WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

Expert Witness Statement of Tony McAlister

In the matter of the Fingerboards Mineral Sand Project EES – Water Quality

Kalbar Operations Pty Ltd

February 2021

1 INTRODUCTION

I, Tony McAlister, was engaged by Kalbar Operations Pty Ltd (Kalbar) to provide expert evidence in respect to water resources and water quality for the proposed Fingerboards Mineral Sands Mine.

Statement of Engagement, Qualifications and Experience:

- I have prepared this Witness Statement at the request of Kalbar's legal advisers, White & Case.
- I am a Senior Principal Engineer and Director at Water Technology Pty. Ltd. I hold a Bachelor's Degree in Civil Engineering (1st Class Honours) from James Cook University and a Master's Degree in Civil Engineering from the University of Queensland. I have 35 years' professional consulting engineering experience.
- A copy of my curriculum vitae is provided in Appendix A of this report.
- This statement is prepared as an independent and impartial report.
- I accept that I have an overriding duty to the Inquiry and Advisory Committee to assist impartially on matters relevant to my area of expertise, that my paramount duty is to the Inquiry and Advisory Committee and not to any party to the proceedings (including the entity retaining me), and that I am not an advocate for any party.
- I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Committee.

2 SCOPE

2.1 Role in Preparation of the EES

Water Technology prepared the following reports to support and inform the proposed mine application:

- "Fingerboards Mineral Sands, Surface Water Assessment – Site Study", dated 30 April, ref: 6319-01_R01V08, included in Appendix A006 (Appendix E) of the EES;
- "Fingerboards Mineral Sands, Surface Water Assessment – Regional Study", dated 30 April, ref: 6319-01_R02V09_Regional, included in Appendix A006 (Appendix F) of the EES; and
- "Fingerboards Mineral Sands, Landscape Stability and Sediment Transport Regime Assessment", dated 30 April, ref: 5949-01_R01V10_Fingerboards_Landform_Stability_Final, included in Appendix A006 (Appendix C) of the EES.

The water resources and water quality components of the above reports were prepared by staff at Water Technology, principally Jenna Parker, under my supervision. My role in the project was to lead all water resources and water quality modelling and impact assessment aspects of the work undertaken and to provide a detailed response to submissions in this regard. As catchment flows and water resources matters relate to water quality matters, I oversaw the eWater Source modelling conducted for the project by Dr Kris Latu (who is no longer with Water Technology). I was also involved in one meeting in Bairnsdale with/presentation to the EES Technical Reference Group. My evidence therefore relates to water quality, water resource and large-scale catchment hydrologic modelling aspects of the project, and specifically excludes flooding matters.

The assessments undertaken by Water Technology under my supervision were aimed at answering several of the key EES Scoping Requirement questions; namely:

- Potential for indirect effects on biodiversity values including but not limited to effects associated with changes in hydrology (including surface and ground water changes), hydrogeology, **water quality (i.e., on water dependent ecosystems), contaminants and pollutants (including nuclides),** dust emissions, weed, pathogen and pest animal, and risk of significantly increasing mortality of FFG and EPBC Acts listed species resulting from mine-related activities (e.g., road traffic).
- The potential for adverse effects on nearby and downstream water environments (including the Mitchell and Perry Rivers, King and Wellington Lakes, and Gippsland Lakes Ramsar wetland of international importance overall) due to changed **water quality, flow regimes or waterway conditions** during construction, operations, rehabilitation, decommissioning and post-closure.
- Ore, product, overburden, tailings and mining by-products management, in the context of potential **water quality impacts including those arising from sedimentation, release of radionuclides, other contaminants and pollutants, tunnel erosion, acid sulphate soils, acid/metalliferous drainage formation, and salinity**.
- Outline and assess measures for the management of soils to minimise potential adverse effects on local hydrology and **water quality** associated with project area soils.
- Use appropriate methods, including modelling, to identify and evaluate effects of the project and relevant alternatives on groundwater and adjacent surface water and floodplains environments, including changes to groundwater and **surface water quality** at all project phases, including effects from drawdown and rebound of groundwater levels in the vicinity of water supply bores, present contaminants (including radionuclides), as well as downstream and upstream effects on ecological values (e.g. groundwater dependent ecosystems, EPBC Act listed communities and the Gippsland Lakes Ramsar site);

In my opinion, the water quality and water resources/catchment hydrologic modelling undertaken by Water Technology addresses the EES scoping requirements above. The water quality and water resources/catchment hydrologic works were also informed by assessments relating to potential erosion, sedimentation and landform stability effects of the project completed by my colleague Dr Michael Cheetham.

I adopt the water quality and catchment hydrologic modelling in the Water Technology reports as the basis of my evidence, subject to the post—EES work described in Section 3.2 of my statement.

2.2 Other Persons Who Assisted

The following people assisted me in preparing this statement:

Jenna Parker (BSc): Jenna undertook the water quality components of the study under my supervision. Jenna assisted me in my detailed review of the water quality modelling works.

2.3 Instructions

Instructions given to me to prepare this statement are included in Appendix B.

2.4 Methodology

The water resources and water quality assessments undertaken by Water Technology involved the following:

- The collation and review of all available background data on land use, rainfall, stream flow and water quality in the local area, specifically focusing on the Mitchell and Perry River systems, their tributaries and catchments.

- The construction, testing, calibration and validation of an eWater Source model of the catchments of the Mitchell and Perry River systems. The model was calibrated to available stream flow data for sites in the Mitchell River system. The Perry Catchment Model was not calibrated due to a lack of suitable quality observed flow data. The model adopted the calibrated model parameters from the middle reach of the Mitchell Catchment model.
- The extraction of relevant hydrologic model coefficients from the calibrated eWater Source model and the provision of these coefficients to EMM to enable them to separately simulate site water balance behaviour, now and for the respective time periods/stages of site development and operations listed below. This was an important step in order to ensure compatible and consistent behaviour of both the EMM and Water Technology hydrologic models.
- The substitution of relevant Fingerboards site subcatchment specific results in the base case eWater Source model with EMM model predictions for the respective time periods/stages of site development and operation listed below. This enabled and supported impact assessments to be conducted using the eWater Source model and other tools discussed below.
- The development of spreadsheet-based water quality impact assessment tools in order to evaluate how the condition of the site and associated water management regime for the respective time periods/stages of site development listed below may affect water quality in the Mitchell and Perry River systems and Gippsland Lakes.
- The population of these spreadsheet-based water quality impact assessment tools with a range of appropriate water quality constituent concentrations for substances that either were of potential concern or which may be present in catchment and site run-off, both now and for the respective time periods/stages of site development and operations listed below.
- To inform the above task, a range of bespoke laboratory bench scale assessments were conducted using samples of site soil from various vertical strata and locations that may be disturbed by site operations. These works were conducted in order to estimate relevant water quality constituent concentrations in runoff from the site and in various 'processed' water streams as the project proceeds.
- The collation of literature data and the collection of event-based rainfall-runoff samples and subsequent laboratory analysis of collected runoff samples from the site in its existing form to guide and inform spreadsheet-based water quality impact assessments. I note that the number of rainfall-runoff samples were limited - such event-based sampling over the past circa two-year period has been affected by the fact that there has been very little rainfall at the site - this however highlights the fact that the Fingerboards project location is within an area that has significantly lower rainfall than other portions of the Mitchell and Perry River catchments.
- All the above modelling tools and sources of insight into how the site may behave were then combined and used to inform overall site water quality impact assessments.
- Water quality assessments were then conducted of the existing case (where relevant) and three (3) mine operation scenarios, these being:
  - Year 5 of mining operations.
  - Year 8 of mining operations.
  - Year 15 of mining operations.

Key assumptions made in preparing the water resource and water quality assessments include:

- Flow data for the Perry River catchment was limited in available duration. As such, it was assumed that eWater Source model parameters derived from calibration of the adjacent Mitchell River model (which had a far longer data record) were directly transferable to the Perry River catchment.

- Water quality constituents of potential concern that were assessed were all assumed to be conservative in nature. That is, no allowance was made for any settlement, transformation, biological uptake or decay processes. As these processes will, in reality, all occur to different degrees for various constituents, this assumption should mean that the impact assessments which were conducted are, by their very nature, also conservative. That is, any predicted water quality changes should be greater than those that may occur in reality.
- Best estimates were made based on available data and assessments conducted by the study of the concentration of relevant water quality constituents in all types of water flowing from the site, now and in the future. It was assumed that these constituent concentrations will be constant in time. That is, no allowance was made for effects (if any) such as first flush or for changes in concentrations with different size rainfall/run-off events.

2.5 Limitations

Though this is not an exhaustive list, the following limitations apply to the water resources and water quality assessment undertaken:

- All assessments conducted by the study were based on available climatic data and no specific allowances were made for climate change, as is often required for resource/infrastructure projects. The risk of this limitation is considered small in this case given the relatively short timeframe that this project will be in operation (some 15 years) wherein climate change impacts should be slight. The fact that the final landform after site rehabilitation will be comparable to (if not better than) the site in its current condition also influenced the decision to not include climate change processes. I note that separate site scale modelling conducted by EMM considered climate change, however we did not replicate these assessments in our regional water balance modelling.
- There is a limitation regarding the knowledge of the quality of existing surface water run-off from the site and how this may influence base case assessments conducted by the project. Interestingly, though, this limitation also highlights a significant low risk element/aspect of the proposed operation. Even though Kalbar personnel have been on standby for some two years to collect samples of site run-off, in that period of time there have been limited opportunities whereby sufficient rainfall has occurred to generate appreciable run-off from within the site. As such, even though this is a limitation, the use of literature, data and the (minimal) sampling results should be sufficient for the purposes of these investigations, and the low volumes of site run-off further reduce the potential magnitude of this limitation. This matter is further quantified in regard to the additional investigations documented in Section 3.2 of this Expert Witness Statement.

3 FINDINGS

The following section summarises the outcomes of the Site and Regional Reports and water resource and water quality assessments undertaken under my supervision. I also provide a summary of the overall outcomes of all work undertaken by Water Technology to address EES submissions relating to water resources and water quality.

3.1 Summary of Opinions

Conclusions in respect to the water resource and water quality assessments are presented in Section 6 of the Regional Study Report. In my opinion, the key findings of the assessment are:

- The analysis undertaken determined that the mine may affect water resources and water quality in the Mitchell and Perry River systems in the following ways:
  - Flow Regime – The eWater Source modelling (informed by the EMM site water balance modelling) indicated that there are likely to be changes to runoff volumes flowing from the mine site into the Mitchell and Perry Rivers.
    - Within the Mitchell River catchment, the site provides such low volumes of runoff compared to the broader catchment that differences will be negligible (around -0.01% annual volume change). It should be noted that this analysis did not include the effects of proposed winter fill extraction from the Mitchell River.
    - The impact is slightly larger in the Perry River. Runoff to the Perry River from the site is predicted to have a maximum increase of 13% (for the 8-year mining scenario), which results in a 0.98% increase in average annual flows in the Perry River downstream of the mine site. These changes will not be measurable in the receiving waterways.
  - Water Quality – The analysis results indicate there will be no adverse impacts on the water quality of the receiving waters of the Mitchell and Perry Rivers.
    - The event-based analysis highlighted that intermittent site spillway flows from the freshwater dam (which may also contain mine contact water during extreme weather events) to the Mitchell River are quickly diluted due to high coincident background flows. The long-term analysis highlighted that environmental WQO's were not exceeded at any mining stage, therefore all beneficial uses are protected in adjacent and downstream receiving waters.
    - The minor increases in predicted annual sediment loads to the Mitchell River under the year 5 and year 15 mining scenarios are not expected to impact the ecological character of the Gippsland Lakes due to their negligible size in comparison to the variability and scale of existing sediment inputs to the system from the Mitchell River and other tributaries.
    - For the Perry River, the long-term data analysis indicated no material impact from sediment, nutrients and metals. The event-based analysis highlighted that TSS concentrations may increase above background levels for short periods of time. Despite this, the long-term analysis indicated no exceedances of the relevant turbidity WQO.

The modelling of water quality impacts of discharging treated water into the Mitchell River was conservative in a number of respects. Notably, it did not allow for the beneficial water quality impacts associated with the application of flocculants to water in the storage dams to reduce TSS, and also made no allowance for the high likelihood that treated water will mix with Mitchell River winter fill water in the storage dams prior to its discharge during extreme weather events.

There are several steps that the Fingerboards Mine can take to further minimise or offset the potential impacts, such as the installation of progressively more efficient clean water bypass infrastructure and water treatment

infrastructure (sedimentation ponds, swale drains etc.) with learnings from site operations as the mine proceeds. The Conceptual Surface Water Management Strategy by EMM addresses some of these matters; however, it is recommended that the strategy be reviewed in light of these study findings.

3.2 Additional Investigations

3.2.1 Rainfall Assessments

As highlighted earlier in this statement, the collection of baseline/background stormwater run-off samples from the Fingerboards site over the past circa two-year period has been affected by the fact that there has been very little rainfall (and as shown below, the site is in an area where such low rainfalls are not unusual). This highlights the fact that the Fingerboards site is located within an area that has significantly lower rainfall than other portions of the Mitchell and Perry River catchments. In this regard, I felt it necessary to undertake additional analysis to quantify and illustrate the nature of this process. Importantly, as well as being of general interest, this low rainfall pattern across the site highlights the low risk that is associated with operation of the mine on the site as there will be reduced probability of high rainfall volumes impacting the site, meaning that management of the site water regime will be far easier than were the site located in an area exposed to higher incident rainfalls.

To illustrate this process, under my instruction staff from Water Technology obtained gridded historical rainfall data for the entirety of the Mitchell and Perry River catchments from the SILO web site (https://www.longpaddock.qld.gov.au/silo/). SILO is a database of Australian climate data from 1889 to the present. It provides meteorological datasets for a range of climate variables in ready-to-use formats suitable for biophysical modelling, research and climate applications. SILO uses interpolation techniques to construct spatial grids using recorded data and to infill gaps in time series datasets. These data were used to prepare the image shown in Figure 3-1, which is the pattern of annual average rainfall across the Mitchell and Perry River catchments for the last 20 years. The Fingerboards site is also shown in this figure. Based on inspection and analysis of these data, the annual average rainfall on the site is 630 mm/year, whereas most of the catchment upstream of the site has annual average rainfalls of the order of 1,000 mm/year, or almost 50% greater than that of the Fingerboards site.

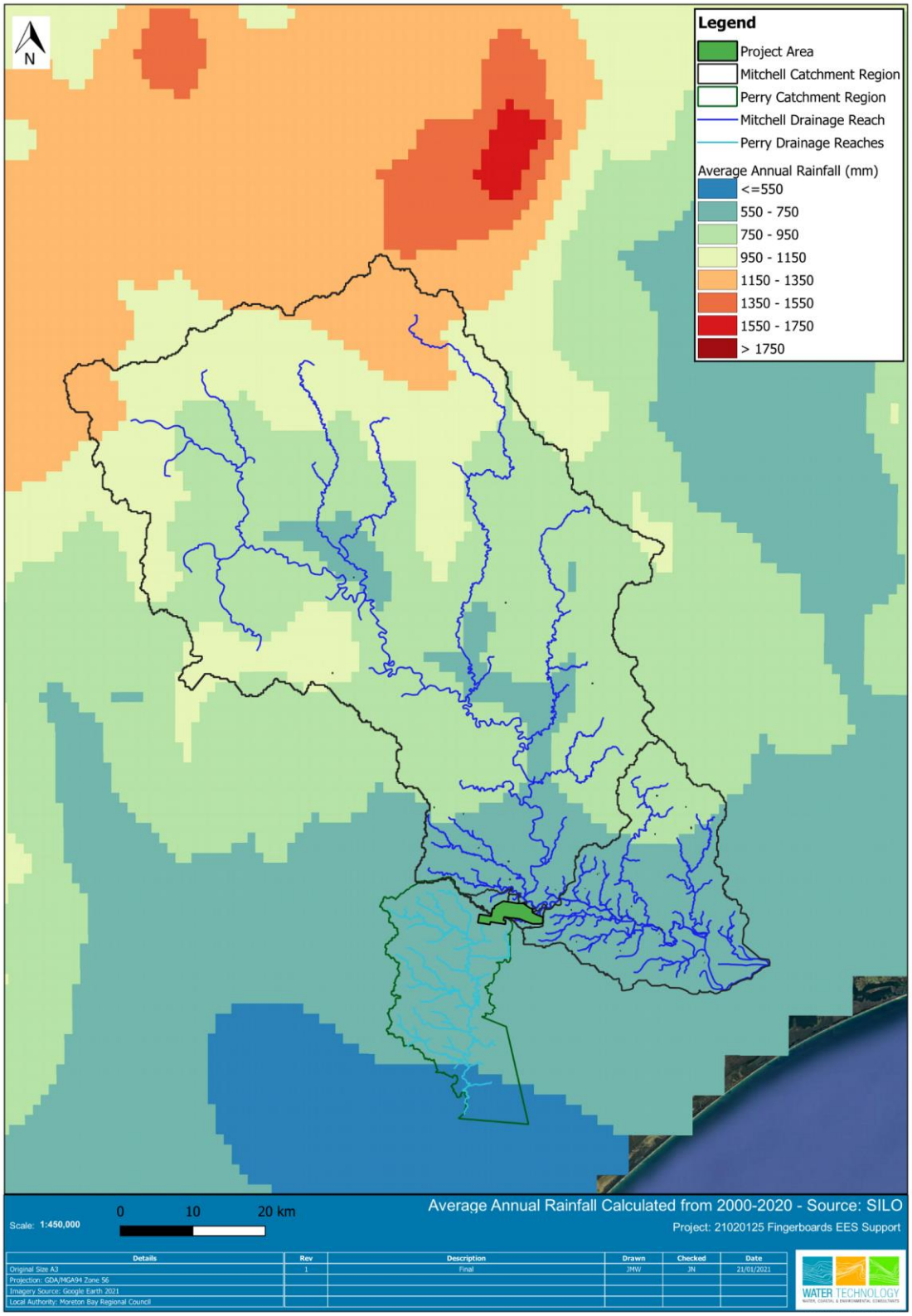

FIGURE 3-1 ANNUAL AVERAGE RAINFALL PATTERN FOR MITCHELL AND PERRY RIVER CATCHMENTS

3.3 Responses to Submissions

I have reviewed submissions with comments relevant to my field of expertise. Table 3-1 contains submissions which include substantial content relating to my area of expertise. I have provided a response to each of the submissions separately in Section 3.4 below. Table 3-2 contains submissions which provide general comments or concerns relating to my area of expertise. The general concerns tend to be common to many submissions, therefore, I have provided a response to these recurring general concerns separately in Section 3.5.

TABLE 3-1 SUBMISSIONS WITH SUBSTANTIAL CONTENT RELATING TO MY FIELD OF EXPERTISE

Issue category	Direction No. 26 issue reference	Submission number
General	Section 1.01, issue 5	514
Biodiversity	Section 1.02, issue 3	521
Groundwater	Section 1.03, issue 15	514
Water Catchment	Section 1.04, issue 1	716
	Section 1.04, issue 6	716
	Section 1.04, issue 7	514, 716
	Section 1.04, issue 9	514, 716
	Section 1.04, issue 10	358, 716
	Section 1.04, issue 16	291
Water Supply	Section 1.05, issue 1	692, 716

TABLE 3-2 SUBMISSIONS WITH RECURRING GENERAL CONTENT RELATING TO MY FIELD OF EXPERTISE

Issue category	Direction No. 26 issue reference	Submission number
Water Catchment	Section 2.4, issue 1	7, 8, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 30, 32, 33, 51, 54, 59, 60, 63, 64, 66, 71, 72, 74,77, 78, 79, 80, 81, 86, 87, 89, 92, 93, 94, 96, 98, 100, 109, 110, 116, 117, 118, 119, 120, 122, 126, 129, 130, 135, 136, 138, 139, 142, 145,154, 155, 159, 160, 161, 163, 164, 169, 171, 176, 178, 179, 180, 181, 183, 190, 191, 192, 201, 202, 203, 205, 206, 207, 208, 210, 212, 219, 222, 223, 225, 226, 233, 237, 238, 240, 241, 242, 243, 244, 246, 252, 253, 255, 259, 260, 261, 262, 263, 264, 266, 267, 268, 269, 271, 279, 280, 281, 288, 290, 296, 300, 301, 302, 304, 308, 314, 315, 316, 317, 319, 321, 325, 329, 332, 335, 336, 339, 340, 341, 344, 346, 348, 349, 351, 352, 356, 357, 365, 366, 370, 371, 372, 373, 374, 375, 378, 382, 384, 385, 386, 388, 390, 393, 394, 395, 399, 400, 405, 406, 408, 410, 413, 417, 420, 423, 424, 426, 429, 433, 434, 436, 437, 439, 440, 442, 444, 446, 447, 450, 452, 453, 457, 459, 469 470, 472, 474, 475, 477, 478, 480, 487, 489, 492, 497, 500, 501, 511, 516, 522, 524, 525, 535, 537, 538, 542, 544, 546, 551, 552, 554, 557, 559, 561, 562, 563, 566, 568 569, 570,

Issue category	Direction No. 26 issue reference	Submission number
		572, 574, 575, 577, 582, 583, 586, 587, 590, 591, 592, 593, 594, 595, 596, 597, 600, 602, 605, 613, 615, 620, 621, 623, 624, 626, 627, 630, 638, 643, 654, 657, 660, 663, 664, 665, 667, 668, 670, 671, 672, 673, 674, 680, 682, 683, 684, 686, 687, 690, 693, 696, 697, 698, 702, 704, 706, 708, 709, 710, 712, 713, 715, 717, 718, 720, 721, 729, 727, 732, 734, 735, 737, 739, 740, 742, 748, 749, 751, 752, 753, 754, 755, 756, 758, 760, 761, 763, 765, 766, 768, 770, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 788, 794, 799, 800, 812, 813, 814, 816, 818, 819, 829, 821, 824, 826, 827, 829, 830, 831, 832, 834, 836, 837, 839, 840, 841, 844, 845, 846, 848, 850, 851, 853, 855, 859, 860, 862, 863, 864, 865, 866, 867, 869, 870, 872, 873, 875, 876, 877, 879, 881, 883, 884, 886, 887, 889, 890, 892, 895, 896, 897, 898, 900, 902, 905, 906, 909.
	Section 2.4, issue 3	70, 123, 135, 155, 168, 191, 201, 239, 268, 429, 457, 524, 525, 530, 546, 568, 649, 672, 673, 708, 712, 713, 732, 763, 781, 812, 813, 837, 843, 846, 866, 875, 896.
	Section 2.4, issue 5	109, 137, 268, 281, 296, 429, 654, 673, 770, 791, 813, 843, 847.
	Section 2.4, issue 9	514, 813.
Water Supply	Section 2.5, issue 1	2, 7, 14, 17, 22, 27, 29, 32, 33, 35, 36, 37, 38, 39, 42, 43, 44, 45, 52, 56, 57, 58, 59, 60, 62, 63, 64, 65, 67, 68, 71, 72, 73, 74, 75, 76, 77, 79, 81, 84, 86, 87, 89, 90, 91, 97, 99, 100, 102, 109, 110, 114, 115, 117, 118, 119, 121, 126, 127, 131, 134, 135, 136, 137, 138, 142, 145, 146, 152, 156, 157, 158, 161, 162, 164, 166, 168, 169, 170, 171, 172, 174, 177, 178, 180, 181, 186, 191, 192, 194, 195, 199, 201, 202, 203, 213, 218, 220, 221, 225, 226, 229, 230, 233, 237, 240, 241, 242, 243, 244, 248, 250, 252, 257, 258, 259, 260, 261, 263, 266, 268, 271, 279, 280, 281, 288, 290, 296, 298, 299, 300, 308, 313, 316, 319, 322, 326, 328, 335, 340, 344, 352, 355, 357, 361, 365, 371, 372, 373, 374, 375, 378, 380, 383, 384, 385, 388, 389, 390, 392, 393, 396, 401, 406, 409, 410, 417, 422, 423, 430, 431, 433, 434, 436, 439, 440, 442, 444, 445, 446, 450, 452, 457, 466, 467, 469, 472, 473, 474, 478, 481, 482, 487, 491, 492, 500, 501, 504, 505, 507, 509, 510, 512, 520, 522, 525, 530, 532, 535, 540, 542, 544, 546, 548, 551, 554, 557, 559, 564, 565, 575, 576, 577, 578, 580, 583, 584, 585, 590, 592, 593, 594, 597, 598, 602, 603, 606, 607, 608, 614, 617, 627, 630, 628, 633, 634, 635, 636, 638, 644, 647, 648, 651, 652, 652, 654, 657, 660, 663, 665, 668, 670, 671, 673, 674, 675, 677, 678, 679, 680, 682, 683, 684, 686, 690, 693, 694, 701, 704, 705, 707, 710, 711, 713, 714, 718, 721, 724, 729, 727, 732,

Issue category	Direction No. 26 issue reference	Submission number
		739, 740, 742, 744, 745, 747, 749, 751, 753, 754, 756, 757, 759, 765, 766, 767, 769, 770, 771, 773, 775, 776, 777, 778, 780, 781, 783, 786, 787, 788, 796, 805, 810, 812, 813, 814, 815, 816, 818, 821,823, 824, 826, 827, 829, 830, 831, 832, 834, 835, 837, 840, 841, 843, 845, 849, 850, 855, 862, 868, 869, 872, 873, 885, 887, 893, 895, 900, 901, 902, 903.
Water Supply	Section 2.5, issue 2	201, 225, 257, 267, 484, 535, 556, 301, 303, 305, 307, 309, 322, 335, 344, 356, 365, 371, 390, 396, 401, 408, 409, 420, 423, 424, 429, 430, 431, 434, 437, 440, 442, 444, 445, 446, 450, 455, 473, 484, 554, 600, 603, 613, 620, 628, 649, 675, 698, 713, 734, 739, 813, 847, 851, 852, 856, 859, 861, 862, 863, 868, 872, 873, 875, 887, 895, 899, 902, 903, 905.
	Section 2.5, issue 3	58, 66, 103, 115, 118, 131, 160, 162, 163, 168, 172, 180, 202, 203, 221, 229, 233, 243, 257, 262, 268, 279, 298, 328, 429, 434, 450, 452, 453, 457, 468, 484, 504, 505, 507, 510, 520, 548, 544, 559, 575, 594, 598, 608, 647, 649, 665, 672, 712, 724, 778, 780, 813, 831, 835, 852, 875.
	Section 2.5, issue 5	54, 56, 61, 66, 71, 99, 131, 225, 252, 457, 530, 813.
Horticulture/agriculture	Section 2.12, issue 1	2, 8, 11, 12, 13, 14, 16, 17, 18, 21, 22, 26, 30, 32, 33, 36, 37, 39, 41, 42, 43, 44, 45, 49, 52, 53, 54, 57, 60, 64, 65, 70, 71, 72, 77, 78, 86, 88, 90, 96, 99, 102, 109, 110, 116, 118, 119, 120, 122, 123, 126, 127, 128, 130, 135, 138, 139, 142, 146, 147, 155, 157, 158, 163, 164, 169, 172, 174, 176, 179, 180, 181, 188, 189, 195, 200, 201, 202, 205, 209, 212, 215, 218, 219, 221, 223, 225, 226, 227, 228, 229, 230, 233, 238, 239, 240, 241, 242, 243, 244, 246, 249, 252, 255, 259, 261, 263, 264, 266, 267, 268, 271, 281, 288, 290, 296, 299, 301, 304, 305, 308, 310, 311, 313, 314, 315, 332, 335, 340, 343, 344, 346, 351, 352, 353, 355, 362, 365, 367, 370, 371, 373, 375, 377, 378, 382, 383, 384, 388, 389, 390, 392, 397, 399, 400, 406, 409, 410, 413, 414, 420, 422, 423, 424, 425, 426, 427, 433, 434, 436, 438, 439, 440, 442, 444, 445, 446, 447, 448, 450, 451, 453, 465, 469, 478, 479, 480, 481, 482, 487, 491, 492, 499, 500, 509, 510, 512, 520, 522, 523, 524, 525, 526, 527, 530, 532, 535, 537, 540, 542, 544, 546,547, 551, 554, 555, 557, 561, 564, 570, 572, 574, 577, 580, 586, 590, 594, 596, 600, 603, 604, 611, 615, 625, 626, 627, 630, 636, 642, 643, 644, 648, 649, 651, 657, 658, 659, 660, 664, 667, 668, 671, 675, 673, 679, 680, 681, 683, 684, 686, 690, 694, 696, 700, 702, 703, 704, 706, 707, 708, 709, 711, 712, 713, 721, 724, 727, 731, 734, 735, 737, 738, 740, 741, 742, 743, 744, 745, 747, 748,

Issue category	Direction No. 26 issue reference	Submission number
		749, 751, 753, 754, 756, 757, 760, 761, 763, 765, 766, 768, 770, 773, 774, 775, 776, 777, 778, 780, 781, 782, 784, 788, 791, 808, 810, 812, 813, 814, 816, 817, 818, 819, 820, 821, 823, 827, 829, 830, 831, 832, 833, 834, 837, , 839, 840, 841, 842, 843, 845, 847, 852, 853, 855, 856, 859, 863, 864, 865, 868, 871, 872, 873, 875, 876, 878, 881, 882, 884, 886, 887, 889, 891, 892, 893, 895, 896, 897, 898, 900, 901, 902, 906, 908, 909
Human health	Section 2.15, issue 8	241, 306, 308, 316, 355, 356, 361, 365, 366, 370, 371, 373, 378, 382, 391, 397, 401, 406, 423, 430, 433, 436, 439, 442, 446, 450, 452, 520, 525, 541, 554, 575, 630, 849, 855, 860, 862, 877, 878, 883, 884, 885, 887, 892, 893, 895, 898, 900.

3.4 Responses to Submissions with Substantial Content

3.4.1 Submission #291 – Southern Rural Water

Following my review of this submission, my responses to specific water resource and water quality comments or queries are provided below:

- Regarding access to winter fill water from the Mitchell River, in my opinion the eWater Source modelling conducted by Water Technology, which was informed by the EMM site water balance modelling, shows that the volumes potentially being extracted will not adversely affect the ability of the system to supply existing users and at the same time protect the downstream environment.
- Regarding the concern with respect to water management dams, and the potential impacts on water quality and the environment due to dam failure, I note that with careful design and operation, the probability of such failure is extremely low. This is further supported by the low rainfall environment at the site (Figure 3-1) which will result in there being relatively low volumes of water being dealt with at most times.
- Regarding site water management, I agree that a robust surface water and groundwater quantity and quality monitoring program will need to be developed, approved and put in place prior to, during and after the mine works occur. Such a program will provide quantitative data to guide and inform operation of the site water management system, and importantly to trigger any corrective actions that may be required, should the monitoring program indicate any adverse impacts.

3.4.2 Submission #358 – West Gippsland Catchment Management Authority (WGCMA)

Following my review of this submission, my responses to specific water resource and water quality comments or queries are provided below:

- Regarding the potential for site operations having impacts, specifically via changes in flow or water quality in the downstream ‘chain of ponds’ features, in my opinion the combination of the site having a very low rainfall environment (Figure 3-1), there being a robust site water management regime in place (including flow diversions, water source separation, water reuse, and as required water treatment), and the intention to implement a robust monitoring and adaptive management program (see last point in this section below) will, in combination result in low to negligible potential for the impacts raised by WGCMA.
- I note that the WGCMA at a number of locations states or implies that there will be uncontrolled discharges from the site and/or that run-off from the site will contain elevated nutrient and/or other constituent concentrations. I disagree that this will be the case given the robust site water management regime discussed in the EES and above.
- I also highlight the difference between what will be a carefully managed, monitored (see last dot point below) and scrutinised site water management regime, as opposed to what currently is a site which is largely unmanaged and unmonitored forestry and grazing land use activities in nature. The potential impacts of the latter in all probability will already be significant and site development for the mining operations may in fact reduce these impacts.
- The WGCMA highlight the heavy reliance on monitoring to mitigate the potential risks of there being any impacts downstream of the site. I agree that a robust surface water and groundwater quantity and quality monitoring program will need to be developed, approved and put in place prior to, during and after the mine works occur. Such a program will provide quantitative data to guide and inform operation of the site water management system, and importantly to trigger any corrective actions that may be required, should the monitoring program indicate any adverse impacts.

3.4.3 Submission #514 – EPA Victoria

Following my review of this submission, my responses to specific water resource and water quality comments or queries are provided below:

- The EPA highlights at several locations in their submission the need for an adequate and robust monitoring plan. In this regard, I note that a robust surface water and groundwater quantity and quality monitoring program will need to be developed, approved and put in place prior to, during and after the mine works occur. Specifically, based on feedback and commentary provided by the EPA, this monitoring program will need to include at least the following:
  - Monitoring in the Mitchell and Perry Rivers upstream and downstream of the mine site; and
  - Monitoring parameters should include at least suspended solids, turbidity, heavy metals, nutrients, dissolved oxygen, pH and salinity/electrical conductivity.

  I fully agree with the EPA's requests in this regard.
- The EPA has requested more detail on the frequency, timing and volume of discharges to the Mitchell River. These matters are addressed in the EES. In my opinion, modelling conducted under my supervision shows that the discharge data provided to Water Technology which resulted from the EMM site water balance modelling, which takes into consideration these issues, shows no adverse downstream impacts, and hence I query this request.
- I note the EPA comment that the background water quality in the receiving environments of the Mitchell and Perry River systems will become the performance objective - where existing water quality is already better than the environmental quality objective. I agree with this statement, and hence the tables referred to by the EPA in the various project reports (e.g., Tables 5-12 and 5-15 of the Water Technology 'Regional Study') should be amended to reflect this. Importantly, all impact assessments conducted under my supervision compared 'background' (i.e., existing or upstream) water quality with post mine scenario cases in order to define the degree of impact (e.g., Table 5-14 and Figures 5-33 to 5-36 of the Water Technology 'Regional Study'). In essence, this is doing exactly what the EPA requires.
- The EPA raises the question of potential radionuclides in site discharges. I note Water Technology has not addressed this matter in any detail and that SGS has addressed it on behalf of the project proponent. I defer to the SGS advice on radiation matters.

3.4.4 Submission #521 – Gippsland, Forest Fire and Regions Group, Department of Environment, Land, Water

Following my review of this submission, my responses to specific water resource and water quality comments or queries are provided below:

- The submission states that the project potentially reduces flows to the Mitchell River following surface water extraction and that this may lead to localised impacts to existing biodiversity and aquatic values. Based upon the eWater source modelling conducted by Water Technology, which was informed by the EMM site water balance modelling, it is apparent that the impacts of water extraction from the Mitchell River are minimal, with the reduction in mean annual flows being less than 0.02%. I do not accept that such small changes will have any impacts on existing biodiversity and aquatic values.

3.4.5 Submission #692 – East Gippsland Region Water Corporation (East Gippsland Water)

Following my review of this submission, my responses to specific water resource and water quality comments or queries are provided below:

- The submission states that East Gippsland Water is concerned with the potential for the project to contribute to reduced surface water availability from the Mitchell River (due to surface water extraction activity) and they have also requested further details around the management of potential contaminants associated with site operations and in particular tailings dams.
- Based upon the eWater Source modelling conducted by Water Technology, which was informed by the EMM site water balance modelling, it is apparent that the impacts of the project on flows in the Mitchell River are minimal, with the reduction in mean annual flows being of the order of 0.02%. I do not accept that such small changes will have any impacts on surface water availability from the Mitchell River.
- Regarding potential contaminants associated with site operations, I note that the water quality modelling assessments undertaken by Water Technology for the range of potential contaminants expected to occur in site run-off show no adverse impacts on water quality in the Mitchell River.
- Regarding tailings dams, I note that the site-based water balance modelling conducted by EMM simulated these structures at various stages through the project and that, as such, the inclusion of the EMM predictions in my larger scale regional assessments has been undertaken. The impacts of these regional assessments show no potential impacts from the project.

3.4.6 Submission #716B – East Gippsland Shire Council

Following my review of this submission, my responses to specific water resource and water quality comments or queries are provided below:

- Council's submission suggests that an assessment of mine water run-off which considers salinity, pH, and radionuclides is warranted. I defer to SGS in regard to radionuclides in the same manner as the advice provided to the EPA query in Section 3.4.3 above. Regarding salt and pH, as the potential discharges from the site are very small when compared to the flows in the Mitchell and Perry River systems, I do not accept that there is any possibility that any detectable adverse impacts to these particular water quality constituents of concern will occur.
- Council's submission states that treatment with dissolved air flotation (DAF) units will not reduce the levels of 'key' contaminants such as nitrogen and copper to levels acceptable for discharge to a freshwater receiving system. I note that Water Technology has not specifically evaluated the DAF units in our investigations to date, however I also note as follows:
  - Our assessments (see for example Table 3-3 and Table 3-4 below - reproduced from our 'Regional' study), show no change in TN loads to the Mitchell River and no change in TN and copper concentrations in the Mitchell River due to site development and operation, hence, indicating no concerns in this regard.
  - I also note that Council may have confused **discharge** quality with the **receiving water** objective. Discharges from the site do not have to be the same quality as the acceptable freshwater receiving system, rather, with dilution and the concept of a mixing zone, intermittent discharges can be of a different quality, yet still achieve an acceptable environmental outcome.

TABLE 3-3 MODEL RESULTS – AVERAGE ANNUAL TSS, TP AND TN LOADS IN COMBINED MITCHELL RIVER FLOW

Parameter	Units	Pre-mining	Year 5	Year 8	Year 15
TSS	t/d	29468	29478	29456	29490
TN	t/d	225.3	225.3	225.2	225.3
TP	t/d	20.2	20.2	20.2	20.2

TABLE 3-4 MODEL RESULTS – 75TH PERCENTILE PARAMETER VALUES IN THE DOWNSTREAM COMBINED MITCHELL RIVER FLOW

Parameter	Units	WQO	Pre-mining	5 year	8 year	15 year
TSS	mg/L	-	13	13	13	13
Turbidity	NTU	25	10	10	10	10
TN	mg/L	1.1	0.21	0.21	0.21	0.21
TP	mg/L	0.055	0.02	0.02	0.02	0.02
Arsenic	mg/L	0.013	0.001	0.001	0.001	0.001
Aluminium	mg/L	0.055	0.010	0.010	0.010	0.010
Barium	mg/L	-	0.006	0.006	0.006	0.004
Copper	mg/L	0.0014	0.001	0.001	0.001	0.001
Chromium	mg/L	0.001	0.001	0.001	0.001	0.001
Iron	mg/L	-	0.120	0.120	0.120	0.120
Strontium	mg/L	-	0.037	0.037	0.037	0.037
Zinc	mg/L	0.008	0.005	0.005	0.005	0.005

- Council's submission recommends event monitoring in site drainage lines to develop a robust, site-specific, baseline for comparison with operational flows. This recommendation is supported. Council's submission, however, seems to confuse **event** monitoring with the ANZECC guidelines which require theoretically two years of monthly sampling to characterise **baseline** water quality. The latter is required for ambient receiving water bodies, not highly intermittent, event-based discharges, as will occur on site.
- Council's submission also raises concern with flocculant products potentially used in association with site operations. I acknowledge the importance of being careful in selecting flocculants and provide the following commentary in regard to this matter.
  - The comment that I provide in regard to the use of flocculants within site operations to enhance operation and performance of the water management operations relates to the fact that this may change the pH of waters being managed and/or introduce other sources or compounds of potential concern into these waters (e.g., dissolved aluminium), depending upon the flocculant used. These concerns are highlighted as they are, with careful consideration, readily manageable. Further investigations by the proponent to clarify and address these matters to my satisfaction are recommended.

    I note further regarding this matter as follows, with this advice having been provided to me by other consultants working on the Fingerboards project while I was preparing this statement:

    The type of flocculant used is an anionic polyacrylamide which is commonly referred to as PAM.

There are a few useful things regarding PAM that will help to understand the impact on the environment.

1. *The bulk of the PAM will adhere to solids particles and will follow the particles. This is important as very little flocculant should remain in the water.*
2. *Ultraviolet light degrades PAM to base compounds, and eventually, it degrades to non-detectable concentrations by forming nitrogen, ammonia, carbon dioxide and water.*
3. *The entrainment of any flocculant in process water that is used for dust suppression will be extremely low, but more importantly, any flocculant that is present in dust suppression water will break down completely.*
4. *The flocculant plant itself will be bunded to ensure that any spillages are contained specifically to avoid the environmental release of a higher concentration of PAM solution.*
5. *Flocculant that is retained in the process water is locked into a recycle circuit. Some process water is present in the final products and by-products, but the bulk is recovered. High concentrations of flocculant in process water are counterproductive as they interfere with the process and result in financial losses that are both unwanted. For this reason, flocculant use is minimised to levels that will allow the process to work.*
6. *PAM is commonly used in the agriculture, domestic wastewater treatment and mining industry. In agriculture, it is sprayed explicitly on the ground to counter erosion and to reduce sediment in catchments due to water runoff.*
7. *Several studies have been performed in recent years to investigate the impact of PAM on the environment (land and waterways) – see below*.
    - *Polyacrylamide degradation and its implications in environmental systems - https://www.nature.com/articles/s41545-018-0016-8*
    - *Overview of the Effects of Residual Flocculants on Aquatic Receiving Environments - http://www.aucklandcity.govt.nz/council/documents/technicalpublications/TP226%20Overview%20of%20the%20effects%20of%20residual%20flocculants%20on%20aquatic%20receiving%20environments.pdf*
    - *Polyacrylamides in Irrigated Agriculture https://www.five-elements.com.au/resources/Polyacrylamide%20in%20Irrigated%20Agriculture.pdf*

3.5 Responses to Submissions with Recurring General Content

In responding to these submissions, I have used the groupings provided in Table 3-2 and have prepared my responses to the consolidated summaries of these submissions as provided to me by Kalbar.

3.5.1 Water Catchment

3.5.1.1 Section 2.4, Issue 1

Issue Description

Pollution, contaminated run off and discharges from the mine and associated infrastructure will affect water quality in the Mitchell and Perry rivers, and other downstream water resources, in particular the Gippsland Lakes.

Specific issues raised include:

- *Gullies and sandy soils present risk of toxic contaminants entering groundwater and spreading to river systems;*
- *Effect of sediments being discharged into the Mitchell River;*
- *Concern that contamination from the mine will negatively affect fishing and migratory birds;*
- *Concern about proximity of project to the Mitchell River;*
- *Haul road and container loading facility were not considered a source of pollution in the EES;*
- *Fresh water from the Mitchell River will increase salinity levels in downstream waterways to dangerous levels. Reduction in environmental flows would be contrary to Australian National Audit Office advice; and*
- *Erosion and runoff will result in loss of soil nutrients.*

Response

All assessments and modelling work conducted under my supervision indicate that operation of the Fingerboards mineral sands project will not adversely affect water quality in the Mitchell and Perry rivers, or any downstream locations. My rationale/justification for this opinion is as follows:

- The site will operate under a contemporary mine site water management regime whereby various water streams/sources will be separated, treated (where required), and reused such that there are no off-site impacts. This management system has been comprehensively modelled by EMM and the impacts of this modelling feed into a regional catchment modelling and water quality assessment framework developed by Water Technology to support the opinion presented above.
- Issues such as erosion, haul road run-off and others as raised by these respondents will be dealt with at source by contemporary management techniques.
- Water usage will be carefully managed and any extractions from the Mitchell River will only occur when there are sufficient flows from the large upstream catchment.
- All site operations will take place within an adaptive management framework that is guided and informed by a detailed site and receiving environment monitoring program, elements of which have been discussed earlier in this document. Any changes in water quality in the receiving environments detected by this program (which will include sites upstream and downstream of the mine site on both the Mitchell and Perry rivers) will trigger immediate investigations and corrective action by the proponent.

3.5.1.2 Section 2.4, issue 3

Issue Description

Concern that baseline water quality and meteorological data used in surface water modelling were inadequate or incorrect. Effects of significant rainfall events and weather impacts and how these risks have been measured/modelled and are managed:

- *Concern that assessment of project impacts on water quality relies too much on computer simulation and not enough on 'actual measurement'.*
- *Overflow from dams presents a flood risk. Concern that local rainfall conditions are not well represented by rainfall data used in EES.*
- *Concern that the EES does not account for the effects of unpredictable weather events and 'East Coast Lows,' in terms of runoff and pollution potential and has in fact underestimated the weather variation within the project footprint.*

- *Comment that the majority of rainfall monitoring in the EES was undertaken towards the end of a significant period of drought and may not reflect future rainfall patterns. Concern that the flood modelling may not be adequate given major flooding events typically occur every 8-10 years.*
- *Concern that dam design and surface water assessment do not take into account local meteorological conditions and will not provide adequate protection against flood/sediment movement (detailed discussion provided).*

Response

Regarding the water resource and water quality assessments undertaken under my supervision, I confirm that all available meteorological and water quality data was collated, reviewed and used for this project. As per work conducted by Water Technology under my supervision, I note as follows:

- Much of the receiving water quality data covered over **30 years**, especially so in the Mitchell River system.
- Meteorological data, in particular that sourced from the SILO database, extends back in time over **100 years**.
- Streamflow data used for eWater Source model development, calibration and validation commenced in 1937, and hence covers some **90 years**.

Given all the above, I am confident that baseline water quality and meteorological data was sufficient for the assessments conducted under my supervision.

Regarding the comment on reliance on computer simulations, this is a contemporary and accepted practice for projects of this nature. It is not in reality possible to build 'pilot' scale projects and then 'actually' measure processes such as I have evaluated due to the cost, time and practicality of such activities.

I accept that more site-based run-off quality data would have been beneficial, and I have expanded on this earlier in my statement. Regardless, where there were not sufficient site data, literature values from other longer-term studies conducted in the local area were sourced and laboratory testing works were undertaken to provide information for the study. These data have all been used in a modelling and assessment framework that is inherently conservative in its configuration and assumptions.

Given all the above, I am confident of the reliability of the modelling and works conducted under my supervision and that these works show there will be no adverse impacts on the receiving environments adjacent to and downstream of the Fingerboards operation due to the proposed site operations.

3.5.1.3 Section 2.4, issue 5

Issue Description

Concern about the use of flocculants and their potential effects on water quality on and discharging from the site.

Response

All site operations will take place within an adaptive management framework that is guided and informed by a detailed site and receiving environment monitoring program, elements of which have been discussed earlier in this document. Any changes in water quality in the receiving environments detected by this program (which will include sites upstream and downstream of the mine site on both the Mitchell and Perry rivers) will trigger immediate investigations and corrective action by the proponent.

Such actions will specifically include due consideration of **all site activities**, including the use of flocculants, and as such any effects will be detected and corrective action can be taken.

3.5.1.4 Section 2.4, issue 9

Issue Description

Comment that more information is required in EPA works approval application in relation to proposed water discharges. Submission also makes recommendations in relation to water quality compliance criteria.

Response

Modelling conducted under my supervision shows that the discharge data provided to Water Technology which resulted from the EMM site water balance modelling, which takes into consideration all water discharges, shows no adverse downstream impacts.

3.5.2 Water Supply

3.5.2.1 Section 2.5, issue 1

Issue Description

Demand for up to 3GL of water will compete with agricultural uses and prevent expansion of agricultural industries, which some submissions emphasise is a particular problem in drought-prone country. This includes issues relating to the following:

- *Comment that water used for agriculture would give a better economic return than water used for mining purposes; view that use of water for dust suppression is not a good use of a scarce resource; and*
- *Perception that mining operators will enjoy priority access to water. This will also affect flows in the Mitchell River and downstream water quality at Gippsland Lakes.*

Response

Water resource modelling conducted under my supervision has conclusively shown that the proposed extraction regime associated with operation of the Fingerboards project will have minimal (less than 0.02%) impact on water resource availability in the Mitchell River. This is comprehensively documented in the EES. For this reason, I am confident that operation of the mine on the site will not affect flows in the Mitchell River and/or downstream water quality in the Gippsland Lakes system.

3.5.2.2 Section 2.5, issue 2

Issue Description

Concern over the quantity of water required for the project: Including issues relating to:

- *Increase in production that will lead to further volumes of water being sought.*
- *Concern the Project will require more than 3GL water per annum, particularly given study undertaken by Oresome Australia Pty Ltd which indicated a water requirement of 4.6-6.2GL per annum.*
- *Concern the Project will be unable to operate safely without the required amount of water, particularly if insufficient water is available for dust suppression; water balance only allows for dust suppression on haul road – not at mining face or on stockpiles (#484)*
- *General concerns about insufficient water supply if the project goes ahead, particularly in light of recent droughts.*

Response

Water resource modelling conducted under my supervision showed that the proposed extraction regime associated with operation of the Fingerboards project will have minimal (less than 0.02%) impact on water resource availability in the Mitchell River, noting that this analysis extended over many decades, with and without drought conditions. This is comprehensively documented in the EES. For this reason, I am confident that operation of the mine on the site will not affect flows in the Mitchell River and/or downstream water quality in the Gippsland Lakes system and that there will be sufficient water for the project.

3.5.2.3 Section 2.5, issue 3

Issue Description

Impact to other users of the water required, including:

- *Unpredictability of effects of water extraction on other users and the environment due to climate change.*
- *Climate change not adequately represented in surface water modelling completed for project. Comment that water is increasingly valuable as climate change impacts and rainfall becomes more unpredictable. Is mining the best use of this resource?*
- *Concern Project will impact the supply of water for domestic use and /or result in existing users being put on permanent water restrictions.*
- *Availability of water to the South Pines Golf Club.*
- *Increase bushfire risk.*
- *Reduce the amount of water available for growing food and protecting the bush.*

Response

Water resource modelling conducted under my supervision conclusively showed that the proposed extraction regime associated with operation of the Fingerboards project will have minimal (less than 0.02%) impact on water resource availability in the Mitchell River, noting that this analysis extended over many decades, with and without drought conditions. This is comprehensively documented in the EES. For this reason, I am confident that operation of the mine on the site will not affect flows in the Mitchell River and/or downstream water quality in the Gippsland Lakes system and that there will be sufficient water for the project.

Regarding the climate change query, the risk that the project did not include climate change processes in the water resource assessments is considered small in this case given the relatively short timeframe that this project will be in operation (some 15 years) wherein climate change impacts should be slight. The fact that the final landform after site rehabilitation will be comparable to (if not better than) the site in its current condition also influenced the decision to not include climate change processes.

If there were a limited supply of surface water to the mine during a particularly dry year, then Kalbar would either need to source supply from groundwater or, if that were unavailable, potentially adjust the rate of mining activities.

3.5.2.4 Section 2.5, issue 5

Issue Description

Concern that the water availability is unobtainable or will be at certain times, responses have included:

- *Queries why Kalbar will be able to access water from the Mitchell River during drought*
- *Suggestions that the intention is to extract water throughout the year.*
- *Australian government bioregional assessments demonstrate that 1,400ML/day flows will not occur for 227 days in a given year.*

- *Extraction sites are not within the tenement boundary.*
- *The river in the area cannot supply anywhere near the volumes of water required for the Project.*
- *Kalbar has not completed adequate assessment of the impacts of extracting 3 GLpa from the Mitchell River (as required by Section 40 of the Water Act 1989).*
- *Kalbar has misrepresented the 'un-used extraction volume' available from the Mitchell River. The RMCG report "…states that there is 6,000 megalitres of irrigation water that has not yet been allocated from the Mitchell River but does not say that it is not yet available." (#530)*
- *What is the back up or alternative strategy if water becomes unavailable?*

Response

See my earlier responses about the fact that Kalbar's proposed water extraction will have less than 0.02% on resource availability within the Mitchell River.

3.5.3 Horticulture/agriculture

3.5.3.1 Section 2.12, issue 1

Issue Description

Concern that the Project will affect food production within the horticultural area of the Lindenow Valley, and on broader agriculture within the area. Concern that the land uses cannot co-exist, particularly due to contaminated dust emissions and pollution of water, and relating to what will be the consequences if proposed mitigation measures do not succeed.

Response

All assessments and modelling work conducted under my supervision indicate that operation of the Fingerboards mineral sands project will not adversely affect water quality in the Mitchell and Perry rivers, or any downstream locations and hence should not affect food production within the horticultural area of the Lindenow Valley, and on broader agriculture within the area. My rationale/justification for this opinion is as follows:

- The site will operate under a contemporary mine site water management regime whereby various water streams/sources will be separated, treated (where required), and reused such that there are no off-site impacts. This management system has been comprehensively modelled by EMM and the impacts of this modelling feed into a regional catchment modelling and water quality assessment framework developed by Water Technology to support the opinion presented above.
- Issues such as erosion, haul road run-off and others as raised by these respondents will be dealt with at source by contemporary management techniques.
- Water usage will be carefully managed and any extractions from the Mitchell River will only occur when there are sufficient flows from the large upstream catchment; and
- All site operations will take place within an adaptive management framework that is guided and informed by a detailed site and receiving environment monitoring program, elements of which have been discussed earlier in this document. Any changes in water quality in the receiving environments detected by this program (which will include sites upstream and downstream of the mine site on both the Mitchell and Perry rivers) will trigger immediate investigations and corrective action by the proponent.

3.5.4 Human health

3.5.4.1 Section 2.15, issue 8

Issue Description

Concern regarding potential contamination of water supply that is used for human consumption.

All assessments and modelling work conducted under my supervision indicate that operation of the Fingerboards mineral sands project will not adversely affect water quality in the Mitchell and Perry rivers, or any downstream locations and hence should not present a potential source of contamination of water supply that is used for human consumption. My rationale/justification for this opinion is as follows:

- The site will operate under a contemporary mine site water management regime whereby various water streams/sources will be separated, treated (where required), and reused such that there are no off-site impacts. This management system has been comprehensively modelled by EMM and the impacts of this modelling feed into a regional catchment modelling and water quality assessment framework developed by Water Technology to support the opinion presented above.
- Issues such as erosion, haul road run-off and others as raised by these respondents will be dealt with at source by contemporary management techniques.
- Water usage will be carefully managed and any extractions from the Mitchell River will only occur when there are sufficient flows from the large upstream catchment; and
- All site operations will take place within an adaptive management framework that is guided and informed by a detailed site and receiving environment monitoring program, elements of which have been discussed earlier in this document. Any changes in water quality in the receiving environments detected by this program (which will include sites upstream and downstream of the mine site on both the Mitchell and Perry rivers) will trigger immediate investigations and corrective action by the proponent.

4 CONCLUDING REMARKS

The work conducted under my supervision for this project has drawn on extensive background data sets and has used contemporary analysis and modelling tools to support the evaluation of impacts on surface water resources and water quality.

These works have consistently shown minimal/negligible potential for water resources and water quality impacts associated with the proposed Fingerboards mineral sands project.

To further address some residual issues raised by submitters, I recommend that a robust surface water and groundwater quantity and quality monitoring program be developed and submitted to the EPA for approval. Such a program will provide quantitative data to guide and inform operation of the site water management system, and importantly will trigger any corrective actions that may be required, should the monitoring program indicate any adverse impacts.

5 DECLARATION

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Inquiry and Advisory Committee.

……
Tony McAlister

1 February 2021

APPENDIX A
CURRICULUM VITAE

TONY MCALISTER

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Phone: 07 3105 1460 | 0497 611 848

Director, Brisbane

BE Hons, M.Eng.Sc, GCELead

FIEAust, CPEng, RPEQ, GAICD

QUALIFICATIONS

- B.E. Civil (1st Class Honours) James Cook University of North Queensland (1981)
- M.Eng.Sc. University of Queensland (1989) specialising in Water Quality Management
- Grad. Cert in Exec Leadership University of Queensland (2013)

AFFILIATIONS

- Registered Professional Engineer, Queensland.
- National Professional Engineers Register
- Fellow, Engineers Australia
- Adjunct Industry Fellow, Griffith University

SUMMARY

Tony has more than 30 years Australian and International (United Kingdom, the Middle East and South East Asia (Singapore, Thailand, Malaysia and Indonesia)) water engineering expertise in the areas of numerical flood and water quality modelling, field data collection and assessment, non-point source pollution assessment and mitigation, WSUD and IWCM, water quality and catchment management and sewerage and water supply investigations.

AWARDS

- 1991 CBI (Consolidated British Industry) Scholarship
- 1998 Best Paper of Conference Award – IPWEAQ Conference Toowoomba

PROFESSIONAL HISTORY

2017 – Current	Director, Water Technology, Brisbane, QLD
2015 – 2017	Senior Principal Engineer, Water Technology, Brisbane, QLD
2008 – 2015	Managing Director, BMT WBM, Brisbane, QLD
2000 – 2008	Director, WBM and then BMT WBM, Brisbane, QLD
1993 – 2000	Associate, WBM, Brisbane QLD
1992 – 1993	Senior Modeller, HR Wallingford, United Kingdom
1987 – 1991	Senior Engineer, WBM
1982 – 1987	Engineer, Department of Local Government and Planning

SPECIALIST AREA OF EXPERTISE

- Numerical Modelling and Field Data Collection
- Catchment, Waterway and Coastal Management
- Water Quality Management
- Flood Management and Hydraulic Modelling
- Stormwater Management and Water Sensitive Urban Design (WSUD)
- Sewerage/Water Supply/Tradewaste Management
- Integrated Water Cycle Management (IWCM)

COUNTRIES OF EXPERIENCE

- Australia
- United Kingdom
- Singapore
- Thailand
- Malaysia
- Papua New Guinea
- Indonesia
- Saudi Arabia

RECENT MAJOR PROJECTS

Water Quality and Estuary Management

- Merrimac Greenheart Water Quality Modelling assistance (2019-ongoing)
- Healthy Land and Water Ecosystem Health Report Card Water Quality Modelling assistance (2018-ongoing)
- Newstead Riverpark Lake Water Quality Management Improvement Strategy (2017)
- Banksia Beach - Pacific Harbour Canal Tidal Circulation and Water Quality Improvement Study (2017)
- Gold Coast Commonwealth Games Water Quality Expert Participation (2016-2017)
- Holcim (Mooloolah) Quarry Water Quality Advice (2016-7)
- Project Sea Dragon Hatchery and Grow Out Facility EIS Water Quality Support and Guidance (2016-7)
- South East Queensland Estuary (Noosa, Maroochy, Mooloolah, Caboolture, Pine, Brisbane, Logan Albert, Pimpama and Nerang River systems) Water Quality Modelling (2014-2015)
- Gold Coast Water Quality Modelling Review (2013-ongoing)
- Penrith Lakes Water Quality Modelling and Management Assessments (2014-2015)
- Pumicestone Passage Water Quality Modelling for the Caloundra South project (2012-2013)
- Moreton Bay 3D Hydrodynamic Water Quality Numerical Modelling (2011-2012)
- Hawkesbury-Nepean Water Quality and Ecological Modelling Study (2011-2012)
- QWC Loganholme Diversion Water Quality Modelling Study (2008)
- Olympic Dam Desalination/Spencer Gulf 3D Oceanographic Data Collection and Water Quality Modelling Studies (2006-2008)
- Moreton Bay Lyngbya Studies (2006)
- Moreton Bay Water Quality Improvement Plan Water Quality Modelling (2005-2006)
- Tamar Estuary Water Quality Study (2004-2006)
- Maroochy Estuary Sustainable Loads Study (2003-2004)
- Sandgate Estuary Water Quality Modelling Study (2003)
- Lake Illawarra Estuary Processes Study, Management Study and Plan (2001-2002)
- Wonboyn Estuary Processes Study, Management Study and Plan (2000-2001)
- Maroochy Estuary Eutrophication Modelling (2001-2002)
- Batemans Bay and Clyde River Estuary Processes Study (2000)
- Nambucca River Estuary Processes Study (1999-2000)
- Samut Prakarn (Thailand) Wastewater Outfall Water Quality Study (1999)
- Water Quality Action Plan - Central River Basin of Thailand (1995-1999)
- Buran Darat Development, Sentosa Island - Singapore (1994-1995)
- Stour Estuary (UK) Water Quality Modelling (1993)
- Hawkesbury Nepean Blue Green Algal Modelling (1993)

- Avon River Barrage (UK) Blue Green Algal Assessments (1993)
- Benthic Respiration Study, Kent Stour (UK) Estuary (1993)
- Water quality studies for proposed Maleny development (1991)
- Water quality modelling of the Clarence River, NSW (1990)
- Water quality modelling of the Tweed River (1990)
- Banora Point STP Outfall Study, Tweed Heads (1989)
- Gladstone Tradewaste Outfall Study (1989)

Stormwater and Urban Water Management

- QUU Effects Based Sewage Overflow Licencing Investigations (2016-2018)
- SPEL Environmental Proprietary Water Quality Improvement Device Peer Reviews (2017-2018)
- Caloundra South Stormwater Harvesting Scheme Technical, Scientific and Approval Investigations (2015)
- Caloundra South Integrated Urban Water Cycle Management Assessments (2014)
- Caloundra South Supplementary Public Environment Report (2013)
- Office of Living Victoria (OLV) Integrated Water Cycle Management modelling review assistance (2014)
- Caloundra South Public Environment Report (2012)
- Victorian Ministerial Advisory Committee (MAC) Integrated Water Cycle Management modelling review assistance (2013)
- National Water Commission WSUD Assessment Guidelines (2007-2008)
- Kalkallo Integrated Water Management Project (2007)
- Forster Palms Stormwater Review (2006)
- Independent Review of Greater Melbourne Urban Water Supply Strategy (2011)
- Forde (Canberra) IUWM Advice (2005)
- Franklin (Canberra) IUWM Advice (2005)
- Pimpama Coomera Water Futures Rainwater Tank Optimisation Study (2004-2005)
- Yarrabilba WSUD and IWCM study (2004)
- Pimpama Coomera Water Futures WSUD Study (2003-2004)
- Victorian WSUD Technical Manual (2003-2004)
- Brisbane WSUD Technical Manual (2004-2005)
- NSW Managing Urban Stormwater (2003-2004)
- Lensworth Lake Doonella (Noosa) (2003)
- Hunter and Western Sydney WSUD Capacity Building Programs (2000-2003)
- Australian Runoff Quality WSUD Chapter (2003-2006)
- Road Runoff Characterisation Study (2002)
- Varsity Lakes Stormwater Management (2002)
- Gold Coast Ecovillage WSUD and IWCM study (2000-2004)

- Springfield Development Scoping and Detailed Design Investigations (1999-2002)
- Stormwater Reuse Background Study (1998)
- Artificial Wetlands for Stormwater Quality Control Design, Wollongong NSW (1995)
- Long Term Consultancy - Brisbane City Council (1993-1995)

Effluent/Tradewaste Management

- Shoreline Project Southern Moreton Bay Sewage Outfall Water Quality Modelling Studies (2019)
- QUU Environmental Improvement Roadmap for Treated Effluent Release to Waterways – Stage 1 (2017)
- QUU Effects Based Sewage Licencing Investigations (2015-2017)
- QUU Sewer Overflow Abatement Program Modelling Studies (2015)
- Batemans Bay Sewage Effluent Transport Study (2003)
- Trinity Inlet/Cairns Wastewater Treatment Plant Advection-Dispersion and Water Quality Model Study (1996)
- Gunns Pulp Mill Outfall Review (2007)
- North South Bypass Tunnel Desalination Brine Outfall Design and Dispersion Study (2007)
- Cement Australia Desalination Brine Outfall Design and Dispersion Study (2007)
- Incitec Pivot Desalination Brine Outfall Design and Dispersion Study Study (2006)
- Moggill Creek Catchment and Sewer Overflow Study (2006-2007)
- Combined Sewer Overflows Assessments - Proposed Tees Barrage (UK) (1993)
- While a Graduate Engineer at the Department of Local Government, Mr McAlister undertook advanced training at the University of NSW in Municipal Wastewater Treatment and subsequently worked as a sewage and water supply process and tradewaste management/effluent disposal specialist supporting Local Governments and industry across Queensland for more than 4 years.

Catchment Management

- Warner Structure Plan Hydraulic and Water Quality Review (2016)
- Black and Ross Rivers Catchment Modelling (2010)
- Pine Shire Sustainable Loads Study (2008)
- Mae Khlong (Thailand) Sustainable Loads Study (2007)
- Coombabah Creek Sustainable Loads Study (2006)
- North Pine Dam Sustainable Loads Study (2006)
- Mooloolah and Logan Albert Sustainable Loads Studies (2005-2006)
- Lake Samsonvale Integrated Catchment Management Strategy (2001-2002)
- Healthy Waterways Task BSES - Broad Scale Evaluation of Sources (2001)
- Gowrie Creek (Toowoomba) Catchment Management Study (1997-1998)
- Moreton Bay Catchment Runoff Pollutant Load Estimation (1997-1998)
- Blue Gum Hills (Newcastle) Catchment Management Strategy (1996)
- Bremer River Catchment Management Strategy (1995-1996)

- Rose Bay Catchment Management Study (1991)

Environmental Management

- Birdsville Wetland Hydrologic Assessments (2017)
- Casino Piggery Audit and Legal Action (2016-2018)
- Ongoing Role with Healthy Waterways Scientific Expert Panels (1996-present)
- Woodlark Island (PNG) ESIA Review (2014)
- AQUIS Development, Cairns, EIS related studies (2013-2014)
- Caloundra South EIS Assistance (2012-2014)
- Olympic Dam Desalination Outfall and EIS Studies (2010-12)
- BG Gladstone EIS Assistance (2008-2009)
- National Prawn Company (Saudi Arabia) Environmental Studies - Stage 2 (2008-2009)
- SANTOS Gladstone EIS Assistance (2008-2009)
- Visy Desalination Outfall Review and Review advice (2008)
- Inner City Bypass Desalination Outfall Design and Review advice (2008)
- Caloundra South Environmental Benefits Report (2008)
- National Prawn Company (Saudi Arabia) Environmental Studies - Stage 1 (2007-2008)
- Thai Oil Spill Fingerprinting and Characterisation Study (2000)
- Malaysian Wetland Sanctuary Hydraulic and Water Quality Studies (1997)
- Logan Waterways Strategy Study (1993-1994)
- Environmental Appraisal of Lake Illawarra (1993-1994)
- Investigation of Dispersion and Hydrodynamic Processes - Halifax Bay, North Queensland (1992)
- Alternative Dredging Strategy Study - Weipa (1990)
- Hydraulic, Sediment Transport and Water Quality Studies, Tweed River (1990)
- Weipa South Channel Siltation Study (1989)
- Tidal Hydrodynamic and Siltation Studies of a Proposed Marina at Fingal Head (1988)

Flood Management and Hydraulic Modelling

- Penrith Lakes Development Corporation P&E Court Appeal (2015)
- Brisbane Flood Class Action assistance to Seqwater (2014)
- Caloundra South Ongoing Flood Assessments (2010-2015)
- Caloundra South Climate Change Flood Assessments (2008)
- TUFLOW Commercialisation and Worldwide Adoption Strategy (2006-2015)
- Maroochy River Floodplain Management Scoping Study (2005-6)
- Banora Point/South Tweed Master Drainage Plan (1996)
- Carseldine - Taigum Master Drainage Plan (1995-1996)
- Cudgen and Mooball Creeks, Clarence, Manning and Maroochy Rivers (1987-1991)

- Gold Coast Broadwater (1989)
- Assessment of Flood Impacts of Pacific Highway-Manning River (1989-1991)

Legal

- Supreme Court
  - JK Williams v Sydney Water (2019)
  - Brisbane Flood Class Action assistance to Seqwater (2014-15)
- Qld Planning and Environment Court
  - Gavin John Finger & Ors at BHP Coal Pty Ltd & Ors (2017-2018)
  - Drywound v Lockyer Valley Council & Ors Water Quality Advice (2016)
  - Bertram and Field v QTMR & Ors Flood and Waterway Erosion Advice (2016)
  - PEA 1631/15 Tingalpa Water Quality Advice (2016)
  - Mr McAlister also undertook numerous P&E Court Appeals in the period between 1995 and 2007
- NSW Land and Environment Court
  - Casino Piggery Audit and Legal Action (2016-2018)
  - PLDC v Penrith City Council Hydraulic Advice
  - Mr McAlister also undertook several L&E Court Appeals in the period between 1995 and 2007

Field and Data Collection Studies

- Shoreline Project Southern Moreton Bay Environmental Data Collection Works (2018-9)
- QUU Effects Based Sewage Overflow Environmental Data Collection Works (2017)
- Banksia Beach - Pacific Harbour Canal Tidal Circulation and Water Quality Measurements (2017)
- Collulli (Eritrea) Potash Project Baseline Oceanographic and Environmental Data Collection (2015)
- Caloundra South Hydrologic and Water Quality Data Collection Studies (2012-15)
- Port of Brisbane Long Term Environmental Monitoring Project (2013-ongoing)
- James Point Port Oceanographic Data Collection Studies (2014)
- Pearl Oil (Indonesia) Oceanographic Data Collection Studies (2012)
- Pumicestone Passage Oceanographic Data Collection Studies (2010 and 2014)

PUBLICATIONS

BOOK CHAPTERS AND NATIONAL PUBLICATIONS

- Approaches to Water Sensitive Urban Design – Potential Design, Ecological Health, urban Greening, Economics, Policies and Community Perceptions – Co-author of Water Harvesting Potential of WSUD Approaches chapter
- Understanding Floods: Questions and Answers. Joint Publication with Queensland Chief Scientist and others. (2011)
- Australian Runoff Quality (Engineers Australia 2006) – Principal author of Modelling Chapter and Co-author of Water Sensitive Urban Design chapter.

- Healthy Waterways, Healthy Catchments: Making the Connection in South East Queensland, Australia, Co Author of Chapter 8 'Integration'.

REFEREED JOURNAL ARTICLES

- Aura, the City of Colour – Australia's Shining Example of Widescale Integrated Water Cycle Management. Water Pract. Technol. 2017, 12, 737-744.
- Waltham, N.J., Barry, M., McAlister, T., Weber, T., Groth, D (2014). "Protecting the Green Behind the Gold: Catchment-Wide Restoration Efforts Necessary to Achieve Nutrient and Sediment Load Reduction Targets in Gold Coast City, Australia". Environmental Management. Published online 24th July 2014, pp.1-12.

REFEREED CONFERENCE PAPERS

- McAlister, A.B., Stephens, M., Middleton, D., Bartkow, M., Watkinson, A. and Lampard, J-L. (2018). 'Aura Stormwater Harvesting Project – An Innovative Risk Based Approach to Identifying Potential Water Quality Issues', Ozwater 2018, Brisbane
- McAlister, A.B., Stephens, M., Brown, D. and Tan, J (2017). 'Aura - A Large Masterplanned Community Applying World's Best Stormwater Management and Reuse Practices', Ozwater 2017, Sydney
- McAlister, A.B., Stephens, M. and Allen, A (2016). 'Aura, The City of Colour - Australia's Shining Example of Widescale Integrated Water Cycle Management', IWA World Water Congress, Brisbane.
- Combes, P.J. and McAlister, A.B. (2016), 'Is the Science and Data underpinning the Rational Method robust for use in Water Sensitive Urban Catchments?' IWA World Water Congress, Brisbane.
- McAlister, A.B. (2007), 'WSUD in South East-Queensland – Implementation by Crisis or Good Planning?', Keynote Address, Rainwater and Urban Design 2007 (13th International Rainwater Catchment Systems Conference and 5th International Water Sensitive Urban Design Conference), Sydney.
- McAlister, A.B. (2006), 'Technologies underpinning Water Sensitive Urban Design and how they work', Water Recycling Conference.
- McAlister, A.B., Ratcliffe, S., Barry, M.E and Teakle, I.A. (2006), 'Tamar Estuary Hydrodynamic, Water Quality & Sediment Modelling – An Overview' Hydrology and Water Resources Symposium, Launceston.
- McAlister, A.B. (2005), 'Integrated Water Cycle Management Considerations in a Greenfield Site: The Way Forward', Hallmark Publications Masterplanned Urban Communities Conference, Sydney 2005 – Keynote Address and awarded Best Paper of Conference.
- McAlister, A.B. and Cavanagh, D.C. (2002), 'Past, Present and Future Directions in Catchment and Stormwater Pollutant Modelling', 4th Queensland Environmental Conference, I.E. Aust Environmental Engineering Society.
- McAlister, A.B. (2000), 'Water Sensitive Urban Design', Water Sensitive Urban Design in the Australian Context Conference, Melbourne 2000.
- McAlister, A.B. and Keane, P. (1998), 'Gowrie Creek Catchment Management Strategy', IMEAQ Conference, Toowoomba. - awarded Best Paper of Conference.
- McAlister, A.B. and Walden, W.J. (1998), 'Water Quality Modelling in the Central Basin of Thailand', Hydrastorm '99, Adelaide.
- Walden, W.J., McAlister, A.B. and Robbins, P. (1998), 'Pollutant Export Assessments in Tropical and Sub-Tropical Environments', Hydrastorm '99, Adelaide.
- McAlister, A.B. and Keane, P. (1998), 'Gowrie Creek Catchment Management and Stream Restoration Program', Hydrastorm '99, Adelaide. - awarded Best Paper of Conference.

- McAlister, A.B. (1998), 'Brisbane City Council Water Sensitive Urban Design Case Study', Hydrastorm '99, Adelaide.
- McAlister, A.B., Walden, W.J., and Taylor, L. (1997), 'The Application of Mathematical Water Quality Models in Areas of Limited Data Availability'. Pollution Control '97, Bangkok, Thailand.
- McAlister, A.B. (1997), 'Water Sensitive Urban Design', Keynote Address, Stormwater and Soil Erosion '97, Brisbane.
- Hogarth, W., Walden, W.J., McAlister, A.B. (1995), 'A Review of current water quality modelling Practices in Australia', 3rd Princess Chulabhorn Science Conference, Thailand.
- Bycroft, B., Mack, P., and McAlister, A.B. (1995), 'Stormwater Quality Data Collection Program for Brisbane City Council'. The Second International Symposium on Urban Stormwater Management, Melbourne.
- McAlister, A.B., Syme, W.J., Bycroft, B., and Mack, P. (1995), 'The Application of a Common Australian Stormwater Quality and Quantity Model in the Sub-Tropical Environment'. The Second International Symposium on Urban Stormwater Management, Melbourne.
- McAlister, A.B. and Hutchinson, R. (1994), 'The Practical Applications of Advanced Numerical Modelling Techniques in the Development of a Functional and Cost-Effective Layout for the Buran Darat Development - Sentosa Island, Singapore', Ninth Congress of the Asia Pacific Division of IAHR, Singapore.
- McAlister, A.B. (1994), 'The Importance of Accurately Simulating Hydraulic Processes in Water Quality Modelling Studies', IE Aust Conference on Hydraulics in Civil Engineering, Brisbane.
- McAlister, A.B. and Witt, C.L. (1993), 'Providing a Better Understanding of Flooding Behaviour with Detailed Numerical Models', 33rd Annual N.S.W. Flood Mitigation Conference.
- McAlister, A.B. (1991), 'Urban Stormwater Pollution - A Description of the Problem, Analysis and Solution Techniques', IE Aust QLD Division Technical Papers.
- McAlister, A.B. (1991), 'Management of Urban Water Quality', AWWA Dirty Waters Workshop, Brisbane.
- McAlister, A.B. and Stokoe, P.C. (1990), 'An Evaluation of Alternative Dredging Operations for the Shipping Channel-Weipa', Third Australian Port and Harbour Engineering Conference, Melbourne.
- McAlister, A.B. (1989), 'Dye Dispersion Studies and Mathematical Modelling of a Tidal Canal in the Clarence River, New South Wales', M.Eng.Sc Thesis, University of Queensland.
- McAlister, A.B. (1989), 'Development and Testing of a Lagrangian Water Quality Model', I.E. Aust. Hydrology and Water Resources Symposium, Christchurch, N.Z.
- Milligan, C.J. and McAlister, A.B. (1988), 'Water Quality Management at Palm Meadows Golf Course by Limited Tidal Exchange', IAWPRC/AWWA Conference - Water Quality and Management for Recreation and Tourism, Brisbane.

APPENDIX B
INSTRUCTIONS

WHITE & CASE

20 October 2020

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Tony McAlister
Water Technology Pty Ltd
Level 5, 43 Peel Street
South Brisbane, QLD 4101

By email: Tony.McAlister@watertech.com.au

Confidential and subject to legal professional privilege

Dear Mr McAlister

Fingerboards mineral sands project

We act as legal advisors to Kalbar Operations Pty Ltd (**Kalbar**), the proponent of the Fingerboards mineral sands project (**Project**).

This letter confirms and sets out the scope of your retainer to prepare an expert witness statement and potentially also present evidence at the inquiry hearing to be held in relation to the environment effects statement (**EES**) prepared for the Project pursuant to the *Environment Effects Act 1978* (Vic).

1. The Project

Kalbar proposes to develop the Project on an area of approximately 1,675 hectares within the eastern part of the Glenaladale mineral sands deposit in East Gippsland, Victoria. The Project site is located near the Mitchell River, approximately 2 km south of Glenaladale, 4 km south-west of Mitchell River National Park and 20 km north-west of Bairnsdale.

The Project includes the development of an open cut mineral sands mine and associated infrastructure. It is expected to have a mine life of 15–20 years and involve extraction of approximately 170 Mt of ore to produce approximately 6 Mt of mineral concentrate for export overseas.

2. Panel and EES inquiry

The EES and the studies and assessments that underpin it (together with a draft planning scheme amendment and application for an EPA works approval) are presently on public exhibition until the end of October 2020.

The inquiry is scheduled to convene its directions hearing on **14 December 2020**, and the inquiry hearing is scheduled to commence on **1 February 2020**. We will keep you informed of any relevant directions, including the timetable for filing evidence and, if required, any expert conferences.

3. Scope

This letter is confirmation of your engagement as an independent expert to:

(a) prepare an expert witness statement in which you:

(i) set out your background and relevant expertise;

20 October 2020

(ii) briefly describe and summarise the surface water assessments prepared in support of the EES – both the site and regional studies - and your role in preparing them. In particular, we ask that you detail whether there is anything in the report that you disagree with or wish to elaborate on and set out any additional information that you consider necessary to include, including any additional assumptions;

(iii) consider the submissions that are relevant to your area of expertise and respond to any issues raised; and

(b) if required, prepare and present expert evidence at the inquiry hearing.

We will provide further instructions on the scope of your engagement and any new instructions as necessary.

4. Form of your expert witness statement

The form and content of your expert witness statement should be prepared in accordance with Planning Panel Victoria's *Guide to Expert Evidence* (**Guide**). We enclose a copy of the Guide for your reference. Please review the Guide and ensure your witness statement addresses the matters set out in it, in particular those matters listed under the heading 'The expert witness statement'. Please contact us if there is anything in the Guide that you do not understand, or if you have questions in relation to it.

Until your expert witness statement is in final form it should not be signed. You should, however, be aware that unsigned documents may need to be disclosed to other parties.

5. Your duties and responsibilities as an expert witness

Even though you are engaged by Kalbar, you are retained as an expert to assist the inquiry, and you have an overriding duty to it. The inquiry will expect you to be objective, professional and form an independent view as to the matters in respect to which your opinion is sought.

6. Timing

The timing for completion of your expert witness statement is to be advised. We will let you know as soon as we can.

7. Conflict of interest

It is important that you are free from any possible conflict of interest in providing your advice. You should ensure that you have no connection with any potential party to this matter that could preclude you from providing your opinion in an objective and independent manner.

20 October 2020

8. Costs and invoicing

Water Technology Pty Ltd will continue to be contractually engaged by Kalbar and Kalbar will continue to be responsible for the payment of your fees. Your accounts should be sent directly to the appropriate person nominated by Kalbar.

9. Confidentiality

Your engagement and any documents you prepare under it should be marked "Confidential and subject to legal professional privilege".

If anyone other than ourselves, Kalbar or its technical advisers contact you about this engagement or the work you are undertaking under this engagement, please contact us immediately.

If you have any questions about this letter or require any additional information, please contact us.

Yours sincerely,

Tim Power
Partner

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Senior Associate

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Enc: Planning Panel Victoria's *Guide to Expert Evidence* - April 2019

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