Section 6

Project Evaluation and Conclusions

PREAMBLE

This section of the Environmental Assessment concludes the document with:

- *an assessment of the alternatives considered and rejected during the planning stages of the Project;*
- *an evaluation of the Project, including an assessment of the residual environmental risk after the management and mitigation measures identified in Sections 4 and 5 are taken into account; and*
- *an assessment of the Project against the principles of Ecologically Sustainable Development.*

The Section concludes with a justification of the Project.

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6.1 ALTERNATIVES CONSIDERED

6.1.1 Introduction

The Director-General's Requirements require that the *Environmental Assessment* include a detailed description of the "*alternatives considered, including a detailed justification of the proposed mine plan.*"

The considerations of feasible alternatives to the proposed activities are discussed in this sub-section. These relate principally to:

- alternative hours of operation (Section 6.1.2);
- alternative locations of surface infrastructure (Section 6.1.3);
- alternative eastern surface water diversion structure (Section 6.1.4);
- alternative Newell Highway crossing (Section 6.1.5); and
- alternative management of waste rock (Section 6.1.6).

The alternative of not developing the Project is considered in Section 6.3.5.

6.1.2 Alternative Hours of Operation

The Proponent proposes to operate the Project 24-hours per day, seven days per week. Alternative hours of operation considered included operating during the day and evening (7:00am to 10:00pm) or day (7:00am to 6:00pm) only. This would have the advantage of reduced night-time (and evening under day-time only operations) noise emissions and reduced noise-related impacts on surrounding residents. However, this alternative was rejected for the following reasons.

- Reduced hours of operations would increase the life of the Project and extend the period over which the capital costs of the Project would be required to be repaid.
- Increased contract mining costs would be incurred because contractor equipment would be unused for a portion of each day.
- Increased operational difficulties would be experienced through daily shutdown and restart of the processing plant.

Each of these would have a severe impact on the viability of the Project to a point where, combined, the Project would not be viable or would be a much higher risk investment.

6.1.3 Alternative Surface Infrastructure Locations

The Proponent considered a number of alternative locations for each of the principal items of infrastructure, namely the waste rock emplacements, processing plant at the residue storage facility. For simplicity of reference, these items are collectively referred to as surface infrastructure in this sub-section. It is noted that the locations of the proposed open cuts are constrained by the location of the associated mineralisation and the geotechnical properties of the rock mass. **Figure 6.1** presents a number of domains within and surrounding the Mine Site and the following identifies constraints that would prevent construction of site infrastructure within those domains.

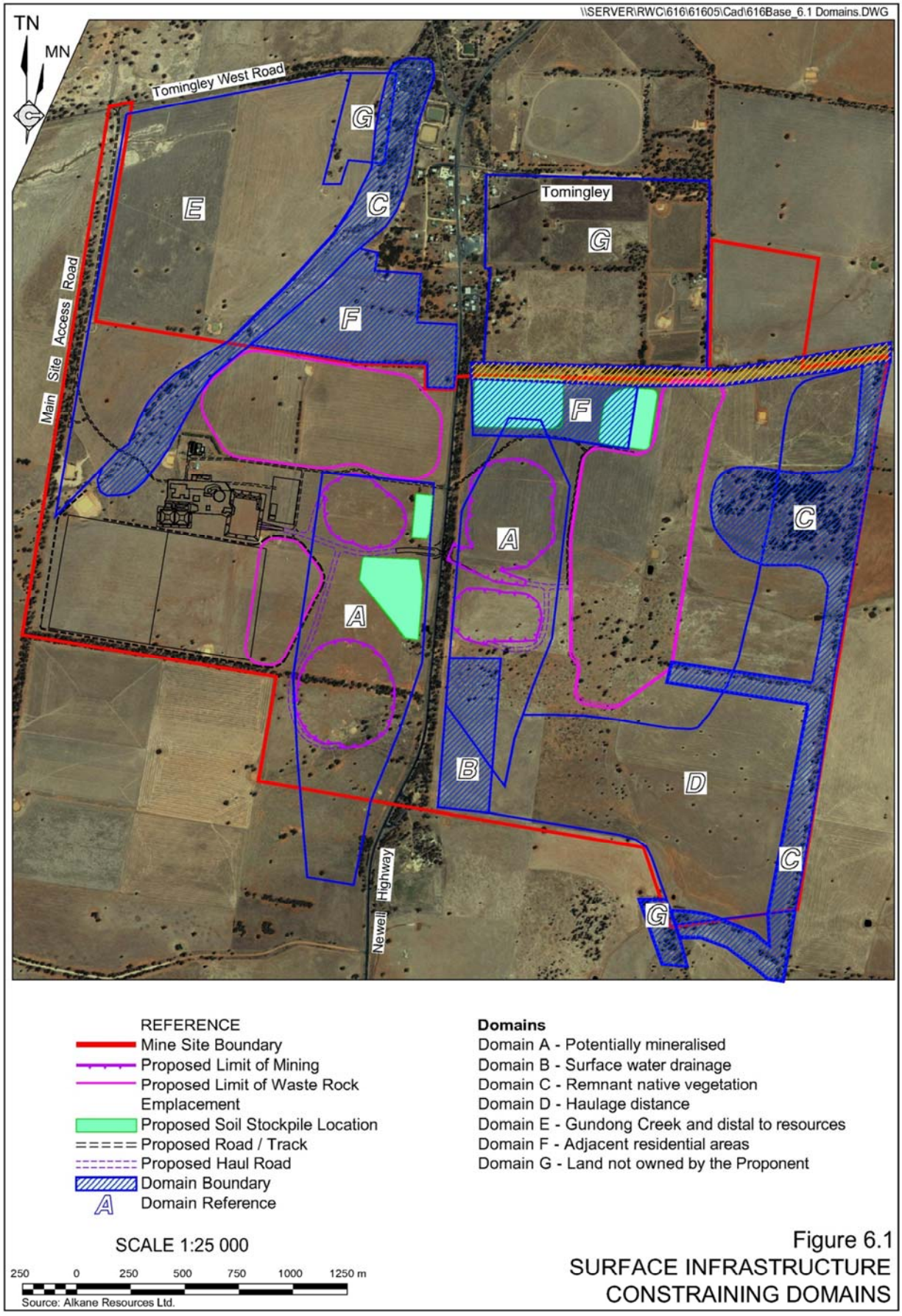


Figure 6.1
SURFACE INFRASTRUCTURE CONSTRAINING DOMAINS

- Domain A – Potentially mineralised

  Exploration drilling has indicated that the potential for additional mineralisation exists within Domain A. As a result, placing surface infrastructure within this domain may potentially prevent recovery of those resources in the future.

- Domain B – Surface water drainage

  Placement of surface infrastructure within this domain would severely impact on the ability of surface waters to flow to Culverts 1 and 2, potentially permanently altering the flow regimes to the east of the Newell Highway and causing adverse environmental impacts.

- Domain C – Remnant native vegetation

  Placement of surface infrastructure in this domain would disturb up to an additional 50ha of native vegetation.

- Domain D – Excessively long haulage distance

  Placement of surface infrastructure, in particular waste rock emplacements within this domain would require an excessively long haulage of material, with resulting cost and greenhouse gas implications.

- Domain E – Western side of Gundong Creek and distal to resources

  Placement of surface infrastructure within this domain would require haul trucks and or cyanide-containing process residue to cross Gundong Creek with the resulting environmental impacts associated with construction of an appropriate crossing, impacts to the flood regime and risk of spills or unintended discharges to Gundong Creek.

- Domain F – Adjacent residential areas

  Placement of surface infrastructure within this domain would result in unacceptable environmental and amenity impacts for the residents of Tomingley.

- Domain G – Land not owned by the Proponent

  Placement of surface infrastructure within this domain would require purchase of additional land.

Finally, the Proponent has located the processing plant to the south of Waste Rock Emplacement 2 and the north of the RSF to maximise the mitigation of noise emissions and minimise amenity impacts associated with operation of the plant for surrounding residents.

6.1.4 Alternative Eastern Surface Water Diversion Structure Alignment

The Proponent considered an alternative alignment for the Eastern Surface Water Diversion Structure. This alternative alignment would have resulted in a larger catchment draining to the structure and more water being diverted to the east of Waste Rock Emplacement 3, reducing the potential for a sudden in-rush of water into the Caloma Open Cut. The alternative alignment would have also required construction of structure that would have been more than 6m deep compared with the proposed maximum 3.4m deep structure. The alternative structure would have been a maximum of 30m wide, while the proposed structure would be a maximum of 17.5m wide. As a result, the alternative structure would have disturbed significantly more area than the proposed structure and would have posed a significant, long-term erosion risk.

6.1.5 Alternative Newell Highway Crossing

The Proponent considered two other alternative crossings over the Newell Highway. These included an overpass over the highway and a level crossing where haul trucks would cross the highway at an intersection that would have been controlled by lights or similar.

The highway overpass would have resulted in an overpass being constructed to permit haul trucks to travel over the highway. This would have negated to the requirement for the amount of road works that will be required to complete the proposed underpass and potentially less disruption to highway traffic during construction. However, this alternative would require haul trucks travelling from the Caloma Open Cut to the processing plant to climb above the level of the highway before being able to cross it, resulting an additional haulage times and associated greenhouse gas emissions. In addition, while crossing the highway, the haul trucks would be in an elevated position, potentially resulting in increased noise emissions for surrounding residents and distraction for motorists using the highway.

A level crossing intersection of the Newell Highway offers the simplest and most cost-efficient transport arrangement. However, the risk of potential conflict / accident between the mining fleet and general public was considered too great to proceed with this alternative.

The Newell Highway is an extremely busy transport corridor and any disruption to traffic would lengthen the travel time between Melbourne and Brisbane.

6.1.6 Placement of Waste Rock within Completed Open Cuts

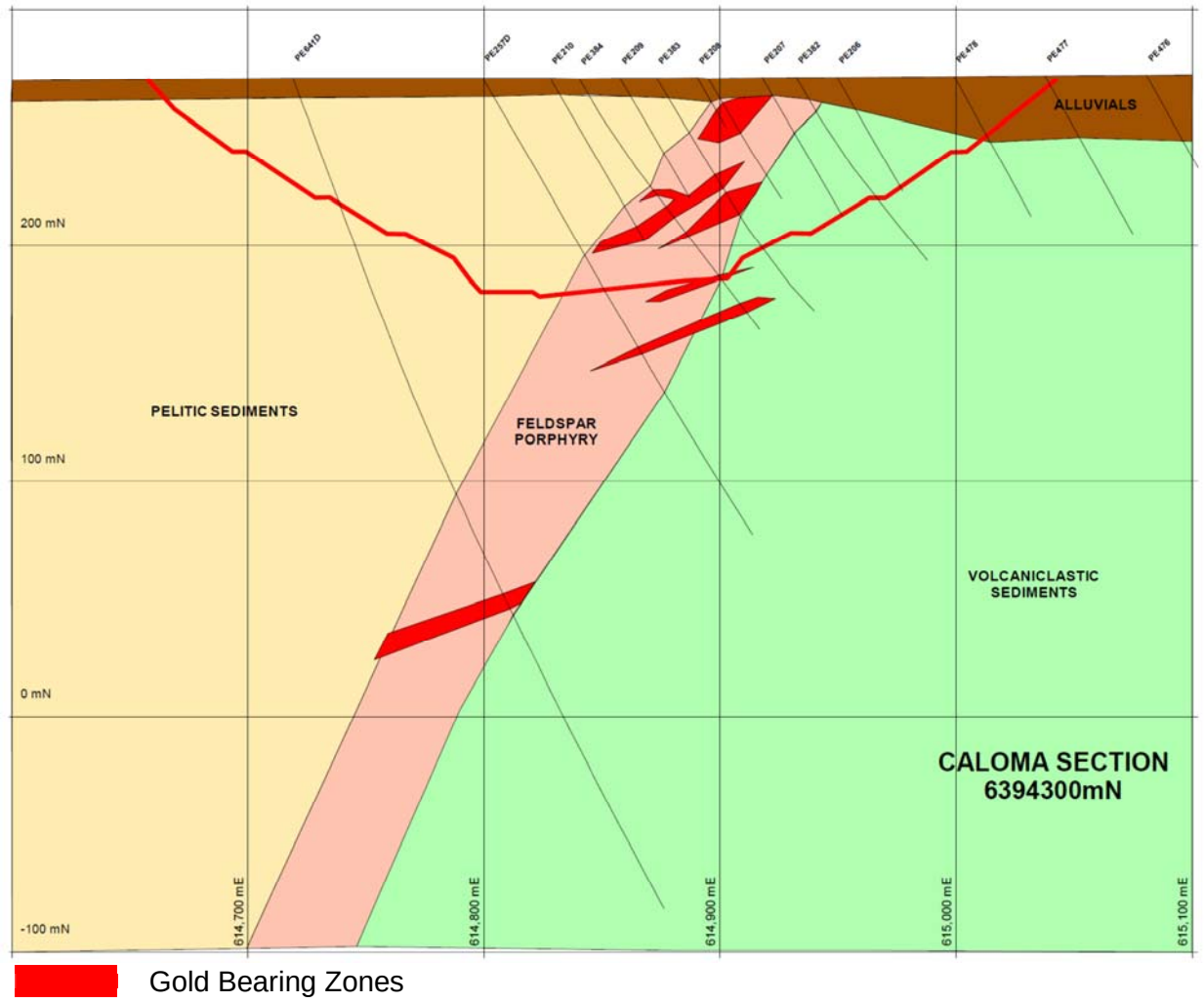
Given the proposed sequential development of the four open cuts, the possibility of back-filling the Caloma and Wyoming Three Open Cuts with waste rock from the Caloma Two and Wyoming One Open Cuts was considered. However, similar to the Wyoming One ore body, the gold containing ore of Caloma and Wyoming Three continues below the base of the open cut (see **Figure 6.2**). The potential to mine this deeper resource by underground methods (as proposed for Wyoming One) remains. Backfilling these open cuts would effectively sterilise this resource and therefore waste rock is to be managed by placement within the out-of-pit waste rock emplacements.

The Proponent has committed to continually reviewing waste rock management and should the underground mining of the Caloma or Wyoming Three ore bodies be confirmed as unviable, the backfilling alternative may be reconsidered.

6.2 EVALUATION OF THE PROJECT

6.2.1 Residual Environmental Risk and Impacts

An assessment of the unmitigated environmental risks associated with the Project has previously been presented in **Table 3.10**. Following consideration of the proposed management and mitigation measures described in Section 4, together with the commitments provided in Section 5, an assessment of the mitigated risks associated with the Project was completed for each potential environmental impact based on the likelihood of occurrence and potential environmental consequence. **Tables 6.1** reproduces **Table 3.8** and presents the risk matrix used during the mitigated risk analysis. **Table 6.2** reproduces the results of the analysis of (unmitigated) risk together with the residual (mitigated) risks associated with the Project. It is noted that in some cases no residual risk rating has been allocated as the assessment recorded in Section 4 has determined that the impact would not occur.



Source: Alkane Resources Ltd

Figure 6.2
CALOMA GOLD RESOURCE

Table 6.1
Risk Rating Matrix

Likelihood	Consequences				
	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
A (Almost Certain)	H	H	E	E	E
B (Likely)	M	H	H	E	E
C (Possible)	L	M	H	E	E
D (Unlikely)	L	L	M	H	E
E (Rare)	L	L	M	H	H

Note: Rating modified after HB 203:2006 (Standards Australia, 2006) - Table 4(C)

Table 6.2
Analysis of Mitigated Risk

Risk Source	Potential Environmental Impact (Type/Level/Scale provided if applicable)	Unmitigated Risk Ranking	Consequence of Occurrence if Mitigated	Likelihood of Occurrence if Mitigated	Residual Risk Rating
Groundwater					
Pollution of groundwater due to leaching of contaminants from the RSF	Reduced groundwater quality leading to reduction in beneficial uses of the water and therefore availability to existing groundwater users	H	3	E	M
Pollution of groundwater due to hydrocarbon spills	Contamination requiring minor recovery works.	M	2	D	L
	Contamination requiring major recovery works.	H	3	E	M
Reduction of groundwater levels due to mining intercepting aquifers	Reduction in the volume of water contained within the affected groundwater aquifer (drawdown of water table).	H	1	C	L
	Reduced yields of local groundwater bores.	M	1	C	L
	Reduced viability of groundwater dependent ecosystems.	L	2	E	L
Reduction in groundwater bore yields	Reduced yields in the groundwater bores of the Gundong Creek Alluvium.	M	2	E	L
	Reduced yields in the groundwater bores of the fractured rock aquifers.	M	1	C	L
Reduction in contribution to surface water flows.	Reduced surface flows to Gundong and other creek catchments of the Bogan River.	L	1	D	L
	Reduced viability of groundwater dependent ecosystems.	M	2	E	L
Surface Water / Flooding / Erosion and Sedimentation					
Reduction in environmental flows as a result of on-site capture of water.	Reduced availability of water to downstream users.	M	1	D	L
	Reduced environmental flows.	L	2	E	L
	Stress to, and possible reduction in viability of native vegetation.	L	2	E	L
	Degradation of aquatic habitats.	M	2	E	L
Discharge of dirty, saline or contaminated water.	Pollution of downstream waters.	H	2	D	L
	Stress to, and possible mortality of flora and/or fauna.	H	2	E	L
	Reduced soil quality and associated reduction in viability of productive post-mining land use.	M	2	D	L
Discharge of contaminated water containing cyanide from the RSF.	Pollution of downstream waters.	H	2	E	L
	Stress to, and possible mortality of flora and/or fauna.	H	2	E	L
	Reduced soil quality and associated reduction in viability of productive post-mining land use.	M	2	E	L

Table 6.2 (Cont'd)
Analysis of Mitigated Risk

Risk Source	Potential Environmental Impact (Type/Level/Scale provided if applicable)	Unmitigated Risk Ranking	Consequence of Occurrence if Mitigated	Likelihood of Occurrence if Mitigated	Residual Risk Rating
Surface Water / Flooding / Erosion and Sedimentation (cont'd)					
Changes to hydrology of creeks and drainage lines.	Reduced environmental flows within the Bogan River catchment.	M	1	D	L
	Increased erosion potential resultant from changed alignment of flow.	H	2	D	L
	Reduction in the quality of aquatic habitat.	M	2	E	L
Changes to the flood regimes of Gundong Creek.	Increased erosion potential within Gundong Creek catchment.	M	2	E	L
	Changes to vegetation community structure and habitat value.	L	2	D	L
	Reduced viability of land uses on affected properties as a result of changes to flooding regime.	M	2	E	L
Erosive actions of water in undisturbed sections of the Mine Site	Excessive soil erosion.	M	2	D	L
	Sedimentation of surrounding drainage lines and land.	M	2	D	L
Erosive actions of water on disturbed sections of the Mine Site, including waste rock emplacement batters, prior to rehabilitation.	Excessive soil erosion.	M	2	D	L
	Sedimentation of surrounding drainage lines and land.	M	2	D	L
	Reduced success of Mine Site rehabilitation.	H	3	E	M
Biodiversity (Flora and Fauna)					
Direct impacts on native flora and fauna - clearing of vegetation.	Loss of, or alteration to, existing habitats.	E	1	A	H[1]
	Removal or mortality of individual species.	E	1	B	M
	Local or regional reduction in distribution of threatened species, populations and endangered ecological communities.	H	3	E	M
	Possible local extinction of threatened species, populations and endangered ecological communities.	H	3	E	H[1]
Direct impacts on native flora and fauna - road kill.	Mortality of individual species.	M	2	D	L
	Local or regional reduction in distribution of threatened species, populations and endangered ecological communities.	M	3	E	M
Direct impacts on native fauna - pooling of contaminated water on the RSF.	Mortality of individual species.	H	2	D	L
	Local or regional reduction in distribution of threatened species, populations and endangered ecological communities.	M	3	E	M
Indirect impacts on flora, fauna and fauna habitat, e.g. noise, dust etc.	Alteration to existing habitats.	M	2	E	L
	Local or regional reduction in distribution of threatened species, populations and endangered ecological communities.	M	3	E	M

[1] A high risk ranking is retained as a consequence of either a certain likelihood or extreme consequence (regardless of whether the corresponding likelihood or consequence is rare or insignificant).

Table 6.2 (Cont'd)
Analysis of Mitigated Risk

Risk Source	Potential Environmental Impact (Type/Level/Scale provided if applicable)	Unmitigated Risk Ranking	Consequence of Occurrence if Mitigated	Likelihood of Occurrence if Mitigated	Residual Risk Rating
Aboriginal Heritage					
Removal or destruction of known Aboriginal sites and/or artefacts within the Project footprint (including Tomingley Narromine Water Pipeline route)	Removal, damage or destruction of Aboriginal artefacts.	H	3	B	H
Removal or destruction of currently unidentified Aboriginal sites and/or artefacts due to Project Site extraction and associated activities.	Damage or destruction of Aboriginal artefacts.	H	3	E	M
European Heritage					
Removal or destruction of sites of heritage significance due to Project activities.	Damage or destruction of items of heritage significance.	M	2	C	M
Noise					
Increased noise levels resulting from operation of mobile equipment, crushing and screening equipment and product transportation.	Increased noise levels associated with Project activities (≤5dBA above noise criteria) causing annoyance, distractions, i.e. amenity impacts.	H	2	D	L
	Increased noise levels associated with Project activities (>5dBA above noise criteria) causing more significant amenity impacts.	H	3	D	M
	Sleep disturbance as a result of maximum noise levels.	H	3	D	M
	Increased noise levels associated with the Project leading to impacts on local fauna assemblage.	M	2	E	L
Ground vibration from mine blasting. Airblast Overpressure from mine blasting (air vibration)	Structural damage to buildings, structures and other infrastructure, e.g. telecommunication cables.	E	3	E	M
	Subsidence of land in the village of Tomingley (as a consequence of collapse / subsidence of historic Tomingley Mine workings).	H	3	E	M
	Nuisance/amenity impacts on surrounding landowners / residents.	M	2	E	L
	Loss of income to livestock producers.	M	2	E	L
	Disrupted communication services.	L	2	E	L
Fugitive fly rock from blasting.	Personal injury.	H	4	E	H[1]
	Disrupted traffic on the Newell Highway.	H	3	E	M

Table 6.2 (Cont'd)
Analysis of Mitigated Risk

Risk Source	Potential Environmental Impact (Type/Level/Scale provided if applicable)	Unmitigated Risk Ranking	Consequence of Occurrence if Mitigated	Likelihood of Occurrence if Mitigated	Residual Risk Rating
Air Quality – Dust, Odour and Greenhouse Gas					
Dust generation resulting from: - vehicle movements on unsealed roads; - fixed plant, including crushing operations; - blasting operations; and - wind action on disturbed areas, overburden emplacements and stockpiles.	Nuisance/amenity impacts from dust deposited on window sills, cars, surfaces etc.	H	2	D	L
	Adverse health impacts (if PM_{10} levels are excessive).	H	3	E	L
	Stress of native vegetation, and indirect impacts on fauna habitat.	L	2	E	L
	Reduced road safety.	M	3	E	M
Greenhouse gas emissions.	Increased contribution to greenhouse effect.	M	1	C	L
Traffic and Transport					
Road construction activities, e.g. entrance to the Mine Site and Newell Highway Underpass.	See "*air pollution*", "*flora and fauna protection*" and "*noise*" and "*Aboriginal heritage*" above.				
	Temporary inconvenience to commuters (if delayed for road works).	M	2	D	L
	Change to existing floodways	M	2	E	L
Increased traffic levels due to movement of workforce and contractors.	Increased traffic congestion and or traffic delays.	L	2	E	L
	Elevated risk of accident/incident on local roads.	H	4	E	H[1]
Increased heavy vehicle movements.	Road pavement deterioration.	M	2	D	L
Transportation of oversize of overweight loads.	Road pavement deterioration.	M	2	D	L
Transportation of dangerous or hazardous goods.	Water or land contamination as a result of a spill of dangerous or hazardous goods.	M	3	E	M
Visual Amenity					
Changes in visual characteristics of the Mine Site.	Changes to local visual amenity for the life of the Project.	H	1	A	H[1]
	Unsightly landform at the completion of the Project.	H	2	D	L
	Reduced night time amenity caused by lighting.	M	2	D	L
	Distraction to traffic resulting in accidents/incidents.	M	2	E	L

Table 6.2 (Cont'd)
Analysis of Mitigated Risk

Risk Source	Potential Environmental Impact (Type/Level/Scale provided if applicable)	Unmitigated Risk Ranking	Consequence of Occurrence if Mitigated	Likelihood of Occurrence if Mitigated	Residual Risk Rating
Soil Resources					
Reduction in soil quality through poor soil stripping, stockpiling or spreading practices.	Insufficient soil quantities for rehabilitation.	L	2	E	L
	Reduced soil quality resulting in poor rehabilitation or inability to achieve nominated final land capability.	H	2	D	L
	Increased erosion hazard compared with original landform.	M	2	D	L
Increased erosion or erosion potential of soils.	See "erosion and sedimentation" above.				
Land Use					
Temporary and permanent changes to the landform of the Project Site.	Altered final landform not compatible with activities/lifestyle of adjoining land owners.	H	3	E	M
	Reduced productivity of land for agricultural production as post-mining land use.	H	2	D	L
	Increased local biodiversity.	Positive Impact			
Unstable or eroding final landform.	Increased sedimentation of drainage from the Mine Site.	H	2	E	L
	Reduced stability of the final landform.	M	2	E	L
Waste Management					
Production of contaminating or polluting materials, eg. waste oils, saline water, tailings, general rubbish.	Hydrocarbon or other pollutant contamination of surface water.	H	2	D	L
	Hydrocarbon or other pollutant contamination of groundwater.	M	2	E	L
	Contamination of local water and/or soil resources by leaking or spilt residue.	M	3	E	M
	Reduced amenity of Project Site due to poor rubbish, litter management.	M	1	D	L
Acid Mine Drainage from mineralised waste rock	Reduced viability of remnant or rehabilitated vegetation.	M	2	E	L
	Stress to, or mortality of local flora and fauna.	M	2	E	L
	Reduced productivity of land.	M	2	E	L
Land Contamination					
Extraction exposing previously contaminated materials.	Transfer of contaminated material.	M	2	E	L
	Surface water contamination.	M	2	E	L

Table 6.2 (Cont'd)
Analysis of Mitigated Risk

Risk Source	Potential Environmental Impact (Type/Level/Scale provided if applicable)	Unmitigated Risk Ranking	Consequence of Occurrence if Mitigated	Likelihood of Occurrence if Mitigated	Residual Risk Rating
Bushfire					
Initiation of fire on the Mine Site and spread to adjoining properties.	Injury or health impacts on project personnel.	H	3	E	M
	Operational constraint posed by damaged equipment.	M	2	E	L
	Destruction/damage of native vegetation and fauna habitat.	M	2	E	L
	Loss of livestock, crops and property on neighbouring land	M	2	E	L
Socio-Economic Impacts					
Alteration of social activities or employment due to employment generation and capital expenditure.	Increased economic activity and related social impacts attributable to reduced unemployment	Positive Impact			
	Loss of local farm workers and tradespeople to work on the mine.	M	1	D	L
	Increased resilience in local community through diversification and capacity building.	Positive Impact			
Perceived or real impacts on local amenity of neighbouring properties.	Reduced quality of life (actual or perceived).	H	2	D	L
	Immigration of some workers and families wanting to live closer to the Project.	M	2	D	L

Consequence of Occurrence: 1 = Insignificant; 2 = Minor; 3 = Moderate; 4 = Major; 5 = Catastrophic
Likelihood of Occurrence: A = Almost Certain; B = Likely; C = Possible; D = Unlikely; E = Rare
Risk Rating: E = Extreme; H = High; M = Moderate; L = Low

Through the implementation of the proposed management and mitigation measures identified in Section 4 and summarized in the Statement of Commitments in Section 5, the residual (mitigated) risk rating for the majority of potential environmental impacts has been reduced. Several residual risk ratings, however, remain "high." The following provides further consideration of those potential impacts

- Loss of, or alteration to, existing habitats.

  The Project would result in the removal of approximately 2.7ha of Inland Grey Box Poplar Box White Cypress Pine community and 0.9ha of Fuzzy Box Inland Grey Box community, both of which may be classified as Endangered Ecological Communities in NSW. In addition, 18ha of Belah / Black Oak Western Rosewood Wilga Woodland community, which could provide habitat for threatened native fauna would be disturbed. The remaining disturbance on the Mine Site would be restricted to cleared and farmed land or planted vegetation. These impacts have been avoided as far as practical, however, as the areas of EEC to be disturbed occur within the footprints of the Wyoming One Open Cut further reduction in impact was not feasible. However, as described in Section 2.14.8 and assessed in Section 4.5.8, the Proponent has proposed the implementation and management

of a biodiversity offset strategy to protect and enhance the remaining remnants of these communities on the Mine Site and surrounds. Therefore, while the residual risk rating remains 'high', by virtue of the fact that loss of, or alteration to, existing habitats is a certain outcome (albeit a very minor area and temporarily), OzArk (2011b) conclude that the Project would not have a significant effect on threatened species or populations or endangered ecological communities listed under State or Commonwealth legislation.

- Possible local extinction of threatened species, populations and endangered ecological communities.

  Although considered extremely unlikely, it is conceivable that the Project may result in the local loss of a threatened species or (even less likely) an EEC. Again, reference is made to the proposed biodiversity offset strategy described in Section 2.14.8 and assessed in Section 4.5.8. Considering the proposed biodiversity offset strategy and other operational safeguards and mitigation measures, OzArk (2011b) conclude that the Project is unlikely to have such an impact on threatened species or populations or endangered ecological communities listed under State or Commonwealth legislation as to lead to local extinction.

- Removal, damage or destruction of Aboriginal artefacts.

  Three Aboriginal sites (Sites TGP-ST7, TPG-ST10 and TNWP-OS1 with PAD) are located such that avoiding impact is not possible. Acknowledging this, the Proponent has engaged with the registered Aboriginal stakeholders for the Project, in particular the Traditional Owners of the Peak Hill / Tomingley area, to ensure that management of these sites is undertaken in a culturally sensitive manner (see Section 4.6.5). Section 4.6.8 documents the proposed management of these sites (as well as the remaining sites of the Mine Site and TNWP that would be avoided), which have been presented to the registered Aboriginal stakeholders both at community meetings as well as in the form of a draft Cultural Heritage Management Plan. At community meetings held to discuss management of the two sites, those present verbally assented to the management measures proposed. No feedback has been received following distribution of the CHMP disagreeing with, or requesting changes to the proposed management of these sites.

  It is noted that additional survey work is to be undertaken on Site TGP-ST7 to clarify the origin of modifications to the tree, i.e. whether these represent cultural carvings or not and if so whether an associated burial or other significant site occurs in the vicinity. The registered Aboriginal stakeholders have provided support for initial bark removal to assess the origin of the tree modifications, however, have indicated that further ground disturbance should be undertaken only when there is certainty over the requirement for disturbance, i.e. following determination of the project.

  On the basis of the support provided by the registered Aboriginal stakeholders for the proposed approach to Aboriginal site management, the high residual risk

rating is considered acceptable as risk has been reduced to the lowest rating possible (given the removal of any Aboriginal site is considered by the Aboriginal community to be at least of moderate consequence).

- Fugitive fly rock from blasting resulting in personal injury.

  Given the potential severity of impact should personal injury occur as a result of fly rock from the Mine Site, the residual risk rating for this impact is high. It is noted that given the proposed management of blasting to be implemented by the Proponent, the likelihood of such an occurrence would be reduced as far as practically possible. Confidence in the application of the nominated blasting controls can be obtained from the history of good practice displayed by the Proponent at the Peak Hill Gold Mine.

- Elevated risk of a major or severe accident/incident on local roads

  As indicated in Section 4.11.4, the Project would not result in increased traffic levels on roads surrounding the Mine Site that would be in excess of the capacity of those roads. In addition, the Proponent has committed to implementing a number of measures, including widening and upgrading of Tomingley West Road, that would promote the safe use of surrounding roads. However, as the Proponent does not control motorists who use those roads, the potential for accidents cannot be eliminated. As a result, the risk rating associated with accident or incident on the roads surrounding the mine Site remains high.

- Permanent disturbance to landform.

  Section 2.14.4 describes the final landform. The Project would result in permanent changes to the landform within the Mine Site. However, the Proponent contends that the changes would be reasonable and that progressive and final rehabilitation operations would ensure that the proposed final landform would be safe, stable, self-sustaining and non-polluting. In addition, the visual amenity assessment presented in Section 4.8.4 concluded that the visual impact of the final landform would not be significant. Finally, as permanent disturbance to the landform is certain, should the Project receive Project approval, the "high" risk rating is a reflection that the likelihood of occurrence is "A = Almost certain" and a "high" risk rating is the lowest rating available.

The risks associated with the majority of potential environmental impacts are considered moderate or less and therefore, while these may result in impacts deemed unacceptable to some stakeholders, the development and operation of the Project, with the implementation of appropriate management and mitigation measures, are generally considered acceptable.

6.2.2 Ecologically Sustainable Development

6.2.2.1 Introduction

Sustainable practices by industry, all levels of government and the community are recognised to be important for the future prosperity and well-being of the world. The principles of Ecologically Sustainable Development (ESD) that have been recognised for over a decade were

based upon meeting the needs of the current generation while conserving our ecosystems for the benefit of future generations. In order to achieve sustainable development, recognition needs to be placed upon the integration of both short-term and long-term environmental, economic, social and equitable objectives.

Throughout the design of the project, the Proponent has endeavoured to address each of the sustainable development principles. The following sub-sections draw together the features of the project that reflect the four principles of sustainable development, namely:

- the precautionary principle;
- the principle of social equity;
- the principle of the conservation of biodiversity and ecological integrity; and
- the principle for the improved valuation and pricing of environmental resources.

6.2.2.2 The Precautionary Principle

In order to satisfy this principle of ESD, emphasis must be placed on anticipation and prevention of environmental damage, rather than reacting to it. During the planning phase for the Project and throughout the preparation of the *Environmental Assessment*, the Proponent engaged specialist consultants to examine the existing environment, predict possible impacts and recommend controls, safeguards and/or mitigation measures in order to ensure that the level of impact satisfies statutory requirements or reasonable community expectations.

Throughout the development of the Project, the Proponent and its consultants have adopted an anticipatory approach to impacts, particularly that of irreversible ecological damage, by undertaking an analysis of the risks posed by proposed activities, an appropriate level of research and baseline investigations and environmental evaluation. The controls, safeguards and/or mitigation measures have therefore been planned with a comprehensive knowledge of the existing environment and the potential risk of environmental degradation posed by Project-related activities.

The implementation of the environmental safeguards, controls and mitigation measures has been formalised by the Proponent as the draft Statement of Commitments presented as Section 5.

Examples of matters relating to the precautionary principle that were considered during the various stages of the project are listed below.

Project Objectives

The principal objectives of the Project are the design and operation of a gold mine in a manner that minimises surface disturbance and impact on the environment and surrounding residents, as well as ensuring compliance with environmental criteria, reasonable community expectations and all relevant statutory requirements through appropriate design, management and mitigation measures.

Project Design Components

A number of design features were incorporated during the initial design stage in recognition of the precautionary principle. In addition, subsequent modifications were made in response to issues identified during the specialist consultant investigations undertaken as part of the

environmental assessment phase. These design features and modifications included the following.

- All Project infrastructure is to be constructed on the eastern side of Gundong Creek to limit the requirement for construction of large creek crossings and flood control structures on both sides of the creek. As a result, surface waters would not be restricted into a narrow area between items of infrastructure and the existing flood regime of widespread distribution of floodwater across the land adjacent to the creek can continue (see also Section 6.1.3).
- The location of all items of infrastructure was chosen to minimise the amount of vegetation that would be disturbed during the life of the Project (see also Section 6.1.3).
- Both Waste Rock Emplacements 2 and 3 have been designed to provide an amenity barrier between the residents of Tomingley and mining, processing and waste rock and residue management activities on both the eastern and western sides of the Mine Site. This would have the effect of ensuring that unintended impacts associated with the Project are minimised to the greatest extent possible.
- Sediment Basins 1 to 5 were designed to ensure that all surface water within disturbed sections of the Mine Site would be captured and either used for mining-related purposes or sediment permitted to settle before being discharged.
- The design of the Eastern Surface Water Diversion Structure has been amended to reduce the size of the structure and minimise the potential for long-term erosion or sedimentation issues (see also Section 6.1.4).
- The final landform has been designed to provide for areas of native vegetation, agriculture and, potentially, light industry or other activities. The Mine Site final landform also provides for the protection and extension of remnant areas of native vegetation (including EECs). The proposed approach to final landform creation and land use allows for the greatest flexibility in the use of the Mine Site following completion of the Project.

Management and Operational Safeguards

The framework for ongoing environmental management, operational performance and rehabilitation of the Mine Site would be provided through the project approval and be managed in accordance with the Mining, Rehabilitation and Environmental Management Process, both of which would involve the input from relevant State and local government agencies. The *Mining Operations Plan* (or *Rehabilitation and Environmental Management Plan*) would contain a range of site specific environmental procedures to achieve consistency with specified outcomes and to control identified risks. This document would be updated periodically. In addition, the *Annual Environmental Management Report* would document the progress of the Project and provide an opportunity to review the effectiveness of the environmental management strategies adopted. Finally, the following management and operational safeguards would be implemented in accordance with the precepts of the precautionary principle.

- All on-site procedures would be regularly reviewed, particularly in light of monitoring results.
- Surface water, groundwater, noise, deposited dust and PM_{10} levels would be monitored at locations potentially most affected by the Project in order to ensure the continued compliance with the goals outlined in this document. Importantly,

the Proponent has committed to real time monitoring of noise at the southern-most residence in Tomingley (with land owner consent).

- The northern sections of Waste Rock Emplacements 2 and 3 would be constructed to a height of approximately 15m above the remainder of the waste rock emplacement to provide a noise barrier between the active sections of the Mine Site and Tomingley.
- Mobile equipment operation would be restricted during the evening and night time, especially under inversion conditions to minimise the potential for noise-related impacts to residents in Tomingley. Section 4.2.5 (and **Figures 4.11** to **4.15**) provides an illustration of operating scenario's which reduce noise emissions from the Mine Site as low as reasonably and feasibly possible. It is important to note that actual modifications to mining operations may differ from that presented in **Figures 4.11** to **4.15** while still resulting in the same noise levels (as measured by real time noise monitoring) as predicted at residences surrounding the Mine Site.
- Surface water management structures identified within Section 4.3.3 would be constructed and maintained to ensure that potentially sediment-laden water does not flow from the Mine Site.
- Water within the sediment basins would preferentially be used for mining-related purposes, minimising the water that would be required to be drawn from the water supply pipeline.
- A biodiversity offset strategy would be implemented which would provide for the protection and extension of remnant native vegetation (including EECs) on the Mine Site. The areas of to be protected and enhanced would be fenced (unless impractical to do so) and access limited to minimise the potential for inadvertent disturbance.
- Wherever practicable, areas not required for mining-related activities would remain vegetated to assist in minimising erosion and reducing the suspended sediment load in surface water flowing through the Mine Site.
- Soil material would be stripped, stockpiled and re-spread on the basis of the quality of the soil (as indicated by the soil mapping unit), and planned final land use of different areas of the final landform.

Rehabilitation and Subsequent Land Use

Long term adverse impacts on the environment would be avoided through:

- creation of a safe, stable, vegetated, non-polluting final landform;
- progressive rehabilitation, including shaping of the final landform, spreading of soil and reseeding or replanting with endemic, locally sourced species as described in Section 2.14.6; and

- a final land use of agriculture, nature conservation and other land uses, possibly including light industry, to be determined in conjunction with the surrounding community and the relevant government agencies.

Conclusion

The precautionary principle has been considered during all stages of the design and assessment of the Project. The approach adopted, ie. risk analysis, initial assessment, consultation, specialist investigations and safeguard design, provides a high degree of certainty that the project would not result in any major unforeseen impacts.

6.2.2.3 Social Equity

Social equity embraces value concepts of justice and fairness so that the basic needs of all sectors of society are met and there is a fair distribution of costs and benefits to the community. Social equity includes both inter-generational (between generations) and intra-generational (within generations) equity considerations.

Equity within generations requires that the economic and social benefits of the development be distributed appropriately among all members of the community. Equity between generations requires that the non-material well-being or "quality of life" of existing and future residents of the local community would be maintained throughout and beyond the life of the Project.

Both elements of social equity are addressed through the design of the Project itself, the implementation of operational safeguards to mitigate any short-term or long-term environmental impacts, and the proposed rehabilitation of the areas directly disturbed. Examples of matters relating to social equity that are relevant to the various stages of the proposed development are listed below.

Identification of Project Objectives

As noted above, the principal objective of the Project is the design and operation of a gold mine in a manner that minimises surface disturbance and impact on the environment and surrounding residents. The Project would also be developed with the objective of maximising the social and economic benefits to local communities (Tomingley and Peak Hill) and wider region (Narromine, Parkes and Dubbo LGAs) through:

- provision of employment, including a commitment to employee training (whilst not adversely affecting the ability of other employers within the region to maintain suitably qualified staff);
- support to community organisations, groups and events and, as appropriate, assist in and contribute to the planning and development of community based projects;
- assist the local Aboriginal community through the provision or contribution towards education and training initiatives that will increase the potential of local Aboriginal people to gain employment; and
- development of a purchasing policy specifying the local purchase of project-related consumables such as fuel, oil, cleaning products etc where practicable.

The Project has also been designed with the objective to ensure the continued viability of surrounding land uses throughout and beyond the life of the Project.

Design of Project Components

The Project has been designed to maintain inter-generational equity, i.e. in recognition that the mining and processing of the gold resource is a short term land use, and to ensure components of the existing biological, social and economic environment available to existing generations would also be available to future generations.

- The final landform and land use of the Mine Site has been designed conceptually to provide for both the protection and enhancement of native vegetation / fauna habitat, and the continued commercial use of the affected properties (either for agriculture or possibly light industry which could utilise the Project-established infrastructure).
- A biodiversity offset strategy would be established to compensate for any disturbance to native vegetation and fauna habitat, to safeguard the populations of threatened flora and fauna species and EECs, and ultimately provide a higher level of protection and management to these threatened species.
- Surface water management on the Mine Site has been designed to have minimal impact on environmental flows and maintain or improve the water quality available to downstream users.
- The availability of groundwater to surrounding landholders, although not predicted to be significantly affected by the Project, would be monitored throughout the life of the Project and compensatory measures taken in the event reductions in the availability (yield) are identified.
- The establishment of water transfer infrastructure from Narromine to Tomingley would be available following the completion of mining and could provide added security of water availability to the residents of Tomingley

Integration of Safeguards and Procedures

The Proponent recognises that all members of the local community should benefit appropriately from the Project, either directly or indirectly. In order to ensure a realistic distribution of benefits, the Proponent would continue to consult with the local community and maintain a pro-active approach to issues of interest. This dialogue would also include a system to record, manage and respond to any complaints relating to the operation.

Several issues, some Project-related and others of a more general nature, have possible inter-generational effects. The following describes these issues and the approach to be taken by the Proponent to ensure potential for adverse inter-generation impacts are minimised.

- Residue Management. The RSF has been designed to ensure it remains structurally sound, retains all residue, i.e. no leachate, and can be rehabilitated to provide for future nature conservation, agricultural or other light industrial land use. Ongoing monitoring would be undertaken to confirm no leakage of leachate into local groundwater or surface water drainage, with this monitoring undertaken for the life of the Project and for as long as required by the responsible government agency. These measures will ensure that the proposed residue management does not adversely impact on the environment and land users of future generations.
- Weed Management. The spread of weeds is recognised as an issue that could potentially impact on surrounding land owners over the life of the Project and beyond. While this issue is a more general one for the local area, the Proponent

recognises that poor land management on the Mine Site could exacerbate the problem. Conversely, the proposed implementation of appropriate weed control on Proponent owned land would assist in overall weed management of the local area. The Proponent proposes to implement appropriate weed management programs. Any such works would be undertaken in consultation with the local Weeds Officer of Narromine Shire Council or DTIRIS.

- Land Use. The proposed rehabilitation objectives and measures described in Section 2.14.2 have been designed to ensure that the Mine Site lands are available for future use for agricultural or nature conservation purposes and do not restrict the ongoing agricultural activities on surrounding lands.
- Cultural Heritage. A *Cultural Heritage Management Plan* is being developed in conjunction with the Aboriginal community to provide for the protection and, where unavoidable, salvage of those Aboriginal sites that would or could otherwise be disturbed by the Project. The Proponent has already assisted in the establishment of the Peak Hill Aboriginal Reference Group and developed a *Community Engagement Protocol* with the local Aboriginal community which aims to provide for mutual benefit from mining and exploration activity in the Peak Hill/Tomingley district.

Rehabilitation and Subsequent Land Use

The final landform would be constructed and rehabilitated in a manner that would generally retain land for native vegetation management with some land retained for agricultural or possibly light industrial activities. The land retained for agricultural or light industrial purposes would provide a basis for continuing economic activity in the local community. The areas rehabilitated for native vegetation protection and enhancement may provide areas for recreational activities for the local community.

Conclusion

The principle of social equity has been addressed through the consideration of how the Project could benefit the local and regional communities, the design of particular elements of the Project and the integration of operational safeguards and management measures that would maximise community involvement in reviews of operations, as well as ensure that gains made in the short-term do not result in adverse impacts on the environment or the local community post-completion of the Project. Notably, the Project would contribute significantly to the economic activity of the local and regional community through the generation of employment, increased demand for local goods and services, direct community contributions and flow-on effects. These benefits of the Project, which are considered in more detail in Section 6.3.3, would be distributed throughout the local community. The Project has also been designed such that elements of the existing environment available to this generation, including water and local biodiversity would continue to be available to future generations. The Proponent would adopt a pro-active approach in identifying and addressing any concerns identified by the local community.

6.2.2.4 Conservation of Biological Diversity and Ecological Integrity

The protection of biodiversity and maintenance of ecological processes and systems are central goals of sustainability. It is important that developments do not threaten the integrity of the ecological system as a whole or the conservation of threatened species in the short- or long-term. Details of how the Project has been designed to achieve compliance with these principles are set out below.

Identification of Project Objectives

The Proponent has nominated specific objectives with respect to the rehabilitation of the Mine Site and development of final landform / land use (see Section 2.14.2). Importantly, these rehabilitation objectives provide for the establishment of:

- a low maintenance, geotechnically stable and safe, non-polluting landform which blends with surrounding landforms and provides land suitable for the final land use of nature conservation, agriculture, tourism or light industry; and
- native vegetation with the species diversity commensurate to each relevant ecological community.

Design of Project Components

The Proponent is committed to undertake all activities in an environmentally responsible manner, and recognises the need to ensure that changes to natural components of the environment do not significantly adversely affect biological diversity or ecological integrity.

The Proponent, on advice from the specialist consultancies commissioned to assist with the design and to assess the impact of the Project, has provided for the conservation of biological diversity and ecological integrity through the following design elements. As far as practical, the Proponent has followed Step 4 of the guideline document "*Draft Guidelines for Threatened Species Assessment"* (DEC/DPI, 2005), ie. "*avoid, mitigate and then offset*".

Impact Avoidance

- Impacts on threatened flora and fauna have been further avoided through the strategic location of surface disturbance away from remnant native vegetation and use of previously cleared land for the construction of surface infrastructure.
- Areas of the waste rock emplacement footprints have been nominated as temporary soil stockpiles (rather than using additional areas of the Mine Site).

Impact Mitigation

- Water management structures have been designed and would be constructed to ensure that only water of appropriate quality leaves the Mine Site and minimise changes to surface flows to the southwest (into Gundong Creek and the Bogan River).
- Soil would be stripped and managed in stockpiles for eventual respreading over the final landform.
- The construction of internal roads and access routes would minimise disturbance to native vegetation.
- Progressive rehabilitation of the Project Site would provide for the re-establishment of native and pasture vegetation. The area to be rehabilitated back

to nature conservation would be greater that what is currently available for nature conservation within the Project Site, as the majority of the land has been previously been cleared of trees for agricultural purposes.

- Effective weed control would be undertaken to reduce the spread of weeds over the Project Site and surrounding land.

Impact Offsetting

- The limited areas of disturbance to native vegetation and fauna habitats associated with the Project would be compensated by the establishment of a biodiversity offset strategy. The strategy would provide for the protection and enhancement of remnant native vegetation on and surrounding the Mine Site.

Integration of Safeguards and Procedures

The following safeguards and procedures would be integrated into the Project with the objective of maintaining biological diversity and ecological integrity.

- Clearing of vegetation would be undertaken on a campaign basis to ensure that clearing is undertaken during periods when local fauna is unlikely to be nesting, roosting or over-wintering within the trees and shrubs to be cleared.
- Given the potential occurrence of threatened native fauna on the Mine Site and within trees to be cleared, a Pre-start Clearing Inspection of the proposed disturbance area would be completed prior to each clearing campaign to identify if any threatened fauna species are present in trees nominated for clearing. In the event a threatened fauna species is present, clearing would be suspended until it moves away from the subject area or is relocated by a suitably qualified person.
- Remnant native vegetation enhancement would involve seeding and tree planting activities as deemed appropriate to improve the coverage and species diversity of each remnant to be conserved.
- Rehabilitation of the Mine Site would include the establishment of endemic vegetation, including grassland species.
- Weed eradication programs would be implemented, as required.

Rehabilitation and Subsequent Land Use

The final landform has been designed to provide for future use of the Project Site lands for nature conservation, agricultural activity and/or some other light industry to be determined in consultation with the local community and local government.

Conclusion

The Project addresses the principle of conservation of biological diversity and ecological integrity through the minimisation of disturbance to areas of native vegetation, and conservation of greater areas of native vegetation than are disturbed. Should threatened species be identified within those areas of the Mine Site to be disturbed, these would be relocated or managed appropriately in consultation with OEH or a suitably qualified professional. Weed eradication programs would continue to be implemented as appropriate and would further assist in addressing the conservation of biological diversity and ecological integrity principle of sustainable development.

6.2.2.5 Improved Valuation and Pricing of Environmental Resources

The issues that form the basis of this principle relate to the acceptance that:

- the polluter pays;
- when all resources are appropriately valued, cost-effective environmental stewardship is adopted; and
- the adoption of user-pays principle based upon the full life cycle of the costs.

A reflection of these issues on the Project is set out below.

Identification of Project Objectives

The Proponent's principal objective (see Sections 6.2.2.2 to 6.2.2.4) demonstrates that an appropriate value has been placed on elements of the existing environment.

Design of Project Components and Integration of Safeguards and Procedures

The extent of research, planning and design of environmental safeguards, mitigation measures and offset strategies to prevent irreversible damage to environmental resources, other than the gold to be mined, is evidence of the value placed by the Proponent on these resources.

Rehabilitation and Subsequent Land Use

The design of the final landform to integrate ongoing agricultural activities, light industry and nature conservation with the re-establishment and conservation of native vegetation illustrates the value placed by the Proponent on both the commercial and ecological elements of the Project Site.

Conclusion

The value placed by the Proponent on environmental resources is evident in the identification of Project objectives, extent of site-specific research, planning and environmental safeguards and measures to be implemented to prevent irreversible damage to the environment on and surrounding the Project Site. It is planned that the income received from the sale of the gold would be sufficient to enable the Proponent to achieve an acceptable profit level whilst undertaking all environmentally-related tasks and meeting all commitments in all approvals, licences and permits and those made to the local community.

6.2.2.6 Conclusion

The approach taken in planning the Project has been multi-disciplinary, involved consultation with community representative groups, potentially affected local residents and various government agencies and emphasis on the application of safeguards to minimise potential environmental, social and economic impacts. The design of the Project has addressed each of the sustainable development principles, and on balance, it is concluded that the proposed Tomingley Gold Project achieves a sustainable outcome for the local and wider environment.

6.3 JUSTIFICATION OF THE PROJECT

6.3.1 Introduction

In assessing whether the development and operation of the Project is justified, consideration has been given both to the predicted residual impacts on the local and wider environment and the potential benefits the Project would have for the Proponent, surrounding land owners and residents, the Tomingley and Peak Hill communities (including Aboriginal community), the local LGAs of Narromine, Parkes and (to a lesser extent) Dubbo, NSW and Australia. When considering the predicted residual impacts, a review of the proposed controls, safeguards and mitigation measures prepared by the Proponent was also undertaken to determine the emphasis placed on impact minimisation and the incorporation of the principles of ESD.

This section also considers the consequences of the Project not proceeding.

6.3.2 Biophysical Considerations

6.3.2.1 Introduction

Table 6.2 presents the range of mitigated residual impacts on the biophysical environment predicted should the Project proceed based on the assessments summarised in Section 4. The residual impacts considered being of greatest significance and the proposed management of these are summarised in the following sub-sections.

6.3.2.2 Noise

Noise modelling completed as part of the noise assessment for the Project (SLR, 2011), predicts the Project would generate noise levels greater than those currently experienced in the vicinity of the Mine Site. Initial noise modelling indicated that without the implementation of noise mitigation measures, the increase in noise levels received at residences surrounding the Mine Site would exceed the nominated intrusiveness criteria, i.e. background noise + 5dB(A). The construction of the 15m high outer wall of Waste Rock Emplacements 2 and 3 and operation of mobile equipment behind this assisted in reducing the noise levels received, in particular within the village of Tomingley, however, did not result in the predicted noise levels being reduced such that compliance with the intrusiveness criteria during the night time was achieved.

Acknowledging that operation of the processing plant must continue 24 hours a day, additional noise mitigation measures were considered and applied.

- It was determined that the cost associated with reducing the individual sound power level (SPL) of the mobile equipment to be operated on the Mine Site could not be sustained. That is, the costs of retro-fitting an existing mobile fleet with noise attenuating features, or purchasing new mobile equipment with such noise attenuation in-built cannot be supported by Project economics.
- Attenuation of noise generated by the crushing circuit, through the enclosing of the secondary crusher and screen tower to achieve a reduction in the emitted SPL of at least 8dB, was applied.
- Further restrictions on the number and location of the various mobile equipment were modelled.

This modelling demonstrates that with limited exception, the noise levels predicted to be received at residences surrounding the Mine Site would comply with the intrusiveness criteria

during the day time and evening periods. Elevated noise levels up to 4dB above the intrusiveness criteria are predicted (during the day time) at only three residences during the initial 3 month construction period. These exceedances are predicted largely as a result of the operation of scrapers and therefore would only occur during the short soil stripping campaigns on the Mine Site.

Exceedances of the intrusiveness criteria during the night time have been reduced, both in the size of the exceedance and frequency of occurrence, as far as reasonably and feasibly possible through the application of the noise mitigation measures described in Section 4.2.5. Critically, the scale of exceedance has been reduced to no more than 2dB, a difference unlikely to be noticeable to most people, at all but one residence (R3). Furthermore, the period of time when exceedances are likely is generally restricted to a period of no more than 12 to 15 months (when operations are equivalent to those simulated by Scenarios 2 and 3).

To ensure noise levels do not exceed the modelled predictions, the Proponent proposes to implement real-time noise monitoring at the potentially most affected location (at the southern end of Tomingley village). This monitoring would enable mine management to have an accurate real-time record of the noise levels being received at this residence. This would ensure that restrictions or modifications to operations could be made as and when noise levels approach or reach the intrusiveness criteria or the levels predicted by noise modelling.

The Proponent has committed to implementing further noise mitigation controls at residence R3, and/or any other residence at which the measured noise levels exceed intrusiveness criteria by more than 2dB, on request of the resident, e.g. air conditioning, window treatment (such as double glazing).

6.3.2.3 Surface Water Resources

The conclusion of the surface water assessment (SEEC, 2011) is that there would be limited residual impacts to surface water as a result of the Project. In fact, as a result of the proposed surface water management structures such as catch banks and sediment basins, the quality of water (total suspended solids, total nitrogen, total Phosphorous) discharged from the Mine Site during and following the completion of the Project would be improved on current water quality. This notwithstanding, the Proponent would implement appropriate mitigation measures if it was determined that impacts to surface water resources have occurred as a result of the Project.

6.3.2.4 Groundwater Resources

The groundwater impact assessment (Impax, 2011) determined that while the mining operations could drawdown the water table surrounding the Mine Site, there would be minimal impact on groundwater quality or access to groundwater by surrounding users as a result of the Project. The Proponent would, however, implement appropriate mitigation measures if it is determined that impacts to groundwater resources have occurred as a result of the Project, e.g. through leaching of contaminated groundwater from the RSF or reduced yields within bores surrounding the Mine Site.

6.3.2.5 Biodiversity

Based on the conclusions of the biodiversity assessment for the Project (OzArk, 2011a), the following residual impacts relating to biodiversity would result.

The Project would result in the removal of approximately 21.6ha of remnant native woodland vegetation. Of this 2.7ha is considered to meet the classification of the NSW listed Inland Grey

Box Woodland EEC and 0.9ha meets the classification of the NSW listed Fuzzy Box on Alluvials EEC. However, this minor impact is assessed as being appropriately offset by the proposed establishment and management of a biodiversity offset strategy which provides for:

- the conservation of 21.1ha (in moderate to good condition) and enhancement of a further 21.5ha (in low condition) of the Inland Grey Box Woodland EEC (Benson 76);
- the conservation of 5.1ha (in moderate to good condition) and enhancement of a further 26.0ha (in low condition) of the Fuzzy Box on Alluvials EEC (Benson 201);
- the conservation of 17.2ha (in moderate to good condition) and 17.2ha (in low condition) of Belah/Black Oak Western Rosewood, Wilga Woodland (Benson 57); and
- the conservation of 13.1ha (in moderate to good condition) and enhancement of a further 13.5ha (in low condition) of River Red Gum riverine woodland forest (Benson 78).

When considered using the BioBanking Assessment Methodology (DECC, 2008d), the TGP BOS provides for a surplus of ecosystem credits when compared to those required for all but Community 5 (Benson 57). Overall, a surplus of 870 ecosystem credits is provided by the TGP BOS and, given two of the communities for which surplus credits are provided are EEC's (Benson 76 – 369 surplus credits and Benson 201 – 284 surplus credits), the TGP provides for conservation of "like for like or better" vegetation (see Section 4.5.8.2.2).

The proposed biodiversity offset strategy satisfies each of DECCW's nominated principles for biodiversity offsets (DECC, 2008c) (see Section 4.5.8.2.4).

In addition, the Proponent proposes to rehabilitate various areas of disturbance on the Mine Site using native vegetation (see **Figure 2.18**).

On the basis of the above, it is assessed that the Project would result in 'no net loss' of biodiversity locally and would potentially lead to an improvement through the widening and connection of protected wildlife / habitat corridors.

6.3.2.6 Cultural Heritage

In total, 57 sites of Aboriginal heritage sites were identified within the Project Site (19 on the Mine Site and 38 along the Tomingley Narromine Water Pipeline route). Of the 57 sites, impact to three sites (TGP-ST7, TPG-ST10 and TNWP-OS1 with PAD) would be unavoidable and a further four sites (TGP-OS1, TGP-OS2, TGP-ST8 and TGP-ST9) may potentially be impacted by the Project in the absence of appropriate management and mitigation measures.

Specific management measures for each site have been proposed and presented to the registered Aboriginal community stakeholders. No objection to the proposed methodology for further site assessment and management has been received from the registered Aboriginal stakeholders. Furthermore, support has been provided for the proposed management by the Traditional Owners of the Peak Hill / Tomingley area. The Proponent will continue to engage with the Aboriginal community to ensure that Aboriginal cultural heritage continues to be managed appropriately and sensitively.

6.3.2.7 Air Quality

The air quality assessment for the Project (PAEHolmes, 2011), predicted that the probability of an exceedance of the maximum 24-hour PM_{10} concentrations is 0.09% at up to six residences, i.e. one day every 3 to 4 years. The air quality modelling completed by PAEHolmes (2011) predicted compliance with all other annual emission criteria. Contribution to greenhouse gas emissions, even accounting for Scope 3 emissions, would represent a maximum annual contribution of 0.04% to baseline 2008 NSW emissions.

Monitoring of emissions to air would be undertaken to ensure that the conservative predictions summarised above are correct. Should concentrations be noted to be approaching trigger criteria, relevant and contributing project operations would be identified and activity appropriately reduced until such time as the monitoring information provided confidence that concentrations had been reduced.

6.3.3 Socio-economic Considerations

While the impacts summarised in Section 6.3.2 have been assessed to comply with nominated criteria or to meet accepted environmental standards, the cumulative effect of these minor impacts may have some adverse effect on the amenity of the local setting.

Importantly, the Project would provide several economic benefits to the local and regional socio-economic setting, including the following.

- Direct full-time employment for approximately 100 full-time equivalent positions during the site establishment and up to 90 full-time equivalent positions during the operational phase of the Project.
- Employees would preferably be sourced from the region (Parkes, Narromine and Dubbo LGAs) and even if drawn from further afield, would be encouraged to reside locally.

Increased employment opportunities associated with the Project would have additional flow-on benefits including:

- the provision of new employment would provide an impetus to other local businesses;
- contribution of $28.6 million per year to the local and regional economy through wages and purchases of local goods and services; and
- support of local community services and projects.

The Project would provide for the continued diversification of development / industry in the region which would lead to increased training and employment opportunities for the residents of the region.

The socio-economic benefits of the Project would also flow through to the economies of NSW and Australia. It is anticipated that the Project would contribute approximately $20.4 million per year to the State and national economy through purchases of goods and services within NSW and Australia.

It is acknowledged that while impacts on the biophysical environment have been assessed as complying with nominated criteria or meeting accepted environmental standards, the

cumulative effect of these minor impacts may have some adverse effect on the socio-economic setting. This is often expressed as a reduction in the amenity of the local area.

An objective assessment of this impact on local amenity is difficult as what one person may consider as acceptable, may not be to another person (and vice versa). However, where all biophysical impacts are assessed as complying with nominated criteria or standards, it is considered unlikely for impacts on local amenity to be unacceptable to a reasonable person.

It is further noted that the Proponent remains accountable for managing the Project in a manner that complies with the nominated environmental criteria and meets reasonable community expectations. A comprehensive monitoring program would be established to demonstrate compliance with environmental criteria, and liaison with both official and unofficial community representation would continue to address community concerns as they arise.

6.3.4 Planning Considerations

6.3.4.1 Introduction

This subsection reviews the compliance of the Project with local and State planning instruments. It is noted that whilst the relevance of these instruments may change in the future, the following represents the application of these in their current form to the Project as described in Section 2.

6.3.4.2 Permissibility

As noted in Section 3.3.4.1, mining is permissible within the Mine Site by virtue of its location within Zone 1(a) (General Rural) of the Narromine LEP 1997 which identifies mining as being permissible with consent.

6.3.4.3 State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

The SEPP specifies matters requiring consideration in the assessment of any mining, petroleum production and extractive industry development, as defined in NSW legislation. **Table 3.1** presents a summary of each element requiring consideration and a reference to the section in the *Environmental Assessment* where this is addressed.

6.3.4.4 State Environmental Planning Policy (Infrastructure) 2007

In accordance with Clause 101 of the Infrastructure SEPP, the Mine Site:

- provides vehicular access other than the classified road, i.e. Main Site Access Road;
- provides for the safe construction and operation of the Newell Highway underpass;
- provides for visual screening of Mine Site activities; and
- would not be sensitive to adverse impacts from the classified road.

6.3.4.5 State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33)

The transport, storage and use of sodium cyanide and LPG required a *Preliminary Hazard Analysis* (PHA) under the SEPP 33 (in accordance with DoP, 2008) to be conducted (**Appendix 3**). The PHA confirms that with the implementation of various safeguards and controls, the risks associated with sodium cyanide and LPG would be reduced to a Tolerable level and hence the Project does not represent a hazardous industry. SEPP 33 is not required to be considered further.

6.3.4.6 State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44)

The Ecological Assessment completed by OzArk (2011a) has confirmed that one of the species listed in Schedule 2 of SEPP 44 is found within the Project Site. The proportion of these feed tree species within the canopy would vary across the Project Site (due to the 46km linear distance covered by the water pipeline route), however, in accordance with the precautionary principle, the woodland vegetation of the Project Site could be regarded as "potential Koala habitat". However, fauna surveys failed to identify any signs of Koala habitation of the area and therefore the Project Site is not considered core Koala habitat. No Koala Management Plan is therefore required, however, the Proponent has committed to undertaking Pre Clearance Inspections to ensure that no Koalas are present within these areas prior to clearing.

6.3.5 Consequences of not Proceeding with the Project

The consequences of not proceeding with the Project include the following.

- The recoverable gold resource would not be mined. Such an outcome would be contrary to the objective of I&I NSW and the Proponent to maximise resource utilisation.
- The opportunity to create up to 100 construction and 90 operational full-time jobs would be foregone.
- The contribution of $28.6 million per year to the local and regional economy through wages and purchases of local goods and services would be foregone.
- The opportunity to re-establish an industry historically associated with the region would be foregone, along with the training opportunities proposed by the Proponent. This loss of training opportunities would also reduce the ability of the local communities to retain younger people who generally are lost from regional communities to pursue opportunities elsewhere.
- Approximately $20.4 million per year in rates, taxes and royalties would be foregone to the local, State and national governments annually.
- The minor impacts on the local biophysical environment would not eventuate.

It is considered that the benefits of proceeding with the Project therefore far outweigh the minor impacts on the environment that would result.

6.4 CONCLUSION

The proposed Tomingley Gold Project has been designed, as far as practicable, to address the issues of concern to the community and all levels of government. The Project provides for the recovery of valuable gold resources which contribute significantly to the economies of NSW and Australia. The subsequent landform would be constructed to sustain agricultural operations, light industry and nature conservation.

This document and the range of specialist consultant studies undertaken have identified that the Project should proceed because it would:

- satisfy sustainable development principles;
- operate with risks to the local environment minimised to the greatest extent practicable through Project design and implementation of a range of environmental controls and safeguards;
- have a minimal and manageable adverse impact on the biophysical environment;
- have a substantial positive impact on the local and wider regional and NSW socio-economic environment;
- contribute to the continued economic activity of the Narromine, Parkes and Dubbo LGAs; and
- provide a site suitable for future agricultural activities and possibly light industry incorporating areas for long term nature conservation.

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