

### 3.2.4 Groundwater

Mr and Mrs Spring have advised the Proponent that there is no bore located within their property and that they are not aware of any springs within the property.

### 3.2.5 Air Quality

As indicated in Table 4.42 of the *Environmental Assessment*, Project-related air quality emissions are not expected to result in exceedances of the relevant air quality criteria at any residences surrounding the Project Site, including Residence R31 which is located between Residence R108 and the proposed processing plant. As a result, compliance with those criteria at Residence R108 is also expected.

### 3.2.6 Visual Amenity

The Proponent acknowledges that the ROM pad and processing plant would be visible from Residence R108. In accordance with Commitment 12.6, the Proponent would consider favourably any request for assistance in creation of a visual screen. To this end, the Proponent will commence consultation with Mr and Mrs Spring in relation to identifying options for visual amenity screens and would ensure that any screens are planted/constructed as soon as practicable after receipt of project approval.

## 3.3 PROPERTY 115

A submission was received from Brian and Karis Sanderson (Submission 045). In that submission it was noted that while their residence (Residence R33) was included in the *Environmental Assessment*, specific reference to their property was not. **Figure 1** has been amended to include reference to the property, namely Lot 1 DP 1093136, as Property 115.

## 4. GOVERNMENT AGENCY SUBMISSIONS

### 4.1 Introduction

This sub-section presents the submissions received from relevant government agencies (in *italics*). A response to each issue raised is presented (in normal text). Where one of the specialist consultants identified in Section 1 has provided the relevant response, the response is prefaced with the consultant's acronym in parenthesis.



## 4.2 DEPARTMENT OF ENVIRONMENT, CLIMATE CHANGE AND WATER

### 4.2.1 Water

#### 4.2.1.1 Discharges

*Legislation that DECCW implements such as POEO Act, do not support the discharge of water into other water bodies unless Ambient Water Quality Objectives are met. Therefore if the proponent intends to discharge water into Majors and/or Spring Creek then that water should meet the ambient water quality objectives of both water ways. It may be in the proponent's interest to begin monitoring water quality in both waterways so that they can establish appropriate ambient water quality levels.*

**Response:** The Proponent acknowledges that a licence under the POEO Act will be required for discharge of environmental flows to Majors Creek and that the quality of water released will be required to meet the relevant water quality criteria. The Proponent has undertaken long term monitoring of water within both Spring and Majors Creeks (see Section 4.6) and proposes to implement the monitoring program identified in the *Environmental Assessment* and this document as soon as practicable.

#### 4.2.1.2 Tailings Storage Facility and Tailings Composition

*Page 4-82, under "Design and construct the Tailings storage facility (TSF) as per section 2.7 ...":*

- *dot point 2 - Ensure that the Tailings Storage Facility embankment is keyed into the underlying material in a manner that would prevent down slope migration of potentially contaminated groundwater from the facility;*
- *dot point 4 - "Construct seepage collection structures at the foot of the tailing storage facility embankment and ensure that any captured seepage is automatically pumped back to the tailings storage facility":*
- *dot point 5 - "Install piezometers at appropriate interval at the base of the tailings storage facility embankment and monitor these regularly to assess the integrity of the facility. "*

*These points indicate potential contamination of the material to be placed in the TSF and therefore potential impacts on downstream ground and surface waters. The EA does not include sufficient information on the processing chemicals and whether they will be part of tailings generated through the project. The longer term fate of the material and water in the TSF is an issue, for example, there is no indication as to when seepage collection and integrity monitoring end after the completion of the mining activities. DECCW believes that the main contaminant appears to be salinity, as it will be the most mobile. However the information regarding process chemicals and their resultant volumes within tailings or other waste streams has not been provided in the EA.*

**DECCW requires this information in order to ascertain the suitability of tailings management and monitoring for the project.**



**Response:** The Proponent does not anticipate that tailings material will pose any significant contamination risk. However, in line with best practice tailings management and taking into consideration the sensitivity of downstream environments and users of surface and groundwater, the Proponent proposes to construct an impermeable tailings storage facility with surface and sub-surface structures to capture and return any leakage from the facility and implement a monitoring program to test for leakage. This does not imply that the Proponent anticipates significant contamination-risks.

The Proponent notes that a report prepared for the Project feasibility study was received after finalisation of the *Environmental Assessment*. The following provides a summary of relevant information from that report

### Acid Generation Potential

An analysis of the tailings material indicated that the tailings material has a very low sulphur content of 0.095%, with all sulphur occurring as sulphide. The maximum potential acidity was calculated at 2.6 kg H<sub>2</sub>SO<sub>4</sub>/t which is considered very low. The acid neutralising capacity of the tailings was determined to be 89kg H<sub>2</sub>SO<sub>4</sub> /t of tailings. As a result, the net acid producing potential of the tailings material is approximately -86 kgH<sub>2</sub>SO<sub>4</sub>/t of tailings.

In addition, net acid generation tests were undertaken. These tests indicate that even under extreme oxidising conditions no measurable acid is produced and the pH of the solution remains alkali.

As a result, the tailings are therefore classified as Non Acid Forming.

### Tailings Chemical Composition

**Table 2** identifies the geochemical composition of the tailings material. These results are compared with average crustal abundance to give the geochemical abundance indices The Geochemical Abundance Index. The results of the analysis show that tailings solids contain a low number of elemental enrichments. Molybdenum and antimony are naturally enriched components of the ore and are classified as significantly enriched with silver slightly enriched. Boron is classified as slightly enriched but this is a result of the high detection limit for the test and the sample may not actually be enriched in boron.

The results of the analysis have also been compared to *National Environmental Protection Measures Investigations Levels for Assessment of Site Contamination* published by the National Environmental Protection Council in 1999. However guideline values for antimony and molybdenum, which were found to be enriched, were not available in this reference. To allow assessment of the antimony and molybdenum concentrations, the concentrations contained in the samples have been compared to *Netherlands National Institute of Public Health and Environment Intervention Levels for Soil* published by the Dutch National Institute of Public Health and the Environment in 1998 and ecological threshold concentrations for antimony in water and soil published by the European Centre for Risk Assessment in 2009. The results of this assessment indicate that the concentration of enriched elements are below ecological or health based investigation levels for all parameters except sulphur. The sulphur is found to be in relatively low concentration and there is sufficient neutralising capacity so as this does not present a risk to the environment or human health.



**Table 2**  
**Tailings Solid Multi-Element Results & Geochemical Abundance Indices**

<b>Element</b>	<b>Unit</b>	<b>Multi-Element Analysis Result</b>	<b>Average Crustal Abundance</b>	<b>Geochemical Abundance Index</b>
Ag	ppm	0.45	0	<b>2</b>
Al	ppm	82890	82000	0
As	ppm	<2	2	0
B	ppm	<50	10	<b>2</b>
Ba	ppm	334	500	0
Be	ppm	2.7	3	0
Ca	ppm	34771	41000	0
Cd	ppm	0.1	0.1	0
Co	ppm	4.1	20	0
Cr	ppm	159	100	0
Cu	ppm	48	50	0
F	ppm	976	950	0
Fe	ppm	14800	41000	0
Hg	ppm	0.1	0.1	0
K	ppm	19222	21000	0
Mg	ppm	6298	23000	0
Mn	ppm	630	950	0
Mo	ppm	25	2	<b>3</b>
Na	ppm	30025	23000	0
Ni	ppm	125	80	0
P	ppm	712	1000	0
Pb	ppm	6	14	0
Sb	ppm	3.8	0.2	<b>4</b>
Se	ppm	0.06	0.1	0
Sn	ppm	3.3	2	0
U	ppm	3.13	2	0
V	ppm	88	160	0
Zn	ppm	34	190	0
Note1: Bold = slightly enriched. Highlighted and Bold – Significantly Enriched				
Source: Knight Piésold Pty Limited (2010) – Table 4.15				

### Supernatant Water Quality

The supernatant water quality, namely the quality of water contained within the tailings paste pumped to the tailings storage facility, was assessed. The results of the testing give an indication of the water quality which is likely within the supernatant pond during operation.



**Table 3** presents the results of that testing as well as West Australian water quality standard for release of water from mining operations and livestock drinking water. In summary, the supernatant water quality meets the guidelines for release and for livestock drinking water for all parameters analysed.

**Table 3**  
**Tailings Supernatant & Comparison to Release and Livestock Guidelines**

Parameter	Reference Value (mg/L)	Assay results (mg/L)	Exceedance of reference (%)
pH	6 to 9	7.8	-
TDS	2000	630	-
Aluminium	5	0.16	-
Antimony	N/G	0.035	No Guideline
Arsenic	0.1	0.001	-
Barium	N/G	0.098	No Guideline
Boron	5	0.15	-
Cadmium	0.01	0.00012	-
Calcium	1000	55.88	-
Chloride	N/G	157.5	No Guideline
Chromium (total)	1	<0.01	-
Cobalt	1	0.0002	-
Copper	0.3	0.01	-
Flouride	2	1	-
Iron	2	0.22	-
Lead	0.1	<0.0005	-
Magnesium	2000	14.12	-
Manganese	N/G	0.16	No Guideline
Mercury	0.002	<0.0001	-
Molybdenum	0.15	0.01	-
Nickel	0.05	<0.01	-
Phosphorus	N/G	<0.1	No Guideline
Selenium	0.02	0.0016	-
Silver	0.5	0.00001	-
Sodium	N/G	127	No Guideline
Sulphate	1000	115.1	-
Tin	N/G	0.0036	No Guideline
Uranium	0.2	0.028	-
Vanadium	N/G	<0.01	No Guideline
Zinc	0.5	0.015	-
Note 1: Reference Value Source – West Australian water quality standard for release of water from mining operation and livestock drinking water.			
Source: Knight Piésold Pty Limited (2010) – Table 4.17			



## Salinity

As the water to be used during processing operations is not significantly saline and that Braidwood Granodiorite does not contain elevated levels of salts, elevated salinity in pore water within the tailings material is not expected to be a significant potential contaminant. In addition, management and mitigation measures that would be implemented to prevent discharge of reagent-laden seepage from the tailings storage facility would also prevent discharge of salt-laden seepage.

## Seepage Collection and Monitoring

Seepage collection and monitoring would continue from the commencement of tailings placement operations until continued collection and monitoring is deemed to be no longer required by the relevant government agencies. Commitment 15 has been amended to reflect this commitment.

*The proponent is investigating alternative measures for managing the tailings that would be produced by the Project. This may include using tailings to backfill completed stopes within the proposed mine using a process referred to as "paste fill." The implications of any contaminants found to be present in the tailings might limit or prevent this use. The proposal to use the tailings in this manner should be further investigated and reported on prior to this activity commencing.*

**Response:** However, it is noted that the use of paste fill techniques would result a significantly smaller tailings storage facility on surface and a greater degree of backfilling of the final slopes, resulting in more rapid groundwater recovery following completion of mining operations. As indicated in Tables 2 and 3, the Proponent currently understands that there are no deleterious elements within either the tailings material itself or within the supernatant water. As a result, no significant adverse environmental impacts are anticipated as a result of the use of paste fill techniques.

However, as investigations into the use of paste fill is ongoing, the use of this process is not proposed at this stage. A description was merely provided in the *Environmental Assessment* to highlight to readers that alternative tailings placement procedures were being considered and that subsequent applications may be made to permit this placement method.

*DECCW note that after completion of mining operations the proponent does not intend to put a clay capping on the tailings storage facility (see Section 2.14.8). DECCW do not support this position as there will be potential implications for the amount of ongoing seepage from the tailings storage facility. Modelling the effect of saline seepage water on the salinity/conductivity levels in Majors Creek to see if environmental values could be compromised is something that the proponent should be required to undertake.*

**Response:** The Proponent contends that surface water infiltration into the surface of the reshaped and rehabilitated tailings storage facility would not pose a significant risk to the post-mining management of the facility because the final landform would be shaped to be free draining and would be well vegetated. However, in light of the concerns raised by the Department, the Proponent would agree to construction of a suitable cap on the tailings storage facility during final rehabilitation to prevent surface water infiltration into the post-mining landform. The form that this cap would take, namely a clay liner or some other form of liner, would be determined in consultation with the relevant government agency during preparation of the *Closure Plan*. Commitment 16.12 has been amended to reflect this commitment.



#### 4.2.1.3 Ore Processing Area

*Previous DECCW comments on the proposal raised concerns with the recycling of water through the ore processing activities, particularly with the potential for contaminate concentrations to increase over time. DECCW is concerned that the exhibited EA did not fully address this issue, and believe that better controls around these processing areas are needed. This information will be relevant for licensing and setting licensing conditions. For example, does the proponent intend to put a bund around the area to capture major rainfall events, or have a catch dam close to the processing area that might discharge in a high rainfall event, or both? The proponent has also indicated that low grade ore would be used in the construction of the ROM pad, potentially becoming a source of acid mine drainage for the time it is emplaced. The proponent needs to consider these matters further and indicate how it will manage runoff and infiltration, and thus minimise the spread of contaminants.*

**Response:** The Proponent proposes to have three classes of water within the Project Site, and three resulting water management areas. These would be as follows.

- Contaminated water – namely water with the potential to contain processing reagents, hydrocarbons, other chemicals or lowered pH as a result of natural oxidation of sulphide bearing materials. This water would be contained within a Contaminated Water Management Area that would be banded to ensure no discharge of potentially contaminated water. In addition, the Proponent would ensure that the processing plant, reagent and concentrate storage area and hydrocarbon store are all contained within the Contaminated Water Management Area(s). All surface waters within the Contaminated Water Management Area would be retained and pumped to the Process Water Tank for use within the processing plant. Commitment 7.21 has been inserted to clarify this commitment.
- Dirty water – namely water with the potential to contain suspended sediment but not chemicals or other contaminants. This water would be managed through appropriately designed sediment control structures. Unless those structures are included in the Proponent's harvestable right, water would be released from the sediment control structures once required suspended sediment concentrations have been achieved.
- Clean water – all surface water within undisturbed sections of the Project Site would be treated as clean water. This water would be diverted around disturbed sections of the Project Site and would be directed to natural drainage or the proposed harvestable or existing dams.

As indicated in Section 4.5.7 of the *Environmental Assessment*, the Proponent would prepare a detailed *Surface Water, Sediment and Erosion Control Plan*. That plan would be prepared in consultation with Department of Environment, Climate Change and Water (DECCW) and other relevant government agencies and would provide detailed descriptions of the proposed surface water management structures, including design rainfall assumptions to ensure nil discharge from the Contaminated Water Management Area.



Finally, in light of the Department's concern in relation to the use of low grade ore material within the ROM pad, the ROM pad would be constructed entirely from waste rock material. Commitment 7.19 has been inserted into the Final Statement of Commitments to reflect this commitment.

#### **4.2.1.4 Management of Surface Water, Pollutants and Erosion and Sediment**

*The proponent has proposed that they will develop a Sediment and Erosion Control Plan (as described in the Statement of Commitments). DECCW is concerned that this Plan does not sufficiently cover the ore processing area and run of mine pad well enough.*

**Response:** The Proponent anticipates that the *Surface Water and Sediment and Erosion Control Plan* would be prepared in consultation with the Department and that all issues of concern to DECCW will be addressed in that document.

*The proponent has committed to having various mitigation and control measures covering groundwater and surface water. These measures will be important but there are few other areas that need to be considered and addressed.*

*One aspect of mitigation and control that the proponent has not specifically discussed or committed to (eg see commitments 7.16 to 7.18) is how it will deal with the inevitable spills, leaks and maintenance activities that will occur in the area or areas where the ore will be processed (ie from grinding through to the final flotation concentrate). This is unsatisfactory. DECCW require that the proponent provides information on the management of processing chemicals, reagents and processing leachate within the processing areas so that DECCW can determine if the proposal complies with industry standards and includes sufficient pollutant prevention measures.*

**Response:** As indicated in Section 4.2.1.3, the Proponent would ensure that the processing plant, reagent storage area and hydrocarbon storage area are all contained within the Contaminated Water Management Area and that appropriate surface water controls, including bunding and oil/water separators are installed to ensure no discharge of potentially contaminated water. In addition, detailed design parameters would be identified in the *Surface Water and Sediment and Erosion Control Plan* that would be prepared in consultation with Department of Environment, Climate Change and Water and other government agencies.

In addition, the Proponent has previously committed to implement the following management and mitigation measures during the life of the Project.

- All reagents would be stored and used in accordance with the manufacturer's instructions and the relevant Material Safety Data Sheets.
- All liquid reagents would be stored within a bunded area with a capacity of at least 110% of the capacity of the largest container.
- Reagents would not be stored with incompatible chemicals or chemicals that may cause a reaction in the event of a reagent spill.
- Only the minimum volume of reagents required for the ongoing operation of the Project would be stored within the Project Site.





- Material Safety Data Sheets and appropriate spill management equipment would be available in the vicinity of all reagent storage areas.
- A *Hydrocarbon, Chemical and Reagent Management Plan*, including emergency management procedures, would be developed and implemented throughout the life of the Project

*Similarly, the company has discussed (but not tabulated a commitment covering) containment measures for the final floatation concentrate (see Section 2.6.5) There seems to be little or nothing said about containing and managing spills, leaks, overflows, wash down waters, oil and grease and runoff from treatment process areas prior to the final floatation concentrate area. Process streams in these areas will contain one or more of: recycled water with a build up of contaminants, elevated levels of metal sulphides, and process chemicals. The proponent needs to have some system(s) of contaminant minimisation and containment and water management in this/these areas otherwise contamination will spread downstream. This aspect needs to be explicitly addressed in detail and it needs to be done in the planning/design phase not retrofitted afterwards: Such a system would simplify licensing including supervision, monitoring and the number of discharge points. The detail of how the proponent plans to contain contamination and manage water should be a documented commitment describing how the matters will be explicitly addressed.*

**Response:** As indicated in Section 2.6.5 of the *Environmental Assessment*, concentrate material would be placed within a covered area on a concrete sealed surface. As also indicated all surface water, including water draining from the concentrate material following stacking, would be directed to a sump and returned to the process water system. The concentrate storage area would be contained within the Contaminated Water Management Area and no surface water would be discharged. Commitment 7.1 has been amended to reflect the above.

*DECCW recommend that prior to commencement of works, the proponent must develop and provide to DECCW for comment, a comprehensive Water Management Plan for the ore processing area and run of mine pad to manage, at source, potential pollutants spills of chemicals during processing or runoff from contaminants in the ore from the run of mine pad. The Water Management Plan must include measures to prevent pollution from the processing area and run of mine pad including:*

- *limiting overland runoff from the run of mine pad and processing area for example use of additional bunding to contain the work area;*
- *minimising infiltration to groundwater from the run of mine pad and processing area;*
- *capturing and reusing or treating any runoff from the runoff mine pad and processing area, such as directing flows to detention basins adjacent to the processing areas and run of mine pad;*

**Response:** Section 4.5.7 of the *Environmental Assessment* identifies that a *Surface Water, Sediment and Erosion Control Plan* would be prepared. The Proponent anticipates that that plan, or a *Water Management Plan*, would:

- be prepared prior to the commencement of site establishment operations;



- include the matters identified by the Department; and
- be prepared in consultation with the Department.

*If discharges are proposed from the processing area or run of mine area, wet weather discharge licence limits or monitoring conditions may be required for, but not limited to, process chemicals, pollutants mobilised from the ore, salinity, pH, suspended solids, oil and grease. It should be noted that DECCW does not support the pollution of waters and instead would require appropriate pretreatment options be identified prior to discharge to the environment.*

**Response:** No discharges from the contaminated water management area are proposed.

*Sediment and erosion control around the processing area and run of mine pad during construction and operational phase should be guided by "Volume 2E: Mines and quarries" from the Managing . urban storm water: soils and construction publications, available on the DECCW website at: <http://www.environment.nsw.gov.au/stormwater/publications.htm>*

**Response:** Section 4.5.4 of the *Environmental Assessment* identifies that the proposed sediment and erosion control would be constructed to comply with the identified document.

#### 4.2.2 Noise

*The proponent has not determined what, if any, modifying factor adjustments should be made. It is considered that tonality / low frequency and/or impulsiveness will be an issue, and therefore adjusted levels could be 5 -10 dB(A) above their modelled LEq(15min) values. This may result in the proponent not being able to meet amenity criteria at a number of receivers under any stability conditions.*

**Recommendation:** *That the proponent investigate which modifying factor adjustments (detailed in section 4 of the Industrial Noise Policy (INP)) should be made to predicted noise levels at receivers, and report these adjusted values, with additional mitigation as necessary.*

**Response: (Spectrum)** None of the noise sources (as used in the noise modelling and sourced from similar plant and machinery) is tonal, impulsive or contains sufficient low-frequency content to attract a modifying factor correction. Modifying factor corrections are, however, an important compliance issue and any future noise monitoring will be required to be in third-octave bands, both A- and C-weighted, and as assessment of modifying correction factors included in compliance reporting

*The proponent has also not qualified which future drilling activities for exploration would occur on the licensed premises.*

**Recommendation:** *DECCW considers that any exploratory drilling proposed for the premises would constitute activities ancillary to the licensed activity. As that ancillary activity would be undertaken on the licensed premise, it would be captured under the EPL for the premises. The proponent should therefore detail and consider in their modelling, the cumulative impact of any exploratory drilling on predicted noise levels at receivers, and propose any additional mitigation measures as necessary.*

**Response:** The Proponent notes that exploration is an intermittent activity that may be undertaken in a variety of locations using a variety of equipment. As a result, any modelling that may be undertaken is unlikely to reflect the actual noise impacts.

It is noted that exploration drilling operations have been undertaken intermittently within the Project Site since 2004. It is also noted that further drilling operations are likely to be undertaken during the life of the Project. As a result, the Proponent agrees that drilling operations should be considered to be ancillary to the proposed licenced activity and noise emissions should be covered by any Environment Protection Licence issued for the Project. This approach is consistent with recent discussions and agreements with Industry and Investment NSW in relation to proposed exploration operations within the Project Site.

*The proponent has also not justified their assumptions about the duty cycles or locations used in the model (i.e. haul trucks and semi trailer had a "time-based correction" applied, but this correction has not been explained or justified).*

**Recommendation:** *That the proponent fully justify all assumptions made about the duty cycles of plant and equipment proposed for the premises, as well as adjustments made to plant noise levels based on location.*

**Response: (Spectrum)** The time-based correction used in the noise assessment was a standard calculation for modelling noise sources that would not be present for an entire 15-minute period. It was estimated that a road truck would traverse the road from loading point to its junction with Major Creek Road in four minutes. A point source was located at both the northern and southern ends of the haul road and it was conservatively assumed that there could be two truck movements in a 15-minute period.

The correction factor for 2 x 2 minute occurrences of noise in a 15-minute period is  $10\log_{10}(4/15) = -5\text{dB}$ . Based on previously measured pass-by sound power level of 103 dB(A), each of the truck point sources was modelled as 98 dB(A),  $L_{\text{eq}(15\text{minute})}$ .

*The proposal is located within one kilometre of the Majors Creek State Conservation Area (SCA). At present the noise assessment does not address the potential for noise impacts on the amenity of this SCA.*

**Recommendation:** *That the proponent assess noise impact on the Majors Creek State Conservation Area via methodology detailed in the Industrial Noise Policy.*

**Response:** It is noted that the Majors Creek Falls Reserve or Majors Creek State Conservation Area is located approximately 2.5km from the processing plant and ROM pad. It is also noted that the closest residence to those points is Residence R31 which is approximately 750m from the processing plant and ROM pad. As the noise assessment determined that all relevant noise assessment criteria would be achieved at Residence R31, the Proponent contends that all relevant noise assessment criteria would also be achieved at the Majors Creek Falls Reserve located three times as far away as Residence R31.

Spectrum Acoustics Pty Limited note that the relevant INP noise criterion for the reserve is 50dB(A), 15 dB higher than the criterion at residential receivers. In addition, Spectrum note that the reserve is located on the Araluen valley escarpment and is thereby shielded from the Project Site.



*DECCW recommend that a Traffic Noise Management Strategy (TNMS) be developed by the proponent, prior to commencement of construction and operation activities, to ensure that feasible and reasonable noise management strategies for vehicle movements associated with the facility are identified and applied, that include but are not necessarily limited to the following;*

- *driver training to ensure that noisy practices such as the use of compression engine brakes are not unnecessarily used near sensitive receivers,*
- *best noise practice in the selection and maintenance of vehicle fleets,*
- *movement scheduling where practicable to reduce impacts during sensitive times of the day,*
- *communication and management strategies for non licensee/proponent owned and operated vehicles to ensure the provision of the TNMS are implemented,*
- *a system of audited management practices that identifies non conformances, initiates and monitors corrective and preventative action (including disciplinary action for breaches of noise minimisation procedures) and assesses the implementation and improvement of the TNMS,*
- *specific procedures for drivers to minimise impacts at identified sensitive receivers,*
- *clauses in conditions of employment, or in contracts, of drivers that require adherence to the noise minimisation procedures and facilitate effective implementation of the disciplinary actions for breaches of the procedures.*

**Response:** Section 2.9 of the *Environmental Assessment* and Commitment 16.1 identify that a *Traffic Management Plan* would be prepared. The Proponent would prepare the plan in consultation with DECCW and would ensure that the above matters are included in the document.

### **4.2.3 Air Quality**

*Page ES-7, Processing Operations, describes the proposed processing arrangements for the site. In this section it states" ..... . to produce a gravity concentrate. This would then be dried before being smelted to produce gold dore." Page 2-28 states that "The final gravity concentrate would be dried before being smelted with suitable fluxes to produce gold dore and slag." DECCW is concerned that if gold is being smelted on-site, that no details of this process have been included in the EA.*

*The air quality impact assessment does not provide any assessment of the smelting process.*

***An updated air quality impact assessment must be completed in accordance with the DGR's if gold is being smelted on-site so that DECCW can assess the potential for impacts on air quality of the proposed smelting. In addition DECCW requires information on the smelting process including a detailed process diagram and identification of the types of fluxes that will be used.***



**Response:** The Proponent anticipates that any emissions to air from the smelting process would be minor, compared with emissions from other sources on the Project site, and unlikely to negatively affect air quality outside of the immediate process plant area. The principle gas emissions from the smelting process and quantity estimates are provided below:

- Carbon dioxide – 2.4kg/day
- Sulphur dioxide – 57.6kg/day
- Oxides of Nitrogen – 0.99kg/day
- Water – 18.7kg/day

These emissions are the result of the fluxes used in the smelting process, which includes silica, borax and sodium nitrate. Given the small quantities of gas emissions involved, the Proponent contends that the current Air Quality Impact Assessment adequately reflects the impacts on air quality associated with the Project.

#### 4.2.4 Aboriginal Cultural Heritage

##### 4.2.4.1 Literature review and archaeological significance

*DECCW has previously indicated to the proponent that there is not an adequate review of previous archaeological work. The AHIMS database indicates that there are seven archaeological reports that are relevant to the study area (Attenbrow 1984, Barber 2000, Bonhomme 1984, Boot 1999, Byrne 1981, Grinbergs 1995 and Williams 1987). Most of these reports can be accessed at Hurstville or Queanbeyan. This information should be reviewed in order to complete and fully inform the Aboriginal Cultural Heritage assessment.*

**Response:** This issue is addressed in Section 1 of Appendix 3.

*The assessment of archaeological significance at page 5a-45 section 8.3 does not meet DECCW DGR's because only research value has been assessed. An adequate significance assessment must also consider representativeness (ie, how common are these sites locally and regionally), educational value and aesthetic value for each recorded site.*

**Response:** This issue is addressed in Section 1 of Appendix 3.

##### 4.2.4.2 Site cards

*The recorded sites are still not listed on AHIMS, indicating that the proponent potentially has not submitted the site cards to DECCW. This is a potential breach of s89A of the National Parks and Wildlife Act 1979, which requires site cards to be submitted within a reasonable time of discovery.*

**Response:** This issue is addressed in Section 1 of Appendix 3.



#### 4.2.5 Biodiversity and Threatened Species

*It is unclear if the eight water harvesting dams and associated pipelines have been included in the biodiversity assessment, especially in terms of quantification of impacts. DECCW would like this point clarified.*

**Response:** The Proponent confirms that the water harvesting dams were included in the biodiversity assessment, however, the areas of those dams were not included in the areas shown on Figure 4.17 of the *Environmental Assessment* or in the Key Statistics table at the rear of the Executive Summary. **Table 4** presents the revised areas of disturbance, including the proposed harvestable rights dams. The Proponent notes that the inclusion of the dams in the areas presented in **Table 4** results in minor increases in the area of to be disturbed disturbance within:

- Community 3 - woody weed shrubland (from 0.1ha to 0.4ha);
- Community 4 – regenerating wattles (from nil to 0.1ha); and
- Community 7 – Native-dominated pasture (from 23.6ha to 23.9ha).

**Table 4**  
**Proposed Areas of Disturbance**

	To be disturbed	Area not to be disturbed	Total within Project Site	Total within Biodiversity Area
Ribbon Gum Forest	nil <sup>1</sup>	28.1	28.2	8.7
Fragmented Ribbon Gum Forest	nil <sup>1</sup>	7.0	7.1	7.1
Woody weeds Shrubland	0.4	29.6	30.1	nil
Regenerating wattles	0.1	18.4	18.5	7.6
Exotic vegetation	0.2	5.4	5.6	5.1
Native grassland (non-viable)	0.2	nil	0.2	0.2
Native-dominated pasture	23.9	256.1	280.1	235.7
Exotic pasture	nil	2.5	2.5	2.5
Largely disturbed land	2.2	20.9	23.1	3.9
River Peppermint Open Forest	nil	1.3	1.3	1.3
<b>TOTAL</b>	<b>27.0</b>	<b>369.3</b>	<b>396.6</b>	<b>272.1</b>
Note 1: See Section 4.6 for discussion of Ribbon Gum forest impacts.				

*The principles of Avoid, Mitigate and Offset are applied to assessment of all Part 3A applications. It is extremely disappointing to see that the only patch of Natural Temperate Grassland that occurs on the site will be destroyed through the development process. DECCW do not concur with the consultant's view that this patch is "not viable." It is well known that native grasslands survive in small areas and continue to do so for many years.*

**Response:** As identified in Section 6.1.2.4 of the Environmental Assessment, the Proponent is aware of the Department's requirement to Avoid, Mitigate and Offset impacts. While not identified in the *Environmental Assessment*, the Proponent considered a number of alternative locations for the tailings storage facility, including the following.

- A location on flat to gently sloping land in the northwest section of the Project Site. This location was not on a drainage line. However, its elevated location would result in significant visual amenity impacts for many kilometres. The proponent considered these impacts unacceptable.
- Alternative locations were considered in a number of valleys within the Project Site, including Spring Creek. However, each was considered to be unacceptable because they were either too low in the catchment, requiring significant surface water diversions and associated ongoing risk of failure of those structures in the long term or, in the case of Spring Creek, there was risks of groundwater contamination associated with the spring in the upper reaches of the creek.

In addition, as indicated in Table 4.16 of the *Environmental Assessment*, the small area of Natural Temperate Grassland within the Project Site is not considered to be non-viable because of the small size and very narrow width (<5m) of the community, rather because the community is located on an eroding bank of a creek which is likely to be lost to erosion in the coming years. Furthermore, erosion protection measures to prevent this loss would require substantial earthworks to re-shape the gully walls, which would result in the complete removal of the remnant grassland community.

Finally, the Proponent has committed to implement a Biodiversity Management Strategy that would seek to re-establish the Natural Temperate Grassland community through the northern section of the Project Site. The Proponent has commenced discussions with research officers of I&I NSW who have indicated that in their experience, agricultural areas such as the Project Site which have been subjected to base phosphate-based fertiliser use can be returned to native grasslands relatively quickly through appropriate grazing and land management practices.

*The offset strategy for the project is vague. DECCW notes that there needs to be a net environmental benefit of the proposed offset and biodiversity management on the site and this is not a clearly identified outcome from the information provided in the EA. DECCW consider that the Biodiversity Management Plan is separate from the offset strategy. The BMP should guide biodiversity management on the site during the construction and operation phases and should therefore be completed prior to any works being started on the site. The offset strategy, which the proponent has stated will be a Property Vegetation Plan, is designed to offset the impacts of the project on biodiversity by protecting and improving biodiversity management on the site in perpetuity. This commitment needs to be reflected in any consent if it is granted for the project.*

**Response:** It is noted that Biodiversity Offset Strategies are typically outlined in *Environmental Assessments* in broad terms, with a commitment that a detailed Biodiversity Management Plan or similar is prepared in consultation with DECCW during the initial stages of the Project. There is little value in spending considerable resources developing a plan when granting of project approval is not guaranteed.

As identified in Section 4.3.6.8 of the *Environmental Assessment*, Gaia Research undertook an assessment of the proposed biodiversity offset strategy as required by DECCW and concluded that the proposal to protect and enhance approximately 272ha of the northern section of the Project Site adequately offset the proposed impacts to approximately 0.2ha of non-viable Natural Temperate Grassland.

Finally, Section 4.3.6.8 of the *Environmental Assessment* and Commitment 16.1 identify that the Proponent would prepare a *Property Vegetation Plan* for the northern section of the Project Site.

*DECCW require the proponent to clearly identify and implement protection works around key biodiversity areas before any work is undertaken on site. This specifically includes the remnant wooded vegetation, Gang-gang Cockatoo nest site plus buffer and the habitat for the Major's Creek Leek Orchid. These measures should be clearly articulated in the Statement of Commitments.*

**Response:** The Proponent notes that the following Commitments are included in the *Environmental Assessment*.

- Commitment 5.1 – “Ensure that, with the exception of minor disturbance associated with, installation of water pipelines and management of existing tracks, no surface disturbing activities are being undertaken within areas of Ribbon Gum Forest and Fragmented Ribbon Gum Forest. No native vegetation over 3m high would be removed.”
- Commitment 5.4 – “Fence all areas of Ribbon Gum Forest and Fragmented Ribbon Gum Forest and exclude stock from those areas.” [It is noted that these areas include all Gang Gang Cockatoo nest sites]
- Commitment 5.5 – “Ensure that areas of habitat suitable for the Majors Creek Leek Orchid are appropriately identified and fenced and access restricted. Ensure no disturbance occurs within the fenced areas.”

These fenced area surrounding the habitat suitable for *Majors Creek Leek Orchid* would include a buffer of approximately 20m Commitment 5.5 has been amended to reflect this.

*In relation to commitment 5.6, DECCW recommend the proponent engage a suitable qualified wildlife carer or fauna ecologist to supervise activities that involve direct impacts to the wombat burrows.*

**Response:** Commitment 5.6 has been amended to reflect the Department’s request.

*DECCW supports conditional consent to implement a Biodiversity Management Plan applied to the site during the construction, operation and rehabilitation phases of the project. In developing a plan DECCW suggest the proponent implement specific conditions that are transparent to avoid management actions that cause ambiguity and adverse effects on the environment. For example, weed management must be supported by detail which demonstrates, for example, type and number of treatments, species of particular interest, the frequency and methods for monitoring and reporting. General statements in management plans are not supported by DECCW.*





*The BMP will also include maps/figures that clearly define management actions across the site. For example, areas that will exclude stock grazing from those which have grazing restrictions set by biomass limits should be mapped.*

*Additionally, DECCW recommend the proponent considered these factors during the preparation of the BMP.*

- *A sound strategy to " maintain or improve" habitat integrity and water quality of Majors Creeks*
- *A sound strategy to ensure tailings storage does not impact on the surrounding ecosystems and native species*
- *A sound strategy to ensure groundwater changes does not impact on the surrounding ecosystems and native species*
- *Rehabilitate degraded drainage lines*
- *A sound strategy to monitor and protect the Majors Creek Leek Orchid.*
- *Promote wildlife or vegetation corridors*
- *Eradicate weed and pest species, including exotic pasture species*
- *A grazing strategy based on biomass limits in addition to ground cover*
- *Sediment & Erosion Control*
- *Monitoring & reporting*
- *Site rehabilitation*

**Response:** The Proponent agrees with and supports the Department's suggestions.

#### **4.2.6 Potential Impact on nearby Conservation Areas**

*Specialist Consultative Studies - Part 4: Surface Water Assessment 5.1.4 Return of baseflow to Majors Creek pg 4-23 states "Big Island Mining Pty Ltd propose to 'return' water to the Majors Creek system at a rate commensurate with the modelled losses (i.e. up to 2.1L/s). „PWG believes that the proponent must apply the precautionary principle rather than rely on the accuracy of the modelled losses in determining the rate at which water is returned to the system. If modelled data is completely relied on, the potential remains that this rate could fall below the required baseflow to sustain ecosystems within the Majors Creek State Conservation Area (SCA) and beyond due to errors in such data. It is in our opinion that to ensure the natural baseflows are achieved, this rate should tested against historically monitored flow data for the Majors Creek and any available adjacent creek systems. If this information is not available, monitoring stations such as v-notch gauges should be established as soon as possible in order to gain robust data.*



**Response:** The Proponent notes that the proposed environmental flows are intended to replace lost base flows resulting from reduced groundwater seepage into a limited section of Majors Creek with a reach of approximately 1.5km. Groundwater seepage into the remainder of the creek both upstream of the anticipated groundwater impact area and downstream would be unaffected. As a result, the Proponent contends that a 3-dimensional numerical groundwater model is the most appropriate mechanism for determining the volume of the reduced groundwater seepage and therefore the most appropriate volume of water to be released.

However, the Proponent acknowledges the concerns of DECCW and notes that Commitment 6.5 states that the groundwater model would be updated and recalibrated with additional monitoring data within 2 years of the commencement of mining operations.

In addition, Commitment 15.14 has been inserted into the Statement of Commitments to indicate that surface water flows within Majors Creek would be monitored regularly and that the existing surface water flow monitoring within Spring Creek would continue. That data would be used to determine whether surface water flows within either creek would be impacted to a greater degree than the groundwater model suggests. If so, the Proponent would implement appropriate management measures. These management measures would be identified in the *Surface water, Sediment and Erosion Control Plan* that would be prepared in consultation with the Department and may include increased compensatory flows or provision of water from other sources to impacted residents.

*Environmental Assessment - Section No. 4: Assessment and Management of Key Environmental Issues. 4.5.7 Monitoring pg 4-111 states that the results of [surface water] monitoring "would be presented in the Annual Environmental Management Report ... ". PWG notes that any changes to the baseflow, turbidity and chemical properties of water entering Majors Creek has the potential to affect the ecosystems that rely on this creek particularly those contained within the Majors Creek SCA. Unlike the detailed description of the monitoring and ameliorative action process made on pg 4-97 and 4-98 in relation to groundwater, we note that there is no such commitment to take ameliorative action based on the results of the surface water monitoring program. This absence is also reflected in the Draft Statement of Commitments on pg 5-18.*

**Response:** Section 4.5.4 of the *Environmental Assessment* identifies that a *Surface Water, Sediment and Erosion Control Plan* would be prepared in to support the Project. That document would be prepared in consultation with DECCW and would include detailed ameliorative actions in the event that identified surface water triggers are exceeded. These would include but not be limited to the following.

- Review and adjustment of the proposed rate of discharge of water for environmental flows.
- Review and modifications to the proposed surface water and sediment and erosion control structure and procedures to ensure that water is only discharged once the required water quality criteria have been achieved.

Commitment 7.1 has been amended to reflect the above.



*Draft Statement of Commitments: point 5.7 pg 5-6 The PWG manages the Majors Creek SCA which is located downstream of the proposed project site. PWG notes that the site contains large expanses of woody weeds containing declared class 4 noxious weeds such as Scotch Broom and Blackberry. There is clear evidence that these species have migrated down the Majors Creek catchment and are impacting on lands such as the SCA and beyond. Good catchment management requires threats such as noxious weeds to be controlled at the head of the catchment before sustainable progress can be made downstream. As this site is at the head of the catchment, PWG supports the stated commitment to continue ongoing control of Blackberry and Broom in the south of the site.*

**Response:** The Proponent notes that it purchased the northern section of the Project Site in 2008. Since that time, extensive weed management programs have been implemented and that as noted in Section 4.3.4.3 of the *Environmental Assessment*, that section of the Project Site is now largely free of noxious or other weeds.

In addition, the southern section of the Project Site was purchased by the Proponent in 2010. It is acknowledge that sections of the newly purchased land have extensive weed issues. However, the Proponent has commenced and proposes to continue its successful weed management program within the newly purchased land and anticipates that this issue will be significantly reduced in significance in the next two growing seasons

*Environmental Assessment - Section No. 4: Assessment and Management of Key Environmental Issues. 4.4.5.6 Impact on groundwater dependent ecosystems pg 4-94 This section states that the project is "not expected to result in adverse impacts to groundwater dependant ecosystems as none are likely to exist within the site". In 4.4.2.2 Regional Groundwater Setting pg 4-72 the proponent assumes the fractured rock (granodiorite) is "hydraulically tight" and not able to transmit groundwater flow. This statement is in direct contrast to that of the Specialist Consultative Studies - Part 3: Groundwater Assessment which on pg 3-25 9.3.1 Distribution and Yield states that paired monitoring bores indicate "the two [granodiorite and regolith] aquifers are in direct hydraulic connection". Therefore any changes in the granodiorite will affect the groundwater level in the two other aquifers and surface water systems not supplemented with compensatory baseflows such as Majors Creek. This is evidenced in Appendix 6: Drawdown and recovery contours - Years 1-8.*

**Response:** The text referred to in Section 4.4.2.2 of the *Environmental Assessment* states in full that

*the [fracture-controlled granodiorite] aquifer may be categorised a hydraulically "tight" massive granodiorite with little or no primary permeability and localised fracture or fault systems which may be open and transmit groundwater flow.*

This is a factually correct statement and does not imply that the aquifer is "not able to transmit groundwater flow".

As indicated in Section 4.4.2 and 4.4.5 of the *Environmental Assessment*, it is acknowledged that the regolith, granodiorite and alluvial aquifers are hydraulically connected and that impacts in one aquifer will affect the others.



As indicated in Section 4.4.5.6 of the *Environmental Assessment*, there are no groundwater dependent ecosystems within the Project Site as a result of prior land disturbance. It is also noted in Section 4.4.5 of the *Environmental Assessment* that groundwater-related impacts would be limited to approximately 2.5km from the proposed Dargues Reef Mine. As a result, direct impacts on groundwater dependent ecosystems within the Project Site are not considered to be likely.

However, it is acknowledged that the Project would result in impacts to the base flow in Majors Creek through reduced groundwater seepage into the creek and its tributaries during periods of low rainfall. This has the potential to result in indirect impacts to groundwater dependent ecosystems downstream of the Project Site. As a result, the Proponent proposes to implement an environmental release program as identified in Section 2.10.2.4 of the *Environmental Assessment*. This would ensure that groundwater dependent ecosystems downstream of the Project Site in the vicinity of Majors Creek are not impacted as a result of reduced base flow in Majors Creek.

Finally, as indicated previously, the groundwater modelling indicates that groundwater impacts associated with the project would be limited to approximately 2.5km from the proposed Dargues Reef Mine. As a result, groundwater dependent ecosystems not associated with Majors Creek and located more than 2.5km from the proposed Dargues Reef Mine, namely outside the area shown on Figure 4.26 of the *Environmental Assessment*, would not be directly impacted by the Project because no springs or seeps would outside that area would be impacted.

*PWG would like to make reference to the occurrence the Endangered Ecological Community Araluen Scarp Grassy Forest in the South East Corner Bioregion contained within and around the Majors Creek SCA. This community and the SCA occurs less than 1 km from the modelled extent of the groundwater 1 m drawdown contour. The final determination for this community expressly states that "The community is susceptible to extreme dry spells" and that "Field sampling in 2003-04 identified extensive dieback of eucalypt crowns and understoreys attributed to recent extended drought, particularly on the spurs of the escarpment" which testifies the importance of groundwater security for this community.*

**Response:** Reference is made to the previous response which identifies that no groundwater-related impacts are expected outside the area shown on Figure 4.26 of the *Environmental Assessment*. As the ecology assessment did not identify the Araluen Scarp Grassy Forest in the South East Corner Bioregion within the Project Site and DECCW identifies that the community is located outside the area of predicted groundwater impacts, then no adverse impacts associated with Project-related groundwater drawdown are expected.

However, as indicated in Section 4.4.6 of the *Environmental Assessment*, extensive groundwater monitoring would be undertaken prior to, during and following mining operations. This monitoring would identify if actual impacts are greater than those anticipated and remedial action would be implemented. In addition, Commitment 10.15 identifies that the groundwater model would be revised within two years of the commencement of mining operations in light of receipt of ongoing monitoring data. This would allow further assessment of the potential impacts on this community.



*Additionally, a number of vegetated streams feeding Majors Creek outside of the proposed site still fall within the 1 m drawdown contour, one at least falling within the 5m contour. It is likely that in times of drought, the vegetation contained within these stream corridors relies on groundwater for survival. Groundwater seepage would appear to be a key contributor in the replenishment of pools and freshes within the streambed and thus be utilised by a range of native fauna species during dry times. It is of our opinion that impacts from the changes to groundwater levels on the ecosystems of the Majors Creek SCA namely the Araluen Scarp Grassy Forest in the South East Corner Bioregion and impacts on the fauna and vegetation utilising streams adjacent the project site should have been considered in the EA.*

**Response:** Figure 4.16 of the *Environmental Assessment* identifies the vegetation within the creek lines identified by DECCW as Ribbon Gum Forest, not Araluen Scarp Grassy Forest in the South East Corner Bioregion.

It is acknowledged that groundwater discharge, particularly in Spring Creek which has a measured base flow of approximately 0.3L/s, fills pools and hollows in the creeks within the Project Site. However, it is also noted that the creeks are typically steeply incised with steep banks of up to approximately 10m in height. As a result, it is unlikely that vegetation within the Ribbon Gum Forest would rely on groundwater seepage into the creeks for water. As a result, the Project is not expected to result in significant impacts on the Ribbon Gum Forest as a result of reduced groundwater discharge to Spring Creek and other unnamed tributaries.

*Specialist Consultative Studies - Part 2: Ecology Assessment 6.TSC Act Detailed Impact Assessment pg 2-66 PWG believes this does not adequately address the Director General's Requirements (DECCW) for threatened species and for all other species, populations and ecological communities that may be potentially impacted by the proposal, particularly in relation to altered noise, light and vibration pg 2-103 Table 1 (c) v. and (c) viii. We note that there has been very little or no attempt to quantify the impacts of noise and vibration on the fauna of the surrounding area, at this point we draw your attention to the proximity of the Majors Creek SCA which is located less than 1 km from the project site. It is of our opinion that this potential impact must be addressed as failing to do so may have unknown consequences for ecosystems within and surrounding the reserve.*

**Response: (Gaia)** It is noted that noise, lighting and blasting impacts within the Project Site were assessed in Gaia (2010). In particular, it was noted that Gang-gang Cockatoo were observed to be breeding in the immediate vicinity of the ongoing exploration operation which were being undertaken 24-hours per day, and included the use of night-time lighting. As a result, no adverse impacts associated with noise and lighting within the Project Site are anticipated. Similarly, given the distance from the Project Site to the Majors Creek State Conservation Area, no noise and lighting-related impacts are anticipated.

It is also noted that blasting operations during establishment of the box cut would be limited in duration and that ongoing underground blasting operations would use significantly smaller maximum instantaneous charges than those used during box cut establishment. As a result, no significant vibration-related impacts on threatened species within or surrounding the Project Site are anticipated.



(Spectrum) In addition, as noted in Section 4.2.2, the Majors Creek SCA is located approximately 2.5km from the principal noise sources, namely the processing plant and ROM pad. It is also noted that the closest residence to those points is Residence R31 which is approximately 750m from the processing plant and ROM pad. As the noise assessment determined that all relevant noise assessment criteria would be achieved at Residence R31, the Proponent contends that all relevant noise assessment criteria would also be achieved at the Majors Creek Falls Reserve located three times as far away as Residence R31. Spectrum Acoustics Pty Limited note that the relevant INP noise criterion for the reserve is 50dB(A), 15 dB higher than the criterion at residential receivers. In addition, Spectrum note that the reserve is located on the Araluen valley escarpment and is thereby shielded from the Project Site. As a result, the Proponent contends that noise-related impacts within the Majors Creek SCA would be negligible.

## 4.2.7 Statement of Commitments

### 4.2.7.1 Operating Hours

*DECCW will only support blasting between 9.00 am and 3.00 pm, Monday to Friday.*

*The SoC should be modified to reflect standard definitions of Daytime etc:*

- *Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays,*
- *Evening is defined as the period from 6pm to 10pm on any day,*
- *Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays*

**Response:** The Proponent would consent to restricting surface blasting operations to 9.00 am to 3.00 pm Monday to Saturday. However, the Proponent contends that underground blasting 24 hours per day, 7 days per week is appropriate for the following reasons.

- Underground blasting is typically undertaken at shift changes when the mine is evacuated. Indicatively, shift changes would occur at approximately 6:00am and 6:00pm each day.
- Underground blasting typically fragments smaller volumes of material than surface blasting. As a result, more frequent blasts are required to operate the mine.
- Based on a likely Maximum Instantaneous Charge of 150kg and a distance to the closest residence, namely Residence R31, of 1km, Spectrum Acoustics advise that the anticipated ground vibration at Residence R31 would be approximately 1.5mm/s. This is considerably less than the relevant blast criteria of 5mm/s. Underground blasting would not have any air blast overpressure impacts at surrounding residences.

The Statement of Commitments has been amended to reflect the above. In addition, Commitment 3.1 has been amended to reflect the standard *Industrial Noise Policy* time-of-day definitions.



#### 4.2.7.2 Noise and Blasting

*DECCW will only support blasting between 9.00 am and 3.00 pm, Monday to Friday.*

**Response:** See Section 3.2.7.1.

*Noise monitoring should be undertaken by a suitably qualified and experienced acoustical consultant. The SoC should be modified to make this explicit.*

**Response:** Section 4.2.7 of the *Environmental Assessment* identifies that a *Noise and Vibration Management Plan* would be prepared in consultation with the Department. This would include requirements in relation to qualifications and experience of the person undertaking the monitoring. Notwithstanding this, Commitment has been amended to reflect the Department's suggestion.

*The Noise Management Plan should be prepared prior to any works occurring on-site. The SoC should be modified to reflect this change in timing.*

**Response:** Commitment 15.2 has been amended to reflect the Department's suggestion.

#### 4.2.7.3 Groundwater

*Remove reference to "where practicable" in SoC 6.7, 6.8, so that a commitment to achieve these restrictions is made by the proponent.*

**Response:** Large and less mobile equipment, including bulldozers, excavators, scrapers, vibrating rollers and underground loaders and drill rigs, would, as is standard practice in mining operations, be refuelled in their work area by a suitably equipped service vehicle. That vehicle would be equipped with appropriate spill management equipment and the operators would be trained in the use of that equipment.

Similarly, large and less mobile equipment would, as is also standard practice in mining operations, be serviced within their work area. These operations would also be supported by a suitably equipped service truck and would be undertaken by suitably qualified and trained individuals.

#### 4.2.7.4 Surface Water

*Discharging water from sediment basins, as detailed in 7.6, does not appear to be compliant with s120 of the POEO Act and should be modified.*

**Response:** RWC has previously been advised by DECCW that, unless included in the Proponent's harvestable rights, potentially sediment-laden water collected within sediment basins or other sediment control structures may only be retained until such time as the sediment concentration has been reduced to below the required concentration, typically 50mg/L. The Proponent would construct the required sediment basins and other structures in accordance with "Volume 2E: Mines and quarries" from the *Managing urban storm water: soils and construction* publications. In addition, as previously indicated, the Proponent would ensure that potentially contaminated water within the Contaminated Water Management Area is not permitted to enter the sediment and erosion control system.



#### 4.2.7.5 Aboriginal Heritage

*Buffer area stated in 8.1 should be 20 m not 15 m, SoC should be amended to reflect this change.*

**Response:** Commitment 8.1 has been amended.

#### 4.2.7.6 Traffic and Transportation

*The reference to "where practicable" should be removed from 10.6, and a strong commitment to achieve these restrictions made.*

**Response:** The Proponent notes that it does not control all heavy vehicle movements to or from the Project Site. For example, fuel and consumable deliveries are managed by other organisations and while the Proponent would request that these deliveries be restricted to the identified times, it cannot guarantee compliance. In light of this, Commitment 10.6 has been amended to commit the Proponent to ensuring that all heavy vehicle movements directly controlled by the Proponent would comply with the restricted hours of operation and that the Proponent would require, where practicable, that non-Proponent-controlled heavy vehicles also comply with the restricted hours of operation.

#### 4.2.7.7 Air Quality and Energy

*A dust management plan should be prepared for the site that identifies control methods and appropriate areas for dust monitoring.*

**Response:** Section 4.10.8 of the *Environmental Assessment* and Commitment 16.1 identify that an *Air Quality Monitoring Program* would be prepared in consultation with DECCW and the surrounding community.

### 4.3 NSW OFFICE OF WATER

A separate response will be provided to the NSW Office of Water submission following a meeting between the Proponent and its advisors and the Department

## 4.4 INDUSTRY AND INVESTMENT NSW

### 4.4.1 Mineral Resources

*Section 2.14.1 in the EA states that a Rehabilitation Environmental Management Plan (REMP) will be prepared. The Department is concerned that the requirement to prepare a REMP may create confusion as the proposed REMP guideline has not, as yet, been finalised and the REMP provision of the Mining Amendment Act 2008 has not commenced.*

*The Department believes that the best way to incorporate the REMP provision of the proposed Mining Amendment Act 2008 for the Dargues Reef Gold Project would be to specifically require a "Rehabilitation Plan" in the project approval conditions rather than a REMP. The Rehabilitation Plan would need to be prepared in accordance with the relevant I&I NSW*





*Guideline so that such a plan can satisfy the requirements under the Mining Act 1992. This approach allows I&I NSW to manage the transition from a Mining Operations Plan (MOP) to a REMP. Given I&I NSW role of managing rehabilitation, any rehabilitation plan must be approved by the Director-General of I&I NSW in consultation with Department of Planning.*

**Response:** Agreed.

*The retention of the box-cut in the final landform is not supported by I&I NSW for the following reasons:*

- The box-cut landform is not consistent with the proposed final land-use of agricultural grazing and the existing topography of gently sloping hills and valleys; and
- Ongoing maintenance will be required for the box-cut fence and safety bund, which will be passed onto subsequent landowners.

*I&I NSW recommends that the retention of the box-cut is either removed from the final revised version of the EA or a condition is specified by the Department of Planning that the box-cut be rehabilitated to a landform consistent with the pre-mining topography. The eventual rehabilitation of the box-cut must be planned for in the initial stages of the mine development (i.e. stockpiling suitable quantities of fill material and topsoil). This process can be managed through the "Rehabilitation Plan".*

**Response:** As indicated in an email dated 7 September to Kane Winwood, the Proponent contends that back filling of the box cut would not be appropriate or reasonable for the following reasons.

- Backfilling the box cut would be contrary to I&I NSW's stated objective to ensure that resources are not sterilised. Backfilling the box cut would make it harder for the Proponent or subsequent operators to recommence mining operations within the Dargues Reef mine following cessation of mining activities.
- Bunding and fencing is typically regarded as a suitable closure mechanism for open cut mines and extractive industries in NSW. There are numerous precedents for retaining box cuts and open cuts in recently approved mining and extractive industry-related applications for project approval provided suitable mechanisms are in place to ensure the safety of people, domestic animals and wildlife in the long-term.
- It is noted that material to backfill the box cut would not be available within the Project Site at the cessation of mining operations. As a result, material would be required to be brought in from another location, with the resultant environmental impacts, including traffic, road maintenance, noise and dust-related impacts. In addition, importation of the required material would impose a significant cost on the Proponent that would not result in significant environmental benefits,

Notwithstanding the above, however, the Proponent would be willing to negotiate a suitable final landform with I&I NSW during preparation of the initial MOP/REMP and/or *Rehabilitation Plan*. This may include reducing the angle of the walls of the box cut to an angle suitable for placement of soil material and revegetation.



#### 4.4.2 Fisheries

*All the proposed safeguards, monitoring and mitigation actions listed in the EA and Appendices (including Ecology Assessment by Gaia Research P/L dated September 2010 and Surface Water Assessment by SEEC dated September 2010) should be included in any project approval, and listed in the Construction and Operation Environmental Management Plans (CEMP and OEMP) and fully implemented by the proponent and its contractors.*

**Response:** Agreed.

*I&I NSW also recommends that any project approval require that the design and construction of new or upgraded access road crossings of on-site waterways must be undertaken in accordance with I&I NSW 'Policy and Guidelines for Fish Friendly Waterway Crossings (2004) and Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (2004)'. These documents are available on our website [www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au) under 'Aquatic Habitats' and 'Publications'.*

**Response:** Agreed.

#### 4.4.3 Agriculture

*The proponent is to ensure that all top soil is removed from planned sites for the mine development itself, the waste rock emplacement area, roads, car parks, workshops, stores and other mine facilities. The top soil should be stored on site and stabilised for use when the site is decommissioned and rehabilitation is undertaken.*

**Response** Agreed. Sections 2.2.3 and 4.12 of the *Environmental Assessment* include commitments similar to the above.

*Section 2.5.2 of the EA (p2.24) states that testing of waste rock indicated that acid leachate is not likely to be produced. However, as there is a possibility that the rock may produce leachate, mitigation measures should be put in place should leachate be detected.*

**Response:** Agreed. Condition 7.20 has been inserted to reflect the above.

*To protect livestock, the proponent is to ensure that any livestock is separated from all mine infrastructures by fences and appropriate access structures.*

**Response:** Agreed. This commitment would be reflected in the proposed *Property Vegetation Plan* that would be prepared for the Project.

#### 4.5 SYDNEY CATCHMENT AUTHORITY

*The SCA has completed its review of the Environmental Assessment report and is satisfied that the report provides adequate information with regard to the potential contamination and water management issues for the construction and operation stages of the development.*



*Given the information contained in the EA report, the SCA considers the proposal is likely to achieve a neutral or beneficial effect on water quality providing the following conditions are included in the approval:*

- 1. Any road construction within the Sydney Drinking Water Catchment is to include an Erosion and Sediment Control Plan in accordance with Managing Urban Stormwater: Soils and Construction Volumes 2C Unsealed Roads (DECC, 2008);*
- 2. The SCA is to be included in the consultation regarding the review of the analysis and verification of groundwater modelling;*
- 3. The SCA is to receive a copy of the Annual Environmental Management Report containing results and analysis of groundwater monitoring.*

**Response:** The Proponent agrees with the above.

#### **4.6 SOUTHERN RIVERS CATCHMENT MANAGEMENT AUTHORITY**

*The EA does not adequately address the impacts on the Tableland Basalt Forest Endangered Ecological Community (EEC) (2-76). If the groundcover disturbance and the vegetation impacts were assessed under the Native Vegetation Act 2003 (NVA), it is likely that the project would be refused on the basis that the vegetation community (Ribbon Gum Narrow Leaf Peppermint Grassy Open Forest) is considered an over cleared vegetation community under the NVA.*

**Response: (Gaia – Mr Greg Stone)** Amendments under consideration since finalisation of the *Environmental Assessment* to the broader classification of the *Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions* Endangered Ecological Community (Tableland Basalt Forest EEC) incorporates several vegetation types, including *Ribbon Gum - Narrow-leaved Peppermint grassy open forest on basalt plateaux, Sydney Basin and South Eastern Highlands*. That vegetation community may be considered equivalent to the *Ribbon Gum – Snow Gum Grassy Open Forest (Ribbon Gum Forest)*, of which approximately 35.3ha was identified within the Project Site. As a result of these recent amendments, the *Ribbon Gum Forest* within the Project Site may be classified as *Tableland Basalt Forest EEC*. As a result, the following provides an assessment of significance in accordance with the requirements of Section 5A of the *Environmental Planning and Assessment Act 1979*.

**(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction,**

No Threatened species of flora listed in Schedule 1 or 2 of the *Threatened Species Conservation Act 1995* (TSC Act) were identified within the Project Site.

**(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction,**



No endangered populations listed in Part 2 of Schedule 1 of the TSC Act or Part 2 of Schedule 4 of the *Fisheries Management Act 1994* were found on site.

**(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:**

**(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or**

**(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,**

Tableland Basalt Forest listed under Schedule 1 of the TSC Act occupies an area of 35.3ha within the Project Site .

Tableland Basalt Forest is dominated by an open eucalypt canopy of variable composition. *Eucalyptus viminalis*, *E. radiata*, *E. dalrympleana* subsp. *dalrympleana* and *E. pauciflora* may occur in the community in pure stands or in varying combinations. The community typically has an open canopy of eucalypts with sparse mid-story shrubs (e.g. *Acacia melanoxylon* and *A. dealbata*) and understory shrubs (e.g. *Rubus parvifolius*) and a dense groundcover of herbs and grasses, although disturbed stands may lack either or both of the woody strata. The structure of the community varies depending on past and current disturbances, particularly fire history, clearing and grazing. Contemporary tree-dominated stands of the community are largely relics or regrowth of originally taller forests and woodlands, which are likely to have had scattered shrubs and a largely continuous grassy groundcover. At some sites, mature trees may exceed 30m tall, although regrowth stands may be shorter than 10m tall.

Tableland Basalt Forest is currently found in the Eastern Highlands and Southern and Central Tablelands, covering the local government areas of Bathurst Regional, Goulburn Mulwaree, Oberon, Palerang, Shoalhaven, Upper Lachlan and Wingecarribee. The community, however, may be found elsewhere within the designated bioregions.

Tableland Basalt Forest occurs within areas with a mean annual rainfall varying from approximately 750 mm up to 1100 mm. It typically occurs on loam or clay soils associated with basalt or, less commonly, alluvium, fine-grained sedimentary rocks, granites and similar substrates that produce relatively fertile soils. The species composition of Tableland Basalt Forest varies with average annual rainfall. On basalt or plutonic substrates east of Mittagong and Moss Vale, at the eastern edge of its distribution where average rainfall exceeds 1000-1100mm per year, the community is replaced by Robertson Basalt Tall Open-forest and Mount Gibraltar Forest. Its distribution spans altitudes from approximately 600m to 900m above sea level, usually on undulating or hilly terrain.

(i) The Proponent does not intend to disturb remnant Tableland Basalt Forest at the site. An initial proposal that approximately 0.2ha of the community would be disturbed was made by the Proponent as a contingency for the ongoing maintenance of existing tracks and construction and maintenance of buried water pipelines.

In light of the potential reclassification of the community as an EEC, the Proponent would ensure that no ground disturbing activities would be undertaken within identified areas of Ribbon Gum Forest. In addition, Commitment 5.4 identifies that all areas of Ribbon Gum

Forest would be fenced to exclude stock. These areas would be managed to maintain and improve the biodiversity values of this community. Commitments 5.1 and 5.4 have been amended to reflect these commitments.

In light of the above, the proposed action is considered unlikely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

(ii) In light of the above, it is considered unlikely that proposed action would substantially or adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction.

**(d) in relation to the habitat of a threatened species, population or ecological community:**

**(i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and**

**(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and**

**(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality,**

Tableland Basalt Forest listed under Schedule 1 of the TSC Act occupies an area of 35.3ha within the Project Site. In light of the above commitments:

(i) no habitat is likely to be removed or modified as a result of the action proposed;

(ii) no area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action; and

(iii) no habitat of importance to the long-term survival of the species, population or ecological community in the locality is likely to be removed, modified, fragmented or isolated

**(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly),**

The DECCW website was searched for critical habitat listed in the Register of Critical Habitat kept by the Director General of Department of Environment and Climate Change. Currently (last updated March 2008) critical habitat has been declared for Little Penguin population at Sydney's North Harbour, Mitchell's rainforest snail in Scotts Island Nature Reserve, Wollemi Pine and Gould's Petrel. There are two recommendations for critical habitat one for the Eastern suburbs Banksia scrub endangered ecological community and the Bomaderry Zieria within the Bomaderry Creek bushland.

The action proposed shall not have an adverse effect on critical habitat.

**(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan,**

A recovery plan or threat abatement plan has not been prepared for Tablelands Basalt Forest.



- (g) **whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

The removal of native vegetation is considered a key threatening process under Part 4 of the TSC Act. It is presently proposed that clearing of the remnant Tableland Basalt Forest will not be required and therefore the action proposed does not constitute a key threatening process for Tablelands Basalt Forest.

### **Conclusion**

It is concluded that the action proposed is unlikely to significantly affect *Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions* Endangered Ecological Community or its habitat.

*The EA does not adequately address the removal and disturbance of bushrock as defined under the Threatened Species Conservation Act 1995 (2-78)*

**Response:** The Proponent notes that no bush rock occurs within the Project Site and that none would be disturbed by the Project.

*The project proposes to offset groundwater losses into the mine void with surface water captured in harvestable right farm dams and augmented with water drawn from old mines (4-22, 4-23). This presents a number of issues of concern. The first is the loss of normal surface water flows into Majors Creek through the construction of eight new farm dams (in addition to the 14 existing farm dams on the property). The second is the quality of water from the two sources that will be released during periods of low flow. Given the analysis of water samples from the old mines stated in 3-32 of the EA, this represents a real risk to downstream water quality and the users of this water. In the event that the project is approved, Southern Rivers CMA recommends that the eight new harvestable right dams be removed and the dam sites rehabilitated to return natural surface flows to Majors Creek at completion of the project. Southern Rivers CMA is also concerned by the potential long term loss of groundwater to Majors and Spring Creek beyond the working life of the mine. There is no indication in the EA that groundwater flows will be returned to the pre-mine conditions or that these losses can be mitigated in any way post-mining.*

**Response:** The following presents a response to each of the issues raised.

### **Loss of surface water flows through the construction of the harvestable rights dams**

As identified in Section 2.2.4 of the *Environmental Assessment*, the harvestable rights dams would be constructed under the Proponent's rights under Section 53 of the *Water Management Act 2000*. The Proponent has been advised by the NSW Office of Water (NOW) that as long as the total volume of storages within the Proponent's land is less than 34.5ML and that all dams are constructed on first or second-order streams only, the dams may be constructed without further approvals from NOW. As a result, construction of these dams is a right currently held by the Proponent and should therefore not be considered a "loss to normal surface water flows into Majors Creek."

In addition, the Proponent contends that removal of the dams at the end of the life of the Project would be unreasonable for the reasons identified previously.



### Quality of water to be released through the environmental flows program

**Figure 3** presents an overview of the results of surface water quality monitoring undertaken between 2006 and April 2010 at a range of locations within the Project Site (**Figure 4**). In summary, the results indicate the following.

- The pH of surface water within the Project Site is consistently between 6.5 and 8.0.
- The electrical conductivity of surface water within Spring Creek is typically between 1 000 $\mu$ S/cm and 1 200 $\mu$ S/cm. Samples taken in September 2009 were collected following a rainfall event and the lower electrical conductivities recorded during that sampling program are the result of dilution by surface water flows. All other sampling programs are likely to be representative of low or base flow conditions. These results indicate that electrical conductivities within Spring Creek significantly exceeds the ANZECC (2000) water quality guidelines for upland rivers of 30-350 $\mu$ S/cm.
- The electrical conductivity of surface water within Majors Creek is typically between 200 $\mu$ S/cm and 400 $\mu$ S/cm. These results indicate that electrical conductivities within Majors Creek are at the upper end or exceed the ANZECC (2000) water quality guidelines for upland rivers of 30-350 $\mu$ S/cm.

It is noted that water to be released to Majors Creek through the compensatory flow program would be sourced principally from the harvestable rights dams and that water quality within those dams is likely to be within the relevant ANZECC (2000). It is also noted that the surface water modelling identified that based on a maximum rate of release of 66.2ML per year, 100 years of rainfall data and a range of conservative assumptions, that the harvestable rights dams could provide sufficient water for the compensatory release program on 97% of all days modelled.

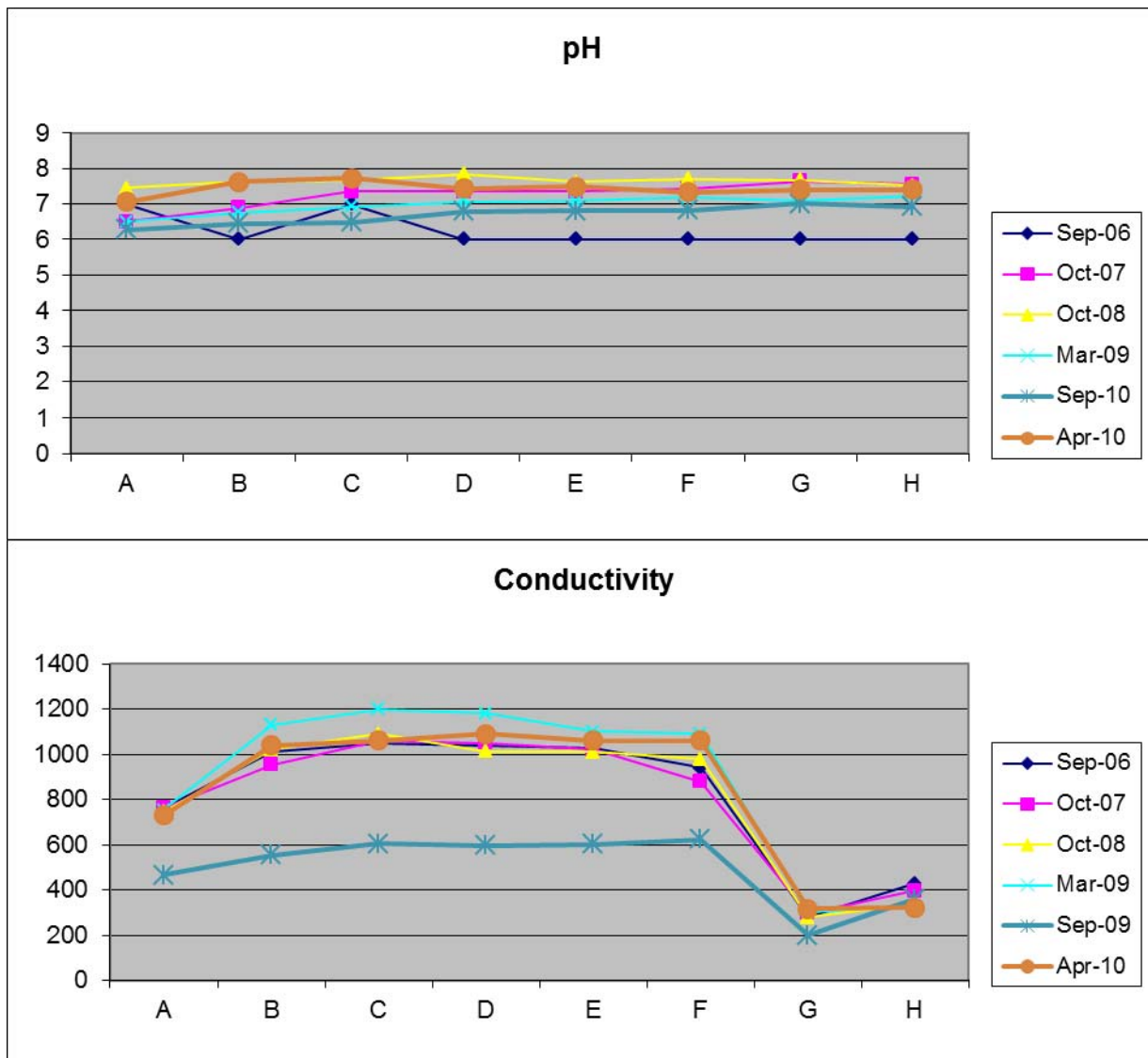
As indicated in Section 2.10.2.6 of the *Environmental Assessment*, the Proponent would, if required, source water for the from the historic Snobs, United Miners or Stuart and Mertons workings for compensatory flows should the harvestable rights dams not be able to provide the required water. Table 4.19 of the *Environmental Assessment* provides an overview of the quality of water within the monitoring bores constructed for the groundwater assessment.

Given that electrical conductivities of water within Spring Creek significantly exceed the ANZECC (2000) guidelines and that water within Majors Creek is at the upper end or exceed those guidelines, the Proponent contends that the proposed compensatory release program does not “represent a real risk to downstream water quality and the users of this water” for the following reasons.

- The compensatory flow program is designed to compensate for reduced groundwater discharge to Spring and Majors Creeks. Table 4.19 of the *Environmental Assessment* identifies the quality of groundwater within the Project Site. In summary, water within the granodiorite aquifer typically has electrical conductivities in the range of 530 $\mu$ S/cm to 1 300 $\mu$ S/cm.



Figure 3 Surface Water Quality Results



- Water within the harvestable rights dams would be likely to have electrical conductivities significantly lower those measured in groundwater within the Project Site. As a result, the compensatory flow program would result in improved water quality within Majors Creek.
- In the unlikely event that water would be required to be drawn from the historic workings for the compensatory flow program, the quality of the water that would be discharged would be equivalent to the quality of the water that the program is designed to replace. As a result, the program would result in a negligible change in groundwater quality within Majors Creek.

**Long-term recovery of groundwater levels**

This issue will be addressed in the response to the submission provided by the NSW Office of Water.

