest potential risk to ecological receptors, primarily avifauna, however the likelihood of adverse impacts to avifauna is considered to be relatively low on the basis that the pit lakes are unlikely to support a diverse littoral and aquatic habitat, the metals predicted to be potentially elevated are not highly bioaccumulative, and more desirable alternate habitats are available in the region.
- Water quality within the existing and proposed wetlands is predicted to exhibit some limited exceedances of freshwater values, however, these exceedances are likely to be intermittent and present a low ecological risk to potential terrestrial and aquatic receptors. The overall ecological risk to the intended wetland communities is moderated by the artificial nature of the

habitats, the currently low baseline wetland fauna values in the catchment, restricted livestock access. The anticipated net biodiversity benefit associated with wetland creation is expected to outweigh the limited risks associated with the intermittent water quality exceedances that are predicted to potentially occur within the wetlands.

- The surface water expressions within the project area are not predicted to exhibit water quality that represents a significant human health risk. Viable ingestion and direct contact pathways are limited and temporally intermittent and therefore are considered unlikely to result in complete exposure pathways.

On-going water quality and ecological monitoring and management is proposed throughout the mine life cycle, to confirm environmental performance objectives are met and enable adaptive management to be undertaken to mitigate any potential adverse impacts to the terrestrial, avian, and aquatic ecosystems.

CLOSING REMARKS

We trust that the information provided adequately addresses the matters raised in the Request for Information. Should the assessing authority require any further clarification or additional information, we would welcome the opportunity to assist. We appreciate your consideration of this response in progressing the assessment of the application.

GEOCONTAM RISK MANAGEMENT PTY LTD

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REFERENCES

ANZG. 2026. Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Australian and New Zealand Governments, Canberra. https://www.waterquality.gov.au/anz-guidelines.

HGG. 2026. BOGP Wetland Hydrology Analysis. Prepared for Matakanui Gold Ltd. 22 June 2026. J-H-NZ0238-005-M-Rev0.

Kōmanawa Solutions Ltd (KSL), 2025. Rise & Shine Gold Project – Surface Water & Catchment Existing Environment & Effects Assessment. Report for Matakanui Gold Limited. RN: Z24002BOG2-Rev2. Dated 19 August 2025.

MWM. 2025a. Source Term Definition Report – Bendigo-Ophir Gold Project. Prepared for Matakaui Gold Limited. 5 August 2025. J-NZ0475-001-R-Rev2.

MWM. 2025b. Water and Load Balance Model Report – Bendigo-Ophir Gold Project. Prepared for Matakaui Gold Limited. 10 October 2025. J-NZ0233-016-R-Rev1.

New Zealand Government. 2022. Water Services (Drinking Water Standards for New Zealand) Regulations 2022. Secondary Legislation 2022/168. Wellington, New Zealand. Available at: https://www.legislation.govt.nz/regulation/public/2022/0168/latest/whole.html.